Development of a Testing Protocol for Quality Control/Quality Assurance of Hot Mix Asphalt

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16. Abstract

The objective of this research was to develop a test protocol for the use of the rapid triaxial test method for use in quality control of HMA production. The scope of this study consisted of testing different mixes at two different temperatures and frequencies and evaluating the results. The equipment is rugged and portable, and the hardware and software are easy to handle and do not require extensive technician training. The results from this study show that modulus and phase angle values obtained from testing are sensitive to key mixture components and properties. The coefficients of variation of results obtained from tests conducted at 60oC and 1 Hz are low. Tests with fine graded mixes showed good correlation of dynamic stiffness parameters with rutting, and the stiffness parameters were found to be sensitive to dust to effective binder ratio. One significant advantage of using this test procedure as a regular quality control tool is that decisions can be taken on the basis of performance related parameters rather than on the basis of volumetric properties only. Considering the desirable qualities, it seems that this test method can be considered for regular use for quality control testing. However, before it is used, user agencies must test mixes using the suggested test protocol, and establish target values and allowable variations.

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Chapter 1. Introduction

1.1. Problem Statement

In order to implement the Superpave design system for Hot Mix Asphalt (HMA) mix design and construction, proper measures must be taken to ensure the quality of mixes produced in the HMA plant. Good quality can be maintained only through the use of sensitive, easy to use and repeatable quality control and quality assurance tests. The nature of quality control requires a system that is easily and rapidly implemented and routinely operated at the project level. Once a good test procedure is identified, there is a need to develop testing protocols for proper use.

For quality control and quality assurance (QC/QA), the Superpave gyratory compactor (SGC) and the rapid triaxial testing equipment have been recommended for use by the researchers of NCHRP 9-7: Field Procedures and Equipment to Implement SHRP Asphalt Specifications (*1*). The utility of the rapid triaxial test procedure for characterization of mixes has been presented in a number of reports (*2, 3, 4*). Since the recommended triaxial testing equipment is new, there is a need to evaluate the equipment, determine its sensitivity to key mixture properties and develop guidelines for using the equipment and the test results in an effective QC/QA system for HMA.

1.2. Objectives of Research:

The objectives of the research reported in this paper are to evaluate the rapid triaxial test method for use in quality control of HMA production – its applicability, practicality and sensitivity to mix properties, and if possible, determine test conditions for obtaining reliable results.

1.3 Format of Report

This report presents the results of NETC 01-2, "Development of a Testing Protocol for Quality Control/Quality Assurance of Hot Mix Asphalt (HMA) study, carried out by University of Massachusetts at Dartmouth and Worcester Polytechnic Institute (WPI). The rest of the report is divided in five chapters.

Chapter 2 provides the background, scope and test plan of the study.

Chapter 3 presents details of test results and analysis.

Chapter 4 provides conclusions and recommendations.

Chapter 5 presents the list of references indicated in the different chapters.

Appendix A presents the suggested Standard Practice for Rapid Triaxial Test for Flexible Pavement QC/QA

Appendix B presents the raw data obtained during tests in this study.

Chapter 2: Background, Scope and Test Plan

Background

Researchers of NCHRP 9-7 realized that the measurement of gyratory properties such as slope of compaction or volumetric property such as density is not adequate for testing of materials for performance related properties. Accordingly, they proposed the use of two tests – field shear test and rapid triaxial testing. The field shear test is an expedited version of the SST, and the rapid triaxial test is an automated version of a triaxial testing system that has been used by Texas Department of Transportation (DOT) in the past. Preliminary studies indicated that the rapid triaxial test is better suited for adoption at this time, since it is based on the widely used concept of shear strength and triaxial testing of soils, and also because a significant amount of work needs to be done to evaluate the effects of different test parameters in the field shear device before it can be recommended for regular use. At this time, it also appears that the field shear device will not be used for either the AASHTO 2002 Guide for Design of Pavement Structures or the Superpave Simple Performance Testing. Accordingly, the objective of this proposed research project is to develop testing protocols for the rapid triaxial test.

The prototype rapid triaxial testing system was developed by Barry Tritt of Industrial Process Controls (IPC) based on conceptual designs by Dr. Crockford and theoretical considerations put forth by R.L. Lytton of Texas Transportation Institute as part of the NCHRP 9-7 research program (*1*). The basic philosophy behind the test is based on triaxial testing of construction and geomaterials, as conducted for many years by Texas DOT and CalTrans. The newly developed testing system is much easier to use than a conventional geotechnical cell triaxial system, and is fully automated and software controlled (Figure 1). Testing can be conducted using a wide range of stress, states of stress and confinement conditions.

The test applies a haversine loading to the specimen and engineering properties are determined from the response. The draft procedure outlined in Reference *1* includes information on loading, frequency, and pay factor style result analysis. Very little testing was used to support the pay factor table in project 9-7, so the table is heavily dependent on theoretical estimates. However, recent efforts in the Superpave Models and AASHTO 2002 projects have independently confirmed that there is some merit to the table published in Report 409.

For QC purposes, the 9-7 recommendations were testing at one confining pressure, using specimens taken straight out of gyratory mold, and for QA the recommendations were testing at multiple frequencies at desired temperature(s).

Results from tests with materials obtained from SPS 9 projects and Westrack have shown that the test procedure is sensitive to basic mixture components and can be used to identify changes in key mixture components (*1, 2, 3*).

Scope

The scope of this study consisted of testing of different mixes at two different temperatures and frequencies and evaluating the results. The tests were conducted to obtain two parameters – dynamic modulus and phase angle. The compression dynamic modulus is a measure of the stiffness of the mix and affects the deflection response of the pavement under load. The phase angle, which indicates the lag between stress and strain response, is a measure of the viscoelastic response of the mix.

The equipment used was a testing machine consisting of software controlled rapid triaxial testing system. The maximum load capacity of the equipment is 40kN, and load is applied through a pneumatic system. While going through the results and analysis sections, the reader should keep in mind that this equipment, unlike its bigger versions, which are hydraulically operated, works through a pneumatic system, and hence suffers from usual load variations common to all pneumatic powered testing equipment. However, the pneumatic powered system (can be used with a portable air compressor) makes it ideal for use in quality control operations in a plant or field laboratory.

In the first phase, two mixes, with different nominal maximum aggregate size, gradation and asphalt content, were tested. Next, samples compacted from the same mix, but with different air voids, were tested. In the third phase, mixes with design, design plus and design minus asphalt contents (AC) and percent passing the 0.075 mm sieve (P75) were tested. Observations made during the tests and analyses of results were used for evaluation of the test procedure. Data analysis was focused on evaluation of repeatability of test, comparison of desired and actual load at two different frequencies and sensitivity of test results to mix properties at different frequencies and temperature.

The testing required compaction of gyratory samples, and questions about dimensions and mass of sample, and number of gyrations were raised. For obtaining speed/economy, it was decided to use a 100 mm diameter sample, as tall as can be obtained. Regarding the question of sample mass and gyration, it was decided to use samples with a fixed amount of mix – 2,000 grams, and compact the mixes to design (N_{design}) gyrations. It was realized that the samples would not end up with optimum air voids, and the plan was to treat the resultant air voids as covariates in the subsequent analysis.

Initially, it was decided to use samples taken straight out of the gyratory compactor for testing. The temperature of samples taken straight out of the gyratory compactor was found to be approximately 100^{o}C. Also, to simulate pavement conditions under traffic traveling at highway speeds, a frequency of 5 Hz was selected. However, as work progressed, it was determined that practical considerations would necessitate the investigation of the use of this test at a lower temperature and a lower frequency. A lower temperature of 60^{o}C and a lower frequency of 1 Hz were selected.

The tests were run in compression, using a sinusoidal wave, ranging from 10 kPa to 90 kPa, with the application of a range of ±40kPa about a 50kPa compressive stress. A confining pressure of 5 kPa was applied. Figure 1b shows a typical stress and strain plot from testing.

Test Plan

The test plan consisted of three different phases. In the first phase, two different mixes (different in nominal maximum aggregate size, asphalt content and gradation) were used for compacting samples and testing. These mixes, a 9.5 (known as Class 2) and a 12.5 mm (known as Class 1) mix, were obtained from a HMA plant in Connecticut. The samples were made by taking 2,000 gram mix, and using the required number of gyrations required to produce samples with 6 to 8 percent (construction) VTM. Since the 9.5 mm NMAS mix sample could not stand the seating load (20N) at the beginning of the dynamic modulus test (it fell apart) at 100^{o}C, all tests were run at 60^{o}C. Aggregate gradation and other relevant mix information are shown in Table 1.

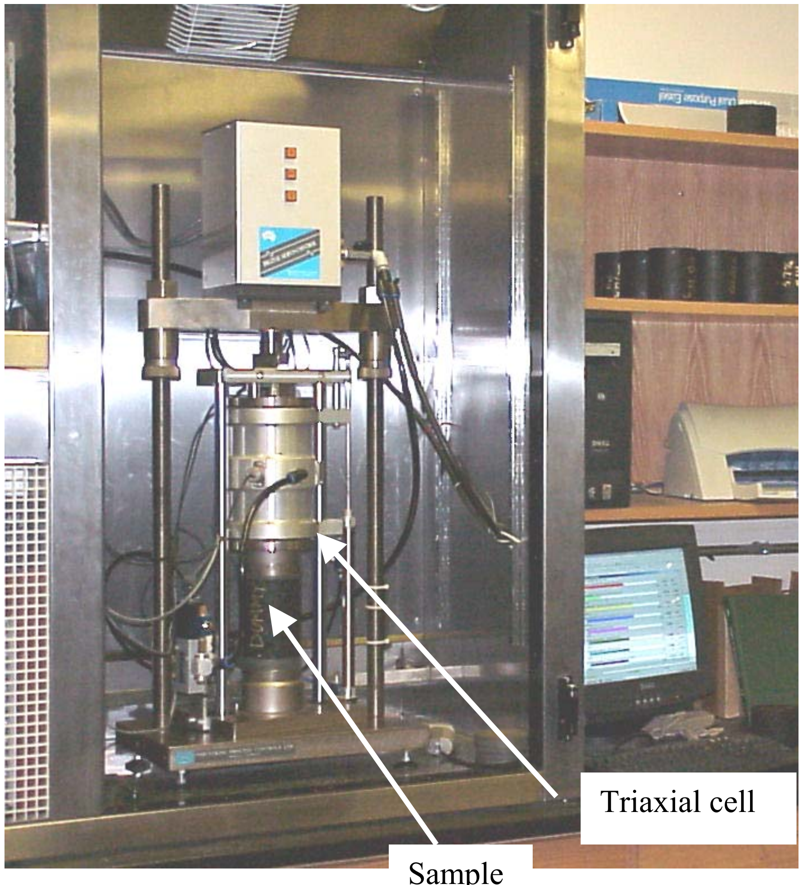
In Phase 2, samples were made out of granite aggregate, using a coarse gradation and one asphalt content, and different numbers of gyration (to obtain specific heights), to produce samples with different voids in total mix (VTM). A PG 64-28 asphalt binder was used, at an asphalt content of 5.3 %. Target VTM were 5, 7 and 9 percent. Aggregate and asphalt properties are shown in Table 1.

Next, to observe the sensitivity of the test procedure, at different conditions, to mix variables, tests were run with samples compacted with different asphalt contents and percent passing the 0.075 mm sieve (Phase 3, part 1). The asphalt content was increased and decreased by 0.5 % from the Phase 2 mixes, and the percent passing the 0.075 mm sieve (P75) was increased and decreased by 2 % from the Phase 2 mixes. The matrix for the samples is shown in Table 2. The same aggregate and gradations as used in Phase 2 were used. These samples were all compacted to 75 gyrations, using approximately 2,000 gram mix for each sample. The samples were tested at 60°C and 100°C, and using 1 Hz and 5 Hz loading rate. Three samples were made for each cell.

In Phase 3, part 2, another aggregate was used for preparing a fine graded mix, with different asphalt contents and percentage passing the 0.075 mm sieve. Relevant mix information is shown in Table 1. The sample matrix is shown in Table 2. Tests were conducted for the dark shaded cells only. Five samples were made for each cell. Next, a set of samples was made with mixes with design asphalt content and design, design -2 and design +2 percent P75. Unlike the other samples, these were compacted using 50 gyrations, to obtain higher air voids. The compacted samples were tested at 60°C, at 1 Hz and 5 Hz loading rate.

The test parameters and test results were then analyzed to determine whether the test procedure is practical and sensitive to key mix properties.

Note that these particular gradations (used in Phase 2) were selected on the basis of recommendation from New England Transportation Consortium (NETC) technical committee members. The coarse and fine gradations are commonly used gradations in mixes used by the New Hampshire and Maine department of transportation, respectively.



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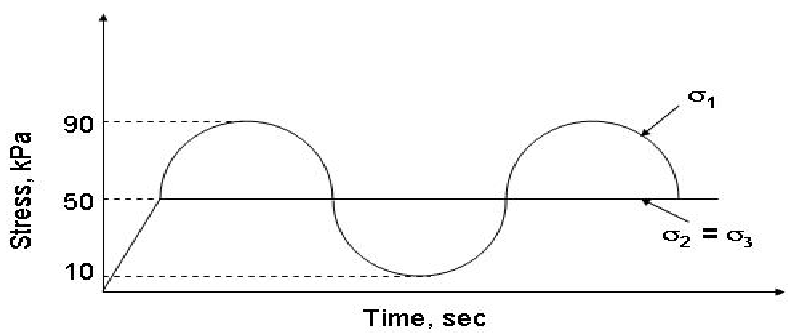

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FIGURE 1 A Triaxial cell with sample, B Loading parameters.

TABLE 1 Mix information

Phase 1

Mix	Asphalt Content, %	Theoretical Maximum Density (Gmm)
Class 1, 12.5 mm NMAS	5.2	2.478
Class 2, 9.5 mm NMAS	6.0	2.447

Phase 2, Phase 3, part 1

Material	Property
Aggregate	Bulk specific gravity: 2.599
Aggregate	Absorption: 0.85
Asphalt, content	PG 64-28, 5.3 %

Phase 3, part 2

Material	Property
Aggregate	Bulk specific gravity: 2.681
Aggregate	Absorption: 0.57
Asphalt	PG 64-28

Gradation

Sieve Size, mm	% Passing			
	Phase 1 12.5 mm mix	Phase 1 9.5 mm mix	Phase 2 and Phase 3, part 1	Phase 3, part 2
19	100		100	100
12.5	96	100	98	98
9.5	76	98	86	83
4.75	56	63	46	64
2.36	45	51	32	45
1.18			24	28
0.6	26	29	17	16
0.3	14	14	11	10
0.15			6	7
0.075	4.6	3.5	3.1	100

Note: In phase 1, samples of two mixes, a 9.5 mm and a 12.5 mm mix, with approximately 7 % VTM were tested. In phase 2, samples prepared with gradation shown above, and 5.3 % asphalt content, were compacted to 5, 7 and 9 % VTM, and tested.

TABLE 2 Sample matrix

Phase 3, part 1

Percent passing 0.075 mm sieve	Asphalt Content, %		
	5.3 – 0.5 = 4.8	5.3	5.3 + 0.5 = 5.8
3.1 – 2 = 1.1	XXX	XXX	XXX
3.1	XXX	XXX	XXX
3.1 + 2 = 5.1	XXX	XXX	XXX

Phase 3, part 2

Percent passing 0.075 mm sieve	Asphalt Content, %		
	5.7	6.2	6.7
7 – 2 = 5	XXXXX	XXXXX	XXXXX
7	XXXXX	XXXXX	XXXXX
7 + 2 = 9	XXXXX	XXXXX	XXXXX

Note: Dark shaded cells – compaction to 75 gyrations, light shaded cells – compaction to 50 gyrations, 6.2 % asphalt content and 7 percent passing 0.075 mm sieve mix was used for both 50 and 75 gyrations, unshaded mixes were not prepared

Chapter 3. Results and Analysis

Practical considerations, user friendliness and cost

The steps for setting up and testing samples and the approximate time needed are as follows.

1. Run a tuning procedure with a representative sample at representative test conditions to obtain target test conditions. This process takes about ten minutes for an experienced operator. This step is needed only at the start of the test program and is not needed before testing each and every sample.
2. Input parameters to specific test template. This takes about two to five minutes, and is needed only at the start of the test program.
3. Select the specific template file for running the test. Input sample information and test conditions. This step takes less than a minute.
4. Take sample out from gyratory compactor/conditioning chamber and place it under the triaxial cell.
5. Use software to lower the rapid triaxial cell and run test. Running the test consists of checking the readings from LVDTS (linear variable differential transducers), applying required number of cycles of stress, saving the results, selecting data filtering options and viewing and printing results. This step, depending on the number of cycles, takes about three to five minutes.

The entire procedure, starting from placement of the sample under the cell and getting the results takes less than 10 minutes. The hardware and software are relatively easy to handle.

Portability of the equipment: The loading equipment, along with the rapid triaxial cell, data acquisition and pneumatic filtration/regulation system is less than 300 kg in weight. The loading equipment is about 60 cm wide, 30 cm wide and 1.5 m in height. The equipment can easily be placed and towed in a trailer. It runs on standard 115V, single-phase electrical system. The equipment requires a system for providing filtered clean air at a minimum pressure of 800 kPa. The test procedure is fairly easy to understand, and a technician can be trained within a relatively short period of time. The equipment used in this study, along with an environmental chamber, costs about $50,000. Note that the environmental chamber may not be necessary for running in quality control mode.

Rate of loading

One important concern was that of making sure that the applied load is the same as (or close to) the specified load. The software provides an estimate of "standard error" which is a measure of the difference between specified and applied load, as obtained from the load transducer. These errors, for a set of samples, as obtained at 1 Hz and 5 Hz (at 60°C), are shown in Table 3. Each set of three samples belongs to the same mix. As Table 3, shows, the average standard error at 5 Hz is more than 3 times the average standard error for the 1 Hz loads.

Test temperature

With time, the flexible membrane inside the triaxial cell gets coated with asphalt and very fine aggregates (on the inside). After conducting tests on approximately 50 samples at 100°C, the test could not be run, as the head could not move up and down. It seemed that because of tests ran at 100°C, a significant amount of asphalt had stuck to the inside of the membrane, and the build up was preventing the cell from moving up or down by getting caught in the loading head. Figure 2a shows the build up of asphalt inside the membrane. The moving cell actually tore the membrane (Figure 2b) and this caused a reduction in confining pressure. This could also have occurred because when the cell lifted up, the system did not pull enough vacuum on the membrane. At this time it is recommended that tests be conducted at temperatures lower than 100°C.

Results and Analysis

The results of this ongoing study are provided in several paragraphs.

Variability of Test Results and Effect of Mix Properties

The results of phase 1, which consisted of tests conducted on samples from two different mixes, are shown in Table 4. Average temperature of samples (average of temperatures measured on the specimen surface at the start and end of the test) are also shown. The dynamic modulus and phase angle values were analyzed to determine whether the values differed significantly or not. It can be seen that the dynamic modulus values of 12.5 mm mix are (mostly) greater than the dynamic modulus values of the 9.5 mm mix. The phase angle values for the 9.5 mm mix (which has a higher asphalt content) are (mostly) greater than the phase angle values of the 12.5 mm mix. Also, as expected, the modulus values for each mix at 5 Hz are greater than the modulus values at 1 Hz. The statistical analysis results are shown in Table 4. It shows that the dynamic modulus values obtained at both 1 and 5 Hz are significantly affected by mix type and temperature, whereas the phase angle values obtained at 1 Hz are significantly affected by mix type only, and phase angle values obtained at 5 Hz do not show any significant effect of mix type or temperature. Note that quality control documents were obtained to verify the properties of these mixes, and theoretical maximum density tests for these two mixes were run as part of this study.

The results of tests conducted in phase 2, which consisted of tests on samples (of same mix) with different air voids, are shown in Table 5. As planned initially, these samples were tested at 5 Hz and 100^{o}C. Only the dynamic modulus values are shown as the phase angles obtained in these tests were believed to be erroneous because of wrong software settings. The dynamic modulus values decrease with an increase in VTM, and the statistical analysis results, presented in Table 5, show significant effect of air voids on dynamic modulus values. In the model, the parameter estimate for temperature was not found to be significantly different from zero, most likely because of narrow range of temperature. However, the inclusion of temperature variable did improve the model.

Results of tests in phase 3, part 1, consisting of tests conducted at 60 and 100^{o}C at 1 and 5 Hz, with granite aggregates and a coarse gradation, are shown in Table 6. The coefficients of variation (CV) are close to 10 in all cases except for the phase angles at 100^{o}C and 5 Hz (which is abnormally high, around 23 percent). In comparison, the CVs are close to 5 percent for tests run at 60^{o}C, except again for the phase angle results at 5 Hz (CV of 25 percent). It seems that the results are the least variable, and hence the test has the best repeatability when conducted at 60^{o}C and 1 Hz.

The data was analyzed to determine whether the dynamic modulus and phase angle values are significantly affected by air voids, temperature, asphalt content and percent passing the 0.075 mm sieve. (Note that both asphalt content and P75 are present in the Witczak's equation, which relates dynamic modulus with mix properties, *4*). Data were taken at nominal temperatures 60^{o}C and 100^{o}C (measured temperature was used as a covariate). Models were fit for each response, nominal temperature and covariate. Model selection was done from among a set of candidate regressors consisting of the four predictors, their squares and pairwise cross products. Promising models were selected using stepwise regression (p = 0.05), all possible regressions using the adjusted R^2 criterion, and all possible regression using the C(p) criterion. Baseline model with asphalt content, percent passing the 0.075 mm sieve, temperature and VTM as linear terms are also provided. The results of analysis are shown in Table 7.

In the second part of Phase 3 tests were conducted at 60°C only, at 1 and 5 Hz with fine gradation mixes, with different asphalt contents and percent passing the 0.075 mm sieve. The results are shown in Table 8. The CVs are less than 10 percent in all cases, and the CV for the phase angle results is the less for the 1 Hz than that at 5 Hz condition, whereas the CVs for the dynamic modulus at 1 Hz and 5 Hz are both approximately 6 percent. Hence, it seems that the test has better repeatability at 1 Hz than at 5 Hz.

Statistical analysis was conducted in a similar way as done for Phase 3, part 1 results, and the analysis results are shown in Table 9.

Results of analyses presented in Table 7 (for coarse gradation) show that dynamic modulus values at both 60°C and 100°C are significantly affected by asphalt content and P75. As expected, interaction factors also have significant effects. The best models for the phase angles, obtained at 1 Hz and 5 Hz at 60°C include AC and P75, and contains only P75 for the results of tests conducted at 1 Hz and 100°C. Regressions are stronger (higher R^2) for tests results obtained at 60°C compared to regressions for test results obtained at 100°C.

Results of analyses presented in Table 9 (for fine gradation) show that better regressions are obtained for the phase angles compared to the regressions obtained for dynamic modulus, although the models for dynamic modulus are significant, as shown by Pr>F<0.05. However, it seems that the dynamic modulus values are not significantly affected by a change in asphalt content (AC). The best regression model obtained for the phase angle values obtained at 1 Hz does not include AC. The best regression model (with R^2=0.6) for phase angle values obtained at 5 Hz includes AC and P75, as well as an interaction factor, AC*P75. Considering all the results, it seems that the phase angle values are more sensitive to the mix variables in this fine graded mix, than the dynamic modulus values. However, it is quite possible that the range of variation (for example in asphalt content) in this study was not simply wide enough.

Results of tests conducted on the samples compacted to 50 gyrations are shown in Table 8. Results from the tests conducted at 1 Hz indicate a maximum modulus at design P75 (7 %) and lower modulus values at lower (5 %) and higher (9 %) P75. The phase angle values increase with an increase in P75. Results from tests conducted at 5 Hz show a decrease in modulus values between 7 and 9 % P75. Statistical analyses presented in Table 9 show that dynamic modulus values obtained from tests conducted at 1 Hz are significantly different for mixes with different P75.

Samples compacted to 50 gyrations (as discussed above) were also tested for rutting with the Asphalt Pavement Analyzer. Note that all of these samples (shown in Table 8) have voids around 3 %. Rut tests were conducted at 60°C using 690 kPa pressure and 8,000 cycles. The results are plotted against dust to effective binder ratio in Figure 3a. A plot of dynamic modulus/sin ϕ versus dust to effective binder ratio is also shown in the same Figure. The low dust to effective binder ratio (D/P_{be}=0.9) corresponds to reduced dust, the medium D/P_{be}=1.2 corresponds to the design dust content and the high D/P_{be}=1.6 corresponds to increased dust. Note that the stiffness values peak at the design dust content, are lower in the case of reduced dust content, and lowest at the increased dust content. At the same time, the rut depths are lowest at the design dust content, high at the reduced dust content, and highest at the increased dust content. A plot of dynamic modulus/sin ϕ versus rutting (Figure 3b) shows that the dynamic stiffness properties have good correlation with rutting.

Determination of phase angle values

Note that the phase angles can be calculated from the test data by using either the midpoint values or from the maximum and minimum (peak) values. Since the method using the "peak" values does not work well with imperfect wave shapes, it is recommended that the midpoint method be used. Note that the results (and statistical analysis result) improved significantly when the values from the midpoint method were used (instead of the values obtained from the peak picking method).

Suggested use of the test procedure

Note that this study was carried out to determine a suitable test that can be conducted as a regular quality control procedure. This study was to evaluate and (if proven to be possible) recommend the test procedure as a regular QC tool to identify changes in mix properties. To do this, tests were conducted under different conditions to select a set of conditions that can give reliable results, considering the sophistication level of this portable equipment. As shown from this research and from the statistical analysis of the test results, DOTs /user agencies can consider using this test as a QC tool for identifying changes in mix properties. DOTs intending to use the proposed test procedure should develop their own database of mix properties for building specifications, including target values and allowable variations for specific mixes.

It must be noted that the advantage of using a test procedure such as the one evaluated in this study, over existing methods (such as testing for volumetric properties only) is that the quality control decisions can be taken on the basis of *performance-related* properties (modulus and phase angle) rather than on the basis of indirectly related surrogate properties. In view of the fact that the stiffness parameter $E^*/\sin \phi$ has been found to have the best statistical correlation with rutting (*5, 6*) it makes sense to consider the test (procedure) evaluated in this study as a regular QC tool, since it offers the option of getting reliable performance related parameters quickly and easily, with a portable testing equipment. Obviously, the parameters obtained from this test procedure have far greater significance – for example dynamic modulus has been proposed as design parameters by researchers of both NCHRP 9-19 (Superpave Support and Performance Models Management), and 1-37A (Development of the 2002 Guide for the Design of New and Rehabilitated Pavement Structures) projects. However, the test procedure(s) and conditions used and recommended in this study are not robust and sophisticated enough to yield performance or structural design parameters. It is also not the intent of the researchers to prove whether this test, as recommended in this study, can be used to predict mix or structural performance.

TABLE 3 Standard error, load transducer (60^{o}C)

Sample	1Hz	5 Hz
1	1.9	5.2
2	3.2	6.9
3	2.1	5.9
4	2.7	8.6
5	2.5	8.0
6	2.4	7.4
7	3.0	9.5
8	2.5	8.0
9	2.4	6.7
10	2.0	6.9
11	1.8	6.0
12	1.9	6.7
13	3.0	8.9
14	2.7	8.5
15	2.9	8.7
16	2.2	7.4
17	1.9	7.4
18	2.0	6.9
19	2.0	6.6
20	2.1	7.5
21	2.1	7.0
22	2.3	7.0
23	2.3	7.1
24	1.8	6.1
25	1.5	4.8
26	1.9	5.9
27	2.2	6.9
Average	2.3	7.1

TABLE 4 Test results, Phase 1

Sample	NMAS	VTM	AC, %	Dynamic Modulus, MPa		Phase angle, degrees		Average Temperature, C
				1 Hz	5 Hz	1 Hz	5 Hz	
9.5-2	9.5	6.9	6	40.3	47.7	11.9	9.9	55
9.5-3	9.5	6.5	6	46.4	53.3	12.2	9.5	56.5
9.5-4	9.5	6.5	6	50.1	56.6	11.3	10.8	57.5
9.5-5	9.5	6.5	6	51.9	58.8	11.5	7.9	57
9.5-6	9.5	6.4	6	54.3	61.7	11.7	9.3	57.5
Average				48.6	55.6	11.7	9.5	
Standard Deviation				5.46	5.39	0.35	1.05	
12.5-1	12.5	7	5.2	54.8	61.6	10	7.8	57.5
12.5-2	12.5	7.4	5.2	53	60.1	10.6	10	57.5
12.5-3	12.5	6.9	5.2	55.5	61.5	10.3	8.5	57
12.5-4	12.5	7.4	5.2	56.5	61.9	10.6	8.3	57
12.5-5	12.5	7.1	5.2	53.8	60.6	10.6	8.6	57
12.5-6	12.5	7	5.2	57.4	62.9	10	8.6	56.5
Average				55.2	61.4	10.4	8.6	
Standard Deviation				1.65	0.99	0.29	0.73	

Statistical analysis of Phase 1 (all tests conducted at 60°C) results

Variables	Parameters			
	Response - Dynamic Modulus, MPa		Response – Phase angle, degrees	
	1 Hz	5 Hz	1 Hz	5 Hz
Temperature, Mix type, Temperature* Mix type	Pr>F = 0.0003 All parameter estimates significantly different from 0	Pr>F= 0.0006 All parameter estimates significantly different from 0	Pr>F=0.0015 Parameter estimate for mix type significantly different from 0	Pr>F=0.58

TABLE 5 Results of tests with samples with different VTM, Phase 2

Sample number	VTM, %	Average Temperature, C	Dynamic Modulus, MPa
21	5	98.5	44.5
22	5	98	46.6
Average			45.5
5	6.8	95.5	39.9
14	7	96.5	39.3
17	7	99.5	36.6
23	7	97.5	33.0
24	7	97.5	35.3
Average			36.8
25	9	98	29.4
26	9	97.5	38.9
4	8.8	92.5	38.3
13	8.5	95.5	36.8
Average			35.8

Statistical analysis of Phase 2 (all tests conducted at 100°C, 5 Hz) results

Variables	5 Hz
VTM, VTM^2, Temperature	Pr>F= 0.02 Parameter estimate for only VTM significantly different from 0

TABLE 6 Results of Phase 3, part 1

Mix/condition	Asphalt Content %	Percent passing 0.075 mm sieve	VTM, %	Dynamic Modulus		Phase angle	
				Average Mpa	Coefficient of variation %	Average degrees	Coefficient of variation %
Coarse graded 100C, 1 Hz Phase 3, part 1	4.8	3.1	7.4	42.7	22.48	13.8	5.88
	5.3	3.1	5.1	37	9.16	13.6	8.30
	5.8	3.1	3.8	44.5	18.65	14.1	23.73
	4.8	1.1	7.2	43.3	9.15	12.6	8.92
	5.3	1.1	5.6	48.3	14.76	12.9	10.00
	5.8	1.1	3.8	35.6	8.62	12.1	7.40
	4.8	5.1	1.7	49.4	1.46	11.3	4.07
	5.3	5.1	1.1	46.6	5.97	12.7	13.33
	5.8	5.1	0.4	44.6	2.33	12.6	20.32
			Average		10.29		11.33
Coarse graded, 100C, 5 Hz Phase 3, part 1	4.8	3.1	7.4	52	22.31	12.3	6.34
	5.3	3.1	5.1	46.3	7.00	12.3	18.60
	5.8	3.1	3.8	51.9	16.05	13.1	52.58
	4.8	1.1	7.2	51.2	10.74	11.0	30.13
	5.3	1.1	5.6	56.4	16.38	12.4	31.32
	5.8	1.1	3.8	42.7	8.31	11.3	7.50
	4.8	5.1	1.7	56.6	1.59	9.9	9.55
	5.3	5.1	1.1	54.6	7.44	11.6	23.13
	5.8	5.1	0.4	52.9	2.12	11.0	30.39
			Average		10.22		23.28
Coarse graded, 60C, 1 Hz Phase 3, part 1	4.8	3.1	7.4	51.3	13.90	8.3	8.50
	5.3	3.1	5.1	50.7	4.04	7.0	5.80
	5.8	3.1	3.8	48.7	8.25	7.5	5.00
	4.8	1.1	7.2	57.5	7.36	8.1	2.59
	5.3	1.1	5.6	51.8	2.70	7.1	5.54
	5.8	1.1	3.8	53.8	4.46	7.5	6.34
	4.8	5.1	1.7	60.5	3.65	7.5	3.00
	5.3	5.1	1.1	56.8	2.31	6.8	1.52
	5.8	5.1	0.4	52.6	4.33	7.2	3.57
			Average		5.67		4.65
Coarse graded, 60C, 5 Hz Phase 3, part 1	4.8	3.1	7.4	59.1	13.16	7.9	5.90
	5.3	3.1	5.1	55.1	3.65	7.0	48.91
	5.8	3.1	3.8	53.6	7.82	7.5	51.71
	4.8	1.1	7.2	64.1	5.82	8.3	19.12
	5.3	1.1	5.6	56.5	2.28	6.1	25.36
	5.8	1.1	3.8	58.3	4.75	8.5	26.25
	4.8	5.1	1.7	65	5.29	8.2	24.41
	5.3	5.1	1.1	61.4	2.65	8.2	23.27
	5.8	5.1	0.4	58.2	5.60	7.8	3.88
			Average		5.67		25.42

TABLE 7 Statistical analysis of phase 3, part 1 results

Parameters			
Response - Dynamic Modulus, MPa		Response – Phase angle, degrees	
60°C			
1 Hz	5 Hz	1 Hz	5 Hz
Variables: AC, P75, Temp Pr>F=0.001 R^2=0.5 All parameter estimates, except for temperature, are significantly different from 0	Variable: AC, P75, Temp Pr>F=0.0046 R^2=0.4 Parameter estimates for AC and VTM are significantly different from 0	Variable: AC, AC2, P75, Temp, VTM, Temp*VTM, AC*Temp, P75*Temp Pr>F<0.0001 R^2 = 0.9 All parameter estimates, except for AC, P75 and P75*Temp are significantly different from 0	Variables: AC, P75, VTM, Temp, AC*P75, AC*VTM, P75*Temp, P75*VTM, VTM*VTM, Temp*Temp Pr>F = 0.0464 R^2 = 0.6 Parameter estimates for AC, P75, VTM, AC*VTM are significantly different from 0
100°C			
Variables: AC, P75, Temp, VTM Pr>F=0.28	Variables: AC, P75, Temp, VTM Pr>F=0.3	Variables: P75, Temp, VTM, Temp*VTM Pr>F=0.0057 R^2=0.5 All parameter estimates are significantly different from 0	Variables: Temp, VTM, Temp*VTM Pr>F=0.0405 R^2 = 0.3 Parameter estimate of Temperature only significant

TABLE 8 Results of Phase 3, part 2

Samples compacted to 75 gyrations

Mix/condition	Asphalt Content %	Percent passing 0.075 mm sieve	VTM, %	Dynamic Modulus		Phase Angle	
				Average Mpa	Coefficient of variation %	Average degrees	Coefficient of variation %
Fine graded, 60C, 1 Hz Phase 3, part 2	6.2	7	1.9	52.2	5.94	8.6	4.40
	6.7	7	0.8	52.5	6.48	9.9	5.15
	5.7	7	2.9	55.4	2.35	8.8	4.44
	5.7	9	2.7	46.8	8.76	11.0	6.36
	6.7	5	1.3	48.8	10.25	11.7	2.56
			Average		6.75		4.58
Fine graded, 60C, 5 Hz Phase 3, part 2	6.2	7	1.9	57.7	6.24	9.1	7.06
	6.7	7	0.8	57.5	2.09	9.7	3.23
	5.7	7	2.9	60.5	3.47	8.9	12.66
	5.7	9	2.7	51.8	10.62	10.9	10.09
	6.7	5	1.3	55.4	10.29	10.9	8.11
			Average		6.54		8.23

Samples compacted to 50 gyrations

Mix/condition	Asphalt Content %	Percent passing 0.075 mm sieve	VTM, %	Dynamic Modulus		Phase Angle	
				Average Mpa	Coefficient of variation %	Average Degrees	Coefficient of variation %
Fine graded, 60C, 1 Hz Phase 3, part 2	6.2	7	3.0	87.3	7.39	9.3	7.68
	6.2	9	2.7	75.7	2.59	10.0	3.29
	6.2	5	3.6	82.0	2.60	10.2	5.72
			Average		4.19		5.56
Fine graded, 60C, 5 Hz Phase 3, part 2	6.2	7	3.0	89.1	12.60	11.9	18.77
	6.2	9	2.7	83.4	2.09	11.8	5.41
	6.2	5	3.6	89.3	3.48	11.5	6.15
			Average		6.06		10.11

TABLE 9 Statistical analysis of Phase 3, Part 2 results
Samples compacted to 75 gyrations

Parameters			
Response - Dynamic Modulus, MPa		Response – Phase angle, degrees	
60°C			
1 Hz	5 Hz	1 Hz	5 Hz
Variables: P75, VTM, Temp, VTM*Temp, P752 Pr>F=0.01 R^2=0.4 Parameter estimates for P75 and P752 are significantly different from 0	Variables: P75, Temp, P*Temp, P752 Pr>F=0.04 R^2=0.3 Parameter estimates for P75, P752 are significantly different from 0	Variables: AC, Temp, P75, VTM, Temp*P75, AC*VTM, AC*P75 Pr>F<0.0001 R^2=0.9 All parameter estimates except for Temp and Temp*Pass are significantly different from 0	Variables: AC, Temp, P75, VTM, Temp*P75, VTM*VTM, AC*P75 Pr>F = 0.0007 R^2=0.8 Parameter for AC, AC*P75 and VTM*VTM are significantly different from 0

Note: For coarse graded mix, VTM is present in best model for both dynamic modulus and phase angle. For fine graded mix, a better model (R^2=0.8) is obtained at 1 Hz with P75 and VTM^2 (does not include AC) compared to the one (R^2=0.6) which has AC and P75.

Samples compacted to 50 gyrations

Parameters			
Response - Dynamic Modulus, MPa		Response – Phase angle, degrees	
60°C			
1 Hz	5 Hz	1 Hz	5 Hz
Variables: P75, Temp, VTM Pr>F= 0.04	Variables: AC, P75, Temp, VTM Pr>F=0.17	Variables: Temp, Temp*Temp Pr>F<0.0001 R^2 = 0.8 All parameter estimates are significantly different from 0	Variables: P75, VTM, Temp, P75*Temp, VTM*Temp, P75*P75, Temp*Temp Pr>F = 0.0145 R^2 = 0.9 All parameter except for Temp and Temp*Temp are significantly different from 0

A

B

FIGURE 2 A Asphalt and fine particle build-up inside the membrane
B. Torn membrane.

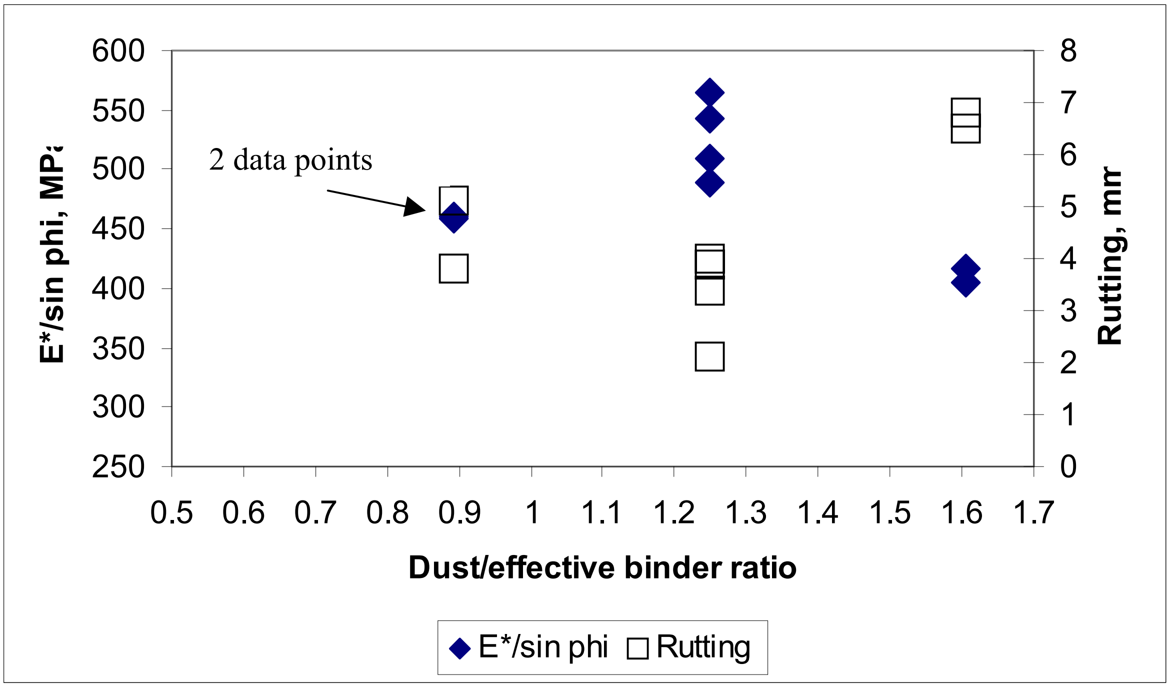


FIGURE 3a Plots of dust/effective binder ratio versus E*/sinϕ and APA rutting.

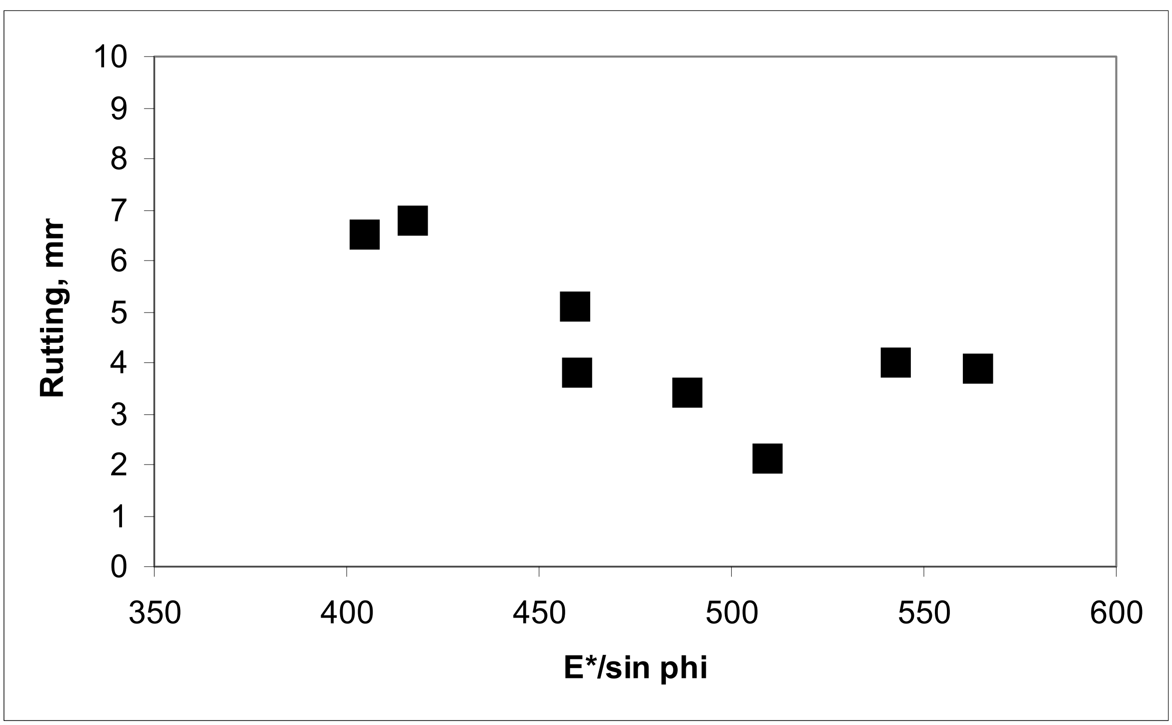


FIGURE 3b Plot of E*/sin ϕ versus rutting

Chapter 4. Conclusions and Recommendations

Based on the results of this study, the following conclusions and recommendations are made:

1. The rapid triaxial testing procedure offers a fundamental, practical, fast and economic procedure for obtaining mechanistic properties of HMA. The triaxial testing process allows proper simulation of in-place stress states, while fully automated and software controlled equipment allows the user to avoid lengthy sample and test preparation steps that are usually involved in a standard triaxial testing.
2. The results from this study and several others have shown that modulus and phase angle values obtained from testing are sensitive to key mixture components and properties, and that rankings of mixes based on results from this test are consistent with observed in-place rutting in HMA pavements.
3. The coefficients of variation of results obtained from tests conducted at 60^{o}C and 1 Hz are low (around 5 %) and hence the test has good repeatability.
4. The equipment is rugged and portable, and the hardware and software are easy to handle and do not require extensive technician training.
5. It should be noted that the equipment and software allow user definable stress, load frequencies and waveforms, and hence allow the user to conduct a wide range of standard and customized tests such as static and dynamic, uniaxial and triaxial, creep and resilient modulus. Also, the use of its environment chamber (which is typically not used for QC testing) allows the user to test mixes under a wide range of temperatures. The chamber for the equipment used in this study was found to be capable of maintaining temperatures between –10^{o}C to 60^{o}C.
6. Considering the desirable qualities, it seems that this test method can be considered for regular use for QC testing. However, before it is used, each state DOT must test each of its mixes (produced under controlled conditions) using an adopted test protocol, and establish target parameter (modulus and phase angles) and allowable variations. For guidance, test temperature and frequency of 60^{o}C and 1 Hz, respectively, are recommended.

APPENDIX A

Standard Practice for Rapid Triaxial Test for Flexible Pavement QC/QA

Standard Practice for Rapid Triaxial Test for Flexible Pavement QC/QA

1 Scope

1.1 This standard provides rapid laboratory test procedures for quality control, quality assurance (QC/QA) and engineering analysis of hot mix asphalt concrete mixtures. With suitably prepared specimens, the test may also be used for base course materials.

1.2 This standard is applicable to specimens prepared by gyratory compaction or cored from a laboratory scale slab compacted with a rolling wheel compactor or from a full scale pavement. The specimen diameter is 150mm with a minimum height to diameter ratio of approximately 1:1 (but not less than 0.97:1). The procedure is written assuming a 150 mm tall by 150 mm diameter specimen, a configuration that is readily produced in a gyratory compactor. While it is recognized that there is interest among various circles in testing specimens with reduced diameters and height to diameter ratios of 2:1, the intent of the proposed practice is to provide a rapid means of testing specimens that can be readily produced in a standard Superpave™ gyratory compactor. The test does not require alteration to accommodate these other specimen sizes, but the triaxial cell dimensions must be altered to properly fit the specimen and specimens less than 69 mm in diameter will not be used. The standard is applicable to materials having maximum aggregate sizes up to 63.5 mm.

1.3 Two procedures are available in this test method.

Procedure A - Quality Control Testing

Procedure B - Quality Assurance and Mixture Evaluation Testing

1.4 This practice may involve hazardous materials, operations, and equipment. It does not purport to address all the safety problems associated with its use. It is the responsibility of whoever uses this practice to consult and establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to its use.

2 Reference Documents

2.1 AASHTO Standards

Quality Assurance Guide Specification, AASHTO Joint Task Force report 09/22/95

PP2 Practice for Short and Long Term Aging of Hot Mix Asphalt (HMA)

PP3 Practice for Preparing Hot Mix Asphalt (HMA) Specimens by Means of the Rolling Wheel Compactor

T40 Sampling Bituminous Materials

T168 Sampling Bituminous Paving Mixtures

T 245 Resistance to Plastic Flow of Bituminous Mixtures Using Marshall Apparatus

T283 Resistance of Compacted Bituminous Mixture to Moisture Induced Damage

TP4 Method for Preparing and Determining the Density of Hot Mix Asphalt (HMA) Specimens by Means of the SHRP Gyratory Compactor

TP7 Method for Determining the Permanent Deformation and Fatigue Cracking Characteristics of Hot Mix Asphalt (HMA) Using the Simple Shear Test (SST) Device

2.2 ASTM Standards

D3387 Method for Compaction and Shear Properties of Bituminous Mixtures by Means of the U.S. Corps of Engineers Gyratory Testing Machine (GTM)

D5361 Practice for Sampling Compacted Bituminous Mixtures for Laboratory Testing

2.3 Other Documents

PPaa-96, Standard Practice for Design and Analysis of Large Stone (LSM) Bituminous Mixtures, NCHRP 4-18 Final Report, Appendix C.

Superpave™ Asphalt Mixture Design & Analysis, National Asphalt Training Center Demonstration Project 101

Glossary of Highway Quality Assurance Terms, Transportation Research Circular 457, April 1996, TRB.

AASHTO Quality Assurance Guide Specification, September 1995

3 Significance and Use

3.1 The triaxial approach to determining material properties is useful for a variety of reasons. One of the more important reasons for this utility is the ability to handle the characterization of different types of materials, including those materials in the pavement system that do not stick together very well (*e.g.* unbound base and subgrade materials and asphalt concrete at high temperature). The test procedure is written for asphalt concrete, but agencies may utilize the proposed practice for soils and base course materials with only slight modification. The apparatus specified in this procedure differs significantly from standard geotechnical type triaxial machines and the primary driving force for this difference is the requirement to minimize the time between specimen preparation and testing.

3.2 The unconfined uniaxial testing conducted without radial measurements is known to be of limited utility when trying to relate lab performance to field performance with LSMs and SMAs in particular. The two key elements of this limitation are:

- If the test is both unconfined and conducted without radial measurements, there is (a) virtually no possibility of mobilizing the internal friction of the aggregate without the benefit of confinement similar to that which is present in a full scale pavement since the binder acts more as a lubricant than a binder at the relatively high temperatures used in tests related to rutting, and (b) if there is no radial measurement as well, there is very little possibility of quantifying the potential for mobilizing friction.
- If an attempt is made to relate lab and field performance using only one parameter out of a full time dependent elastic-plastic model (*e.g.* complex compliance, or slope of the creep response curve only), the relationship will likely be quite crude. However, individual parameters can often be used in process control (QC) and QA. It is in mix design/performance prediction that combinations of material properties are needed most.

This proposed practice addresses these two issues by requiring both confinement and measurement of Poisson's ratio.

3.3 "Poisson's ratio" in compression is expected to equal or exceed 0.5 for mixes with good stone-on-stone contact. High ratios should only be interpreted as identifying superior mixtures if other portions of the analysis indicate that long-term performance is acceptable (*i.e.*, impending failure and nonuniform strain fields can also be accompanied by high Poisson's ratios under certain circumstances).

3.4 If the analysis procedure indicates that the mixture will not perform adequately, the following suggestions are offered for correction of the problem. Remove any stockpile that prevents the stone skeleton from developing throughout the gradation curve. This problem often arises when a larger stone stockpile of material is not fully taken advantage of because a smaller stone stockpile has been used in too high a proportion and/or the average size of the smaller stockpile is large enough to reduce or eliminate any beneficial contribution the largest stockpile might have on the performance of the mixture. If the problem is due to breakdown of a weak aggregate during mixing and/or compaction or is due to aggregate shape, surface texture or surface chemistry, a different parent material source for the aggregate should be selected.

4 Apparatus

4.1 General

4.1.1 Loading Device - The device shall have a minimum actuator load capacity of 5 kN on one axis (usually the vertical), and a minimum confining pressure capacity of 400 kPa. It is unlikely that mechanical (*e.g.* screw-driven) machines would be capable of meeting the intent of this practice. Servo-controlled hydraulic and pneumatic machines are recommended.

> Note 1: Pneumatic and hydraulic machines machines manufactured by Industrial Process Controls Ltd. have been found to be suitable for this purpose. Nitrile or neoprene membranes for the triaxial cell manufactured by Karol-Warner have been found to be suitable for moderate temperature range applications. Extended temperature range membranes manufactured by TSL Services & Equipment have been found suitable for high temperature QC testing as well as low temperature QA/performance testing. Latex membranes are not suitable for use in this apparatus.

4.1.2 Control system - The loading device shall have two channels of feedback control and shall be capable of producing a sinusoidal waveshape at 15 Hz on the vertical axis while maintaining a constant confining pressure. The control system shall allow the user to change the frequency of the axial loading, the shape of the waveform, and the type of test. The feedback system shall dynamically control the amplitude of the axial waveform to within 0.5% of the command at the measurement point. Additionally, the control system shall be capable of ramping the vertical load and confining pressure simultaneously such that a condition of hydrostatic pressure is maintained throughout when this type of loading is required during the test.

4.1.3 Load Measuring Devices - The load measuring device shall consist of an electronic load cell with a resolution of 5 N or better, and a minimum capacity of 5 kN with 0.1% accuracy. An electronic pressure transducer with a 600 kPa range, 0.5 kPa resolution and 0.25% accuracy shall be used to measure confining pressure.

4.1.4 Specimen Deformation Measurement Devices - Axial and radial measurement devices shall have a range and resolution sufficient to measure the strains that occur during the test. The required range may be different for different temperatures and materials.

4.1.5 Specimen Temperature Measurement Devices - A device to measure and automatically record specimen temperature inside the triaxial cell during the test is recommended. However, measurement by external means (e.g. infrared thermometer) is allowed. If external means are used, temperature readings shall be taken within 30 seconds (a) before placing the specimen in the cell, and (b) within 30 seconds after removing the specimen from the cell, and both temperature readings shall be recorded on the report.

4.1.6 Environmental Chamber - An environmental chamber that is an integral part of the testing machine is optional, but if used shall maintain the desired test temperature to within ±1.0°C over the range of interest. The use of an integral environmental chamber is highly recommended for Procedure B. If a separate environmental chamber is used for Procedure B, the time limit between removal of the specimen from the conditioning system and placement in the testing machine shall be the same as the time limit specified in Procedure A for the time between removal from the compaction mold and placement in the machine.

4.1.7 Data Acquisition - The data acquisition system shall be capable of sampling at least 6 channels at a minimum rate of 200 Hz with a minimum of 12-bit analog to digital resolution.

5 Hazards

5.1 Observe all safety precautions recommended by the manufacturer as well as standard laboratory safety precautions when operating testing equipment and preparing, testing, and disposing of HMA test specimens.

6 Standardization

6.1 Testing systems shall be standardized prior to initial use and at least once every year thereafter.

6.1.1 Verify the calibration of all measurement components and verify the capability of the environmental and specimen conditioning systems to maintain temperatures and pressures within specified limits.

6.1.2 If any of the verifications yield data that does not comply with the accuracy specifications, correct the problem prior to testing. Appropriate action may include correction of menu entries, maintenance on system components, calibration of system components (using an independent calibration agency, or service by the manufacturer, or in-house resources), or replacement of system components.

7 Test Requirements

7.1 Procedure A is used for process control of the plant production and laydown operation. Procedure B is used in conjuction with Procedure A for Quality Assurance purposes. Both procedures may also be used in the mix design and/or evaluation phases to estimate pavement performance.

7.2 Sampling, Specimen Preparation and Preliminary Determinations

7.3 Plant Mixed, Laboratory Compacted Specimens - Obtain hot mix asphalt sample(s) in accordance with T168. Compact specimens in accordance with PP3, TP4, or ASTM D3387. Specimens shall have a diameter of 150 mm and a height to diameter ratio of at least 0.97:1. The ratio of the smallest dimension of the specimen (i.e. the smaller of height or diameter) to the nominal maximum aggregate size shall not be less than 2.5:1. If equipment is unavailable to produce specimens with the dimensions recommended herein, the dimensions and actual ratios shall be entered in the report and the sentence ***"Specimen dimensions do not meet the recommendations of the AASHTO standard"*** shall be prominently entered in boldface type on the report.

7.4 Roadway Specimens - Obtain specimens of the necessary diameter and height from the pavement in accordance with ASTM D5361.

8 Procedure A - QC Testing

8.1 Compute the frequency of loading.

> Note 2: It is recommended that a frequency corresponding to the posted speed limit be used. The frequency should be computed assuming a tire contact radius, the posted speed limit, and a 1.8 m radius deflection basin. While testing at only one frequency is approved for use in this section of the proposed practice, it is not approved for Procedure B. Therefore, it is recommended that several frequencies be used in Procedure A as well, one of which should correspond closely with the posted speed limit. Then, the single frequency corresponding to the speed limit may be used for QC, and the entire frequency sweep data may be used in conjunction with the other testing for QA purposes. To provide a reasonably comprehensive range of

frequencies, 11 frequencies were used during the early research on frequency sweep testing, while later in the research, only 5 were used: 13.33, 10, 6.67, 5, and 4 Hz. While the 5 frequencies shown above are recommended, the following frequencies correspond approximately to the speed limits shown and should suffice for most applications.

Speed Limit (MPH)	***Approximate Frequency (Hz)***
40	4.89 (5)
55	6.72 (7)
70	8.56 (9)

Note that in the study reported in this document, a pneumatic equipment was used and a combination of 60°C and 1 Hz (as temperature and frequency) was found to be optimum for minimizing test data variability. This combination should be suitable for rapid quality control and assurance testing. However, as long as the standard errors and data variability are checked, the user can use any suitable frequency (from the above table) and temperature.

8.2 Sample, prepare, and test a minimum of three specimens per sublot of material in accordance with section 7 of this standard.

Note 3: It is recommended that QA samples be taken simultaneously with QC samples. Agency procedures should be developed for environmentally controlled storage of the QA samples for later testing if necessary. Two additional specimens may be prepared for optional strength testing of each sublot, at each stress state and environmental condition using the confining pressure for the stress state of interest and axial loading at a rate of 50.8 mm/min up to the point of (a) specimen failure, (b) the capacity of the load cell, or (c) 5% strain is reached, whichever comes first.

8.3 After compacting each specimen, immediately extrude the specimen from the mold. The specimen shall be placed in a hydrostatic confinement condition of at least 2 kPa and not more than 10% of the starting pressure selected in paragraph 8.4.1, within 60 seconds of extrusion from the mold.

8.4 Test the specimen.

8.4.1 Within 60 seconds of applying the initial 2 kPa hydrostatic pressure, simultaneously ramp both the vertical and confining pressures up to the selected starting pressure and begin the axial sinusoidal loading.

Note 4: 50 kPa hydrostatic pressure has been used successfully in this procedure as the baseline starting pressure. An axial sinusoidal loading of ±40 kPa is applied about the 50 kPa hydrostatic level, resulting in a cyclic load range in the axial direction of +10 to +90 kPa. Higher or lower stress levels may be indicated to meet local preferences.

9 Procedure B - QA and Mixture Evaluation Testing

9.1 Determine the frequencies and environmental conditions to be used in the test.

Note 5: Except as allowed in paragraph 9.3.1, a minimum of three frequencies is required for this procedure. These frequencies should include testing at the same frequencies as used in Procedure A, as a minimum. Five frequencies are recommended (see note 2).

Note 6: In general, it is recommended that three temperatures are used, one of which should be the maximum 7-day temperature for the location. However, fewer or greater numbers of temperature conditions may be used. If moisture conditions are used as well, two should suffice and should be coupled with the temperature condition based on the local environment. Testing under moisture conditioning may be used to complement other moisture susceptibility tests such as T283. If no agency guidance has been issued, temperatures of 4, 25 and 40°C, and/or moisture conditioning of vacuum saturated versus dry are suggested.

9.2 Sample, prepare, and test a minimum of four specimens per sublot of material per temperature of interest in accordance with section 7 of this standard. It is the intent of this practice that QA tests may be used in place of QC tests, but QC tests may not be used in place of QA tests. Therefore, a full QC/QA testing program requires a minimum of four specimens per condition if Procedure B is used for both QC and QA. However, a minimum of seven specimens per condition is required if Procedure A is used for QC (3 specimens) and Procedure B is used for QA with additional stress states and/or environmental conditions over those used for QC (4 additional specimens).

9.3 Test the specimen.

9.3.1 If operating without an integral environmental chamber, within 60 seconds of removing the specimen from the chamber being used for conditioning, insert the specimen in the testing machine and bring to a 2 kPa hydrostatic pressure. Within 60 seconds of applying the hydrostatic pressure, simultaneously ramp both the vertical and confining pressures up to the selected starting pressure and begin the axial sinusoidal loading. A minimum of one stress state (*i.e.* that used for paragraph 8.4.1) and loading frequency is required. However, it is recommended that a frequency sweep is applied at each of four stress states. If the starting hydrostatic stress state changes between two consecutive stress states, simultaneously ramp both the vertical and confining pressures up (or down) to the next stress state before starting the cyclic loading. The test must be completed within 10 minutes of removing the specimen from the chamber. **Testing in accordance with this paragraph for purposes of mixture evaluation beyond the level of QC/QA work (e.g. for performance prediction models) is not allowed. For these more detailed studies, paragraph 9.3.2 must be used.**

Note 7: 50 kPa hydrostatic pressure has been used successfully in this procedure as the baseline starting pressure for the first stress state. An axial sinusoidal loading of ± 40 kPa is applied about the 50 kPa hydrostatic level, resulting in a cyclic load range of +10 to +90 kPa. Higher or lower stress levels may be indicated to meet local preferences. Stress states corresponding to octahedral shear stresses of 310 kPa for a heavy truck and 138 kPa for a light truck may be used. However, these loads may cause premature specimen failure, especially if applied at elevated temperature. Although several stress magnitudes were used during the research, for temperatures between 4ºC and 100ºC the following stress states were found to be adequate for most of the mixtures tested.

Stress State	***Starting Hydrostatic State (kPa)***	***Axial Deviation from Hydrostatic (kPa)***
Extension/Compression	50	+40 / -40
Extension	50	+0 / -40
Compression	50	+50 / -0
Compression	100	+100 / -0

9.3.2 If operating with an integral environmental chamber, confirm that the environmental chamber and specimen are maintaining the specified test temperature ± 0.5°C and/or other environmental conditions as desired. Conduct testing in accordance with Note 7.

10 Calculations

10.1 Procedures A and B

10.1.1 For the extension-compression stress state, it is necessary to separate the extension response from the compression response. Compute the dynamic modulus and Poisson's ratio in extension and in compression. Compute the phase angle between the axial stress and the axial strain. Recall that engineering strain is equal to the change in displacement divided by the gage length and that modulus is stress divided by strain. Compute the

Poisson's ratio as the radial strain divided by the axial strain. These calculations should be performed on a minimum of five cycles of data, usually starting at cycle 20. Compute the average response over the five cycles as well as the trend over the period.

> Note 8: The extension-compression test is a full sinusoidal waveform that is intended to simulate the changing stress states during vehicle passage and to provide an indication of the possibility of permanent deformation in fully reversed loading. The extension portion of the waveform elicits response from the material that is similar to, but not necessarily equal to, tension loading. The reasons an extension test is used in place of a tension test are (a) the tension test requires time consuming attachment of the specimen to the loading platens by some means such as gluing which is inconsistent with the objective of a rapid test procedure, and (b) at elevated temperatures where the asphalt binder is playing a reduced role in the response, performing a direct tension test is virtually impossible.

10.1.2 If strength testing is performed, calculate the strength and Poisson's ratio at the termination point.

10.2 Procedure B

10.2.1 Compute the engineering properties listed in paragraph 10.1 for all additional stress states and environmental conditions.

11 Report

11.1 Procedures A and B

11.1.1 Report the results of the calculations given in paragraph 10 and its subparagraphs.

11.1.2 Plot both compression and extension modulus results versus environmental condition (e.g. temperature), and versus stress state (e.g. bulk stress).

11.1.3 For the extension-compression stress state, plot the axial and radial strain peak response as a function of cycle number. Plot the line delineating the change in response from extension to compression as a function of cycle number.

11.1.4 Using the data reported in paragraph 11.1.1, compute the percent within limits (PWL) in accordance with the AASHTO Quality Assurance Guide Specification. Determine composite pay factors using the guidance in QA-401.05 of the Guide Specification and appropriate locally developed weighting factors for each parameter selected for acceptance measurement. Pay factors are often based on measurements at one stress and environmental condition, while the results from the additional stress and moisture conditions are usually applied to mixture evaluation and performance prediction in a continuous improvement program.

12 Precision and Bias

12.1 Precision - The research required to develop precision estimates for the procedures described in this standard has not been conducted.

12.2 Bias - The research required to establish the bias of this standard has not been conducted.

13 Key Words

Quality Control, Quality Assurance, triaxial, modulus, permanent deformation, rutting, dilation, Poisson's ratio, Mix design

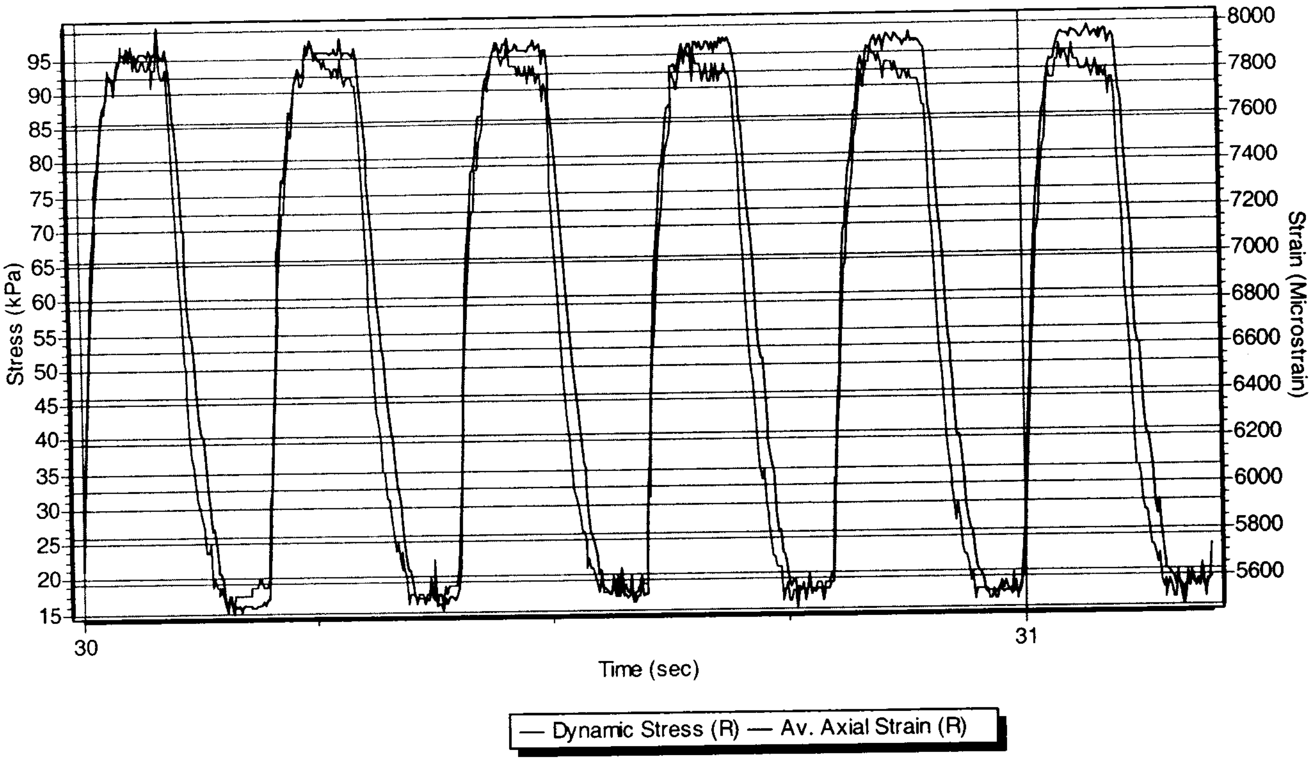
APPENDIX B

Test Data

PHASE I
Dynamic Modulus Test Outputs

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#23a.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 3:45 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.6	80.8	80.8	80.8	79.6	81.3
Recoverable axial micro-strain	2541.4	2480.5	2444.0	2431.9	2444.0	2468.3
Permanent axial micro-strain	5473	5485	5510	5510	5522	
Dynamic modulus (MPa)	33.3	32.6	33.1	33.2	32.6	33.0
Phase angle (Deg)	7.70	7.01	6.34	7.04	5.80	6.78
Dyn.Modulus/sine(phase angle)	495.7	533.4	598.4	541.6	644.2	562.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#23a

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

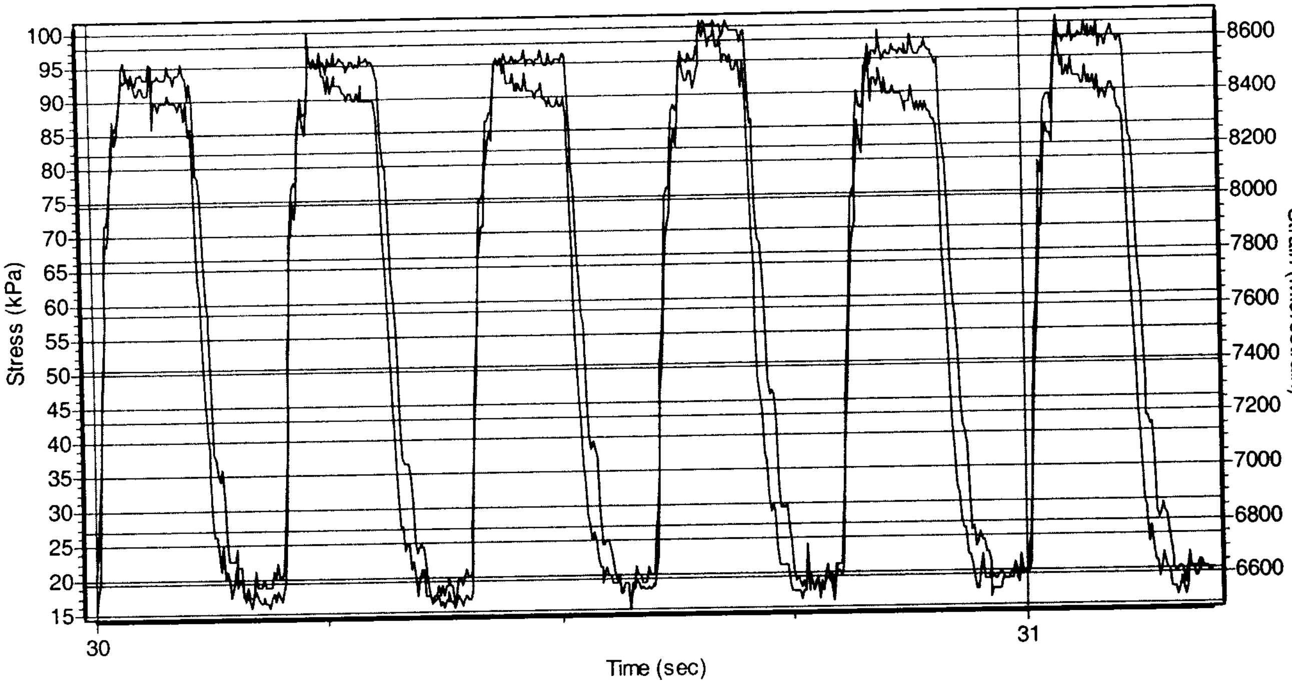
Cross-Sectional Area: 7853.982
Volume: 887499.9

Comments/Properties: Initial Temp: 95 'C
Final Temp: 89. 'C

23 samp:

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#26.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:30 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.4	83.3	80.8	84.6	78.4	81.1
Recoverable axial micro-strain	2053.2	2077.7	2077.5	2162.6	2053.2	2084.9
Permanent axial micro-strain	6491	6503	6503	6515	6576	
Dynamic modulus (MPa)	38.2	40.1	38.9	39.1	38.2	38.9
Phase angle (Deg)	-86.59	108.38	102.14	115.56	101.23	68.14
Dyn.Modulus/sine(phase angle)	-55.6	49.5	50.0	46.2	49.4	27.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#26

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112						112	

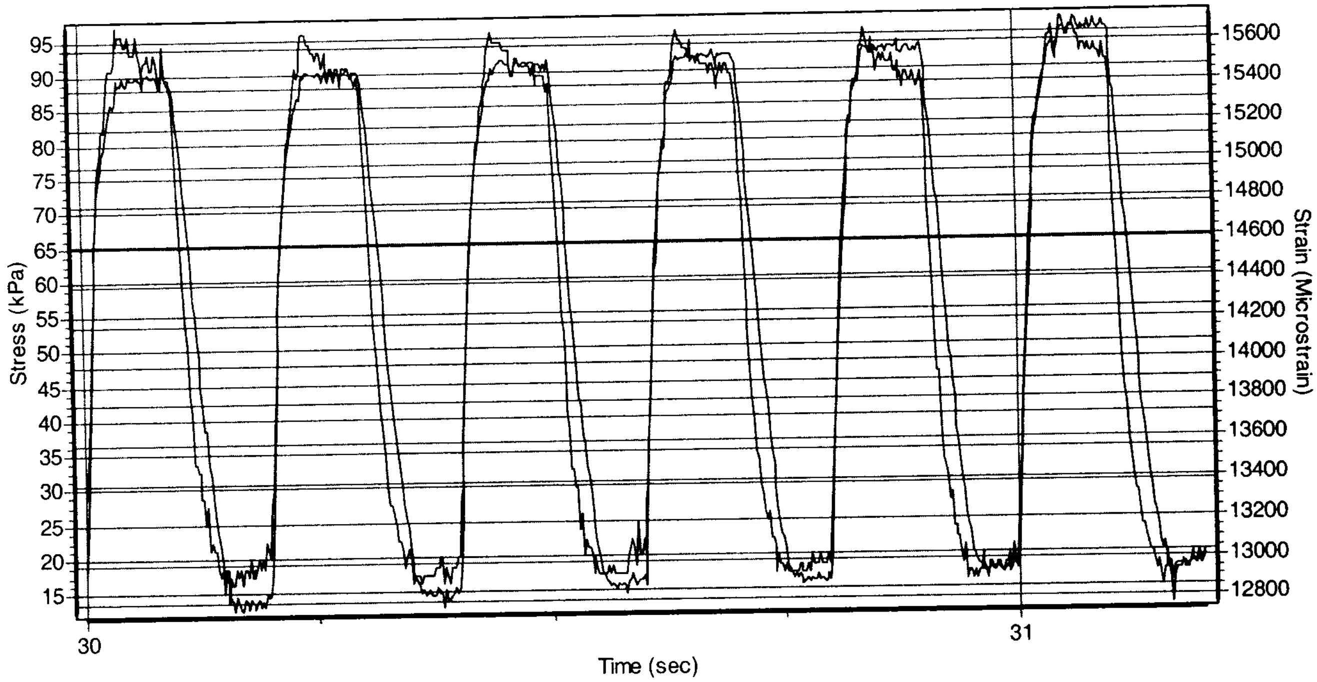
Cross-Sectional Area: 7853.982
Volume: 879645.9

Comments/Properties: Initial Temp: 100 'C
Final Temp: 95 'C

# 26 Phase 1 $E^* = 38.9$ MPa
Tm = [illegible]
Temp = 100 - 95°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#25.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:26 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.3	79.6	78.4	78.4	79.6	79.8
Recoverable axial micro-strain	2751.9	2715.5	2691.1	2702.9	2702.7	2712.8
Permanent axial micro-strain	12764	12777	12837	12874	12910	
Dynamic modulus (MPa)	30.3	29.3	29.1	29.0	29.5	29.4
Phase angle (Deg)	9.12	8.85	8.33	8.87	9.23	8.88
Dyn.Modulus/sine(phase angle)	380.8	379.8	401.0	375.0	366.0	380.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#25

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

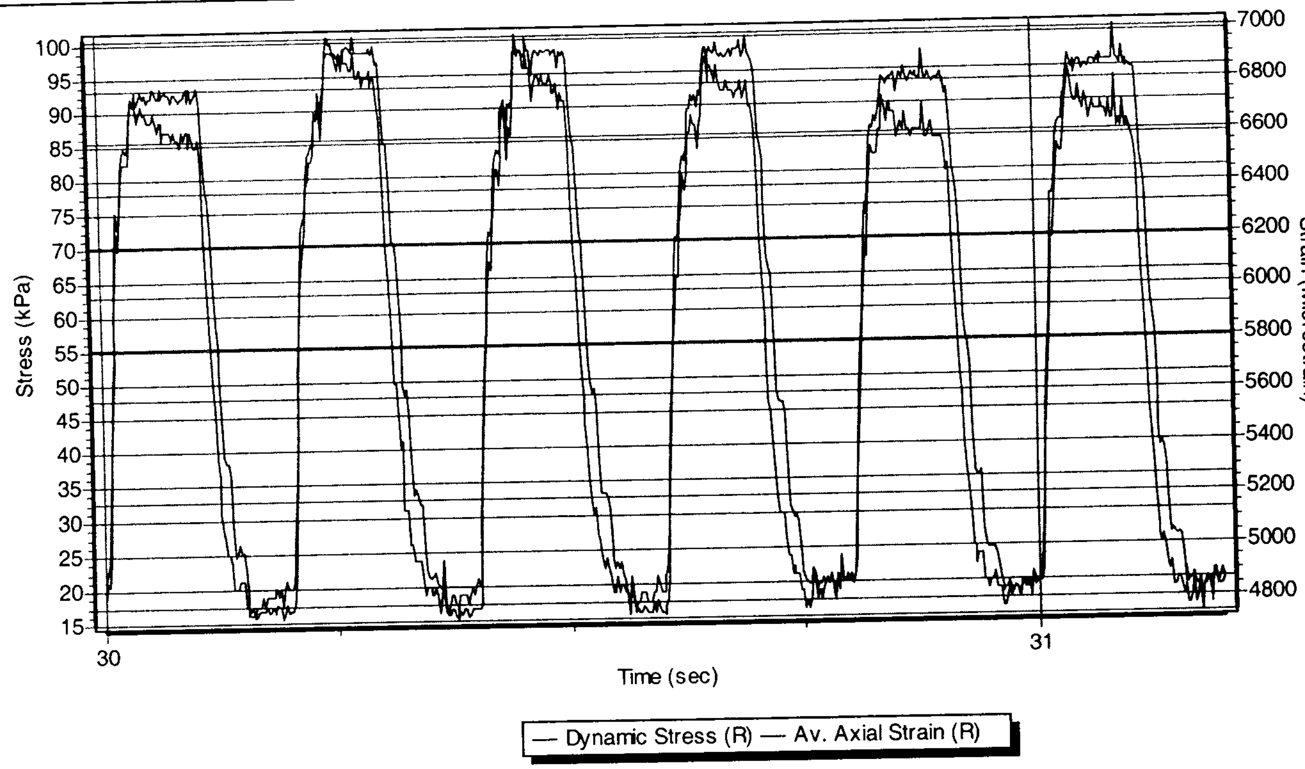
Cross-Sectional Area: 7853.982
Volume: 895353.9

Comments/Properties: Initial Temp: 102 'C
Final Temp: 94 'C

#25 Phase I $E^* = 29.4$ MPa
VTM = 9.0 %
Temp: 102°C - 94°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#13.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:36 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	75.9	84.6	84.6	80.8	74.6	80.1
Recoverable axial micro-strain	2061.5	2270.2	2245.8	2196.6	2110.7	2177.0
Permanent axial micro-strain	4748	4735	4748	4784	4809	
Dynamic modulus (MPa)	36.8	37.3	37.7	36.8	35.4	36.8
Phase angle (Deg)	5.17	4.15	7.96	-172.96	5.41	-30.06
Dyn.Modulus/sine(phase angle)	816.2	1029.6	542.6	-36.9	749.4	620.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

Cross-Sectional Area: 7853.982
Volume: 887499.9

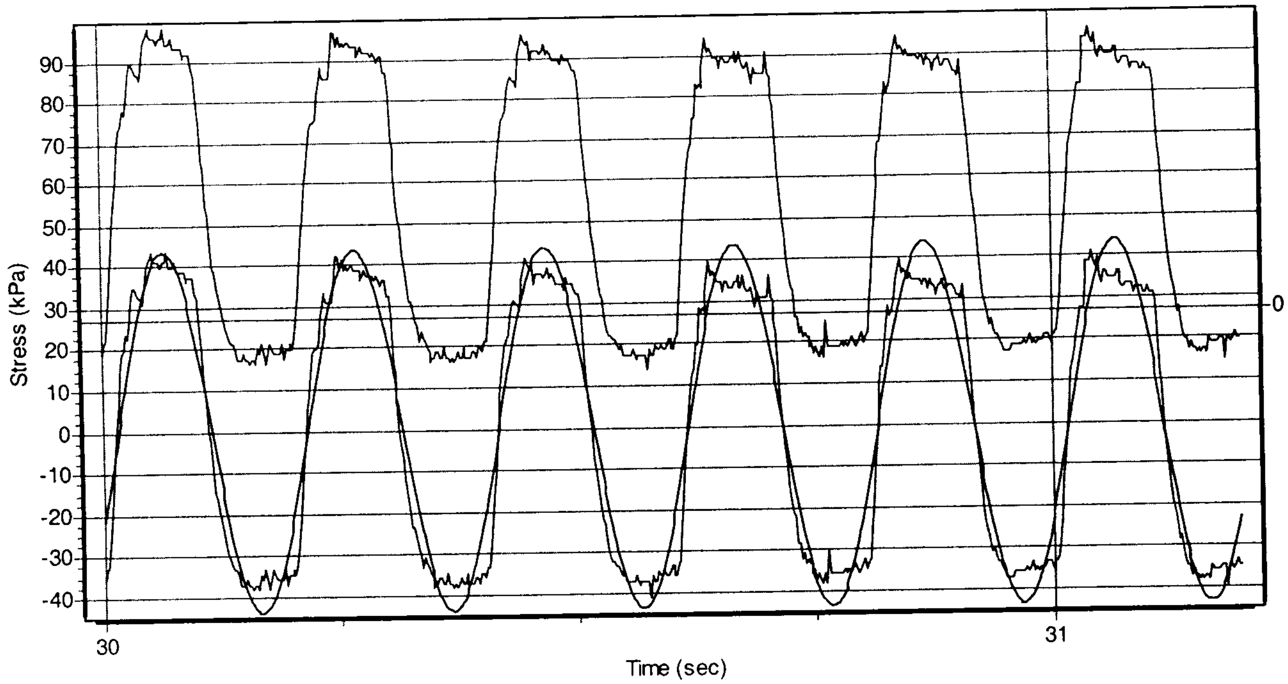
Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

#13 Phase 1 $E^* = 36.8$ MPa
VTM = 8.5% (?)
Temp = 98 - 93°C

39 ∅ 36.0
43 ∅ 58.7

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#04.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 1:44 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	80.8	82.1	78.4	77.1	80.1
Recoverable axial micro-strain	2196.8	2087.3	2148.1	2038.5	1977.2	2089.6
Permanent axial micro-strain	10245	10294	10257	10342	10452	
Dynamic modulus (MPa)	37.4	38.7	38.2	38.4	39.0	38.3
Phase angle (Deg)	-75.98	101.85	125.29	-49.43	-23.77	15.59
Dyn.Modulus/sine(phase angle)	-60.7	49.9	43.0	-91.9	-189.4	-49.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

Cross-Sectional Area: 7853.982
Volume: 895353.9

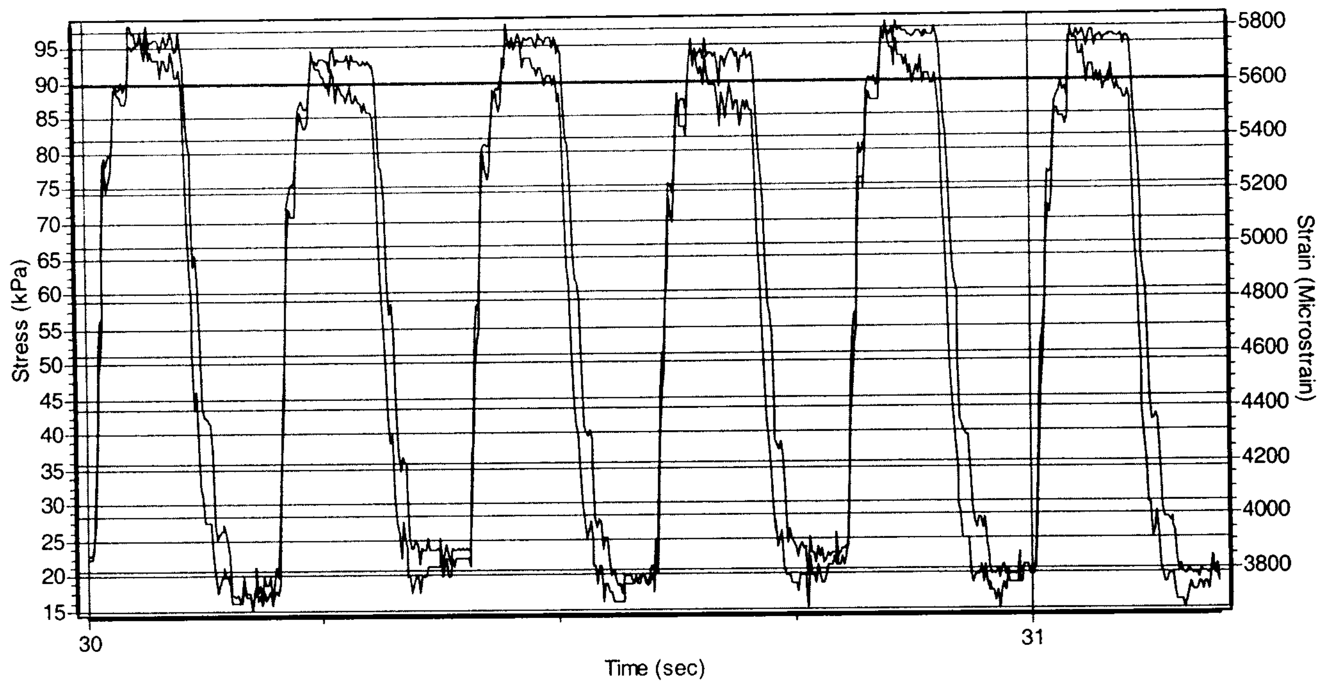
Comments/Properties: Initial Temp: 97 'C
Final Temp: 88 'C

#4 Phase I E* = 38.3 MPa
VTM = 8.8 %
Temp = [illegible]
97 - 88°C

8.8
38.3

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#14.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:43 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.3	77.1	82.1	80.8	83.3	81.3
Recoverable axial micro-strain	2165.7	2018.4	2067.4	2030.8	2055.2	2067.5
Permanent axial micro-strain	3655	3716	3716	3728	3765	
Dynamic modulus (MPa)	38.5	38.2	39.7	39.8	40.5	39.3
Phase angle (Deg)	3.29	-172.67	2.85	-172.74	10.06	-65.84
Dyn.Modulus/sine(phase angle)	1339.3	-38.3	1596.7	-39.9	462.6	664.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#14

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

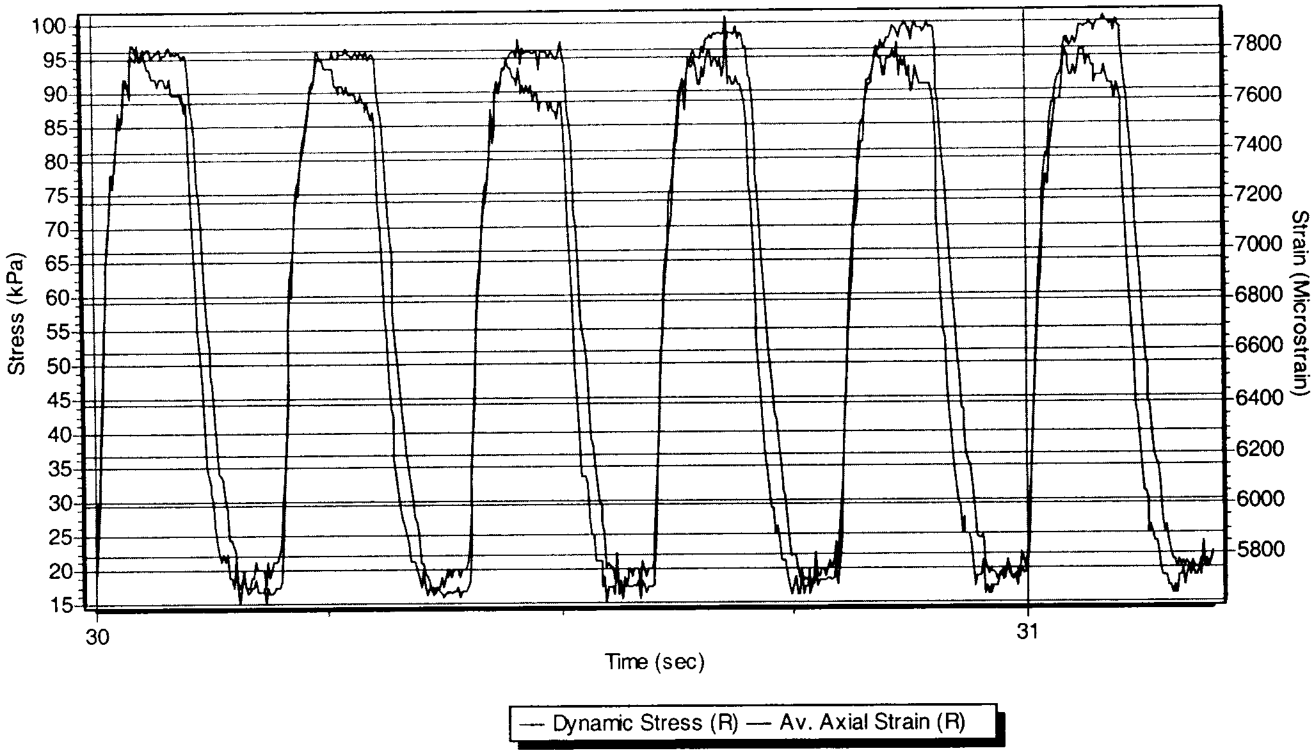
Cross-Sectional Area: 7853.982
Volume: 895353.9

Comments/Properties: Initial Temp: 98 'C
Final Temp: 95 'C

#14 Phase I $E^* = 37.3$ MPa
VTM = 7.0 %
Temp: 98-95°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#17.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:49 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	79.6	79.6	84.6	80.8	81.3
Recoverable axial micro-strain	2212.9	2176.7	2225.2	2261.9	2225.5	2220.4
Permanent axial micro-strain	5609	5633	5621	5669	5681	
Dynamic modulus (MPa)	37.1	36.6	35.8	37.4	36.3	36.6
Phase angle (Deg)	10.10	9.87	9.60	10.24	9.55	9.87
Dyn.Modulus/sine(phase angle)	421.3	425.3	427.4	418.8	436.5	425.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

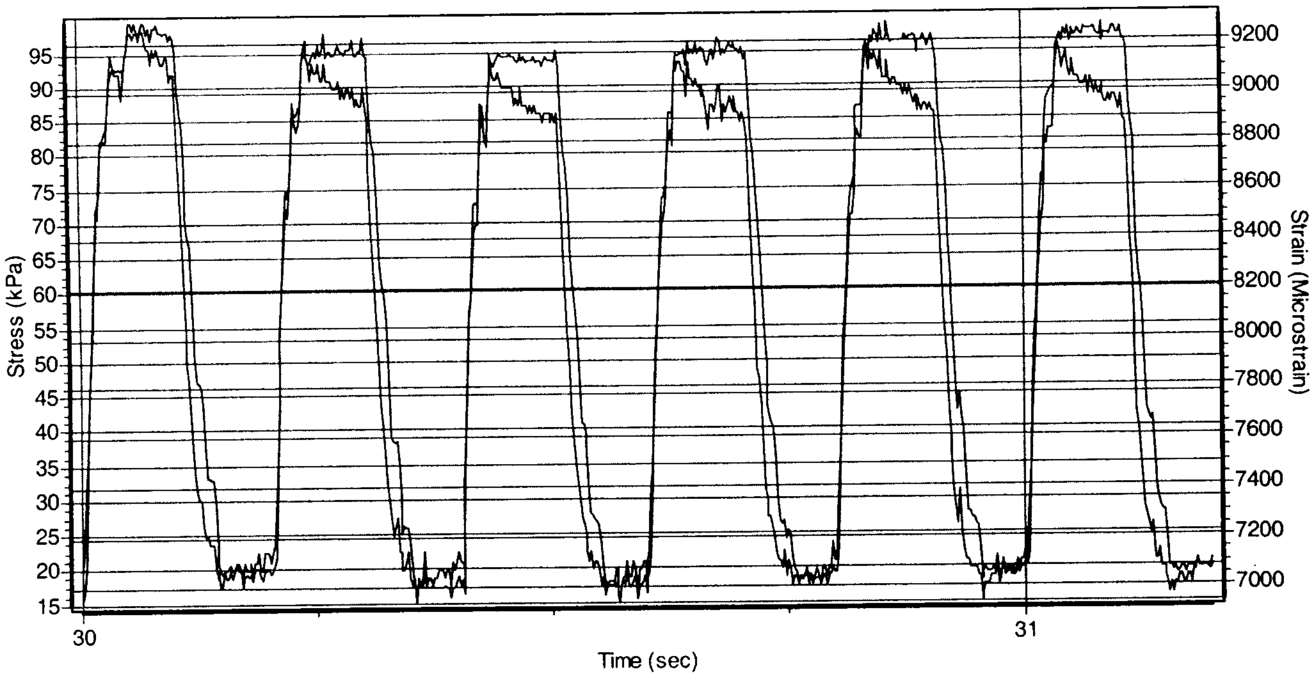
Cross-Sectional Area: 7853.982
Volume: 887499.9

Comments/Properties: Initial Temp: 104 'C
Final Temp: 95 'C

#17 $E^* = 36.6$ MPa
VTM = 7.0%
Temp = 104 - 95°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#24.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 3:08 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	82.1	79.6	75.9	80.8	80.1
Recoverable axial micro-strain	2345.5	2284.5	2236.3	2211.4	2259.7	2267.5
Permanent axial micro-strain	6944	6957	6932	7005	7018	
Dynamic modulus (MPa)	35.0	35.9	35.6	34.3	35.8	35.3
Phase angle (Deg)	-72.94	111.62	134.18	110.43	77.39	72.14
Dyn.Modulus/sine(phase angle)	-58.9	43.4	38.6	41.8	57.2	24.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#24

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

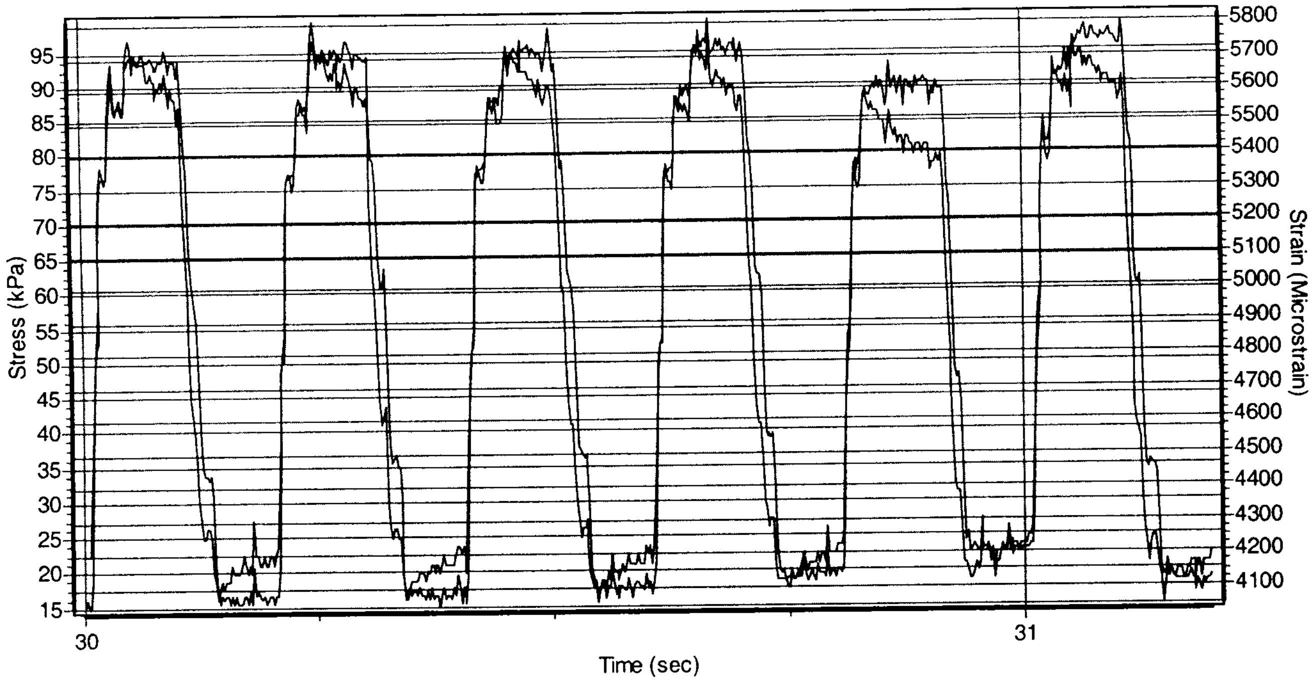
Cross-Sectional Area: 7853.982
Volume: 887499.9

Comments/Properties: Initial Temp: 100 'C
Final Temp: 95 'C

#24 thermal $E^* = 35.3$ MPa
VTM = 7.0%
Temp = 100 - 95°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#23.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 3:03 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.8	83.3	79.6	79.6	69.6	78.6
Recoverable axial micro-strain	1682.4	1707.0	1731.6	1731.6	1547.4	1680.0
Permanent axial micro-strain	4044	4044	4056	4081	4130	
Dynamic modulus (MPa)	48.1	48.8	46.0	46.0	45.0	46.8
Phase angle (Deg)	-224.51	-46.80	-233.71	-244.52	-213.07	-192.52
Dyn.Modulus/sine(phase angle)	-51.9	-122.9	-51.5	-54.4	-47.0	-65.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#23

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

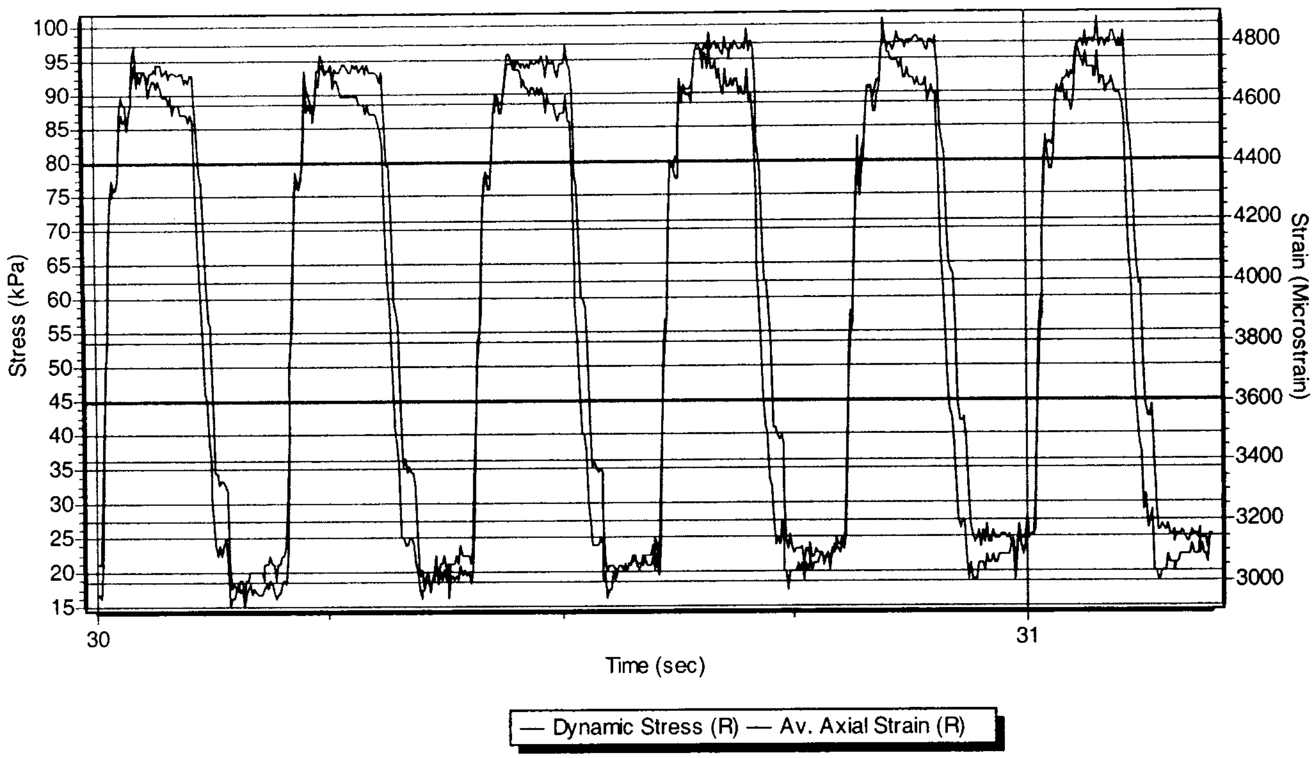
Cross-Sectional Area: 7853.982
Volume: 895353.9

Comments/Properties: Initial Temp: 100 'C
Final Temp: 95 'C

#23 Phase I $E^* = 46.8$ MPa
VTM = 7.0% (?)
Temp = 100-95°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#21.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:53 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	79.6	79.6	79.6	82.1	80.6
Recoverable axial micro-strain	1817.1	1792.4	1804.2	1828.4	1803.8	1809.2
Permanent axial micro-strain	2918	2943	2992	3017	3067	
Dynamic modulus (MPa)	45.2	44.4	44.1	43.5	45.5	44.5
Phase angle (Deg)	9.21	9.52	-170.25	-168.25	9.76	-62.00
Dyn.Modulus/sine(phase angle)	562.5	534.9	-44.3	-43.8	535.0	308.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#21

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

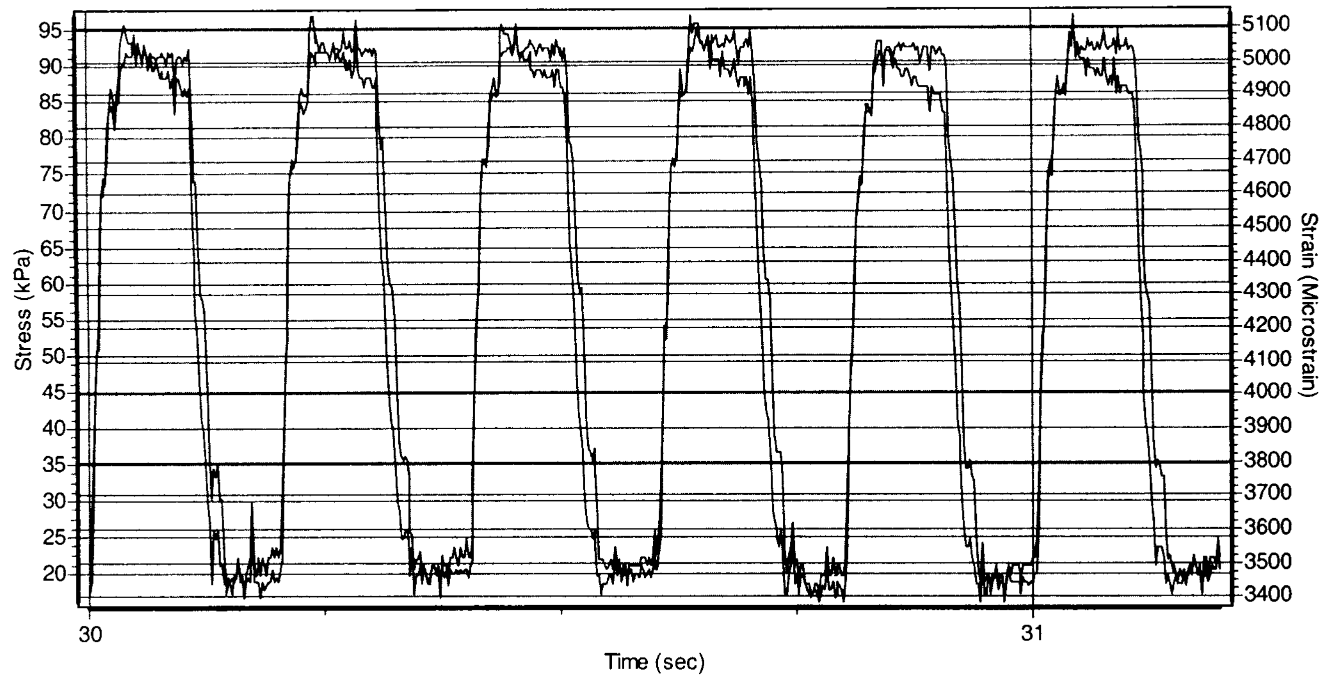
Cross-Sectional Area: 7853.982
Volume: 895353.9

Comments/Properties: Initial Temp: 101 'C
Final Temp: 96° 'C

# 21 $E^* = 44.5$ MPa
VTM = ~~[illegible]~~ 5.0%
Temp = 101 - 96°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#22.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 2:58 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.4	79.6	78.4	79.6	77.1	78.6
Recoverable axial micro-strain	1666.3	1727.4	1665.9	1703.1	1666.4	1685.8
Permanent axial micro-strain	3396	3396	3433	3384	3384	
Dynamic modulus (MPa)	47.0	46.1	47.0	46.7	46.3	46.6
Phase angle (Deg)	18.28	15.46	7.41	9.02	-165.58	-23.08
Dyn.Modulus/sine(phase angle)	296.0	342.6	727.6	594.3	-46.6	382.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#22

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114						114	

Cross-Sectional Area: 7853.982
Volume: 895353.9

Comments/Properties: Initial Temp: 100 'C
Final Temp: 96 'C

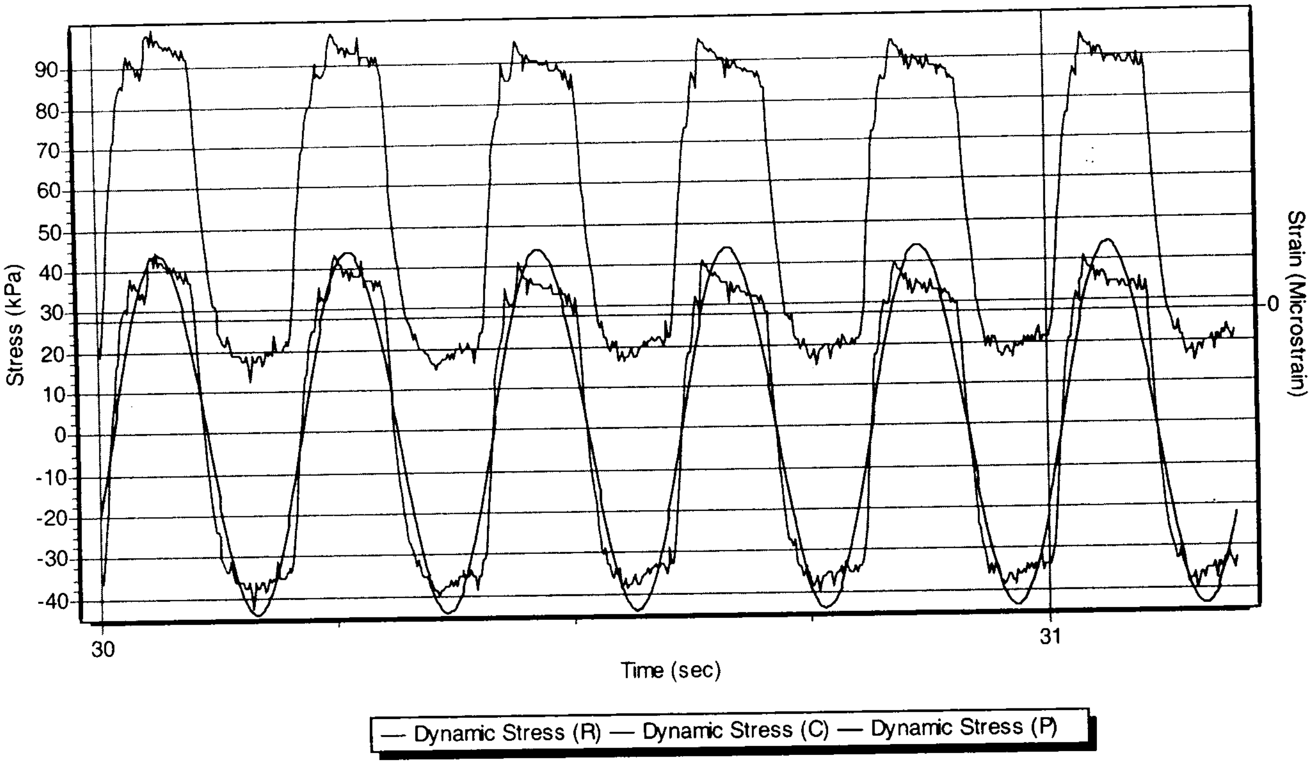
22 Phase 1 $E^* = 46.6$ MPa

VTM = 5.0%

Temp: 100 - 96°C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P1_#05.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, May 6, 2002, at 1:54 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	87.1	83.3	79.6	80.8	78.4	81.8
Recoverable axial micro-strain	2147.3	2184.0	2000.1	1950.9	1975.3	2051.5
Permanent axial micro-strain	4185	4185	4271	4332	4345	
Dynamic modulus (MPa)	40.5	38.2	39.8	41.4	39.7	39.9
Phase angle (Deg)	6.91	6.62	-175.82	6.03	7.12	-29.83
Dyn.Modulus/sine(phase angle)	672.9	661.2	-39.8	787.9	638.6	544.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

0-90

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P1_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

Cross-Sectional Area: 7853.982
Volume: 887499.9

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

8.6 <

E* 39.9

#5 Phase 1 E* 39.9 MPa
VTM: ~~[illegible]~~ 6.8%
Temp: 98° - 93°C

Sample	Asphalt Content, %	Percent passing 0.075 mm sieve	Voids in Total Mix, %	Effective Specific Gravity, Gse	Bulk Specific Gravity
1	4.8	3.1	7.3	2.725	2.34
2	4.8	3.1	7.8	2.725	2.329
3	4.8	3.1	7.2	2.725	2.345
4	5.3	3.1	5.2	2.725	2.376
5	5.3	3.1	5.4	2.725	2.37
6	5.3	3.1	4.8	2.725	2.386
7	5.8	3.1	3.5	2.725	2.401
8	5.8	3.1	4.2	2.725	2.384
9	5.8	3.1	3.8	2.725	2.392
10	4.8	1.1	6.6	2.717	2.354
11	4.8	1.1	7.3	2.717	2.335
12	4.8	1.1	7.8	2.717	2.321
13	5.3	1.1	5.9	2.717	2.352
14	5.3	1.1	5.5	2.717	2.363
15	5.3	1.1	5.3	2.717	2.368
16	5.8	1.1	3.9	2.717	2.384
17	5.8	1.1	3.8	2.717	2.386
18	5.8	1.1	3.8	2.717	2.386
19	4.8	5.1	1.7	2.648	2.421
20	4.8	5.1	1.8	2.648	2.417
21	4.8	5.1	1.5	2.648	2.426
22	5.3	5.1	1.7	2.648	2.402
23	5.3	5.1	0.7	2.648	2.428
24	5.3	5.1	0.8	2.648	2.425
25	5.8	5.1	0.4	2.648	2.418
26	5.8	5.1	0.6	2.648	2.413
27	5.8	5.1	0.2	2.648	2.421

check dust content
determine vma and vfa
ask for good and bad mix from DOTs

CHECK THE OD AND RD SAMPLES; SUSPECT
CHECK TMD, BSG, VOIDS ACCORDINGLY

1Hz, 100°C

5Hz

Sample	Voids in Mineral Aggregate, %	Voids filled with Asphalt, %	Loading stress, kPa	Dynamic Modulus, MPa	Phase Angle, degree
1	18.25027523	60.00060323	82.9	42.6 5Hz, 60°C	7.4
2	18.63456881	58.14231024	81.9	40.1	7.88
3	18.07559633	60.16728926	81.8	40.2	9.2
4	17.42855046	70.16389853	79.6	47.7	7.6
5	17.63706422	69.38265954	81.5	49.6	**3.9**
6	17.08102752	71.89864606	82.6	49.2	10.9
7	17.00029358	79.41212024	81.7	48	8.7
8	**17.5879633**	**76.12003205**	**81.3**	**33.9**	**10.1**
9	17.31141284	78.04916309	83.5	48.8	6.2
10	17.51902834	62.32667776	82.3	55.8	10.6
11	18.18476261	59.85650097	81.5	56.5	12.6
12	18.67530364	58.23361082	81.9	55.3	14.2
13	18.02193596	67.26211871	81.2	**111.3**	12.8
14	17.63853515	68.8182723	80.3	41.3	**25.2**
15	17.46426205	69.65231062	82.7	38.4	10.4
16	17.34530732	77.51553243	81.4	**37.7**	6.5
17	17.27596614	78.00412452	81.9	**29.5**	9.7
18	17.27596614	78.00412452	81.3	**32.3**	**13.3**
19	12.96102719	86.88375562	80.8	**37.6**	11
20	13.10483384	86.26461028	82.2	50.7	11.7
21	12.78126888	88.26407602	81.4	53.9	13.3
22	14.09765861	87.94125999	81.9	**47.8**	13.7
23	13.16782477	94.68401188	82	**52.3**	11.6
24	13.27511329	93.97368608	81.6	**36.3**	14.2
25	13.98202417	97.13918389	82.3	36	9.7
26	14.15989426	95.76268022	81.6	37.7	11.2
27	13.87530211	98.55858994	80.7	37.2	11.4
				45	30

de

ask for g

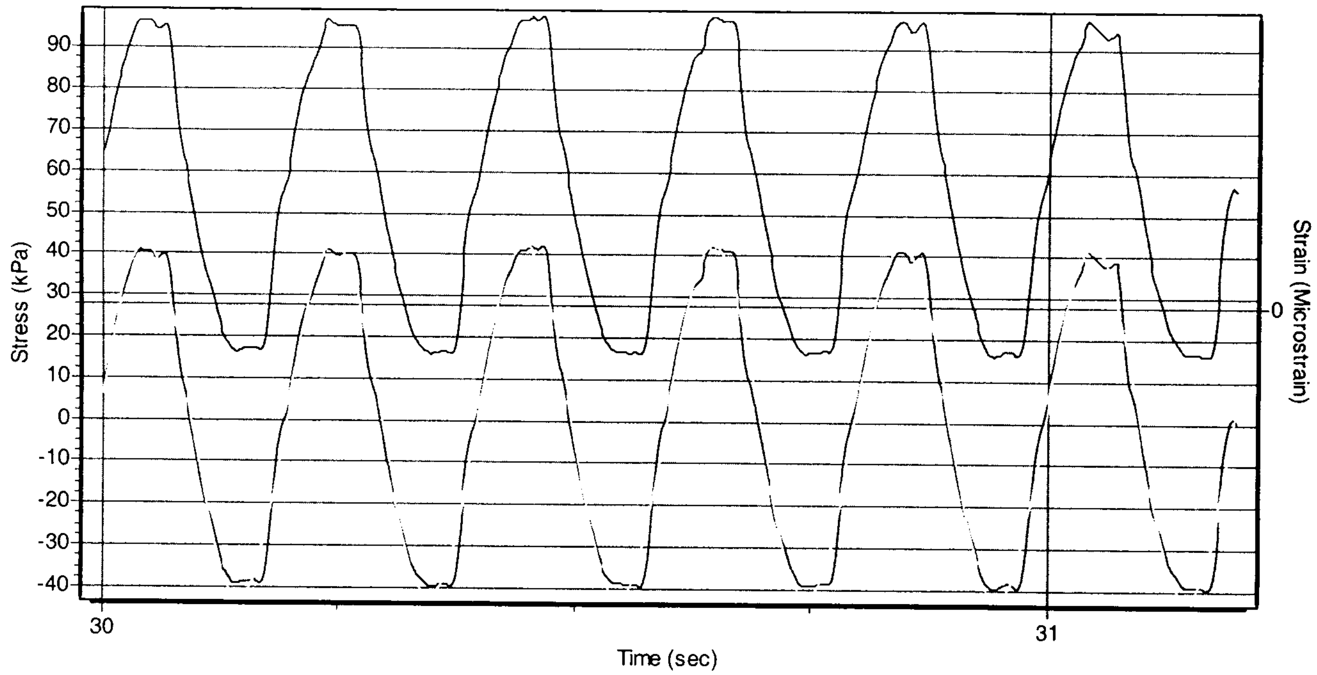
Sample	Mod/sin(phase angle)	In Temp, C	Out Temp, C	Average Temp, C	final cycle Permanent axial strain
1	330.7566495	96	86	91	1615
2	292.4898284	97	91	94	1832
3	251.4367111	97	87	92	1567
4	360.6631022	95	89	92	2039
5	729.2477841	94	90	92	2034
6	260.1860691	96	91	93.5	2125
7	317.3326703	99	92	95.5	1481
8	**193.3091913**	**97**	**89**	**93**	**1969**
9	451.8545475	98	91	94.5	2237
10	303.3410726	102	97	99.5	1594
11	259.0041279	103	97	100	2101
12	225.4314512	103	98	100.5	2167
13	502.373075	95	91	93	2132
14	96.9986113	99	94	96.5	2474
15	212.7198195	98	92	95	1817
16	333.0294145	96	92	94	3044
17	175.0852195	100	94	97	2326
18	140.4044203	101	94	97.5	1994
19	197.0556992	102	94	98	1452
20	250.0156625	102	95	98.5	1579
21	234.2971596	102	98	100	1128
22	201.8255961	102	97	99.5	1871
23	260.0981734	101	92	96.5	1560
24	147.9776072	102	96	99	2584
25	213.6633187	101	95	98	1986
26	194.0954304	101	95	98	2790
27	188.2044954	101	95	98	1807
'	90				

de
ask for g

PHASE II
Dynamic Modulus Test Results

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#01.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:21 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.2	83.5	83.2	83.3	82.6	82.9
Recoverable axial micro-strain	1942.1	1934.6	1961.5	1954.3	1945.6	1947.6
Permanent axial micro-strain	1589	1590	1598	1605	1615	
Dynamic modulus (MPa)	42.3	43.2	42.4	42.6	42.4	42.6
Phase angle (Deg)	6.16	5.87	7.20	9.44	8.43	7.42
Dyn.Modulus/sine(phase angle)	787.1	843.6	675.5	517.7	577.6	680.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#01

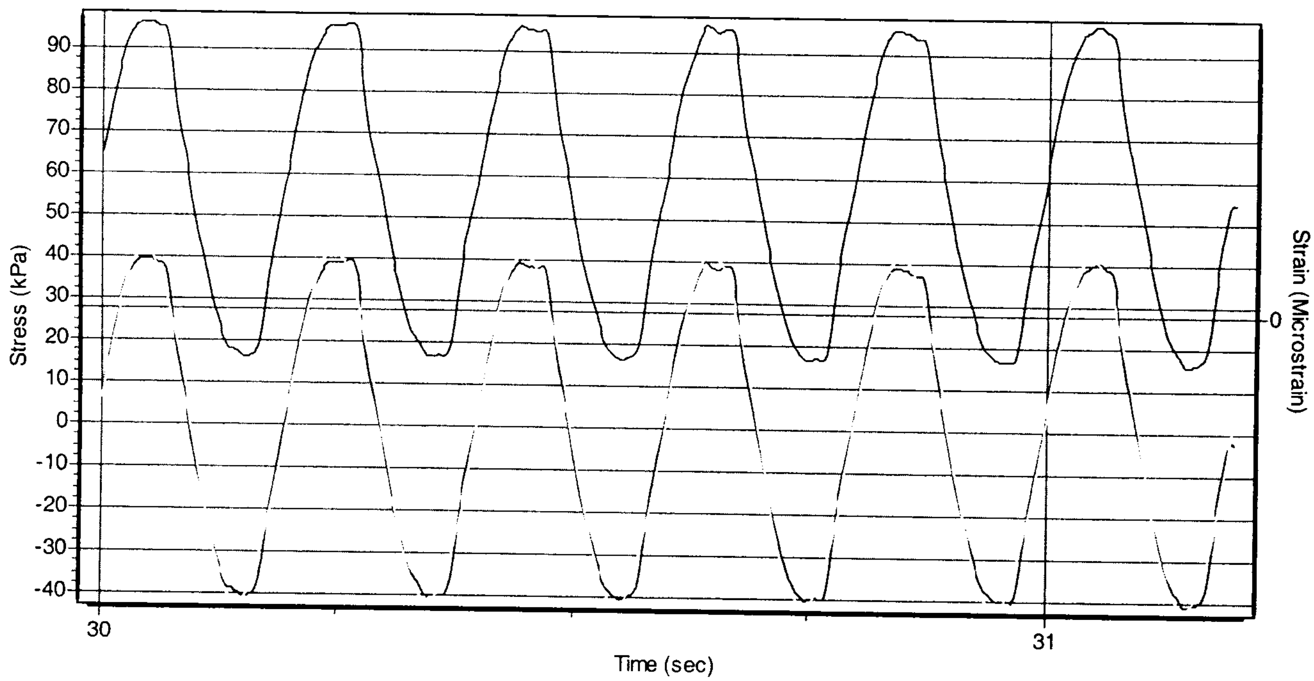
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 86 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#02.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:25 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.7	81.8	81.9	82.1	81.2	81.9
Recoverable axial micro-strain	2048.2	2024.9	2080.5	2029.9	2039.1	2044.5
Permanent axial micro-strain	1798	1829	1779	1842	1832	
Dynamic modulus (MPa)	40.4	40.4	39.4	40.4	39.8	40.1
Phase angle (Deg)	8.77	6.83	7.48	8.07	8.23	7.88
Dyn.Modulus/sine(phase angle)	528.2	678.8	603.5	574.4	554.8	587.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

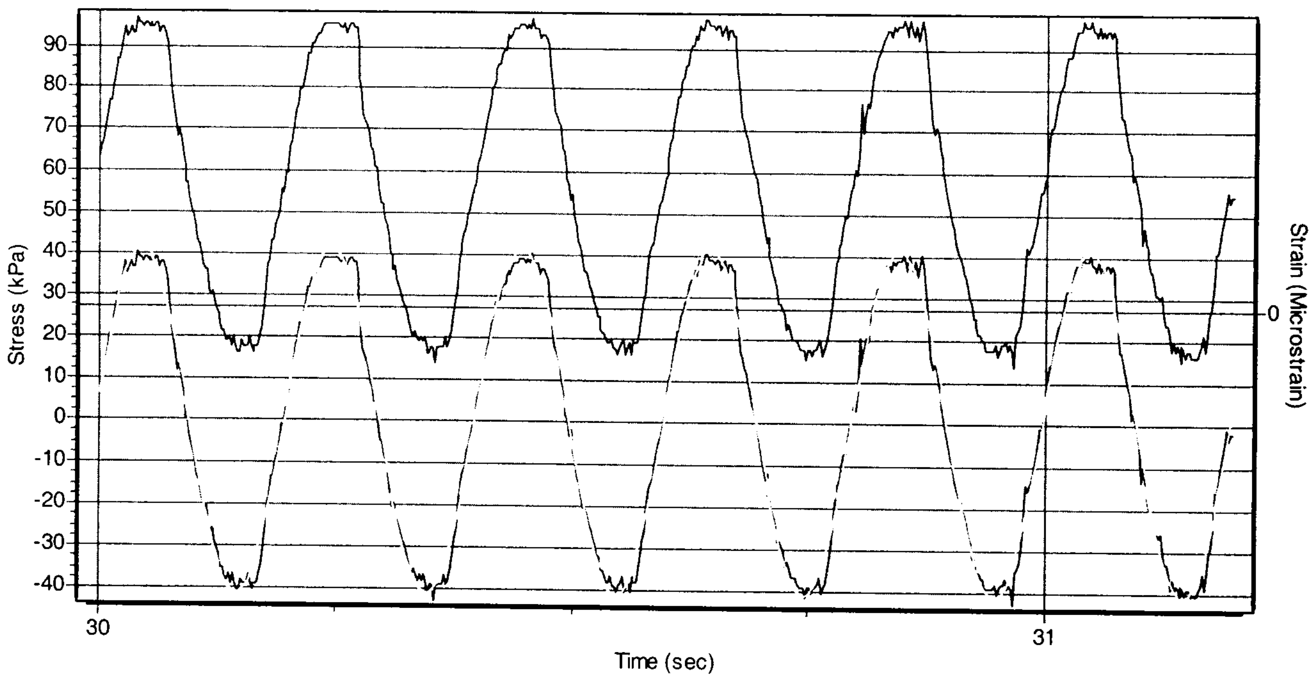
Core/Sample Number: P2_#02

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#03.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:29 PM
Data Filtering: Not used
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 107
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.8	82.1	80.8	82.1	83.3	81.8
Recoverable axial micro-strain	2009.6	2077.9	2021.2	2009.9	2066.6	2037.0
Permanent axial micro-strain	1590	1567	1601	1601	1567	
Dynamic modulus (MPa)	40.2	39.5	40.0	40.8	40.3	40.2
Phase angle (Deg)	8.87	9.81	8.66	8.59	10.07	9.20
Dyn.Modulus/sine(phase angle)	520.2	461.9	529.8	545.2	459.3	503.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#03

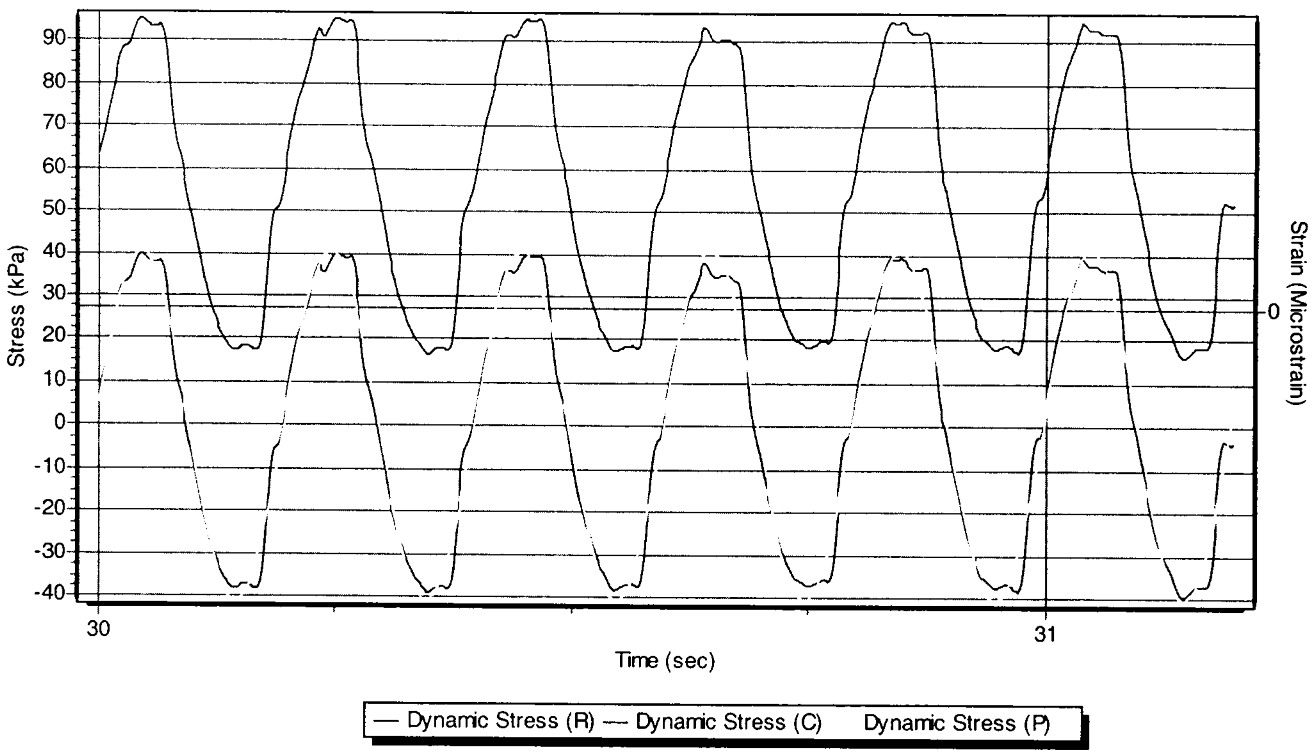
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	107						107	

Cross-Sectional Area: 7853.982
Volume: 840376

Comments/Properties: Initial Temp: 97 'C
Final Temp: 67 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#04.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:34 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	79.9	81.5	80.3	76.9	79.4	79.6
Recoverable axial micro-strain	1661.3	1664.7	1650.4	1711.2	1659.1	1669.4
Permanent axial micro-strain	2062	2055	2071	2003	2039	
Dynamic modulus (MPa)	48.1	49.0	48.7	44.9	47.9	47.7
Phase angle (Deg)	4.61	8.02	9.34	8.65	7.61	7.65
Dyn.Modulus/sine(phase angle)	1194.6	700.4	597.4	595.7	721.4	761.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

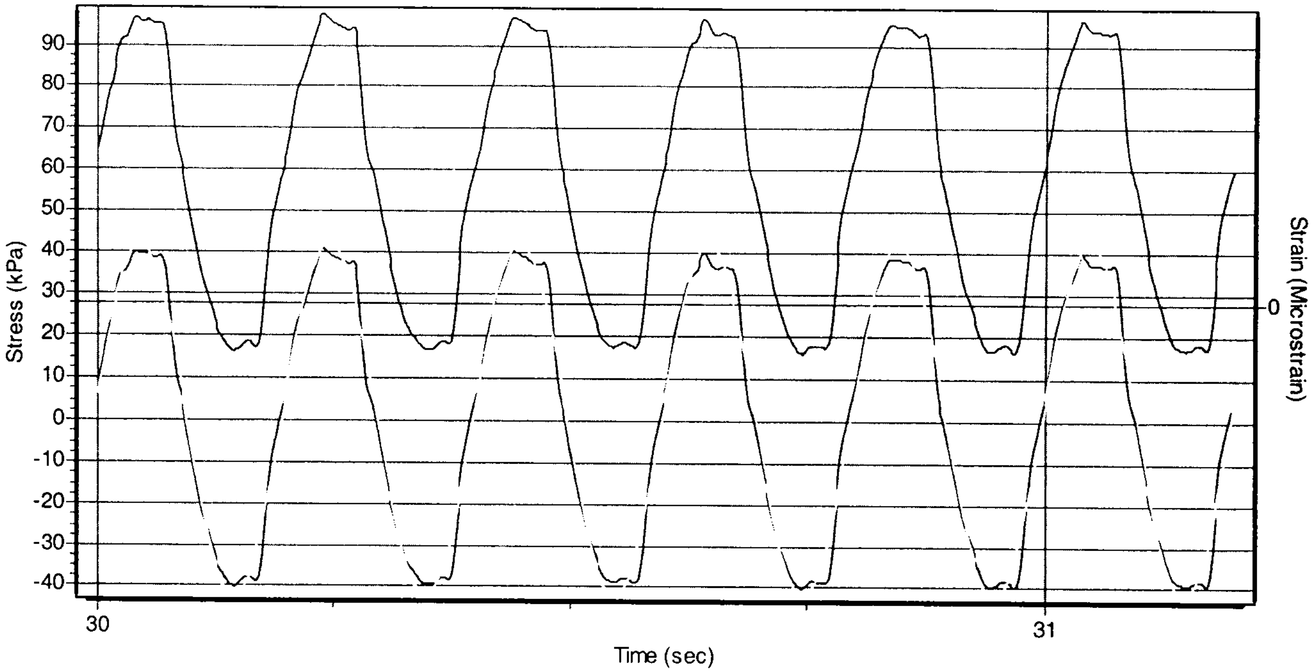
Core/Sample Number: P2_#04

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 95 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#05.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:38 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	82.6	81.1	81.1	80.7	81.5
Recoverable axial micro-strain	1647.7	1639.1	1650.3	1630.9	1649.3	1643.5
Permanent axial micro-strain	2007	2020	2026	2028	2034	
Dynamic modulus (MPa)	49.9	50.4	49.1	49.7	48.9	49.6
Phase angle (Deg)	4.47	4.91	3.81	6.71	-0.37	3.91
Dyn.Modulus/sine(phase angle)	1277.7	1175.2	1479.9	850.0	-15077.6	-2059.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#05

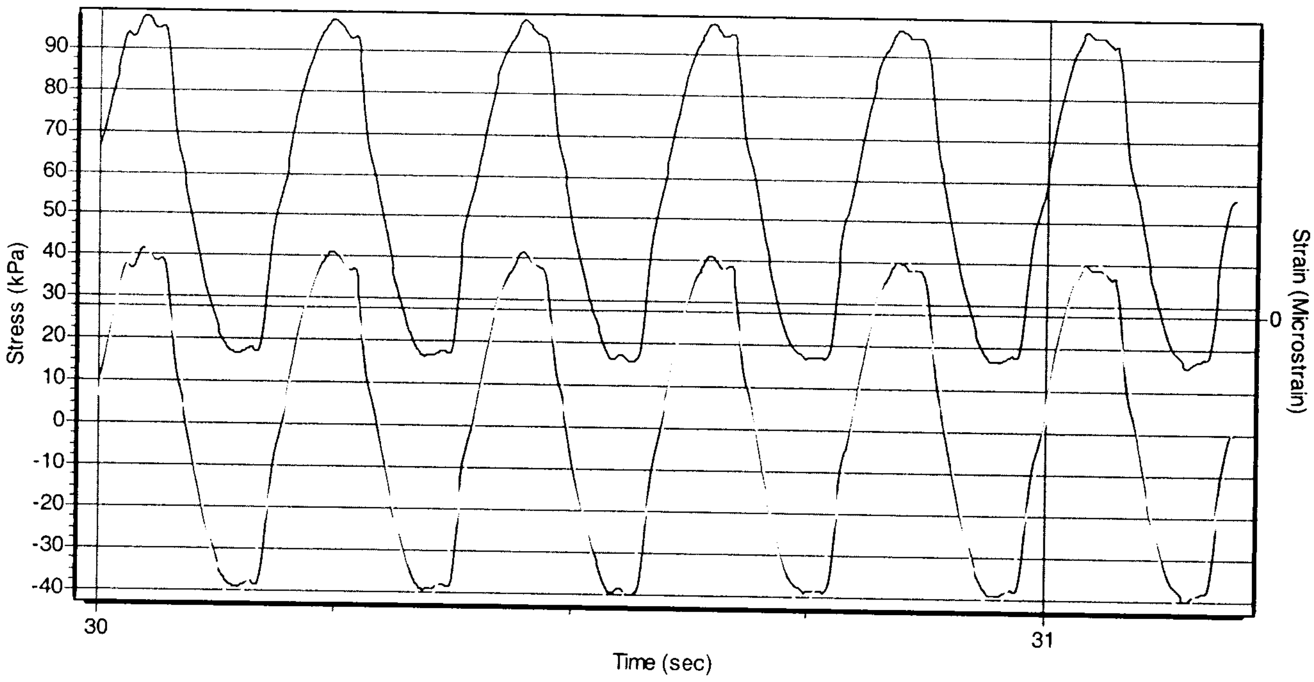
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 94 'C
Final Temp: 70 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#06.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:42 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.4	82.5	83.4	82.2	81.6	82.6
Recoverable axial micro-strain	1682.3	1678.2	1682.8	1680.6	1677.1	1680.2
Permanent axial micro-strain	2096	2094	2095	2112	2125	
Dynamic modulus (MPa)	49.6	49.1	49.6	48.9	48.6	49.2
Phase angle (Deg)	12.75	9.37	9.84	11.93	10.84	10.95
Dyn.Modulus/sine(phase angle)	446.5	601.9	577.8	470.9	514.8	522.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#06

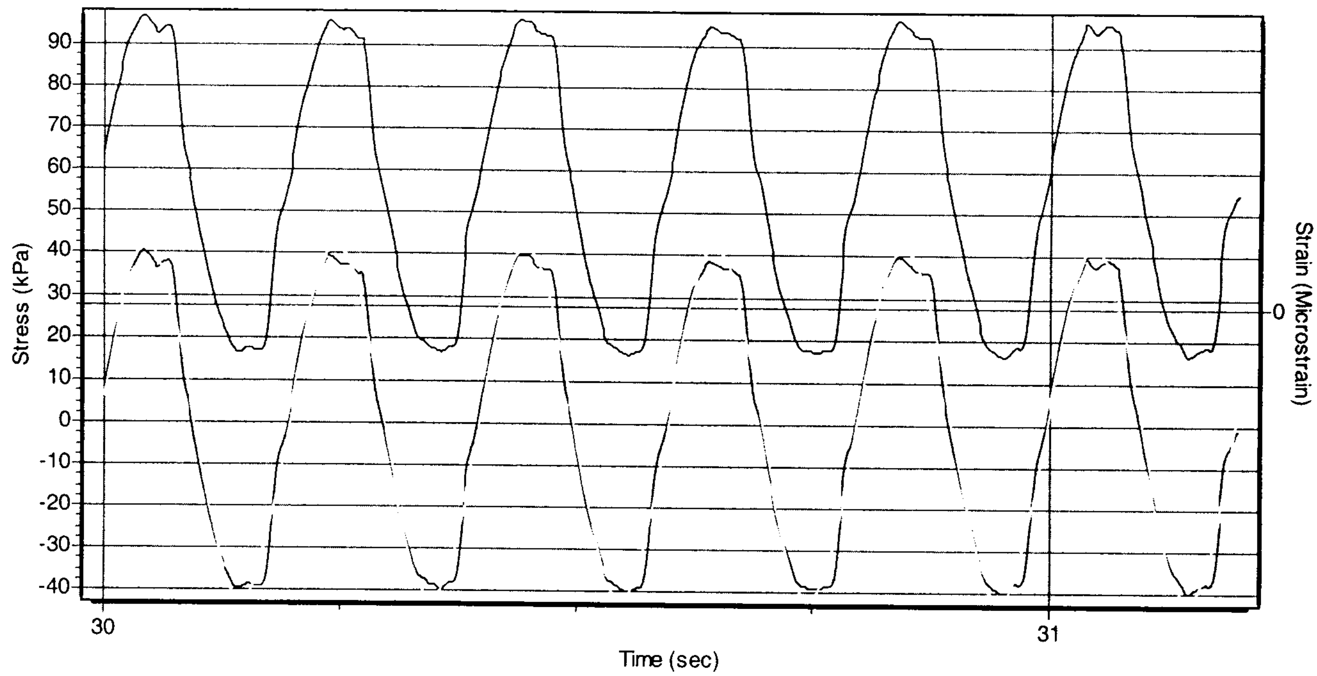
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#07.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:45 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	81.2	82.4	81.4	82.0	81.7
Recoverable axial micro-strain	1693.2	1726.0	1680.9	1672.6	1742.8	1703.1
Permanent axial micro-strain	1507	1472	1521	1536	1481	
Dynamic modulus (MPa)	48.1	47.0	49.0	48.6	47.1	48.0
Phase angle (Deg)	11.80	5.36	5.18	11.34	9.70	8.68
Dyn.Modulus/sine(phase angle)	467.7	1006.5	1083.7	492.5	556.8	721.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#07

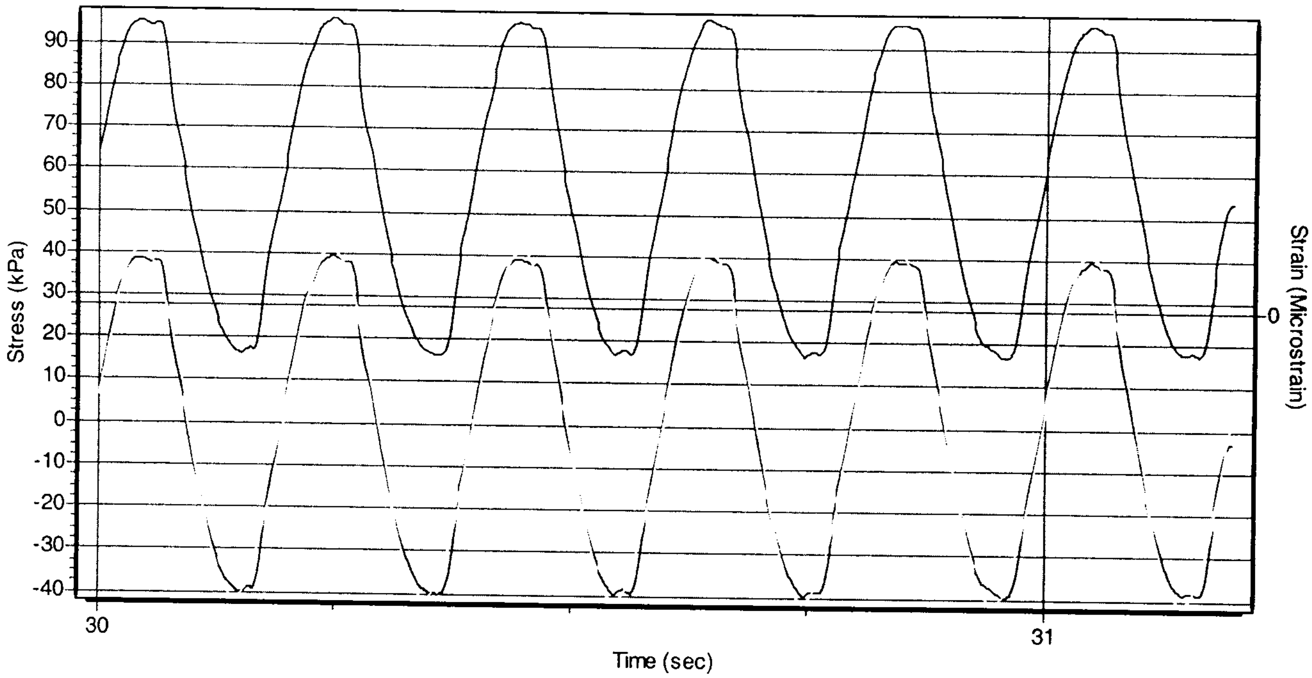
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#08.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.7	80.8	81.4	81.2	81.3
Recoverable axial micro-strain	2392.9	2396.7	2394.9	2401.9	2404.6	2398.2
Permanent axial micro-strain	1946	1952	1964	1975	1969	
Dynamic modulus (MPa)	33.9	34.1	33.8	33.9	33.8	33.9
Phase angle (Deg)	10.27	10.33	10.23	10.24	9.60	10.13
Dyn.Modulus/sine(phase angle)	379.3	378.8	378.5	379.7	403.7	384.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#08

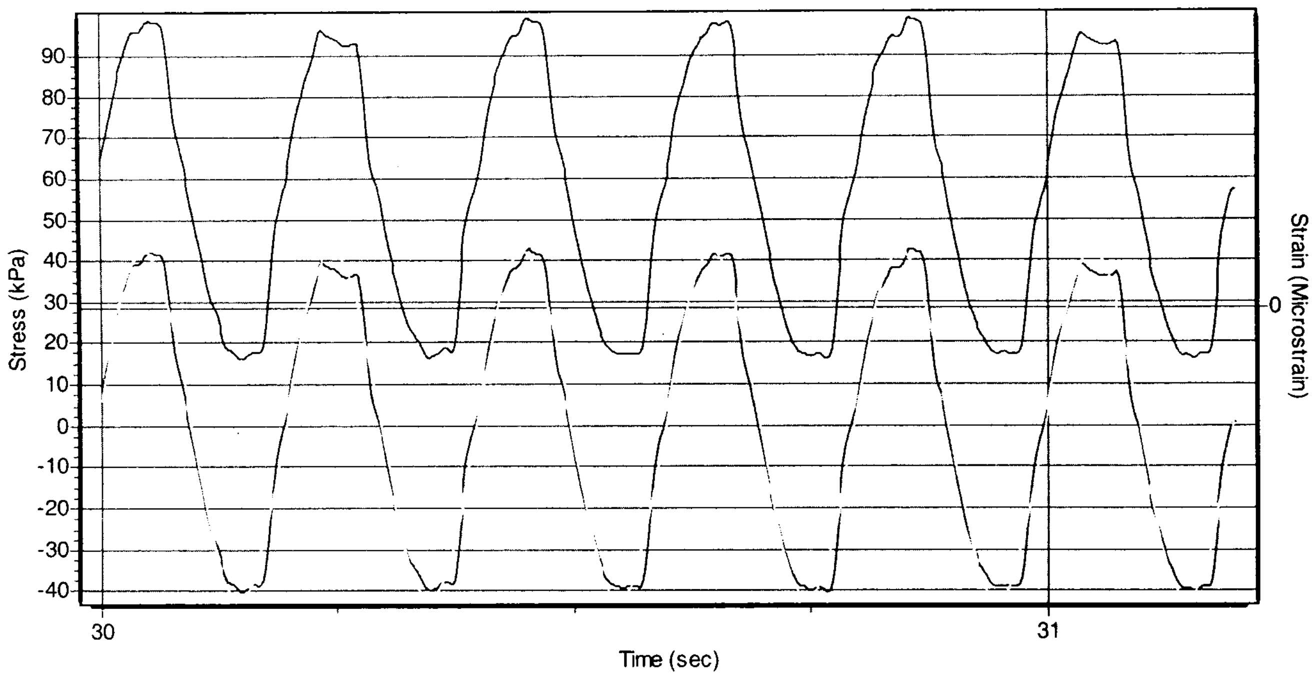
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 89 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#09.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:53 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.8	80.9	85.0	82.8	84.1	83.5
Recoverable axial micro-strain	1717.0	1677.9	1719.6	1717.1	1721.6	1710.6
Permanent axial micro-strain	2201	2224	2213	2219	2237	
Dynamic modulus (MPa)	49.4	48.2	49.4	48.2	48.8	48.8
Phase angle (Deg)	7.67	0.12	6.53	7.06	9.35	6.15
Dyn.Modulus/sine(phase angle)	738.6	46499.6	867.8	783.1	599.0	9897.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

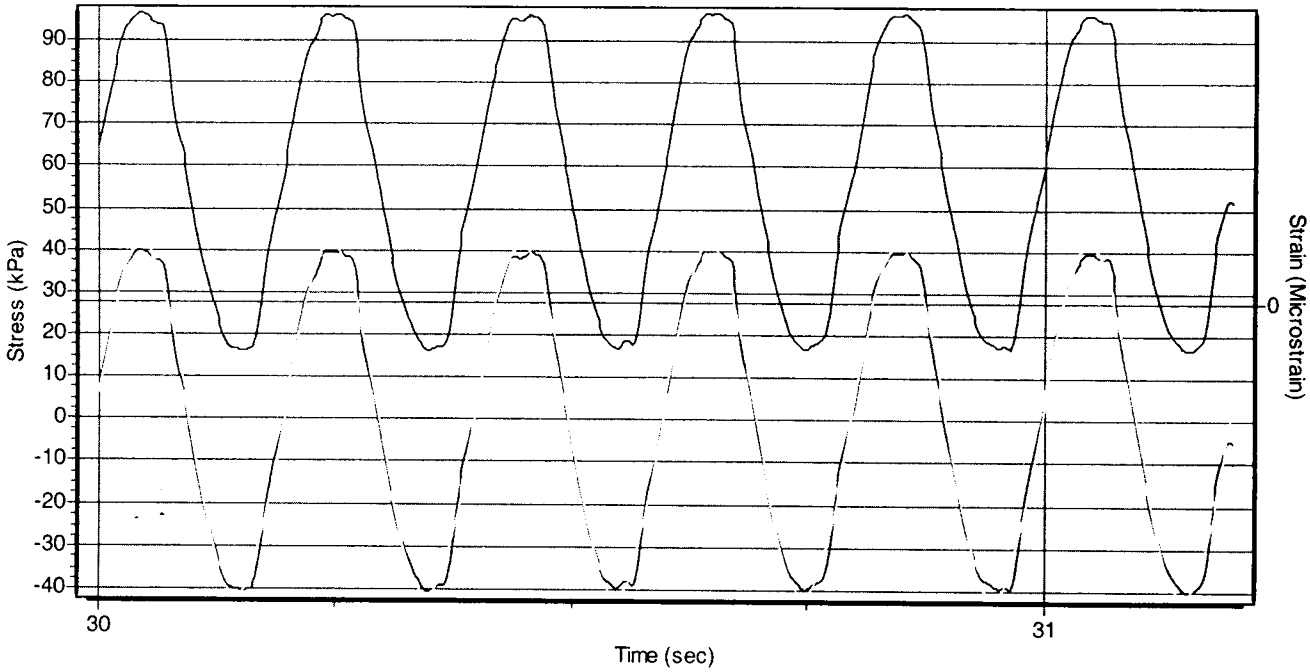
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#10.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 2:58 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.6	82.4	81.9	82.7	81.6	82.3
Recoverable axial micro-strain	1481.4	1469.5	1465.9	1478.0	1474.9	1473.9
Permanent axial micro-strain	1567	1579	1599	1594	1594	
Dynamic modulus (MPa)	55.8	56.1	55.9	55.9	55.4	55.8
Phase angle (Deg)	10.39	10.73	11.25	10.27	10.55	10.64
Dyn.Modulus/sine(phase angle)	616.1	599.7	570.1	625.4	602.1	602.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#10

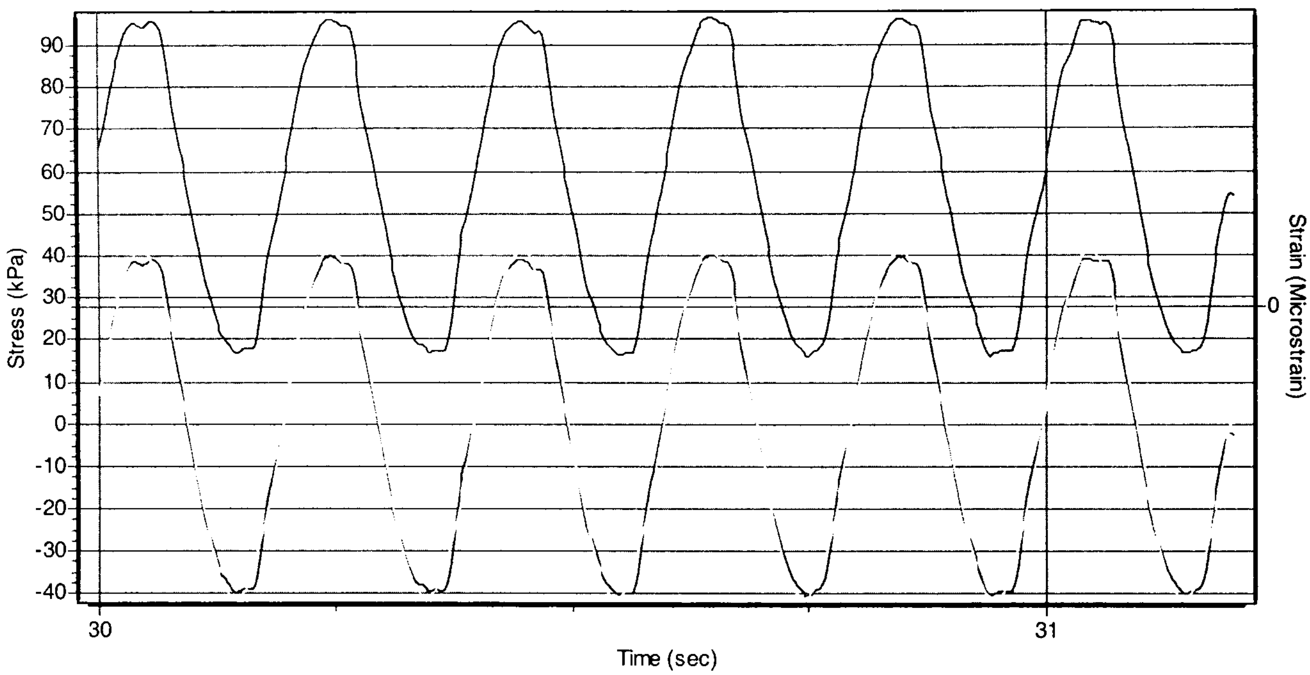
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: ~~98~~ 102 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#11.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:02 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 107
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.7	81.5	81.9	81.2	81.5
Recoverable axial micro-strain	1432.3	1429.7	1429.6	1473.4	1442.8	1441.5
Permanent axial micro-strain	2088	2100	2095	2071	2101	
Dynamic modulus (MPa)	56.7	57.2	57.0	55.6	56.3	56.5
Phase angle (Deg)	11.02	12.96	13.13	13.01	12.69	12.56
Dyn.Modulus/sine(phase angle)	590.2	506.5	498.3	490.5	509.6	519.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#11

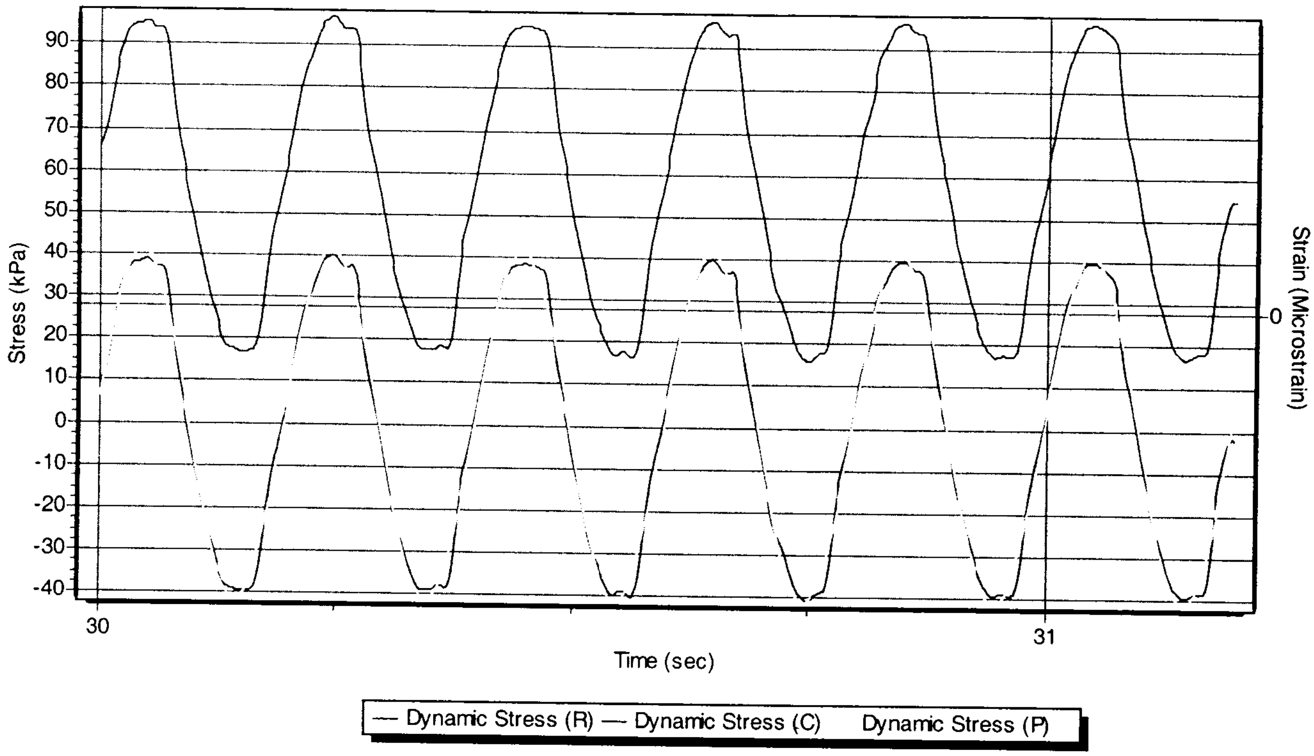
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	107						107	

Cross-Sectional Area: 7853.982
Volume: 840376

Comments/Properties: Initial Temp: 103 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#12.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:05 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.4	81.8	81.5	81.9	81.8	81.9
Recoverable axial micro-strain	1478.3	1473.9	1490.5	1469.1	1484.7	1479.3
Permanent axial micro-strain	2145	2156	2146	2173	2167	
Dynamic modulus (MPa)	55.7	55.5	54.7	55.8	55.1	55.3
Phase angle (Deg)	15.25	14.65	15.18	13.59	12.29	14.19
Dyn.Modulus/sine(phase angle)	419.8	435.5	413.9	471.5	514.6	451.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#12

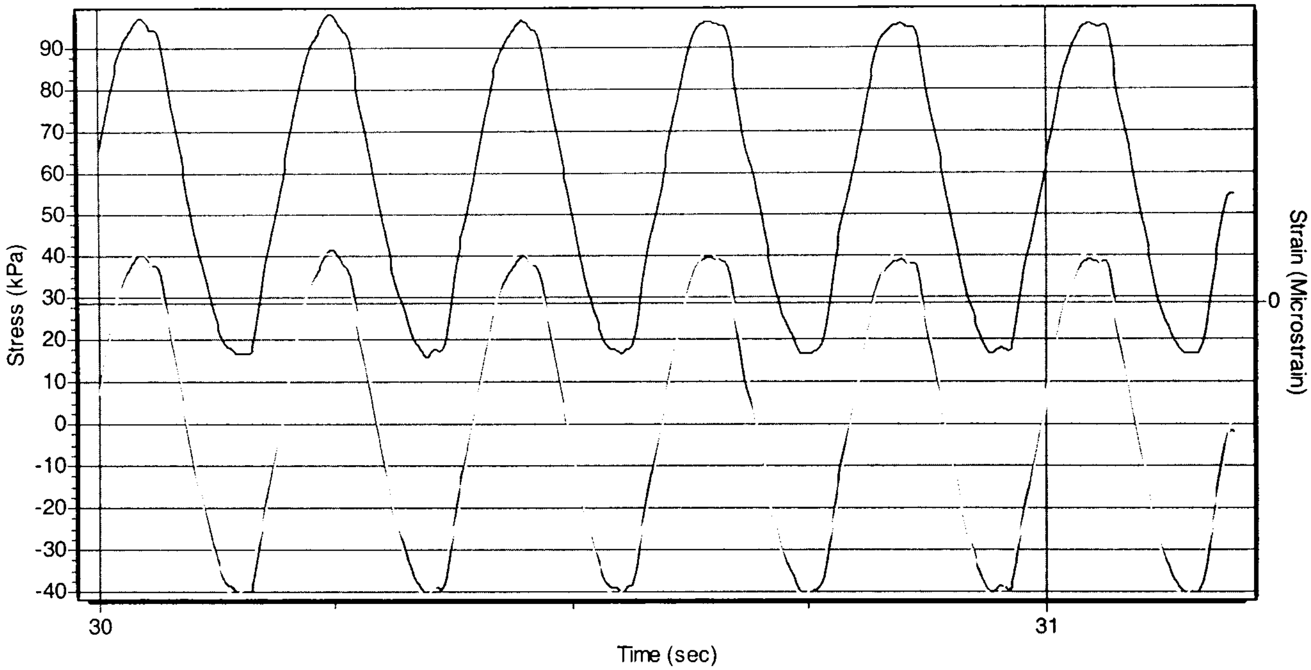
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 103 'C
Final Temp: 98 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#13.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:09 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.9	81.8	80.4	82.1	80.8	81.2
Recoverable axial micro-strain	737.2	732.6	729.2	727.7	722.5	729.8
Permanent axial micro-strain	2099	2110	2109	2119	2132	
Dynamic modulus (MPa)	109.8	111.7	110.2	112.8	111.9	111.3
Phase angle (Deg)	13.25	13.05	14.04	10.83	12.94	12.82
Dyn.Modulus/sine(phase angle)	951.4	983.4	902.0	1195.0	993.0	1005.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#13

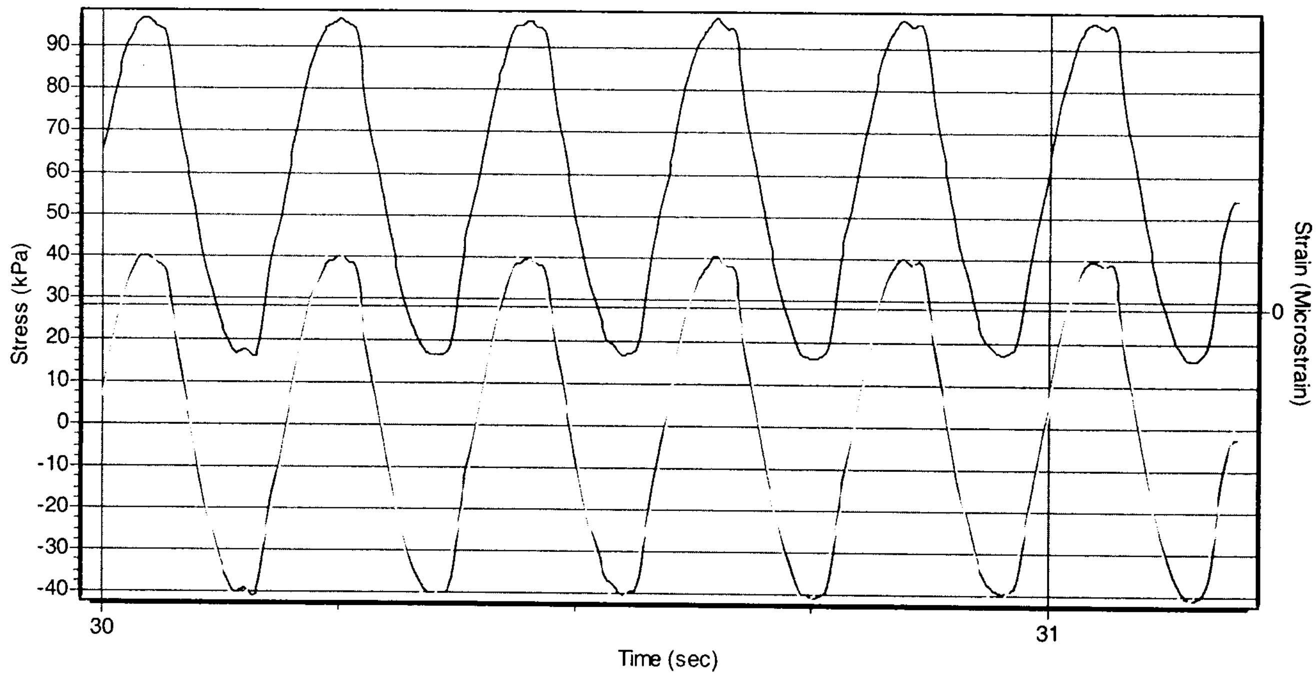
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 95 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#14.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.8	79.8	79.9	81.2	79.6	80.3
Recoverable axial micro-strain	1968.8	1940.9	1952.9	1943.1	1921.0	1945.3
Permanent axial micro-strain	2401	2434	2438	2444	2474	
Dynamic modulus (MPa)	41.0	41.1	40.9	41.8	41.4	41.3
Phase angle (Deg)	32.40	21.60	3.60	32.40	36.00	25.20
Dyn.Modulus/sine(phase angle)	147.1	219.5	1301.9	149.9	134.1	390.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#14

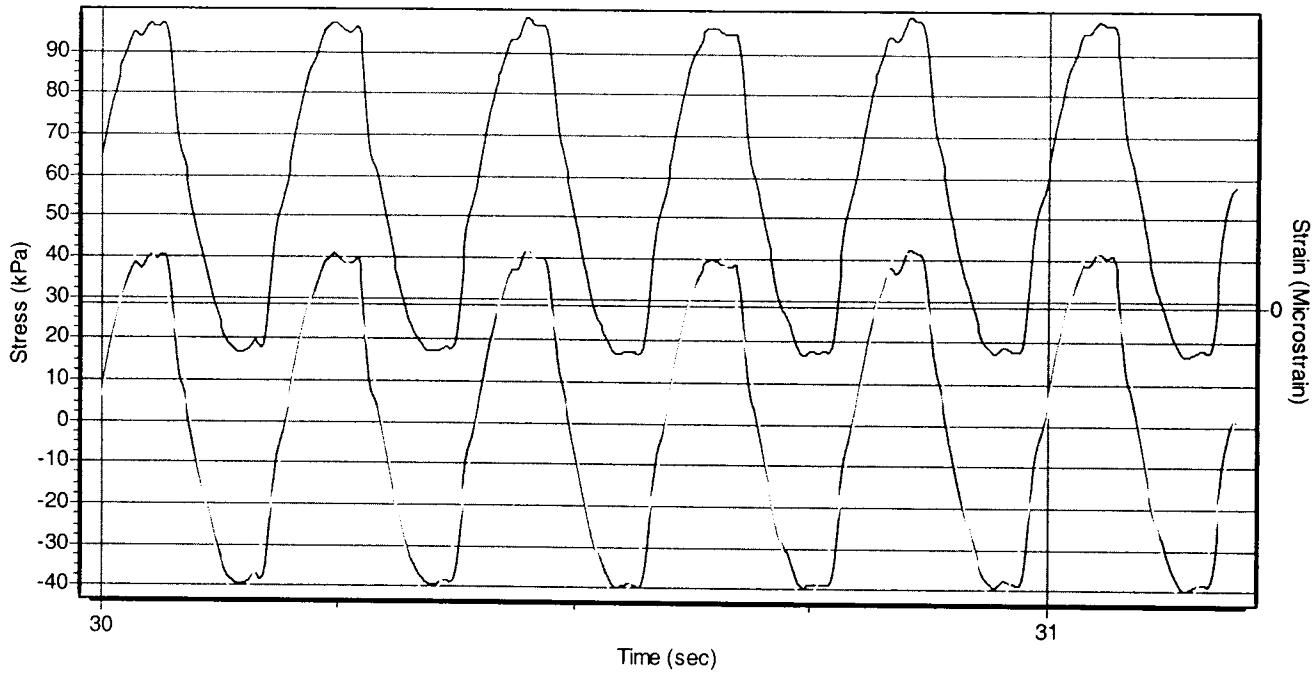
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 94 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#15.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:17 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	83.8	83.5	81.8	82.8	82.7
Recoverable axial micro-strain	2148.6	2161.7	2159.2	2158.3	2155.6	2156.7
Permanent axial micro-strain	1789	1789	1795	1806	1817	
Dynamic modulus (MPa)	38.1	38.8	38.7	37.9	38.4	38.4
Phase angle (Deg)	9.17	11.53	10.46	10.80	9.80	10.35
Dyn.Modulus/sine(phase angle)	476.2	386.0	424.2	402.7	449.7	427.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#15

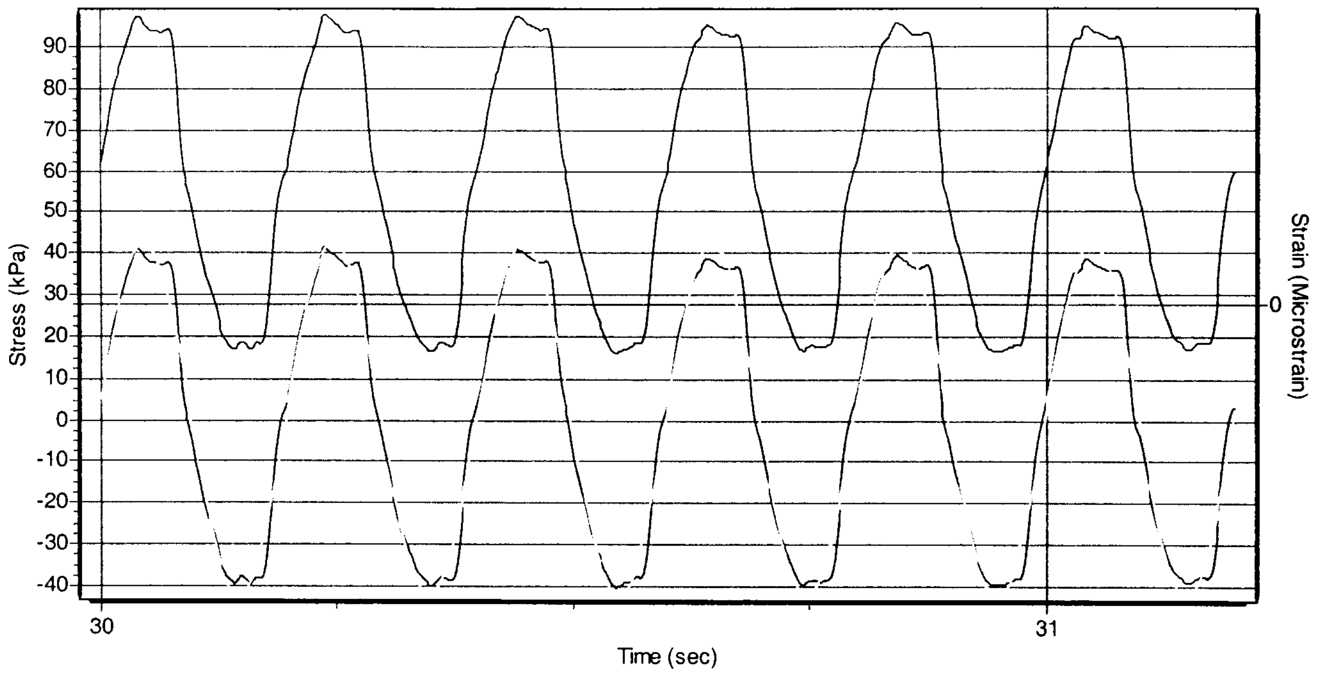
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#16.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:21 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.9	82.6	82.0	79.9	81.8	81.4
Recoverable axial micro-strain	2160.8	2153.4	2162.9	2157.4	2167.2	2160.4
Permanent axial micro-strain	3024	3029	3027	3042	3044	
Dynamic modulus (MPa)	37.4	38.4	37.9	37.0	37.8	37.7
Phase angle (Deg)	5.67	6.98	6.09	6.89	6.68	6.46
Dyn.Modulus/sine(phase angle)	757.5	630.0	713.6	615.7	648.1	673.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#16

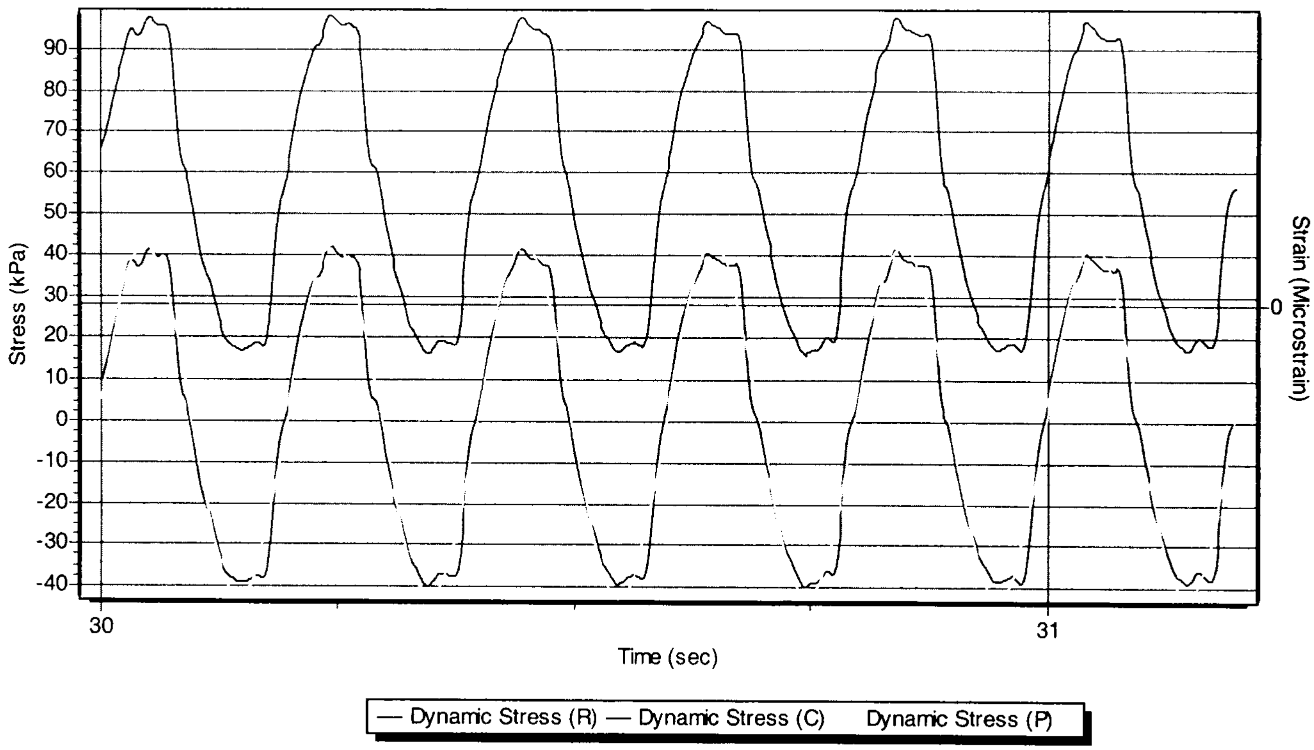
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#17.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:25 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.0	82.3	81.2	80.9	81.0	81.9
Recoverable axial micro-strain	2761.2	2758.0	2749.0	2853.6	2760.1	2776.4
Permanent axial micro-strain	2285	2304	2312	2220	2326	
Dynamic modulus (MPa)	30.4	29.9	29.5	28.3	29.4	29.5
Phase angle (Deg)	12.27	12.53	7.87	7.60	8.10	9.67
Dyn.Modulus/sine(phase angle)	284.7	273.7	430.4	427.8	415.5	366.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#17

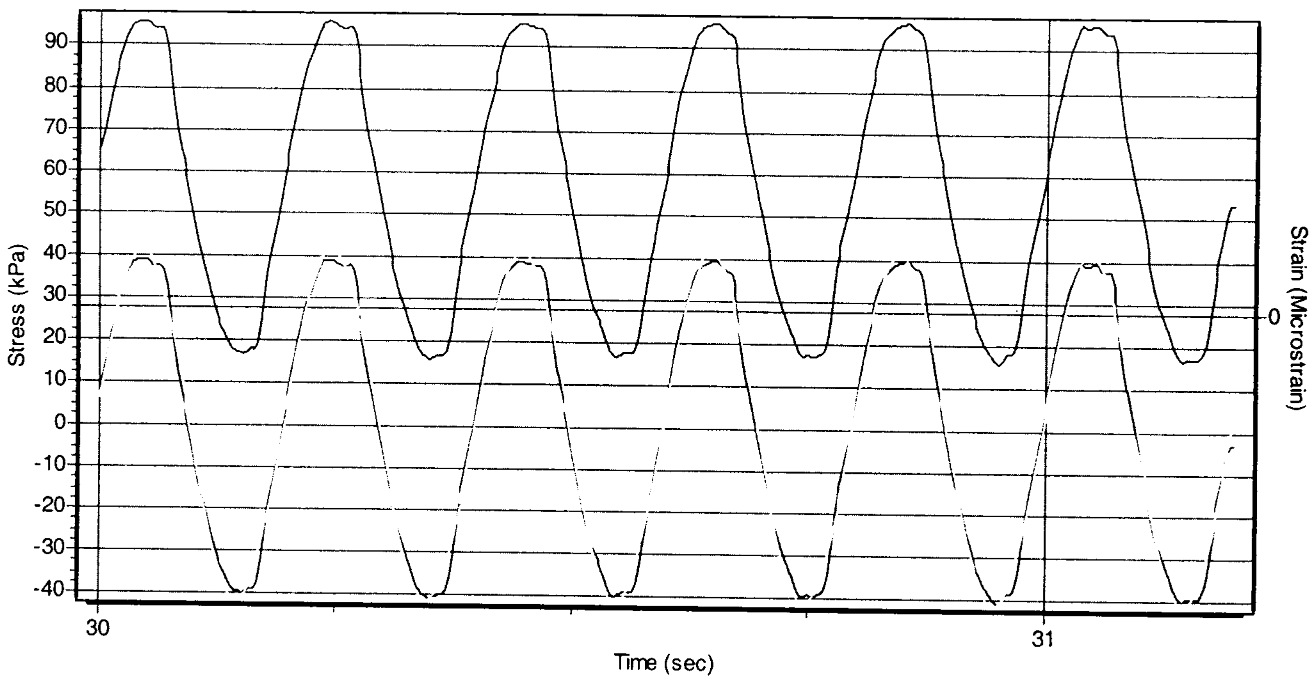
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 100 'C
Final Temp: 94 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#18.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:30 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.9	80.5	80.8	82.0	81.3
Recoverable axial micro-strain	2520.3	2526.4	2512.8	2499.9	2519.5	2515.8
Permanent axial micro-strain	1956	1958	1975	1996	1994	
Dynamic modulus (MPa)	32.2	32.4	32.0	32.3	32.5	32.3
Phase angle (Deg)	13.40	14.38	12.01	13.64	12.98	13.28
Dyn.Modulus/sine(phase angle)	276.2	258.9	306.2	272.3	287.9	280.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

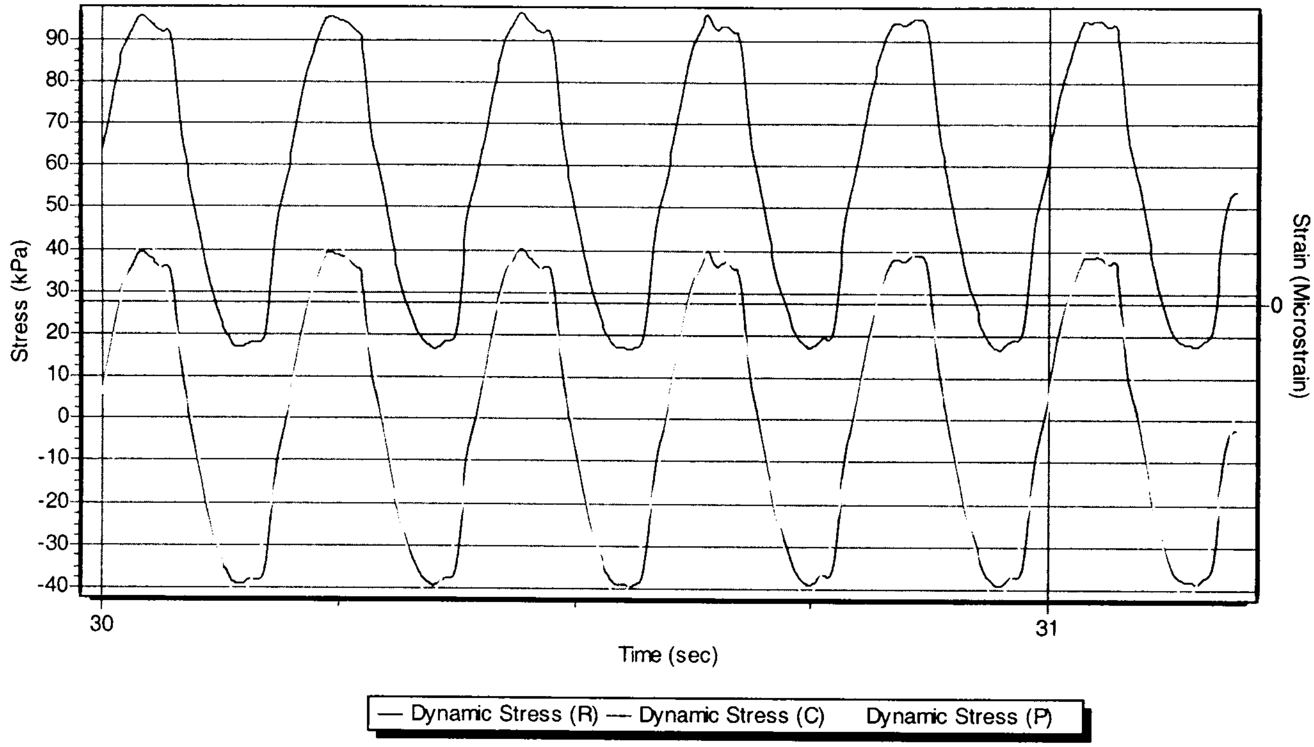
Core/Sample Number: P2_#18

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 94 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#19.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:34 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.4	81.4	81.8	79.9	80.6	80.8
Recoverable axial micro-strain	2139.8	2132.5	2209.4	2124.4	2134.1	2148.0
Permanent axial micro-strain	1409	1424	1359	1447	1452	
Dynamic modulus (MPa)	37.6	38.2	37.0	37.6	37.8	37.6
Phase angle (Deg)	12.88	9.87	10.49	9.36	12.50	11.02
Dyn.Modulus/sine(phase angle)	334.9	443.7	405.0	461.3	347.1	398.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#019

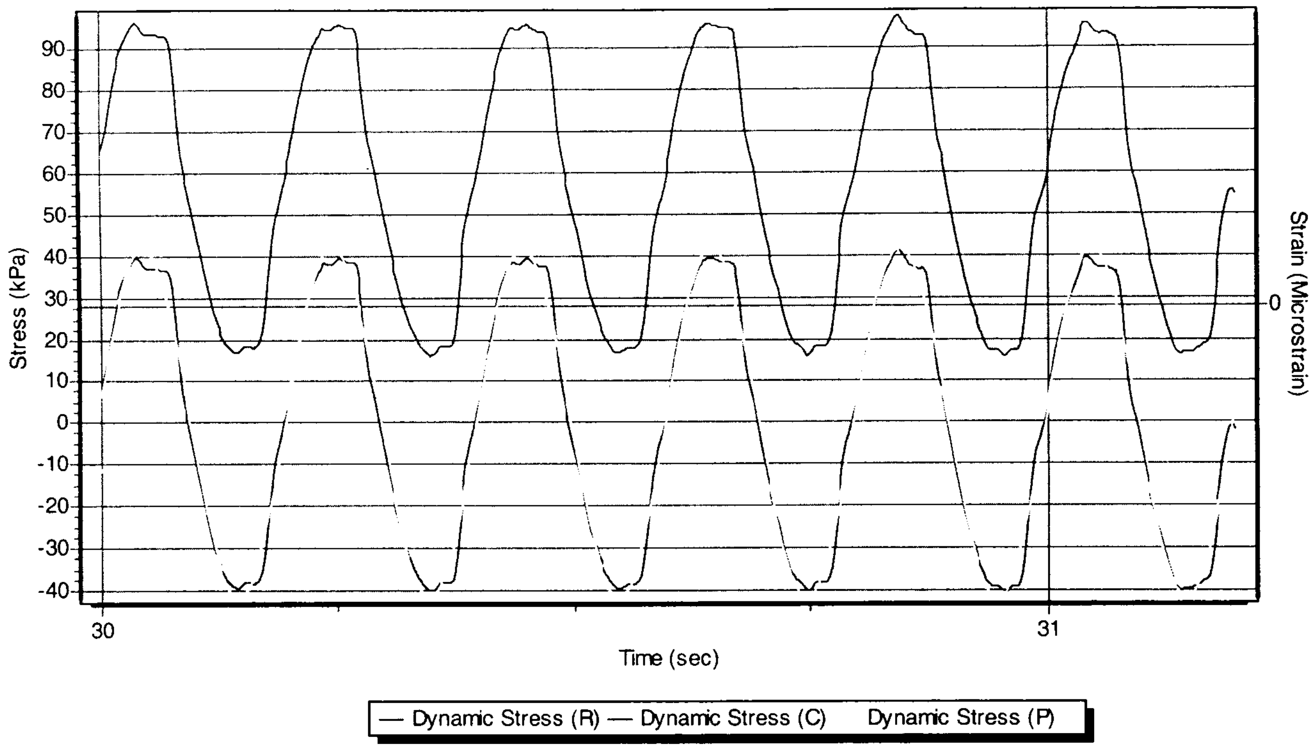
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 94 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#20.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:40 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.7	82.7	82.4	82.4	82.8	82.2
Recoverable axial micro-strain	1609.1	1611.9	1625.5	1631.7	1619.7	1619.6
Permanent axial micro-strain	1572	1570	1561	1569	1579	
Dynamic modulus (MPa)	50.1	51.3	50.7	50.5	51.1	50.7
Phase angle (Deg)	5.57	14.41	12.56	12.39	13.78	11.74
Dyn.Modulus/sine(phase angle)	1032.1	409.2	463.3	467.7	426.1	559.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#20

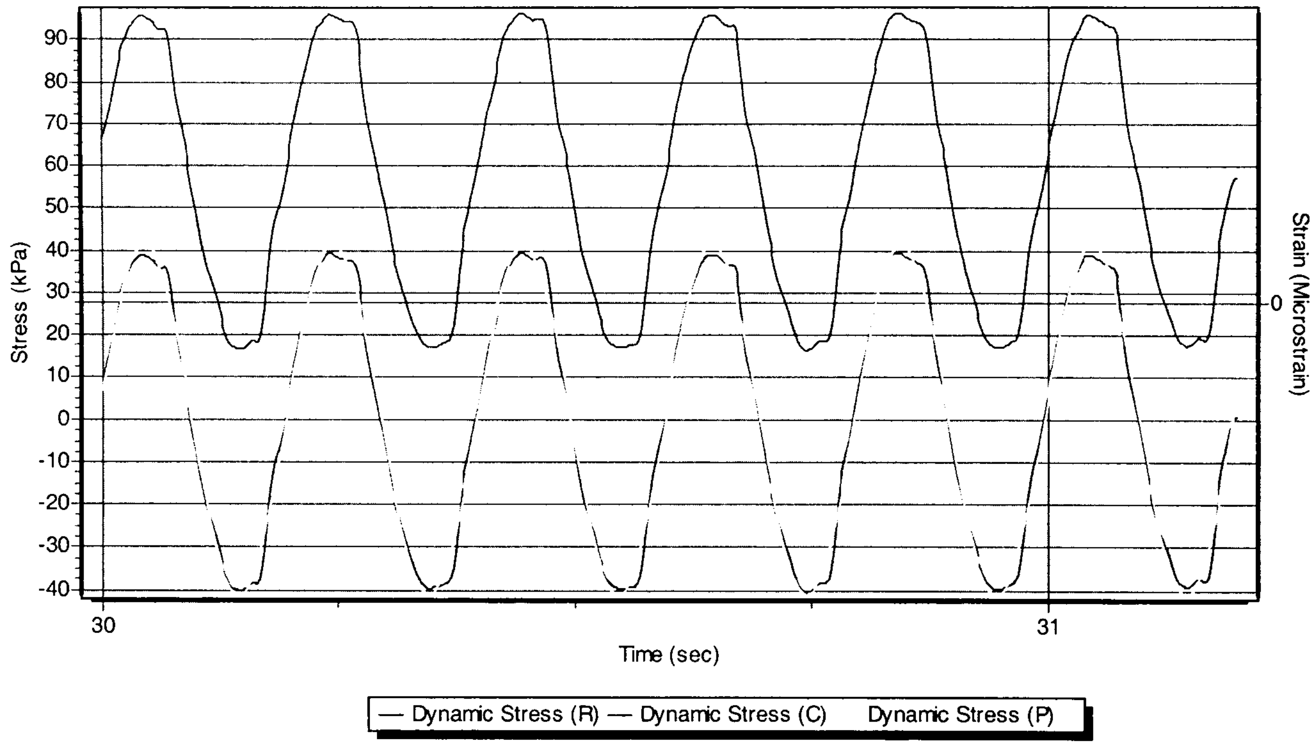
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 95 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#21.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:44 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.2	82.1	81.3	81.1	81.4
Recoverable axial micro-strain	1494.5	1509.8	1521.4	1508.6	1519.7	1510.8
Permanent axial micro-strain	1121	1123	1118	1131	1128	
Dynamic modulus (MPa)	54.3	53.8	54.0	53.9	53.4	53.9
Phase angle (Deg)	12.31	13.41	13.15	14.74	12.79	13.28
Dyn.Modulus/sine(phase angle)	506.4	460.8	471.5	420.3	478.9	467.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#21

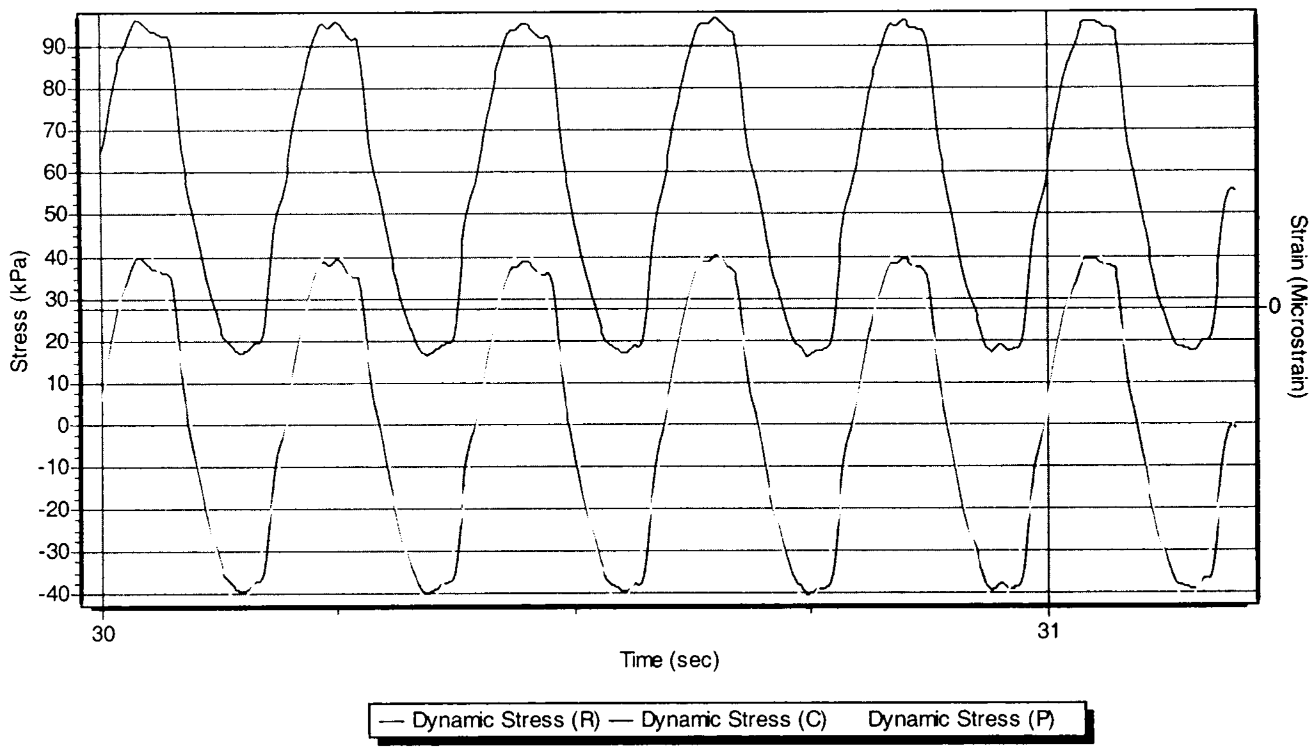
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 98 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#22.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:47 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.7	82.2	81.7	83.6	81.3	81.9
Recoverable axial micro-strain	1704.4	1711.3	1712.7	1717.2	1715.6	1712.3
Permanent axial micro-strain	1859	1850	1860	1858	1871	
Dynamic modulus (MPa)	47.4	48.0	47.7	48.7	47.4	47.8
Phase angle (Deg)	12.51	12.29	15.43	12.81	15.18	13.65
Dyn.Modulus/sine(phase angle)	434.6	448.7	355.1	436.2	358.7	406.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#22

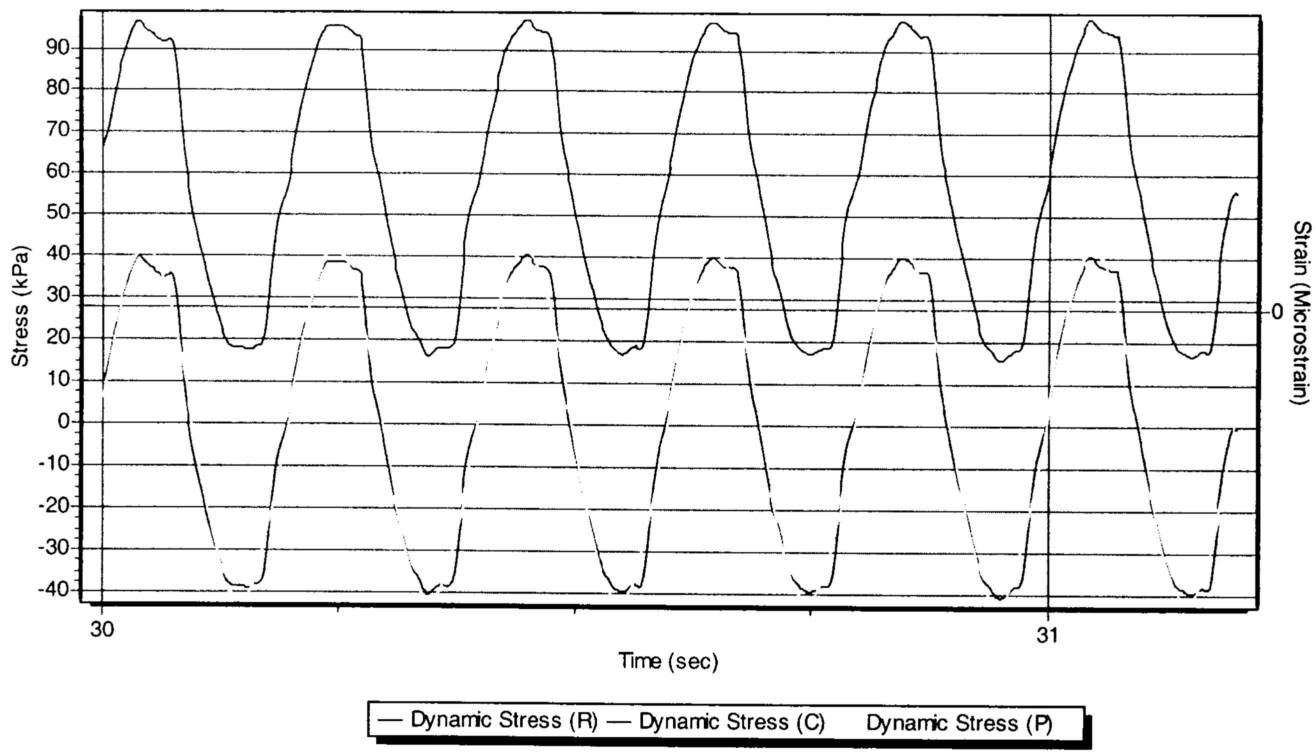
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#23.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:52 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.7	81.2	82.6	82.6	82.9	82.0
Recoverable axial micro-strain	1554.9	1562.5	1571.3	1567.8	1578.2	1566.9
Permanent axial micro-strain	1563	1559	1562	1569	1560	
Dynamic modulus (MPa)	51.9	52.0	52.6	52.7	52.5	52.3
Phase angle (Deg)	8.68	9.64	13.14	15.08	11.61	11.63
Dyn.Modulus/sine(phase angle)	685.7	618.5	459.4	401.5	519.7	537.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#23

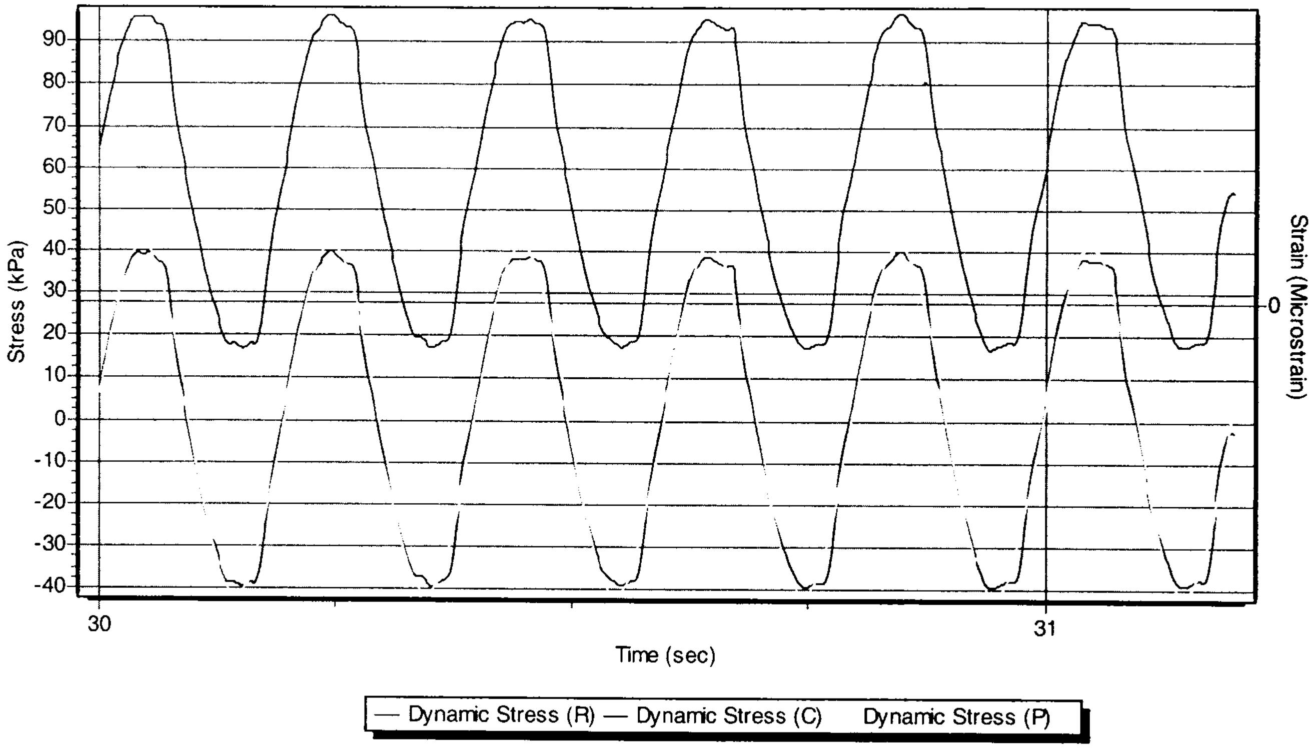
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#24.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 3:56 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.7	81.6	81.6	80.9	81.3	81.6
Recoverable axial micro-strain	2267.6	2238.7	2242.4	2242.5	2251.2	2248.5
Permanent axial micro-strain	2551	2571	2584	2587	2584	
Dynamic modulus (MPa)	36.5	36.5	36.4	36.1	36.1	36.3
Phase angle (Deg)	14.60	13.78	15.27	14.39	13.02	14.21
Dyn.Modulus/sine(phase angle)	287.0	303.9	273.9	288.0	318.5	294.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#24

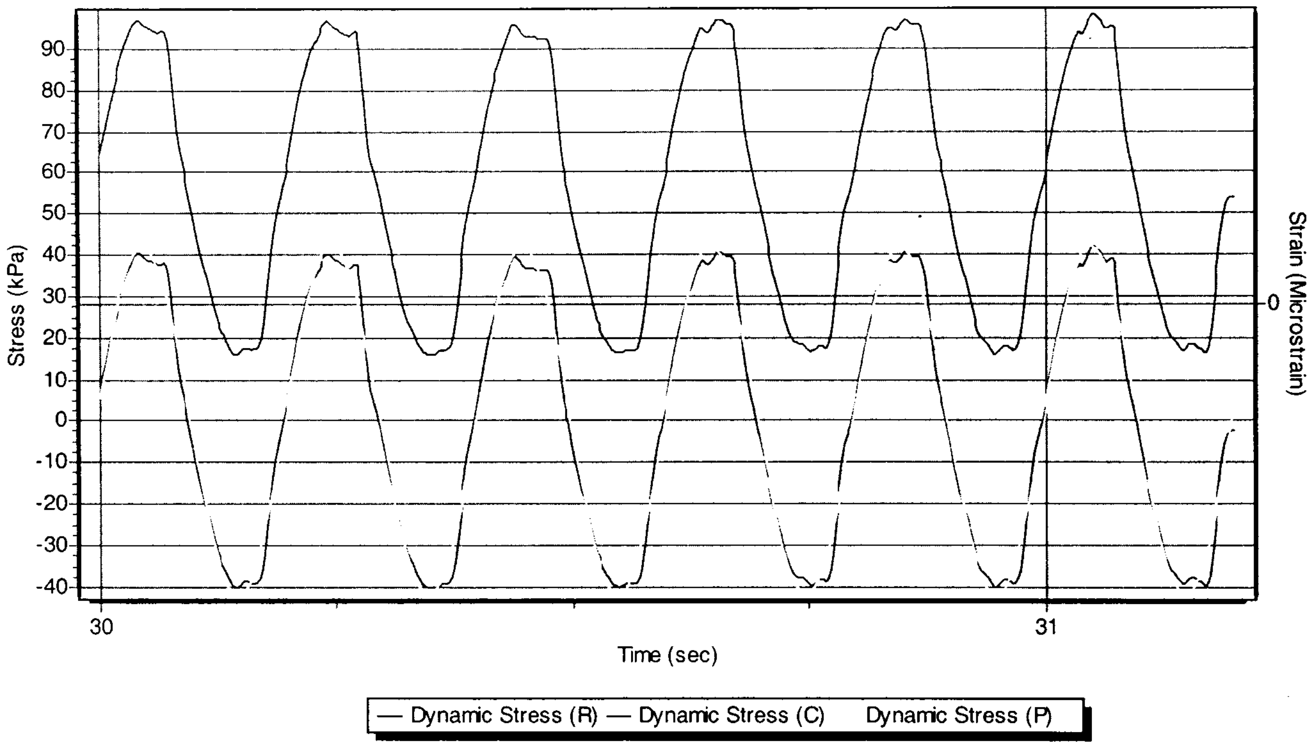
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#25.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 4:02 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.5	82.6	80.7	83.6	83.3	82.3
Recoverable axial micro-strain	2281.1	2352.5	2255.7	2267.1	2268.4	2285.0
Permanent axial micro-strain	1951	1882	1972	1984	1986	
Dynamic modulus (MPa)	35.7	35.1	35.8	36.9	36.7	36.0
Phase angle (Deg)	9.03	10.73	7.15	10.48	11.08	9.69
Dyn.Modulus/sine(phase angle)	453.5	375.4	573.7	403.6	380.2	437.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#25

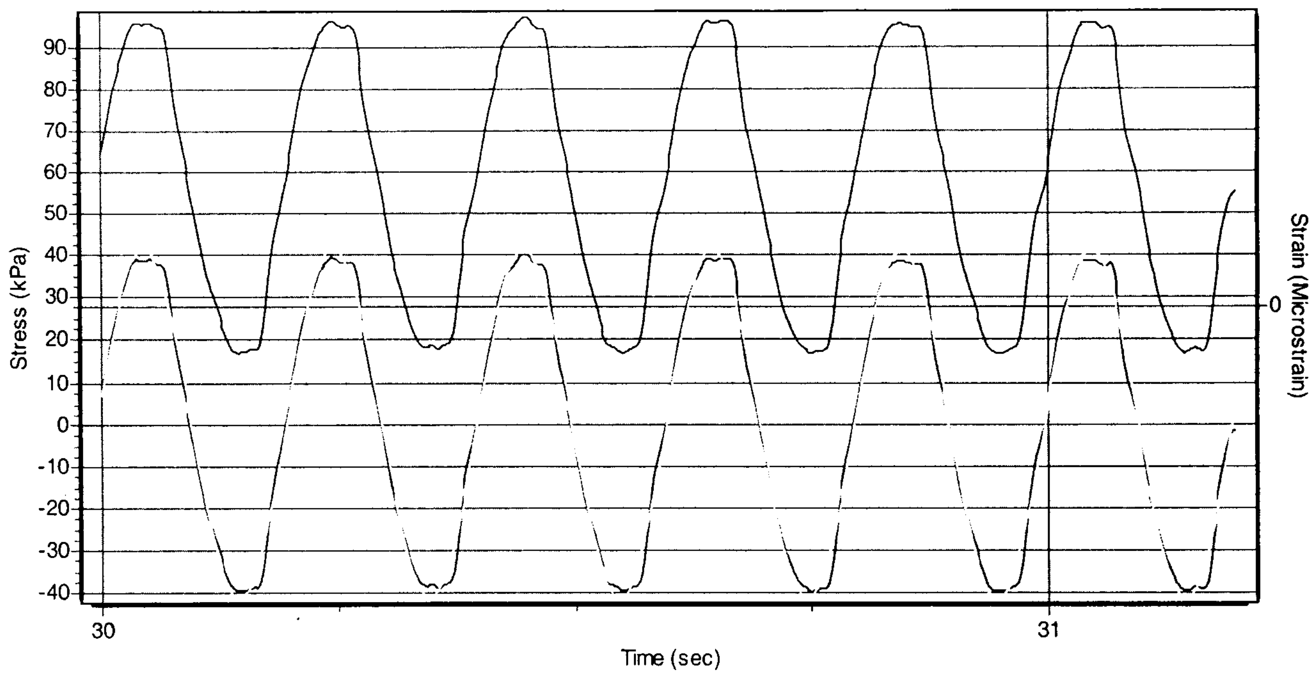
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 95 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#26.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 4:06 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.7	81.0	82.5	82.1	81.9	81.6
Recoverable axial micro-strain	2162.0	2163.5	2175.1	2182.3	2153.6	2167.3
Permanent axial micro-strain	2752	2765	2759	2763	2790	
Dynamic modulus (MPa)	37.3	37.4	37.9	37.6	38.0	37.7
Phase angle (Deg)	9.71	12.75	11.36	9.93	12.47	11.24
Dyn.Modulus/sine(phase angle)	441.4	337.2	382.9	434.9	350.2	389.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#26

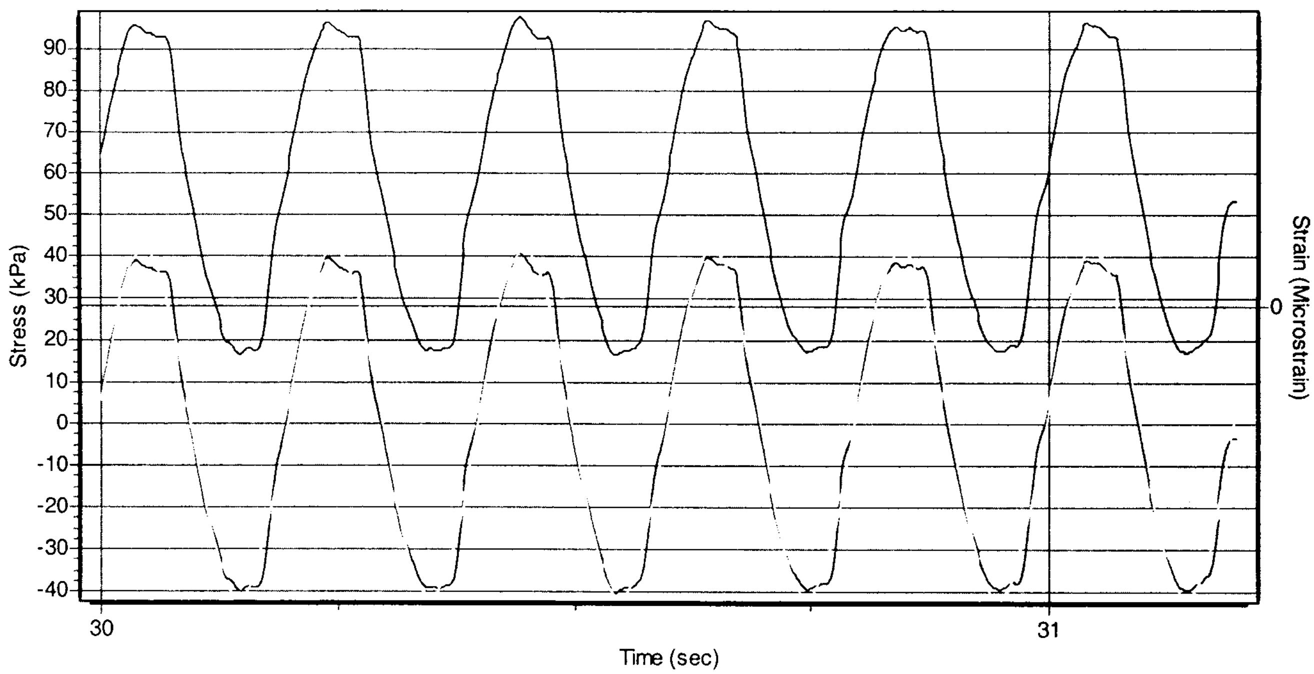
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 95 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\NETC_01-02_P2_#27.B38



Sweep 1 (5Hz)

Test Date and Time: Wednesday, May 8, 2002, at 4:10 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 4.9
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.3	81.0	80.6	81.0	80.6	80.7
Recoverable axial micro-strain	2169.7	2163.2	2205.5	2154.5	2149.8	2168.5
Permanent axial micro-strain	1765	1780	1745	1796	1807	
Dynamic modulus (MPa)	37.0	37.5	36.6	37.6	37.5	37.2
Phase angle (Deg)	10.73	11.31	12.08	11.44	11.45	11.40
Dyn.Modulus/sine(phase angle)	395.9	380.0	347.3	377.2	375.5	375.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

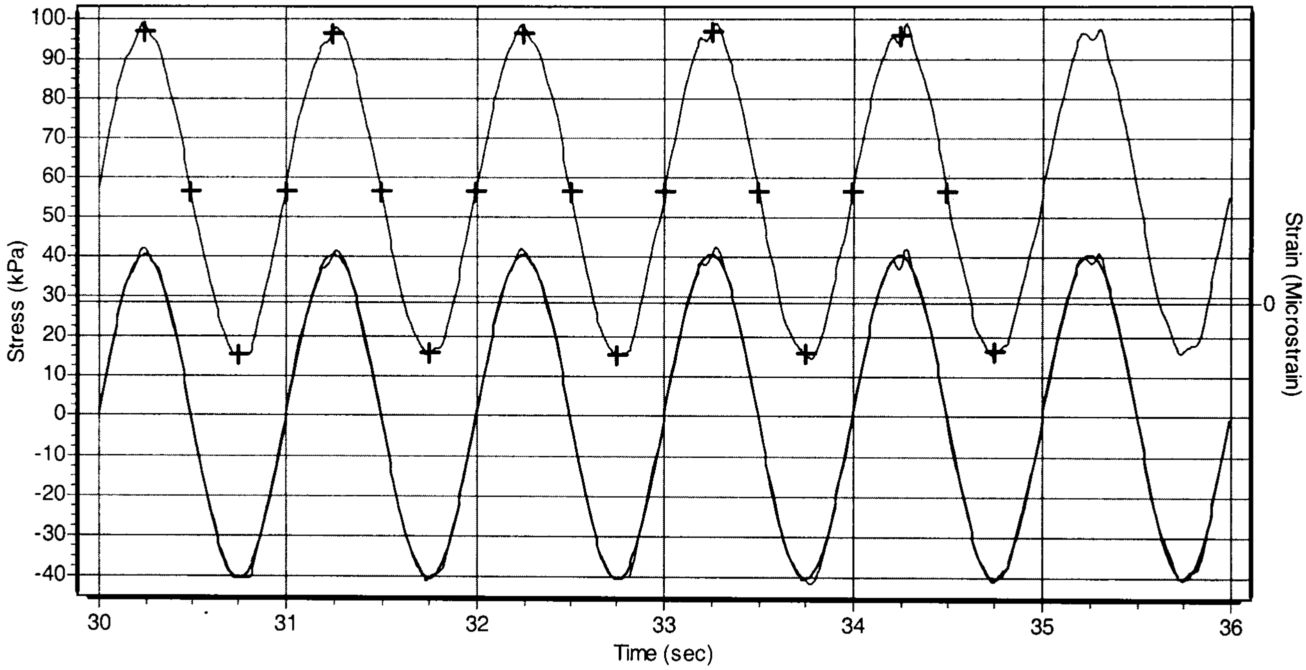
Comments/Properties: Initial Temp: 101 'C
Final Temp: 95 'C

Reran Phase II Samples at 1 Hz and 5 Hz at 100°C

Sample	Dynamic Modulus, Mpa				Phase Angle, °		Temp.
	1 Hz		5 Hz		1 Hz	5 Hz	
1	48.3	(2.3)	59.3	(7.9)	14.4	9.4	98-91
2	49.3	(2.5)	58.1	(9.1)	13.7	10.6	97-91
3	31.6	(1.9)	38.7	(6.1)	12.8	10.4	98-91
4	36.4	(2.8)	46.9	(8.4)	13.5	8.4	99-92
5	33.5	(2.6)	42.8	(9.3)	13.2	8.2	99-92
6	40.6	(2.3)	49.2	(7.7)	14.7	11.3	100-93
7	58.5	(2.1)	45.5	(8.0)	14.4	11.9	103-96
8	41.1	(2.4)	48.8	(8.4)	15.9	12.4	102-95
9	54.0	(2.2)	61.3	(8.1)	9.8	3.7	10-96
10	38.7	(2.6)	44.9	(8.9)	11.9	5.9	96-99
11	45.4	(2.7)	53.4	(8.8)	12.8	6.8	100-93
12	45.7	(2.4)	55.2	(8.4)	14.2	10.3	101-95
13	58.6	(2.3)	60.4	(8.4)	14.3	10.2	96-90
14	54.0	(2.2)	62.9	(7.9)	12.91	5.47	96-90
15	40.3	(2.2)	45.8	(5.6)	11.7	7.2	97-91
16	32.1	(2.2)	38.6	(7.7)	11.3	8.2	97-90
17	37.7	(2.6)	44.8	(8.0)	12.4	8.7	98-93
18	37.1	(2.7)	44.7	(8.4)	13.1	9.5	
19	48.6	(1.8)	57.6	(6.1)	11.2	8.6	91-87
20	50.0	(2.1)	56.1	(7.5)	10.9	8.3	91-87
21	47.6	(2.1)	56	(7.0)	11.8	9.9	93-87
22	49.8	(2.3)	58.5	(6.7)	11.9	8.1	93-87
23	44.6	(2.3)	50.4	(7.4)	10.9	9.2	98-89
24	45.5	(2.0)	54.8	(6.5)	14.1	12.5	98-93
25	44.9	(2.1)	51.9	(6.1)	9.7	7.1	96-93
26	45.4	(1.7)	54.1	(5.1)	12.8	10.2	97-91
27	43.4	(2.1)	52.6	(7.0)	14.7	13.3	98-93

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#01.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:39 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.3	80.3	81.1	81.1	79.7	80.7
Recoverable axial micro-strain	1686.4	1650.6	1677.6	1686.8	1645.3	1669.4
Permanent axial micro-strain	564	609	617	635	693	
Dynamic modulus (MPa)	48.2	48.6	48.4	48.1	48.4	48.3
Phase angle (Deg)	13.73	14.71	14.59	14.11	14.73	14.37
Dyn.Modulus/sine(phase angle)	403.1	379.9	380.8	391.4	378.0	386.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.631	0.637	0.637	0.626	0.634
Maximum load (kN)	0.762 (30.242s)	0.757 (31.243s)	0.760 (32.244s)	0.763 (33.246s)	0.756 (34.245s)	0.759
Minimum load (kN)	0.124 (30.744s)	0.127 (31.743s)	0.123 (32.745s)	0.126 (33.749s)	0.130 (34.741s)	0.126
Maximum averaged axial (mm)	0.234 (30.280s)	0.235 (31.284s)	0.239 (32.284s)	0.241 (33.285s)	0.243 (34.286s)	0.238
Minimum averaged axial (mm)	0.059 (30.781s)	0.063 (31.780s)	0.064 (32.782s)	0.066 (33.781s)	0.072 (34.780s)	0.065
Maximum axial #1 (mm)	0.240 (30.281s)	0.240 (31.285s)	0.244 (32.287s)	0.248 (33.286s)	0.249 (34.286s)	0.244
Minimum axial #1 (mm)	0.066 (30.781s)	0.071 (31.781s)	0.071 (32.782s)	0.074 (33.783s)	0.079 (34.781s)	0.072
Maximum axial #2 (mm)	0.228 (30.279s)	0.230 (31.283s)	0.233 (32.282s)	0.235 (33.283s)	0.237 (34.286s)	0.233
Minimum axial #2 (mm)	0.051 (30.780s)	0.056 (31.780s)	0.056 (32.780s)	0.059 (33.780s)	0.065 (34.780s)	0.057

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#01

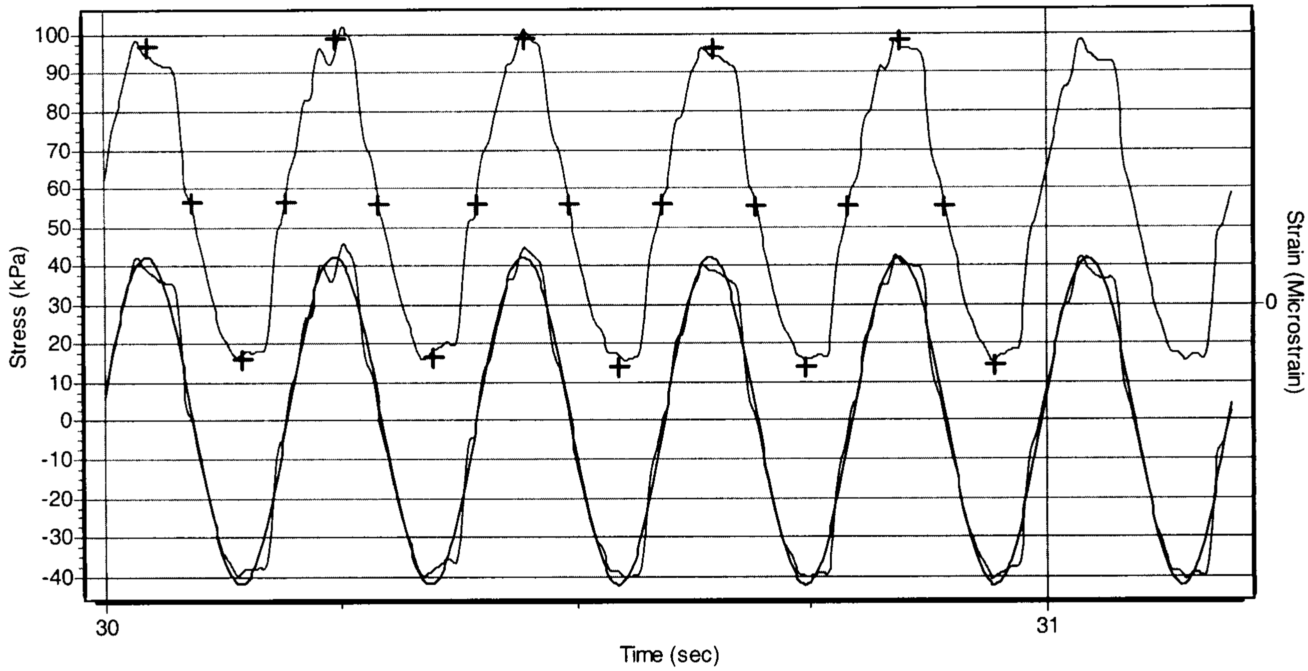
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 98 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#01.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:39 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.0	82.8	84.9	82.1	83.4	82.8
Recoverable axial micro-strain	1377.7	1386.1	1404.6	1383.7	1434.1	1397.3
Permanent axial micro-strain	121	129	116	125	94	
Dynamic modulus (MPa)	58.8	59.7	60.4	59.3	58.1	59.3
Phase angle (Deg)	10.16	8.89	11.19	4.99	11.71	9.39
Dyn.Modulus/sine(phase angle)	664.2	770.7	619.5	1362.9	569.9	797.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.650	0.666	0.645	0.655	0.651
Maximum load (kN)	0.761 (30.048s)	0.779 (30.246s)	0.778 (30.445s)	0.756 (30.648s)	0.771 (30.845s)	0.769
Minimum load (kN)	0.125 (30.147s)	0.129 (30.349s)	0.111 (30.546s)	0.111 (30.745s)	0.116 (30.945s)	0.118
Maximum averaged axial (mm)	0.156 (30.053s)	0.158 (30.251s)	0.158 (30.451s)	0.157 (30.651s)	0.159 (30.851s)	0.157
Minimum averaged axial (mm)	0.013 (30.151s)	0.013 (30.355s)	0.012 (30.553s)	0.013 (30.751s)	0.010 (30.951s)	0.012
Maximum axial #1 (mm)	0.153 (30.051s)	0.154 (30.251s)	0.154 (30.451s)	0.154 (30.651s)	0.155 (30.851s)	0.154
Minimum axial #1 (mm)	0.014 (30.151s)	0.014 (30.355s)	0.013 (30.553s)	0.014 (30.751s)	0.011 (30.951s)	0.013
Maximum axial #2 (mm)	0.159 (30.053s)	0.161 (30.250s)	0.162 (30.451s)	0.160 (30.651s)	0.162 (30.852s)	0.161
Minimum axial #2 (mm)	0.012 (30.151s)	0.013 (30.355s)	0.012 (30.552s)	0.012 (30.751s)	0.009 (30.951s)	0.011

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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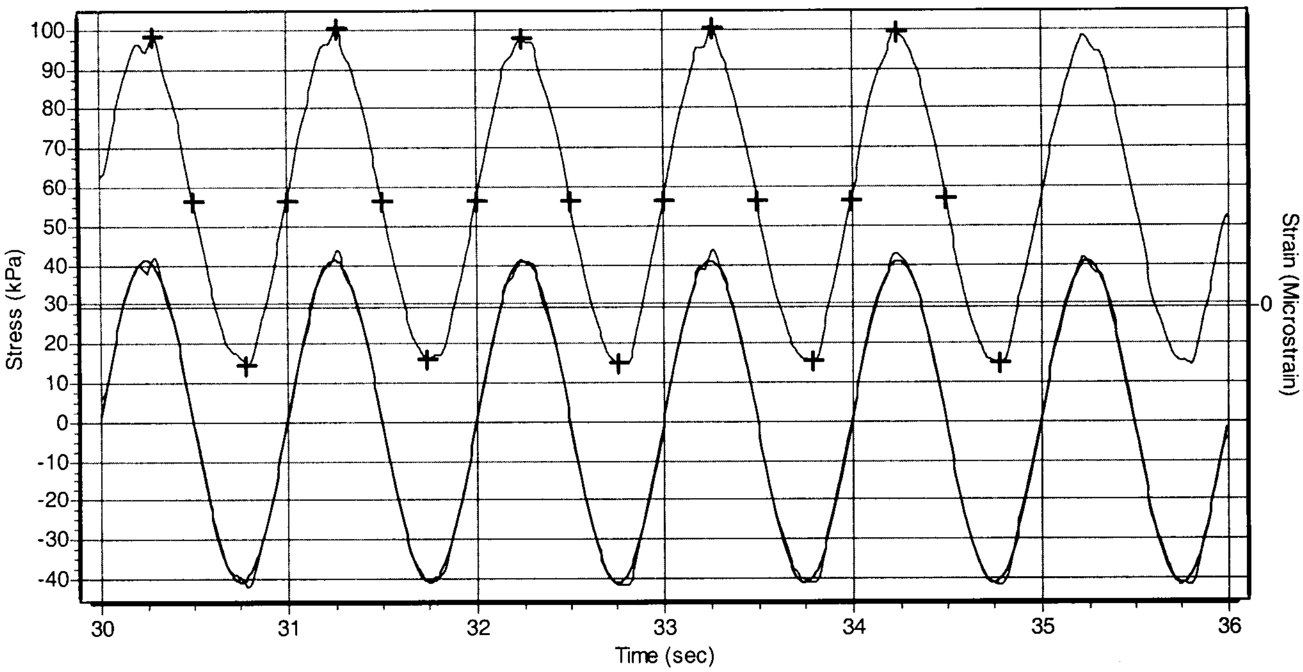

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 12:57 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	83.7	84.2	82.7	84.9	84.5	84.0
Recoverable axial micro-strain	1941.5	1897.5	1904.4	1948.9	1942.4	1926.9
Permanent axial micro-strain	780	866	863	881	896	
Dynamic modulus (MPa)	43.1	44.4	43.4	43.6	43.5	43.6
Phase angle (Deg)	3.60	3.60	18.00	3.60	3.60	6.48
Dyn.Modulus/sine(phase angle)	1373.2	1412.3	277.5	1386.8	1385.6	1167.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.658	0.661	0.649	0.667	0.664	0.660
Maximum load (kN)	0.772 (30.290s)	0.788 (31.260s)	0.767 (32.240s)	0.788 (33.260s)	0.780 (34.240s)	0.779
Minimum load (kN)	0.114 (30.780s)	0.127 (31.730s)	0.117 (32.750s)	0.122 (33.790s)	0.116 (34.780s)	0.119
Maximum averaged axial (mm)	0.289 (30.300s)	0.293 (31.270s)	0.293 (32.290s)	0.300 (33.270s)	0.301 (34.250s)	0.295
Minimum averaged axial (mm)	0.083 (30.790s)	0.092 (31.800s)	0.091 (32.790s)	0.093 (33.790s)	0.095 (34.790s)	0.091
Maximum axial #1 (mm)	0.296 (30.300s)	0.300 (31.270s)	0.301 (32.290s)	0.308 (33.270s)	0.309 (34.260s)	0.303
Minimum axial #1 (mm)	0.096 (30.790s)	0.104 (31.810s)	0.104 (32.800s)	0.107 (33.800s)	0.109 (34.790s)	0.104
Maximum axial #2 (mm)	0.281 (30.300s)	0.286 (31.270s)	0.286 (32.290s)	0.292 (33.270s)	0.293 (34.250s)	0.287
Minimum axial #2 (mm)	0.070 (30.790s)	0.079 (31.760s)	0.078 (32.780s)	0.080 (33.790s)	0.081 (34.790s)	0.078

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 90 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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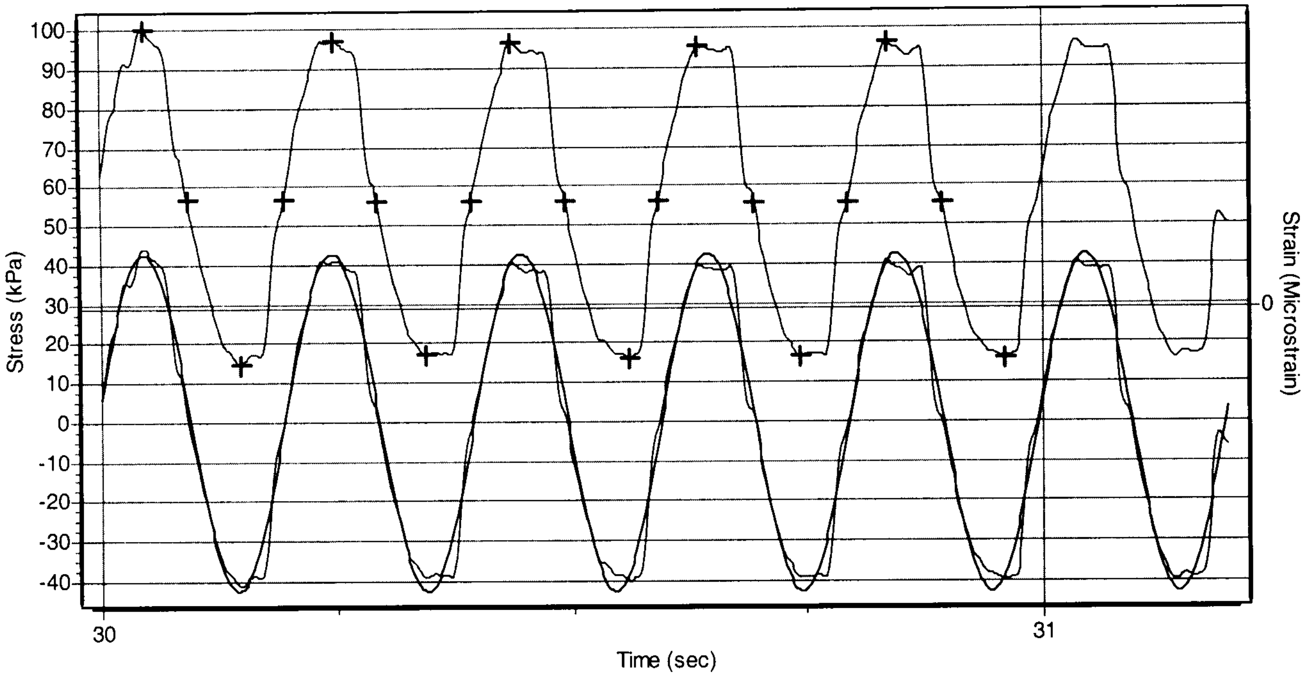

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 12:57 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	85.4	80.1	80.6	78.8	80.5	81.1
Recoverable axial micro-strain	1770.0	1764.2	1698.7	1742.8	1722.8	1739.7
Permanent axial micro-strain	90	112	133	121	129	
Dynamic modulus (MPa)	48.3	45.4	47.4	45.2	46.7	46.6
Phase angle (Deg)	3.60	3.60	7.20	64.80	61.20	28.08
Dyn.Modulus/sine(phase angle)	1536.1	1446.2	755.5	84.4	91.8	782.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.671	0.629	0.633	0.619	0.632	0.637
Maximum load (kN)	0.787 (30.046s)	0.762 (30.248s)	0.758 (30.436s)	0.750 (30.636s)	0.760 (30.836s)	0.763
Minimum load (kN)	0.116 (30.148s)	0.133 (30.344s)	0.125 (30.560s)	0.131 (30.744s)	0.128 (30.960s)	0.126
Maximum averaged axial (mm)	0.197 (30.048s)	0.199 (30.250s)	0.194 (30.440s)	0.198 (30.672s)	0.196 (30.870s)	0.197
Minimum averaged axial (mm)	0.010 (30.148s)	0.012 (30.372s)	0.014 (30.562s)	0.013 (30.770s)	0.014 (30.970s)	0.012
Maximum axial #1 (mm)	0.199 (30.054s)	0.200 (30.250s)	0.196 (30.472s)	0.200 (30.672s)	0.199 (30.870s)	0.199
Minimum axial #1 (mm)	0.015 (30.148s)	0.018 (30.372s)	0.019 (30.560s)	0.018 (30.770s)	0.019 (30.970s)	0.018
Maximum axial #2 (mm)	0.196 (30.046s)	0.198 (30.250s)	0.193 (30.440s)	0.195 (30.670s)	0.194 (30.834s)	0.195
Minimum axial #2 (mm)	0.004 (30.170s)	0.006 (30.372s)	0.009 (30.562s)	0.007 (30.770s)	0.008 (30.970s)	0.007

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 90 'C

Kim

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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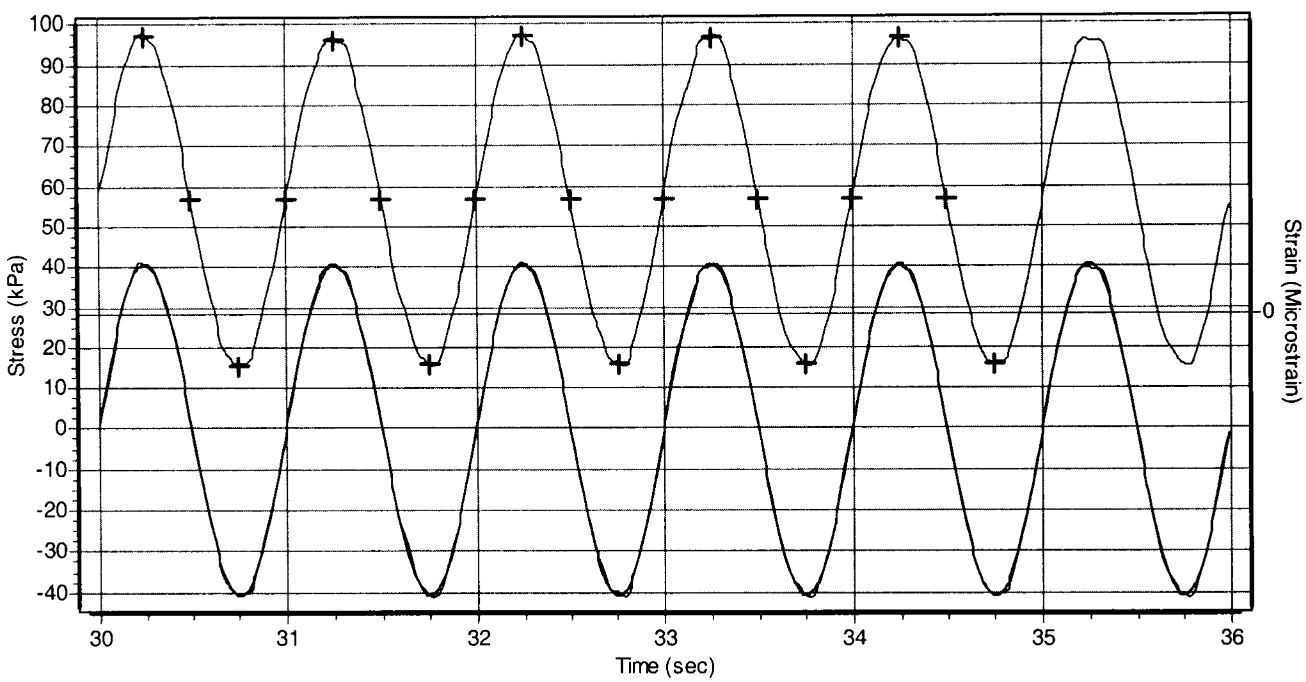

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:45 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.4	80.3	81.0	81.1	80.8	80.9
Recoverable axial micro-strain	1683.0	1666.0	1678.1	1678.4	1663.9	1673.9
Permanent axial micro-strain	1658	1701	1729	1762	1800	
Dynamic modulus (MPa)	48.4	48.2	48.3	48.3	48.6	48.3
Phase angle (Deg)	13.49	14.00	13.92	13.26	13.92	13.72
Dyn.Modulus/sine(phase angle)	411.8	395.2	398.5	418.3	400.7	404.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.630	0.636	0.637	0.635	0.635
Maximum load (kN)	0.762 (30.245s)	0.758 (31.247s)	0.763 (32.244s)	0.761 (33.248s)	0.759 (34.244s)	0.760
Minimum load (kN)	0.123 (30.743s)	0.127 (31.747s)	0.127 (32.747s)	0.124 (33.746s)	0.124 (34.745s)	0.125
Maximum averaged axial (mm)	0.351 (30.283s)	0.353 (31.286s)	0.358 (32.283s)	0.361 (33.285s)	0.364 (34.282s)	0.357
Minimum averaged axial (mm)	0.174 (30.777s)	0.179 (31.779s)	0.182 (32.778s)	0.185 (33.776s)	0.189 (34.778s)	0.182
Maximum axial #1 (mm)	0.378 (30.282s)	0.380 (31.285s)	0.384 (32.282s)	0.387 (33.284s)	0.390 (34.282s)	0.384
Minimum axial #1 (mm)	0.190 (30.777s)	0.194 (31.778s)	0.198 (32.778s)	0.201 (33.775s)	0.205 (34.779s)	0.198
Maximum axial #2 (mm)	0.324 (30.282s)	0.327 (31.288s)	0.331 (32.284s)	0.335 (33.285s)	0.337 (34.283s)	0.331
Minimum axial #2 (mm)	0.158 (30.776s)	0.163 (31.778s)	0.165 (32.778s)	0.169 (33.776s)	0.173 (34.777s)	0.166

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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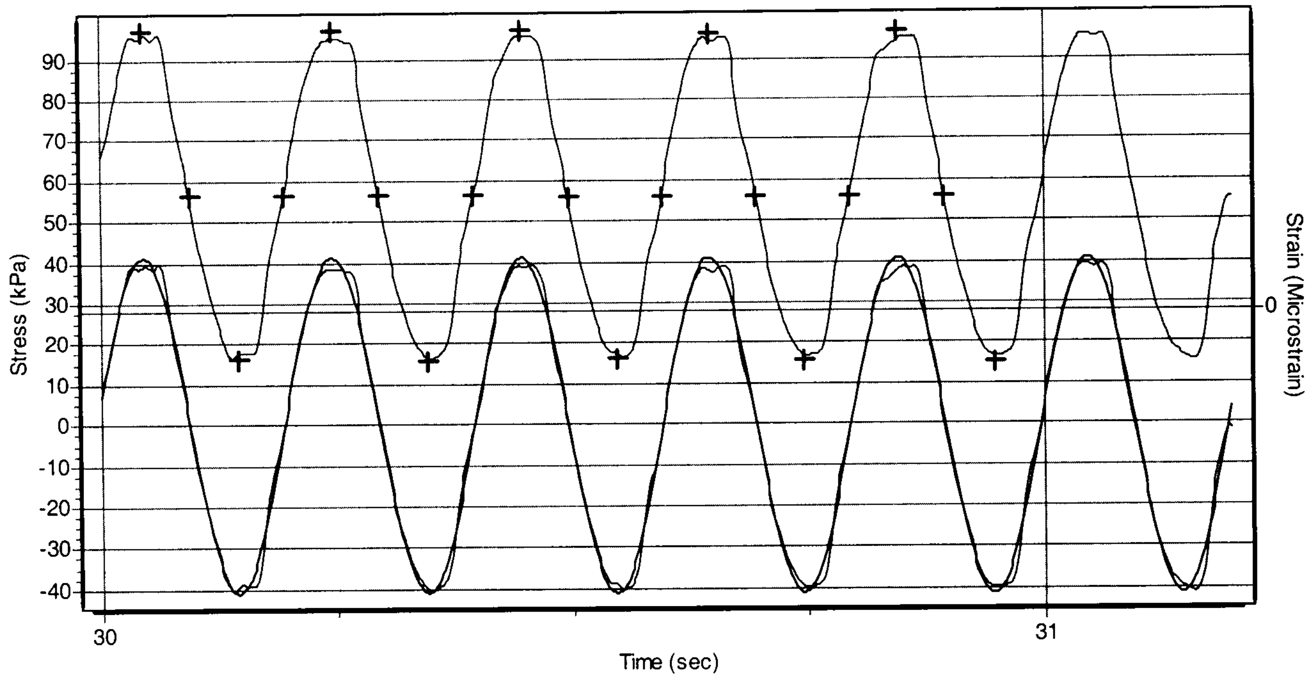

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:45 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.0	81.4	81.0	80.5	81.4	81.0
Recoverable axial micro-strain	1375.7	1415.5	1402.4	1380.2	1403.1	1395.4
Permanent axial micro-strain	460	428	440	457	451	
Dynamic modulus (MPa)	58.9	57.5	57.7	58.3	58.0	58.1
Phase angle (Deg)	9.93	11.92	9.54	10.64	10.80	10.56
Dyn.Modulus/sine(phase angle)	680.7	553.8	694.8	629.1	616.5	635.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.639	0.636	0.632	0.639	0.637
Maximum load (kN)	0.763 (30.045s)	0.762 (30.246s)	0.762 (30.445s)	0.757 (30.645s)	0.760 (30.846s)	0.761
Minimum load (kN)	0.127 (30.145s)	0.123 (30.345s)	0.126 (30.546s)	0.125 (30.745s)	0.121 (30.946s)	0.124
Maximum averaged axial (mm)	0.193 (30.050s)	0.194 (30.252s)	0.193 (30.450s)	0.193 (30.651s)	0.195 (30.852s)	0.193
Minimum averaged axial (mm)	0.048 (30.151s)	0.045 (30.351s)	0.046 (30.551s)	0.048 (30.752s)	0.047 (30.951s)	0.047
Maximum axial #1 (mm)	0.198 (30.050s)	0.200 (30.252s)	0.199 (30.451s)	0.199 (30.651s)	0.201 (30.852s)	0.199
Minimum axial #1 (mm)	0.044 (30.151s)	0.041 (30.351s)	0.045 (30.552s)	0.044 (30.752s)	0.043 (30.951s)	0.043
Maximum axial #2 (mm)	0.187 (30.050s)	0.188 (30.252s)	0.188 (30.450s)	0.187 (30.651s)	0.189 (30.851s)	0.188
Minimum axial #2 (mm)	0.051 (30.151s)	0.052 (30.351s)	0.050 (30.551s)	0.052 (30.752s)	0.052 (30.951s)	0.051

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 9~~4~~7 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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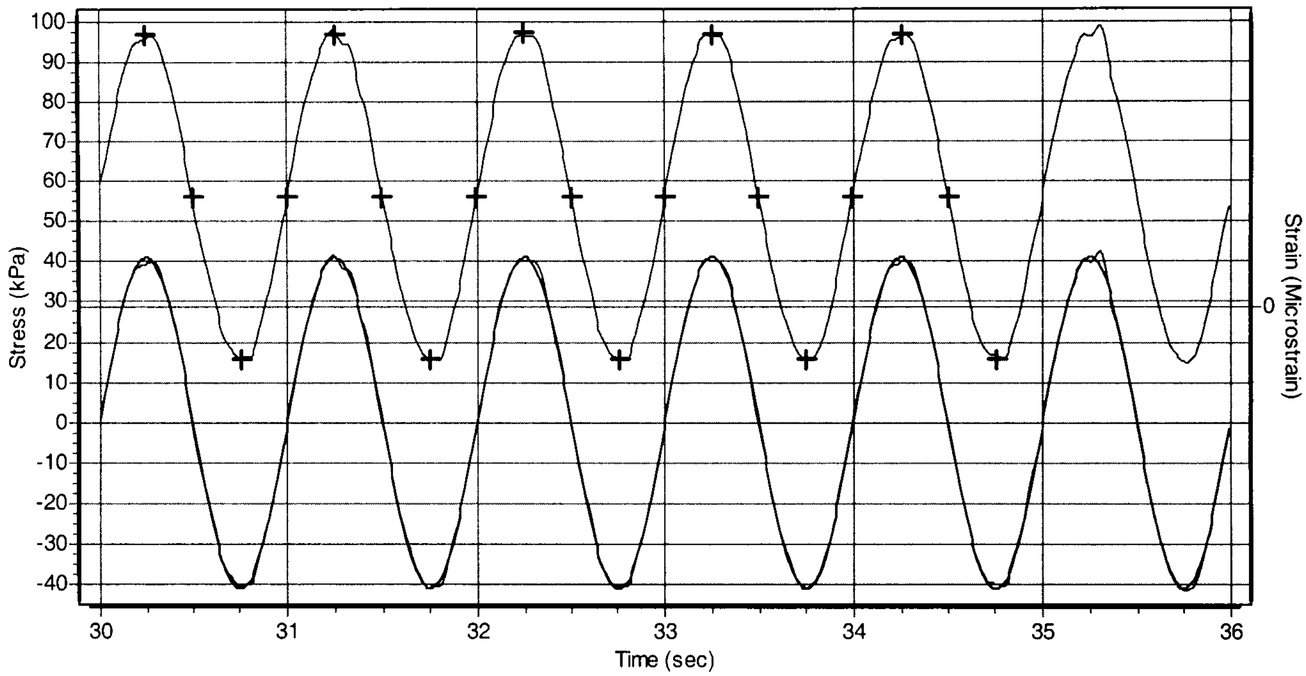

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:07 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	81.3	81.8	81.4	81.0	81.3
Recoverable axial micro-strain	2586.4	2581.8	2573.5	2580.9	2558.9	2576.3
Permanent axial micro-strain	621	652	691	725	768	
Dynamic modulus (MPa)	31.3	31.5	31.8	31.6	31.7	31.6
Phase angle (Deg)	12.24	13.12	12.82	13.00	12.85	12.81
Dyn.Modulus/sine(phase angle)	293.8	275.7	284.8	278.8	283.0	283.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.639	0.643	0.640	0.636	0.639
Maximum load (kN)	0.761 (30.249s)	0.762 (31.248s)	0.766 (32.245s)	0.763 (33.246s)	0.762 (34.249s)	0.763
Minimum load (kN)	0.124 (30.748s)	0.123 (31.747s)	0.123 (32.750s)	0.123 (33.748s)	0.125 (34.748s)	0.124
Maximum averaged axial (mm)	0.340 (30.283s)	0.343 (31.285s)	0.346 (32.281s)	0.350 (33.282s)	0.353 (34.285s)	0.346
Minimum averaged axial (mm)	0.066 (30.779s)	0.069 (31.778s)	0.073 (32.779s)	0.077 (33.777s)	0.081 (34.779s)	0.073
Maximum axial #1 (mm)	0.318 (30.284s)	0.321 (31.284s)	0.325 (32.280s)	0.328 (33.282s)	0.331 (34.285s)	0.325
Minimum axial #1 (mm)	0.057 (30.779s)	0.061 (31.778s)	0.064 (32.779s)	0.067 (33.777s)	0.072 (34.779s)	0.064
Maximum axial #2 (mm)	0.361 (30.282s)	0.364 (31.284s)	0.368 (32.282s)	0.372 (33.282s)	0.374 (34.285s)	0.368
Minimum axial #2 (mm)	0.075 (30.779s)	0.078 (31.778s)	0.082 (32.779s)	0.087 (33.778s)	0.091 (34.779s)	0.083

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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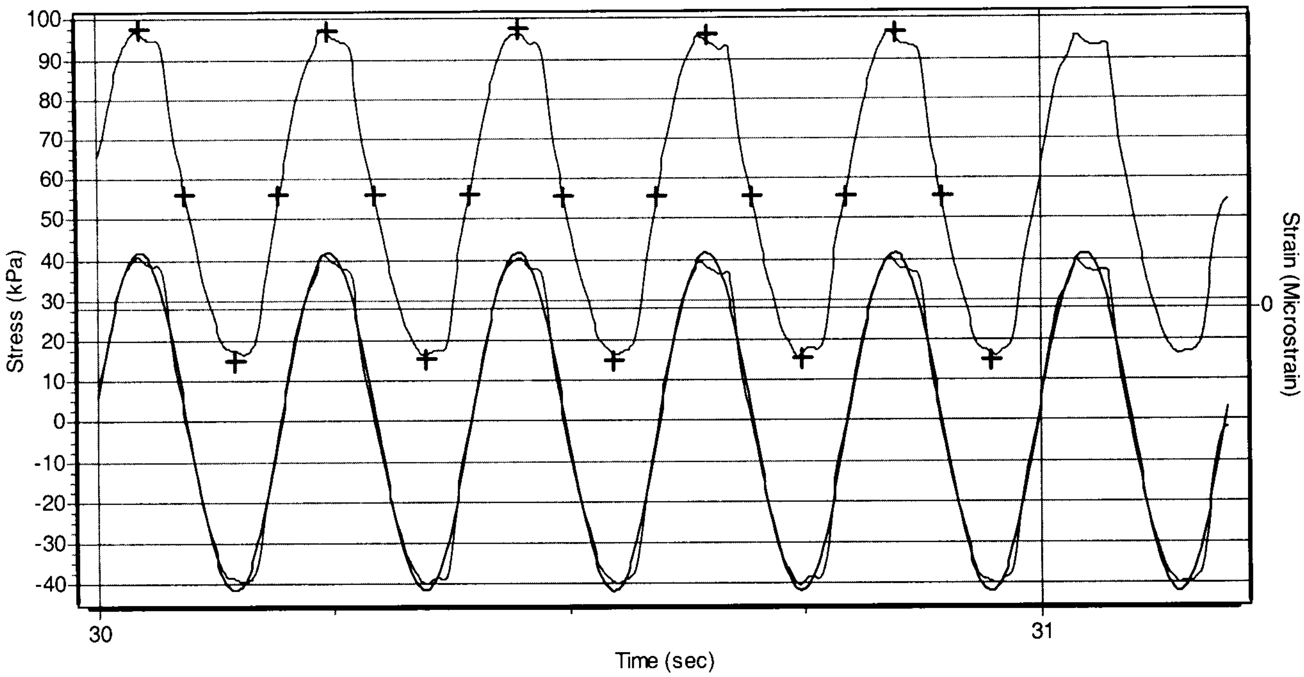


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:07 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.5	82.0	82.4	80.7	81.7	81.8
Recoverable axial micro-strain	2117.9	2110.3	2162.1	2097.1	2098.9	2117.2
Permanent axial micro-strain	195	190	235	170	165	
Dynamic modulus (MPa)	38.9	38.8	38.1	38.5	38.9	38.7
Phase angle (Deg)	11.19	9.90	10.53	9.69	10.90	10.44
Dyn.Modulus/sine(phase angle)	399.2	450.2	415.0	455.6	410.0	426.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.648	0.644	0.647	0.634	0.642	0.643
Maximum load (kN)	0.767 (30.046s)	0.765 (30.245s)	0.767 (30.446s)	0.754 (30.647s)	0.759 (30.847s)	0.762
Minimum load (kN)	0.119 (30.147s)	0.121 (30.346s)	0.120 (30.547s)	0.121 (30.746s)	0.117 (30.947s)	0.120
Maximum averaged axial (mm)	0.204 (30.052s)	0.204 (30.251s)	0.204 (30.452s)	0.204 (30.652s)	0.205 (30.853s)	0.204
Minimum averaged axial (mm)	-0.021 (30.154s)	-0.020 (30.354s)	-0.025 (30.555s)	-0.018 (30.754s)	-0.017 (30.954s)	-0.020
Maximum axial #1 (mm)	0.193 (30.053s)	0.193 (30.252s)	0.193 (30.453s)	0.194 (30.654s)	0.195 (30.854s)	0.193
Minimum axial #1 (mm)	-0.021 (30.154s)	-0.020 (30.354s)	-0.026 (30.554s)	-0.018 (30.754s)	-0.017 (30.954s)	-0.020
Maximum axial #2 (mm)	0.215 (30.051s)	0.215 (30.251s)	0.215 (30.451s)	0.215 (30.652s)	0.216 (30.852s)	0.215
Minimum axial #2 (mm)	-0.021 (30.154s)	-0.020 (30.354s)	-0.024 (30.555s)	-0.018 (30.754s)	-0.018 (30.954s)	-0.020

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#03

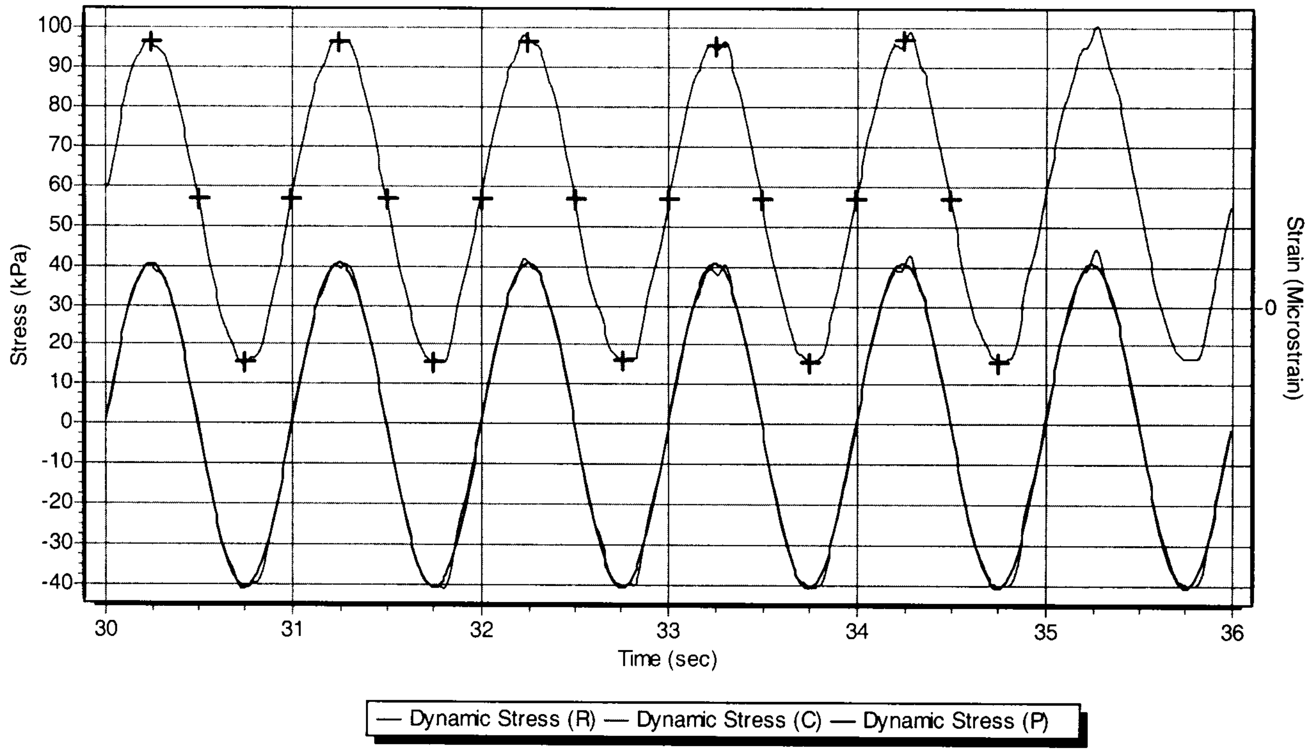
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#04.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.8	80.9	80.7	80.1	81.3	80.8
Recoverable axial micro-strain	2240.9	2230.4	2230.0	2202.5	2191.5	2219.1
Permanent axial micro-strain	990	1032	1066	1105	1166	
Dynamic modulus (MPa)	36.1	36.3	36.2	36.4	37.1	36.4
Phase angle (Deg)	13.26	12.18	12.98	11.97	11.99	12.48
Dyn.Modulus/sine(phase angle)	312.4	341.7	320.3	349.0	355.1	335.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.635	0.634	0.629	0.638	0.634
Maximum load (kN)	0.759 (30.244s)	0.759 (31.247s)	0.761 (32.243s)	0.753 (33.247s)	0.763 (34.248s)	0.759
Minimum load (kN)	0.124 (30.746s)	0.124 (31.747s)	0.127 (32.746s)	0.123 (33.748s)	0.125 (34.746s)	0.125
Maximum averaged axial (mm)	0.336 (30.281s)	0.339 (31.281s)	0.343 (32.279s)	0.344 (33.280s)	0.349 (34.282s)	0.342
Minimum averaged axial (mm)	0.103 (30.783s)	0.107 (31.781s)	0.111 (32.785s)	0.115 (33.781s)	0.121 (34.783s)	0.111
Maximum axial #1 (mm)	0.333 (30.281s)	0.336 (31.281s)	0.340 (32.279s)	0.341 (33.279s)	0.346 (34.281s)	0.339
Minimum axial #1 (mm)	0.104 (30.784s)	0.107 (31.781s)	0.111 (32.785s)	0.115 (33.782s)	0.121 (34.783s)	0.111
Maximum axial #2 (mm)	0.340 (30.280s)	0.343 (31.282s)	0.346 (32.280s)	0.347 (33.281s)	0.353 (34.282s)	0.346
Minimum axial #2 (mm)	0.103 (30.783s)	0.108 (31.781s)	0.111 (32.785s)	0.115 (33.781s)	0.120 (34.781s)	0.111

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#04

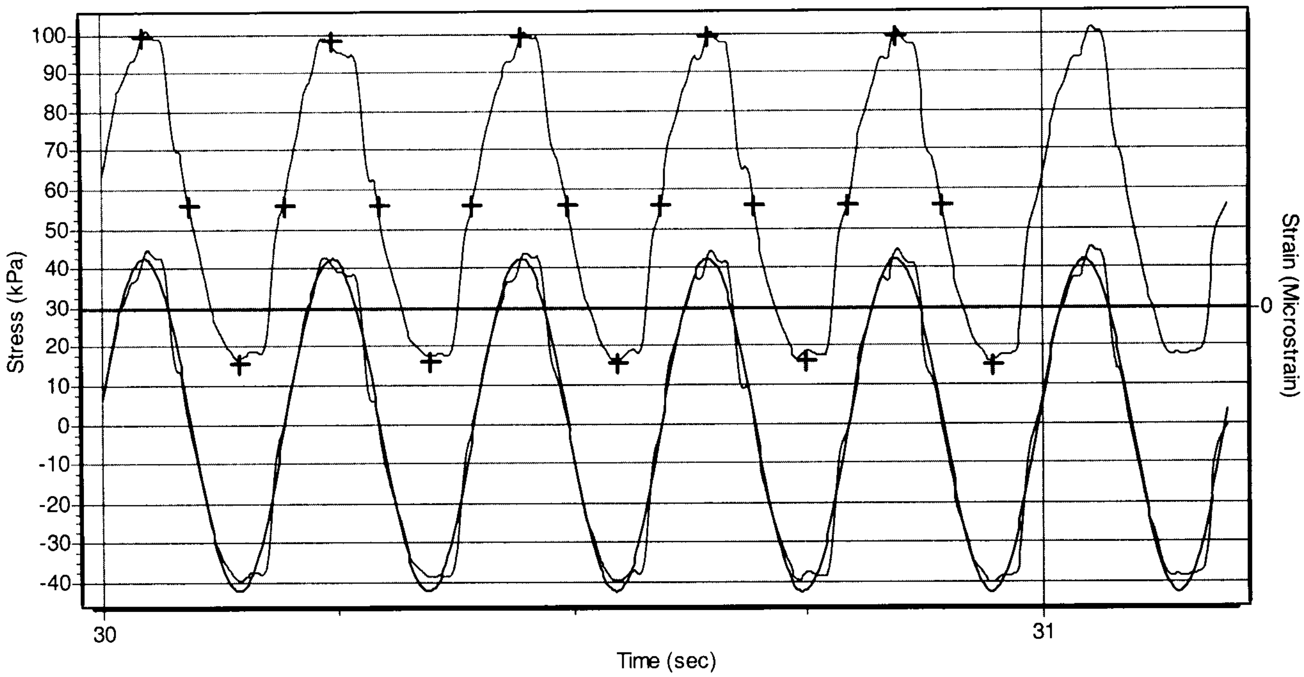
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#04.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.8	82.3	83.8	83.0	84.2	83.4
Recoverable axial micro-strain	1777.3	1780.4	1786.7	1775.2	1779.7	1779.9
Permanent axial micro-strain	91	87	100	77	87	
Dynamic modulus (MPa)	47.2	46.2	46.9	46.8	47.3	46.9
Phase angle (Deg)	9.21	6.62	10.27	7.54	8.39	8.41
Dyn.Modulus/sine(phase angle)	587.6	800.1	523.6	711.2	646.5	653.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.658	0.646	0.658	0.652	0.661	0.655
Maximum load (kN)	0.780 (30.045s)	0.771 (30.247s)	0.779 (30.446s)	0.780 (30.646s)	0.778 (30.845s)	0.778
Minimum load (kN)	0.122 (30.147s)	0.125 (30.348s)	0.121 (30.548s)	0.128 (30.749s)	0.117 (30.947s)	0.122
Maximum averaged axial (mm)	0.175 (30.051s)	0.176 (30.251s)	0.175 (30.452s)	0.177 (30.650s)	0.176 (30.850s)	0.176
Minimum averaged axial (mm)	-0.009 (30.151s)	-0.009 (30.353s)	-0.010 (30.552s)	-0.008 (30.752s)	-0.009 (30.952s)	-0.009
Maximum axial #1 (mm)	0.172 (30.051s)	0.172 (30.251s)	0.172 (30.453s)	0.173 (30.651s)	0.173 (30.851s)	0.172
Minimum axial #1 (mm)	-0.010 (30.150s)	-0.011 (30.353s)	-0.011 (30.551s)	-0.009 (30.752s)	-0.010 (30.952s)	-0.010
Maximum axial #2 (mm)	0.179 (30.050s)	0.180 (30.249s)	0.179 (30.450s)	0.180 (30.650s)	0.180 (30.849s)	0.180
Minimum axial #2 (mm)	-0.009 (30.152s)	-0.009 (30.353s)	-0.009 (30.553s)	-0.007 (30.752s)	-0.008 (30.953s)	-0.008

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#04

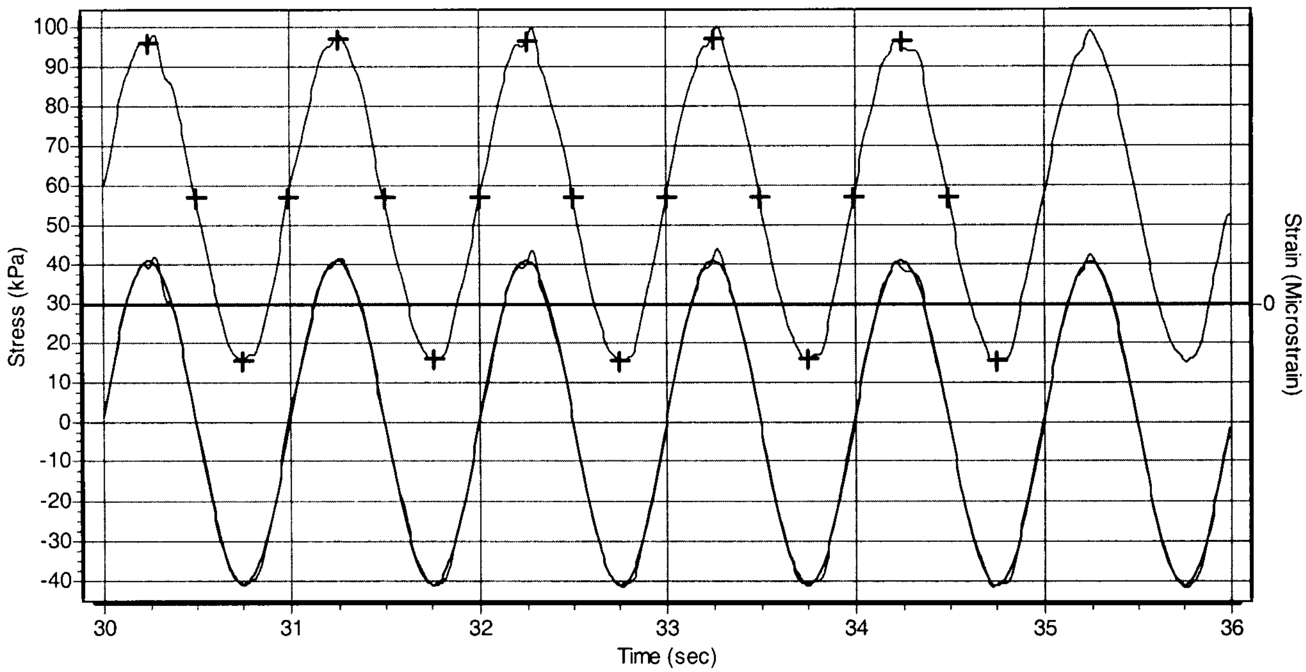
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#05.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:18 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	81.6	81.5	81.3	80.9	81.2
Recoverable axial micro-strain	2394.0	2423.7	2406.7	2375.4	2378.9	2395.7
Permanent axial micro-strain	1324	1357	1400	1478	1498	
Dynamic modulus (MPa)	33.8	33.7	33.8	34.2	34.0	33.9
Phase angle (Deg)	14.11	12.89	13.00	13.78	12.31	13.22
Dyn.Modulus/sine(phase angle)	275.2	299.8	299.0	285.1	317.2	295.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.641	0.640	0.638	0.635	0.638
Maximum load (kN)	0.757 (30.244s)	0.764 (31.248s)	0.759 (32.246s)	0.762 (33.247s)	0.758 (34.244s)	0.760
Minimum load (kN)	0.121 (30.748s)	0.124 (31.749s)	0.119 (32.745s)	0.124 (33.747s)	0.122 (34.745s)	0.122
Maximum averaged axial (mm)	0.387 (30.283s)	0.393 (31.284s)	0.396 (32.282s)	0.401 (33.285s)	0.403 (34.278s)	0.396
Minimum averaged axial (mm)	0.138 (30.779s)	0.141 (31.781s)	0.146 (32.778s)	0.154 (33.781s)	0.156 (34.779s)	0.147
Maximum axial #1 (mm)	0.374 (30.283s)	0.380 (31.284s)	0.383 (32.283s)	0.387 (33.286s)	0.389 (34.278s)	0.382
Minimum axial #1 (mm)	0.126 (30.779s)	0.130 (31.781s)	0.134 (32.778s)	0.141 (33.781s)	0.143 (34.780s)	0.135
Maximum axial #2 (mm)	0.400 (30.283s)	0.407 (31.285s)	0.409 (32.282s)	0.415 (33.285s)	0.418 (34.279s)	0.410
Minimum axial #2 (mm)	0.149 (30.779s)	0.153 (31.781s)	0.157 (32.778s)	0.166 (33.781s)	0.168 (34.779s)	0.159

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 92 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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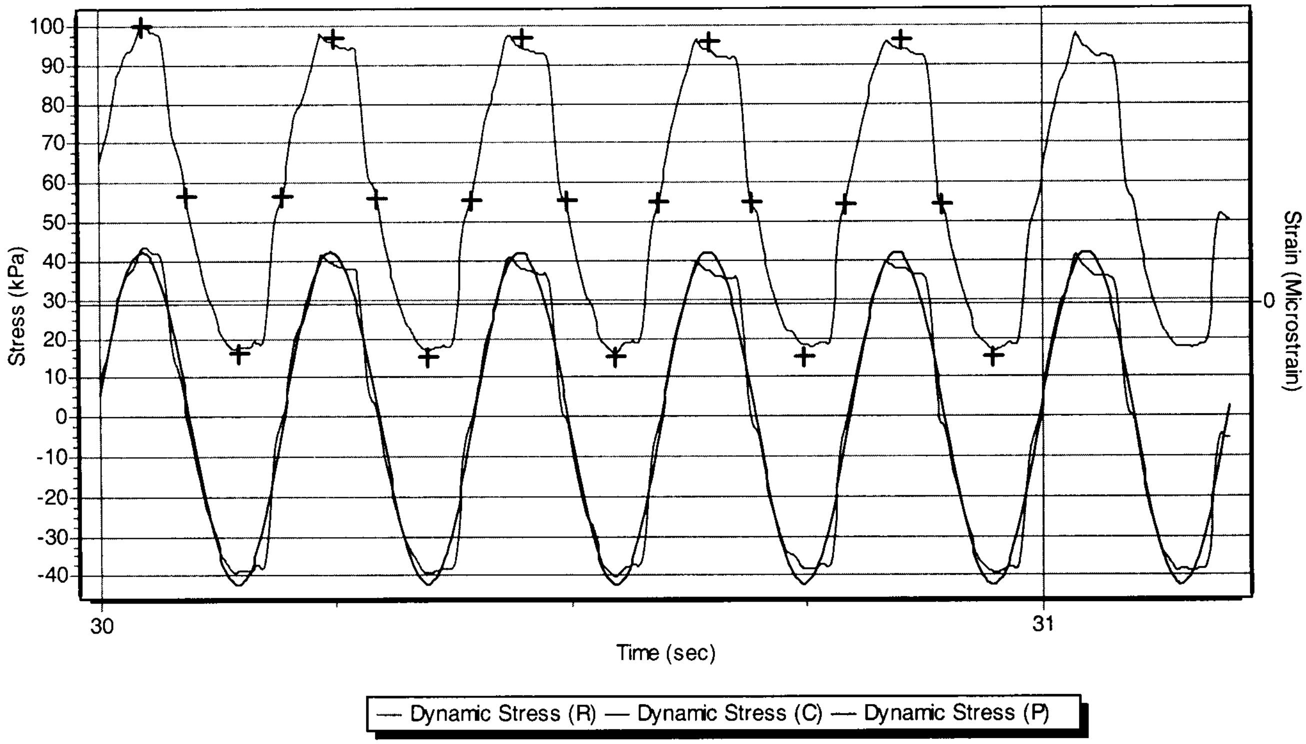

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:18 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.9	81.8	81.3	80.7	81.1	81.8
Recoverable axial micro-strain	1918.1	1927.1	1911.6	1895.8	1901.0	1910.7
Permanent axial micro-strain	310	302	306	327	332	
Dynamic modulus (MPa)	43.8	42.4	42.5	42.6	42.7	42.8
Phase angle (Deg)	9.45	4.48	7.14	12.88	6.79	8.15
Dyn.Modulus/sine(phase angle)	531.0	1086.0	682.8	379.6	720.8	680.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.659	0.642	0.638	0.634	0.637	0.642
Maximum load (kN)	0.785 (30.046s)	0.763 (30.251s)	0.760 (30.449s)	0.752 (30.649s)	0.756 (30.851s)	0.763
Minimum load (kN)	0.126 (30.148s)	0.121 (30.347s)	0.121 (30.547s)	0.118 (30.748s)	0.119 (30.947s)	0.121
Maximum averaged axial (mm)	0.232 (30.051s)	0.232 (30.253s)	0.231 (30.453s)	0.231 (30.656s)	0.232 (30.854s)	0.232
Minimum averaged axial (mm)	0.032 (30.152s)	0.031 (30.352s)	0.032 (30.551s)	0.034 (30.753s)	0.035 (30.952s)	0.033
Maximum axial #1 (mm)	0.254 (30.052s)	0.253 (30.253s)	0.252 (30.453s)	0.253 (30.656s)	0.254 (30.855s)	0.253
Minimum axial #1 (mm)	0.055 (30.152s)	0.053 (30.353s)	0.055 (30.551s)	0.057 (30.753s)	0.057 (30.951s)	0.055
Maximum axial #2 (mm)	0.210 (30.050s)	0.210 (30.253s)	0.209 (30.453s)	0.209 (30.656s)	0.211 (30.851s)	0.210
Minimum axial #2 (mm)	0.010 (30.152s)	0.009 (30.352s)	0.009 (30.551s)	0.011 (30.753s)	0.012 (30.952s)	0.010

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 97 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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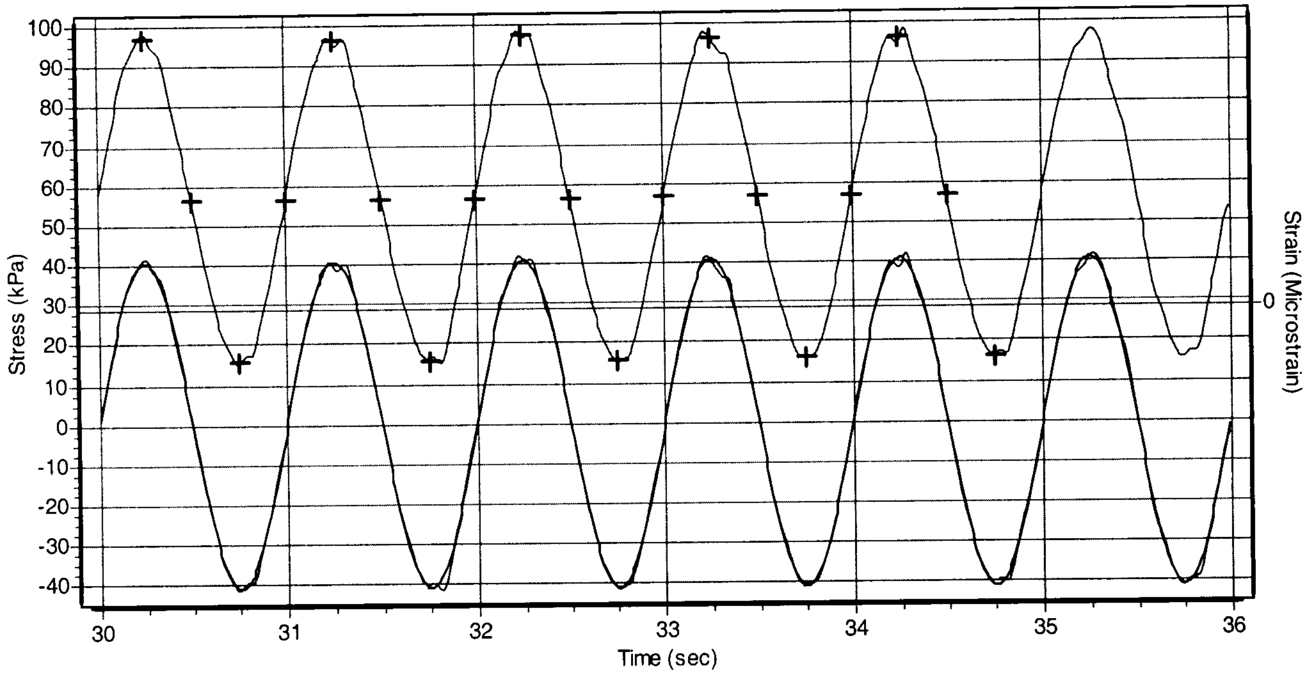

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:23 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	80.8	82.0	80.6	80.4	81.1
Recoverable axial micro-strain	2011.0	1996.6	2012.4	1990.4	1976.6	1997.4
Permanent axial micro-strain	1040	1074	1105	1142	1186	
Dynamic modulus (MPa)	40.5	40.4	40.8	40.5	40.7	40.6
Phase angle (Deg)	13.85	14.72	14.72	15.06	15.11	14.69
Dyn.Modulus/sine(phase angle)	336.4	315.8	318.1	308.9	309.6	317.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.634	0.644	0.633	0.632	0.637
Maximum load (kN)	0.763 (30.245s)	0.759 (31.246s)	0.766 (32.242s)	0.759 (33.247s)	0.760 (34.245s)	0.762
Minimum load (kN)	0.123 (30.746s)	0.125 (31.749s)	0.122 (32.744s)	0.126 (33.747s)	0.128 (34.743s)	0.125
Maximum averaged axial (mm)	0.317 (30.284s)	0.319 (31.287s)	0.324 (32.282s)	0.326 (33.289s)	0.329 (34.287s)	0.323
Minimum averaged axial (mm)	0.108 (30.782s)	0.112 (31.784s)	0.115 (32.782s)	0.119 (33.781s)	0.123 (34.782s)	0.115
Maximum axial #1 (mm)	0.305 (30.286s)	0.308 (31.289s)	0.312 (32.284s)	0.314 (33.290s)	0.317 (34.289s)	0.311
Minimum axial #1 (mm)	0.104 (30.783s)	0.107 (31.784s)	0.110 (32.783s)	0.114 (33.782s)	0.118 (34.783s)	0.110
Maximum axial #2 (mm)	0.329 (30.282s)	0.331 (31.285s)	0.336 (32.281s)	0.338 (33.287s)	0.341 (34.285s)	0.335
Minimum axial #2 (mm)	0.113 (30.781s)	0.116 (31.783s)	0.120 (32.781s)	0.124 (33.781s)	0.128 (34.780s)	0.120

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 100 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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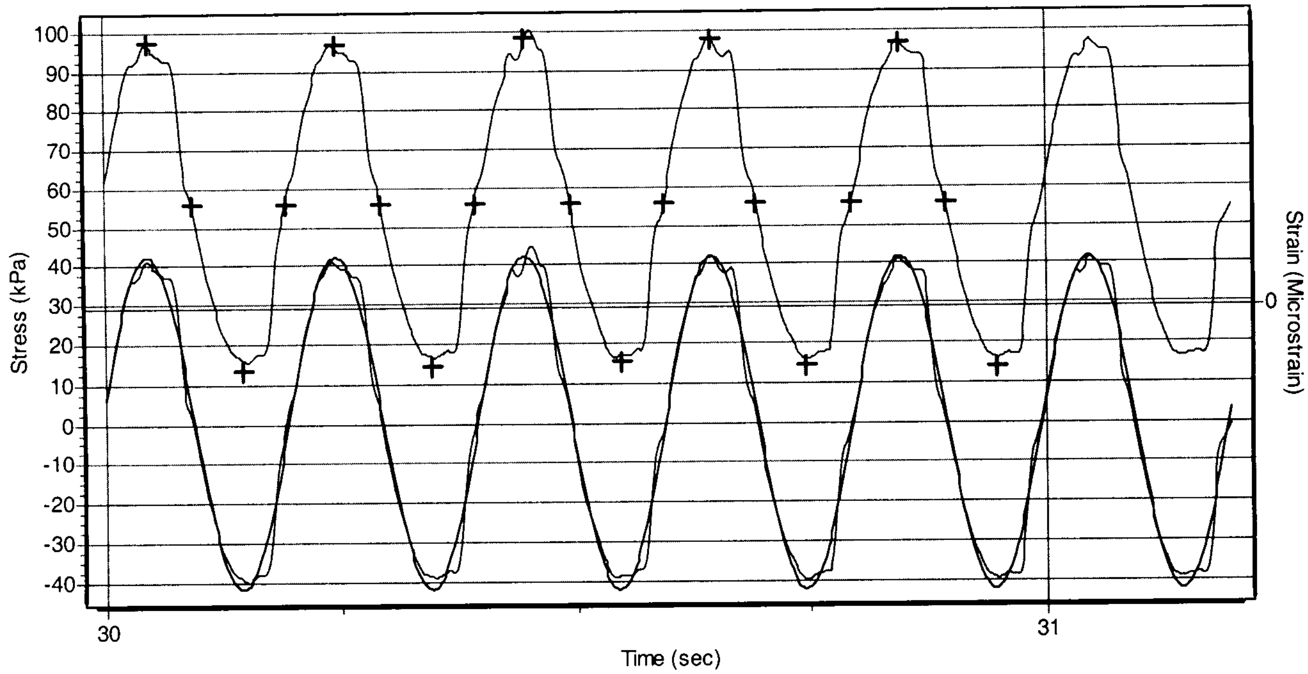

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:23 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.5	82.6	83.1	83.5	83.0	83.1
Recoverable axial micro-strain	1724.9	1659.3	1666.8	1723.9	1676.1	1690.2
Permanent axial micro-strain	13	59	66	6	51	
Dynamic modulus (MPa)	48.4	49.8	49.9	48.4	49.5	49.2
Phase angle (Deg)	10.19	9.82	10.58	12.64	13.37	11.32
Dyn.Modulus/sine(phase angle)	544.9	581.8	540.9	440.0	425.3	506.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.656	0.649	0.653	0.656	0.652	0.653
Maximum load (kN)	0.763 (30.046s)	0.763 (30.246s)	0.774 (30.446s)	0.768 (30.645s)	0.762 (30.846s)	0.766
Minimum load (kN)	0.107 (30.147s)	0.114 (30.346s)	0.122 (30.547s)	0.112 (30.746s)	0.111 (30.947s)	0.113
Maximum averaged axial (mm)	0.178 (30.052s)	0.179 (30.252s)	0.180 (30.452s)	0.180 (30.652s)	0.180 (30.854s)	0.179
Minimum averaged axial (mm)	-0.001 (30.153s)	0.006 (30.352s)	0.007 (30.552s)	0.001 (30.753s)	0.005 (30.954s)	0.004
Maximum axial #1 (mm)	0.169 (30.052s)	0.170 (30.252s)	0.172 (30.453s)	0.171 (30.652s)	0.171 (30.854s)	0.171
Minimum axial #1 (mm)	-0.002 (30.153s)	0.005 (30.352s)	0.006 (30.552s)	0.006 (30.752s)	0.005 (30.954s)	0.004
Maximum axial #2 (mm)	0.187 (30.051s)	0.187 (30.251s)	0.189 (30.452s)	0.189 (30.652s)	0.188 (30.854s)	0.188
Minimum axial #2 (mm)	-0.001 (30.153s)	0.007 (30.352s)	0.008 (30.552s)	0.001 (30.752s)	0.006 (30.954s)	0.004

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 100 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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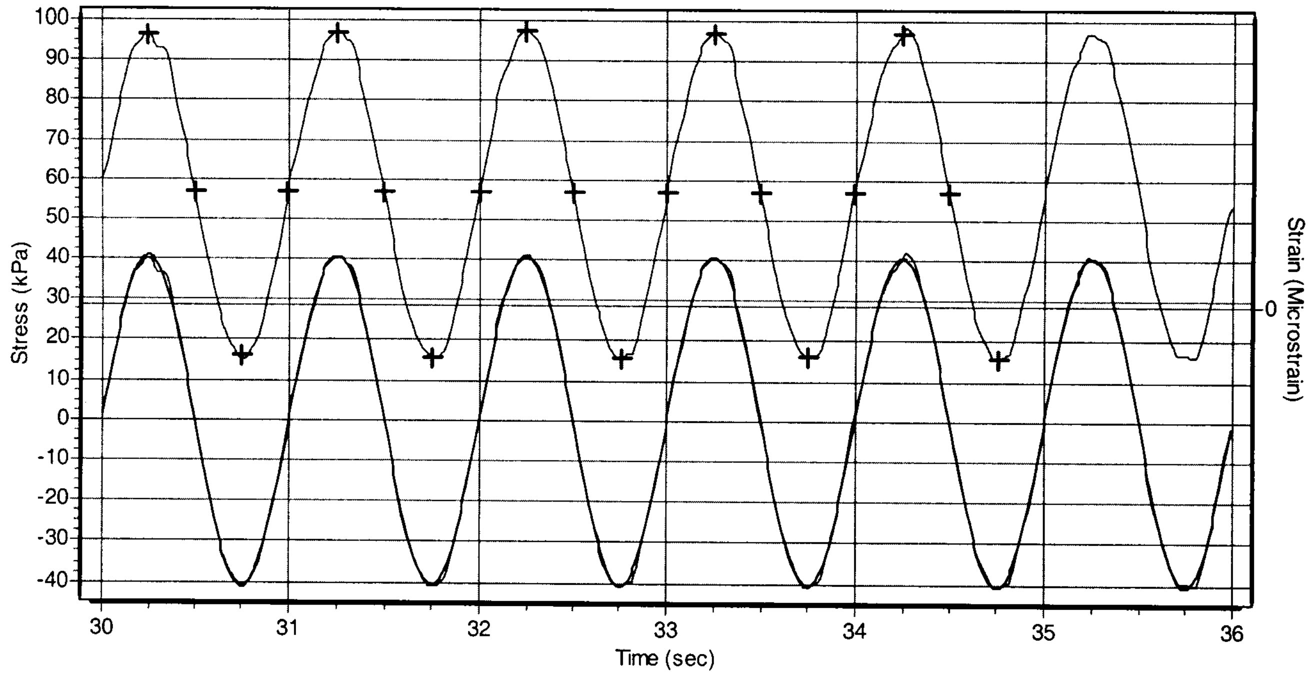


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:28 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	81.1	81.6	80.9	81.2	81.0
Recoverable axial micro-strain	2095.4	2108.3	2095.8	2106.6	2106.4	2102.5
Permanent axial micro-strain	881	905	951	971	1011	
Dynamic modulus (MPa)	38.4	38.5	38.9	38.4	38.5	38.5
Phase angle (Deg)	14.48	14.21	15.34	13.74	14.13	14.38
Dyn.Modulus/sine(phase angle)	304.8	311.0	291.6	320.9	313.3	308.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.637	0.641	0.635	0.638	0.637
Maximum load (kN)	0.758 (30.246s)	0.761 (31.248s)	0.764 (32.245s)	0.761 (33.246s)	0.762 (34.249s)	0.761
Minimum load (kN)	0.126 (30.746s)	0.124 (31.745s)	0.123 (32.747s)	0.126 (33.746s)	0.124 (34.748s)	0.125
Maximum averaged axial (mm)	0.307 (30.286s)	0.310 (31.288s)	0.314 (32.288s)	0.317 (33.284s)	0.321 (34.288s)	0.314
Minimum averaged axial (mm)	0.091 (30.777s)	0.093 (31.781s)	0.098 (32.783s)	0.100 (33.781s)	0.104 (34.784s)	0.097
Maximum axial #1 (mm)	0.309 (30.288s)	0.312 (31.289s)	0.315 (32.289s)	0.318 (33.286s)	0.323 (34.289s)	0.315
Minimum axial #1 (mm)	0.097 (30.779s)	0.100 (31.781s)	0.105 (32.784s)	0.107 (33.782s)	0.111 (34.785s)	0.104
Maximum axial #2 (mm)	0.305 (30.288s)	0.309 (31.286s)	0.312 (32.287s)	0.316 (33.283s)	0.319 (34.288s)	0.312
Minimum axial #2 (mm)	0.084 (30.777s)	0.085 (31.779s)	0.091 (32.782s)	0.093 (33.781s)	0.097 (34.783s)	0.090

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#07

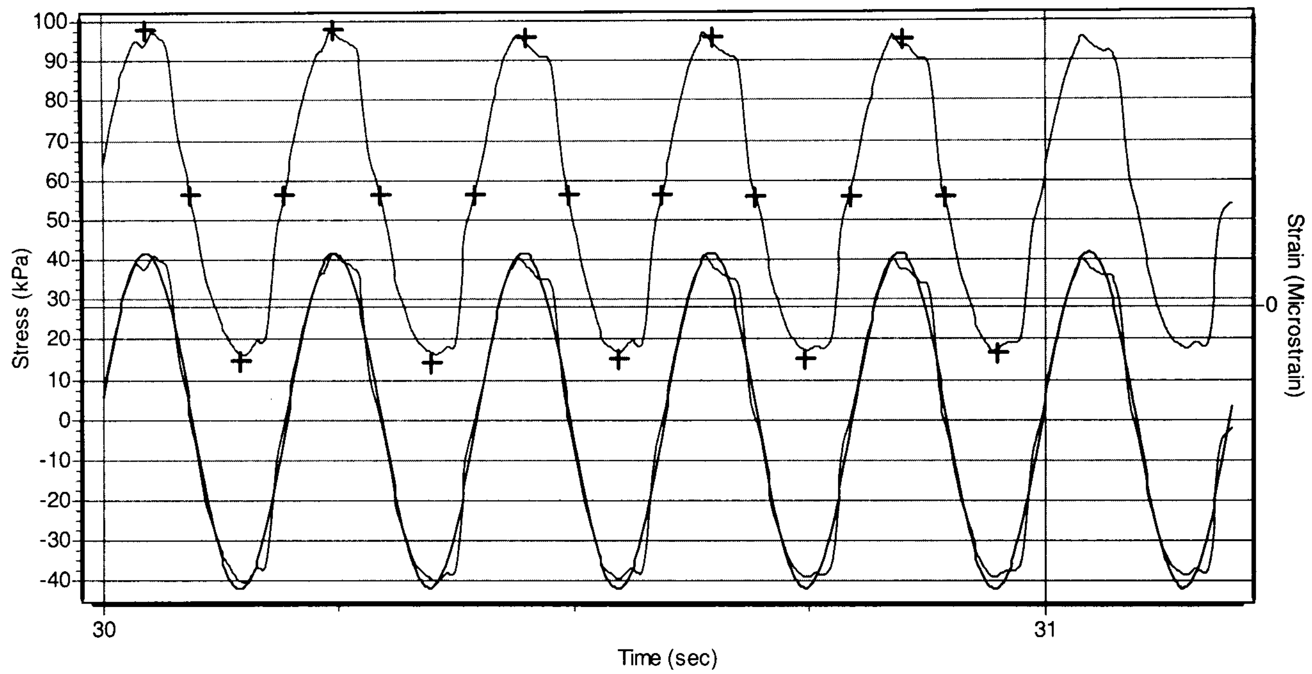
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 103 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#07.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:28 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.1	83.7	80.7	80.8	79.0	81.5
Recoverable axial micro-strain	1819.1	1835.6	1766.0	1780.2	1758.7	1791.9
Permanent axial micro-strain	11	0	70	66	80	
Dynamic modulus (MPa)	45.7	45.6	45.7	45.4	44.9	45.5
Phase angle (Deg)	14.01	14.59	11.75	12.15	6.85	11.87
Dyn.Modulus/sine(phase angle)	374.6	359.3	446.3	429.0	751.5	472.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.653	0.658	0.634	0.635	0.621	0.640
Maximum load (kN)	0.771 (30.046s)	0.770 (30.246s)	0.755 (30.449s)	0.756 (30.648s)	0.751 (30.849s)	0.760
Minimum load (kN)	0.118 (30.146s)	0.112 (30.347s)	0.121 (30.546s)	0.121 (30.746s)	0.130 (30.947s)	0.121
Maximum averaged axial (mm)	0.189 (30.054s)	0.189 (30.254s)	0.189 (30.455s)	0.190 (30.655s)	0.189 (30.853s)	0.189
Minimum averaged axial (mm)	0.001 (30.153s)	0.000 (30.353s)	0.007 (30.553s)	0.007 (30.753s)	0.008 (30.954s)	0.005
Maximum axial #1 (mm)	0.185 (30.054s)	0.185 (30.253s)	0.186 (30.455s)	0.187 (30.655s)	0.186 (30.853s)	0.186
Minimum axial #1 (mm)	0.004 (30.153s)	0.003 (30.354s)	0.010 (30.553s)	0.010 (30.753s)	0.011 (30.954s)	0.008
Maximum axial #2 (mm)	0.191 (30.053s)	0.193 (30.253s)	0.192 (30.452s)	0.193 (30.655s)	0.193 (30.853s)	0.193
Minimum axial #2 (mm)	-0.002 (30.153s)	-0.003 (30.353s)	0.004 (30.553s)	0.004 (30.753s)	0.006 (30.954s)	0.002

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#07

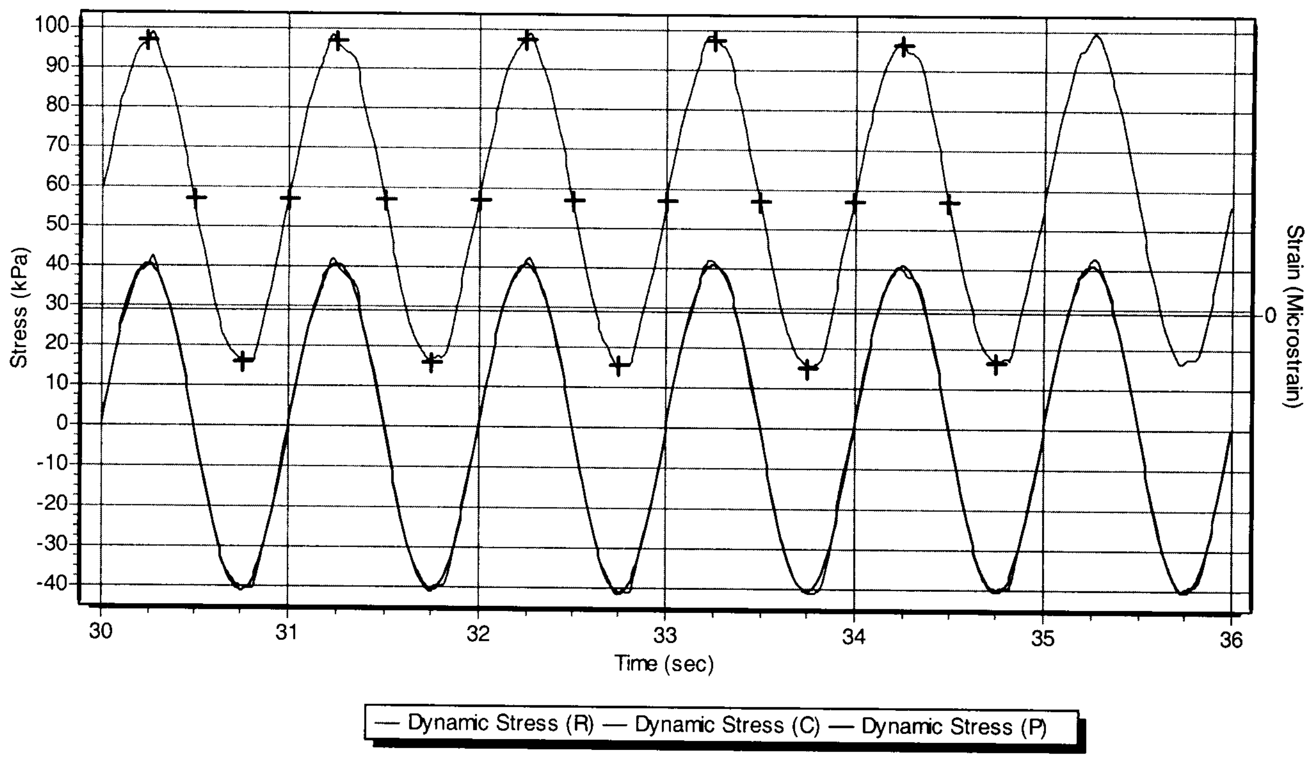
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 103 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#08.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:35 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.7	80.5	81.5	82.1	80.0	81.0
Recoverable axial micro-strain	1966.9	1950.9	1983.1	1992.4	1957.0	1970.0
Permanent axial micro-strain	1176	1223	1238	1261	1320	
Dynamic modulus (MPa)	41.0	41.3	41.1	41.2	40.9	41.1
Phase angle (Deg)	15.46	16.26	15.61	15.69	16.39	15.88
Dyn.Modulus/sine(phase angle)	305.0	291.8	302.6	302.0	286.8	297.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.633	0.640	0.645	0.628	0.636
Maximum load (kN)	0.759 (30.248s)	0.759 (31.247s)	0.762 (32.246s)	0.764 (33.244s)	0.756 (34.243s)	0.760
Minimum load (kN)	0.125 (30.747s)	0.126 (31.746s)	0.122 (32.746s)	0.119 (33.747s)	0.128 (34.746s)	0.124
Maximum averaged axial (mm)	0.324 (30.291s)	0.327 (31.293s)	0.332 (32.290s)	0.335 (33.288s)	0.338 (34.289s)	0.331
Minimum averaged axial (mm)	0.121 (30.783s)	0.126 (31.784s)	0.127 (32.784s)	0.130 (33.783s)	0.136 (34.785s)	0.128
Maximum axial #1 (mm)	0.328 (30.292s)	0.331 (31.294s)	0.336 (32.291s)	0.340 (33.289s)	0.342 (34.290s)	0.336
Minimum axial #1 (mm)	0.128 (30.783s)	0.133 (31.785s)	0.134 (32.784s)	0.137 (33.784s)	0.143 (34.785s)	0.135
Maximum axial #2 (mm)	0.319 (30.291s)	0.323 (31.290s)	0.327 (32.289s)	0.330 (33.286s)	0.333 (34.288s)	0.326
Minimum axial #2 (mm)	0.115 (30.783s)	0.119 (31.784s)	0.121 (32.783s)	0.123 (33.782s)	0.128 (34.784s)	0.121

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#08

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 75 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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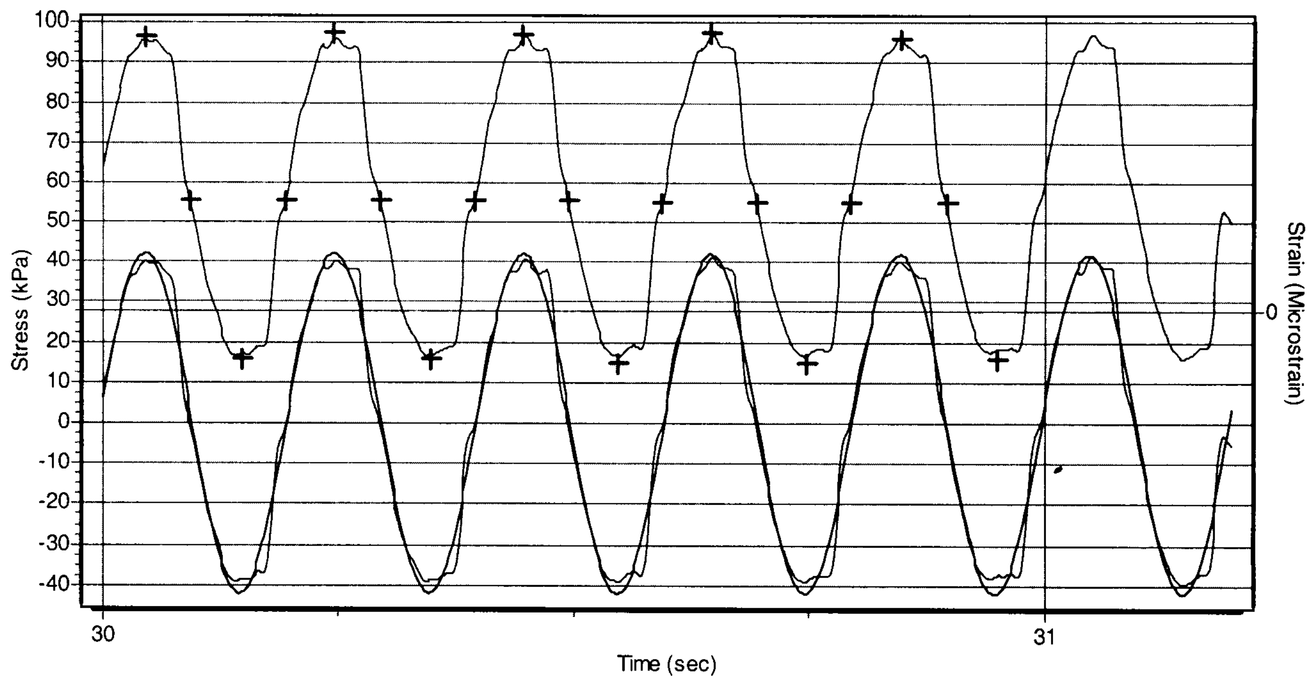

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:35 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.1	81.7	82.1	82.7	80.3	81.6
Recoverable axial micro-strain	1733.2	1651.2	1659.0	1672.7	1643.8	1672.0
Permanent axial micro-strain	250	318	321	311	342	
Dynamic modulus (MPa)	46.8	49.5	49.5	49.5	48.8	48.8
Phase angle (Deg)	9.78	13.93	14.80	12.85	10.82	12.43
Dyn.Modulus/sine(phase angle)	549.0	408.2	384.3	442.1	518.0	460.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.642	0.645	0.650	0.630	0.641
Maximum load (kN)	0.760 (30.048s)	0.766 (30.246s)	0.763 (30.446s)	0.767 (30.646s)	0.757 (30.847s)	0.762
Minimum load (kN)	0.123 (30.149s)	0.124 (30.347s)	0.118 (30.547s)	0.117 (30.746s)	0.126 (30.949s)	0.122
Maximum averaged axial (mm)	0.204 (30.053s)	0.203 (30.253s)	0.204 (30.454s)	0.204 (30.653s)	0.205 (30.853s)	0.204
Minimum averaged axial (mm)	0.026 (30.154s)	0.033 (30.353s)	0.033 (30.552s)	0.032 (30.753s)	0.035 (30.952s)	0.032
Maximum axial #1 (mm)	0.206 (30.053s)	0.204 (30.254s)	0.206 (30.454s)	0.206 (30.653s)	0.205 (30.854s)	0.205
Minimum axial #1 (mm)	0.032 (30.154s)	0.039 (30.353s)	0.040 (30.552s)	0.039 (30.752s)	0.042 (30.952s)	0.038
Maximum axial #2 (mm)	0.203 (30.053s)	0.201 (30.253s)	0.202 (30.453s)	0.202 (30.652s)	0.203 (30.853s)	0.202
Minimum axial #2 (mm)	0.025 (30.153s)	0.026 (30.353s)	0.027 (30.552s)	0.025 (30.753s)	0.029 (30.952s)	0.026

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#08

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 95 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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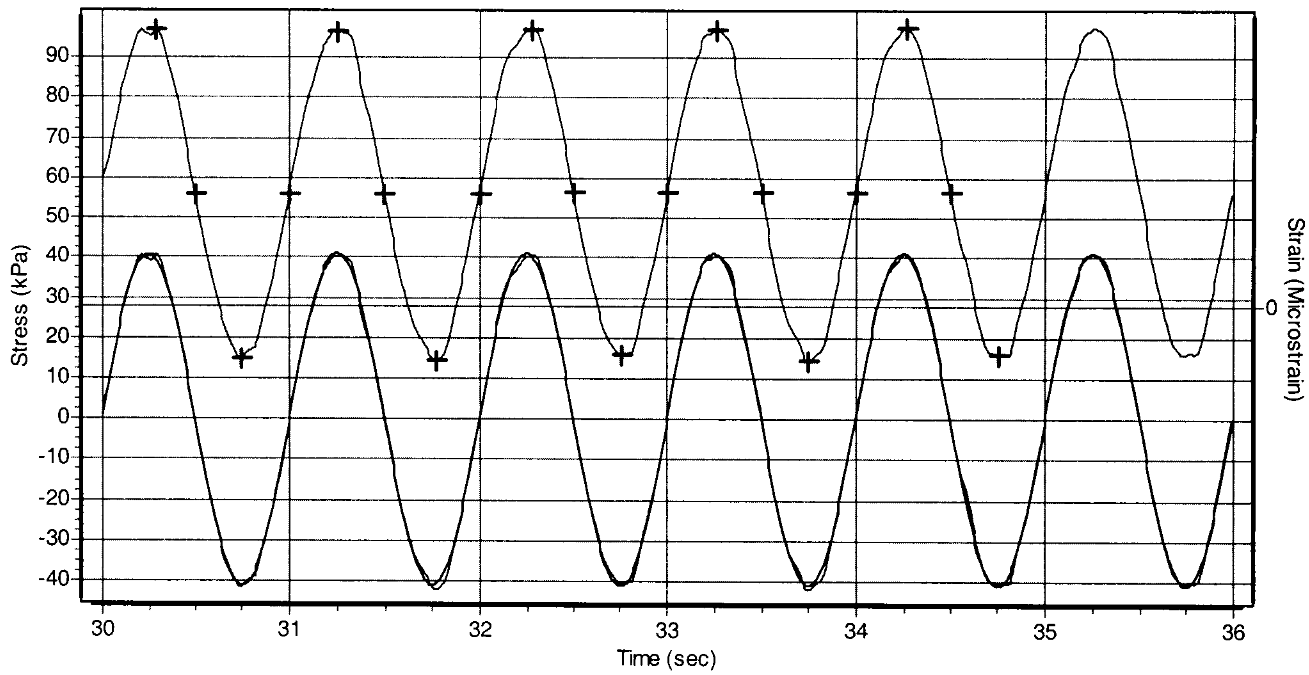

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:41 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	82.1	82.1	81.2	82.5	81.7	81.9
Recoverable axial micro-strain	2199.0	2242.5	2199.1	2197.3	2205.4	2208.7
Permanent axial micro-strain	1221	1219	1290	1331	1362	
Dynamic modulus (MPa)	37.3	36.6	36.9	37.5	37.0	37.1
Phase angle (Deg)	3.60	21.60	3.60	18.00	7.20	10.80
Dyn.Modulus/sine(phase angle)	1188.1	195.5	1175.5	239.9	589.7	677.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.645	0.645	0.638	0.648	0.641	0.643
Maximum load (kN)	0.763 (30.290s)	0.759 (31.250s)	0.763 (32.280s)	0.761 (33.260s)	0.766 (34.260s)	0.762
Minimum load (kN)	0.118 (30.740s)	0.114 (31.770s)	0.125 (32.750s)	0.113 (33.750s)	0.125 (34.750s)	0.119
Maximum averaged axial (mm)	0.356 (30.300s)	0.360 (31.310s)	0.363 (32.290s)	0.367 (33.310s)	0.371 (34.280s)	0.363
Minimum averaged axial (mm)	0.127 (30.800s)	0.127 (31.790s)	0.134 (32.790s)	0.138 (33.770s)	0.142 (34.800s)	0.134
Maximum axial #1 (mm)	0.352 (30.300s)	0.356 (31.310s)	0.359 (32.290s)	0.363 (33.300s)	0.368 (34.280s)	0.359
Minimum axial #1 (mm)	0.132 (30.800s)	0.131 (31.790s)	0.139 (32.790s)	0.143 (33.770s)	0.146 (34.790s)	0.138
Maximum axial #2 (mm)	0.360 (30.290s)	0.364 (31.310s)	0.367 (32.300s)	0.371 (33.310s)	0.374 (34.300s)	0.367
Minimum axial #2 (mm)	0.122 (30.760s)	0.122 (31.790s)	0.129 (32.790s)	0.133 (33.780s)	0.137 (34.800s)	0.129

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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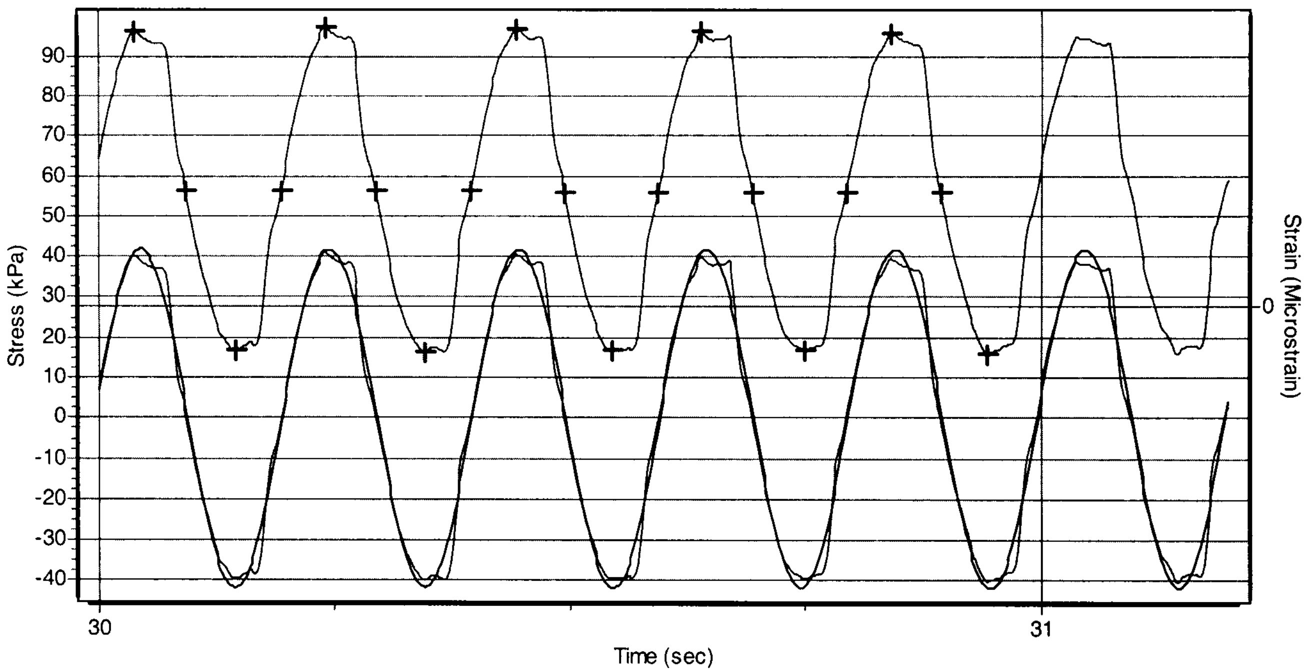

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:41 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	79.7	81.0	79.9	79.3	79.5	79.9
Recoverable axial micro-strain	1727.6	1769.7	1772.9	1775.1	1725.2	1754.1
Permanent axial micro-strain	354	333	342	366	379	
Dynamic modulus (MPa)	46.2	45.8	45.1	44.7	46.1	45.6
Phase angle (Deg)	57.60	46.80	46.80	54.00	10.80	43.20
Dyn.Modulus/sine(phase angle)	95.8	115.2	113.5	98.4	489.8	182.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.626	0.636	0.628	0.623	0.625	0.627
Maximum load (kN)	0.758 (30.038s)	0.764 (30.242s)	0.759 (30.442s)	0.756 (30.640s)	0.751 (30.840s)	0.758
Minimum load (kN)	0.132 (30.146s)	0.128 (30.344s)	0.131 (30.544s)	0.133 (30.750s)	0.127 (30.942s)	0.130
Maximum averaged axial (mm)	0.216 (30.070s)	0.219 (30.268s)	0.220 (30.468s)	0.223 (30.670s)	0.219 (30.846s)	0.219
Minimum averaged axial (mm)	0.037 (30.168s)	0.035 (30.368s)	0.036 (30.568s)	0.038 (30.766s)	0.039 (30.954s)	0.037
Maximum axial #1 (mm)	0.215 (30.070s)	0.217 (30.252s)	0.218 (30.468s)	0.221 (30.670s)	0.217 (30.856s)	0.218
Minimum axial #1 (mm)	0.043 (30.168s)	0.041 (30.368s)	0.041 (30.568s)	0.044 (30.766s)	0.045 (30.952s)	0.043
Maximum axial #2 (mm)	0.218 (30.068s)	0.221 (30.266s)	0.222 (30.468s)	0.224 (30.670s)	0.221 (30.844s)	0.221
Minimum axial #2 (mm)	0.031 (30.168s)	0.028 (30.368s)	0.030 (30.568s)	0.032 (30.766s)	0.034 (30.954s)	0.031

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 102 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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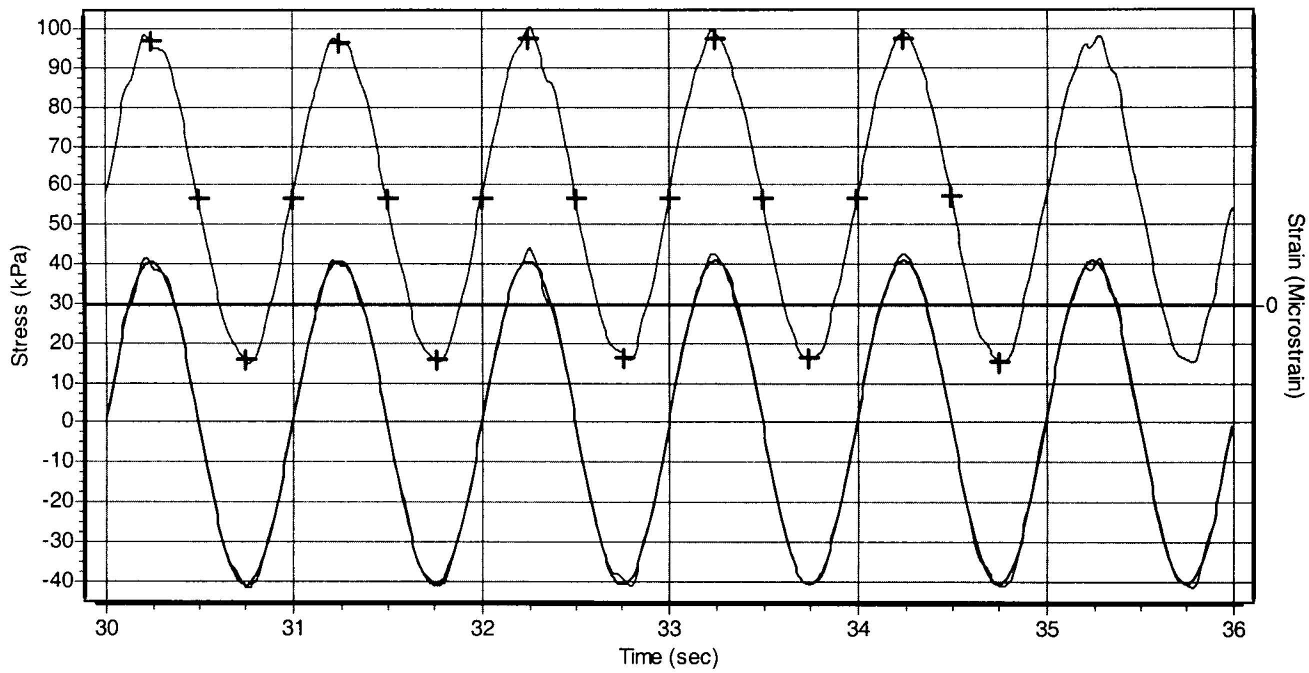


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	80.7	80.8	81.2	82.1	81.2
Recoverable axial micro-strain	1509.5	1506.8	1492.8	1491.5	1508.6	1501.8
Permanent axial micro-strain	1198	1225	1275	1310	1321	
Dynamic modulus (MPa)	53.7	53.6	54.1	54.4	54.4	54.0
Phase angle (Deg)	9.37	10.05	9.85	10.09	9.43	9.76
Dyn.Modulus/sine(phase angle)	656.6	611.9	630.4	618.8	662.3	636.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.634	0.635	0.637	0.645	0.637
Maximum load (kN)	0.760 (30.245s)	0.758 (31.244s)	0.765 (32.245s)	0.764 (33.239s)	0.767 (34.243s)	0.763
Minimum load (kN)	0.124 (30.745s)	0.124 (31.748s)	0.130 (32.747s)	0.127 (33.744s)	0.122 (34.743s)	0.125
Maximum averaged axial (mm)	0.276 (30.271s)	0.279 (31.272s)	0.282 (32.273s)	0.286 (33.267s)	0.289 (34.269s)	0.282
Minimum averaged axial (mm)	0.122 (30.769s)	0.125 (31.770s)	0.130 (32.772s)	0.134 (33.769s)	0.135 (34.767s)	0.129
Maximum axial #1 (mm)	0.281 (30.272s)	0.284 (31.273s)	0.287 (32.274s)	0.291 (33.268s)	0.294 (34.270s)	0.287
Minimum axial #1 (mm)	0.129 (30.770s)	0.132 (31.771s)	0.137 (32.772s)	0.140 (33.769s)	0.141 (34.766s)	0.136
Maximum axial #2 (mm)	0.271 (30.271s)	0.274 (31.270s)	0.277 (32.271s)	0.281 (33.267s)	0.283 (34.268s)	0.277
Minimum axial #2 (mm)	0.116 (30.769s)	0.118 (31.768s)	0.124 (32.772s)	0.127 (33.768s)	0.129 (34.767s)	0.123

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

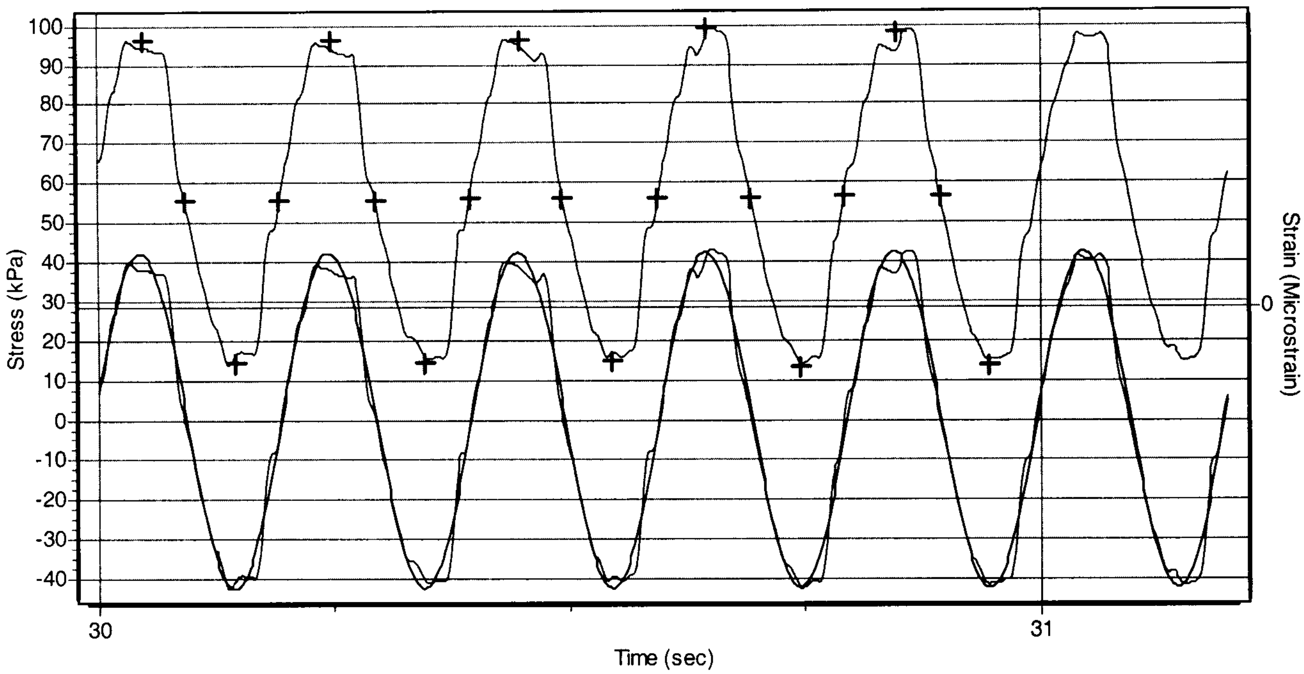
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2ba_#09.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.0	81.9	81.7	86.0	84.6	83.2
Recoverable axial micro-strain	1353.6	1309.7	1348.3	1395.5	1376.9	1356.8
Permanent axial micro-strain	279	318	285	263	274	
Dynamic modulus (MPa)	60.6	62.6	60.6	61.6	61.4	61.3
Phase angle (Deg)	-1.10	1.65	7.71	4.92	5.36	3.71
Dyn.Modulus/sine(phase angle)	-6320.4	4341.8	900.7	1434.2	1314.8	334.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.644	0.644	0.641	0.675	0.665	0.654
Maximum load (kN)	0.757 (30.049s)	0.755 (30.248s)	0.758 (30.447s)	0.780 (30.646s)	0.773 (30.847s)	0.765
Minimum load (kN)	0.114 (30.145s)	0.112 (30.346s)	0.116 (30.545s)	0.105 (30.745s)	0.108 (30.945s)	0.111
Maximum averaged axial (mm)	0.167 (30.049s)	0.166 (30.249s)	0.167 (30.451s)	0.169 (30.648s)	0.168 (30.850s)	0.167
Minimum averaged axial (mm)	0.028 (30.149s)	0.032 (30.349s)	0.029 (30.549s)	0.027 (30.749s)	0.028 (30.950s)	0.029
Maximum axial #1 (mm)	0.164 (30.049s)	0.163 (30.249s)	0.163 (30.451s)	0.166 (30.649s)	0.166 (30.850s)	0.165
Minimum axial #1 (mm)	0.027 (30.149s)	0.032 (30.349s)	0.028 (30.549s)	0.030 (30.750s)	0.027 (30.950s)	0.029
Maximum axial #2 (mm)	0.169 (30.049s)	0.168 (30.250s)	0.170 (30.451s)	0.172 (30.648s)	0.171 (30.850s)	0.170
Minimum axial #2 (mm)	0.032 (30.149s)	0.029 (30.350s)	0.030 (30.549s)	0.028 (30.749s)	0.030 (30.950s)	0.030

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

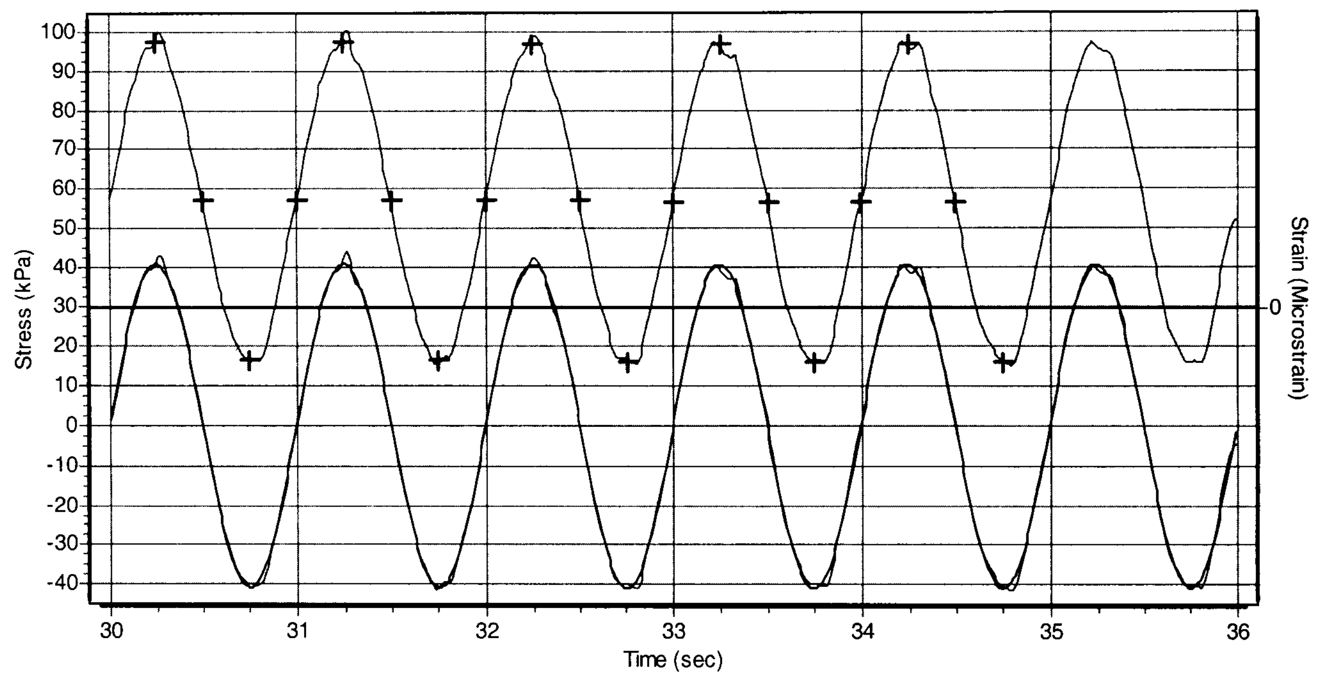
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#10.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:47 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	81.3	80.7	80.6	80.8	80.9
Recoverable axial micro-strain	2091.8	2093.0	2094.7	2083.3	2095.6	2091.7
Permanent axial micro-strain	423	450	466	497	516	
Dynamic modulus (MPa)	38.7	38.8	38.5	38.7	38.6	38.7
Phase angle (Deg)	11.57	12.22	12.52	11.36	11.83	11.90
Dyn.Modulus/sine(phase angle)	383.9	365.1	353.6	391.1	374.1	373.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.639	0.634	0.633	0.635	0.635
Maximum load (kN)	0.764 (30.248s)	0.766 (31.246s)	0.759 (32.245s)	0.759 (33.245s)	0.760 (34.245s)	0.762
Minimum load (kN)	0.128 (30.748s)	0.127 (31.744s)	0.125 (32.746s)	0.126 (33.748s)	0.125 (34.748s)	0.126
Maximum averaged axial (mm)	0.262 (30.280s)	0.265 (31.280s)	0.266 (32.280s)	0.268 (33.277s)	0.272 (34.278s)	0.266
Minimum averaged axial (mm)	0.044 (30.778s)	0.047 (31.777s)	0.049 (32.777s)	0.052 (33.776s)	0.054 (34.777s)	0.049
Maximum axial #1 (mm)	0.258 (30.281s)	0.261 (31.281s)	0.262 (32.281s)	0.264 (33.277s)	0.267 (34.278s)	0.262
Minimum axial #1 (mm)	0.043 (30.778s)	0.046 (31.778s)	0.047 (32.777s)	0.051 (33.777s)	0.053 (34.778s)	0.048
Maximum axial #2 (mm)	0.265 (30.279s)	0.268 (31.279s)	0.271 (32.279s)	0.273 (33.278s)	0.276 (34.278s)	0.271
Minimum axial #2 (mm)	0.044 (30.777s)	0.047 (31.776s)	0.050 (32.776s)	0.052 (33.776s)	0.054 (34.776s)	0.050

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#10

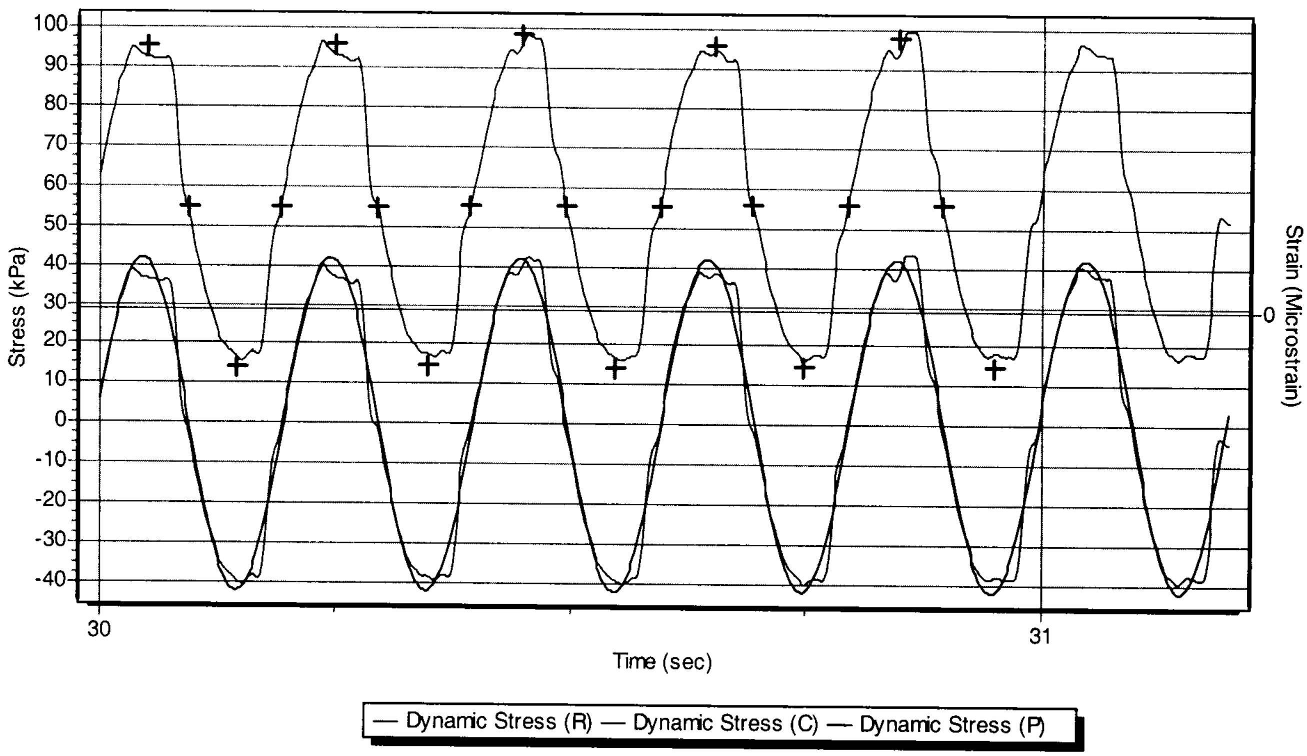
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#10.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:47 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.0	81.5	84.3	80.9	83.0	82.1
Recoverable axial micro-strain	1824.6	1810.2	1839.6	1833.7	1827.0	1827.0
Permanent axial micro-strain	243	219	231	224	204	
Dynamic modulus (MPa)	44.4	45.0	45.8	44.1	45.4	44.9
Phase angle (Deg)	7.15	7.26	8.14	-1.12	7.86	5.86
Dyn.Modulus/sine(phase angle)	712.0	711.2	645.8	-4524.2	662.6	-358.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.640	0.662	0.635	0.652	0.645
Maximum load (kN)	0.748 (30.051s)	0.754 (30.249s)	0.774 (30.446s)	0.752 (30.651s)	0.769 (30.847s)	0.759
Minimum load (kN)	0.112 (30.147s)	0.114 (30.347s)	0.112 (30.547s)	0.117 (30.746s)	0.117 (30.948s)	0.114
Maximum averaged axial (mm)	0.165 (30.055s)	0.165 (30.253s)	0.167 (30.451s)	0.167 (30.650s)	0.169 (30.851s)	0.167
Minimum averaged axial (mm)	-0.025 (30.152s)	-0.023 (30.351s)	-0.024 (30.552s)	-0.023 (30.752s)	-0.021 (30.951s)	-0.023
Maximum axial #1 (mm)	0.163 (30.055s)	0.164 (30.254s)	0.166 (30.451s)	0.166 (30.651s)	0.167 (30.852s)	0.165
Minimum axial #1 (mm)	-0.024 (30.152s)	-0.021 (30.352s)	-0.023 (30.552s)	-0.022 (30.752s)	-0.020 (30.951s)	-0.022
Maximum axial #2 (mm)	0.166 (30.054s)	0.166 (30.254s)	0.168 (30.451s)	0.168 (30.650s)	0.170 (30.851s)	0.168
Minimum axial #2 (mm)	-0.026 (30.151s)	-0.024 (30.351s)	-0.025 (30.551s)	-0.025 (30.752s)	-0.023 (30.951s)	-0.025

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#10

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 99 'C
Final Temp: [illegible] 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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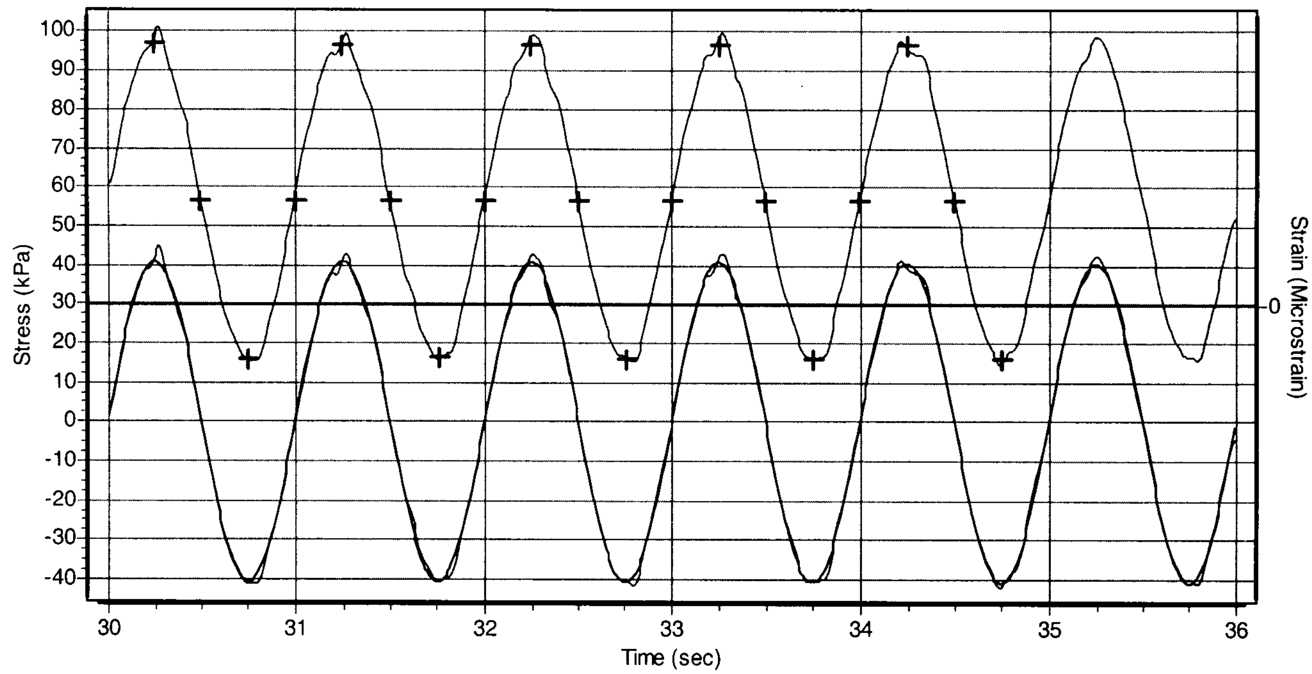

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.6	80.2	80.7	81.0	81.0	80.9
Recoverable axial micro-strain	1794.7	1761.0	1779.8	1791.0	1783.5	1782.0
Permanent axial micro-strain	795	846	855	883	909	
Dynamic modulus (MPa)	45.5	45.6	45.4	45.2	45.4	45.4
Phase angle (Deg)	12.50	13.84	12.77	12.51	12.12	12.75
Dyn.Modulus/sine(phase angle)	417.9	378.1	407.8	415.2	430.3	409.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.630	0.634	0.636	0.636	0.636
Maximum load (kN)	0.764 (30.247s)	0.759 (31.244s)	0.760 (32.245s)	0.761 (33.246s)	0.760 (34.246s)	0.761
Minimum load (kN)	0.123 (30.746s)	0.129 (31.749s)	0.126 (32.746s)	0.125 (33.747s)	0.124 (34.743s)	0.125
Maximum averaged axial (mm)	0.272 (30.282s)	0.274 (31.283s)	0.277 (32.281s)	0.281 (33.281s)	0.283 (34.280s)	0.277
Minimum averaged axial (mm)	0.084 (30.776s)	0.089 (31.780s)	0.090 (32.776s)	0.093 (33.777s)	0.095 (34.768s)	0.090
Maximum axial #1 (mm)	0.277 (30.282s)	0.278 (31.284s)	0.281 (32.282s)	0.285 (33.281s)	0.288 (34.279s)	0.282
Minimum axial #1 (mm)	0.088 (30.776s)	0.094 (31.780s)	0.094 (32.776s)	0.097 (33.778s)	0.100 (34.767s)	0.094
Maximum axial #2 (mm)	0.267 (30.282s)	0.269 (31.282s)	0.272 (32.280s)	0.276 (33.280s)	0.277 (34.279s)	0.272
Minimum axial #2 (mm)	0.079 (30.776s)	0.085 (31.780s)	0.086 (32.775s)	0.089 (33.777s)	0.091 (34.768s)	0.086

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#11

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 100 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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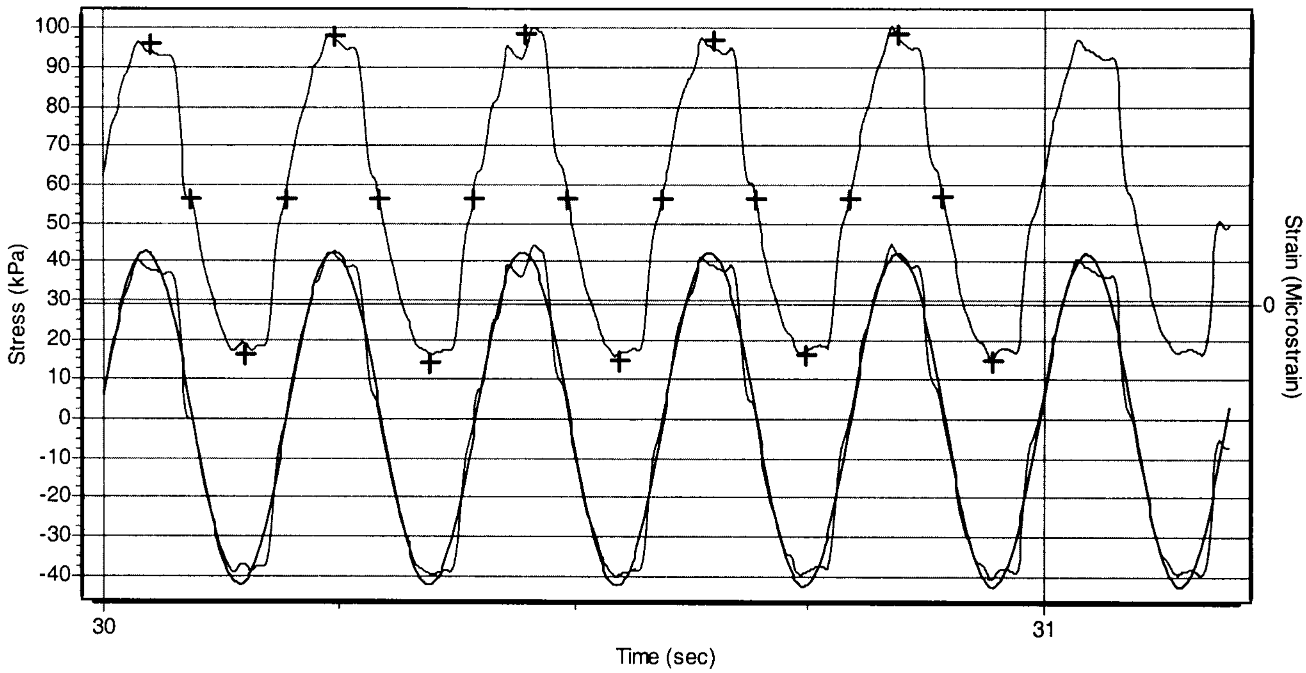

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	79.9	83.9	83.9	80.8	84.3	82.6
Recoverable axial micro-strain	1514.8	1544.3	1564.2	1544.6	1567.6	1547.1
Permanent axial micro-strain	255	235	230	247	240	
Dynamic modulus (MPa)	52.8	54.3	53.6	52.3	53.8	53.4
Phase angle (Deg)	1.05	10.35	8.39	7.32	6.84	6.79
Dyn.Modulus/sine(phase angle)	5739.0	602.3	733.6	819.1	901.6	1759.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.628	0.659	0.659	0.635	0.662	0.648
Maximum load (kN)	0.755 (30.051s)	0.771 (30.246s)	0.777 (30.447s)	0.761 (30.649s)	0.777 (30.845s)	0.768
Minimum load (kN)	0.128 (30.152s)	0.112 (30.346s)	0.118 (30.547s)	0.126 (30.748s)	0.115 (30.946s)	0.120
Maximum averaged axial (mm)	0.186 (30.052s)	0.187 (30.251s)	0.188 (30.452s)	0.188 (30.653s)	0.190 (30.848s)	0.188
Minimum averaged axial (mm)	0.027 (30.151s)	0.025 (30.351s)	0.024 (30.551s)	0.026 (30.751s)	0.025 (30.950s)	0.025
Maximum axial #1 (mm)	0.186 (30.052s)	0.188 (30.252s)	0.189 (30.452s)	0.189 (30.654s)	0.190 (30.848s)	0.188
Minimum axial #1 (mm)	0.027 (30.151s)	0.025 (30.351s)	0.024 (30.551s)	0.026 (30.751s)	0.025 (30.950s)	0.026
Maximum axial #2 (mm)	0.185 (30.052s)	0.186 (30.251s)	0.188 (30.451s)	0.187 (30.653s)	0.190 (30.848s)	0.187
Minimum axial #2 (mm)	0.026 (30.151s)	0.024 (30.351s)	0.019 (30.553s)	0.026 (30.751s)	0.025 (30.950s)	0.024

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#11

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 100 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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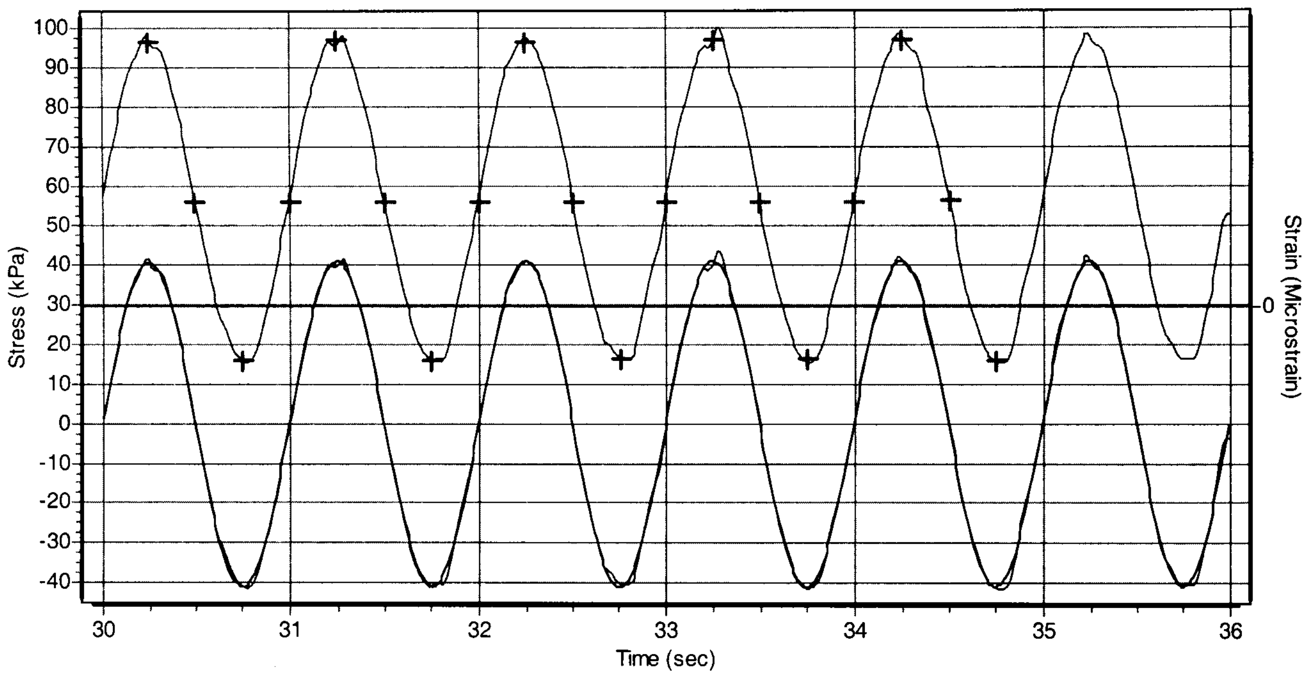

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 1:58 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.8	81.2	80.6	81.1	81.3	81.0
Recoverable axial micro-strain	1775.6	1758.5	1758.8	1782.9	1774.8	1770.1
Permanent axial micro-strain	650	695	710	731	755	
Dynamic modulus (MPa)	45.5	46.2	45.8	45.5	45.8	45.7
Phase angle (Deg)	14.27	13.66	14.90	13.89	14.31	14.20
Dyn.Modulus/sine(phase angle)	366.3	388.1	353.3	376.0	367.8	370.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.637	0.633	0.637	0.638	0.636
Maximum load (kN)	0.760 (30.246s)	0.761 (31.245s)	0.761 (32.244s)	0.763 (33.247s)	0.762 (34.244s)	0.761
Minimum load (kN)	0.125 (30.746s)	0.124 (31.745s)	0.128 (32.747s)	0.127 (33.747s)	0.124 (34.748s)	0.126
Maximum averaged axial (mm)	0.257 (30.285s)	0.260 (31.283s)	0.262 (32.285s)	0.266 (33.286s)	0.268 (34.283s)	0.263
Minimum averaged axial (mm)	0.069 (30.778s)	0.074 (31.780s)	0.075 (32.780s)	0.077 (33.779s)	0.080 (34.781s)	0.075
Maximum axial #1 (mm)	0.255 (30.284s)	0.258 (31.284s)	0.260 (32.285s)	0.265 (33.284s)	0.266 (34.282s)	0.261
Minimum axial #1 (mm)	0.065 (30.778s)	0.070 (31.780s)	0.071 (32.780s)	0.073 (33.779s)	0.076 (34.781s)	0.071
Maximum axial #2 (mm)	0.259 (30.286s)	0.262 (31.283s)	0.264 (32.286s)	0.268 (33.287s)	0.270 (34.284s)	0.265
Minimum axial #2 (mm)	0.073 (30.778s)	0.078 (31.780s)	0.080 (32.780s)	0.082 (33.779s)	0.084 (34.780s)	0.079

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#12

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 95 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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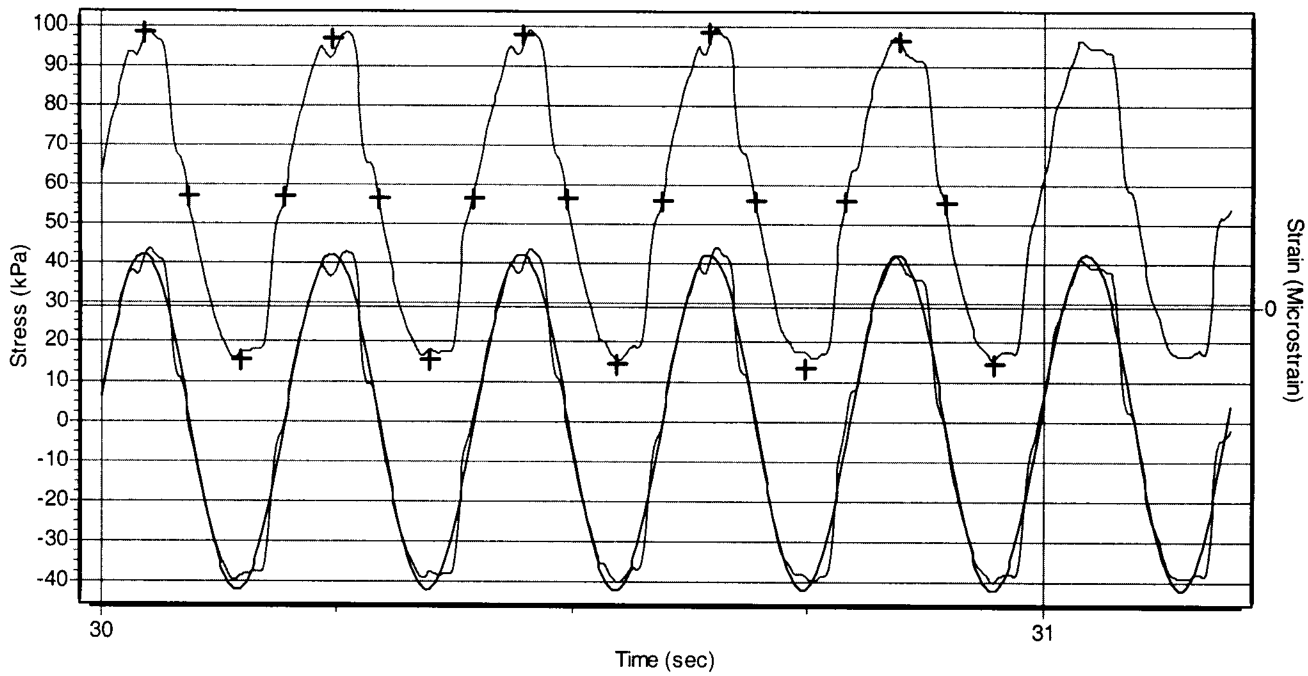

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 1:58 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.0	81.5	83.6	84.9	82.3	83.0
Recoverable axial micro-strain	1498.4	1486.2	1541.8	1503.4	1489.0	1503.8
Permanent axial micro-strain	140	155	110	155	169	
Dynamic modulus (MPa)	55.4	54.8	54.2	56.4	55.3	55.2
Phase angle (Deg)	11.78	9.47	10.49	10.89	8.98	10.32
Dyn.Modulus/sine(phase angle)	540.1	664.4	593.4	594.6	706.3	619.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.652	0.640	0.657	0.666	0.646	0.652
Maximum load (kN)	0.774 (30.046s)	0.764 (30.246s)	0.772 (30.446s)	0.773 (30.646s)	0.760 (30.847s)	0.769
Minimum load (kN)	0.122 (30.148s)	0.124 (30.348s)	0.115 (30.546s)	0.107 (30.746s)	0.114 (30.946s)	0.116
Maximum averaged axial (mm)	0.174 (30.052s)	0.174 (30.251s)	0.175 (30.452s)	0.176 (30.652s)	0.176 (30.852s)	0.175
Minimum averaged axial (mm)	0.015 (30.150s)	0.016 (30.351s)	0.012 (30.552s)	0.016 (30.752s)	0.018 (30.951s)	0.015
Maximum axial #1 (mm)	0.167 (30.052s)	0.168 (30.252s)	0.168 (30.452s)	0.169 (30.651s)	0.170 (30.852s)	0.169
Minimum axial #1 (mm)	0.006 (30.153s)	0.010 (30.351s)	0.005 (30.552s)	0.009 (30.752s)	0.011 (30.951s)	0.008
Maximum axial #2 (mm)	0.180 (30.051s)	0.180 (30.251s)	0.182 (30.452s)	0.182 (30.652s)	0.182 (30.852s)	0.181
Minimum axial #2 (mm)	0.022 (30.150s)	0.023 (30.351s)	0.019 (30.552s)	0.023 (30.753s)	0.025 (30.951s)	0.022

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#12

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 75 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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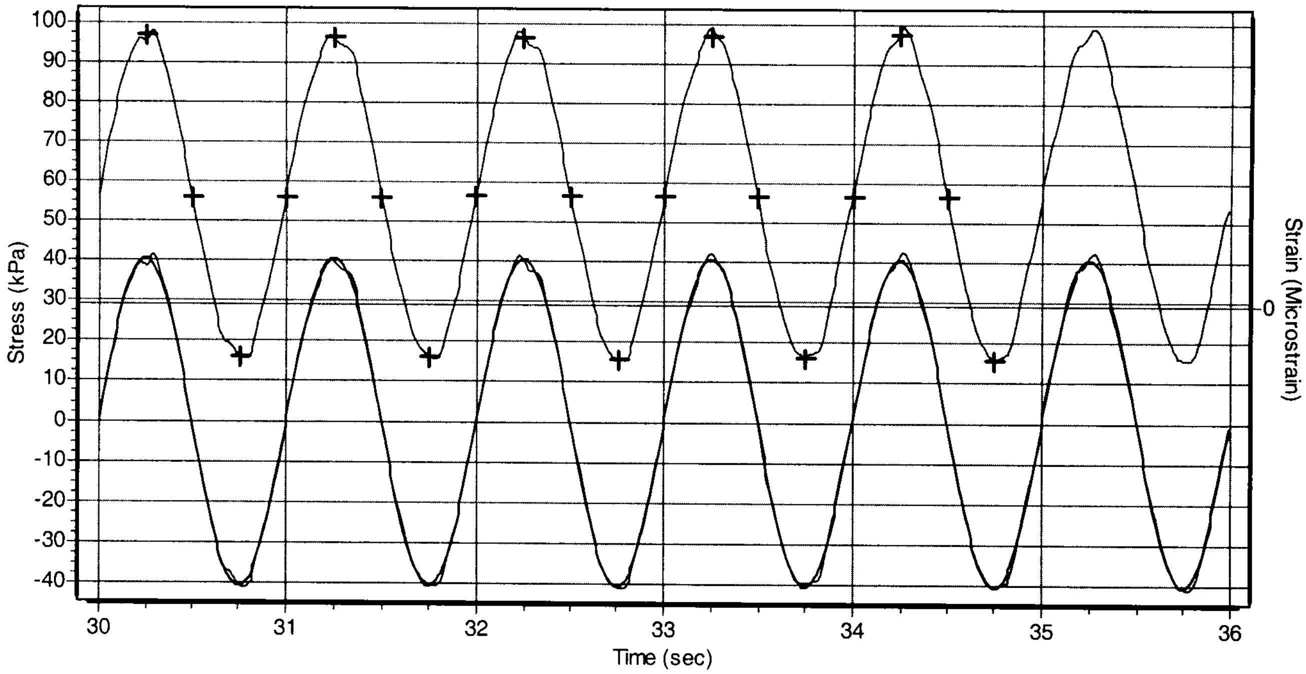

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:04 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.8	80.0	80.9	80.9	81.6	80.8
Recoverable axial micro-strain	1592.3	1602.4	1600.0	1581.4	1605.8	1596.4
Permanent axial micro-strain	466	477	503	540	553	
Dynamic modulus (MPa)	50.7	50.0	50.6	51.1	50.8	50.6
Phase angle (Deg)	13.83	14.56	14.79	14.24	14.07	14.30
Dyn.Modulus/sine(phase angle)	421.3	394.1	392.9	412.7	414.8	407.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.629	0.635	0.635	0.641	0.635
Maximum load (kN)	0.761 (30.250s)	0.756 (31.249s)	0.760 (32.245s)	0.762 (33.244s)	0.765 (34.247s)	0.761
Minimum load (kN)	0.127 (30.747s)	0.127 (31.749s)	0.124 (32.748s)	0.127 (33.744s)	0.125 (34.745s)	0.126
Maximum averaged axial (mm)	0.214 (30.289s)	0.216 (31.289s)	0.219 (32.286s)	0.221 (33.284s)	0.225 (34.286s)	0.219
Minimum averaged axial (mm)	0.048 (30.781s)	0.050 (31.780s)	0.052 (32.781s)	0.056 (33.780s)	0.058 (34.780s)	0.053
Maximum axial #1 (mm)	0.216 (30.290s)	0.219 (31.291s)	0.221 (32.287s)	0.222 (33.284s)	0.226 (34.288s)	0.221
Minimum axial #1 (mm)	0.051 (30.781s)	0.053 (31.780s)	0.056 (32.781s)	0.059 (33.780s)	0.061 (34.781s)	0.056
Maximum axial #2 (mm)	0.212 (30.287s)	0.214 (31.289s)	0.217 (32.284s)	0.219 (33.284s)	0.223 (34.285s)	0.217
Minimum axial #2 (mm)	0.046 (30.780s)	0.047 (31.780s)	0.049 (32.781s)	0.053 (33.781s)	0.054 (34.780s)	0.050

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 90 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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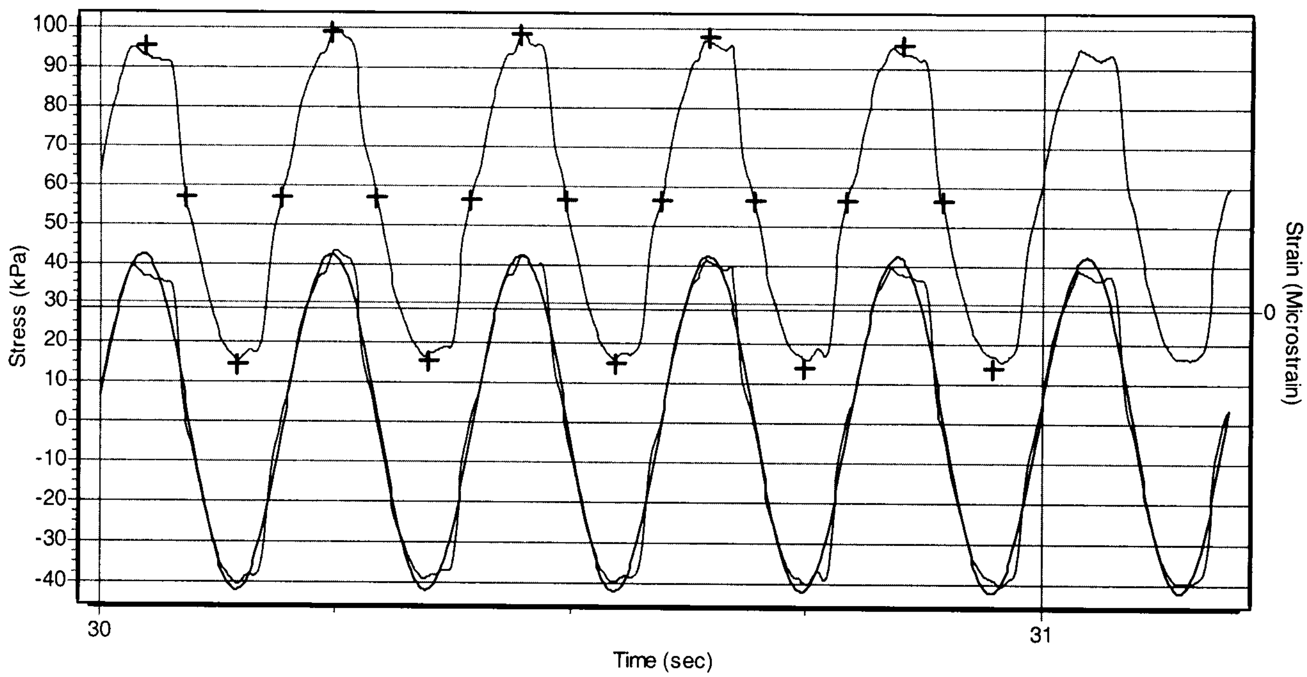

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:04 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.0	83.4	83.7	84.2	81.9	82.8
Recoverable axial micro-strain	1374.3	1351.6	1363.5	1366.0	1403.5	1371.8
Permanent axial micro-strain	75	120	109	118	70	
Dynamic modulus (MPa)	58.9	61.7	61.4	61.6	58.3	60.4
Phase angle (Deg)	12.25	9.08	12.02	14.16	3.39	10.18
Dyn.Modulus/sine(phase angle)	552.2	779.4	586.4	499.7	1971.0	877.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.655	0.658	0.661	0.643	0.651
Maximum load (kN)	0.751 (30.050s)	0.780 (30.246s)	0.777 (30.445s)	0.771 (30.646s)	0.754 (30.850s)	0.767
Minimum load (kN)	0.115 (30.146s)	0.125 (30.346s)	0.119 (30.547s)	0.110 (30.747s)	0.112 (30.947s)	0.116
Maximum averaged axial (mm)	0.151 (30.057s)	0.153 (30.251s)	0.153 (30.452s)	0.154 (30.654s)	0.153 (30.852s)	0.153
Minimum averaged axial (mm)	0.008 (30.151s)	0.013 (30.351s)	0.011 (30.552s)	0.012 (30.751s)	0.007 (30.953s)	0.010
Maximum axial #1 (mm)	0.151 (30.057s)	0.153 (30.251s)	0.153 (30.452s)	0.155 (30.654s)	0.154 (30.856s)	0.153
Minimum axial #1 (mm)	0.011 (30.152s)	0.013 (30.351s)	0.011 (30.552s)	0.012 (30.751s)	0.007 (30.953s)	0.011
Maximum axial #2 (mm)	0.151 (30.056s)	0.153 (30.251s)	0.153 (30.452s)	0.154 (30.653s)	0.153 (30.852s)	0.153
Minimum axial #2 (mm)	0.008 (30.151s)	0.007 (30.352s)	0.011 (30.553s)	0.012 (30.751s)	0.007 (30.953s)	0.009

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 35 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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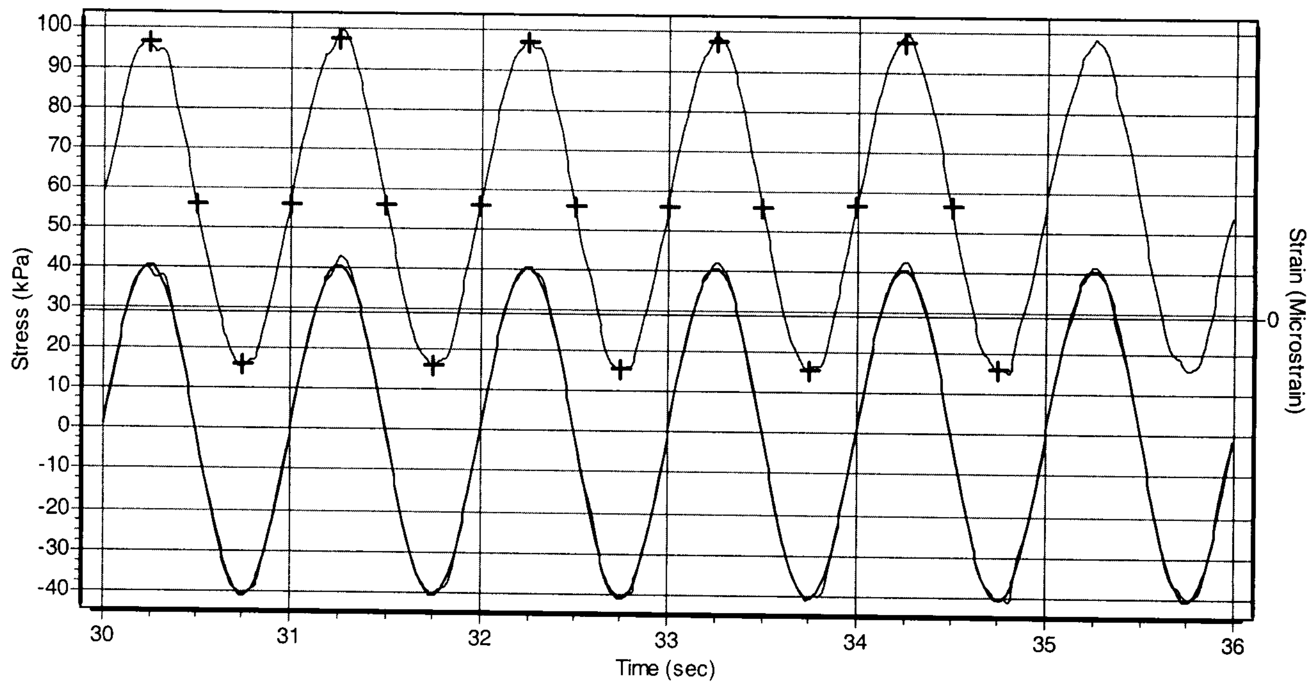

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.6	81.4	81.3	81.8	81.3	81.3
Recoverable axial micro-strain	1488.9	1513.6	1514.0	1506.6	1503.9	1505.4
Permanent axial micro-strain	738	757	770	807	836	
Dynamic modulus (MPa)	54.2	53.8	53.7	54.3	54.0	54.0
Phase angle (Deg)	12.61	13.26	13.73	12.45	12.52	12.91
Dyn.Modulus/sine(phase angle)	493.2	466.0	449.2	500.7	495.7	481.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.633	0.639	0.639	0.643	0.638	0.638
Maximum load (kN)	0.759 (30.244s)	0.765 (31.247s)	0.761 (32.245s)	0.765 (33.245s)	0.766 (34.243s)	0.763
Minimum load (kN)	0.126 (30.745s)	0.125 (31.745s)	0.122 (32.746s)	0.122 (33.745s)	0.128 (34.746s)	0.125
Maximum averaged axial (mm)	0.234 (30.279s)	0.238 (31.284s)	0.240 (32.283s)	0.243 (33.280s)	0.246 (34.278s)	0.240
Minimum averaged axial (mm)	0.077 (30.781s)	0.080 (31.780s)	0.081 (32.779s)	0.085 (33.779s)	0.088 (34.779s)	0.082
Maximum axial #1 (mm)	0.229 (30.281s)	0.234 (31.284s)	0.235 (32.283s)	0.238 (33.280s)	0.241 (34.279s)	0.235
Minimum axial #1 (mm)	0.074 (30.781s)	0.076 (31.780s)	0.077 (32.779s)	0.081 (33.779s)	0.083 (34.779s)	0.078
Maximum axial #2 (mm)	0.238 (30.278s)	0.243 (31.283s)	0.244 (32.282s)	0.248 (33.280s)	0.250 (34.277s)	0.245
Minimum axial #2 (mm)	0.080 (30.780s)	0.083 (31.779s)	0.085 (32.780s)	0.089 (33.779s)	0.092 (34.779s)	0.086

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Core/Sample Number: P2_#14

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 90 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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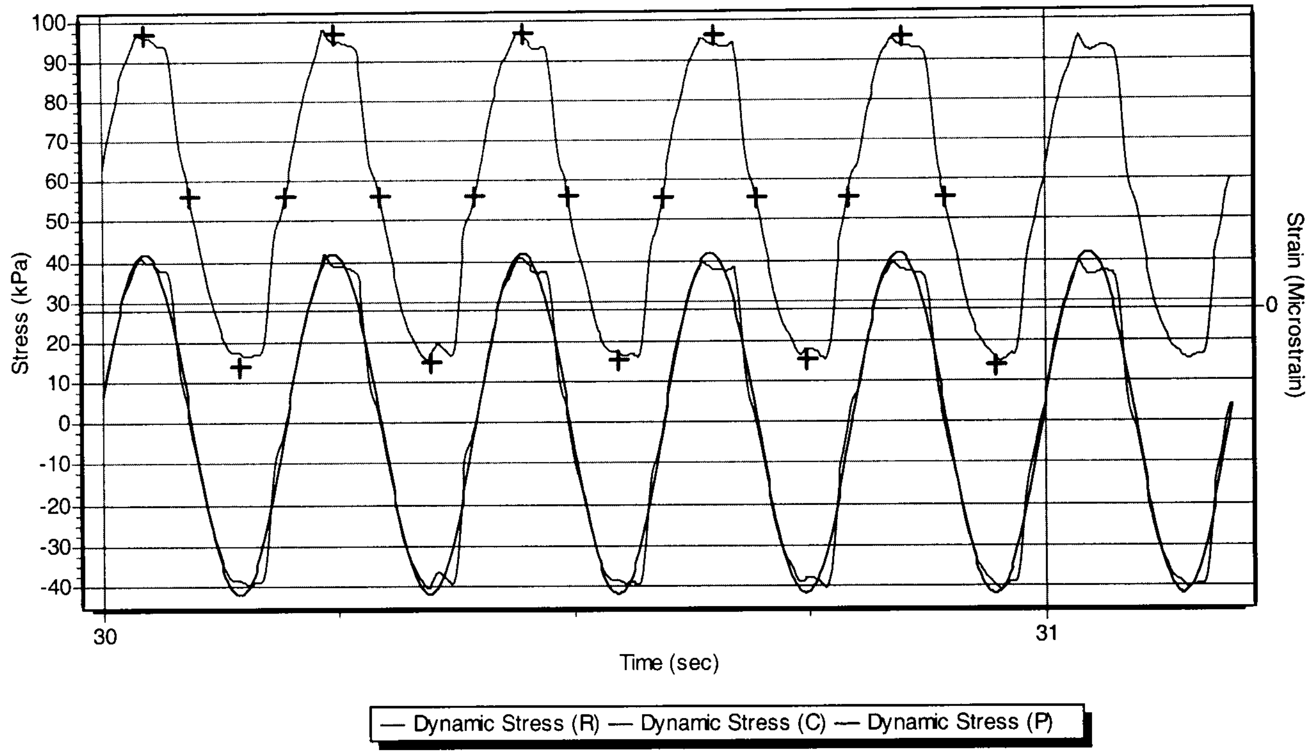

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.8	81.8	81.5	80.7	81.8	81.7
Recoverable axial micro-strain	1302.9	1293.8	1300.7	1303.0	1298.7	1299.8
Permanent axial micro-strain	205	222	209	217	223	
Dynamic modulus (MPa)	63.5	63.2	62.7	61.9	63.0	62.9
Phase angle (Deg)	6.00	7.06	7.28	4.82	2.17	5.47
Dyn.Modulus/sine(phase angle)	1214.2	1027.1	986.8	1471.4	3327.7	1605.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.650	0.643	0.640	0.634	0.642	0.642
Maximum load (kN)	0.761 (30.047s)	0.762 (30.248s)	0.761 (30.446s)	0.756 (30.649s)	0.752 (30.849s)	0.758
Minimum load (kN)	0.111 (30.147s)	0.119 (30.346s)	0.120 (30.547s)	0.123 (30.747s)	0.110 (30.946s)	0.117
Maximum averaged axial (mm)	0.158 (30.050s)	0.159 (30.252s)	0.158 (30.450s)	0.160 (30.652s)	0.160 (30.850s)	0.159
Minimum averaged axial (mm)	0.022 (30.151s)	0.023 (30.349s)	0.022 (30.552s)	0.023 (30.752s)	0.023 (30.951s)	0.023
Maximum axial #1 (mm)	0.154 (30.051s)	0.155 (30.253s)	0.154 (30.451s)	0.156 (30.652s)	0.156 (30.851s)	0.155
Minimum axial #1 (mm)	0.017 (30.151s)	0.019 (30.351s)	0.018 (30.552s)	0.019 (30.752s)	0.019 (30.951s)	0.018
Maximum axial #2 (mm)	0.163 (30.050s)	0.164 (30.252s)	0.163 (30.450s)	0.164 (30.651s)	0.164 (30.850s)	0.163
Minimum axial #2 (mm)	0.026 (30.151s)	0.028 (30.349s)	0.026 (30.551s)	0.028 (30.751s)	0.023 (30.951s)	0.026

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#14

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 90 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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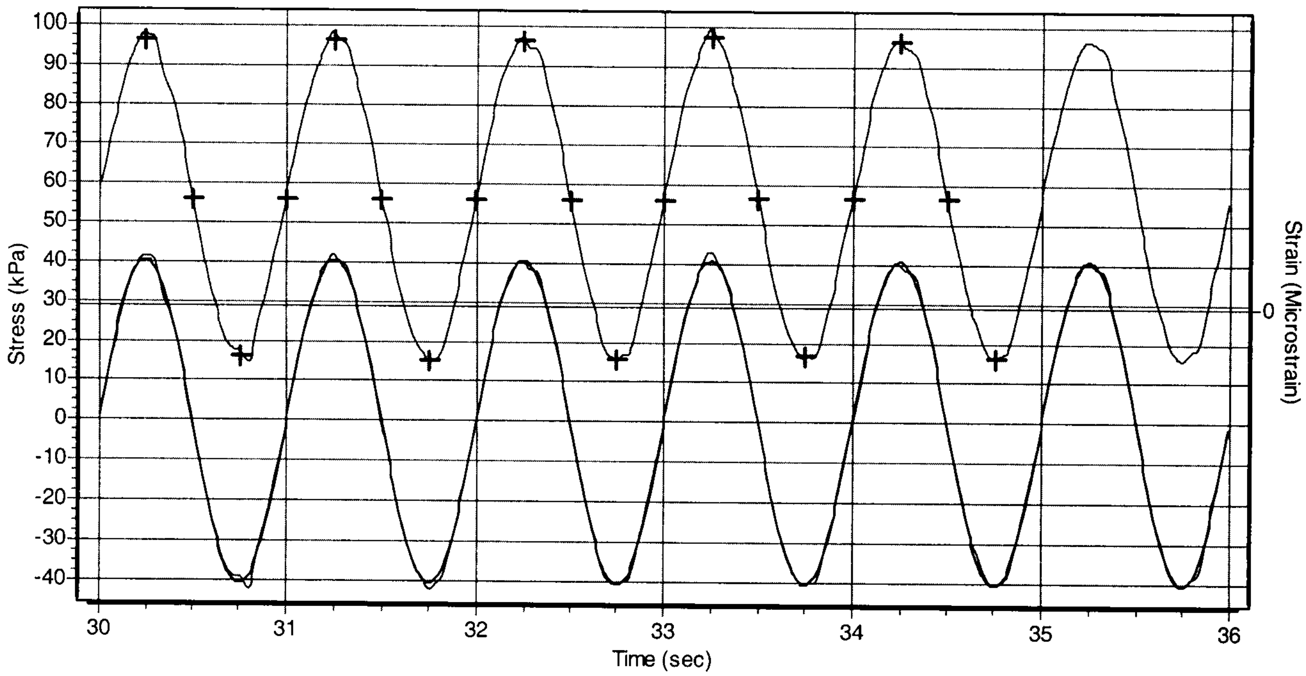

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	81.5	80.9	81.0	80.1	80.8
Recoverable axial micro-strain	2015.9	2031.1	2003.4	2009.1	1976.6	2007.2
Permanent axial micro-strain	1699	1724	1773	1815	1868	
Dynamic modulus (MPa)	39.9	40.1	40.4	40.3	40.5	40.3
Phase angle (Deg)	12.60	11.29	11.86	11.60	11.01	11.67
Dyn.Modulus/sine(phase angle)	363.7	407.7	391.0	399.1	422.5	396.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.640	0.636	0.636	0.629	0.635
Maximum load (kN)	0.761 (30.246s)	0.761 (31.247s)	0.759 (32.244s)	0.766 (33.245s)	0.758 (34.248s)	0.761
Minimum load (kN)	0.129 (30.748s)	0.121 (31.746s)	0.123 (32.743s)	0.130 (33.747s)	0.129 (34.747s)	0.126
Maximum averaged axial (mm)	0.390 (30.281s)	0.394 (31.278s)	0.397 (32.277s)	0.402 (33.277s)	0.404 (34.278s)	0.397
Minimum averaged axial (mm)	0.178 (30.776s)	0.181 (31.774s)	0.186 (32.775s)	0.191 (33.777s)	0.196 (34.775s)	0.186
Maximum axial #1 (mm)	0.371 (30.282s)	0.374 (31.278s)	0.376 (32.277s)	0.381 (33.277s)	0.383 (34.278s)	0.377
Minimum axial #1 (mm)	0.163 (30.776s)	0.165 (31.773s)	0.170 (32.775s)	0.174 (33.777s)	0.180 (34.775s)	0.170
Maximum axial #2 (mm)	0.409 (30.281s)	0.414 (31.278s)	0.416 (32.278s)	0.422 (33.277s)	0.424 (34.280s)	0.417
Minimum axial #2 (mm)	0.194 (30.777s)	0.197 (31.775s)	0.202 (32.775s)	0.207 (33.778s)	0.213 (34.775s)	0.203

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#15

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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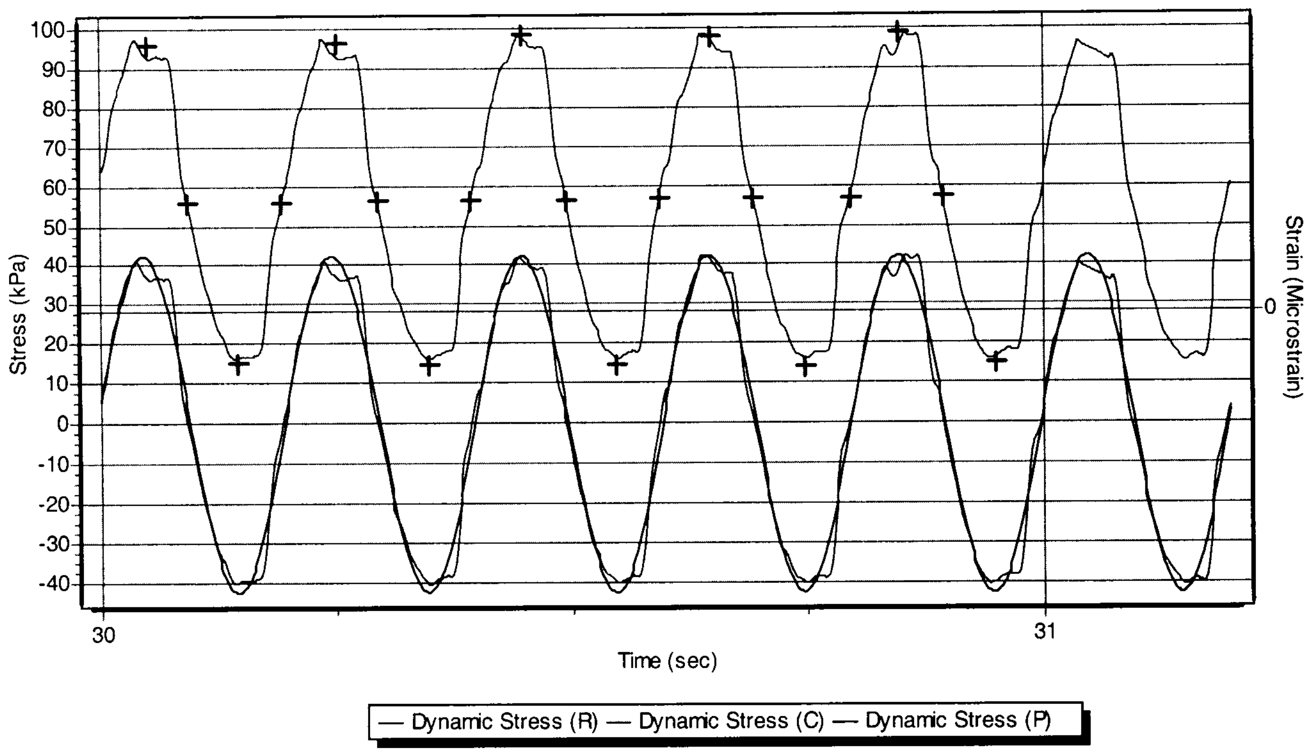


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.9	81.5	83.4	83.2	83.4	82.5
Recoverable axial micro-strain	1794.3	1797.8	1802.2	1814.8	1802.1	1802.2
Permanent axial micro-strain	200	215	221	212	236	
Dynamic modulus (MPa)	45.1	45.3	46.3	45.8	46.3	45.8
Phase angle (Deg)	4.21	3.63	11.68	6.29	10.18	7.20
Dyn.Modulus/sine(phase angle)	1227.0	1431.8	454.9	835.2	521.7	894.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.640	0.655	0.653	0.655	0.648
Maximum load (kN)	0.754 (30.051s)	0.755 (30.251s)	0.770 (30.446s)	0.767 (30.648s)	0.776 (30.847s)	0.764
Minimum load (kN)	0.118 (30.147s)	0.115 (30.346s)	0.115 (30.546s)	0.113 (30.747s)	0.121 (30.948s)	0.116
Maximum averaged axial (mm)	0.209 (30.053s)	0.211 (30.253s)	0.212 (30.453s)	0.213 (30.652s)	0.214 (30.852s)	0.212
Minimum averaged axial (mm)	0.021 (30.152s)	0.023 (30.352s)	0.023 (30.551s)	0.022 (30.752s)	0.025 (30.950s)	0.023
Maximum axial #1 (mm)	0.203 (30.054s)	0.205 (30.254s)	0.206 (30.452s)	0.205 (30.652s)	0.207 (30.853s)	0.205
Minimum axial #1 (mm)	0.014 (30.152s)	0.016 (30.352s)	0.017 (30.551s)	0.015 (30.752s)	0.018 (30.951s)	0.016
Maximum axial #2 (mm)	0.216 (30.052s)	0.217 (30.255s)	0.220 (30.452s)	0.220 (30.651s)	0.221 (30.852s)	0.219
Minimum axial #2 (mm)	0.028 (30.151s)	0.024 (30.352s)	0.030 (30.550s)	0.029 (30.752s)	0.032 (30.950s)	0.028

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#15

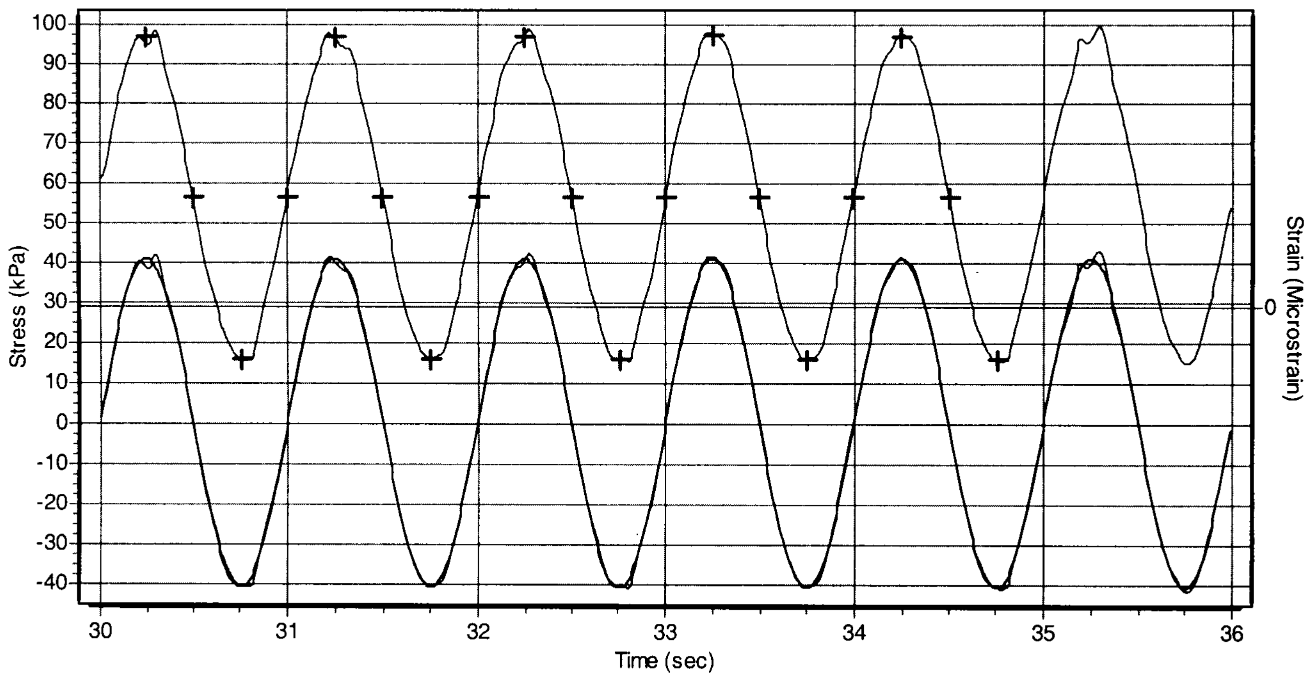
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#16.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.7	80.9	81.1	81.5	81.1	81.1
Recoverable axial micro-strain	2516.1	2528.7	2524.3	2536.6	2520.0	2525.1
Permanent axial micro-strain	2426	2467	2518	2564	2630	
Dynamic modulus (MPa)	32.1	32.0	32.1	32.1	32.2	32.1
Phase angle (Deg)	11.34	11.46	10.74	11.48	11.56	11.32
Dyn.Modulus/sine(phase angle)	324.6	320.2	343.4	321.2	319.7	325.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.635	0.637	0.640	0.637	0.637
Maximum load (kN)	0.759 (30.247s)	0.759 (31.245s)	0.761 (32.247s)	0.764 (33.246s)	0.760 (34.246s)	0.761
Minimum load (kN)	0.126 (30.749s)	0.124 (31.745s)	0.124 (32.751s)	0.124 (33.744s)	0.123 (34.748s)	0.124
Maximum averaged axial (mm)	0.514 (30.278s)	0.520 (31.277s)	0.524 (32.277s)	0.530 (33.278s)	0.536 (34.278s)	0.525
Minimum averaged axial (mm)	0.252 (30.778s)	0.257 (31.776s)	0.262 (32.779s)	0.267 (33.776s)	0.273 (34.777s)	0.262
Maximum axial #1 (mm)	0.523 (30.278s)	0.530 (31.277s)	0.534 (32.277s)	0.540 (33.278s)	0.545 (34.278s)	0.534
Minimum axial #1 (mm)	0.258 (30.778s)	0.262 (31.776s)	0.267 (32.779s)	0.272 (33.776s)	0.278 (34.777s)	0.267
Maximum axial #2 (mm)	0.505 (30.279s)	0.509 (31.278s)	0.515 (32.277s)	0.521 (33.278s)	0.526 (34.278s)	0.515
Minimum axial #2 (mm)	0.247 (30.778s)	0.251 (31.775s)	0.257 (32.779s)	0.261 (33.776s)	0.269 (34.777s)	0.257

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#16

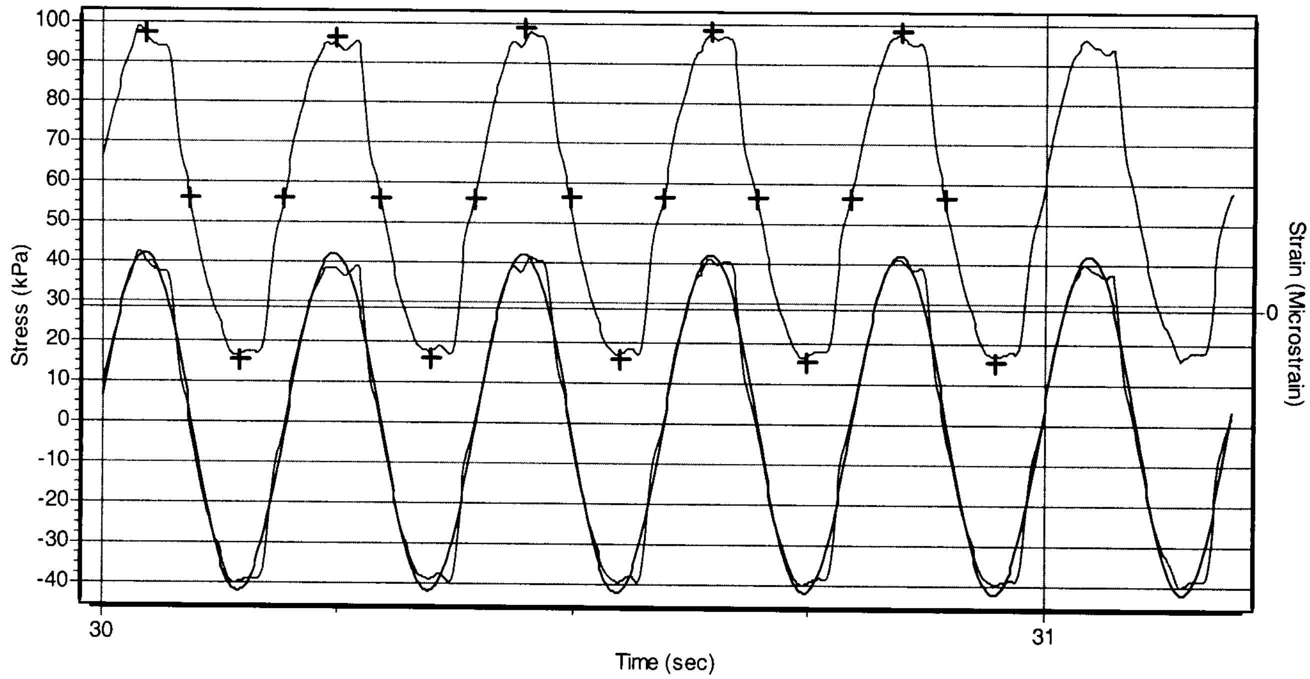
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: ✗ 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#16.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.7	80.1	82.6	83.1	82.9	82.1
Recoverable axial micro-strain	2136.0	2115.5	2120.4	2137.5	2133.8	2128.6
Permanent axial micro-strain	387	408	415	408	424	
Dynamic modulus (MPa)	38.3	37.9	38.9	38.9	38.9	38.6
Phase angle (Deg)	7.71	10.24	5.72	9.48	8.03	8.24
Dyn.Modulus/sine(phase angle)	569.0	424.3	779.8	470.5	555.4	559.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.629	0.648	0.653	0.651	0.645
Maximum load (kN)	0.765 (30.046s)	0.756 (30.247s)	0.775 (30.446s)	0.773 (30.645s)	0.771 (30.846s)	0.768
Minimum load (kN)	0.123 (30.147s)	0.127 (30.347s)	0.127 (30.547s)	0.120 (30.746s)	0.120 (30.947s)	0.123
Maximum averaged axial (mm)	0.262 (30.051s)	0.262 (30.253s)	0.264 (30.450s)	0.265 (30.651s)	0.266 (30.851s)	0.264
Minimum averaged axial (mm)	0.040 (30.151s)	0.042 (30.352s)	0.043 (30.551s)	0.042 (30.751s)	0.044 (30.951s)	0.042
Maximum axial #1 (mm)	0.259 (30.051s)	0.259 (30.252s)	0.260 (30.449s)	0.261 (30.650s)	0.262 (30.851s)	0.260
Minimum axial #1 (mm)	0.034 (30.151s)	0.036 (30.352s)	0.035 (30.552s)	0.036 (30.751s)	0.037 (30.951s)	0.036
Maximum axial #2 (mm)	0.266 (30.051s)	0.266 (30.253s)	0.267 (30.450s)	0.268 (30.651s)	0.270 (30.851s)	0.267
Minimum axial #2 (mm)	0.047 (30.152s)	0.049 (30.352s)	0.050 (30.551s)	0.049 (30.752s)	0.051 (30.952s)	0.049

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#16

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 97 'C
Final Temp: 90 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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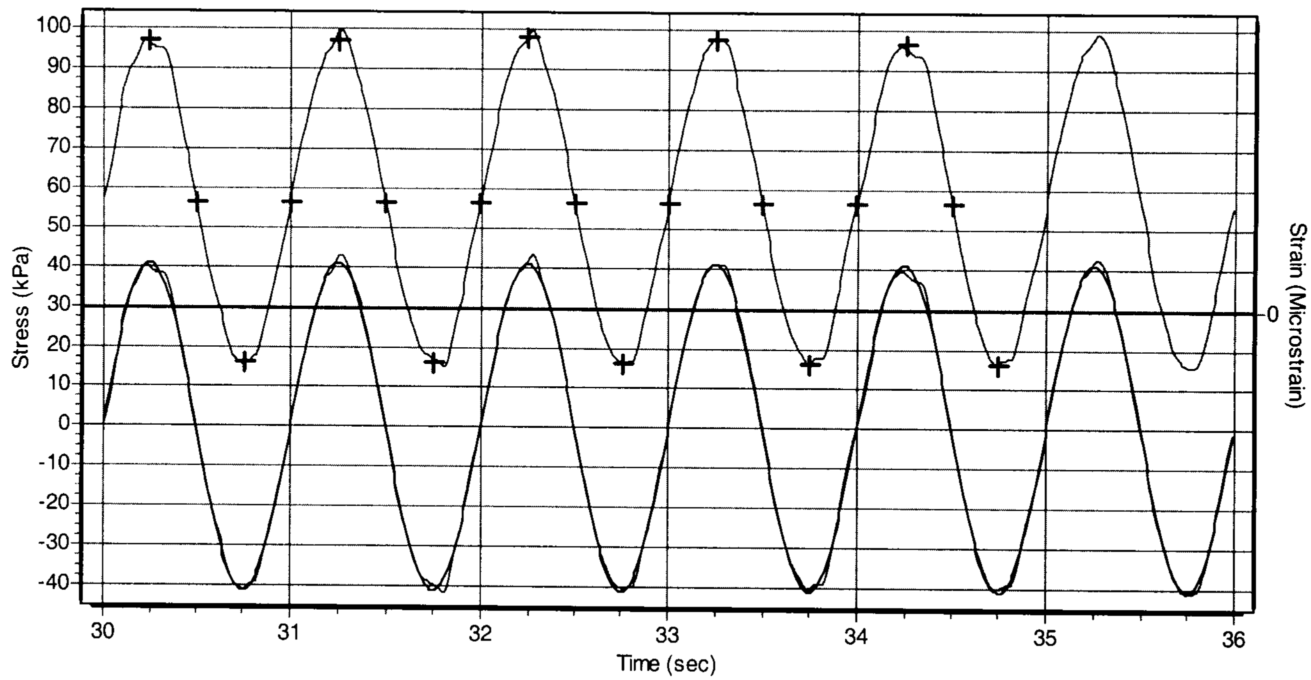

Sweep 1 (1Hz)

Test Date and Time:	Monday, May 13, 2002, at 2:33 PM
Data Filtering:	Spencers 15 Point
Curve fitting:	Applied to 41 data points
Phase angle:	Calculated from max and min values
Temperature (Deg.C):	0.0
Confining Pressure (kPa):	5.2
Axial Gauge Length (mm):	103
Radial Gauge Length (mm):	50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	80.9	81.7	81.0	80.1	80.9
Recoverable axial micro-strain	2153.0	2156.1	2159.7	2155.7	2110.9	2147.1
Permanent axial micro-strain	901	932	968	993	1058	
Dynamic modulus (MPa)	37.6	37.5	37.8	37.6	37.9	37.7
Phase angle (Deg)	12.59	13.30	11.64	12.56	11.78	12.37
Dyn.Modulus/sine(phase angle)	343.3	324.2	373.0	343.2	369.6	350.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.636	0.642	0.636	0.629	0.636
Maximum load (kN)	0.762 (30.247s)	0.762 (31.245s)	0.767 (32.248s)	0.763 (33.244s)	0.758 (34.250s)	0.763
Minimum load (kN)	0.126 (30.746s)	0.127 (31.749s)	0.126 (32.747s)	0.127 (33.744s)	0.129 (34.745s)	0.127
Maximum averaged axial (mm)	0.315 (30.282s)	0.318 (31.282s)	0.322 (32.281s)	0.324 (33.279s)	0.326 (34.282s)	0.321
Minimum averaged axial (mm)	0.093 (30.780s)	0.096 (31.779s)	0.100 (32.780s)	0.102 (33.773s)	0.109 (34.780s)	0.100
Maximum axial #1 (mm)	0.315 (30.282s)	0.318 (31.281s)	0.322 (32.281s)	0.325 (33.279s)	0.326 (34.282s)	0.321
Minimum axial #1 (mm)	0.094 (30.777s)	0.097 (31.779s)	0.102 (32.779s)	0.104 (33.773s)	0.111 (34.780s)	0.101
Maximum axial #2 (mm)	0.314 (30.282s)	0.318 (31.283s)	0.322 (32.280s)	0.324 (33.280s)	0.327 (34.283s)	0.321
Minimum axial #2 (mm)	0.092 (30.780s)	0.095 (31.779s)	0.098 (32.780s)	0.101 (33.773s)	0.107 (34.780s)	0.098

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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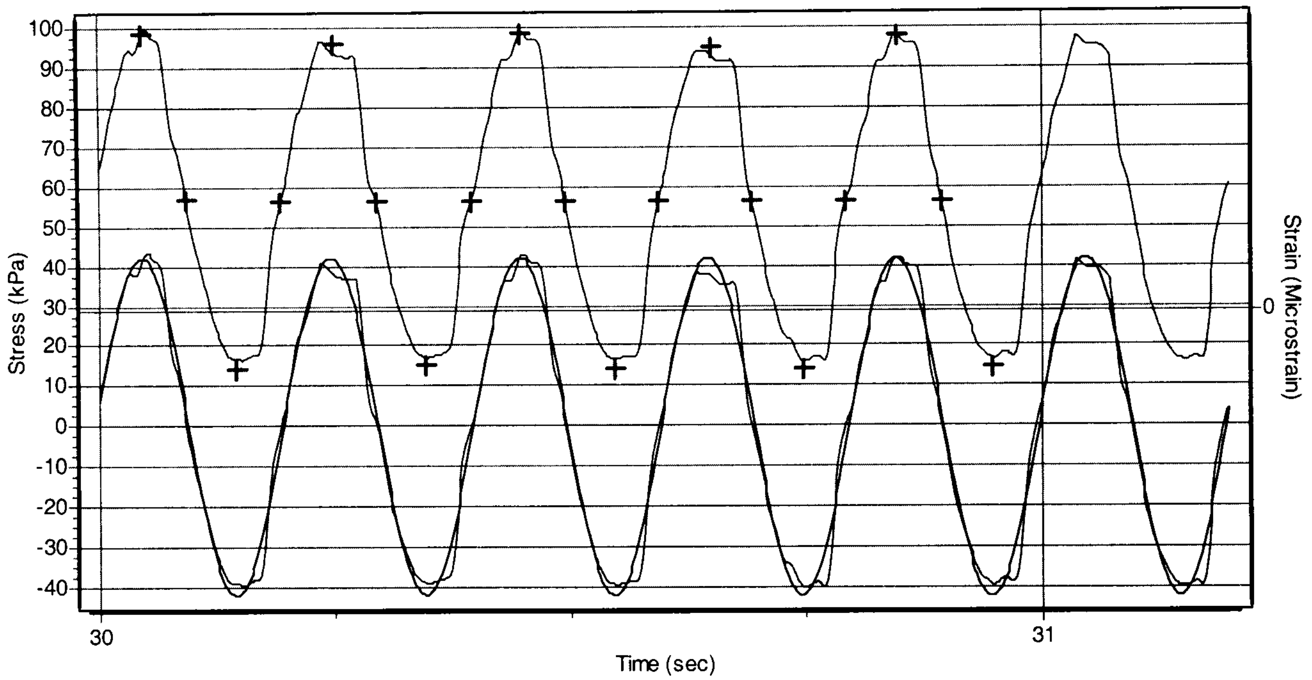

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:33 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.7	81.3	84.4	80.5	83.2	82.8
Recoverable axial micro-strain	1856.7	1843.1	1859.0	1841.9	1846.7	1849.5
Permanent axial micro-strain	8	15	15	16	35	
Dynamic modulus (MPa)	45.6	44.1	45.4	43.7	45.1	44.8
Phase angle (Deg)	7.92	5.34	11.34	7.91	10.99	8.70
Dyn.Modulus/sine(phase angle)	660.4	946.2	459.6	633.7	470.8	634.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.665	0.639	0.663	0.633	0.654	0.651
Maximum load (kN)	0.776 (30.046s)	0.756 (30.250s)	0.776 (30.446s)	0.746 (30.650s)	0.771 (30.846s)	0.765
Minimum load (kN)	0.111 (30.147s)	0.117 (30.346s)	0.113 (30.547s)	0.113 (30.746s)	0.117 (30.946s)	0.114
Maximum averaged axial (mm)	0.192 (30.050s)	0.191 (30.253s)	0.193 (30.452s)	0.191 (30.654s)	0.194 (30.852s)	0.192
Minimum averaged axial (mm)	0.001 (30.151s)	0.002 (30.352s)	0.002 (30.552s)	0.002 (30.753s)	0.004 (30.952s)	0.002
Maximum axial #1 (mm)	0.189 (30.050s)	0.188 (30.253s)	0.190 (30.452s)	0.187 (30.653s)	0.191 (30.852s)	0.189
Minimum axial #1 (mm)	0.000 (30.151s)	0.002 (30.350s)	-0.004 (30.551s)	0.001 (30.753s)	0.003 (30.952s)	0.000
Maximum axial #2 (mm)	0.195 (30.050s)	0.194 (30.253s)	0.196 (30.452s)	0.195 (30.654s)	0.196 (30.851s)	0.195
Minimum axial #2 (mm)	0.001 (30.151s)	0.002 (30.352s)	0.002 (30.552s)	0.002 (30.753s)	0.004 (30.952s)	0.002

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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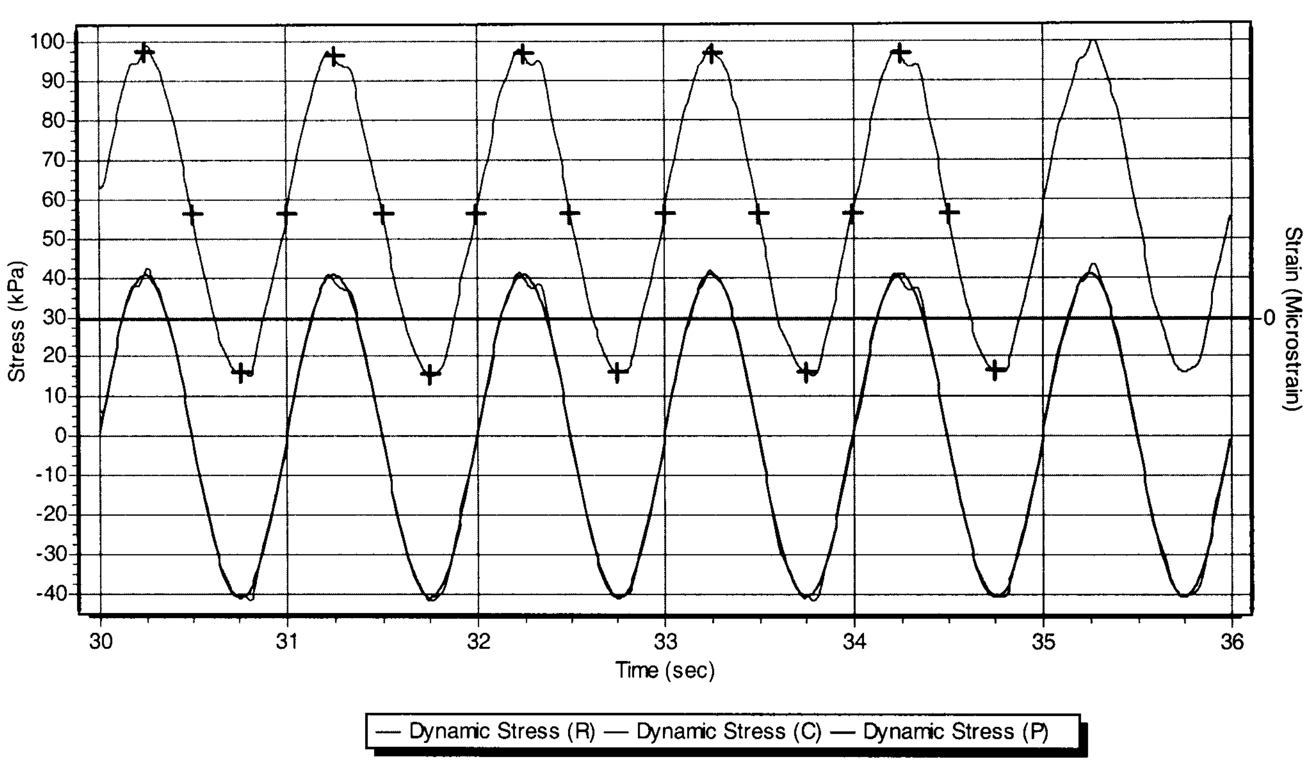

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:39 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	80.8	80.6	80.7	80.3	80.7
Recoverable axial micro-strain	2180.0	2162.6	2164.0	2171.1	2184.8	2172.5
Permanent axial micro-strain	1015	1046	1093	1103	1125	
Dynamic modulus (MPa)	37.1	37.4	37.3	37.2	36.8	37.1
Phase angle (Deg)	13.31	13.08	13.39	13.21	12.54	13.11
Dyn.Modulus/sine(phase angle)	320.0	327.9	319.6	323.3	336.6	325.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.634	0.633	0.634	0.631	0.634
Maximum load (kN)	0.764 (30.246s)	0.757 (31.244s)	0.762 (32.247s)	0.760 (33.245s)	0.761 (34.247s)	0.761
Minimum load (kN)	0.129 (30.748s)	0.122 (31.745s)	0.129 (32.744s)	0.126 (33.743s)	0.130 (34.746s)	0.127
Maximum averaged axial (mm)	0.332 (30.283s)	0.334 (31.281s)	0.339 (32.284s)	0.341 (33.281s)	0.344 (34.282s)	0.338
Minimum averaged axial (mm)	0.106 (30.780s)	0.109 (31.779s)	0.114 (32.775s)	0.115 (33.776s)	0.117 (34.778s)	0.112
Maximum axial #1 (mm)	0.333 (30.282s)	0.334 (31.281s)	0.339 (32.284s)	0.341 (33.281s)	0.344 (34.282s)	0.338
Minimum axial #1 (mm)	0.107 (30.781s)	0.111 (31.779s)	0.116 (32.775s)	0.117 (33.776s)	0.119 (34.778s)	0.114
Maximum axial #2 (mm)	0.332 (30.283s)	0.334 (31.280s)	0.338 (32.284s)	0.340 (33.282s)	0.344 (34.281s)	0.338
Minimum axial #2 (mm)	0.104 (30.780s)	0.107 (31.779s)	0.111 (32.774s)	0.113 (33.776s)	0.115 (34.777s)	0.110

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#18

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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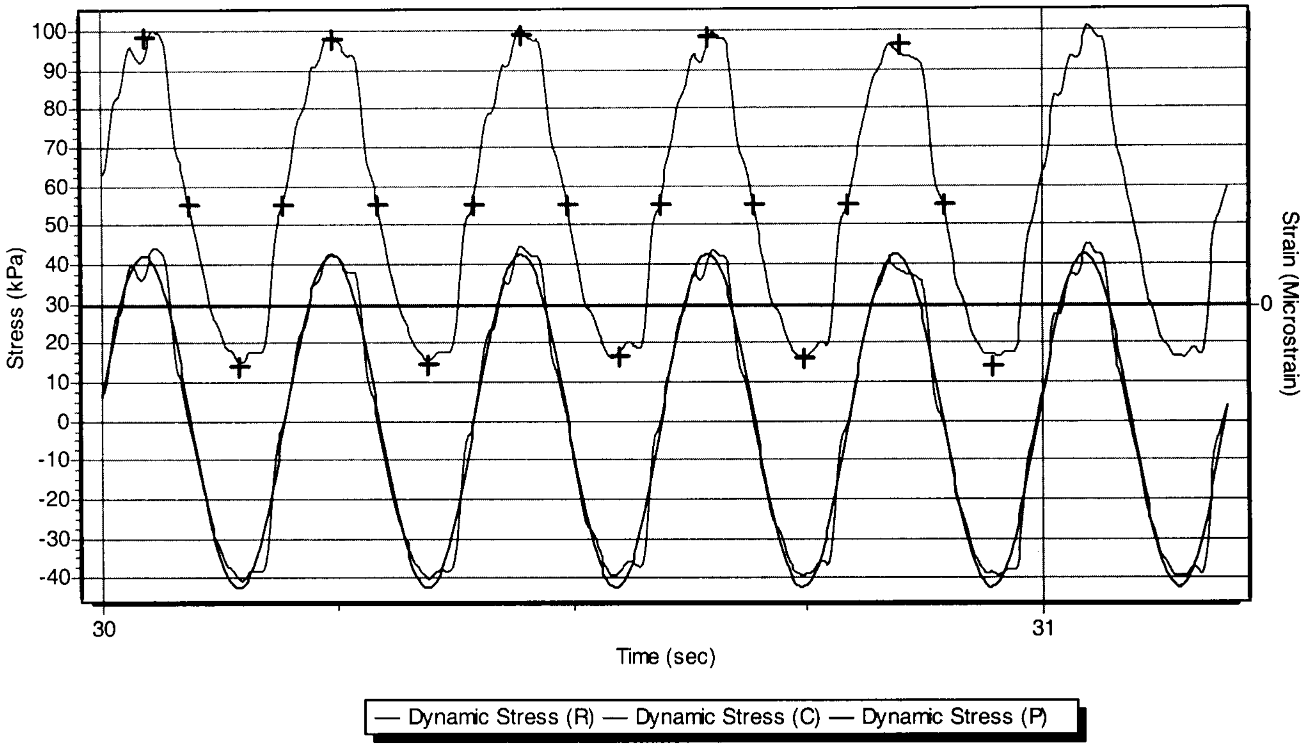

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:39 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.2	83.4	82.8	82.6	82.3	83.1
Recoverable axial micro-strain	1905.1	1870.1	1845.8	1831.2	1847.5	1859.9
Permanent axial micro-strain	176	129	97	95	102	
Dynamic modulus (MPa)	44.2	44.6	44.8	45.1	44.5	44.7
Phase angle (Deg)	9.10	9.88	13.04	11.30	4.23	9.51
Dyn.Modulus/sine(phase angle)	557.7	517.7	394.9	458.1	1206.6	627.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.662	0.655	0.650	0.649	0.646	0.652
Maximum load (kN)	0.772 (30.047s)	0.770 (30.246s)	0.779 (30.445s)	0.773 (30.646s)	0.756 (30.850s)	0.770
Minimum load (kN)	0.110 (30.146s)	0.115 (30.346s)	0.129 (30.550s)	0.125 (30.748s)	0.110 (30.948s)	0.118
Maximum averaged axial (mm)	0.180 (30.052s)	0.181 (30.251s)	0.182 (30.452s)	0.181 (30.652s)	0.182 (30.852s)	0.181
Minimum averaged axial (mm)	-0.018 (30.152s)	-0.013 (30.352s)	-0.010 (30.552s)	-0.010 (30.750s)	-0.011 (30.953s)	-0.012
Maximum axial #1 (mm)	0.179 (30.052s)	0.180 (30.251s)	0.181 (30.452s)	0.180 (30.652s)	0.180 (30.852s)	0.180
Minimum axial #1 (mm)	-0.017 (30.152s)	-0.012 (30.352s)	-0.008 (30.552s)	-0.009 (30.750s)	-0.009 (30.953s)	-0.011
Maximum axial #2 (mm)	0.181 (30.052s)	0.182 (30.251s)	0.183 (30.452s)	0.182 (30.652s)	0.183 (30.852s)	0.182
Minimum axial #2 (mm)	-0.019 (30.152s)	-0.015 (30.352s)	-0.012 (30.552s)	-0.011 (30.752s)	-0.012 (30.953s)	-0.014

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#18

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 101 'C
Final Temp: 96 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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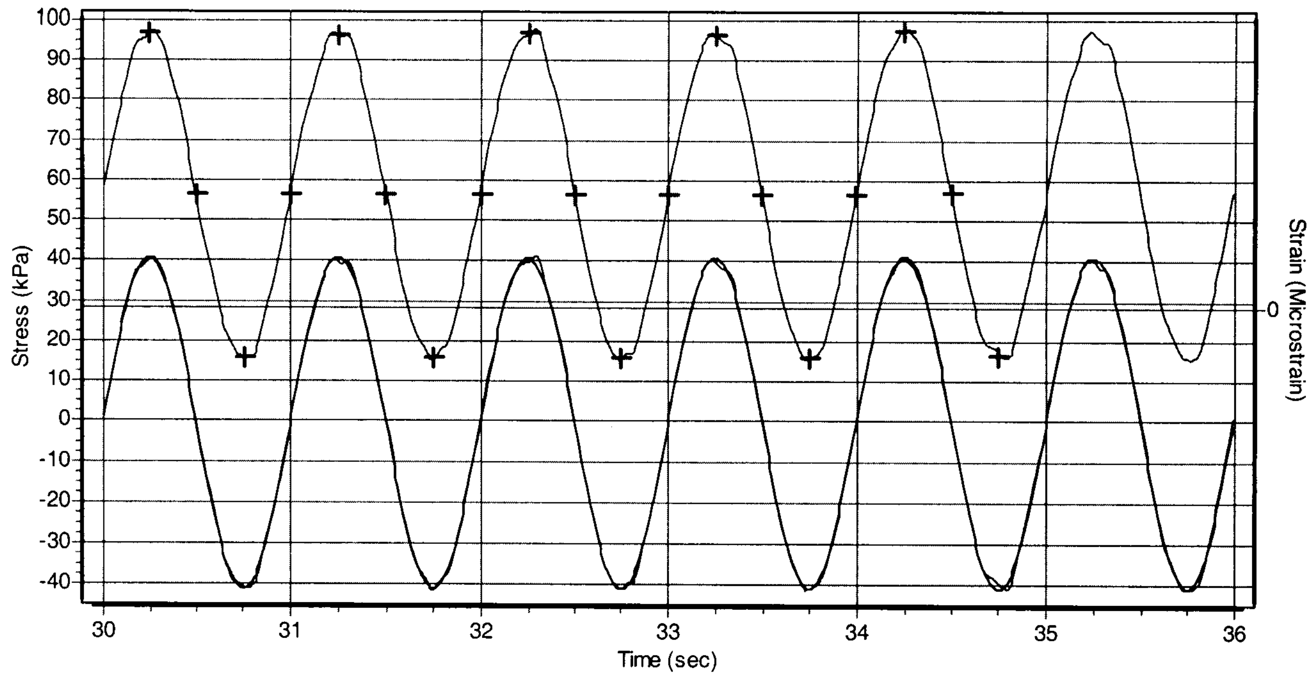

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:46 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.1	80.6	81.1	80.7	81.0	80.9
Recoverable axial micro-strain	1677.8	1658.7	1662.0	1666.6	1659.6	1664.9
Permanent axial micro-strain	690	722	748	754	778	
Dynamic modulus (MPa)	48.3	48.6	48.8	48.4	48.8	48.6
Phase angle (Deg)	10.57	12.07	10.89	11.55	11.08	11.23
Dyn.Modulus/sine(phase angle)	524.5	462.3	514.4	481.2	505.5	497.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.633	0.637	0.634	0.636	0.635
Maximum load (kN)	0.761 (30.247s)	0.759 (31.245s)	0.761 (32.250s)	0.759 (33.246s)	0.765 (34.244s)	0.761
Minimum load (kN)	0.125 (30.747s)	0.126 (31.744s)	0.124 (32.745s)	0.125 (33.743s)	0.129 (34.746s)	0.126
Maximum averaged axial (mm)	0.237 (30.276s)	0.238 (31.278s)	0.241 (32.280s)	0.242 (33.278s)	0.244 (34.275s)	0.240
Minimum averaged axial (mm)	0.069 (30.774s)	0.072 (31.774s)	0.075 (32.774s)	0.075 (33.773s)	0.078 (34.774s)	0.074
Maximum axial #1 (mm)	0.227 (30.277s)	0.228 (31.278s)	0.231 (32.280s)	0.232 (33.278s)	0.234 (34.276s)	0.230
Minimum axial #1 (mm)	0.067 (30.775s)	0.069 (31.774s)	0.072 (32.774s)	0.072 (33.774s)	0.075 (34.774s)	0.071
Maximum axial #2 (mm)	0.247 (30.275s)	0.248 (31.279s)	0.251 (32.279s)	0.252 (33.278s)	0.254 (34.275s)	0.250
Minimum axial #2 (mm)	0.072 (30.774s)	0.075 (31.770s)	0.078 (32.774s)	0.078 (33.773s)	0.081 (34.774s)	0.077

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#19

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 91 'C
Final Temp: 84 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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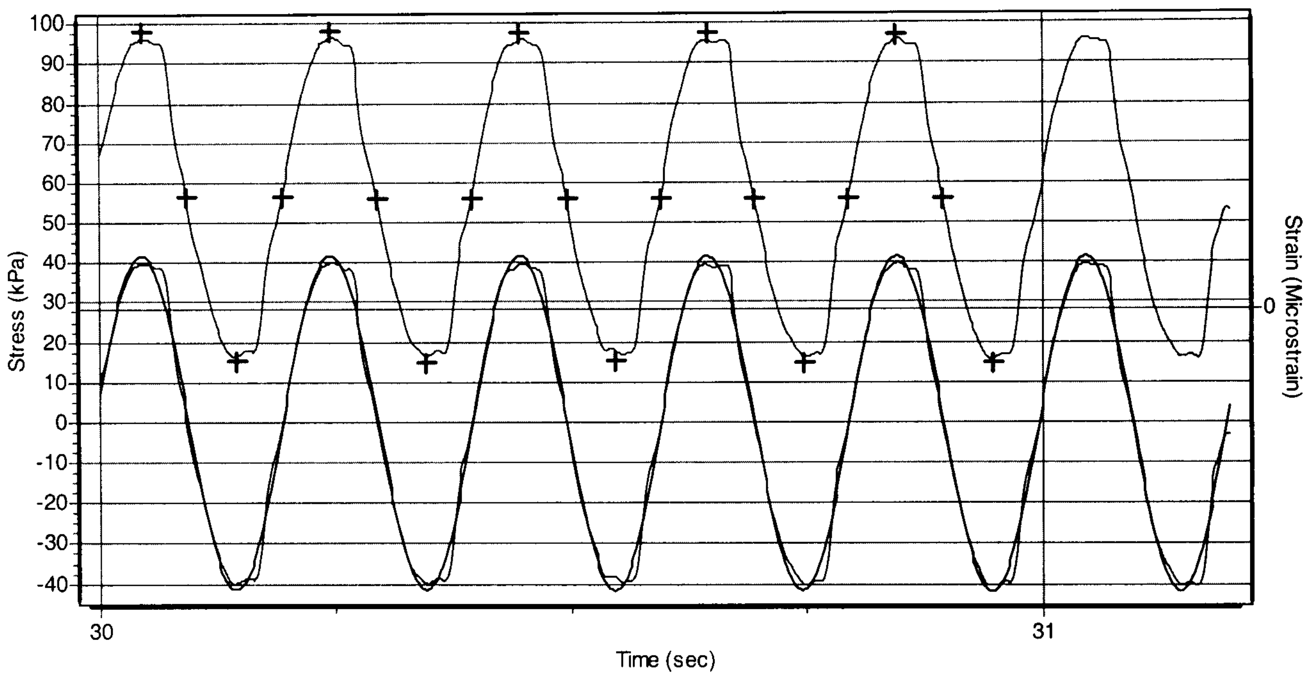

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:46 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.8	82.9	82.4	82.6	82.6	82.6
Recoverable axial micro-strain	1438.5	1431.9	1426.6	1439.3	1435.4	1434.3
Permanent axial micro-strain	331	328	323	325	327	
Dynamic modulus (MPa)	57.6	57.9	57.7	57.4	57.5	57.6
Phase angle (Deg)	8.19	9.77	7.37	9.94	7.88	8.63
Dyn.Modulus/sine(phase angle)	806.5	679.6	899.0	662.3	836.5	776.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.650	0.651	0.647	0.648	0.648	0.649
Maximum load (kN)	0.771 (30.046s)	0.769 (30.245s)	0.768 (30.445s)	0.766 (30.645s)	0.765 (30.845s)	0.768
Minimum load (kN)	0.120 (30.145s)	0.118 (30.345s)	0.121 (30.546s)	0.118 (30.746s)	0.117 (30.945s)	0.119
Maximum averaged axial (mm)	0.111 (30.050s)	0.110 (30.251s)	0.110 (30.449s)	0.111 (30.651s)	0.111 (30.850s)	0.111
Minimum averaged axial (mm)	-0.033 (30.150s)	-0.033 (30.351s)	-0.032 (30.551s)	-0.033 (30.752s)	-0.033 (30.951s)	-0.033
Maximum axial #1 (mm)	0.109 (30.051s)	0.108 (30.251s)	0.108 (30.449s)	0.109 (30.651s)	0.108 (30.849s)	0.108
Minimum axial #1 (mm)	-0.028 (30.150s)	-0.028 (30.350s)	-0.028 (30.551s)	-0.028 (30.751s)	-0.028 (30.950s)	-0.028
Maximum axial #2 (mm)	0.113 (30.050s)	0.113 (30.251s)	0.113 (30.450s)	0.114 (30.651s)	0.114 (30.850s)	0.113
Minimum axial #2 (mm)	-0.037 (30.150s)	-0.038 (30.351s)	-0.037 (30.551s)	-0.037 (30.752s)	-0.037 (30.951s)	-0.037

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#19

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 91 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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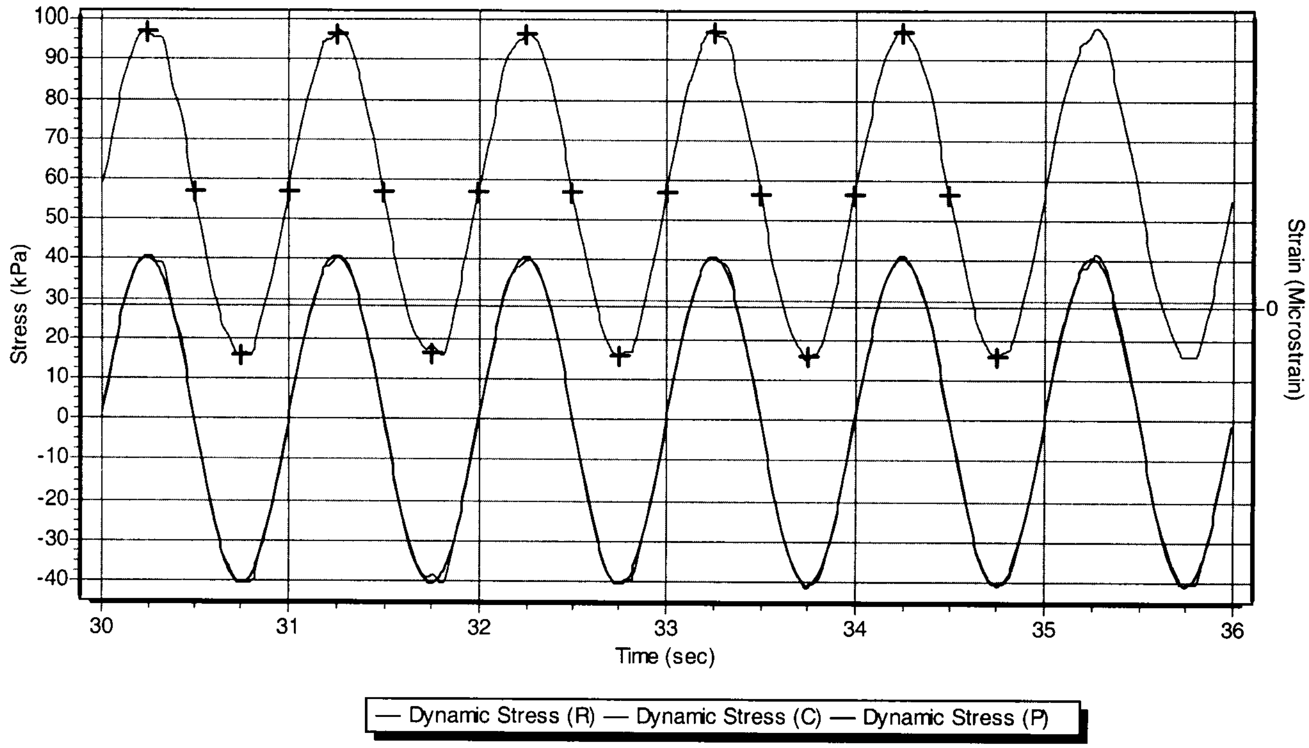

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	80.3	80.7	81.4	80.8	80.9
Recoverable axial micro-strain	1631.2	1614.1	1600.2	1626.1	1616.5	1617.6
Permanent axial micro-strain	647	671	698	700	726	
Dynamic modulus (MPa)	49.8	49.8	50.4	50.0	50.0	50.0
Phase angle (Deg)	11.25	10.74	10.25	11.13	10.93	10.86
Dyn.Modulus/sine(phase angle)	507.7	532.1	564.3	516.0	525.0	529.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.631	0.634	0.639	0.635	0.635
Maximum load (kN)	0.763 (30.248s)	0.759 (31.246s)	0.759 (32.246s)	0.763 (33.244s)	0.761 (34.244s)	0.761
Minimum load (kN)	0.126 (30.744s)	0.128 (31.744s)	0.125 (32.746s)	0.124 (33.744s)	0.126 (34.746s)	0.126
Maximum averaged axial (mm)	0.230 (30.280s)	0.231 (31.276s)	0.232 (32.275s)	0.235 (33.275s)	0.237 (34.275s)	0.233
Minimum averaged axial (mm)	0.065 (30.773s)	0.068 (31.773s)	0.070 (32.774s)	0.071 (33.774s)	0.073 (34.774s)	0.070
Maximum axial #1 (mm)	0.215 (30.280s)	0.216 (31.277s)	0.217 (32.274s)	0.220 (33.275s)	0.221 (34.275s)	0.218
Minimum axial #1 (mm)	0.056 (30.774s)	0.059 (31.773s)	0.060 (32.774s)	0.061 (33.774s)	0.063 (34.774s)	0.060
Maximum axial #2 (mm)	0.245 (30.279s)	0.246 (31.275s)	0.247 (32.276s)	0.250 (33.275s)	0.252 (34.274s)	0.248
Minimum axial #2 (mm)	0.075 (30.773s)	0.077 (31.773s)	0.080 (32.774s)	0.080 (33.774s)	0.083 (34.773s)	0.079

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#20

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 91 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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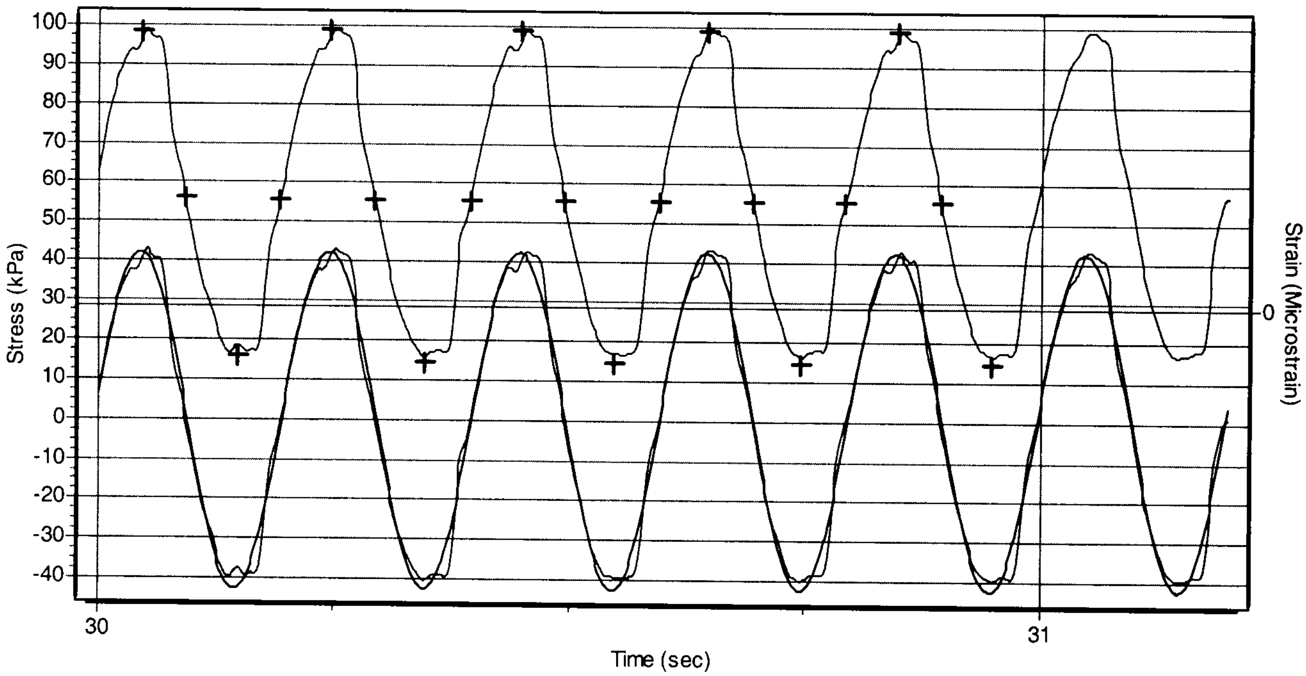

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.7	84.6	85.0	84.4	84.6	84.3
Recoverable axial micro-strain	1495.8	1504.2	1507.0	1506.9	1500.6	1502.9
Permanent axial micro-strain	298	303	301	297	288	
Dynamic modulus (MPa)	55.3	56.3	56.4	56.0	56.3	56.1
Phase angle (Deg)	7.04	7.12	7.30	10.91	9.13	8.30
Dyn.Modulus/sine(phase angle)	900.5	906.3	885.7	589.4	708.0	798.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.649	0.665	0.668	0.663	0.664	0.662
Maximum load (kN)	0.775 (30.046s)	0.778 (30.246s)	0.779 (30.446s)	0.778 (30.646s)	0.778 (30.846s)	0.778
Minimum load (kN)	0.125 (30.148s)	0.113 (30.346s)	0.112 (30.547s)	0.115 (30.746s)	0.114 (30.946s)	0.116
Maximum averaged axial (mm)	0.121 (30.050s)	0.121 (30.250s)	0.122 (30.450s)	0.122 (30.652s)	0.122 (30.851s)	0.122
Minimum averaged axial (mm)	-0.030 (30.151s)	-0.031 (30.351s)	-0.030 (30.552s)	-0.030 (30.751s)	-0.029 (30.951s)	-0.030
Maximum axial #1 (mm)	0.114 (30.050s)	0.115 (30.251s)	0.115 (30.451s)	0.116 (30.652s)	0.116 (30.852s)	0.115
Minimum axial #1 (mm)	-0.034 (30.152s)	-0.034 (30.351s)	-0.036 (30.553s)	-0.033 (30.750s)	-0.032 (30.952s)	-0.034
Maximum axial #2 (mm)	0.128 (30.050s)	0.128 (30.249s)	0.128 (30.450s)	0.129 (30.651s)	0.129 (30.850s)	0.128
Minimum axial #2 (mm)	-0.026 (30.150s)	-0.027 (30.350s)	-0.027 (30.551s)	-0.027 (30.751s)	-0.026 (30.951s)	-0.027

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#20

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 91 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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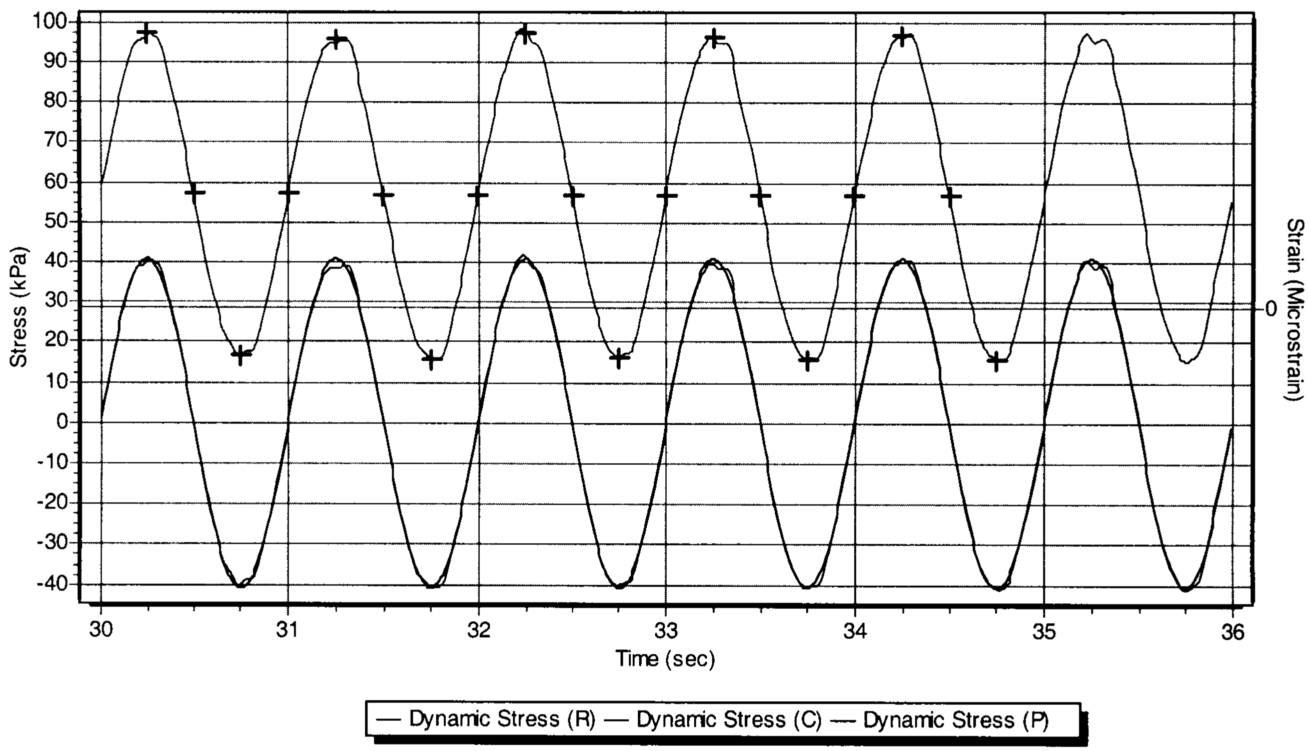

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.6	80.4	81.1	80.7	81.3	80.8
Recoverable axial micro-strain	1627.1	1633.7	1629.8	1621.9	1635.5	1629.6
Permanent axial micro-strain	430	432	459	475	483	
Dynamic modulus (MPa)	49.5	49.2	49.8	49.8	49.7	49.6
Phase angle (Deg)	11.34	11.82	12.07	12.57	11.10	11.78
Dyn.Modulus/sine(phase angle)	501.5	478.3	473.6	454.8	513.5	484.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.633	0.632	0.637	0.634	0.638	0.635
Maximum load (kN)	0.764 (30.247s)	0.755 (31.249s)	0.765 (32.243s)	0.757 (33.246s)	0.761 (34.248s)	0.760
Minimum load (kN)	0.130 (30.744s)	0.124 (31.747s)	0.127 (32.743s)	0.123 (33.745s)	0.123 (34.744s)	0.125
Maximum averaged axial (mm)	0.208 (30.278s)	0.209 (31.282s)	0.211 (32.276s)	0.212 (33.281s)	0.214 (34.279s)	0.211
Minimum averaged axial (mm)	0.043 (30.777s)	0.044 (31.775s)	0.046 (32.776s)	0.048 (33.776s)	0.049 (34.775s)	0.046
Maximum axial #1 (mm)	0.205 (30.279s)	0.205 (31.284s)	0.208 (32.278s)	0.209 (33.283s)	0.211 (34.280s)	0.208
Minimum axial #1 (mm)	0.045 (30.778s)	0.046 (31.777s)	0.048 (32.776s)	0.049 (33.775s)	0.051 (34.777s)	0.048
Maximum axial #2 (mm)	0.211 (30.278s)	0.212 (31.280s)	0.214 (32.274s)	0.215 (33.279s)	0.217 (34.278s)	0.214
Minimum axial #2 (mm)	0.042 (30.776s)	0.041 (31.774s)	0.044 (32.775s)	0.046 (33.775s)	0.047 (34.775s)	0.044

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#21

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 93 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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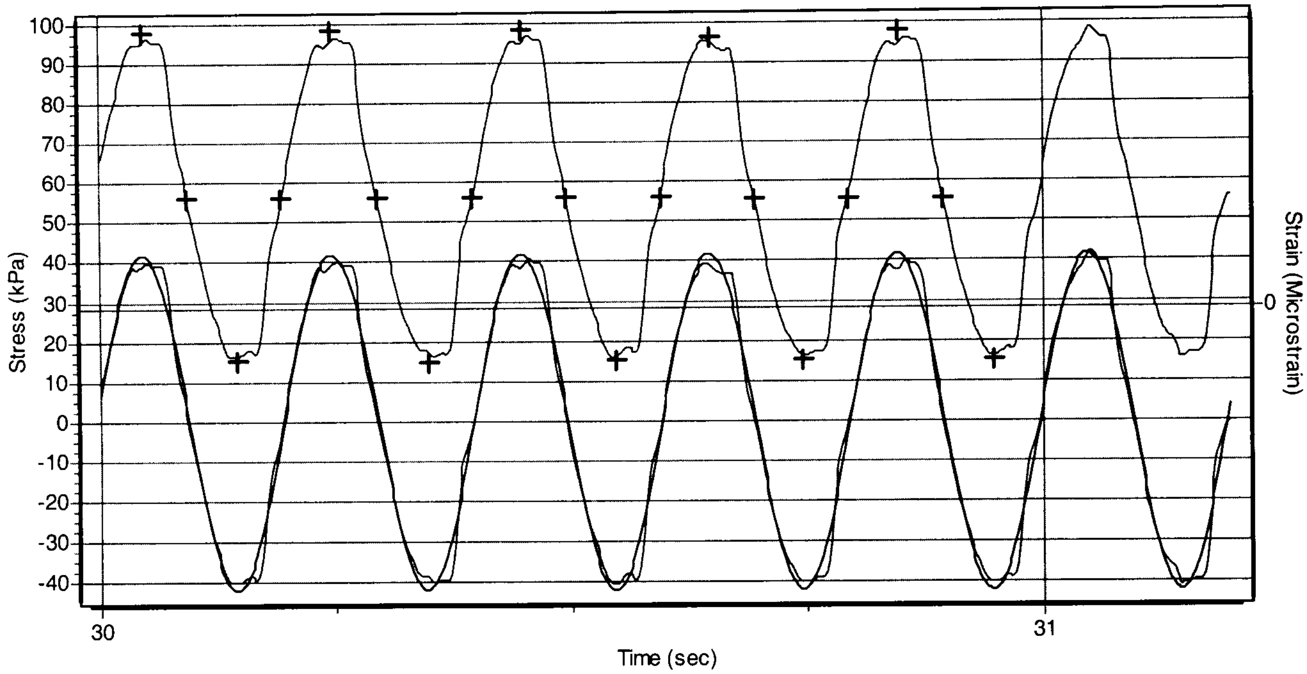

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.8	83.6	83.2	81.1	83.0	82.7
Recoverable axial micro-strain	1483.9	1476.4	1480.5	1470.2	1478.9	1478.0
Permanent axial micro-strain	444	430	431	426	421	
Dynamic modulus (MPa)	55.8	56.6	56.2	55.2	56.1	56.0
Phase angle (Deg)	9.40	10.59	9.87	10.03	9.74	9.93
Dyn.Modulus/sine(phase angle)	680.4	613.6	653.3	631.4	661.2	648.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.650	0.657	0.653	0.637	0.652	0.650
Maximum load (kN)	0.771 (30.046s)	0.773 (30.246s)	0.773 (30.446s)	0.756 (30.647s)	0.771 (30.847s)	0.769
Minimum load (kN)	0.121 (30.147s)	0.116 (30.347s)	0.120 (30.546s)	0.119 (30.746s)	0.119 (30.946s)	0.119
Maximum averaged axial (mm)	0.105 (30.052s)	0.106 (30.251s)	0.106 (30.452s)	0.105 (30.653s)	0.107 (30.852s)	0.106
Minimum averaged axial (mm)	-0.045 (30.152s)	-0.043 (30.352s)	-0.044 (30.552s)	-0.043 (30.751s)	-0.042 (30.952s)	-0.043
Maximum axial #1 (mm)	0.105 (30.052s)	0.106 (30.252s)	0.106 (30.452s)	0.105 (30.653s)	0.107 (30.851s)	0.106
Minimum axial #1 (mm)	-0.042 (30.152s)	-0.041 (30.352s)	-0.042 (30.552s)	-0.041 (30.752s)	-0.040 (30.952s)	-0.041
Maximum axial #2 (mm)	0.105 (30.051s)	0.105 (30.251s)	0.106 (30.451s)	0.105 (30.653s)	0.107 (30.852s)	0.106
Minimum axial #2 (mm)	-0.047 (30.151s)	-0.046 (30.351s)	-0.046 (30.551s)	-0.045 (30.751s)	-0.045 (30.951s)	-0.046

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#21

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 93 'C
Final Temp: 37 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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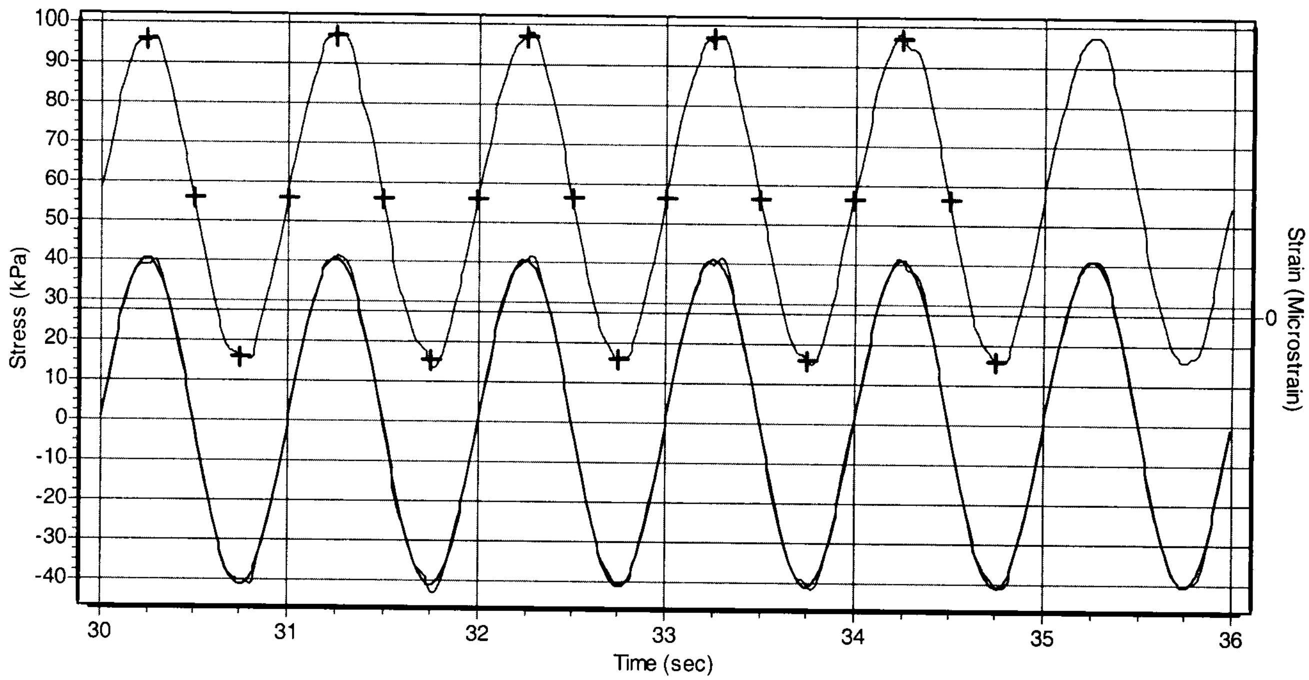


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 2:59 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.3	81.5	80.7	81.0	81.2	81.0
Recoverable axial micro-strain	1614.0	1632.2	1623.6	1626.1	1627.3	1624.6
Permanent axial micro-strain	385	394	420	435	457	
Dynamic modulus (MPa)	49.7	50.0	49.7	49.8	49.9	49.8
Phase angle (Deg)	12.46	11.68	11.09	12.06	12.66	11.99
Dyn.Modulus/sine(phase angle)	458.2	490.9	514.4	474.1	452.6	478.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.631	0.640	0.634	0.636	0.638	0.636
Maximum load (kN)	0.755 (30.246s)	0.764 (31.246s)	0.761 (32.249s)	0.761 (33.248s)	0.764 (34.247s)	0.761
Minimum load (kN)	0.124 (30.745s)	0.123 (31.743s)	0.127 (32.744s)	0.125 (33.747s)	0.126 (34.745s)	0.125
Maximum averaged axial (mm)	0.202 (30.281s)	0.205 (31.279s)	0.206 (32.280s)	0.208 (33.281s)	0.210 (34.282s)	0.206
Minimum averaged axial (mm)	0.039 (30.777s)	0.040 (31.775s)	0.042 (32.776s)	0.044 (33.776s)	0.046 (34.775s)	0.042
Maximum axial #1 (mm)	0.190 (30.282s)	0.193 (31.279s)	0.194 (32.282s)	0.195 (33.282s)	0.198 (34.284s)	0.194
Minimum axial #1 (mm)	0.034 (30.778s)	0.034 (31.775s)	0.037 (32.777s)	0.038 (33.776s)	0.040 (34.776s)	0.037
Maximum axial #2 (mm)	0.214 (30.280s)	0.217 (31.278s)	0.219 (32.278s)	0.221 (33.280s)	0.223 (34.280s)	0.219
Minimum axial #2 (mm)	0.044 (30.776s)	0.045 (31.774s)	0.048 (32.776s)	0.050 (33.776s)	0.052 (34.774s)	0.048

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#22

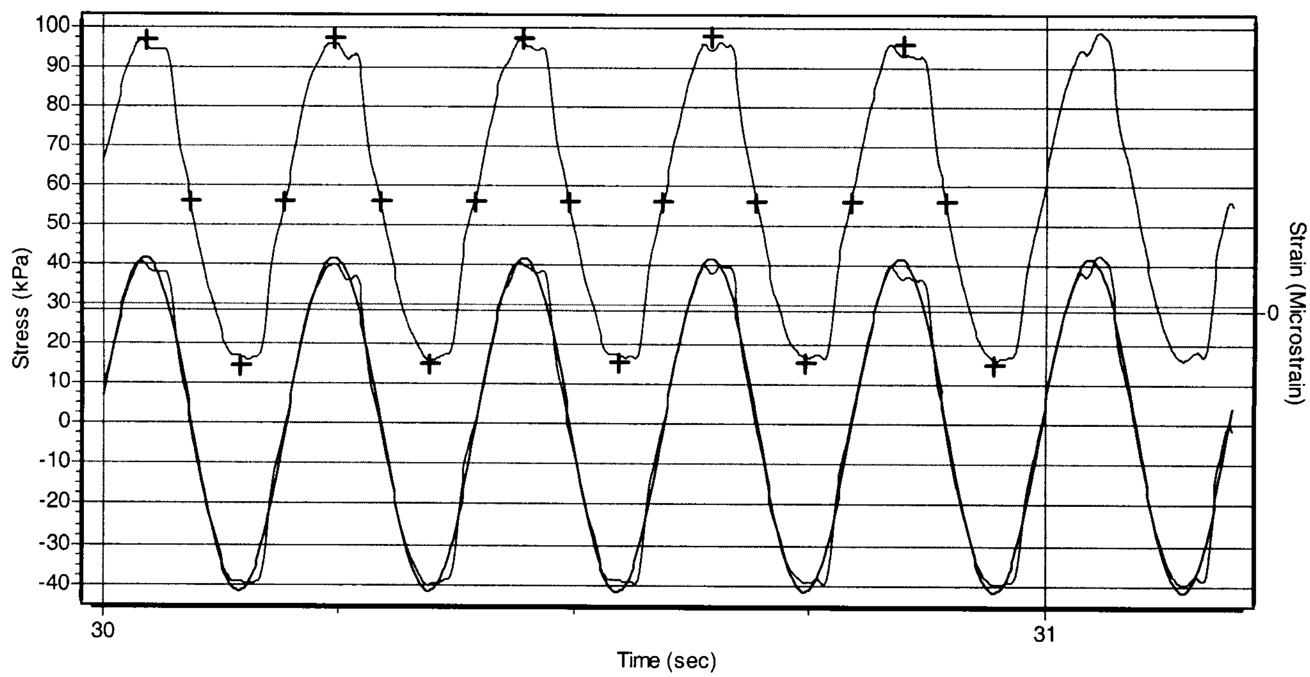
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 93 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#22.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 2:59 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.3	82.4	81.5	82.2	81.0	81.9
Recoverable axial micro-strain	1427.0	1380.4	1394.6	1398.5	1394.5	1399.0
Permanent axial micro-strain	329	286	288	280	288	
Dynamic modulus (MPa)	57.7	59.7	58.5	58.7	58.1	58.5
Phase angle (Deg)	8.64	8.59	10.44	7.62	5.16	8.09
Dyn.Modulus/sine(phase angle)	765.2	796.6	642.7	884.1	1290.3	875.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.647	0.640	0.645	0.637	0.643
Maximum load (kN)	0.760 (30.047s)	0.764 (30.245s)	0.764 (30.445s)	0.770 (30.646s)	0.754 (30.848s)	0.762
Minimum load (kN)	0.113 (30.146s)	0.118 (30.345s)	0.124 (30.546s)	0.125 (30.746s)	0.117 (30.945s)	0.119
Maximum averaged axial (mm)	0.111 (30.051s)	0.111 (30.250s)	0.112 (30.451s)	0.113 (30.650s)	0.112 (30.851s)	0.112
Minimum averaged axial (mm)	-0.033 (30.151s)	-0.029 (30.350s)	-0.029 (30.550s)	-0.028 (30.750s)	-0.029 (30.951s)	-0.030
Maximum axial #1 (mm)	0.103 (30.051s)	0.102 (30.250s)	0.104 (30.451s)	0.104 (30.651s)	0.103 (30.851s)	0.103
Minimum axial #1 (mm)	-0.034 (30.151s)	-0.030 (30.351s)	-0.030 (30.550s)	-0.029 (30.750s)	-0.030 (30.951s)	-0.031
Maximum axial #2 (mm)	0.120 (30.051s)	0.119 (30.249s)	0.120 (30.451s)	0.122 (30.650s)	0.120 (30.851s)	0.120
Minimum axial #2 (mm)	-0.033 (30.151s)	-0.028 (30.350s)	-0.028 (30.550s)	-0.027 (30.750s)	-0.028 (30.951s)	-0.029

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#22

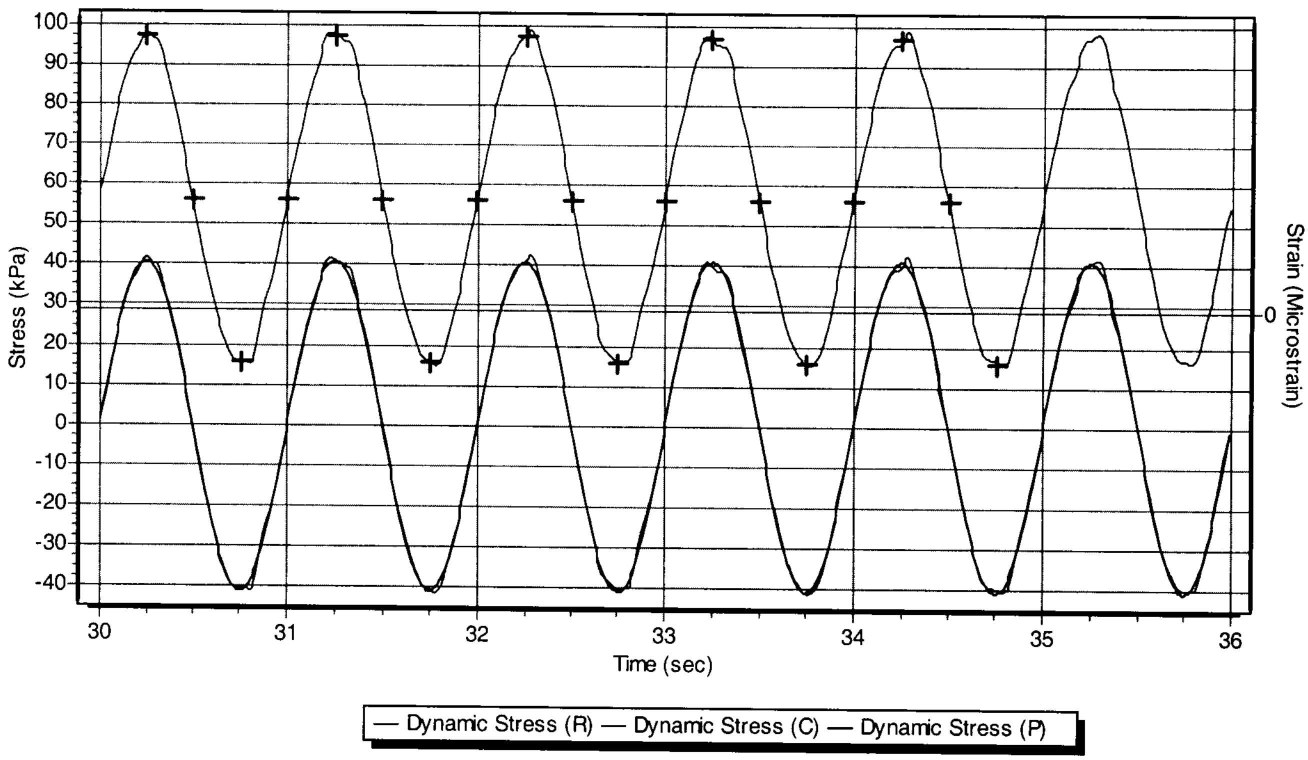
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 93 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#23.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:10 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.4	81.9	81.7	81.5	81.2	81.5
Recoverable axial micro-strain	1841.6	1850.6	1815.5	1826.3	1816.6	1830.1
Permanent axial micro-strain	906	933	981	980	1022	
Dynamic modulus (MPa)	44.2	44.3	45.0	44.6	44.7	44.6
Phase angle (Deg)	12.00	11.31	10.29	10.46	10.21	10.85
Dyn.Modulus/sine(phase angle)	422.9	449.4	502.1	489.8	502.2	473.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.643	0.642	0.640	0.638	0.640
Maximum load (kN)	0.764 (30.246s)	0.767 (31.249s)	0.766 (32.249s)	0.763 (33.242s)	0.762 (34.247s)	0.764
Minimum load (kN)	0.125 (30.748s)	0.124 (31.749s)	0.124 (32.743s)	0.123 (33.748s)	0.124 (34.747s)	0.124
Maximum averaged axial (mm)	0.277 (30.279s)	0.281 (31.281s)	0.282 (32.278s)	0.283 (33.271s)	0.287 (34.276s)	0.282
Minimum averaged axial (mm)	0.091 (30.776s)	0.094 (31.776s)	0.099 (32.775s)	0.099 (33.775s)	0.103 (34.774s)	0.097
Maximum axial #1 (mm)	0.275 (30.280s)	0.279 (31.280s)	0.280 (32.278s)	0.282 (33.272s)	0.285 (34.276s)	0.280
Minimum axial #1 (mm)	0.092 (30.775s)	0.096 (31.775s)	0.101 (32.775s)	0.101 (33.775s)	0.106 (34.775s)	0.099
Maximum axial #2 (mm)	0.279 (30.278s)	0.283 (31.281s)	0.284 (32.278s)	0.285 (33.271s)	0.288 (34.276s)	0.284
Minimum axial #2 (mm)	0.091 (30.776s)	0.093 (31.776s)	0.097 (32.775s)	0.096 (33.773s)	0.101 (34.775s)	0.096

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#23

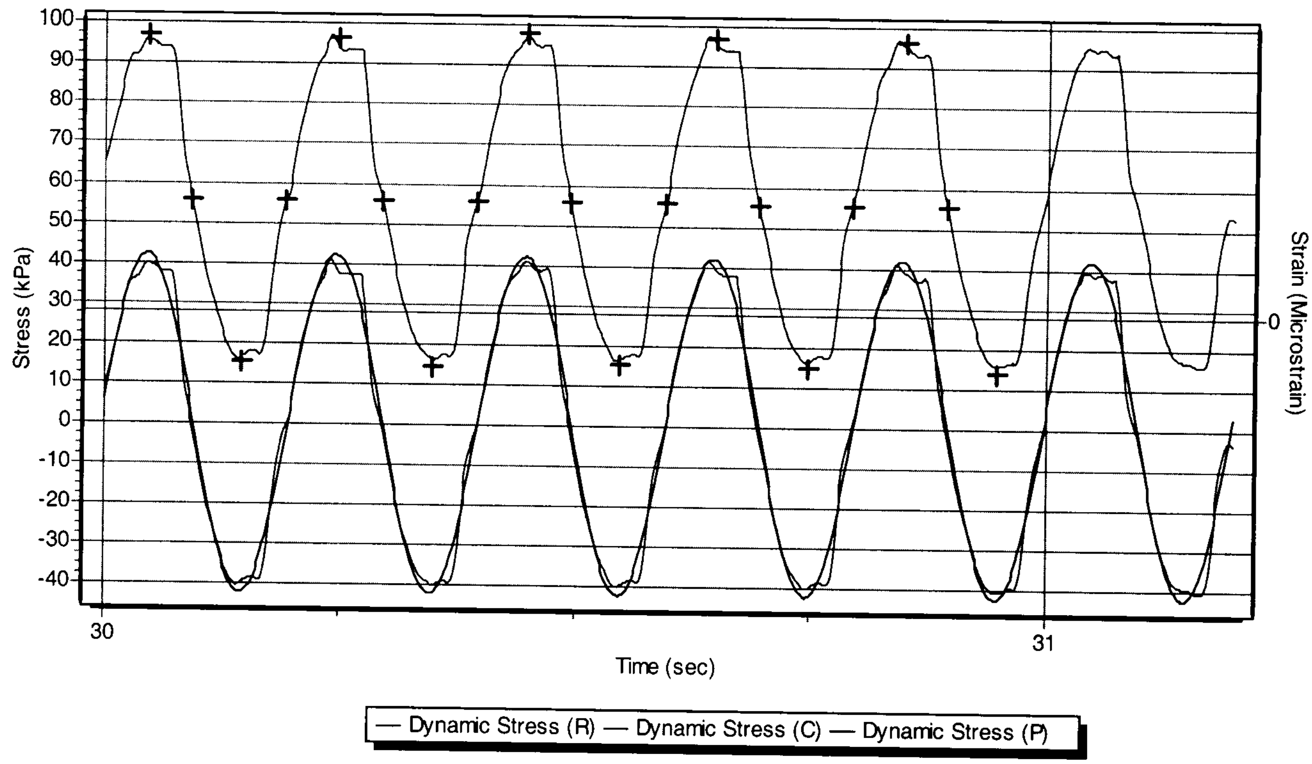
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 87 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#23.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:10 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	82.1	82.4	82.5	82.6	82.3
Recoverable axial micro-strain	1632.2	1627.9	1636.9	1628.9	1644.0	1634.0
Permanent axial micro-strain	195	191	182	182	193	
Dynamic modulus (MPa)	50.1	50.5	50.3	50.6	50.3	50.4
Phase angle (Deg)	11.14	7.76	12.30	7.57	7.26	9.21
Dyn.Modulus/sine(phase angle)	516.2	745.4	470.1	766.6	794.1	658.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.645	0.647	0.648	0.649	0.646
Maximum load (kN)	0.764 (30.047s)	0.759 (30.249s)	0.771 (30.446s)	0.764 (30.648s)	0.760 (30.848s)	0.763
Minimum load (kN)	0.122 (30.146s)	0.114 (30.346s)	0.123 (30.547s)	0.116 (30.746s)	0.111 (30.946s)	0.117
Maximum averaged axial (mm)	0.145 (30.053s)	0.145 (30.253s)	0.147 (30.453s)	0.146 (30.652s)	0.147 (30.852s)	0.146
Minimum averaged axial (mm)	-0.020 (30.151s)	-0.019 (30.352s)	-0.018 (30.552s)	-0.018 (30.752s)	-0.020 (30.953s)	-0.019
Maximum axial #1 (mm)	0.150 (30.054s)	0.150 (30.254s)	0.151 (30.454s)	0.151 (30.653s)	0.151 (30.853s)	0.151
Minimum axial #1 (mm)	-0.018 (30.152s)	-0.018 (30.352s)	-0.017 (30.552s)	-0.017 (30.752s)	-0.018 (30.953s)	-0.018
Maximum axial #2 (mm)	0.140 (30.053s)	0.140 (30.252s)	0.142 (30.450s)	0.142 (30.651s)	0.141 (30.852s)	0.141
Minimum axial #2 (mm)	-0.021 (30.151s)	-0.021 (30.352s)	-0.019 (30.552s)	-0.020 (30.751s)	-0.021 (30.952s)	-0.020

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#23

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 83 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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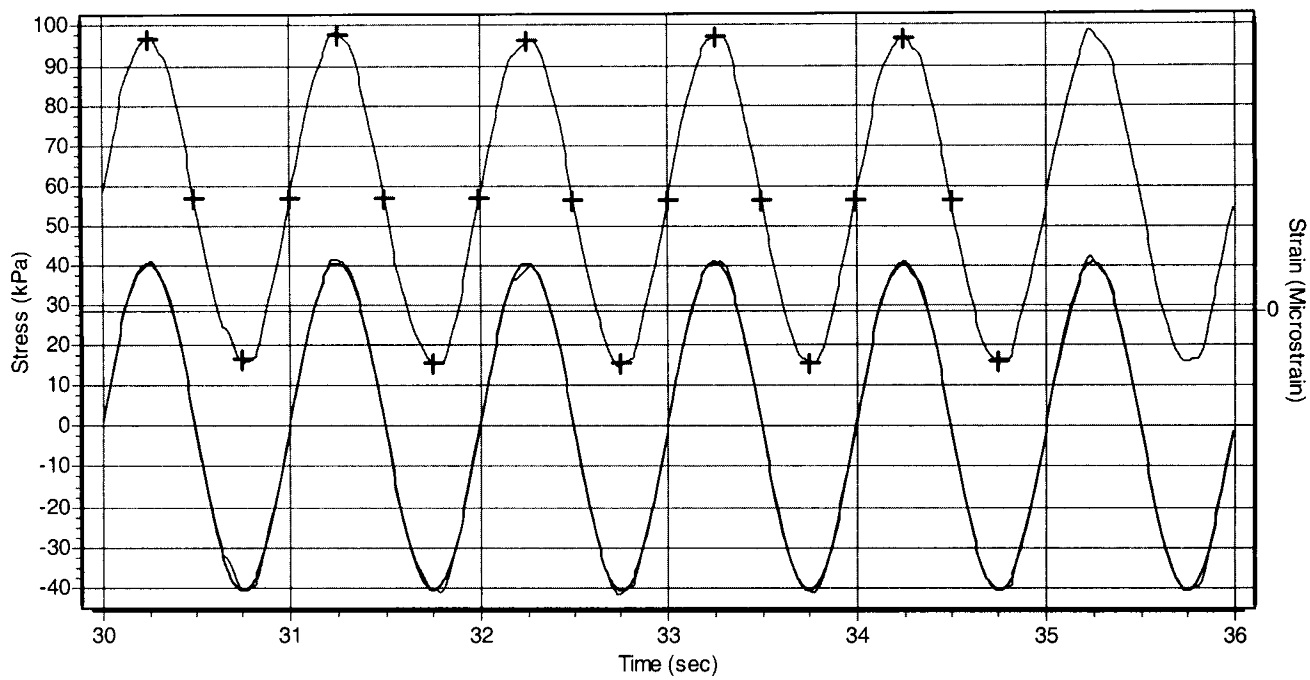


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:17 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.2	81.7	80.7	81.2	80.4	80.8
Recoverable axial micro-strain	1771.8	1786.8	1775.0	1783.5	1769.1	1777.3
Permanent axial micro-strain	807	821	839	863	892	
Dynamic modulus (MPa)	45.3	45.7	45.4	45.5	45.5	45.5
Phase angle (Deg)	13.69	14.47	14.53	13.69	14.27	14.13
Dyn.Modulus/sine(phase angle)	379.9	362.9	359.4	382.0	366.1	370.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.630	0.641	0.634	0.638	0.632	0.635
Maximum load (kN)	0.760 (30.246s)	0.766 (31.245s)	0.755 (32.247s)	0.762 (33.248s)	0.759 (34.245s)	0.760
Minimum load (kN)	0.130 (30.745s)	0.124 (31.749s)	0.121 (32.743s)	0.124 (33.747s)	0.128 (34.746s)	0.126
Maximum averaged axial (mm)	0.260 (30.284s)	0.263 (31.285s)	0.264 (32.287s)	0.267 (33.286s)	0.269 (34.285s)	0.265
Minimum averaged axial (mm)	0.082 (30.779s)	0.083 (31.781s)	0.085 (32.780s)	0.087 (33.778s)	0.090 (34.779s)	0.085
Maximum axial #1 (mm)	0.275 (30.282s)	0.278 (31.284s)	0.278 (32.286s)	0.282 (33.286s)	0.283 (34.284s)	0.279
Minimum axial #1 (mm)	0.089 (30.777s)	0.091 (31.780s)	0.093 (32.779s)	0.095 (33.778s)	0.097 (34.779s)	0.093
Maximum axial #2 (mm)	0.246 (30.287s)	0.249 (31.286s)	0.250 (32.288s)	0.253 (33.287s)	0.254 (34.286s)	0.250
Minimum axial #2 (mm)	0.074 (30.782s)	0.075 (31.781s)	0.077 (32.780s)	0.079 (33.780s)	0.082 (34.779s)	0.078

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#24

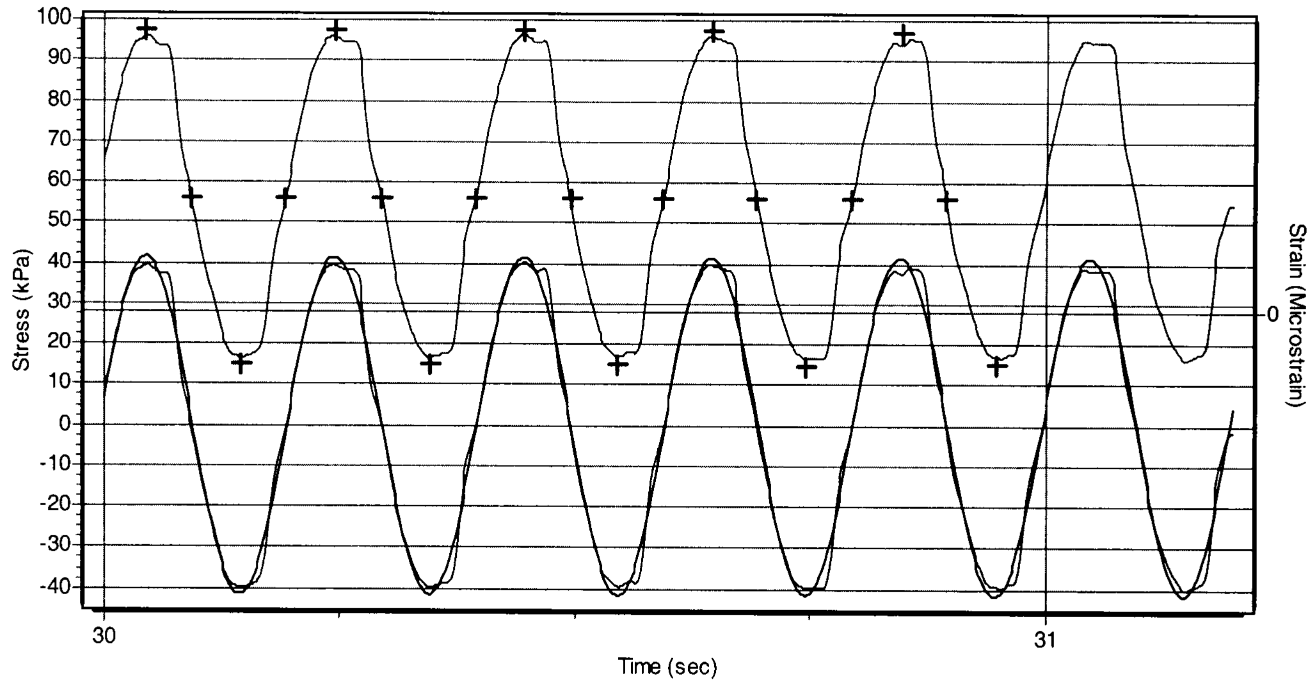
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#24.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:17 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.4	82.4	82.2	82.7	82.0	82.4
Recoverable axial micro-strain	1501.0	1502.5	1499.1	1501.4	1507.7	1502.4
Permanent axial micro-strain	241	237	225	232	228	
Dynamic modulus (MPa)	54.9	54.8	54.9	55.1	54.4	54.8
Phase angle (Deg)	12.36	12.52	12.16	13.72	11.89	12.53
Dyn.Modulus/sine(phase angle)	510.2	502.8	518.0	461.3	524.8	503.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.647	0.647	0.646	0.650	0.644	0.647
Maximum load (kN)	0.765 (30.045s)	0.766 (30.245s)	0.766 (30.445s)	0.766 (30.645s)	0.764 (30.846s)	0.765
Minimum load (kN)	0.118 (30.145s)	0.119 (30.345s)	0.121 (30.545s)	0.116 (30.745s)	0.120 (30.946s)	0.119
Maximum averaged axial (mm)	0.127 (30.052s)	0.128 (30.252s)	0.129 (30.452s)	0.128 (30.653s)	0.129 (30.853s)	0.128
Minimum averaged axial (mm)	-0.024 (30.152s)	-0.024 (30.353s)	-0.023 (30.552s)	-0.023 (30.752s)	-0.023 (30.952s)	-0.024
Maximum axial #1 (mm)	0.133 (30.052s)	0.133 (30.253s)	0.134 (30.453s)	0.134 (30.653s)	0.134 (30.852s)	0.134
Minimum axial #1 (mm)	-0.030 (30.152s)	-0.027 (30.353s)	-0.025 (30.552s)	-0.026 (30.752s)	-0.025 (30.952s)	-0.027
Maximum axial #2 (mm)	0.122 (30.052s)	0.123 (30.251s)	0.123 (30.452s)	0.123 (30.652s)	0.124 (30.853s)	0.123
Minimum axial #2 (mm)	-0.021 (30.151s)	-0.021 (30.353s)	-0.020 (30.552s)	-0.021 (30.751s)	-0.021 (30.952s)	-0.021

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#24

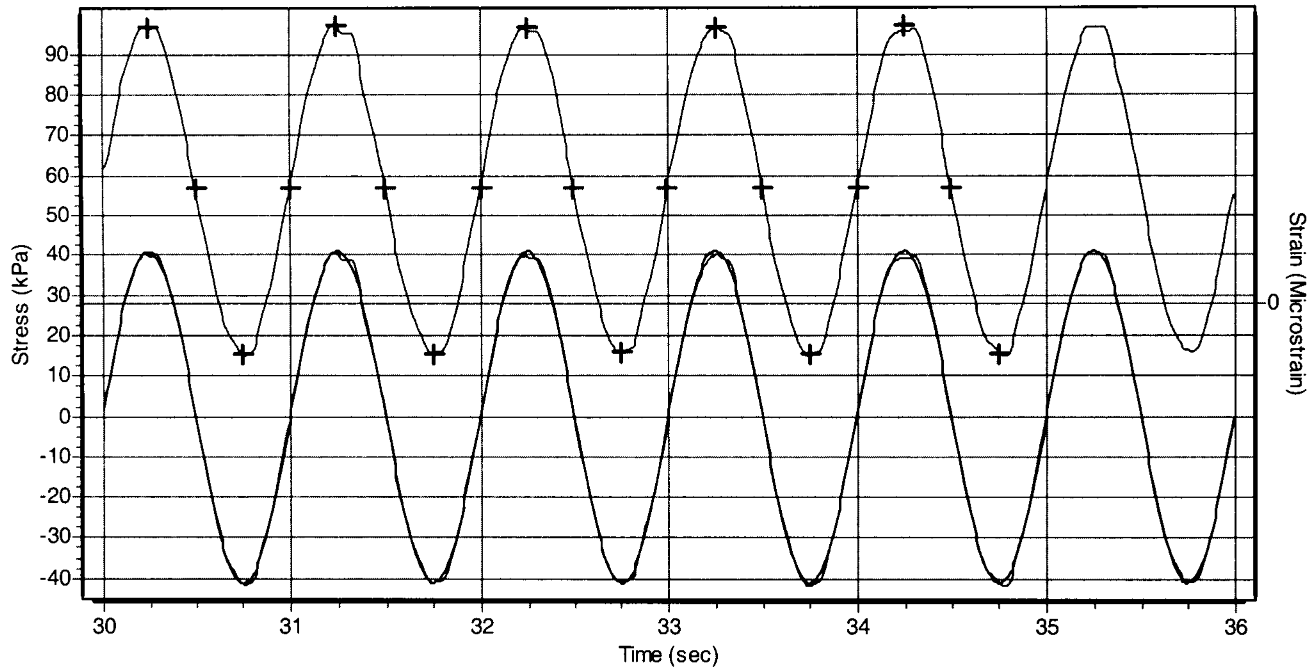
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 98 'C
Final Temp: 73 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#25.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:21 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.4	80.7	81.3	81.4	81.2
Recoverable axial micro-strain	1816.1	1807.4	1793.9	1806.5	1807.5	1806.3
Permanent axial micro-strain	753	780	816	829	855	
Dynamic modulus (MPa)	44.7	45.0	45.0	45.0	45.0	44.9
Phase angle (Deg)	10.22	10.00	9.00	10.14	9.35	9.74
Dyn.Modulus/sine(phase angle)	501.9	516.5	573.1	509.2	552.3	530.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.639	0.634	0.638	0.639	0.638
Maximum load (kN)	0.760 (30.246s)	0.762 (31.243s)	0.759 (32.245s)	0.759 (33.248s)	0.762 (34.247s)	0.761
Minimum load (kN)	0.123 (30.742s)	0.123 (31.743s)	0.126 (32.743s)	0.121 (33.744s)	0.122 (34.745s)	0.123
Maximum averaged axial (mm)	0.260 (30.274s)	0.261 (31.271s)	0.264 (32.270s)	0.266 (33.276s)	0.269 (34.273s)	0.264
Minimum averaged axial (mm)	0.076 (30.767s)	0.079 (31.771s)	0.082 (32.769s)	0.084 (33.770s)	0.086 (34.768s)	0.081
Maximum axial #1 (mm)	0.282 (30.273s)	0.284 (31.270s)	0.287 (32.270s)	0.290 (33.275s)	0.292 (34.271s)	0.287
Minimum axial #1 (mm)	0.094 (30.767s)	0.096 (31.772s)	0.101 (32.770s)	0.102 (33.770s)	0.105 (34.768s)	0.100
Maximum axial #2 (mm)	0.237 (30.275s)	0.238 (31.271s)	0.240 (32.270s)	0.243 (33.276s)	0.246 (34.274s)	0.241
Minimum axial #2 (mm)	0.058 (30.767s)	0.061 (31.769s)	0.064 (32.769s)	0.065 (33.768s)	0.068 (34.769s)	0.063

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#25

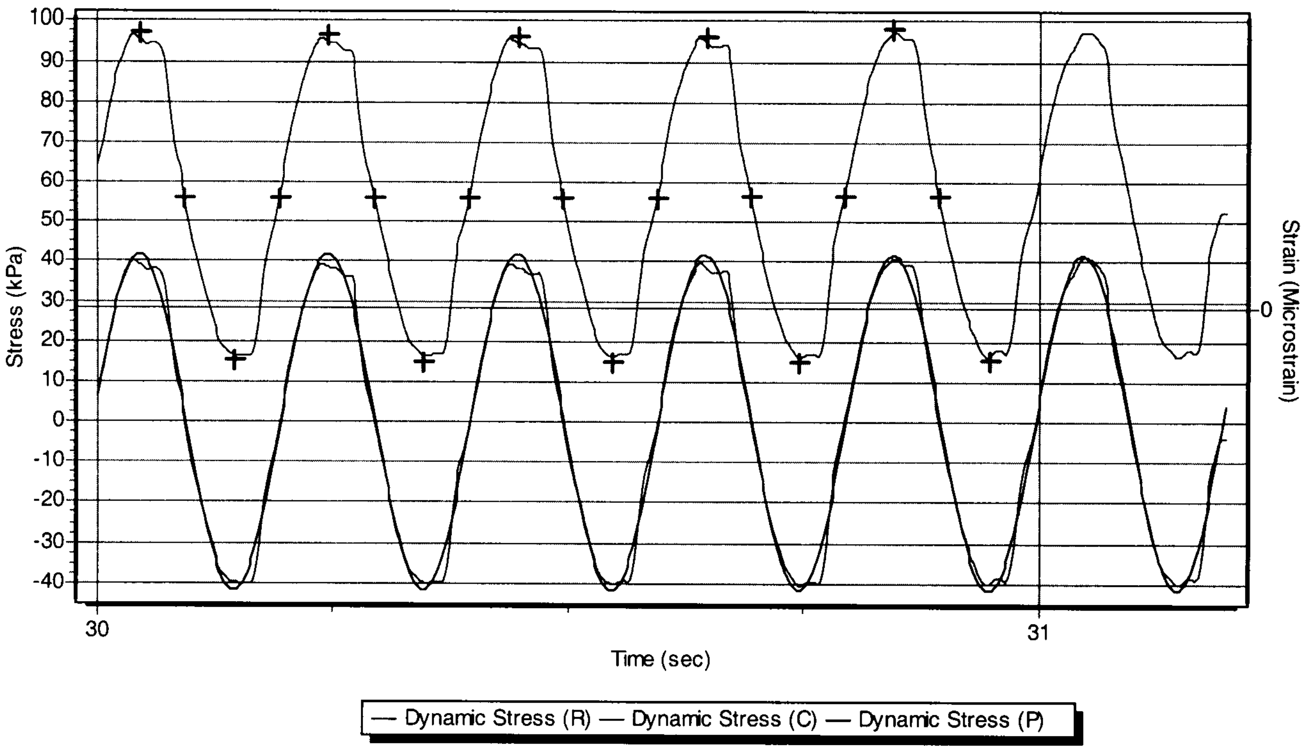
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#25.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:21 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.6	81.9	81.5	81.7	82.7	81.9
Recoverable axial micro-strain	1585.5	1575.9	1574.0	1573.6	1575.3	1576.9
Permanent axial micro-strain	86	79	71	64	61	
Dynamic modulus (MPa)	51.5	51.9	51.8	51.9	52.5	51.9
Phase angle (Deg)	6.26	6.17	6.26	7.36	9.41	7.09
Dyn.Modulus/sine(phase angle)	942.2	965.0	947.7	809.6	639.7	860.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.643	0.640	0.642	0.649	0.643
Maximum load (kN)	0.762 (30.047s)	0.758 (30.246s)	0.756 (30.448s)	0.757 (30.647s)	0.771 (30.845s)	0.761
Minimum load (kN)	0.121 (30.147s)	0.115 (30.346s)	0.116 (30.545s)	0.116 (30.746s)	0.122 (30.945s)	0.118
Maximum averaged axial (mm)	0.151 (30.050s)	0.151 (30.250s)	0.152 (30.451s)	0.152 (30.651s)	0.153 (30.850s)	0.152
Minimum averaged axial (mm)	-0.009 (30.151s)	-0.008 (30.351s)	-0.007 (30.550s)	-0.006 (30.751s)	-0.006 (30.951s)	-0.007
Maximum axial #1 (mm)	0.158 (30.050s)	0.158 (30.250s)	0.159 (30.451s)	0.160 (30.651s)	0.160 (30.850s)	0.159
Minimum axial #1 (mm)	-0.007 (30.151s)	-0.005 (30.351s)	-0.005 (30.550s)	-0.004 (30.751s)	-0.004 (30.951s)	-0.005
Maximum axial #2 (mm)	0.145 (30.050s)	0.144 (30.250s)	0.145 (30.451s)	0.145 (30.651s)	0.146 (30.849s)	0.145
Minimum axial #2 (mm)	-0.011 (30.151s)	-0.010 (30.350s)	-0.009 (30.550s)	-0.009 (30.751s)	-0.008 (30.951s)	-0.009

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#25

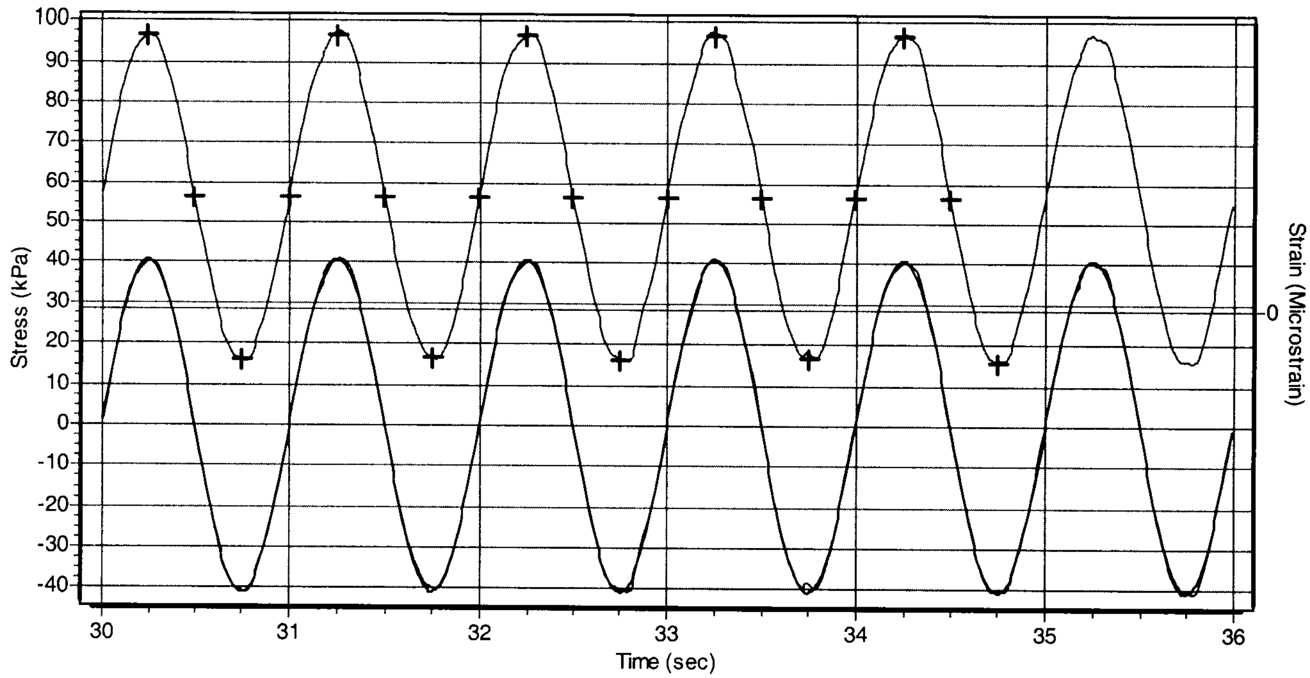
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 96 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#26.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.4	80.2	80.6	80.1	81.0	80.5
Recoverable axial micro-strain	1772.7	1772.6	1767.4	1768.0	1777.6	1771.6
Permanent axial micro-strain	740	771	799	823	835	
Dynamic modulus (MPa)	45.3	45.3	45.6	45.3	45.6	45.4
Phase angle (Deg)	12.93	12.75	12.28	13.90	12.16	12.81
Dyn.Modulus/sine(phase angle)	402.5	407.7	426.0	374.6	430.5	408.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.631	0.630	0.633	0.629	0.637	0.632
Maximum load (kN)	0.758 (30.246s)	0.761 (31.247s)	0.761 (32.244s)	0.760 (33.245s)	0.762 (34.246s)	0.760
Minimum load (kN)	0.127 (30.744s)	0.131 (31.748s)	0.128 (32.745s)	0.131 (33.745s)	0.125 (34.743s)	0.128
Maximum averaged axial (mm)	0.251 (30.282s)	0.254 (31.283s)	0.257 (32.278s)	0.259 (33.284s)	0.261 (34.279s)	0.257
Minimum averaged axial (mm)	0.074 (30.774s)	0.077 (31.778s)	0.080 (32.775s)	0.082 (33.776s)	0.084 (34.774s)	0.079
Maximum axial #1 (mm)	0.266 (30.282s)	0.270 (31.283s)	0.272 (32.278s)	0.274 (33.284s)	0.277 (34.280s)	0.272
Minimum axial #1 (mm)	0.080 (30.775s)	0.083 (31.778s)	0.086 (32.775s)	0.089 (33.776s)	0.090 (34.774s)	0.086
Maximum axial #2 (mm)	0.236 (30.283s)	0.239 (31.283s)	0.242 (32.278s)	0.244 (33.285s)	0.246 (34.279s)	0.241
Minimum axial #2 (mm)	0.068 (30.774s)	0.071 (31.778s)	0.073 (32.775s)	0.076 (33.776s)	0.077 (34.773s)	0.073

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#26

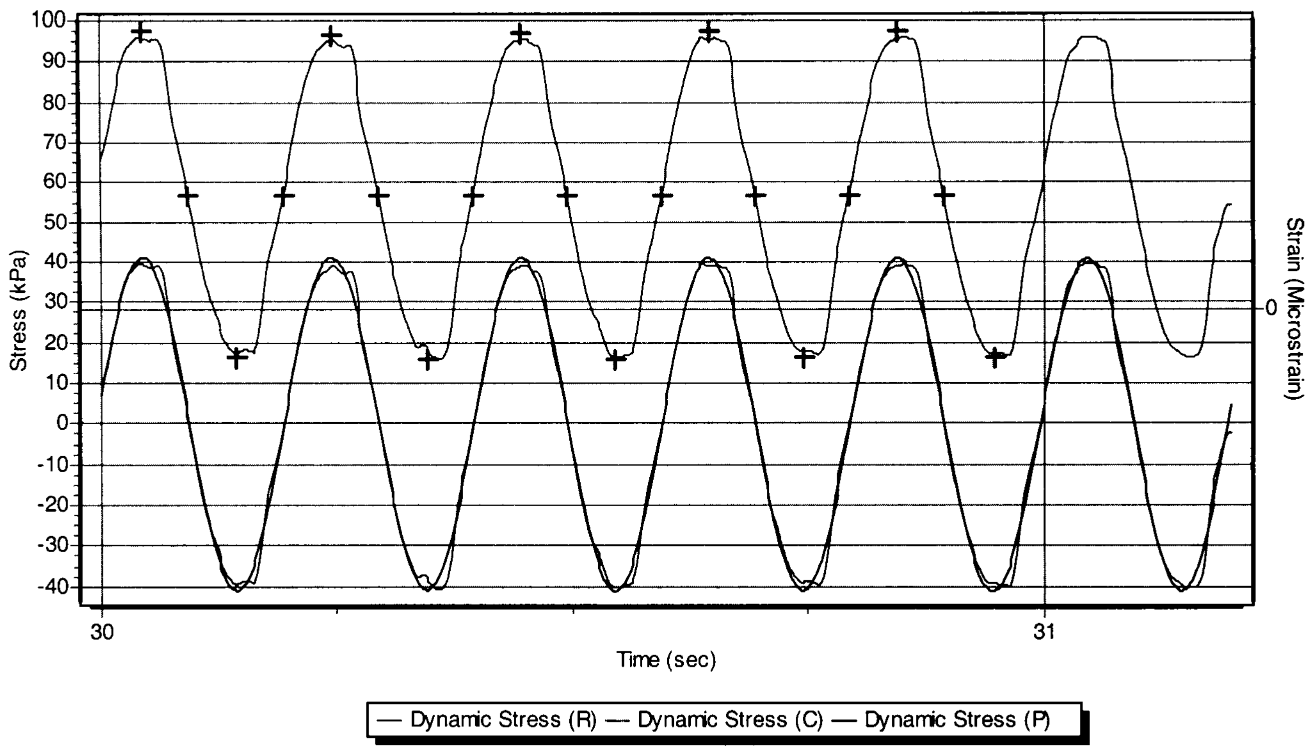
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 97 'C
Final Temp: 77 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2b_#26.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.1	80.6	81.0	80.7	81.2	80.9
Recoverable axial micro-strain	1487.6	1507.0	1497.0	1487.3	1499.1	1495.6
Permanent axial micro-strain	43	25	36	51	52	
Dynamic modulus (MPa)	54.5	53.5	54.1	54.3	54.2	54.1
Phase angle (Deg)	8.56	11.27	10.70	9.32	11.16	10.20
Dyn.Modulus/sine(phase angle)	730.6	544.5	580.7	668.3	556.8	616.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.633	0.636	0.634	0.638	0.636
Maximum load (kN)	0.766 (30.045s)	0.759 (30.245s)	0.761 (30.445s)	0.765 (30.645s)	0.766 (30.845s)	0.763
Minimum load (kN)	0.129 (30.144s)	0.126 (30.346s)	0.125 (30.545s)	0.130 (30.746s)	0.128 (30.946s)	0.128
Maximum averaged axial (mm)	0.153 (30.049s)	0.153 (30.251s)	0.153 (30.451s)	0.154 (30.650s)	0.155 (30.851s)	0.154
Minimum averaged axial (mm)	0.004 (30.152s)	0.002 (30.352s)	0.004 (30.551s)	0.005 (30.752s)	0.005 (30.951s)	0.004
Maximum axial #1 (mm)	0.156 (30.049s)	0.155 (30.251s)	0.156 (30.450s)	0.156 (30.650s)	0.158 (30.851s)	0.156
Minimum axial #1 (mm)	0.001 (30.152s)	0.000 (30.351s)	-0.001 (30.551s)	0.002 (30.751s)	0.002 (30.951s)	0.001
Maximum axial #2 (mm)	0.150 (30.050s)	0.151 (30.252s)	0.151 (30.450s)	0.151 (30.650s)	0.152 (30.851s)	0.151
Minimum axial #2 (mm)	0.008 (30.151s)	0.006 (30.352s)	0.008 (30.551s)	0.008 (30.752s)	0.009 (30.951s)	0.008

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#26

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 97 'C
Final Temp: 91 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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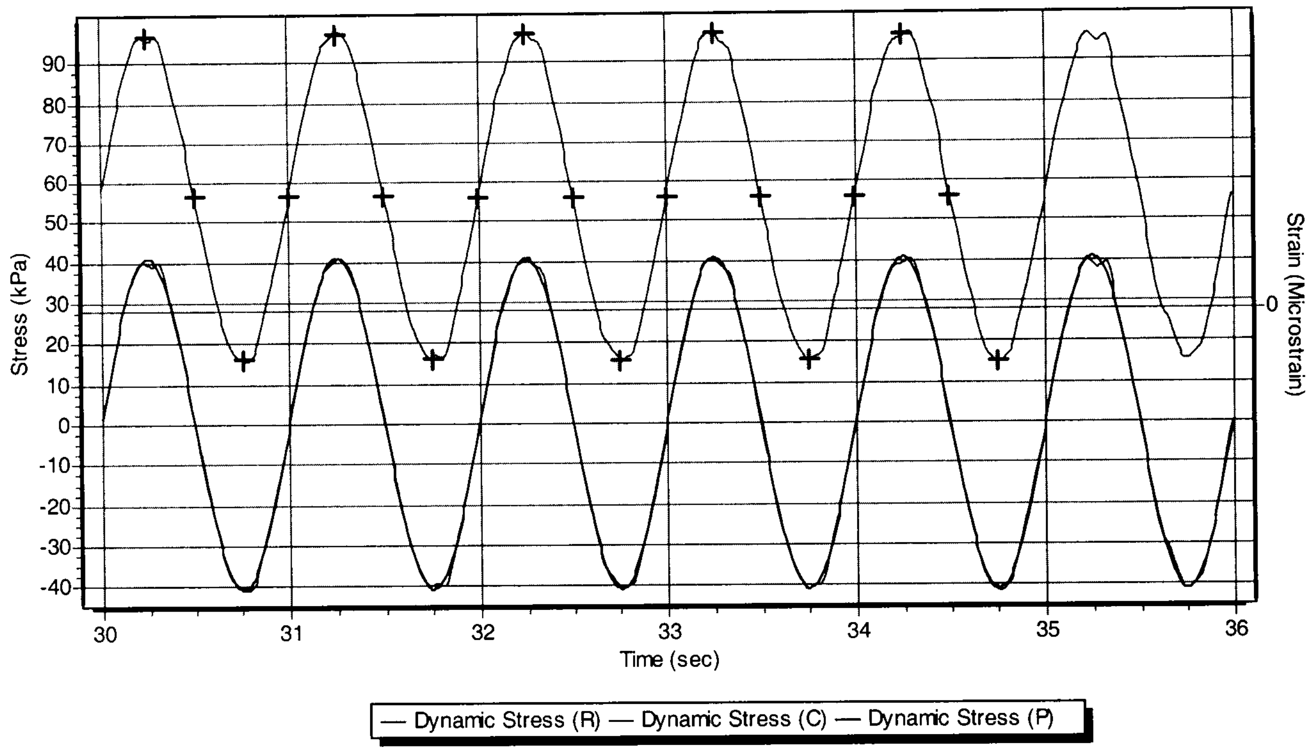

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 3:33 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.6	81.2	81.0	81.1	81.1	81.0
Recoverable axial micro-strain	1861.6	1856.2	1873.6	1868.7	1880.7	1868.2
Permanent axial micro-strain	645	673	685	704	714	
Dynamic modulus (MPa)	43.3	43.7	43.2	43.4	43.1	43.4
Phase angle (Deg)	15.01	14.25	15.38	14.05	14.54	14.65
Dyn.Modulus/sine(phase angle)	331.7	352.5	323.0	354.6	340.7	340.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.633	0.638	0.636	0.637	0.637	0.636
Maximum load (kN)	0.759 (30.246s)	0.763 (31.247s)	0.761 (32.246s)	0.761 (33.246s)	0.759 (34.248s)	0.761
Minimum load (kN)	0.126 (30.747s)	0.126 (31.746s)	0.125 (32.744s)	0.124 (33.745s)	0.122 (34.744s)	0.125
Maximum averaged axial (mm)	0.251 (30.288s)	0.253 (31.286s)	0.256 (32.288s)	0.257 (33.285s)	0.259 (34.288s)	0.255
Minimum averaged axial (mm)	0.064 (30.781s)	0.067 (31.782s)	0.068 (32.779s)	0.070 (33.781s)	0.071 (34.778s)	0.068
Maximum axial #1 (mm)	0.247 (30.289s)	0.249 (31.288s)	0.252 (32.291s)	0.253 (33.286s)	0.255 (34.289s)	0.251
Minimum axial #1 (mm)	0.063 (30.782s)	0.065 (31.783s)	0.067 (32.780s)	0.068 (33.782s)	0.070 (34.780s)	0.067
Maximum axial #2 (mm)	0.255 (30.287s)	0.257 (31.285s)	0.260 (32.286s)	0.262 (33.284s)	0.264 (34.288s)	0.260
Minimum axial #2 (mm)	0.066 (30.781s)	0.069 (31.782s)	0.071 (32.779s)	0.072 (33.780s)	0.073 (34.776s)	0.070

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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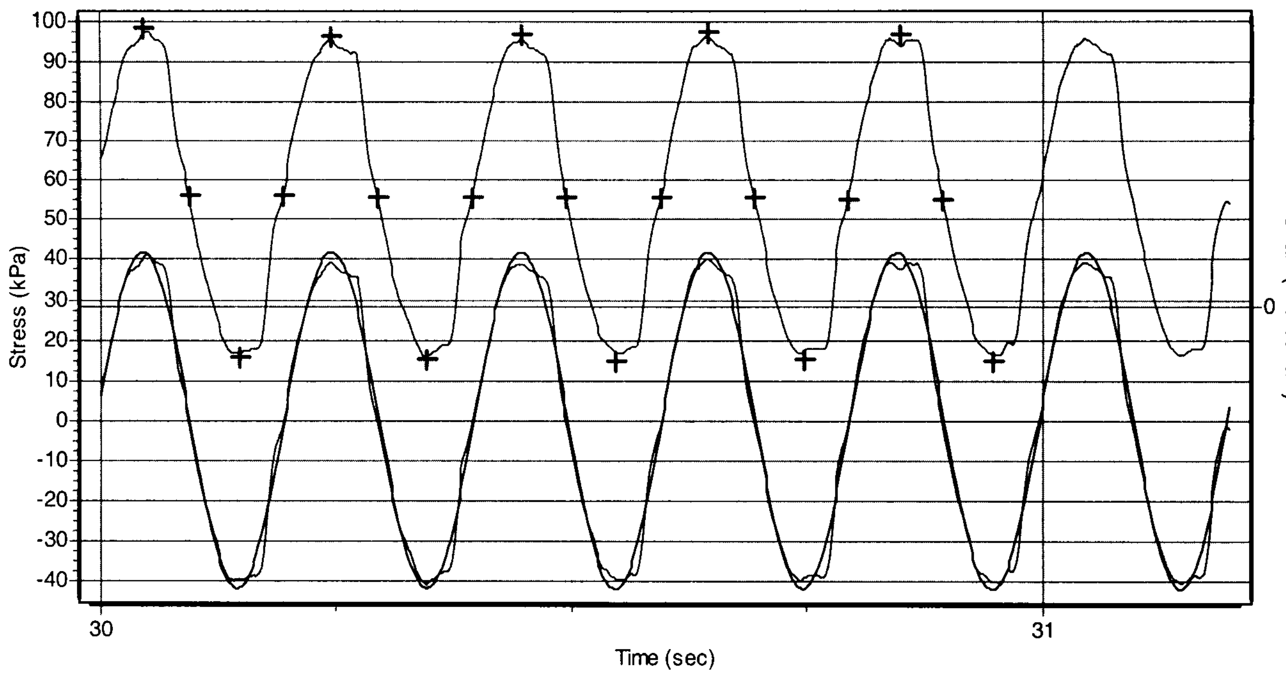

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 3:33 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.8	80.7	81.6	81.7	82.1	81.8
Recoverable axial micro-strain	1558.5	1585.5	1544.2	1544.0	1538.1	1554.1
Permanent axial micro-strain	216	249	204	201	184	
Dynamic modulus (MPa)	53.1	50.9	52.9	52.9	53.4	52.6
Phase angle (Deg)	15.67	15.93	13.79	11.57	9.61	13.31
Dyn.Modulus/sine(phase angle)	389.5	367.4	440.4	525.0	637.0	471.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.650	0.634	0.641	0.642	0.644	0.642
Maximum load (kN)	0.773 (30.046s)	0.756 (30.246s)	0.759 (30.447s)	0.764 (30.647s)	0.761 (30.848s)	0.763
Minimum load (kN)	0.123 (30.147s)	0.122 (30.346s)	0.118 (30.546s)	0.122 (30.747s)	0.116 (30.946s)	0.120
Maximum averaged axial (mm)	0.134 (30.055s)	0.134 (30.255s)	0.134 (30.454s)	0.134 (30.653s)	0.135 (30.854s)	0.134
Minimum averaged axial (mm)	-0.022 (30.153s)	-0.025 (30.353s)	-0.020 (30.553s)	-0.020 (30.753s)	-0.018 (30.952s)	-0.021
Maximum axial #1 (mm)	0.134 (30.055s)	0.132 (30.256s)	0.133 (30.454s)	0.134 (30.654s)	0.135 (30.854s)	0.134
Minimum axial #1 (mm)	-0.022 (30.153s)	-0.021 (30.353s)	-0.021 (30.553s)	-0.021 (30.754s)	-0.019 (30.953s)	-0.021
Maximum axial #2 (mm)	0.135 (30.054s)	0.134 (30.252s)	0.135 (30.454s)	0.135 (30.652s)	0.136 (30.853s)	0.135
Minimum axial #2 (mm)	-0.021 (30.153s)	-0.025 (30.352s)	-0.020 (30.553s)	-0.019 (30.752s)	-0.023 (30.952s)	-0.022

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 100'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Core/Sample Number: P2_#27

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 98 'C
Final Temp: 93 'C

Phase II Samples run at 60°C at 1 and 5 Hz

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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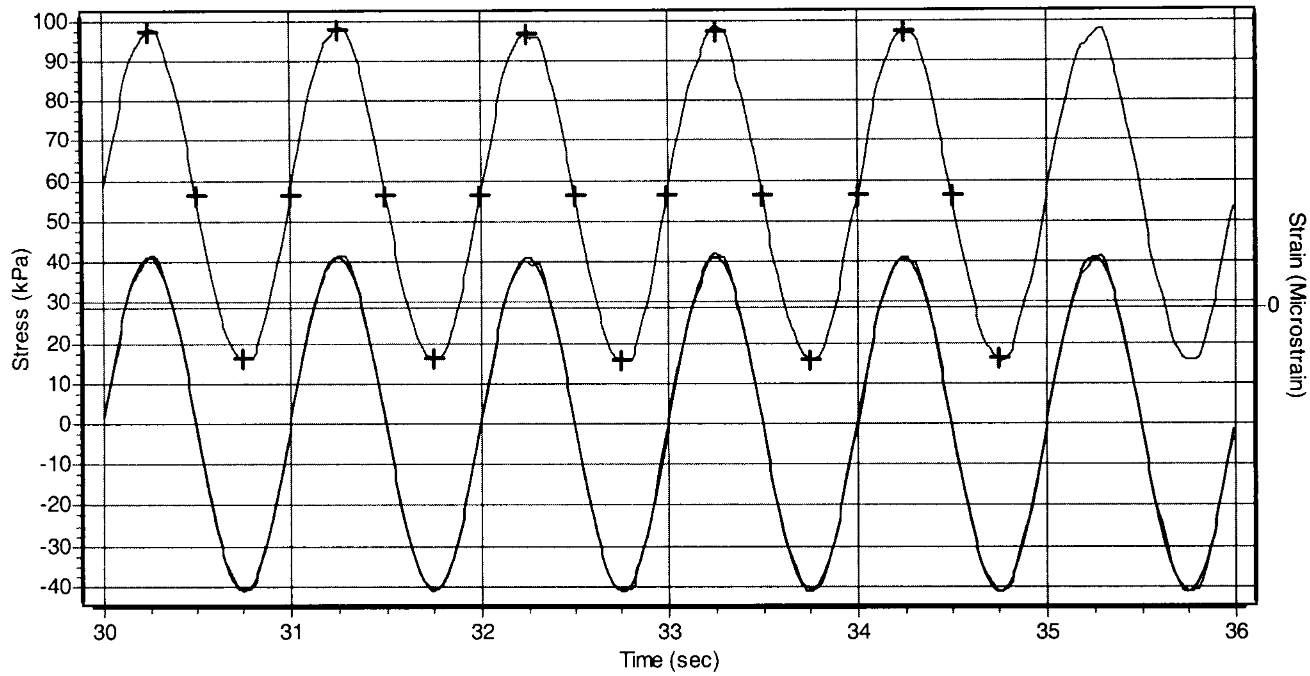

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:08 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.3	81.7	81.4	81.3	81.2	81.4
Recoverable axial micro-strain	1726.2	1722.0	1718.6	1713.4	1712.9	1718.6
Permanent axial micro-strain	472	495	506	534	556	
Dynamic modulus (MPa)	47.1	47.4	47.4	47.5	47.4	47.4
Phase angle (Deg)	8.55	8.90	8.46	9.27	8.98	8.83
Dyn.Modulus/sine(phase angle)	632.0	611.5	642.3	587.2	605.6	615.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.641	0.640	0.639	0.638	0.639
Maximum load (kN)	0.765 (30.248s)	0.768 (31.246s)	0.762 (32.246s)	0.764 (33.245s)	0.765 (34.245s)	0.765
Minimum load (kN)	0.126 (30.744s)	0.127 (31.745s)	0.122 (32.744s)	0.126 (33.749s)	0.127 (34.746s)	0.126
Maximum averaged axial (mm)	0.229 (30.272s)	0.231 (31.271s)	0.231 (32.269s)	0.234 (33.270s)	0.236 (34.270s)	0.232
Minimum averaged axial (mm)	0.049 (30.772s)	0.051 (31.772s)	0.053 (32.770s)	0.056 (33.775s)	0.058 (34.772s)	0.053
Maximum axial #1 (mm)	0.227 (30.272s)	0.229 (31.273s)	0.230 (32.269s)	0.233 (33.271s)	0.234 (34.270s)	0.231
Minimum axial #1 (mm)	0.053 (30.773s)	0.055 (31.772s)	0.057 (32.772s)	0.060 (33.775s)	0.062 (34.772s)	0.057
Maximum axial #2 (mm)	0.230 (30.271s)	0.232 (31.270s)	0.233 (32.269s)	0.235 (33.270s)	0.238 (34.269s)	0.234
Minimum axial #2 (mm)	0.045 (30.772s)	0.048 (31.772s)	0.049 (32.770s)	0.051 (33.775s)	0.054 (34.772s)	0.049

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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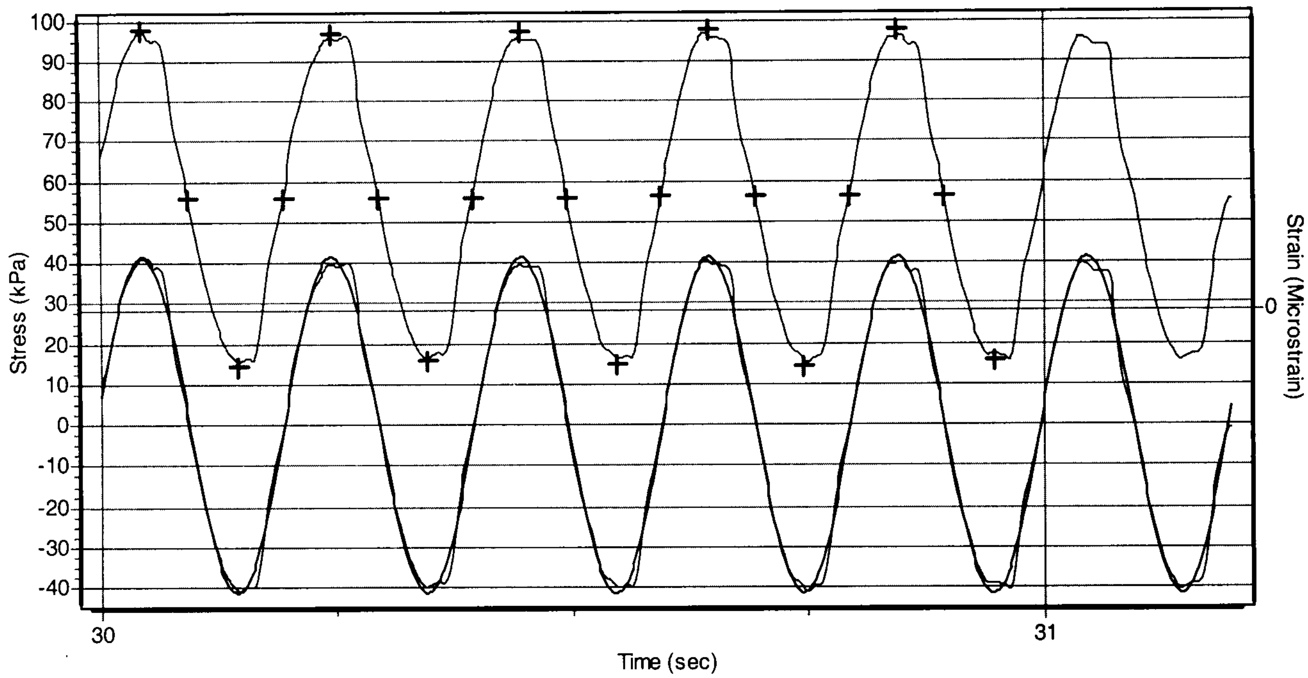

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:08 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.3	81.2	82.1	83.2	81.6	82.3
Recoverable axial micro-strain	1434.0	1427.2	1435.6	1454.5	1435.8	1437.4
Permanent axial micro-strain	412	398	406	418	401	
Dynamic modulus (MPa)	58.1	56.9	57.2	57.2	56.9	57.2
Phase angle (Deg)	7.87	7.46	9.64	7.57	8.78	8.27
Dyn.Modulus/sine(phase angle)	846.2	874.0	680.9	866.2	742.4	801.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.654	0.637	0.645	0.654	0.641	0.646
Maximum load (kN)	0.769 (30.045s)	0.760 (30.246s)	0.763 (30.445s)	0.768 (30.645s)	0.767 (30.845s)	0.766
Minimum load (kN)	0.115 (30.145s)	0.123 (30.345s)	0.118 (30.545s)	0.115 (30.745s)	0.126 (30.946s)	0.119
Maximum averaged axial (mm)	0.106 (30.049s)	0.107 (30.251s)	0.107 (30.451s)	0.108 (30.649s)	0.108 (30.850s)	0.107
Minimum averaged axial (mm)	-0.043 (30.152s)	-0.041 (30.351s)	-0.042 (30.551s)	-0.043 (30.752s)	-0.042 (30.951s)	-0.042
Maximum axial #1 (mm)	0.104 (30.049s)	0.105 (30.251s)	0.105 (30.451s)	0.106 (30.649s)	0.106 (30.850s)	0.105
Minimum axial #1 (mm)	-0.038 (30.152s)	-0.037 (30.351s)	-0.038 (30.551s)	-0.041 (30.751s)	-0.037 (30.952s)	-0.038
Maximum axial #2 (mm)	0.108 (30.049s)	0.109 (30.250s)	0.109 (30.450s)	0.109 (30.650s)	0.109 (30.849s)	0.109
Minimum axial #2 (mm)	-0.047 (30.152s)	-0.046 (30.351s)	-0.046 (30.551s)	-0.047 (30.751s)	-0.046 (30.951s)	-0.046

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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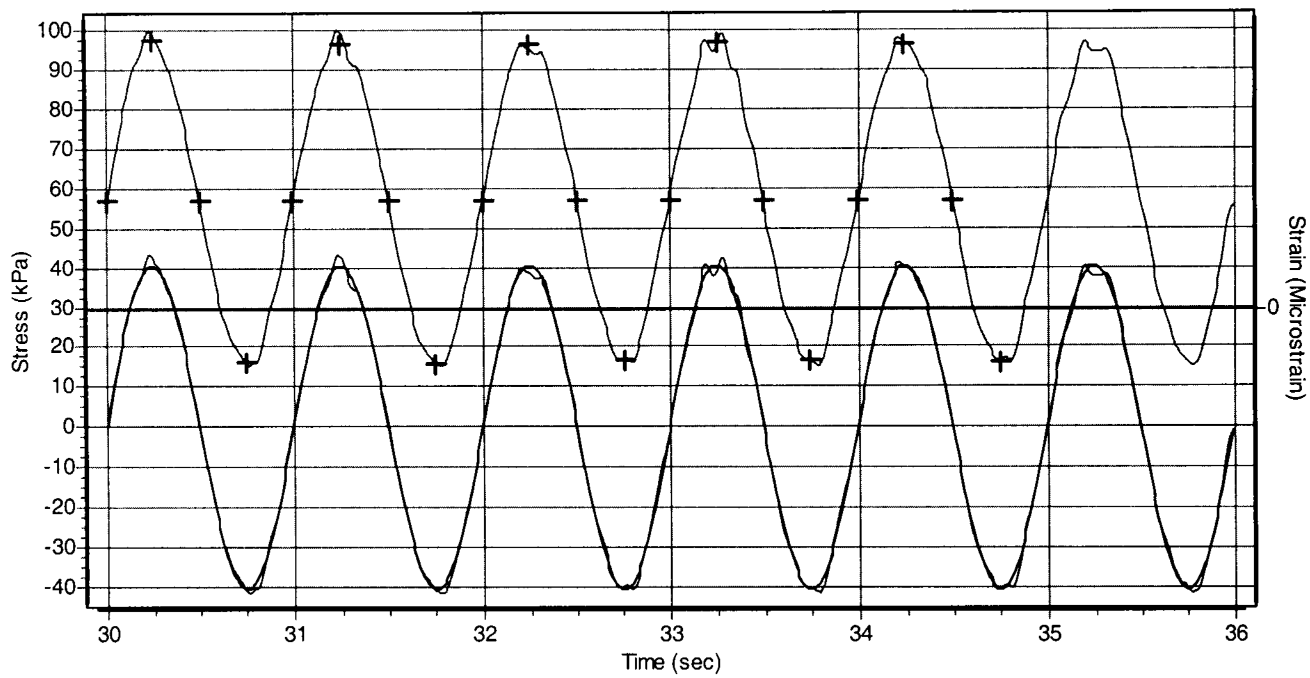

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	80.9	79.6	80.6	80.4	80.6
Recoverable axial micro-strain	1737.1	1742.0	1706.2	1716.1	1695.1	1719.3
Permanent axial micro-strain	275	289	333	347	373	
Dynamic modulus (MPa)	46.9	46.4	46.7	46.9	47.4	46.9
Phase angle (Deg)	7.76	8.78	7.34	7.25	7.81	7.79
Dyn.Modulus/sine(phase angle)	693.3	606.2	729.0	742.1	695.9	693.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.635	0.625	0.633	0.631	0.633
Maximum load (kN)	0.766 (30.242s)	0.759 (31.242s)	0.757 (32.244s)	0.763 (33.246s)	0.759 (34.241s)	0.761
Minimum load (kN)	0.126 (30.745s)	0.124 (31.747s)	0.131 (32.747s)	0.130 (33.743s)	0.128 (34.744s)	0.128
Maximum averaged axial (mm)	0.211 (30.264s)	0.213 (31.267s)	0.214 (32.264s)	0.217 (33.266s)	0.217 (34.263s)	0.215
Minimum averaged axial (mm)	0.029 (30.768s)	0.030 (31.767s)	0.035 (32.768s)	0.036 (33.767s)	0.039 (34.767s)	0.034
Maximum axial #1 (mm)	0.209 (30.264s)	0.211 (31.269s)	0.212 (32.265s)	0.214 (33.267s)	0.215 (34.264s)	0.212
Minimum axial #1 (mm)	0.029 (30.768s)	0.031 (31.767s)	0.035 (32.769s)	0.036 (33.767s)	0.039 (34.768s)	0.034
Maximum axial #2 (mm)	0.214 (30.264s)	0.216 (31.265s)	0.217 (32.264s)	0.219 (33.265s)	0.220 (34.261s)	0.217
Minimum axial #2 (mm)	0.029 (30.767s)	0.030 (31.767s)	0.035 (32.768s)	0.036 (33.767s)	0.039 (34.767s)	0.034

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 60 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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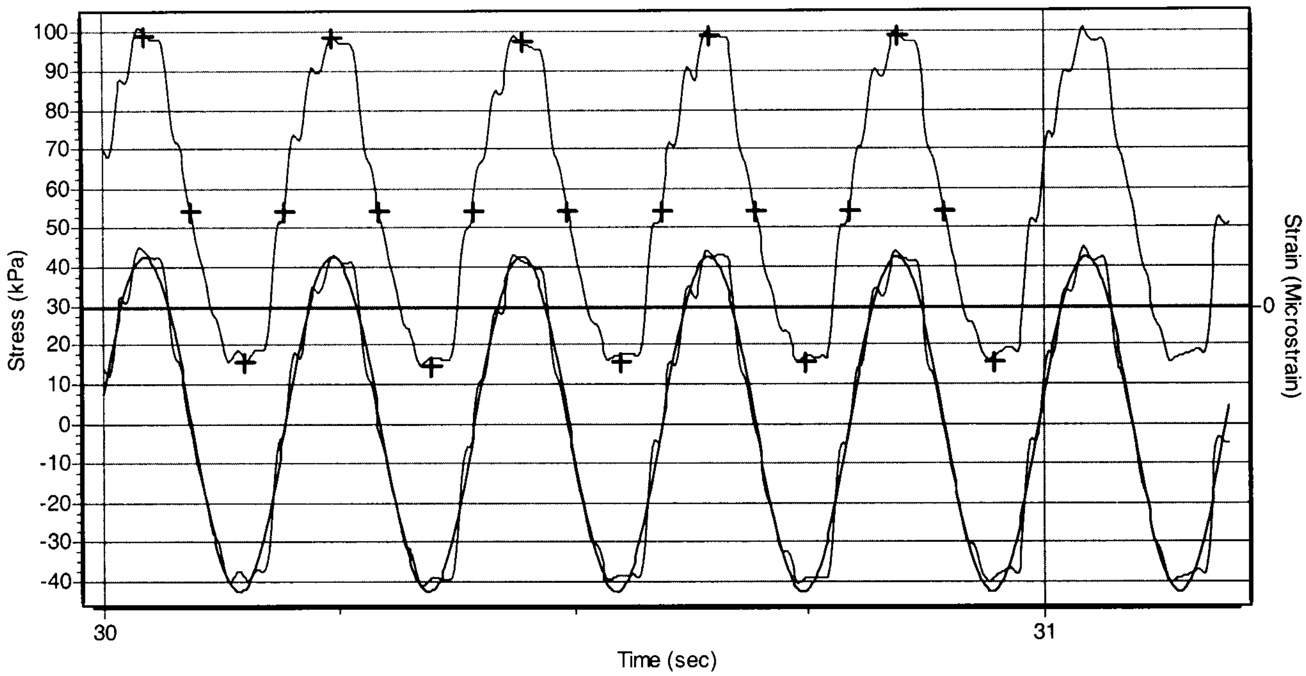

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:13 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.6	84.0	82.1	83.9	83.2	83.4
Recoverable axial micro-strain	1619.2	1588.8	1577.1	1583.0	1572.0	1588.0
Permanent axial micro-strain	520	500	481	477	470	
Dynamic modulus (MPa)	51.6	52.9	52.1	53.0	52.9	52.5
Phase angle (Deg)	7.33	9.59	5.30	9.84	5.65	7.54
Dyn.Modulus/sine(phase angle)	807.3	632.8	1125.8	618.2	1073.9	851.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.656	0.660	0.645	0.659	0.654	0.655
Maximum load (kN)	0.778 (30.044s)	0.775 (30.245s)	0.767 (30.445s)	0.779 (30.645s)	0.778 (30.845s)	0.775
Minimum load (kN)	0.121 (30.151s)	0.115 (30.348s)	0.122 (30.550s)	0.120 (30.749s)	0.124 (30.948s)	0.121
Maximum averaged axial (mm)	0.115 (30.048s)	0.114 (30.250s)	0.115 (30.448s)	0.116 (30.651s)	0.116 (30.848s)	0.115
Minimum averaged axial (mm)	-0.055 (30.150s)	-0.052 (30.349s)	-0.051 (30.547s)	-0.050 (30.750s)	-0.049 (30.953s)	-0.051
Maximum axial #1 (mm)	0.114 (30.048s)	0.113 (30.250s)	0.114 (30.450s)	0.114 (30.651s)	0.114 (30.848s)	0.114
Minimum axial #1 (mm)	-0.054 (30.150s)	-0.056 (30.351s)	-0.050 (30.548s)	-0.050 (30.750s)	-0.049 (30.953s)	-0.052
Maximum axial #2 (mm)	0.117 (30.047s)	0.116 (30.250s)	0.117 (30.448s)	0.118 (30.649s)	0.118 (30.848s)	0.117
Minimum axial #2 (mm)	-0.055 (30.150s)	-0.054 (30.352s)	-0.051 (30.547s)	-0.050 (30.750s)	-0.050 (30.946s)	-0.052

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 60 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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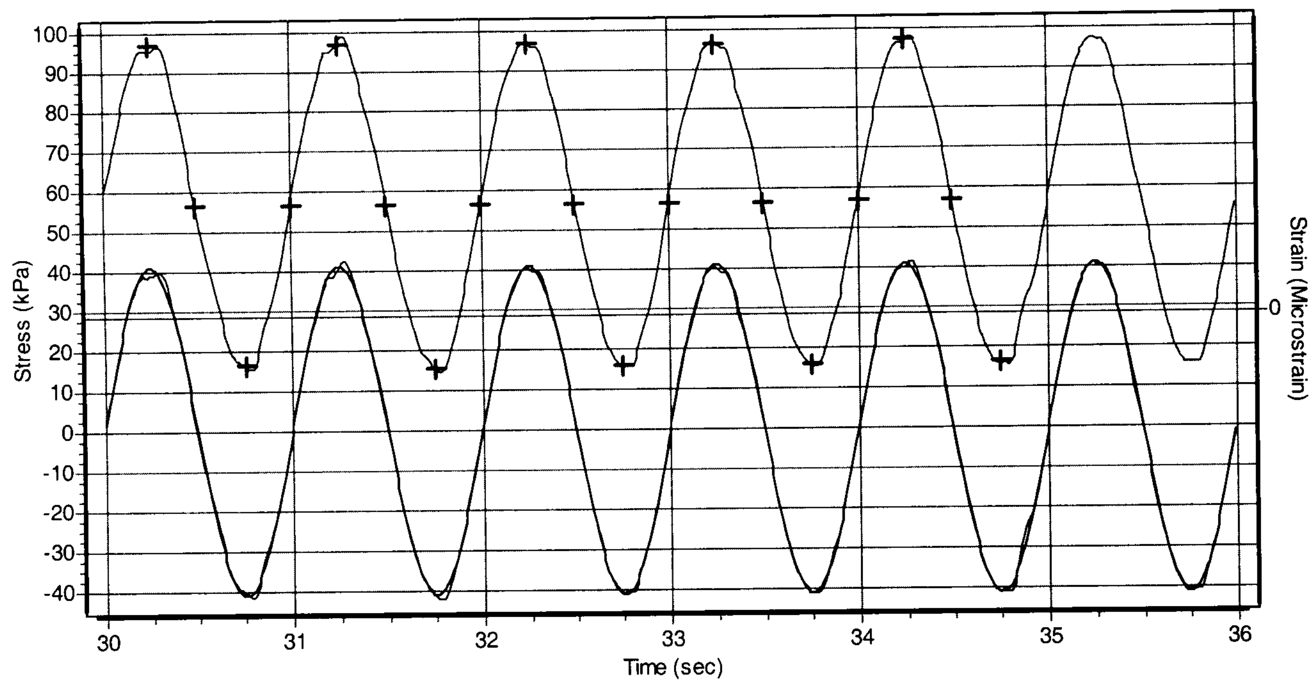

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	81.7	81.0	80.4	80.8	80.9
Recoverable axial micro-strain	1364.1	1363.7	1365.1	1351.2	1348.1	1358.4
Permanent axial micro-strain	147	152	168	179	200	
Dynamic modulus (MPa)	59.0	59.9	59.3	59.5	60.0	59.5
Phase angle (Deg)	6.56	7.75	8.01	8.81	6.36	7.50
Dyn.Modulus/sine(phase angle)	1030.7	886.0	848.9	774.5	1081.9	924.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.641	0.636	0.631	0.635	0.635
Maximum load (kN)	0.760 (30.247s)	0.763 (31.247s)	0.761 (32.243s)	0.757 (33.243s)	0.763 (34.248s)	0.761
Minimum load (kN)	0.128 (30.748s)	0.122 (31.747s)	0.125 (32.746s)	0.125 (33.745s)	0.128 (34.742s)	0.126
Maximum averaged axial (mm)	0.160 (30.265s)	0.161 (31.269s)	0.163 (32.266s)	0.162 (33.267s)	0.164 (34.266s)	0.162
Minimum averaged axial (mm)	0.016 (30.767s)	0.016 (31.766s)	0.018 (32.768s)	0.019 (33.767s)	0.021 (34.767s)	0.018
Maximum axial #1 (mm)	0.155 (30.265s)	0.156 (31.268s)	0.158 (32.268s)	0.157 (33.267s)	0.159 (34.266s)	0.157
Minimum axial #1 (mm)	0.014 (30.767s)	0.015 (31.767s)	0.016 (32.768s)	0.018 (33.767s)	0.020 (34.767s)	0.017
Maximum axial #2 (mm)	0.165 (30.266s)	0.166 (31.270s)	0.168 (32.265s)	0.167 (33.267s)	0.169 (34.265s)	0.167
Minimum axial #2 (mm)	0.017 (30.767s)	0.018 (31.766s)	0.019 (32.767s)	0.021 (33.767s)	0.023 (34.768s)	0.019

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 35 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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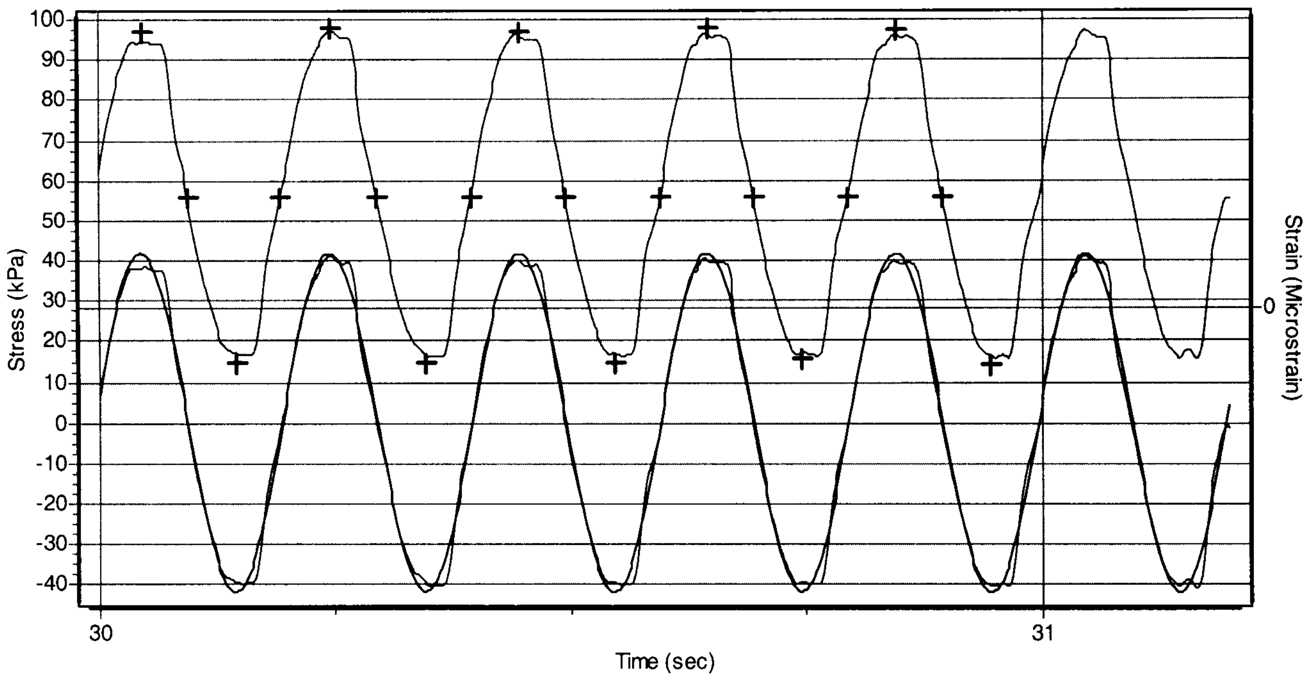

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	83.3	82.3	82.1	83.4	82.6
Recoverable axial micro-strain	1211.2	1222.6	1216.6	1232.4	1221.3	1220.8
Permanent axial micro-strain	434	439	437	438	437	
Dynamic modulus (MPa)	67.7	68.1	67.6	66.6	68.3	67.7
Phase angle (Deg)	10.12	6.90	7.11	6.27	7.04	7.49
Dyn.Modulus/sine(phase angle)	768.3	1132.9	1090.9	1218.4	1112.1	1064.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.644	0.654	0.646	0.645	0.655	0.649
Maximum load (kN)	0.761 (30.046s)	0.771 (30.245s)	0.764 (30.445s)	0.769 (30.645s)	0.767 (30.845s)	0.766
Minimum load (kN)	0.117 (30.146s)	0.116 (30.346s)	0.118 (30.546s)	0.124 (30.745s)	0.112 (30.945s)	0.117
Maximum averaged axial (mm)	0.082 (30.051s)	0.083 (30.249s)	0.083 (30.449s)	0.084 (30.649s)	0.083 (30.849s)	0.083
Minimum averaged axial (mm)	-0.046 (30.150s)	-0.047 (30.351s)	-0.046 (30.550s)	-0.046 (30.750s)	-0.046 (30.950s)	-0.046
Maximum axial #1 (mm)	0.082 (30.052s)	0.082 (30.249s)	0.082 (30.449s)	0.083 (30.649s)	0.082 (30.850s)	0.082
Minimum axial #1 (mm)	-0.044 (30.150s)	-0.047 (30.350s)	-0.045 (30.550s)	-0.045 (30.750s)	-0.045 (30.950s)	-0.045
Maximum axial #2 (mm)	0.083 (30.050s)	0.084 (30.249s)	0.083 (30.449s)	0.086 (30.648s)	0.084 (30.849s)	0.084
Minimum axial #2 (mm)	-0.048 (30.150s)	-0.048 (30.351s)	-0.048 (30.551s)	-0.048 (30.751s)	-0.048 (30.950s)	-0.048

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 65 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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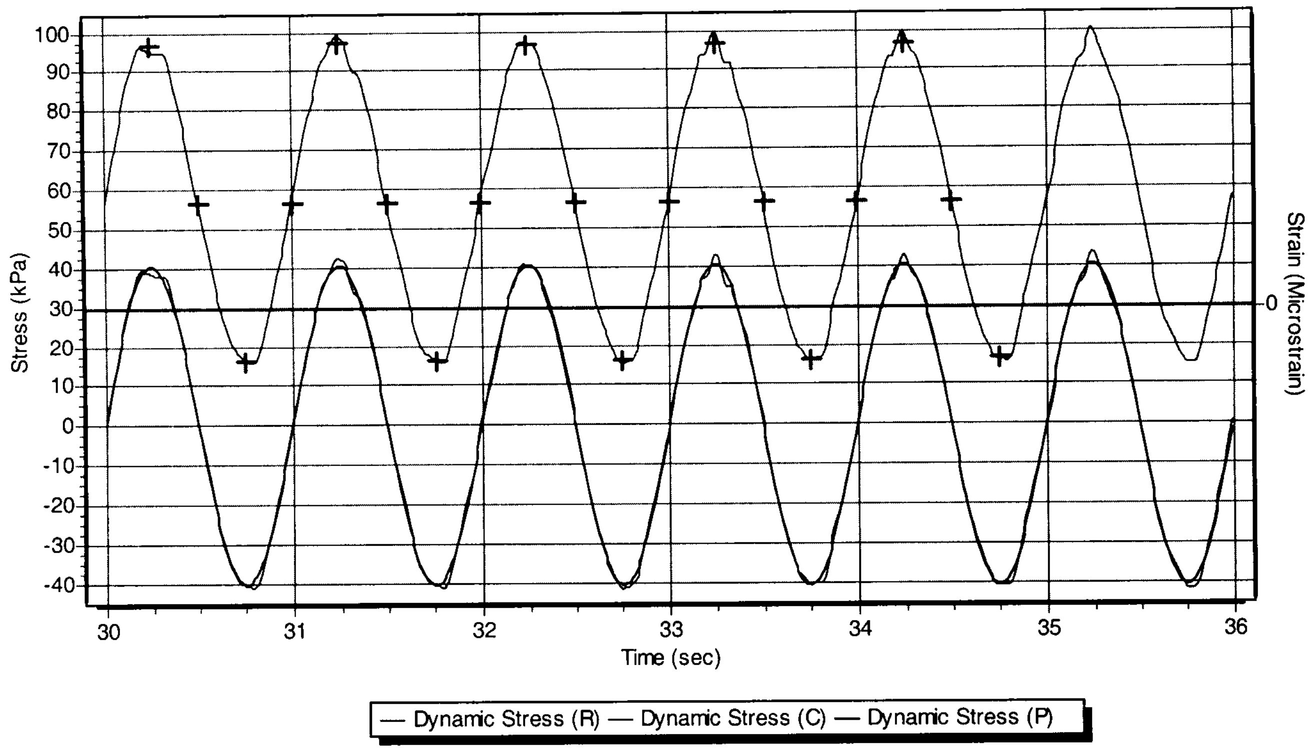

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:24 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	81.2	80.5	80.1	80.1	80.5
Recoverable axial micro-strain	1659.3	1687.1	1688.0	1656.0	1648.7	1667.8
Permanent axial micro-strain	23	38	32	9	23	
Dynamic modulus (MPa)	48.5	48.1	47.7	48.4	48.6	48.3
Phase angle (Deg)	6.39	6.93	7.20	8.02	7.09	7.13
Dyn.Modulus/sine(phase angle)	869.8	795.6	760.1	691.3	785.9	780.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.638	0.632	0.629	0.629	0.632
Maximum load (kN)	0.760 (30.246s)	0.764 (31.245s)	0.758 (32.241s)	0.758 (33.245s)	0.759 (34.244s)	0.760
Minimum load (kN)	0.128 (30.748s)	0.126 (31.747s)	0.126 (32.743s)	0.129 (33.745s)	0.130 (34.747s)	0.128
Maximum averaged axial (mm)	0.170 (30.263s)	0.172 (31.264s)	0.172 (32.261s)	0.173 (33.267s)	0.174 (34.264s)	0.172
Minimum averaged axial (mm)	-0.002 (30.766s)	-0.004 (31.765s)	-0.003 (32.761s)	0.001 (33.765s)	0.002 (34.764s)	-0.001
Maximum axial #1 (mm)	0.173 (30.264s)	0.175 (31.264s)	0.176 (32.261s)	0.177 (33.268s)	0.177 (34.264s)	0.176
Minimum axial #1 (mm)	0.004 (30.766s)	0.002 (31.766s)	0.003 (32.762s)	0.007 (33.766s)	0.009 (34.765s)	0.005
Maximum axial #2 (mm)	0.167 (30.260s)	0.168 (31.264s)	0.169 (32.259s)	0.170 (33.267s)	0.170 (34.263s)	0.169
Minimum axial #2 (mm)	-0.009 (30.764s)	-0.010 (31.764s)	-0.009 (32.761s)	-0.005 (33.764s)	-0.004 (34.764s)	-0.007

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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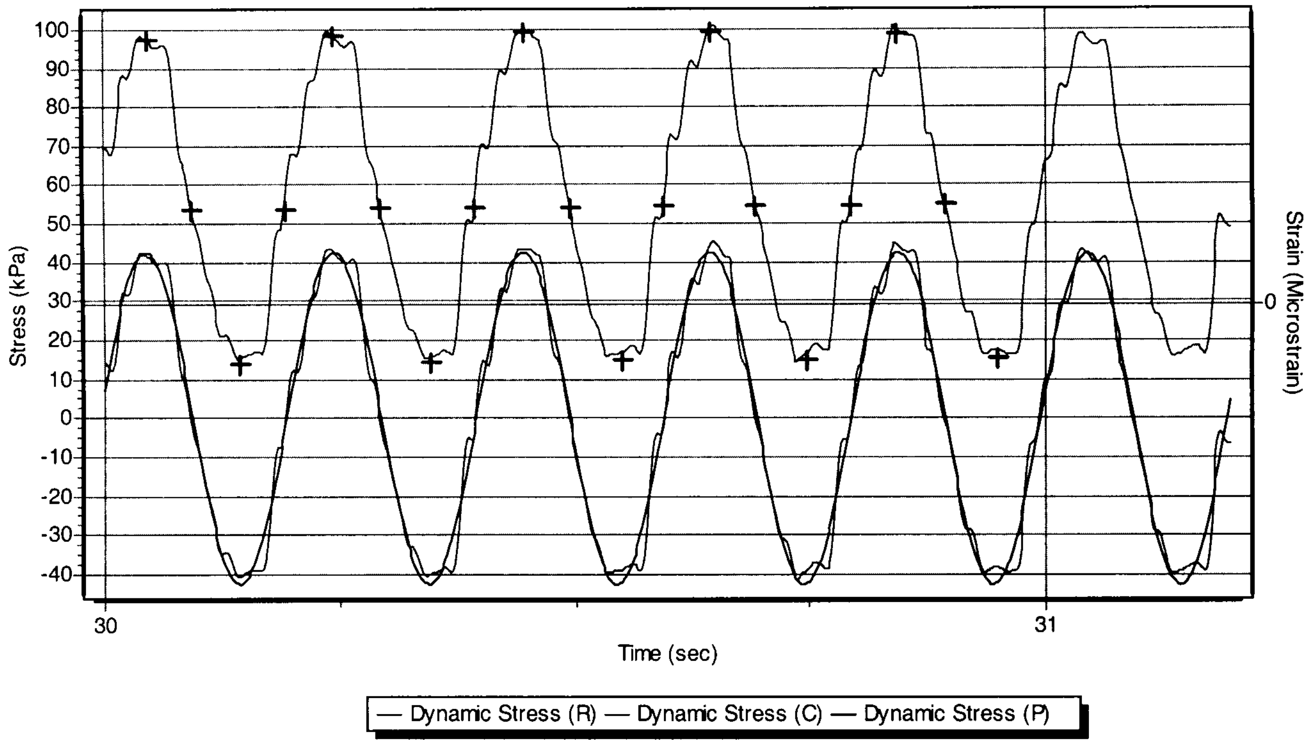


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:24 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.3	83.8	84.5	84.4	83.7	83.9
Recoverable axial micro-strain	1592.4	1575.5	1591.8	1585.6	1570.6	1583.2
Permanent axial micro-strain	721	683	689	681	669	
Dynamic modulus (MPa)	52.3	53.2	53.1	53.3	53.3	53.0
Phase angle (Deg)	5.70	7.77	5.69	5.91	8.88	6.79
Dyn.Modulus/sine(phase angle)	1051.4	785.3	1070.3	1032.6	688.1	925.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.654	0.658	0.664	0.663	0.657	0.659
Maximum load (kN)	0.766 (30.046s)	0.773 (30.245s)	0.781 (30.445s)	0.782 (30.646s)	0.777 (30.844s)	0.776
Minimum load (kN)	0.111 (30.145s)	0.115 (30.346s)	0.117 (30.550s)	0.119 (30.748s)	0.120 (30.950s)	0.116
Maximum averaged axial (mm)	0.091 (30.049s)	0.093 (30.250s)	0.094 (30.449s)	0.094 (30.649s)	0.094 (30.849s)	0.093
Minimum averaged axial (mm)	-0.075 (30.149s)	-0.071 (30.350s)	-0.072 (30.545s)	-0.071 (30.754s)	-0.070 (30.947s)	-0.072
Maximum axial #1 (mm)	0.088 (30.049s)	0.091 (30.250s)	0.092 (30.449s)	0.092 (30.649s)	0.092 (30.849s)	0.091
Minimum axial #1 (mm)	-0.075 (30.149s)	-0.069 (30.350s)	-0.070 (30.544s)	-0.069 (30.754s)	-0.068 (30.947s)	-0.070
Maximum axial #2 (mm)	0.093 (30.049s)	0.095 (30.249s)	0.096 (30.449s)	0.096 (30.649s)	0.096 (30.848s)	0.095
Minimum axial #2 (mm)	-0.073 (30.150s)	-0.073 (30.350s)	-0.073 (30.546s)	-0.072 (30.746s)	-0.071 (30.948s)	-0.072

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#04

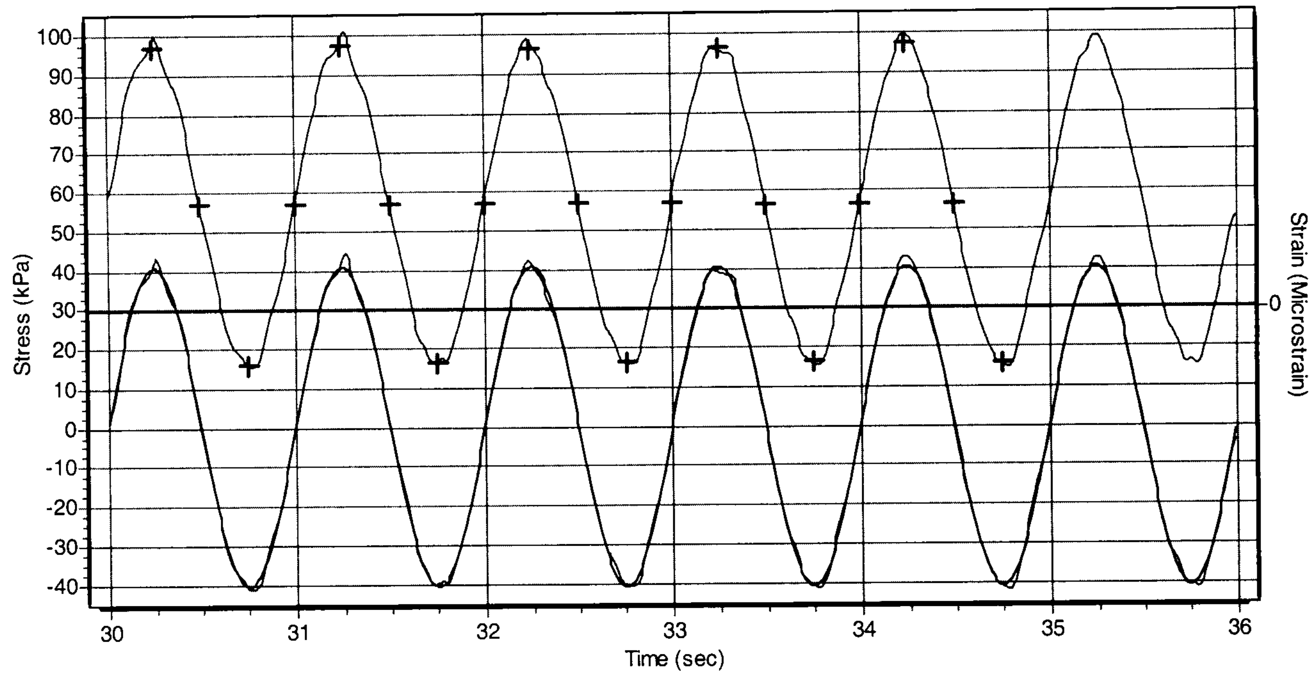
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#05.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:28 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	81.3	79.8	79.7	81.3	80.6
Recoverable axial micro-strain	1554.4	1560.2	1542.1	1544.6	1562.8	1552.8
Permanent axial micro-strain	139	161	172	189	194	
Dynamic modulus (MPa)	52.0	52.1	51.7	51.6	52.0	51.9
Phase angle (Deg)	6.55	6.92	7.81	7.50	6.88	7.13
Dyn.Modulus/sine(phase angle)	910.7	863.1	759.9	789.5	867.2	838.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.639	0.627	0.626	0.639	0.633
Maximum load (kN)	0.762 (30.243s)	0.768 (31.247s)	0.758 (32.242s)	0.756 (33.246s)	0.766 (34.243s)	0.762
Minimum load (kN)	0.127 (30.744s)	0.129 (31.745s)	0.132 (32.747s)	0.130 (33.746s)	0.127 (34.746s)	0.129
Maximum averaged axial (mm)	0.176 (30.262s)	0.179 (31.266s)	0.178 (32.264s)	0.180 (33.267s)	0.183 (34.262s)	0.179
Minimum averaged axial (mm)	0.014 (30.763s)	0.017 (31.766s)	0.018 (32.765s)	0.020 (33.765s)	0.020 (34.765s)	0.018
Maximum axial #1 (mm)	0.180 (30.263s)	0.183 (31.265s)	0.182 (32.265s)	0.185 (33.268s)	0.187 (34.262s)	0.183
Minimum axial #1 (mm)	0.018 (30.764s)	0.021 (31.767s)	0.022 (32.766s)	0.024 (33.763s)	0.024 (34.765s)	0.022
Maximum axial #2 (mm)	0.172 (30.261s)	0.175 (31.266s)	0.174 (32.263s)	0.176 (33.267s)	0.178 (34.262s)	0.175
Minimum axial #2 (mm)	0.011 (30.763s)	0.013 (31.766s)	0.014 (32.764s)	0.015 (33.764s)	0.016 (34.763s)	0.014

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#05

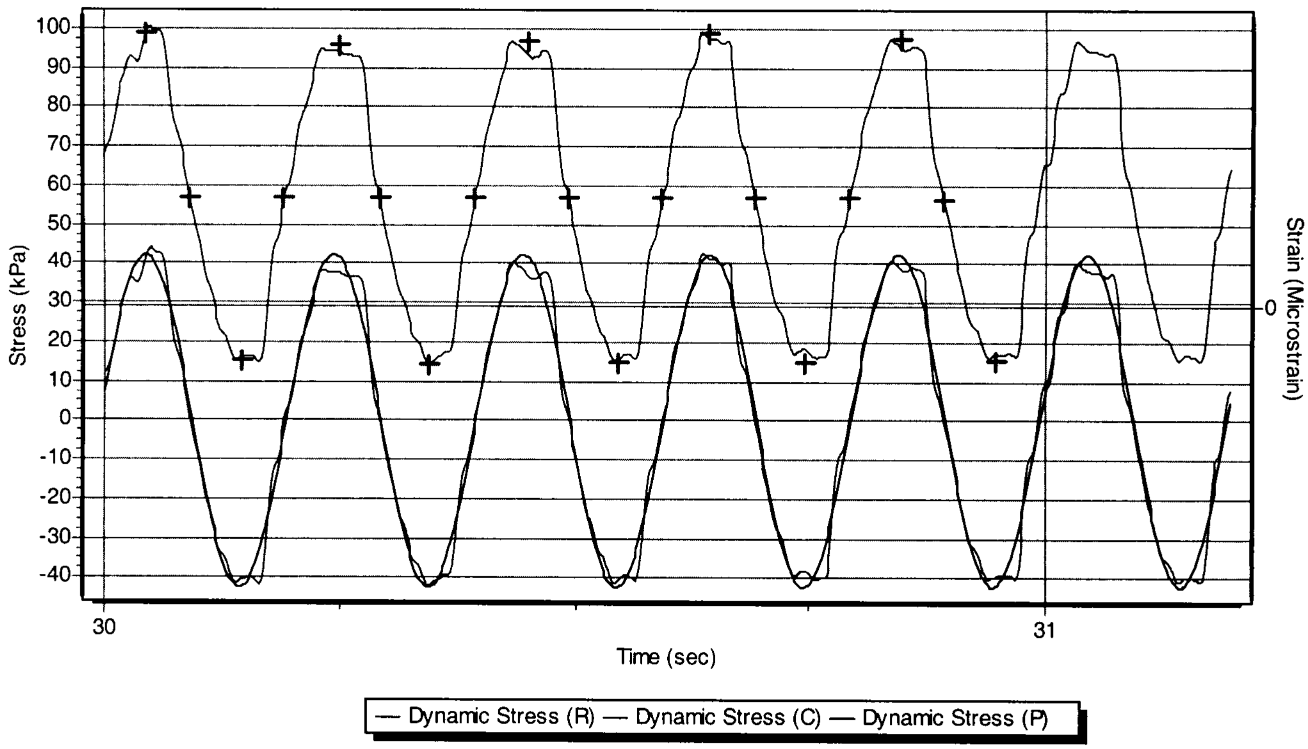
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#05.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:28 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.6	81.5	82.1	84.1	82.0	82.6
Recoverable axial micro-strain	1455.3	1480.1	1437.9	1441.6	1441.4	1451.3
Permanent axial micro-strain	513	543	492	485	483	
Dynamic modulus (MPa)	57.4	55.0	57.1	58.3	56.9	57.0
Phase angle (Deg)	5.14	-1.68	0.65	6.24	1.16	2.30
Dyn.Modulus/sine(phase angle)	1281.3	-3748.7	10126.7	1070.9	5625.8	2871.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.657	0.640	0.645	0.660	0.644	0.649
Maximum load (kN)	0.777 (30.045s)	0.754 (30.250s)	0.761 (30.449s)	0.776 (30.644s)	0.764 (30.849s)	0.766
Minimum load (kN)	0.120 (30.146s)	0.115 (30.345s)	0.116 (30.545s)	0.115 (30.746s)	0.120 (30.947s)	0.117
Maximum averaged axial (mm)	0.098 (30.048s)	0.098 (30.249s)	0.098 (30.450s)	0.099 (30.647s)	0.100 (30.849s)	0.099
Minimum averaged axial (mm)	-0.053 (30.149s)	-0.056 (30.349s)	-0.051 (30.550s)	-0.050 (30.748s)	-0.050 (30.949s)	-0.052
Maximum axial #1 (mm)	0.097 (30.048s)	0.096 (30.249s)	0.097 (30.450s)	0.098 (30.647s)	0.098 (30.850s)	0.097
Minimum axial #1 (mm)	-0.054 (30.149s)	-0.058 (30.349s)	-0.052 (30.550s)	-0.051 (30.748s)	-0.051 (30.949s)	-0.053
Maximum axial #2 (mm)	0.099 (30.048s)	0.100 (30.250s)	0.100 (30.449s)	0.101 (30.647s)	0.101 (30.849s)	0.100
Minimum axial #2 (mm)	-0.052 (30.149s)	-0.055 (30.349s)	-0.050 (30.550s)	-0.050 (30.748s)	-0.049 (30.949s)	-0.051

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#05

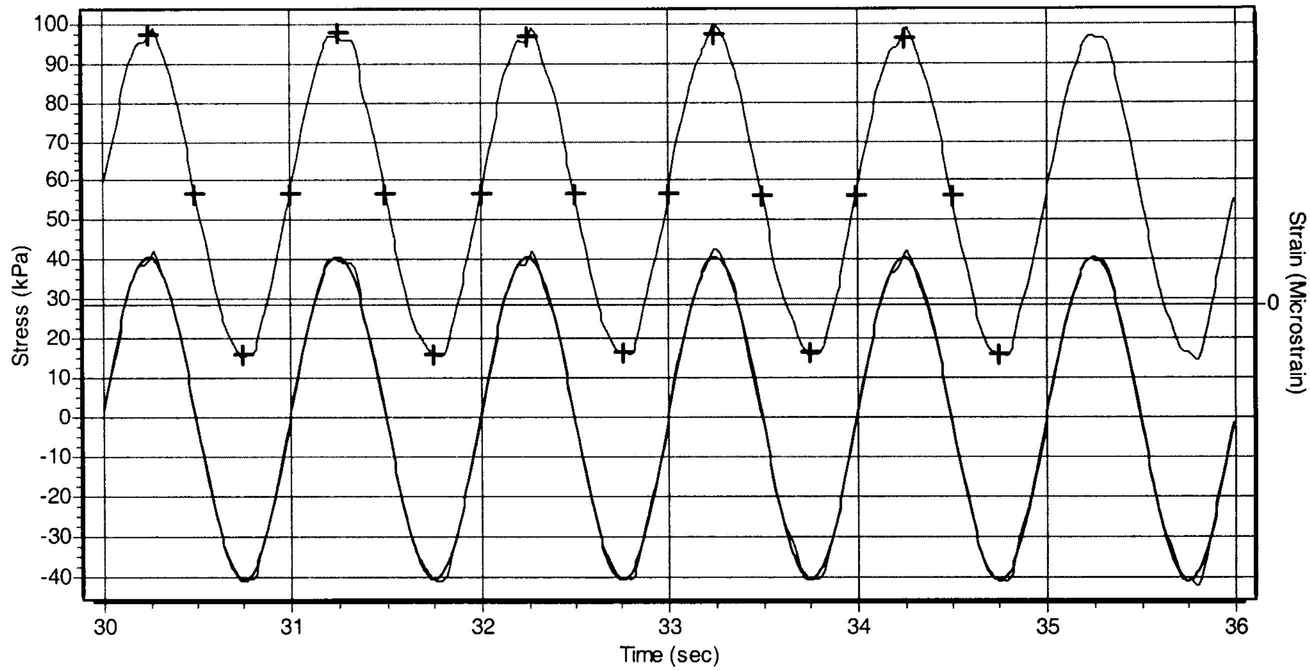
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#06.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:32 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.3	80.1	80.8	80.4	80.8
Recoverable axial micro-strain	1572.8	1571.4	1539.1	1563.8	1549.0	1559.2
Permanent axial micro-strain	129	149	182	172	178	
Dynamic modulus (MPa)	51.6	51.7	52.1	51.7	51.9	51.8
Phase angle (Deg)	6.61	5.83	6.86	7.12	5.64	6.41
Dyn.Modulus/sine(phase angle)	896.2	1017.0	870.7	831.9	1055.7	934.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.638	0.629	0.635	0.631	0.634
Maximum load (kN)	0.764 (30.247s)	0.767 (31.245s)	0.762 (32.245s)	0.765 (33.242s)	0.758 (34.244s)	0.763
Minimum load (kN)	0.126 (30.744s)	0.128 (31.748s)	0.133 (32.747s)	0.130 (33.747s)	0.127 (34.744s)	0.129
Maximum averaged axial (mm)	0.177 (30.266s)	0.179 (31.261s)	0.179 (32.264s)	0.181 (33.261s)	0.180 (34.259s)	0.179
Minimum averaged axial (mm)	0.013 (30.764s)	0.016 (31.767s)	0.019 (32.767s)	0.018 (33.765s)	0.019 (34.763s)	0.017
Maximum axial #1 (mm)	0.174 (30.267s)	0.176 (31.261s)	0.176 (32.264s)	0.177 (33.262s)	0.177 (34.259s)	0.176
Minimum axial #1 (mm)	0.015 (30.765s)	0.018 (31.766s)	0.021 (32.768s)	0.020 (33.767s)	0.020 (34.764s)	0.019
Maximum axial #2 (mm)	0.180 (30.265s)	0.182 (31.262s)	0.182 (32.265s)	0.184 (33.261s)	0.183 (34.260s)	0.182
Minimum axial #2 (mm)	0.011 (30.764s)	0.013 (31.767s)	0.016 (32.766s)	0.016 (33.766s)	0.017 (34.763s)	0.015

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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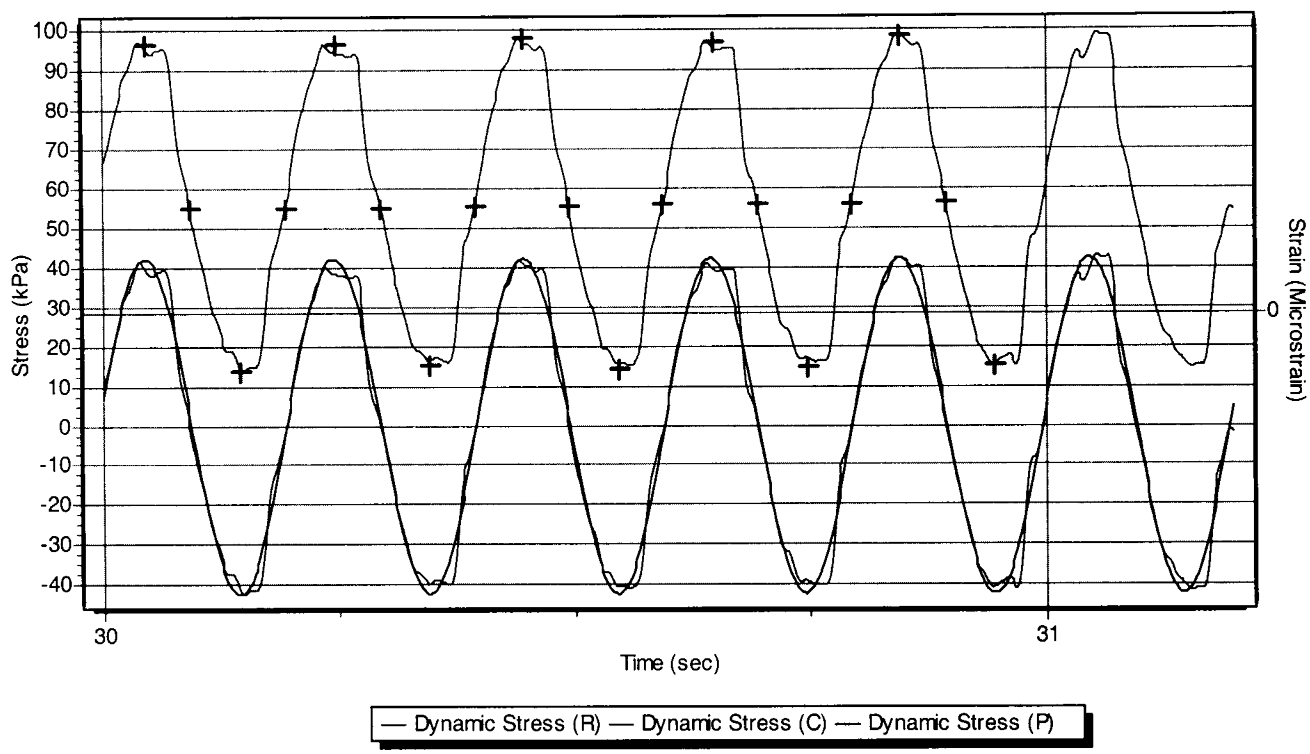


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:32 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.0	81.5	83.7	82.7	83.6	82.9
Recoverable axial micro-strain	1529.8	1470.6	1523.7	1482.9	1480.6	1497.5
Permanent axial micro-strain	715	649	699	640	645	
Dynamic modulus (MPa)	54.3	55.4	54.9	55.8	56.5	55.4
Phase angle (Deg)	3.80	1.46	6.20	5.63	5.66	4.55
Dyn.Modulus/sine(phase angle)	1637.8	4353.0	1015.4	1136.1	1144.9	1857.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.652	0.640	0.657	0.650	0.657	0.651
Maximum load (kN)	0.760 (30.047s)	0.760 (30.248s)	0.770 (30.445s)	0.765 (30.647s)	0.776 (30.845s)	0.766
Minimum load (kN)	0.108 (30.145s)	0.121 (30.346s)	0.113 (30.546s)	0.115 (30.746s)	0.120 (30.945s)	0.115
Maximum averaged axial (mm)	0.085 (30.049s)	0.085 (30.249s)	0.086 (30.448s)	0.088 (30.650s)	0.087 (30.848s)	0.086
Minimum averaged axial (mm)	-0.074 (30.149s)	-0.067 (30.349s)	-0.073 (30.550s)	-0.067 (30.750s)	-0.067 (30.949s)	-0.070
Maximum axial #1 (mm)	0.081 (30.049s)	0.081 (30.249s)	0.083 (30.448s)	0.084 (30.651s)	0.083 (30.848s)	0.082
Minimum axial #1 (mm)	-0.074 (30.149s)	-0.067 (30.349s)	-0.072 (30.550s)	-0.066 (30.750s)	-0.066 (30.949s)	-0.069
Maximum axial #2 (mm)	0.089 (30.049s)	0.090 (30.248s)	0.090 (30.447s)	0.092 (30.650s)	0.091 (30.848s)	0.090
Minimum axial #2 (mm)	-0.070 (30.150s)	-0.068 (30.349s)	-0.073 (30.550s)	-0.067 (30.750s)	-0.068 (30.949s)	-0.069

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#06

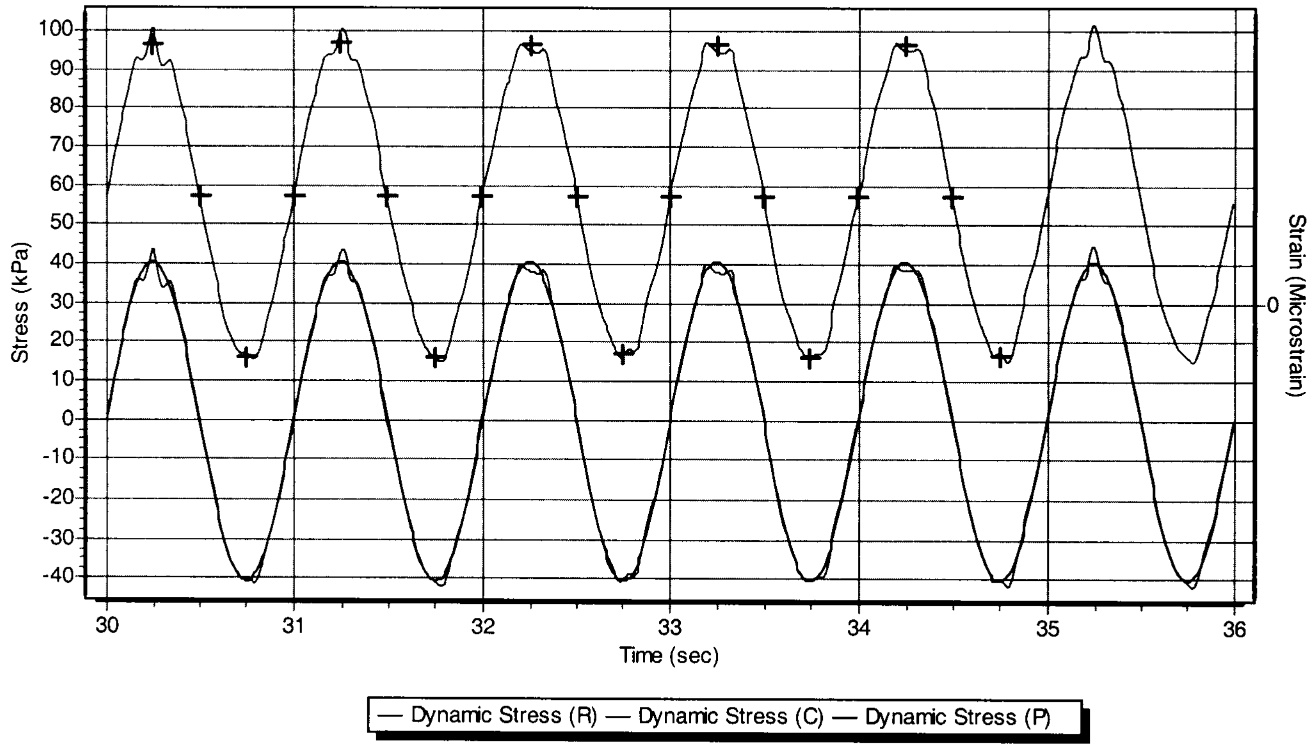
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#07.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:36 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.2	81.1	79.5	80.2	80.1	80.2
Recoverable axial micro-strain	1821.3	1833.0	1788.1	1802.8	1809.7	1811.0
Permanent axial micro-strain	394	407	459	456	466	
Dynamic modulus (MPa)	44.0	44.2	44.4	44.5	44.3	44.3
Phase angle (Deg)	7.26	7.91	6.30	6.08	6.35	6.78
Dyn.Modulus/sine(phase angle)	695.3	641.2	808.8	838.7	799.5	756.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.630	0.637	0.624	0.630	0.629	0.630
Maximum load (kN)	0.758 (30.248s)	0.763 (31.243s)	0.757 (32.247s)	0.758 (33.246s)	0.759 (34.246s)	0.759
Minimum load (kN)	0.128 (30.748s)	0.126 (31.746s)	0.133 (32.744s)	0.128 (33.743s)	0.130 (34.747s)	0.129
Maximum averaged axial (mm)	0.228 (30.268s)	0.231 (31.265s)	0.231 (32.264s)	0.233 (33.262s)	0.234 (34.264s)	0.231
Minimum averaged axial (mm)	0.041 (30.768s)	0.042 (31.767s)	0.047 (32.760s)	0.047 (33.760s)	0.048 (34.767s)	0.045
Maximum axial #1 (mm)	0.191 (30.265s)	0.194 (31.261s)	0.195 (32.262s)	0.195 (33.262s)	0.197 (34.262s)	0.194
Minimum axial #1 (mm)	0.022 (30.764s)	0.024 (31.764s)	0.028 (32.757s)	0.027 (33.756s)	0.029 (34.764s)	0.026
Maximum axial #2 (mm)	0.265 (30.270s)	0.268 (31.269s)	0.268 (32.266s)	0.270 (33.263s)	0.272 (34.266s)	0.268
Minimum axial #2 (mm)	0.059 (30.770s)	0.060 (31.770s)	0.067 (32.762s)	0.067 (33.762s)	0.067 (34.770s)	0.064

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#07

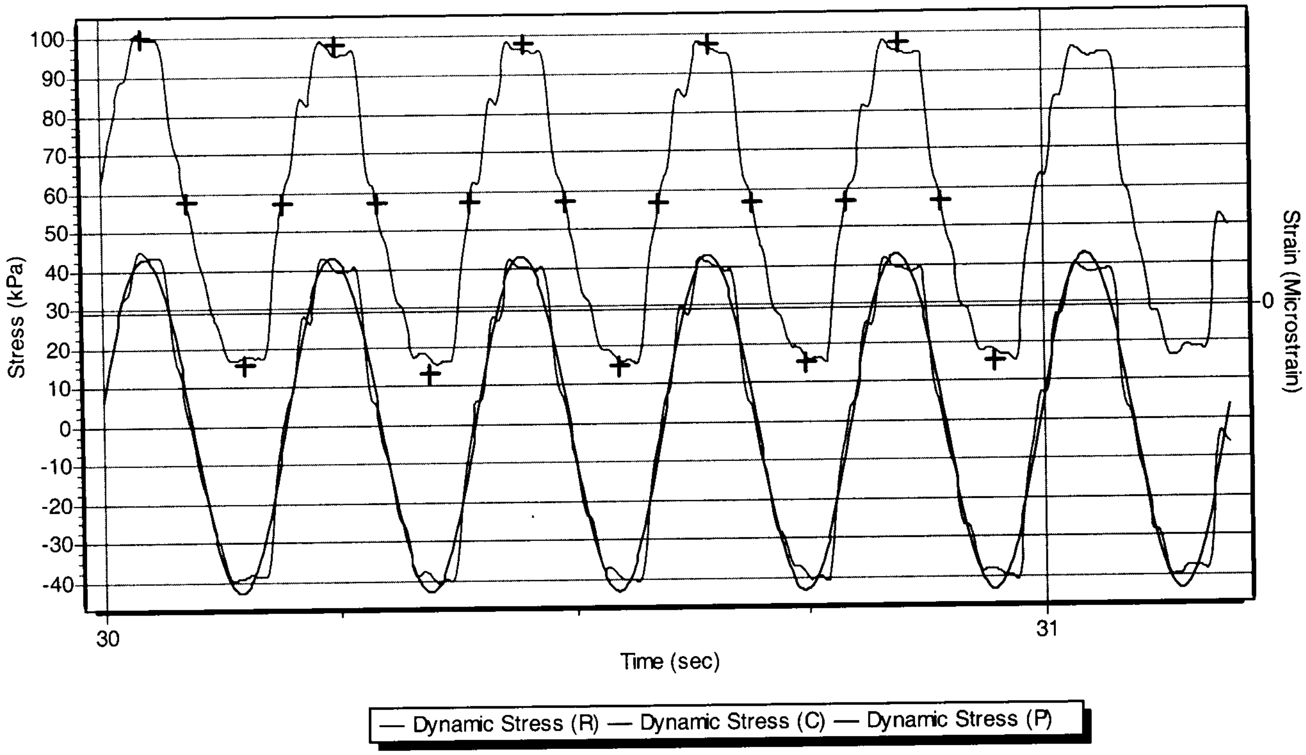
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#07.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:36 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.7	85.2	83.5	82.8	82.2	83.7
Recoverable axial micro-strain	1723.1	1699.1	1694.0	1703.6	1692.5	1702.5
Permanent axial micro-strain	620	603	597	601	591	
Dynamic modulus (MPa)	49.2	50.1	49.3	48.6	48.6	49.1
Phase angle (Deg)	7.85	-2.38	-4.40	-0.73	-1.84	-0.30
Dyn.Modulus/sine(phase angle)	717.9	-2413.5	-1284.5	-7651.8	-3022.4	-2730.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.665	0.669	0.655	0.650	0.646	0.657
Maximum load (kN)	0.789 (30.045s)	0.771 (30.250s)	0.770 (30.451s)	0.769 (30.649s)	0.766 (30.851s)	0.773
Minimum load (kN)	0.123 (30.152s)	0.102 (30.347s)	0.114 (30.548s)	0.119 (30.748s)	0.120 (30.947s)	0.116
Maximum averaged axial (mm)	0.114 (30.049s)	0.113 (30.249s)	0.113 (30.448s)	0.114 (30.648s)	0.113 (30.850s)	0.113
Minimum averaged axial (mm)	-0.064 (30.152s)	-0.062 (30.350s)	-0.061 (30.551s)	-0.062 (30.750s)	-0.061 (30.949s)	-0.062
Maximum axial #1 (mm)	0.107 (30.049s)	0.106 (30.248s)	0.106 (30.448s)	0.107 (30.649s)	0.107 (30.850s)	0.106
Minimum axial #1 (mm)	-0.060 (30.152s)	-0.058 (30.350s)	-0.057 (30.551s)	-0.058 (30.750s)	-0.056 (30.949s)	-0.058
Maximum axial #2 (mm)	0.121 (30.048s)	0.120 (30.249s)	0.120 (30.448s)	0.120 (30.648s)	0.119 (30.853s)	0.120
Minimum axial #2 (mm)	-0.065 (30.148s)	-0.067 (30.350s)	-0.066 (30.551s)	-0.066 (30.750s)	-0.065 (30.949s)	-0.066

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#07

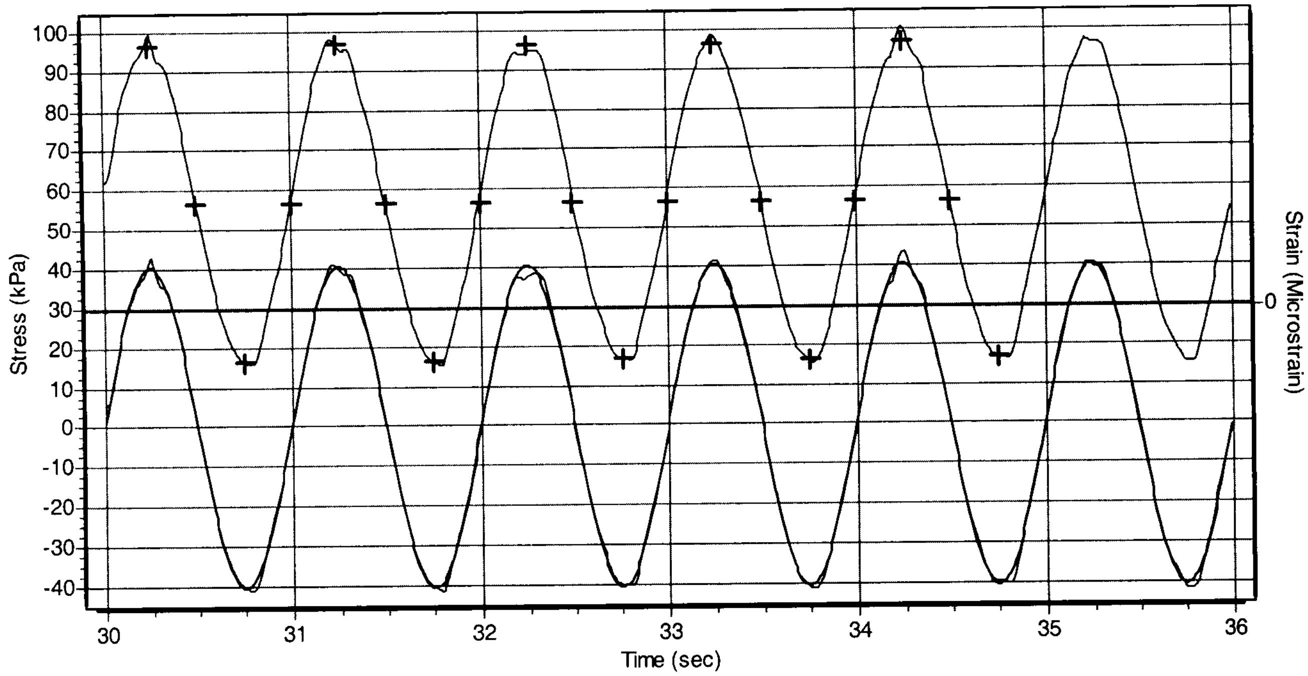
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#08.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:41 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 108
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.0	80.8	79.2	80.3	80.4	80.1
Recoverable axial micro-strain	1631.0	1629.4	1601.3	1613.1	1612.6	1617.5
Permanent axial micro-strain	213	239	269	268	296	
Dynamic modulus (MPa)	49.0	49.6	49.4	49.8	49.9	49.5
Phase angle (Deg)	7.69	6.68	7.09	7.55	7.81	7.37
Dyn.Modulus/sine(phase angle)	731.3	850.9	799.9	755.9	731.9	774.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.628	0.635	0.622	0.631	0.632	0.629
Maximum load (kN)	0.757 (30.245s)	0.762 (31.241s)	0.755 (32.248s)	0.757 (33.241s)	0.762 (34.246s)	0.759
Minimum load (kN)	0.129 (30.747s)	0.127 (31.746s)	0.133 (32.747s)	0.127 (33.746s)	0.130 (34.749s)	0.129
Maximum averaged axial (mm)	0.199 (30.266s)	0.202 (31.260s)	0.202 (32.268s)	0.203 (33.262s)	0.206 (34.268s)	0.202
Minimum averaged axial (mm)	0.023 (30.766s)	0.026 (31.767s)	0.029 (32.767s)	0.029 (33.763s)	0.032 (34.769s)	0.028
Maximum axial #1 (mm)	0.206 (30.265s)	0.208 (31.259s)	0.208 (32.268s)	0.209 (33.262s)	0.212 (34.269s)	0.209
Minimum axial #1 (mm)	0.028 (30.766s)	0.030 (31.765s)	0.034 (32.767s)	0.034 (33.764s)	0.037 (34.768s)	0.033
Maximum axial #2 (mm)	0.193 (30.267s)	0.196 (31.260s)	0.196 (32.268s)	0.197 (33.262s)	0.200 (34.267s)	0.196
Minimum axial #2 (mm)	0.018 (30.766s)	0.021 (31.766s)	0.024 (32.767s)	0.024 (33.763s)	0.027 (34.769s)	0.023

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#08

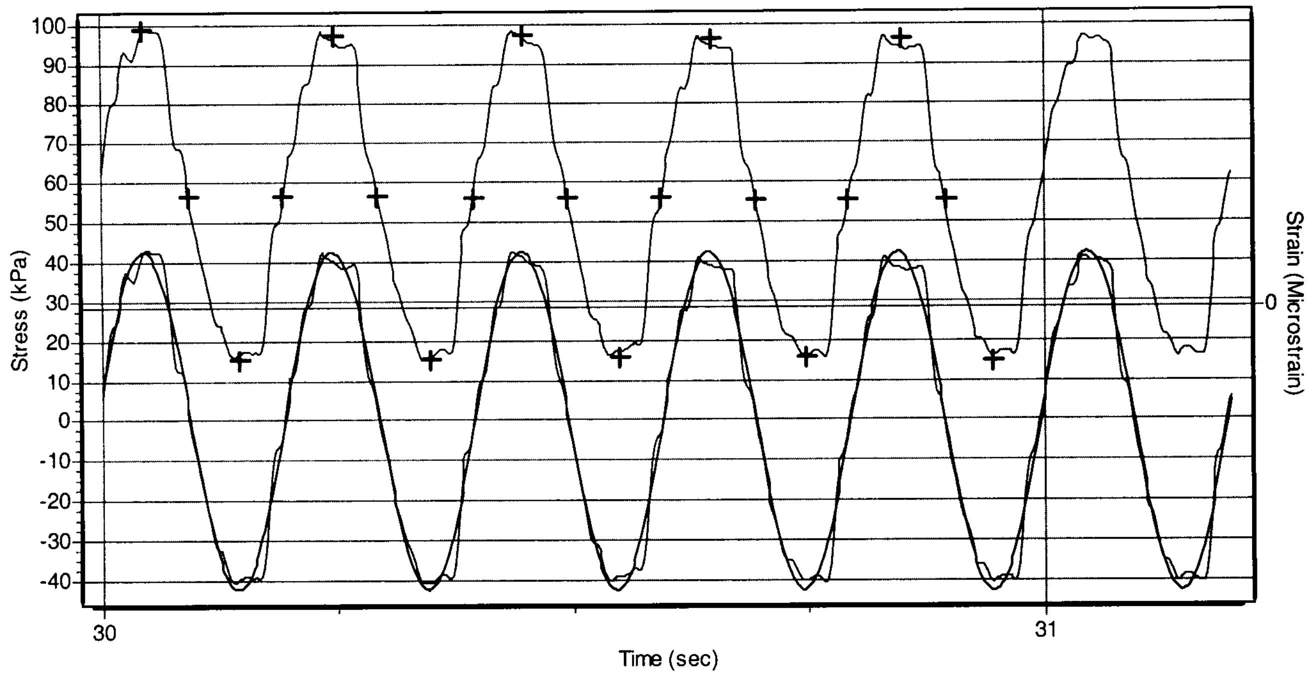
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	108						108	

Cross-Sectional Area: 7853.982
Volume: 848230

Comments/Properties: Initial Temp: 59 'C
Final Temp: 58 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#08.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:41 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 108
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.6	82.1	81.9	81.1	81.7	82.1
Recoverable axial micro-strain	1497.4	1545.1	1503.0	1499.1	1509.0	1510.7
Permanent axial micro-strain	505	542	503	506	509	
Dynamic modulus (MPa)	55.8	53.1	54.5	54.1	54.2	54.3
Phase angle (Deg)	8.53	0.35	3.03	-0.27	1.43	2.61
Dyn.Modulus/sine(phase angle)	751.3	17562.7	2060.6	-22630.1	4326.3	414.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.657	0.645	0.643	0.637	0.642	0.645
Maximum load (kN)	0.776 (30.044s)	0.765 (30.249s)	0.767 (30.446s)	0.759 (30.648s)	0.758 (30.849s)	0.765
Minimum load (kN)	0.119 (30.147s)	0.121 (30.348s)	0.124 (30.548s)	0.122 (30.746s)	0.116 (30.945s)	0.120
Maximum averaged axial (mm)	0.107 (30.049s)	0.108 (30.249s)	0.108 (30.448s)	0.107 (30.648s)	0.108 (30.850s)	0.108
Minimum averaged axial (mm)	-0.054 (30.149s)	-0.059 (30.350s)	-0.054 (30.554s)	-0.055 (30.749s)	-0.055 (30.949s)	-0.055
Maximum axial #1 (mm)	0.109 (30.049s)	0.110 (30.249s)	0.109 (30.448s)	0.108 (30.649s)	0.109 (30.850s)	0.109
Minimum axial #1 (mm)	-0.056 (30.150s)	-0.063 (30.350s)	-0.056 (30.554s)	-0.056 (30.750s)	-0.056 (30.949s)	-0.058
Maximum axial #2 (mm)	0.106 (30.049s)	0.107 (30.248s)	0.107 (30.448s)	0.106 (30.648s)	0.107 (30.849s)	0.107
Minimum axial #2 (mm)	-0.053 (30.149s)	-0.055 (30.348s)	-0.053 (30.553s)	-0.053 (30.749s)	-0.054 (30.949s)	-0.053

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#08

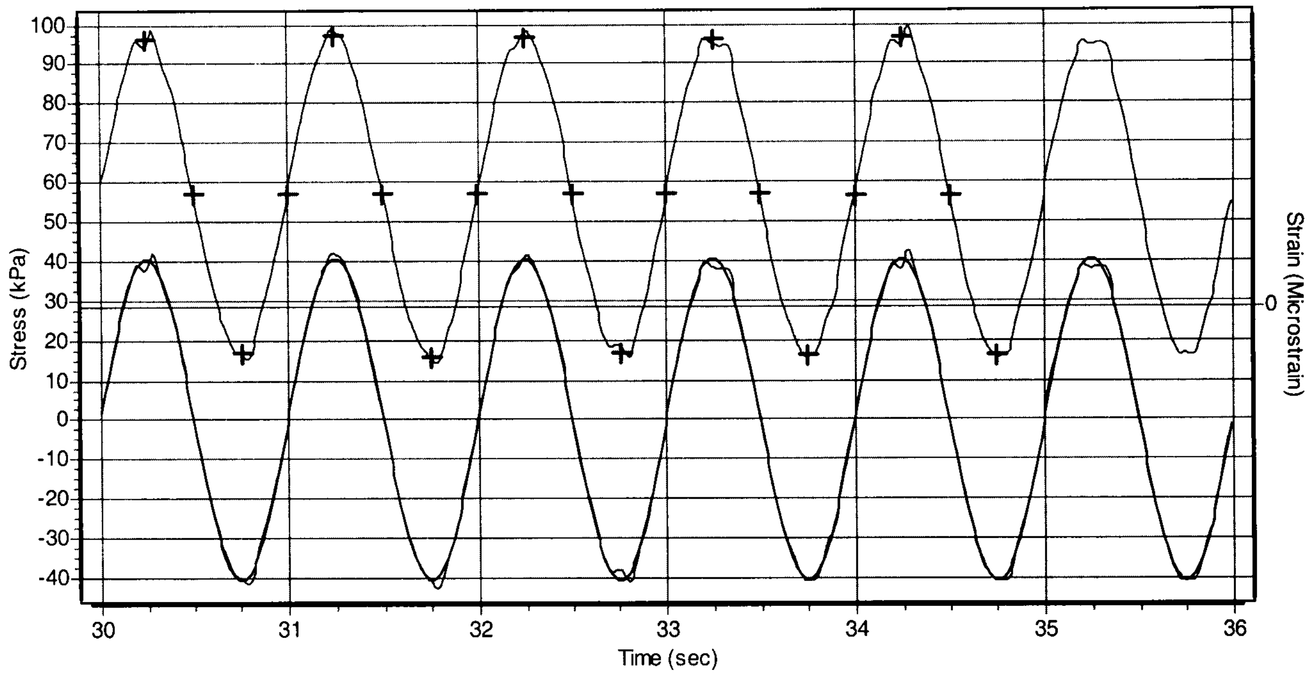
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	108						108	

Cross-Sectional Area: 7853.982
Volume: 848230

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#09.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 7:12 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	79.6	81.4	80.3	79.6	80.7	80.3
Recoverable axial micro-strain	1530.4	1559.8	1532.8	1525.2	1540.2	1537.7
Permanent axial micro-strain	448	441	480	494	505	
Dynamic modulus (MPa)	52.0	52.2	52.4	52.2	52.4	52.2
Phase angle (Deg)	6.48	7.22	6.93	7.23	6.20	6.81
Dyn.Modulus/sine(phase angle)	919.9	829.0	866.6	828.2	968.0	882.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.625	0.639	0.631	0.626	0.634	0.631
Maximum load (kN)	0.757 (30.247s)	0.763 (31.241s)	0.761 (32.246s)	0.755 (33.245s)	0.761 (34.249s)	0.760
Minimum load (kN)	0.132 (30.747s)	0.124 (31.746s)	0.130 (32.750s)	0.130 (33.745s)	0.128 (34.745s)	0.129
Maximum averaged axial (mm)	0.202 (30.265s)	0.204 (31.261s)	0.205 (32.265s)	0.206 (33.265s)	0.209 (34.266s)	0.205
Minimum averaged axial (mm)	0.046 (30.766s)	0.045 (31.764s)	0.049 (32.768s)	0.050 (33.764s)	0.052 (34.766s)	0.048
Maximum axial #1 (mm)	0.204 (30.265s)	0.207 (31.261s)	0.208 (32.265s)	0.209 (33.265s)	0.211 (34.266s)	0.208
Minimum axial #1 (mm)	0.049 (30.765s)	0.048 (31.764s)	0.052 (32.769s)	0.053 (33.765s)	0.054 (34.766s)	0.051
Maximum axial #2 (mm)	0.199 (30.265s)	0.201 (31.261s)	0.203 (32.265s)	0.203 (33.266s)	0.206 (34.265s)	0.202
Minimum axial #2 (mm)	0.043 (30.766s)	0.042 (31.764s)	0.046 (32.767s)	0.049 (33.765s)	0.048 (34.765s)	0.046

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

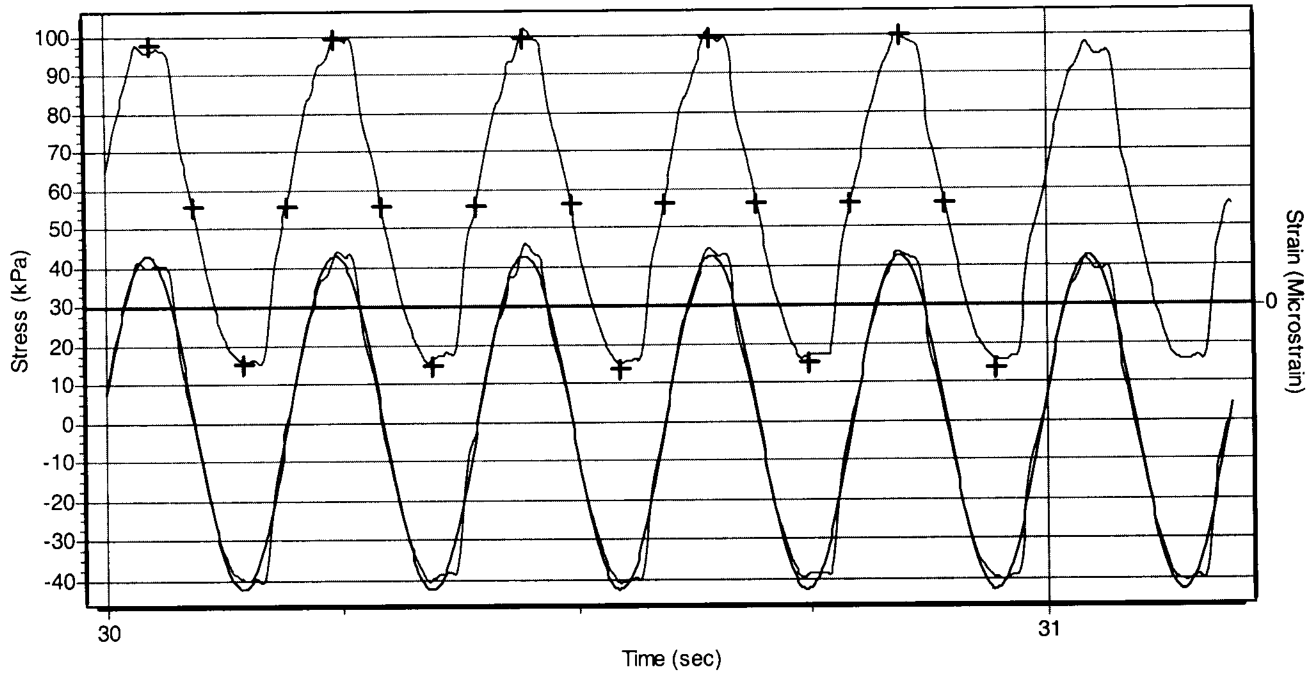
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 60 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#09.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 7:12 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 102
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.8	84.2	85.6	84.4	85.8	84.6
Recoverable axial micro-strain	1467.2	1464.3	1473.4	1456.0	1505.8	1473.3
Permanent axial micro-strain	423	419	424	400	439	
Dynamic modulus (MPa)	56.5	57.5	58.1	57.9	57.0	57.4
Phase angle (Deg)	2.09	5.98	5.63	8.36	6.15	5.64
Dyn.Modulus/sine(phase angle)	3095.1	1101.7	1181.9	794.7	1062.2	1447.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.651	0.661	0.672	0.663	0.674	0.664
Maximum load (kN)	0.768 (30.048s)	0.779 (30.245s)	0.781 (30.445s)	0.782 (30.644s)	0.783 (30.845s)	0.779
Minimum load (kN)	0.118 (30.146s)	0.117 (30.346s)	0.109 (30.546s)	0.120 (30.747s)	0.109 (30.946s)	0.114
Maximum averaged axial (mm)	0.106 (30.049s)	0.107 (30.248s)	0.107 (30.448s)	0.108 (30.649s)	0.109 (30.848s)	0.107
Minimum averaged axial (mm)	-0.043 (30.151s)	-0.043 (30.351s)	-0.043 (30.551s)	-0.041 (30.750s)	-0.045 (30.950s)	-0.043
Maximum axial #1 (mm)	0.106 (30.050s)	0.106 (30.248s)	0.106 (30.448s)	0.107 (30.649s)	0.108 (30.848s)	0.107
Minimum axial #1 (mm)	-0.045 (30.151s)	-0.045 (30.351s)	-0.045 (30.550s)	-0.044 (30.751s)	-0.047 (30.950s)	-0.045
Maximum axial #2 (mm)	0.107 (30.049s)	0.108 (30.249s)	0.108 (30.448s)	0.108 (30.648s)	0.109 (30.848s)	0.108
Minimum axial #2 (mm)	-0.041 (30.151s)	-0.041 (30.351s)	-0.042 (30.551s)	-0.039 (30.751s)	-0.043 (30.950s)	-0.041

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#09

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	102						102	

Cross-Sectional Area: 7853.982
Volume: 801106.1

Comments/Properties: Initial Temp: 60 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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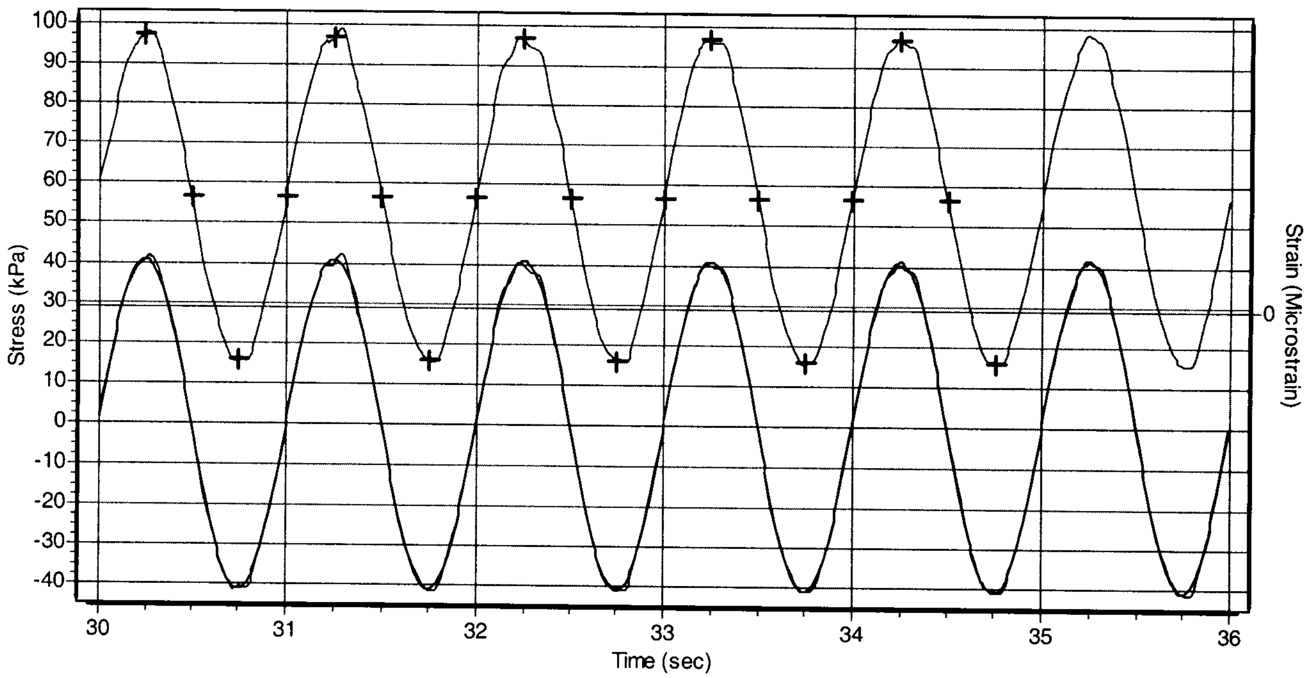

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:47 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.7	80.9	80.8	81.2	81.1	81.1
Recoverable axial micro-strain	1535.8	1529.9	1526.9	1530.5	1537.6	1532.1
Permanent axial micro-strain	488	511	526	540	548	
Dynamic modulus (MPa)	53.2	52.9	52.9	53.0	52.7	53.0
Phase angle (Deg)	7.57	8.63	8.24	8.04	8.96	8.29
Dyn.Modulus/sine(phase angle)	805.6	702.8	736.6	756.6	675.1	735.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.636	0.634	0.638	0.637	0.637
Maximum load (kN)	0.765 (30.246s)	0.762 (31.245s)	0.761 (32.242s)	0.762 (33.242s)	0.762 (34.245s)	0.762
Minimum load (kN)	0.123 (30.742s)	0.126 (31.746s)	0.127 (32.745s)	0.124 (33.744s)	0.125 (34.747s)	0.125
Maximum averaged axial (mm)	0.211 (30.268s)	0.212 (31.269s)	0.213 (32.265s)	0.215 (33.265s)	0.217 (34.270s)	0.214
Minimum averaged axial (mm)	0.051 (30.767s)	0.053 (31.766s)	0.055 (32.767s)	0.056 (33.766s)	0.057 (34.767s)	0.054
Maximum axial #1 (mm)	0.206 (30.265s)	0.208 (31.269s)	0.209 (32.264s)	0.211 (33.263s)	0.213 (34.271s)	0.209
Minimum axial #1 (mm)	0.063 (30.765s)	0.065 (31.764s)	0.066 (32.765s)	0.068 (33.764s)	0.069 (34.765s)	0.066
Maximum axial #2 (mm)	0.215 (30.269s)	0.217 (31.270s)	0.218 (32.266s)	0.220 (33.265s)	0.221 (34.267s)	0.218
Minimum axial #2 (mm)	0.039 (30.769s)	0.041 (31.767s)	0.043 (32.769s)	0.044 (33.768s)	0.045 (34.768s)	0.043

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#10

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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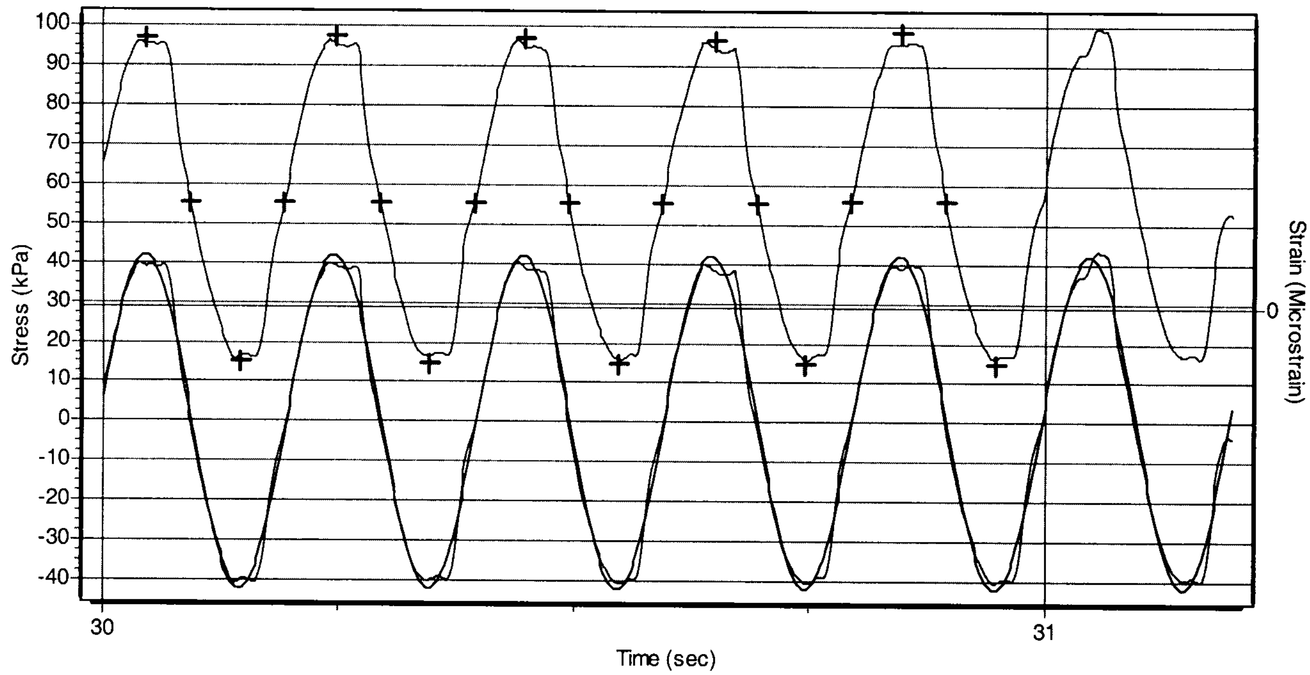

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:47 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.7	82.7	82.5	81.8	83.5	82.4
Recoverable axial micro-strain	1381.0	1362.9	1391.4	1354.2	1372.3	1372.4
Permanent axial micro-strain	359	341	374	335	346	
Dynamic modulus (MPa)	59.1	60.7	59.3	60.4	60.9	60.1
Phase angle (Deg)	6.67	7.63	4.12	3.30	4.78	5.30
Dyn.Modulus/sine(phase angle)	1017.3	911.4	1651.3	2101.5	1458.4	1428.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.649	0.648	0.643	0.656	0.648
Maximum load (kN)	0.762 (30.047s)	0.765 (30.247s)	0.763 (30.447s)	0.757 (30.650s)	0.772 (30.847s)	0.764
Minimum load (kN)	0.120 (30.146s)	0.116 (30.345s)	0.115 (30.545s)	0.115 (30.746s)	0.117 (30.946s)	0.116
Maximum averaged axial (mm)	0.106 (30.051s)	0.106 (30.251s)	0.106 (30.449s)	0.106 (30.652s)	0.107 (30.849s)	0.106
Minimum averaged axial (mm)	-0.037 (30.151s)	-0.035 (30.351s)	-0.039 (30.550s)	-0.035 (30.751s)	-0.036 (30.951s)	-0.036
Maximum axial #1 (mm)	0.104 (30.052s)	0.104 (30.252s)	0.104 (30.450s)	0.104 (30.653s)	0.105 (30.850s)	0.104
Minimum axial #1 (mm)	-0.026 (30.151s)	-0.024 (30.350s)	-0.023 (30.550s)	-0.023 (30.750s)	-0.024 (30.951s)	-0.024
Maximum axial #2 (mm)	0.108 (30.050s)	0.108 (30.250s)	0.108 (30.449s)	0.108 (30.651s)	0.109 (30.849s)	0.108
Minimum axial #2 (mm)	-0.049 (30.151s)	-0.047 (30.351s)	-0.051 (30.550s)	-0.046 (30.751s)	-0.047 (30.951s)	-0.048

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#10

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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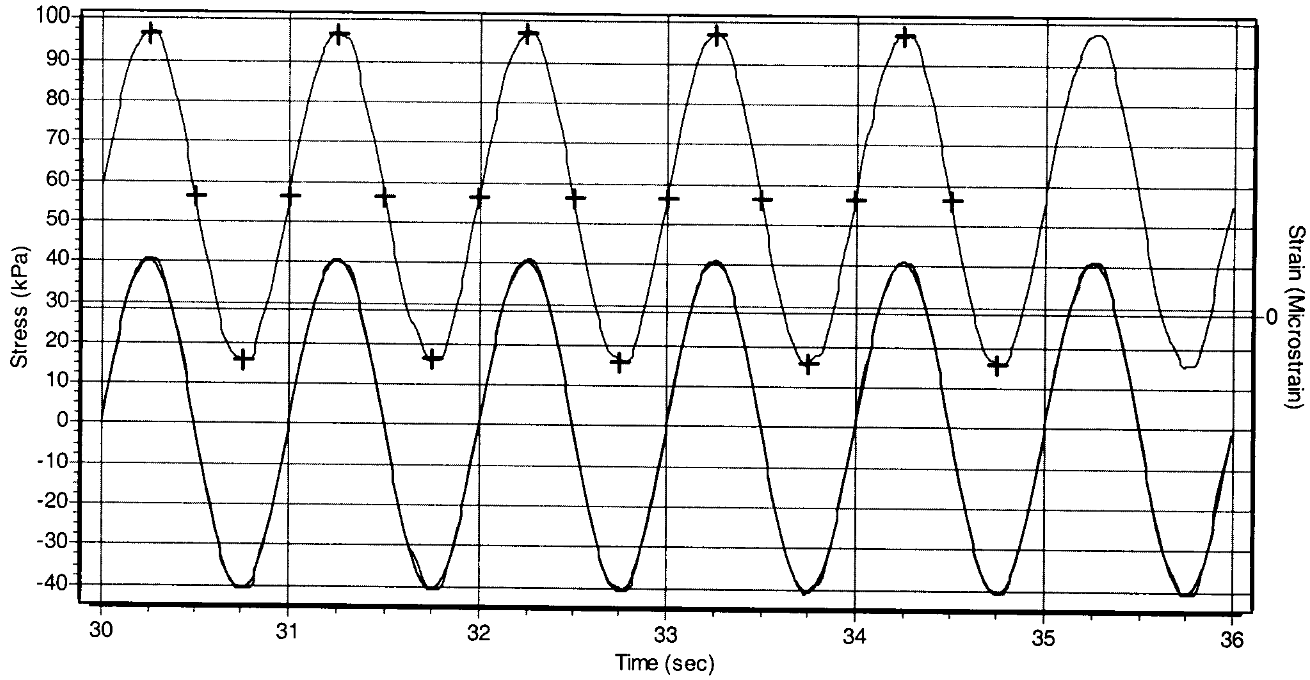

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:51 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	80.3	81.1	81.3	81.2	81.0
Recoverable axial micro-strain	1404.3	1390.6	1390.4	1396.1	1398.7	1396.0
Permanent axial micro-strain	482	503	520	523	541	
Dynamic modulus (MPa)	57.6	57.7	58.4	58.2	58.0	58.0
Phase angle (Deg)	7.36	8.57	7.34	8.19	8.22	7.94
Dyn.Modulus/sine(phase angle)	897.7	772.2	912.1	815.5	809.7	841.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.630	0.637	0.638	0.637	0.636
Maximum load (kN)	0.761 (30.250s)	0.760 (31.245s)	0.764 (32.247s)	0.763 (33.245s)	0.763 (34.248s)	0.762
Minimum load (kN)	0.126 (30.747s)	0.129 (31.745s)	0.126 (32.745s)	0.125 (33.743s)	0.126 (34.746s)	0.126
Maximum averaged axial (mm)	0.198 (30.270s)	0.199 (31.269s)	0.201 (32.267s)	0.202 (33.268s)	0.204 (34.270s)	0.201
Minimum averaged axial (mm)	0.051 (30.768s)	0.053 (31.768s)	0.055 (32.768s)	0.055 (33.765s)	0.057 (34.766s)	0.054
Maximum axial #1 (mm)	0.201 (30.272s)	0.201 (31.270s)	0.203 (32.270s)	0.204 (33.270s)	0.206 (34.270s)	0.203
Minimum axial #1 (mm)	0.051 (30.768s)	0.053 (31.769s)	0.055 (32.768s)	0.055 (33.766s)	0.057 (34.768s)	0.054
Maximum axial #2 (mm)	0.195 (30.270s)	0.196 (31.268s)	0.198 (32.264s)	0.199 (33.266s)	0.201 (34.271s)	0.198
Minimum axial #2 (mm)	0.051 (30.768s)	0.053 (31.768s)	0.055 (32.767s)	0.055 (33.765s)	0.057 (34.766s)	0.054

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#11

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 58 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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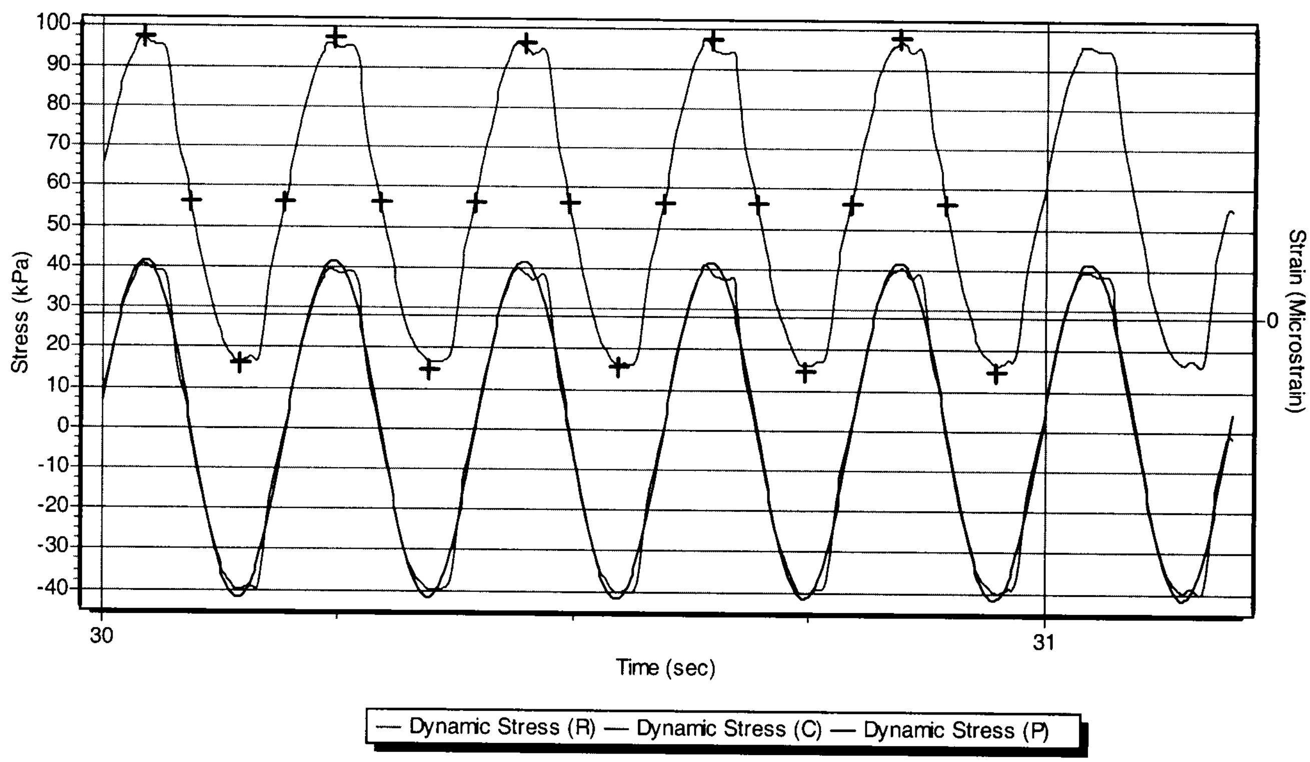


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:51 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	82.3	80.9	82.6	82.9	82.0
Recoverable axial micro-strain	1260.1	1287.7	1266.9	1268.3	1262.5	1269.1
Permanent axial micro-strain	322	350	329	326	317	
Dynamic modulus (MPa)	64.6	63.9	63.8	65.1	65.7	64.6
Phase angle (Deg)	10.76	7.11	4.15	7.11	8.83	7.59
Dyn.Modulus/sine(phase angle)	688.6	1030.8	1764.5	1050.4	853.5	1077.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.646	0.635	0.649	0.651	0.644
Maximum load (kN)	0.766 (30.045s)	0.763 (30.246s)	0.758 (30.447s)	0.765 (30.646s)	0.768 (30.845s)	0.764
Minimum load (kN)	0.127 (30.146s)	0.116 (30.346s)	0.123 (30.546s)	0.116 (30.745s)	0.117 (30.945s)	0.120
Maximum averaged axial (mm)	0.099 (30.051s)	0.098 (30.250s)	0.099 (30.449s)	0.099 (30.650s)	0.099 (30.850s)	0.099
Minimum averaged axial (mm)	-0.034 (30.151s)	-0.037 (30.351s)	-0.034 (30.551s)	-0.034 (30.751s)	-0.033 (30.950s)	-0.035
Maximum axial #1 (mm)	0.096 (30.051s)	0.096 (30.250s)	0.096 (30.450s)	0.097 (30.650s)	0.097 (30.851s)	0.096
Minimum axial #1 (mm)	-0.038 (30.151s)	-0.041 (30.351s)	-0.039 (30.551s)	-0.040 (30.751s)	-0.038 (30.950s)	-0.039
Maximum axial #2 (mm)	0.101 (30.051s)	0.101 (30.250s)	0.101 (30.449s)	0.101 (30.650s)	0.102 (30.850s)	0.101
Minimum axial #2 (mm)	-0.029 (30.151s)	-0.032 (30.351s)	-0.032 (30.550s)	-0.030 (30.751s)	-0.028 (30.950s)	-0.030

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#11

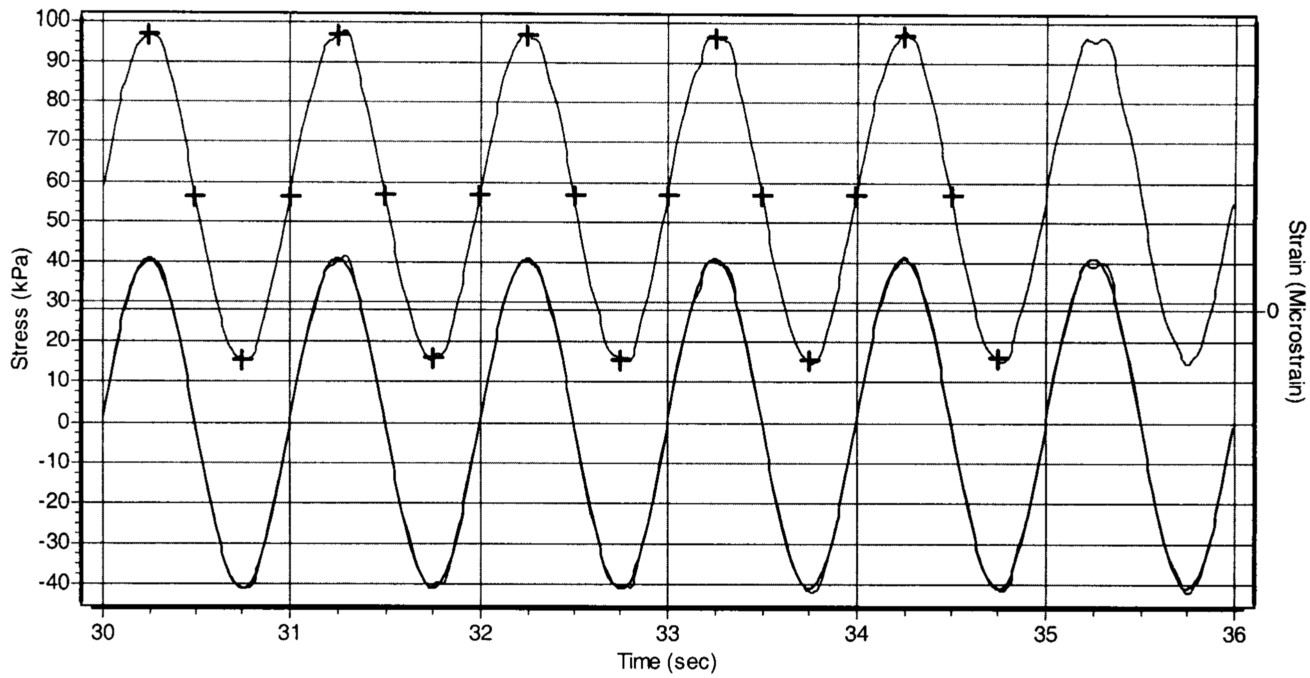
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#12.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 5:55 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.3	80.8	81.0	81.1	81.0	81.1
Recoverable axial micro-strain	1324.4	1323.1	1318.5	1321.3	1309.6	1319.4
Permanent axial micro-strain	344	362	374	392	414	
Dynamic modulus (MPa)	61.4	61.1	61.5	61.4	61.9	61.4
Phase angle (Deg)	8.09	7.57	7.95	9.08	8.37	8.21
Dyn.Modulus/sine(phase angle)	870.2	924.5	887.0	775.6	847.4	860.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.635	0.637	0.637	0.636	0.637
Maximum load (kN)	0.761 (30.246s)	0.761 (31.248s)	0.760 (32.243s)	0.759 (33.244s)	0.762 (34.244s)	0.761
Minimum load (kN)	0.122 (30.744s)	0.127 (31.743s)	0.124 (32.746s)	0.122 (33.748s)	0.125 (34.746s)	0.124
Maximum averaged axial (mm)	0.177 (30.268s)	0.179 (31.269s)	0.179 (32.265s)	0.182 (33.269s)	0.183 (34.267s)	0.180
Minimum averaged axial (mm)	0.036 (30.766s)	0.038 (31.769s)	0.040 (32.766s)	0.042 (33.767s)	0.044 (34.768s)	0.040
Maximum axial #1 (mm)	0.177 (30.268s)	0.179 (31.269s)	0.180 (32.264s)	0.182 (33.271s)	0.183 (34.269s)	0.180
Minimum axial #1 (mm)	0.039 (30.765s)	0.041 (31.769s)	0.042 (32.765s)	0.044 (33.767s)	0.047 (34.767s)	0.042
Maximum axial #2 (mm)	0.176 (30.268s)	0.178 (31.269s)	0.179 (32.266s)	0.181 (33.267s)	0.183 (34.264s)	0.180
Minimum axial #2 (mm)	0.034 (30.765s)	0.036 (31.769s)	0.038 (32.767s)	0.039 (33.768s)	0.041 (34.768s)	0.038

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#12

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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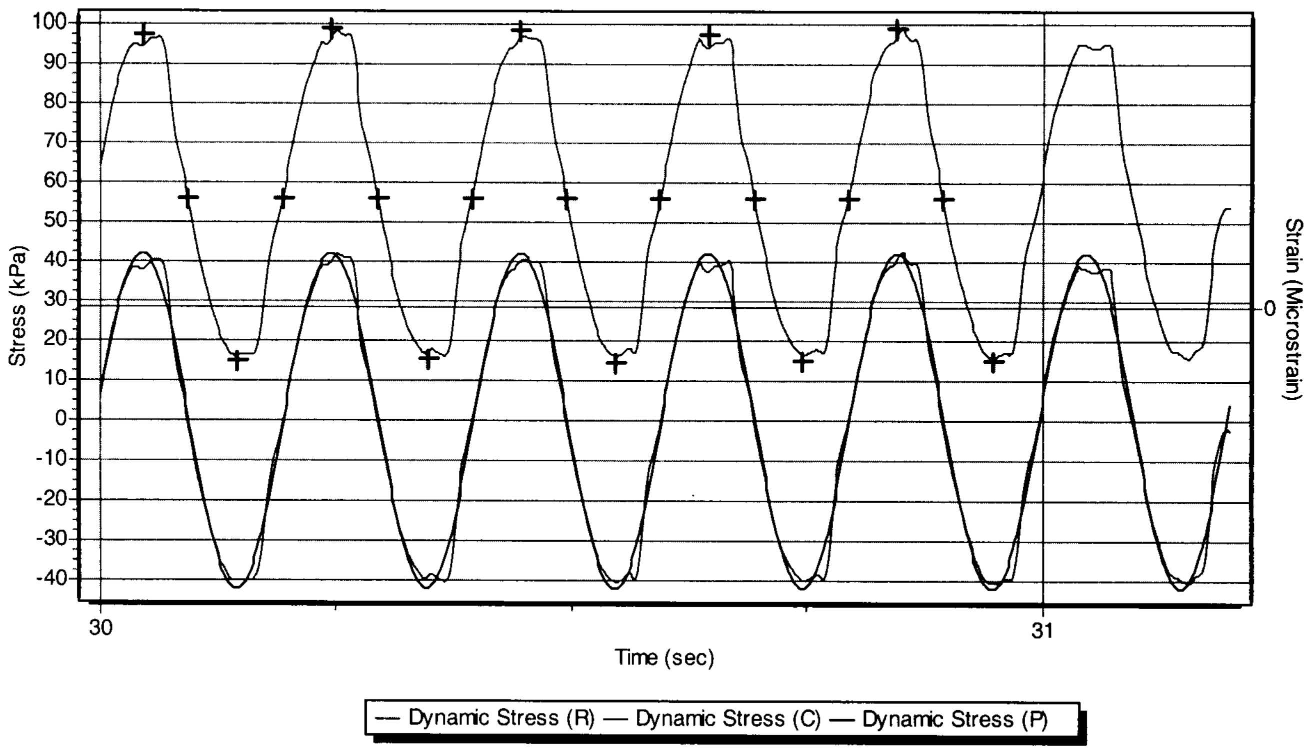

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 5:55 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 106
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.6	83.3	83.8	82.5	84.3	83.3
Recoverable axial micro-strain	1233.8	1237.7	1229.9	1219.7	1251.2	1234.5
Permanent axial micro-strain	317	312	305	299	321	
Dynamic modulus (MPa)	67.0	67.3	68.2	67.7	67.4	67.5
Phase angle (Deg)	6.59	8.30	7.39	8.39	6.89	7.51
Dyn.Modulus/sine(phase angle)	1165.7	930.4	1057.1	924.6	1120.7	1039.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.649	0.655	0.658	0.648	0.662	0.654
Maximum load (kN)	0.765 (30.046s)	0.777 (30.246s)	0.773 (30.445s)	0.765 (30.646s)	0.778 (30.846s)	0.772
Minimum load (kN)	0.117 (30.145s)	0.122 (30.347s)	0.115 (30.546s)	0.117 (30.746s)	0.116 (30.945s)	0.117
Maximum averaged axial (mm)	0.097 (30.050s)	0.098 (30.251s)	0.098 (30.449s)	0.098 (30.650s)	0.099 (30.849s)	0.098
Minimum averaged axial (mm)	-0.034 (30.151s)	-0.033 (30.351s)	-0.032 (30.550s)	-0.032 (30.750s)	-0.034 (30.951s)	-0.033
Maximum axial #1 (mm)	0.097 (30.050s)	0.098 (30.252s)	0.098 (30.451s)	0.097 (30.651s)	0.098 (30.850s)	0.098
Minimum axial #1 (mm)	-0.036 (30.151s)	-0.034 (30.351s)	-0.034 (30.551s)	-0.032 (30.750s)	-0.035 (30.951s)	-0.034
Maximum axial #2 (mm)	0.098 (30.050s)	0.099 (30.250s)	0.099 (30.449s)	0.098 (30.649s)	0.099 (30.849s)	0.098
Minimum axial #2 (mm)	-0.032 (30.150s)	-0.032 (30.350s)	-0.031 (30.550s)	-0.032 (30.751s)	-0.033 (30.951s)	-0.032

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#12

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	106						106	

Cross-Sectional Area: 7853.982
Volume: 832522.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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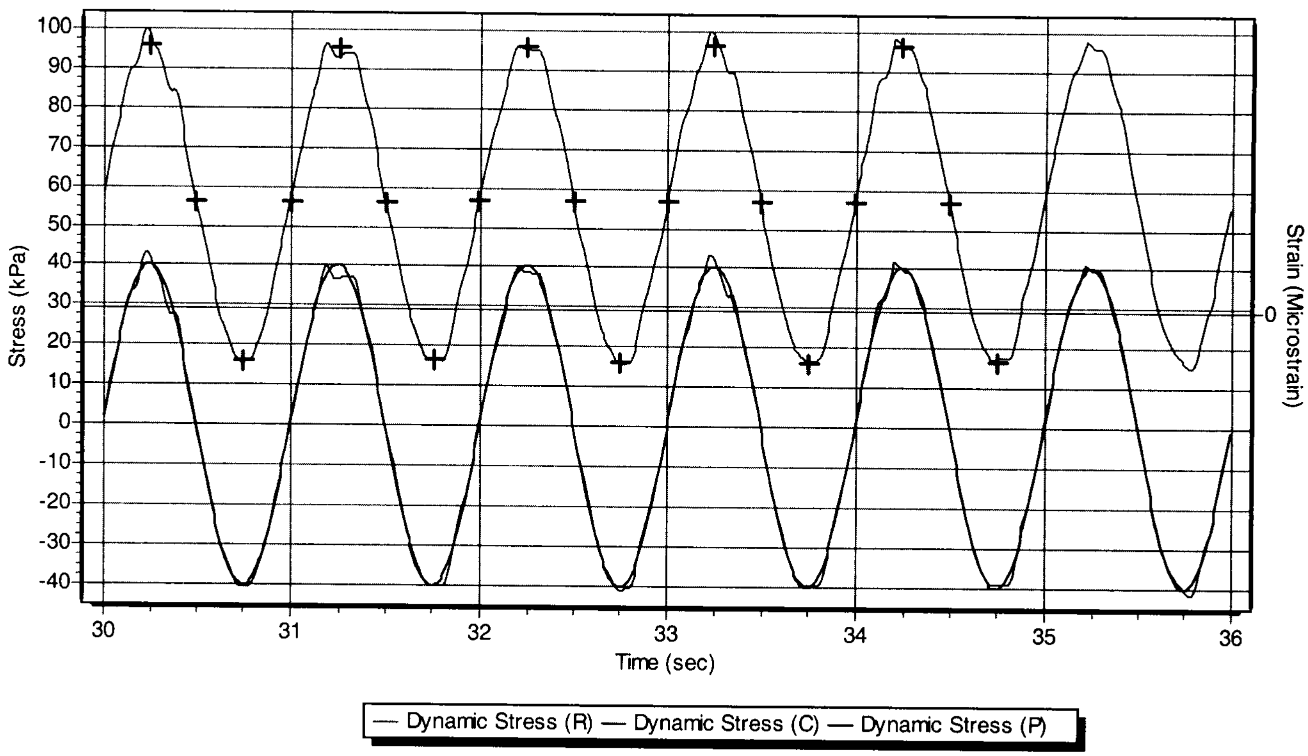

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:00 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.2	79.2	79.9	80.2	80.3	80.0
Recoverable axial micro-strain	1596.2	1576.6	1577.5	1579.9	1581.9	1582.4
Permanent axial micro-strain	153	186	191	211	226	
Dynamic modulus (MPa)	50.3	50.2	50.6	50.8	50.7	50.5
Phase angle (Deg)	6.87	4.40	6.75	6.80	6.25	6.22
Dyn.Modulus/sine(phase angle)	839.5	1308.4	859.5	856.3	930.1	958.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.630	0.622	0.627	0.630	0.630	0.628
Maximum load (kN)	0.756 (30.240s)	0.752 (31.250s)	0.753 (32.243s)	0.759 (33.242s)	0.760 (34.237s)	0.756
Minimum load (kN)	0.126 (30.742s)	0.129 (31.747s)	0.126 (32.744s)	0.128 (33.745s)	0.130 (34.743s)	0.128
Maximum averaged axial (mm)	0.182 (30.259s)	0.183 (31.262s)	0.184 (32.262s)	0.186 (33.261s)	0.188 (34.254s)	0.185
Minimum averaged axial (mm)	0.016 (30.764s)	0.019 (31.765s)	0.020 (32.762s)	0.022 (33.765s)	0.024 (34.765s)	0.020
Maximum axial #1 (mm)	0.181 (30.260s)	0.182 (31.263s)	0.183 (32.262s)	0.185 (33.259s)	0.187 (34.255s)	0.184
Minimum axial #1 (mm)	0.017 (30.764s)	0.021 (31.766s)	0.021 (32.762s)	0.023 (33.765s)	0.024 (34.765s)	0.021
Maximum axial #2 (mm)	0.183 (30.258s)	0.185 (31.263s)	0.185 (32.263s)	0.187 (33.262s)	0.189 (34.253s)	0.186
Minimum axial #2 (mm)	0.014 (30.763s)	0.019 (31.766s)	0.019 (32.763s)	0.021 (33.765s)	0.023 (34.764s)	0.019

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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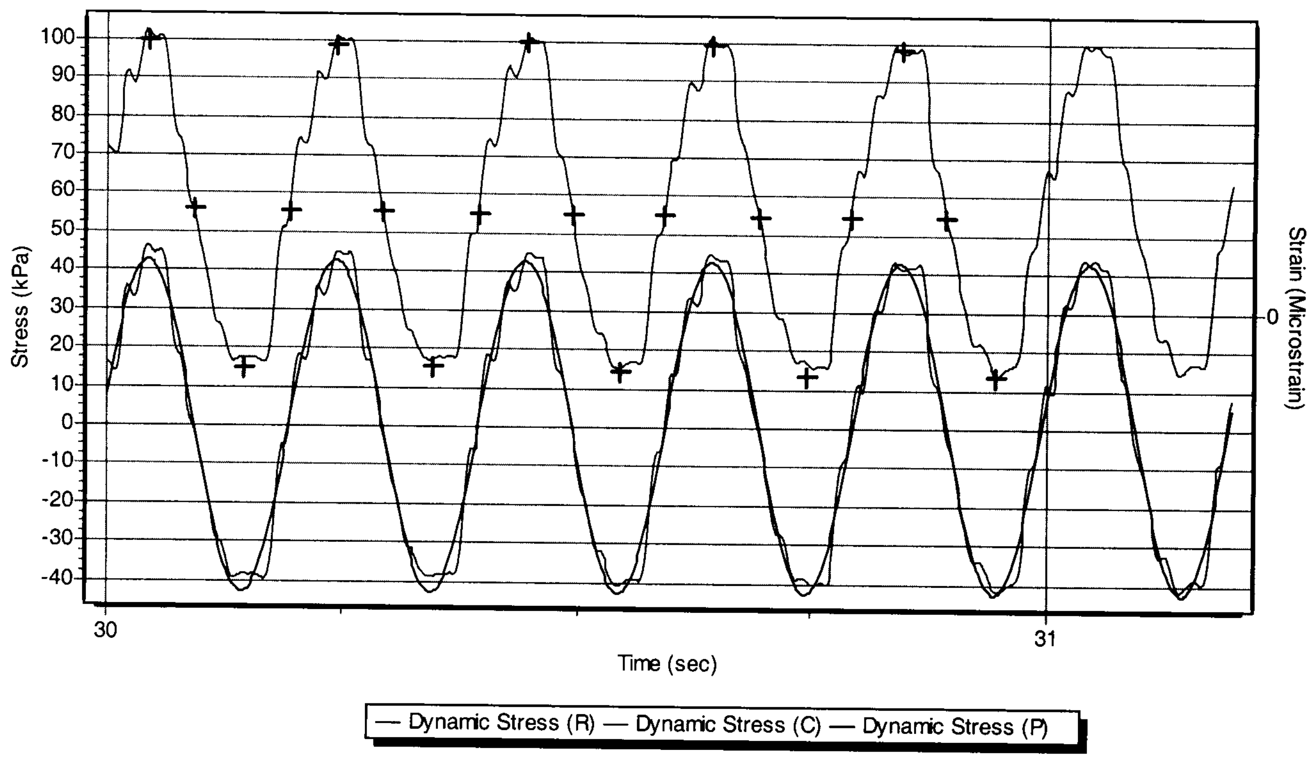

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:00 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.9	83.7	85.5	85.6	84.9	84.9
Recoverable axial micro-strain	1516.4	1497.5	1537.9	1512.4	1595.9	1532.0
Permanent axial micro-strain	480	470	503	484	550	
Dynamic modulus (MPa)	56.0	55.9	55.6	56.6	53.2	55.4
Phase angle (Deg)	6.41	6.69	5.72	6.74	8.72	6.86
Dyn.Modulus/sine(phase angle)	1001.2	956.9	1113.4	962.8	699.8	946.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.667	0.657	0.671	0.672	0.667	0.667
Maximum load (kN)	0.785 (30.044s)	0.778 (30.245s)	0.783 (30.446s)	0.779 (30.644s)	0.774 (30.846s)	0.780
Minimum load (kN)	0.118 (30.147s)	0.121 (30.346s)	0.112 (30.545s)	0.107 (30.746s)	0.107 (30.945s)	0.113
Maximum averaged axial (mm)	0.108 (30.048s)	0.107 (30.249s)	0.108 (30.449s)	0.107 (30.647s)	0.109 (30.851s)	0.108
Minimum averaged axial (mm)	-0.050 (30.148s)	-0.049 (30.349s)	-0.052 (30.550s)	-0.050 (30.747s)	-0.057 (30.949s)	-0.052
Maximum axial #1 (mm)	0.105 (30.048s)	0.105 (30.249s)	0.105 (30.449s)	0.105 (30.648s)	0.107 (30.851s)	0.105
Minimum axial #1 (mm)	-0.051 (30.148s)	-0.054 (30.351s)	-0.053 (30.550s)	-0.051 (30.747s)	-0.058 (30.948s)	-0.053
Maximum axial #2 (mm)	0.111 (30.047s)	0.109 (30.249s)	0.110 (30.449s)	0.109 (30.647s)	0.111 (30.850s)	0.110
Minimum axial #2 (mm)	-0.049 (30.148s)	-0.048 (30.350s)	-0.052 (30.549s)	-0.050 (30.749s)	-0.056 (30.949s)	-0.051

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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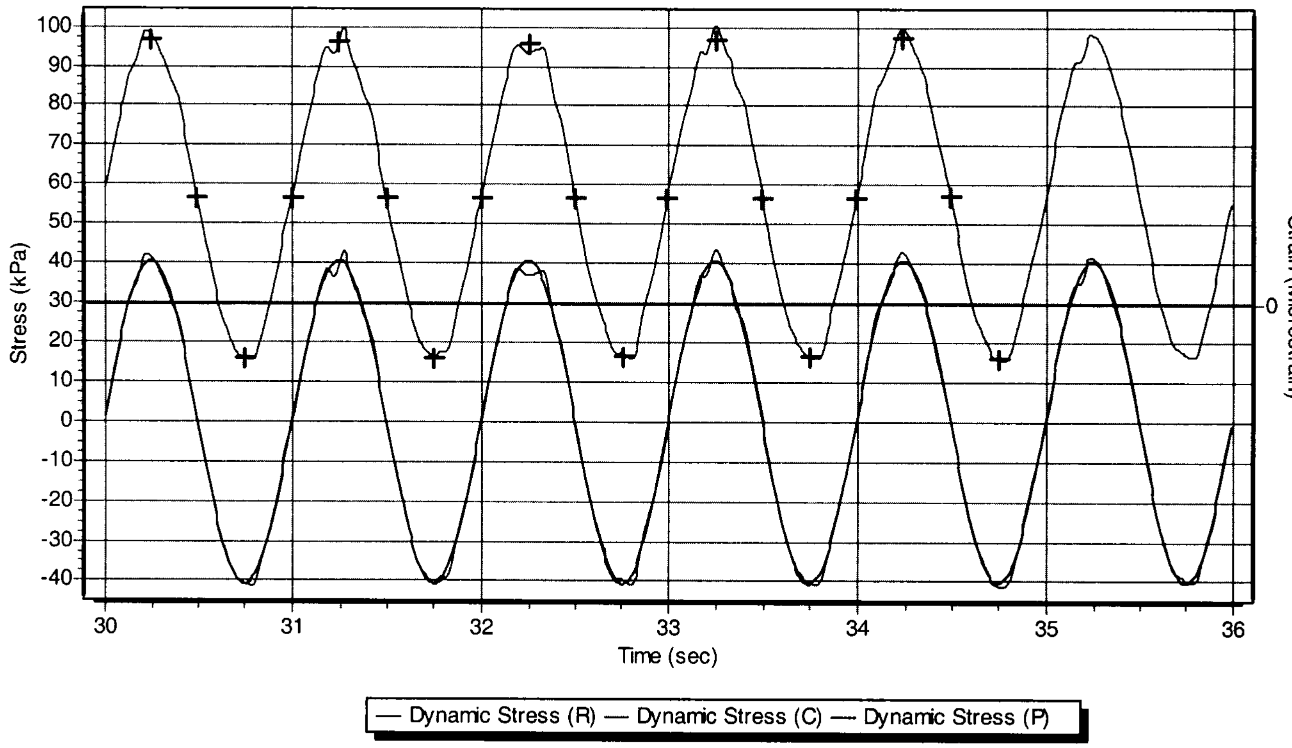

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:04 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	80.5	79.4	80.5	81.1	80.5
Recoverable axial micro-strain	1564.8	1557.7	1544.8	1554.6	1558.5	1556.1
Permanent axial micro-strain	431	452	475	491	497	
Dynamic modulus (MPa)	51.7	51.7	51.4	51.8	52.0	51.7
Phase angle (Deg)	7.62	7.71	5.06	6.89	7.17	6.89
Dyn.Modulus/sine(phase angle)	777.6	768.8	1164.3	861.6	832.0	880.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.632	0.624	0.632	0.637	0.632
Maximum load (kN)	0.760 (30.241s)	0.758 (31.246s)	0.753 (32.249s)	0.762 (33.245s)	0.763 (34.241s)	0.759
Minimum load (kN)	0.125 (30.745s)	0.126 (31.744s)	0.130 (32.748s)	0.130 (33.746s)	0.126 (34.744s)	0.127
Maximum averaged axial (mm)	0.210 (30.262s)	0.211 (31.268s)	0.212 (32.263s)	0.215 (33.264s)	0.216 (34.261s)	0.213
Minimum averaged axial (mm)	0.045 (30.765s)	0.048 (31.761s)	0.050 (32.767s)	0.052 (33.766s)	0.052 (34.763s)	0.049
Maximum axial #1 (mm)	0.205 (30.261s)	0.206 (31.268s)	0.207 (32.262s)	0.209 (33.264s)	0.210 (34.260s)	0.207
Minimum axial #1 (mm)	0.042 (30.765s)	0.045 (31.761s)	0.047 (32.767s)	0.049 (33.766s)	0.049 (34.764s)	0.047
Maximum axial #2 (mm)	0.214 (30.264s)	0.216 (31.267s)	0.217 (32.262s)	0.220 (33.264s)	0.222 (34.262s)	0.218
Minimum axial #2 (mm)	0.048 (30.765s)	0.050 (31.761s)	0.053 (32.767s)	0.054 (33.766s)	0.055 (34.763s)	0.052

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#14

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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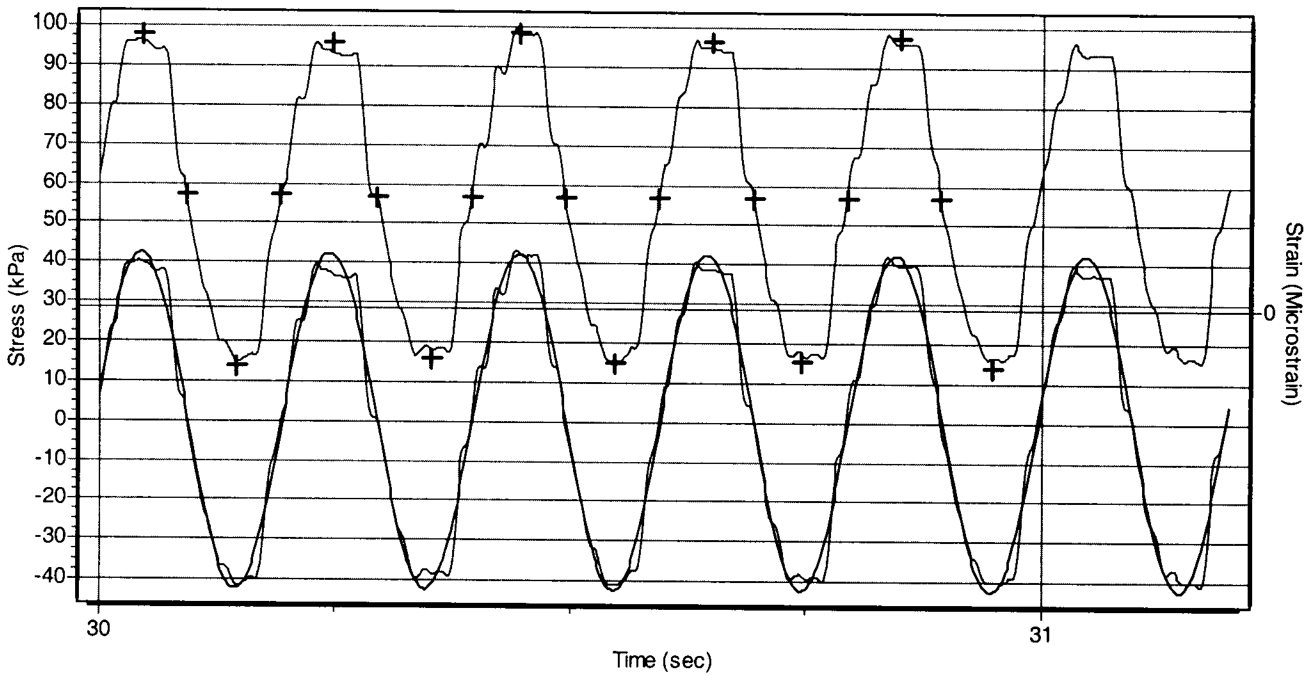


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:04 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.4	79.9	83.8	81.6	83.7	82.7
Recoverable axial micro-strain	1509.7	1432.8	1518.5	1450.0	1464.0	1475.0
Permanent axial micro-strain	483	423	480	426	425	
Dynamic modulus (MPa)	55.9	55.8	55.2	56.2	57.2	56.1
Phase angle (Deg)	5.04	5.28	6.96	0.61	2.64	4.11
Dyn.Modulus/sine(phase angle)	1271.8	1211.5	909.2	10523.2	2478.6	3278.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.663	0.628	0.658	0.641	0.657	0.649
Maximum load (kN)	0.772 (30.046s)	0.753 (30.247s)	0.776 (30.445s)	0.760 (30.650s)	0.767 (30.848s)	0.766
Minimum load (kN)	0.109 (30.145s)	0.126 (30.351s)	0.118 (30.547s)	0.120 (30.745s)	0.109 (30.946s)	0.116
Maximum averaged axial (mm)	0.108 (30.049s)	0.106 (30.250s)	0.109 (30.448s)	0.107 (30.650s)	0.109 (30.850s)	0.108
Minimum averaged axial (mm)	-0.051 (30.149s)	-0.044 (30.345s)	-0.050 (30.550s)	-0.045 (30.747s)	-0.045 (30.950s)	-0.047
Maximum axial #1 (mm)	0.105 (30.049s)	0.103 (30.250s)	0.106 (30.449s)	0.104 (30.650s)	0.106 (30.850s)	0.105
Minimum axial #1 (mm)	-0.051 (30.149s)	-0.045 (30.355s)	-0.046 (30.551s)	-0.045 (30.747s)	-0.045 (30.950s)	-0.046
Maximum axial #2 (mm)	0.111 (30.049s)	0.110 (30.250s)	0.112 (30.450s)	0.111 (30.650s)	0.112 (30.849s)	0.111
Minimum axial #2 (mm)	-0.051 (30.149s)	-0.044 (30.345s)	-0.051 (30.550s)	-0.045 (30.748s)	-0.045 (30.950s)	-0.047

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#14

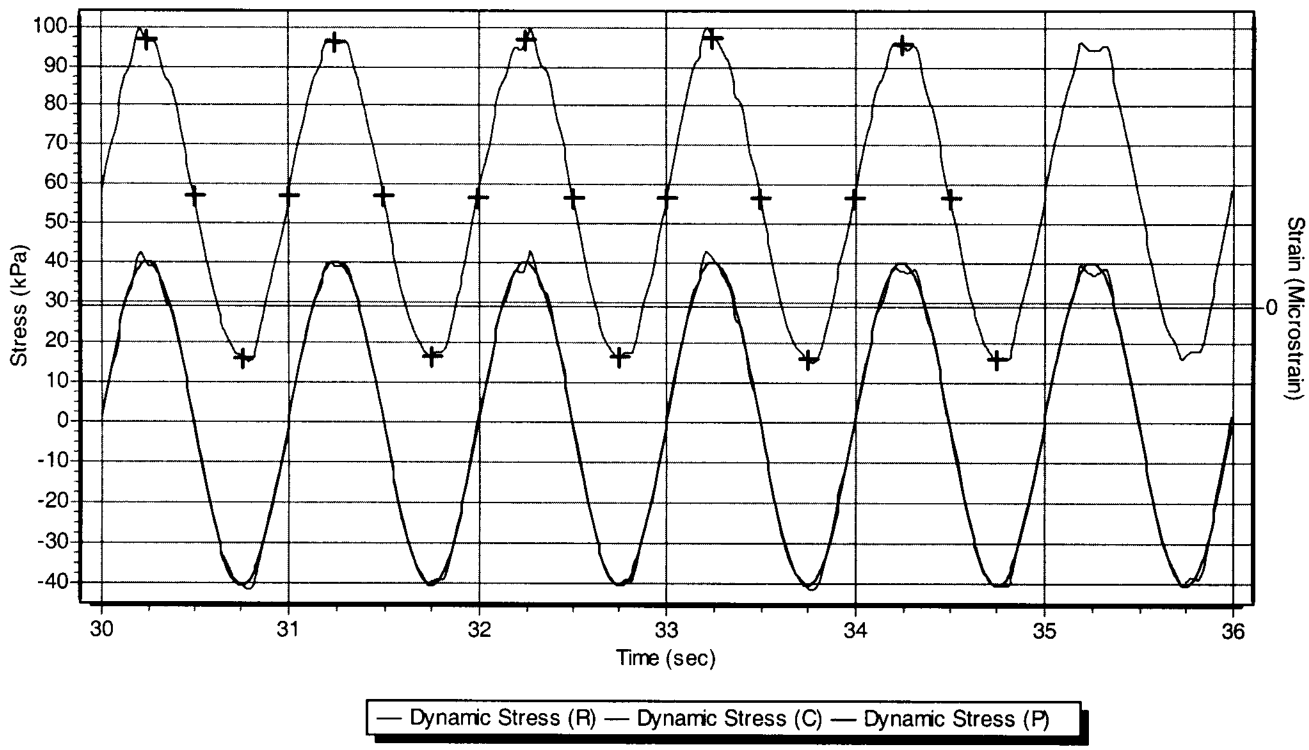
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#15.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:09 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	79.7	80.2	81.2	79.4	80.2
Recoverable axial micro-strain	1518.3	1509.6	1491.7	1521.3	1485.5	1505.3
Permanent axial micro-strain	14	32	62	48	79	
Dynamic modulus (MPa)	53.0	52.8	53.8	53.4	53.4	53.3
Phase angle (Deg)	6.40	6.94	6.05	6.49	6.31	6.44
Dyn.Modulus/sine(phase angle)	949.3	872.0	1018.3	942.5	971.7	950.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.626	0.630	0.638	0.623	0.630
Maximum load (kN)	0.760 (30.243s)	0.758 (31.243s)	0.760 (32.248s)	0.765 (33.239s)	0.751 (34.244s)	0.759
Minimum load (kN)	0.128 (30.748s)	0.132 (31.742s)	0.130 (32.745s)	0.127 (33.743s)	0.127 (34.744s)	0.129
Maximum averaged axial (mm)	0.161 (30.261s)	0.162 (31.262s)	0.163 (32.265s)	0.165 (33.257s)	0.164 (34.262s)	0.163
Minimum averaged axial (mm)	0.002 (30.766s)	0.003 (31.759s)	0.007 (32.766s)	0.005 (33.764s)	0.008 (34.766s)	0.005
Maximum axial #1 (mm)	0.162 (30.260s)	0.163 (31.263s)	0.165 (32.264s)	0.166 (33.256s)	0.166 (34.263s)	0.164
Minimum axial #1 (mm)	0.008 (30.766s)	0.009 (31.759s)	0.012 (32.766s)	0.011 (33.763s)	0.013 (34.764s)	0.011
Maximum axial #2 (mm)	0.159 (30.261s)	0.161 (31.262s)	0.162 (32.265s)	0.163 (33.258s)	0.163 (34.261s)	0.162
Minimum axial #2 (mm)	-0.004 (30.767s)	-0.003 (31.759s)	0.001 (32.766s)	-0.001 (33.764s)	0.003 (34.766s)	-0.001

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#15

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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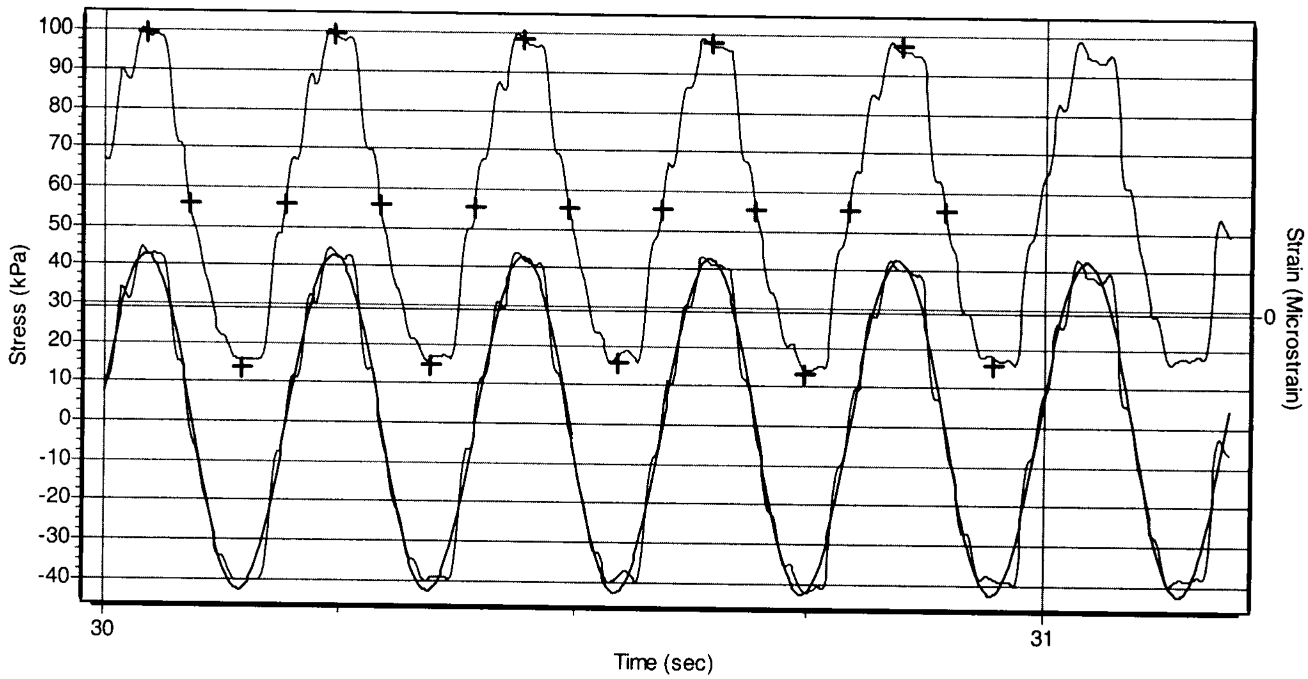

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:09 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 105
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	86.0	84.6	82.8	84.9	82.0	84.1
Recoverable axial micro-strain	1452.7	1440.0	1426.7	1520.4	1426.1	1453.2
Permanent axial micro-strain	525	518	508	588	508	
Dynamic modulus (MPa)	59.2	58.7	58.0	55.9	57.5	57.9
Phase angle (Deg)	6.39	9.40	6.41	2.99	4.30	5.90
Dyn.Modulus/sine(phase angle)	1063.1	716.4	1037.6	2139.2	1532.9	1297.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.676	0.664	0.650	0.667	0.644	0.660
Maximum load (kN)	0.782 (30.044s)	0.781 (30.244s)	0.775 (30.444s)	0.771 (30.646s)	0.766 (30.848s)	0.775
Minimum load (kN)	0.107 (30.146s)	0.117 (30.346s)	0.125 (30.545s)	0.104 (30.746s)	0.122 (30.945s)	0.115
Maximum averaged axial (mm)	0.097 (30.047s)	0.097 (30.249s)	0.096 (30.448s)	0.098 (30.647s)	0.096 (30.850s)	0.097
Minimum averaged axial (mm)	-0.055 (30.149s)	-0.054 (30.350s)	-0.053 (30.549s)	-0.062 (30.750s)	-0.053 (30.948s)	-0.056
Maximum axial #1 (mm)	0.097 (30.048s)	0.097 (30.250s)	0.097 (30.448s)	0.099 (30.648s)	0.097 (30.851s)	0.097
Minimum axial #1 (mm)	-0.052 (30.150s)	-0.052 (30.350s)	-0.050 (30.549s)	-0.058 (30.750s)	-0.051 (30.949s)	-0.053
Maximum axial #2 (mm)	0.097 (30.047s)	0.096 (30.249s)	0.096 (30.447s)	0.097 (30.647s)	0.096 (30.850s)	0.097
Minimum axial #2 (mm)	-0.063 (30.150s)	-0.057 (30.350s)	-0.056 (30.548s)	-0.065 (30.750s)	-0.056 (30.948s)	-0.059

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#15

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	105						105	

Cross-Sectional Area: 7853.982
Volume: 824668.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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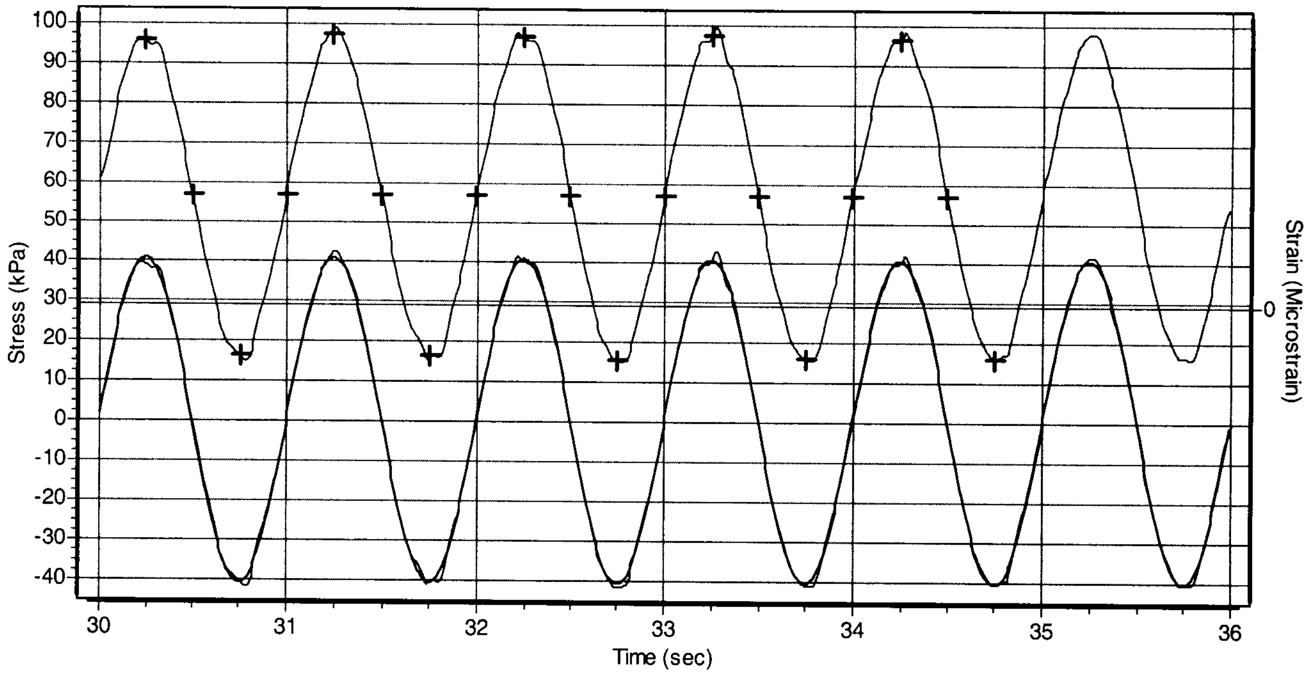

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:14 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	79.9	81.0	81.5	81.3	80.6	80.9
Recoverable axial micro-strain	1585.0	1574.2	1601.0	1584.9	1571.8	1583.4
Permanent axial micro-strain	580	615	604	630	661	
Dynamic modulus (MPa)	50.4	51.5	50.9	51.3	51.3	51.1
Phase angle (Deg)	6.95	6.68	8.48	6.54	6.98	7.13
Dyn.Modulus/sine(phase angle)	831.8	883.5	688.5	900.0	842.0	829.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.627	0.636	0.640	0.639	0.633	0.635
Maximum load (kN)	0.756 (30.245s)	0.764 (31.243s)	0.762 (32.242s)	0.764 (33.246s)	0.760 (34.248s)	0.761
Minimum load (kN)	0.129 (30.747s)	0.128 (31.744s)	0.122 (32.743s)	0.125 (33.746s)	0.127 (34.743s)	0.126
Maximum averaged axial (mm)	0.225 (30.264s)	0.228 (31.262s)	0.229 (32.266s)	0.230 (33.264s)	0.232 (34.267s)	0.229
Minimum averaged axial (mm)	0.060 (30.766s)	0.064 (31.766s)	0.063 (32.764s)	0.066 (33.765s)	0.069 (34.766s)	0.064
Maximum axial #1 (mm)	0.219 (30.264s)	0.221 (31.262s)	0.223 (32.266s)	0.224 (33.264s)	0.225 (34.267s)	0.222
Minimum axial #1 (mm)	0.058 (30.767s)	0.061 (31.766s)	0.059 (32.764s)	0.062 (33.765s)	0.065 (34.766s)	0.061
Maximum axial #2 (mm)	0.231 (30.264s)	0.234 (31.262s)	0.236 (32.265s)	0.237 (33.265s)	0.239 (34.267s)	0.235
Minimum axial #2 (mm)	0.063 (30.766s)	0.067 (31.766s)	0.066 (32.765s)	0.069 (33.765s)	0.072 (34.764s)	0.068

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#16

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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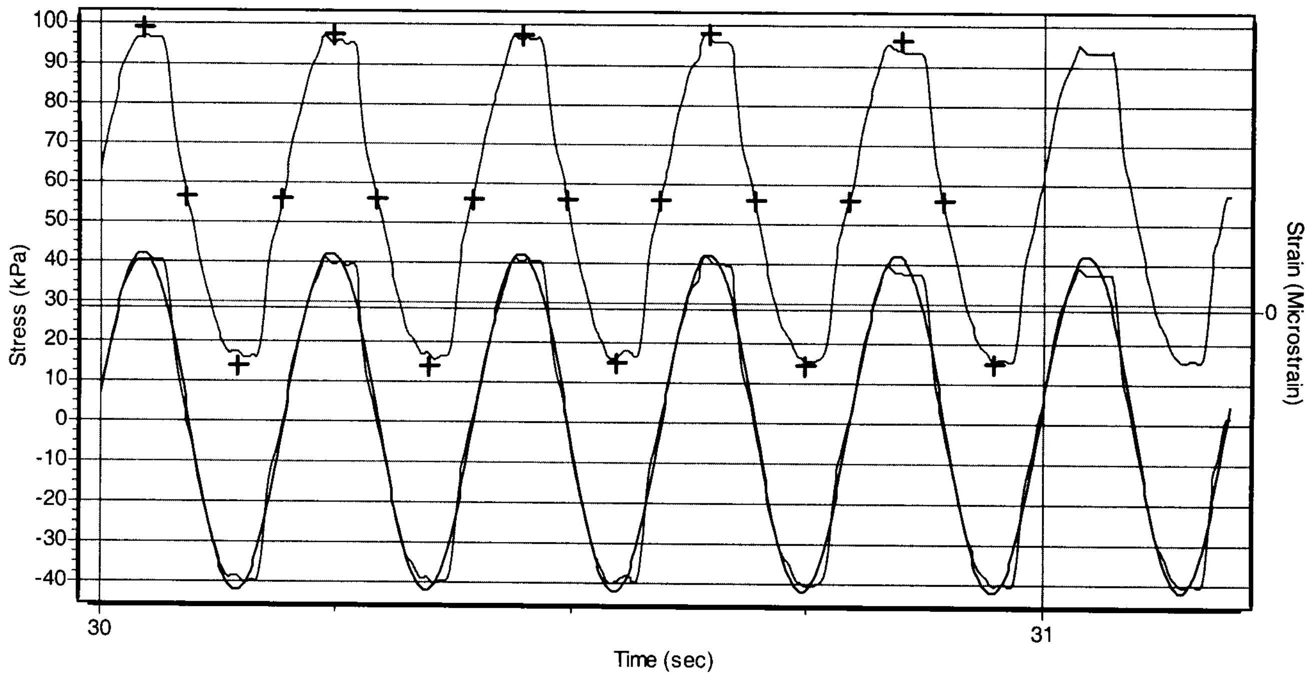

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:14 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.7	83.1	82.5	83.5	81.2	83.0
Recoverable axial micro-strain	1503.8	1526.4	1480.4	1525.3	1488.9	1504.9
Permanent axial micro-strain	415	448	400	442	417	
Dynamic modulus (MPa)	56.3	54.4	55.7	54.8	54.5	55.2
Phase angle (Deg)	5.67	5.13	6.33	5.91	-0.12	4.58
Dyn.Modulus/sine(phase angle)	1139.4	1214.7	1009.8	1062.0	-51187.0	-9352.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.665	0.652	0.648	0.656	0.638	0.652
Maximum load (kN)	0.776 (30.046s)	0.763 (30.247s)	0.765 (30.446s)	0.768 (30.646s)	0.755 (30.850s)	0.765
Minimum load (kN)	0.110 (30.146s)	0.110 (30.346s)	0.117 (30.546s)	0.112 (30.746s)	0.117 (30.947s)	0.113
Maximum averaged axial (mm)	0.113 (30.049s)	0.112 (30.250s)	0.112 (30.450s)	0.113 (30.649s)	0.112 (30.849s)	0.112
Minimum averaged axial (mm)	-0.043 (30.150s)	-0.047 (30.351s)	-0.042 (30.550s)	-0.046 (30.751s)	-0.043 (30.950s)	-0.044
Maximum axial #1 (mm)	0.108 (30.049s)	0.107 (30.250s)	0.107 (30.450s)	0.107 (30.649s)	0.106 (30.850s)	0.107
Minimum axial #1 (mm)	-0.044 (30.150s)	-0.047 (30.351s)	-0.043 (30.550s)	-0.047 (30.750s)	-0.044 (30.950s)	-0.045
Maximum axial #2 (mm)	0.118 (30.049s)	0.118 (30.250s)	0.118 (30.450s)	0.118 (30.649s)	0.116 (30.850s)	0.118
Minimum axial #2 (mm)	-0.042 (30.150s)	-0.042 (30.350s)	-0.041 (30.550s)	-0.042 (30.751s)	-0.042 (30.950s)	-0.042

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#16

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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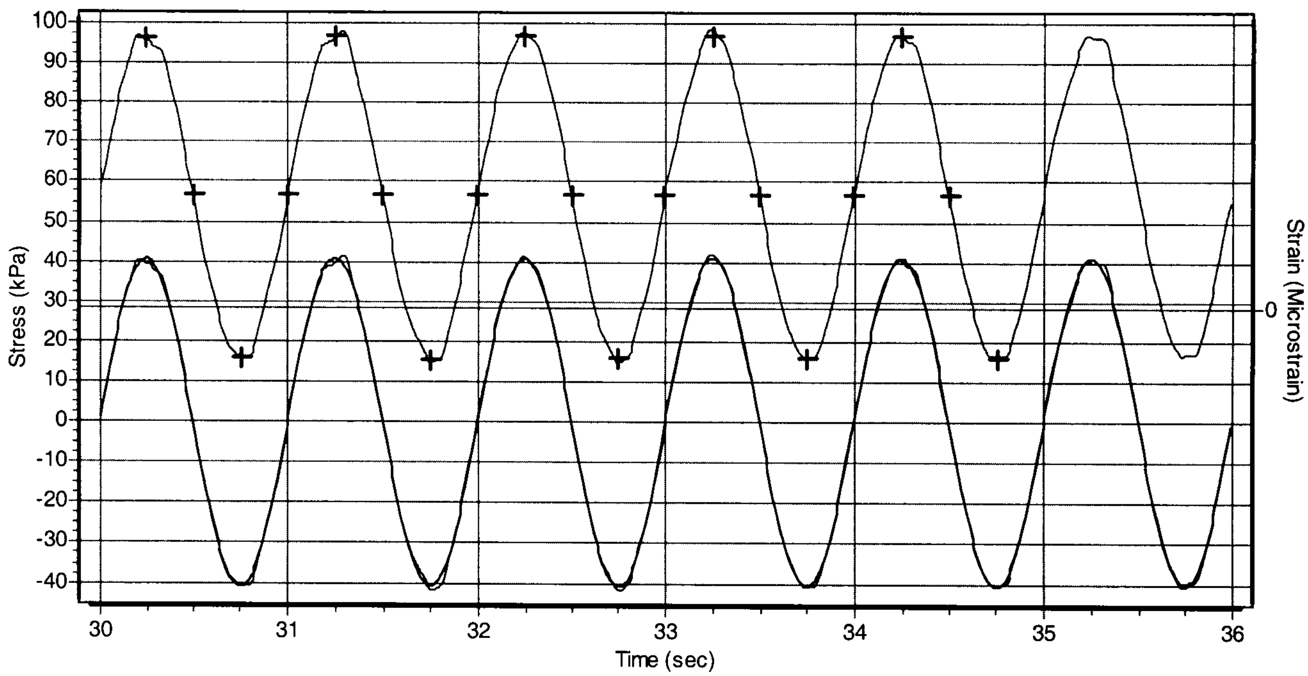

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:18 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.4	81.3	81.3	81.2	80.8	81.0
Recoverable axial micro-strain	1452.9	1464.8	1459.2	1451.8	1435.2	1452.8
Permanent axial micro-strain	16	8	2	23	48	
Dynamic modulus (MPa)	55.3	55.5	55.7	55.9	56.3	55.7
Phase angle (Deg)	6.56	6.20	7.48	6.15	6.56	6.59
Dyn.Modulus/sine(phase angle)	967.6	1026.5	853.8	1042.1	984.1	974.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.631	0.638	0.638	0.638	0.635	0.636
Maximum load (kN)	0.758 (30.244s)	0.761 (31.246s)	0.762 (32.243s)	0.763 (33.244s)	0.761 (34.244s)	0.761
Minimum load (kN)	0.127 (30.749s)	0.123 (31.745s)	0.124 (32.745s)	0.126 (33.745s)	0.126 (34.747s)	0.125
Maximum averaged axial (mm)	0.148 (30.262s)	0.150 (31.263s)	0.151 (32.264s)	0.152 (33.262s)	0.153 (34.262s)	0.151
Minimum averaged axial (mm)	-0.002 (30.769s)	-0.001 (31.765s)	0.000 (32.764s)	0.002 (33.765s)	0.005 (34.766s)	0.001
Maximum axial #1 (mm)	0.140 (30.262s)	0.142 (31.263s)	0.142 (32.263s)	0.143 (33.262s)	0.144 (34.265s)	0.142
Minimum axial #1 (mm)	-0.005 (30.769s)	-0.004 (31.765s)	-0.004 (32.764s)	-0.002 (33.765s)	0.001 (34.765s)	-0.003
Maximum axial #2 (mm)	0.156 (30.262s)	0.158 (31.263s)	0.159 (32.265s)	0.161 (33.261s)	0.162 (34.261s)	0.159
Minimum axial #2 (mm)	0.002 (30.769s)	0.002 (31.763s)	0.004 (32.764s)	0.006 (33.765s)	0.009 (34.766s)	0.005

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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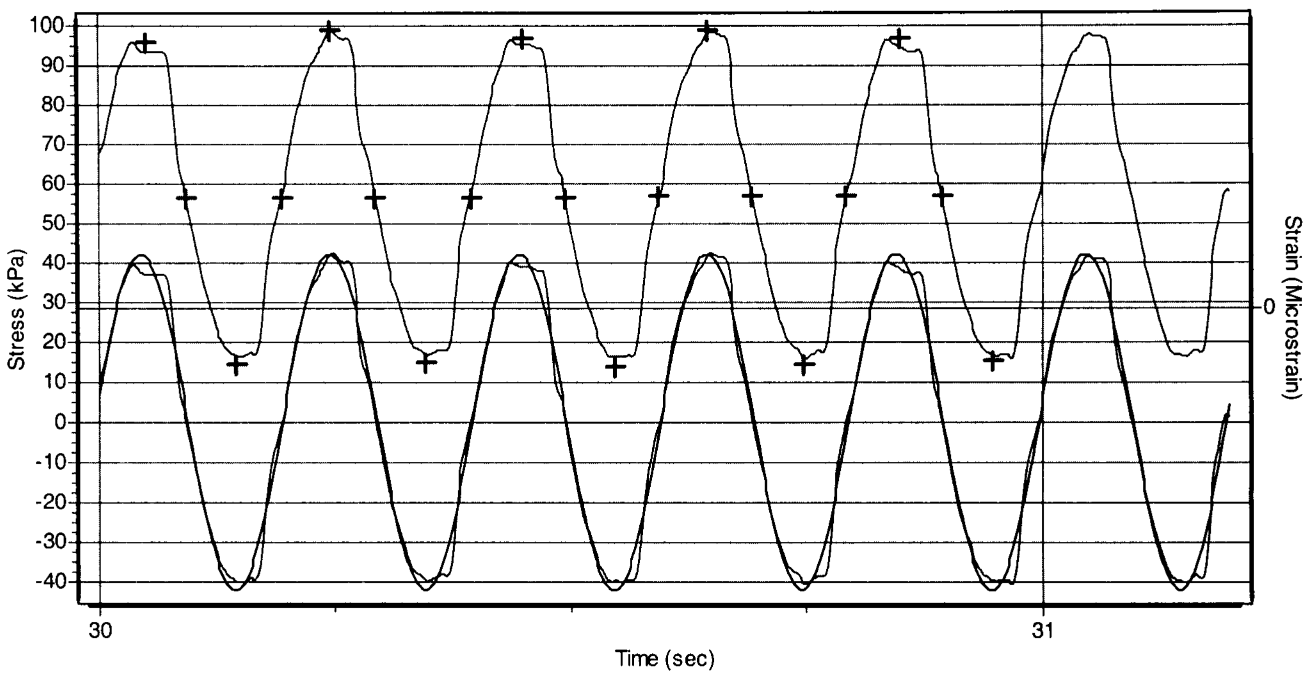

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:18 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 103
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.7	83.7	83.1	84.6	81.2	82.9
Recoverable axial micro-strain	1345.7	1362.5	1372.1	1379.8	1372.0	1366.4
Permanent axial micro-strain	459	459	467	465	461	
Dynamic modulus (MPa)	60.7	61.4	60.5	61.3	59.2	60.6
Phase angle (Deg)	5.66	6.08	-1.01	8.26	-1.21	3.56
Dyn.Modulus/sine(phase angle)	1229.1	1159.0	-6900.3	851.4	-5621.0	-1856.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.657	0.652	0.665	0.638	0.651
Maximum load (kN)	0.754 (30.050s)	0.776 (30.245s)	0.763 (30.449s)	0.777 (30.645s)	0.760 (30.849s)	0.766
Minimum load (kN)	0.112 (30.146s)	0.119 (30.345s)	0.111 (30.546s)	0.113 (30.746s)	0.122 (30.947s)	0.115
Maximum averaged axial (mm)	0.091 (30.053s)	0.093 (30.249s)	0.093 (30.449s)	0.094 (30.650s)	0.094 (30.849s)	0.093
Minimum averaged axial (mm)	-0.047 (30.150s)	-0.047 (30.350s)	-0.048 (30.551s)	-0.048 (30.751s)	-0.048 (30.951s)	-0.048
Maximum axial #1 (mm)	0.080 (30.051s)	0.081 (30.248s)	0.081 (30.451s)	0.082 (30.650s)	0.082 (30.848s)	0.081
Minimum axial #1 (mm)	-0.049 (30.150s)	-0.052 (30.349s)	-0.050 (30.551s)	-0.054 (30.750s)	-0.050 (30.950s)	-0.051
Maximum axial #2 (mm)	0.103 (30.052s)	0.105 (30.249s)	0.105 (30.449s)	0.106 (30.649s)	0.106 (30.849s)	0.105
Minimum axial #2 (mm)	-0.046 (30.151s)	-0.045 (30.351s)	-0.046 (30.552s)	-0.046 (30.751s)	-0.046 (30.951s)	-0.046

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	103						103	

Cross-Sectional Area: 7853.982
Volume: 808960.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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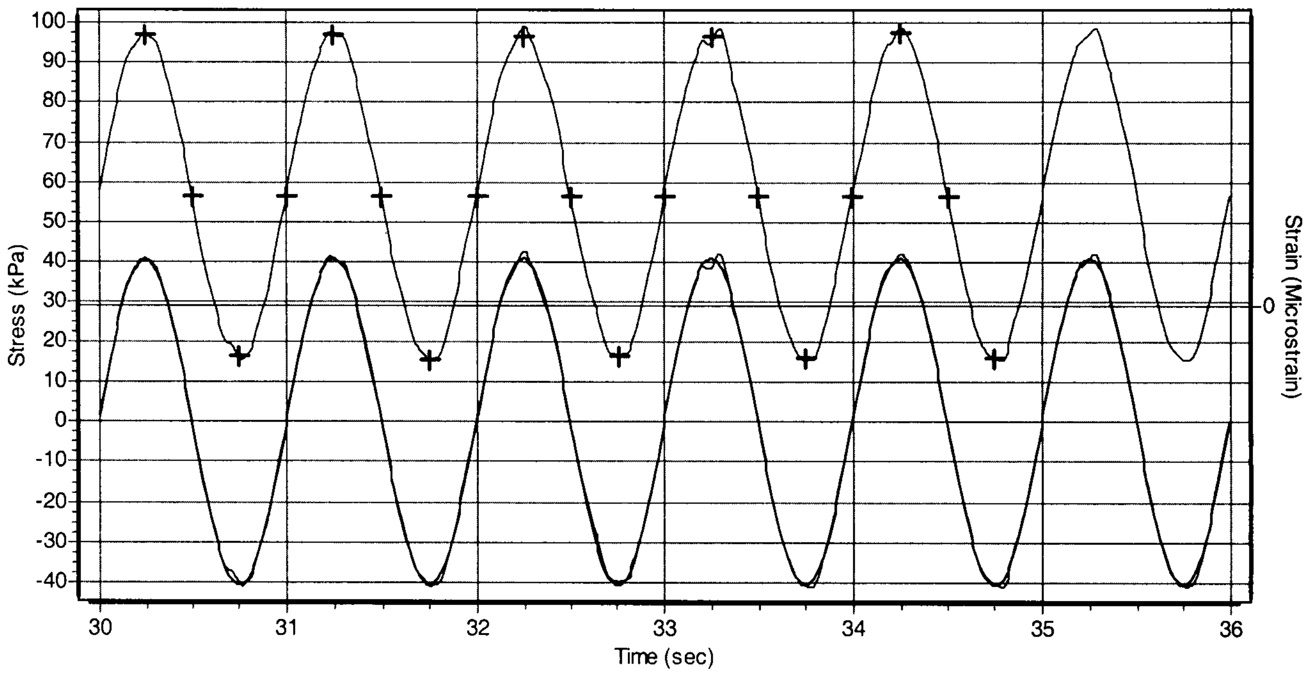


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:23 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	81.4	80.2	80.7	81.4	80.8
Recoverable axial micro-strain	1469.7	1476.0	1475.0	1480.6	1499.6	1480.2
Permanent axial micro-strain	487	488	510	521	530	
Dynamic modulus (MPa)	54.8	55.1	54.4	54.5	54.3	54.6
Phase angle (Deg)	7.71	7.54	7.82	6.84	7.56	7.49
Dyn.Modulus/sine(phase angle)	814.7	838.7	797.8	914.2	823.7	837.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.639	0.630	0.634	0.639	0.635
Maximum load (kN)	0.761 (30.243s)	0.763 (31.241s)	0.761 (32.244s)	0.759 (33.247s)	0.766 (34.244s)	0.762
Minimum load (kN)	0.129 (30.744s)	0.124 (31.744s)	0.131 (32.748s)	0.125 (33.745s)	0.127 (34.746s)	0.127
Maximum averaged axial (mm)	0.203 (30.264s)	0.204 (31.262s)	0.206 (32.266s)	0.208 (33.266s)	0.211 (34.265s)	0.207
Minimum averaged axial (mm)	0.051 (30.764s)	0.051 (31.766s)	0.053 (32.765s)	0.054 (33.767s)	0.055 (34.766s)	0.053
Maximum axial #1 (mm)	0.209 (30.264s)	0.210 (31.264s)	0.211 (32.265s)	0.214 (33.266s)	0.216 (34.266s)	0.212
Minimum axial #1 (mm)	0.056 (30.765s)	0.055 (31.766s)	0.058 (32.765s)	0.059 (33.767s)	0.059 (34.767s)	0.057
Maximum axial #2 (mm)	0.198 (30.264s)	0.199 (31.262s)	0.202 (32.267s)	0.203 (33.266s)	0.206 (34.265s)	0.201
Minimum axial #2 (mm)	0.045 (30.764s)	0.046 (31.766s)	0.048 (32.765s)	0.049 (33.766s)	0.051 (34.765s)	0.048

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#18

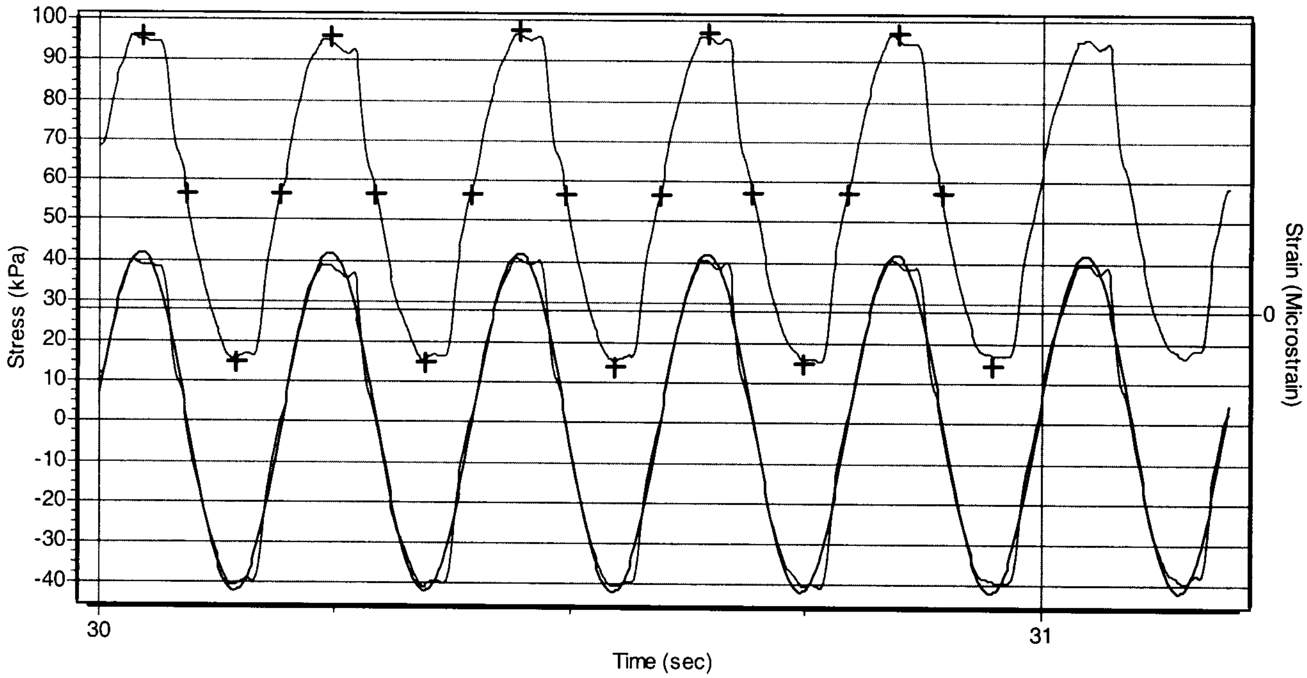
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#18.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:23 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 104
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	81.4	83.4	82.2	82.5	82.2
Recoverable axial micro-strain	1390.1	1384.3	1397.5	1402.6	1390.8	1393.1
Permanent axial micro-strain	475	474	473	480	467	
Dynamic modulus (MPa)	58.5	58.8	59.7	58.6	59.3	59.0
Phase angle (Deg)	4.80	3.21	8.75	8.05	5.58	6.08
Dyn.Modulus/sine(phase angle)	1398.2	2098.0	782.0	834.9	1219.4	1266.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.639	0.655	0.646	0.648	0.645
Maximum load (kN)	0.757 (30.047s)	0.756 (30.246s)	0.767 (30.445s)	0.765 (30.645s)	0.763 (30.846s)	0.762
Minimum load (kN)	0.118 (30.145s)	0.117 (30.345s)	0.112 (30.545s)	0.119 (30.747s)	0.115 (30.946s)	0.116
Maximum averaged axial (mm)	0.095 (30.050s)	0.095 (30.248s)	0.096 (30.450s)	0.096 (30.650s)	0.096 (30.849s)	0.096
Minimum averaged axial (mm)	-0.049 (30.150s)	-0.049 (30.350s)	-0.049 (30.551s)	-0.050 (30.751s)	-0.049 (30.950s)	-0.049
Maximum axial #1 (mm)	0.093 (30.049s)	0.092 (30.247s)	0.094 (30.450s)	0.093 (30.650s)	0.094 (30.850s)	0.093
Minimum axial #1 (mm)	-0.049 (30.149s)	-0.049 (30.350s)	-0.049 (30.550s)	-0.049 (30.751s)	-0.048 (30.950s)	-0.049
Maximum axial #2 (mm)	0.098 (30.048s)	0.097 (30.248s)	0.099 (30.449s)	0.099 (30.650s)	0.099 (30.849s)	0.098
Minimum axial #2 (mm)	-0.050 (30.151s)	-0.050 (30.351s)	-0.050 (30.551s)	-0.050 (30.751s)	-0.049 (30.951s)	-0.050

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#18

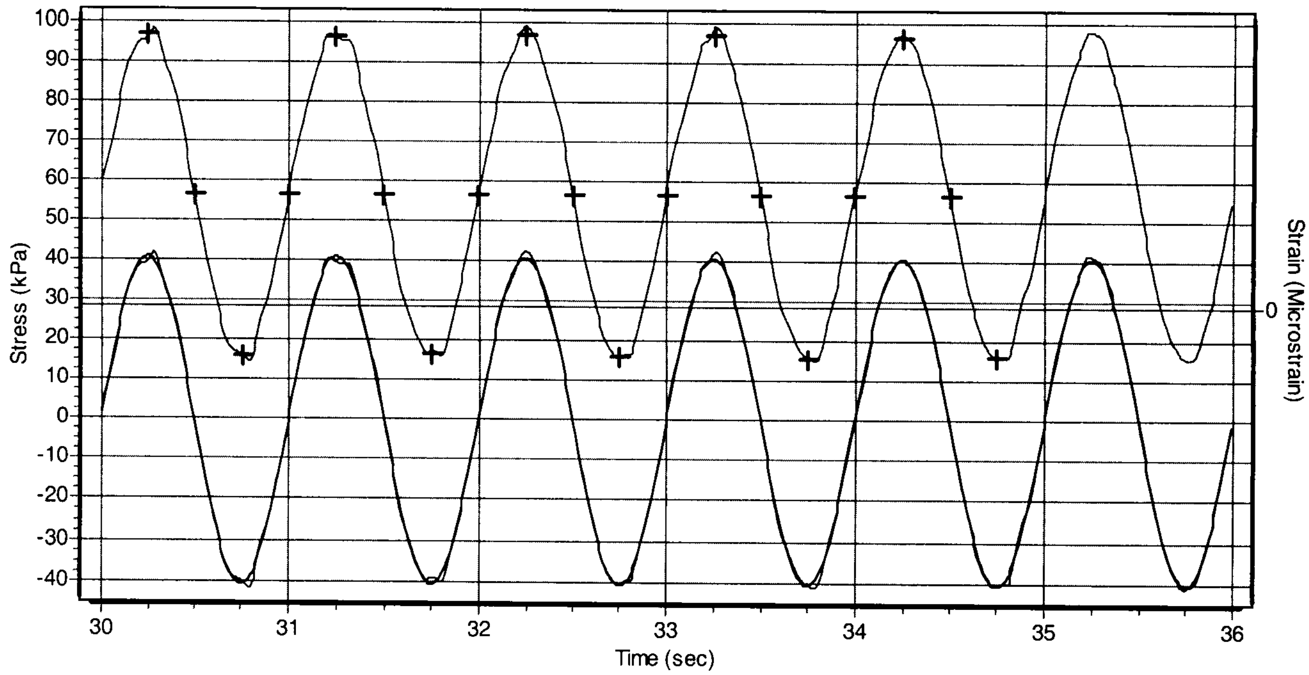
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	104						104	

Cross-Sectional Area: 7853.982
Volume: 816814.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: [illegible] 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#19.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.1	80.2	81.3	81.2	80.6	80.9
Recoverable axial micro-strain	1333.9	1322.4	1335.6	1332.3	1324.2	1329.7
Permanent axial micro-strain	44	23	27	17	8	
Dynamic modulus (MPa)	60.8	60.7	60.9	60.9	60.9	60.8
Phase angle (Deg)	5.91	7.62	7.31	6.47	6.74	6.81
Dyn.Modulus/sine(phase angle)	1179.1	913.1	954.7	1080.2	1035.4	1032.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.630	0.638	0.637	0.633	0.635
Maximum load (kN)	0.762 (30.248s)	0.760 (31.243s)	0.764 (32.243s)	0.763 (33.246s)	0.760 (34.245s)	0.762
Minimum load (kN)	0.125 (30.747s)	0.130 (31.745s)	0.125 (32.744s)	0.125 (33.744s)	0.127 (34.746s)	0.127
Maximum averaged axial (mm)	0.129 (30.264s)	0.130 (31.265s)	0.131 (32.263s)	0.131 (33.264s)	0.132 (34.263s)	0.131
Minimum averaged axial (mm)	-0.004 (30.766s)	-0.002 (31.765s)	-0.003 (32.761s)	-0.002 (33.763s)	-0.001 (34.767s)	-0.002
Maximum axial #1 (mm)	0.122 (30.265s)	0.124 (31.265s)	0.124 (32.263s)	0.125 (33.266s)	0.125 (34.264s)	0.124
Minimum axial #1 (mm)	-0.003 (30.767s)	-0.001 (31.766s)	-0.001 (32.761s)	0.000 (33.763s)	0.001 (34.768s)	-0.001
Maximum axial #2 (mm)	0.136 (30.264s)	0.137 (31.262s)	0.138 (32.262s)	0.138 (33.262s)	0.138 (34.263s)	0.137
Minimum axial #2 (mm)	-0.006 (30.765s)	-0.004 (31.765s)	-0.004 (32.761s)	-0.003 (33.764s)	-0.003 (34.766s)	-0.004

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#19

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 58 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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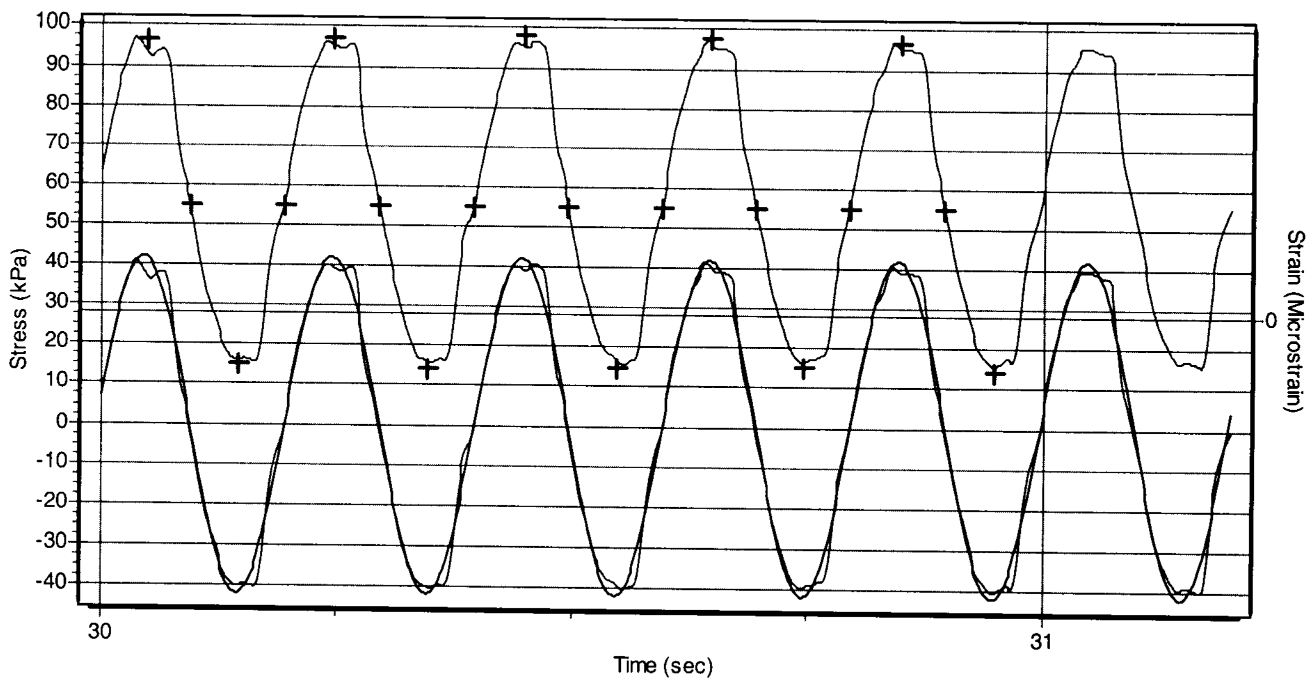


Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	83.5	83.8	82.1	82.2	82.6
Recoverable axial micro-strain	1228.2	1243.9	1297.8	1268.3	1230.3	1253.7
Permanent axial micro-strain	600	608	646	632	603	
Dynamic modulus (MPa)	66.3	67.1	64.5	64.7	66.8	65.9
Phase angle (Deg)	4.30	7.47	5.77	4.69	4.41	5.33
Dyn.Modulus/sine(phase angle)	1766.6	1030.8	1282.1	1581.3	1736.0	1479.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.656	0.658	0.645	0.646	0.649
Maximum load (kN)	0.758 (30.048s)	0.765 (30.245s)	0.772 (30.447s)	0.766 (30.645s)	0.759 (30.847s)	0.764
Minimum load (kN)	0.119 (30.146s)	0.109 (30.345s)	0.114 (30.546s)	0.121 (30.746s)	0.113 (30.945s)	0.115
Maximum averaged axial (mm)	0.063 (30.050s)	0.064 (30.249s)	0.065 (30.450s)	0.064 (30.648s)	0.063 (30.850s)	0.064
Minimum averaged axial (mm)	-0.060 (30.149s)	-0.061 (30.349s)	-0.065 (30.550s)	-0.063 (30.750s)	-0.060 (30.949s)	-0.062
Maximum axial #1 (mm)	0.058 (30.050s)	0.058 (30.251s)	0.060 (30.451s)	0.058 (30.649s)	0.057 (30.851s)	0.058
Minimum axial #1 (mm)	-0.060 (30.149s)	-0.057 (30.349s)	-0.061 (30.550s)	-0.059 (30.750s)	-0.056 (30.949s)	-0.059
Maximum axial #2 (mm)	0.068 (30.049s)	0.069 (30.248s)	0.071 (30.449s)	0.069 (30.647s)	0.068 (30.849s)	0.069
Minimum axial #2 (mm)	-0.064 (30.150s)	-0.065 (30.349s)	-0.068 (30.550s)	-0.067 (30.750s)	-0.064 (30.949s)	-0.066

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#19

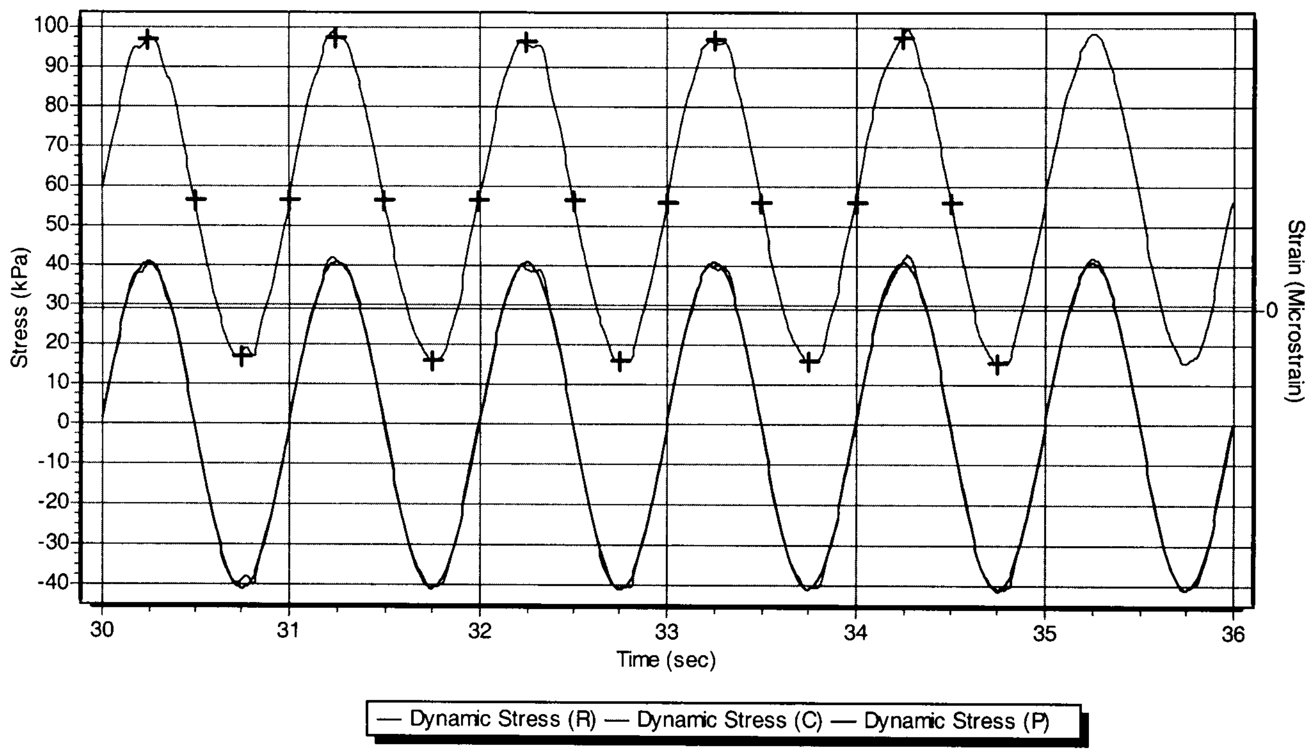
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#20.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:33 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	79.7	81.5	80.5	81.0	81.8	80.9
Recoverable axial micro-strain	1365.2	1399.3	1392.5	1394.4	1400.1	1390.3
Permanent axial micro-strain	78	60	72	76	83	
Dynamic modulus (MPa)	58.4	58.3	57.8	58.1	58.4	58.2
Phase angle (Deg)	7.30	7.79	6.61	7.24	7.17	7.22
Dyn.Modulus/sine(phase angle)	917.1	858.4	1002.3	919.6	934.2	926.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.626	0.640	0.632	0.636	0.643	0.636
Maximum load (kN)	0.762 (30.244s)	0.767 (31.242s)	0.760 (32.246s)	0.762 (33.245s)	0.764 (34.248s)	0.763
Minimum load (kN)	0.136 (30.745s)	0.127 (31.743s)	0.127 (32.745s)	0.126 (33.744s)	0.122 (34.745s)	0.127
Maximum averaged axial (mm)	0.146 (30.264s)	0.147 (31.264s)	0.148 (32.264s)	0.149 (33.265s)	0.150 (34.268s)	0.148
Minimum averaged axial (mm)	0.008 (30.768s)	0.006 (31.767s)	0.007 (32.768s)	0.008 (33.768s)	0.008 (34.768s)	0.007
Maximum axial #1 (mm)	0.147 (30.265s)	0.149 (31.265s)	0.149 (32.265s)	0.150 (33.266s)	0.151 (34.269s)	0.149
Minimum axial #1 (mm)	0.014 (30.767s)	0.012 (31.766s)	0.014 (32.767s)	0.014 (33.768s)	0.015 (34.767s)	0.014
Maximum axial #2 (mm)	0.144 (30.263s)	0.146 (31.265s)	0.147 (32.264s)	0.147 (33.264s)	0.148 (34.268s)	0.146
Minimum axial #2 (mm)	0.002 (30.768s)	-0.001 (31.764s)	0.001 (32.769s)	0.001 (33.769s)	0.002 (34.768s)	0.001

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 20'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#20

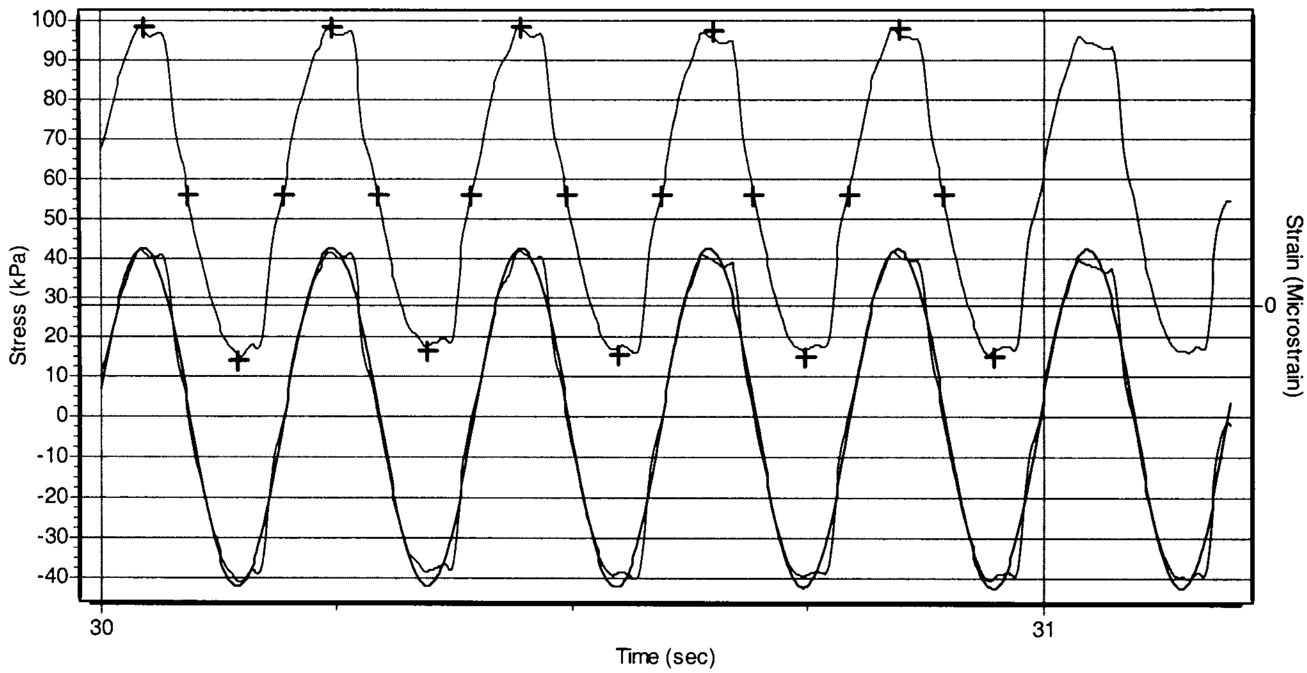
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#20.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:33 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.1	81.9	82.9	82.4	83.1	82.9
Recoverable axial micro-strain	1397.3	1322.2	1350.5	1347.7	1356.0	1354.7
Permanent axial micro-strain	675	608	635	627	640	
Dynamic modulus (MPa)	60.2	61.9	61.4	61.2	61.3	61.2
Phase angle (Deg)	9.37	9.32	10.59	5.80	7.93	8.60
Dyn.Modulus/sine(phase angle)	736.3	761.7	665.0	1207.9	885.9	851.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.660	0.643	0.651	0.647	0.652	0.651
Maximum load (kN)	0.771 (30.046s)	0.771 (30.245s)	0.770 (30.446s)	0.764 (30.649s)	0.768 (30.846s)	0.769
Minimum load (kN)	0.110 (30.146s)	0.128 (30.346s)	0.119 (30.548s)	0.117 (30.746s)	0.116 (30.947s)	0.118
Maximum averaged axial (mm)	0.073 (30.051s)	0.072 (30.250s)	0.072 (30.451s)	0.073 (30.652s)	0.072 (30.850s)	0.072
Minimum averaged axial (mm)	-0.068 (30.151s)	-0.061 (30.350s)	-0.064 (30.551s)	-0.063 (30.750s)	-0.065 (30.951s)	-0.064
Maximum axial #1 (mm)	0.076 (30.052s)	0.075 (30.252s)	0.075 (30.452s)	0.076 (30.653s)	0.076 (30.851s)	0.076
Minimum axial #1 (mm)	-0.065 (30.151s)	-0.058 (30.350s)	-0.061 (30.551s)	-0.060 (30.751s)	-0.061 (30.951s)	-0.061
Maximum axial #2 (mm)	0.070 (30.050s)	0.069 (30.249s)	0.069 (30.450s)	0.069 (30.651s)	0.069 (30.849s)	0.069
Minimum axial #2 (mm)	-0.067 (30.151s)	-0.065 (30.350s)	-0.068 (30.551s)	-0.067 (30.750s)	-0.068 (30.951s)	-0.067

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 20'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#20

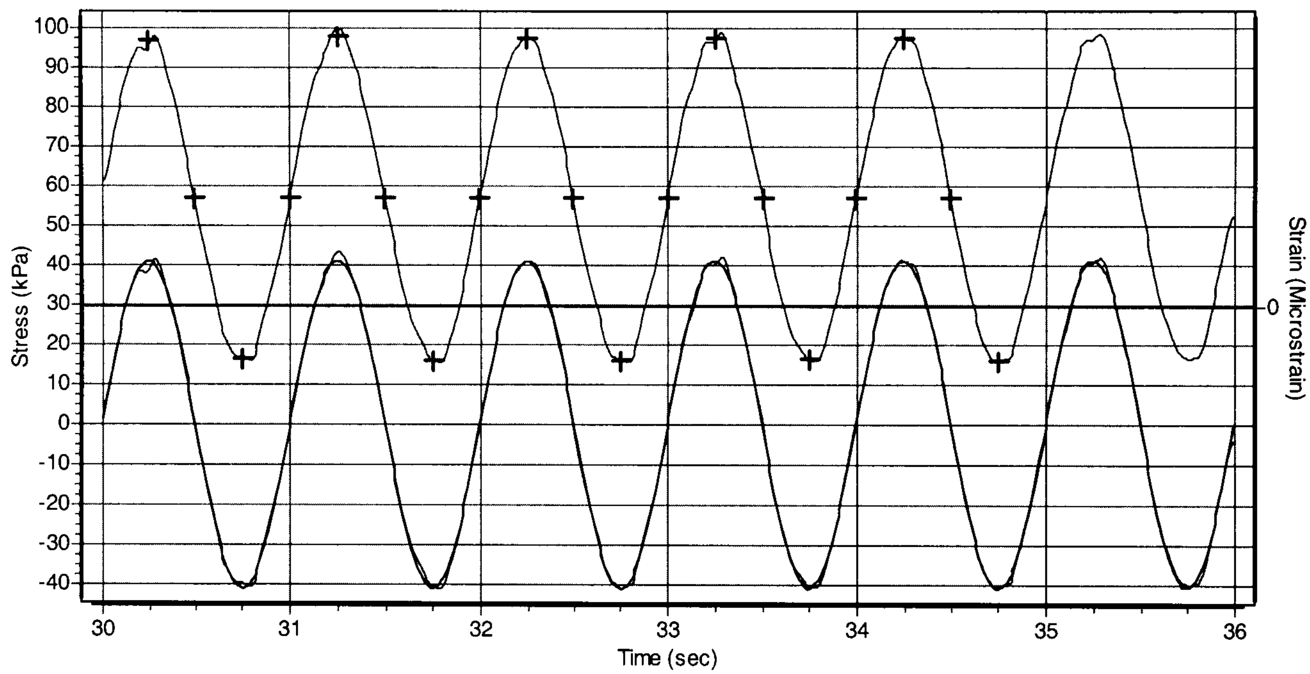
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#21.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:38 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.4	81.9	81.2	81.0	81.8	81.3
Recoverable axial micro-strain	1291.1	1306.4	1292.2	1294.0	1304.6	1297.7
Permanent axial micro-strain	173	176	186	195	199	
Dynamic modulus (MPa)	62.3	62.7	62.9	62.6	62.7	62.6
Phase angle (Deg)	6.38	6.66	6.89	6.52	8.47	6.98
Dyn.Modulus/sine(phase angle)	1119.5	1079.7	1046.9	1100.8	849.1	1039.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.643	0.638	0.636	0.643	0.638
Maximum load (kN)	0.759 (30.244s)	0.768 (31.244s)	0.763 (32.242s)	0.763 (33.247s)	0.765 (34.243s)	0.764
Minimum load (kN)	0.128 (30.742s)	0.125 (31.749s)	0.125 (32.746s)	0.127 (33.747s)	0.123 (34.742s)	0.125
Maximum averaged axial (mm)	0.148 (30.262s)	0.150 (31.263s)	0.149 (32.261s)	0.150 (33.265s)	0.152 (34.267s)	0.150
Minimum averaged axial (mm)	0.017 (30.764s)	0.018 (31.769s)	0.019 (32.765s)	0.020 (33.766s)	0.020 (34.761s)	0.019
Maximum axial #1 (mm)	0.130 (30.261s)	0.132 (31.263s)	0.131 (32.260s)	0.133 (33.266s)	0.134 (34.268s)	0.132
Minimum axial #1 (mm)	0.015 (30.763s)	0.016 (31.769s)	0.016 (32.764s)	0.017 (33.765s)	0.018 (34.759s)	0.016
Maximum axial #2 (mm)	0.166 (30.262s)	0.168 (31.262s)	0.167 (32.262s)	0.168 (33.264s)	0.170 (34.266s)	0.168
Minimum axial #2 (mm)	0.020 (30.766s)	0.020 (31.769s)	0.021 (32.765s)	0.022 (33.766s)	0.023 (34.763s)	0.021

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#21

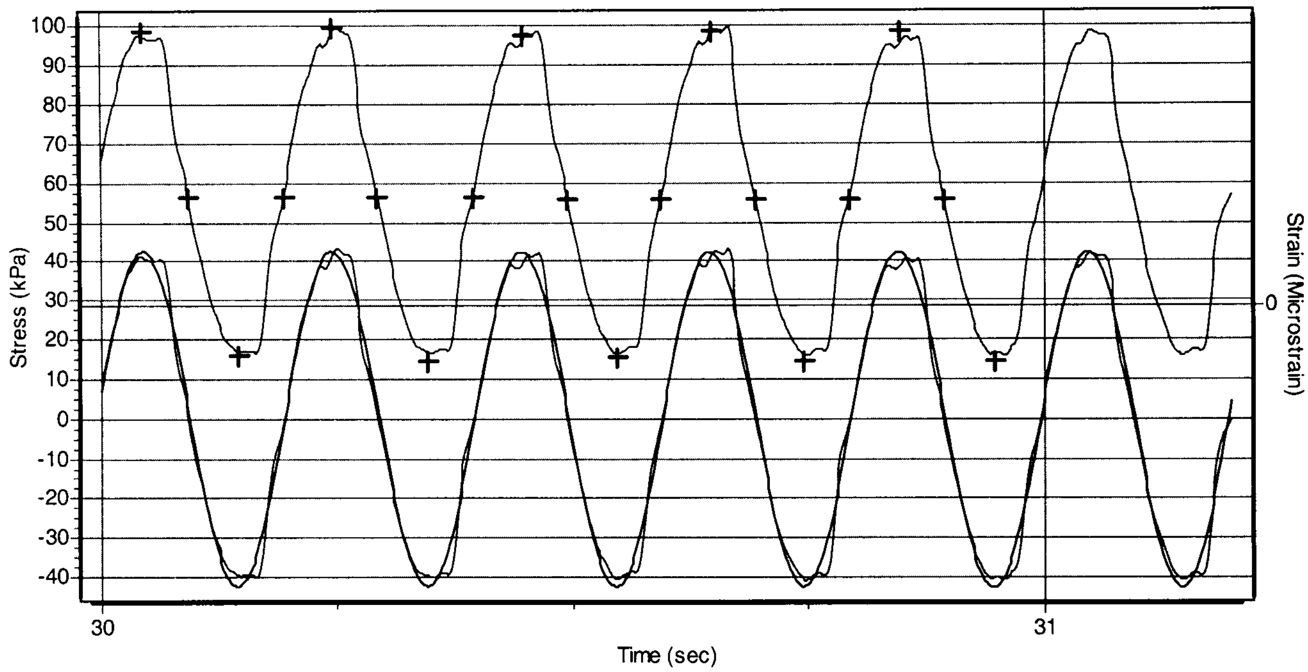
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#21.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:38 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.9	85.1	82.6	84.5	84.3	83.9
Recoverable axial micro-strain	1225.8	1228.6	1244.2	1231.0	1253.0	1236.5
Permanent axial micro-strain	571	569	590	566	598	
Dynamic modulus (MPa)	67.6	69.3	66.4	68.7	67.3	67.9
Phase angle (Deg)	7.32	5.21	6.27	6.70	7.46	6.59
Dyn.Modulus/sine(phase angle)	1059.3	1523.3	1214.8	1175.8	1033.9	1201.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.651	0.668	0.649	0.664	0.662	0.659
Maximum load (kN)	0.775 (30.045s)	0.782 (30.245s)	0.769 (30.446s)	0.776 (30.647s)	0.776 (30.846s)	0.776
Minimum load (kN)	0.124 (30.147s)	0.113 (30.346s)	0.120 (30.546s)	0.112 (30.746s)	0.113 (30.947s)	0.117
Maximum averaged axial (mm)	0.066 (30.049s)	0.067 (30.248s)	0.066 (30.449s)	0.067 (30.650s)	0.066 (30.850s)	0.066
Minimum averaged axial (mm)	-0.058 (30.151s)	-0.057 (30.350s)	-0.060 (30.550s)	-0.057 (30.750s)	-0.060 (30.951s)	-0.058
Maximum axial #1 (mm)	0.056 (30.050s)	0.056 (30.249s)	0.056 (30.450s)	0.057 (30.651s)	0.056 (30.851s)	0.056
Minimum axial #1 (mm)	-0.050 (30.150s)	-0.050 (30.349s)	-0.052 (30.549s)	-0.053 (30.750s)	-0.053 (30.951s)	-0.051
Maximum axial #2 (mm)	0.077 (30.049s)	0.077 (30.248s)	0.077 (30.448s)	0.078 (30.649s)	0.076 (30.848s)	0.077
Minimum axial #2 (mm)	-0.066 (30.151s)	-0.065 (30.350s)	-0.064 (30.551s)	-0.065 (30.751s)	-0.066 (30.951s)	-0.065

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#21

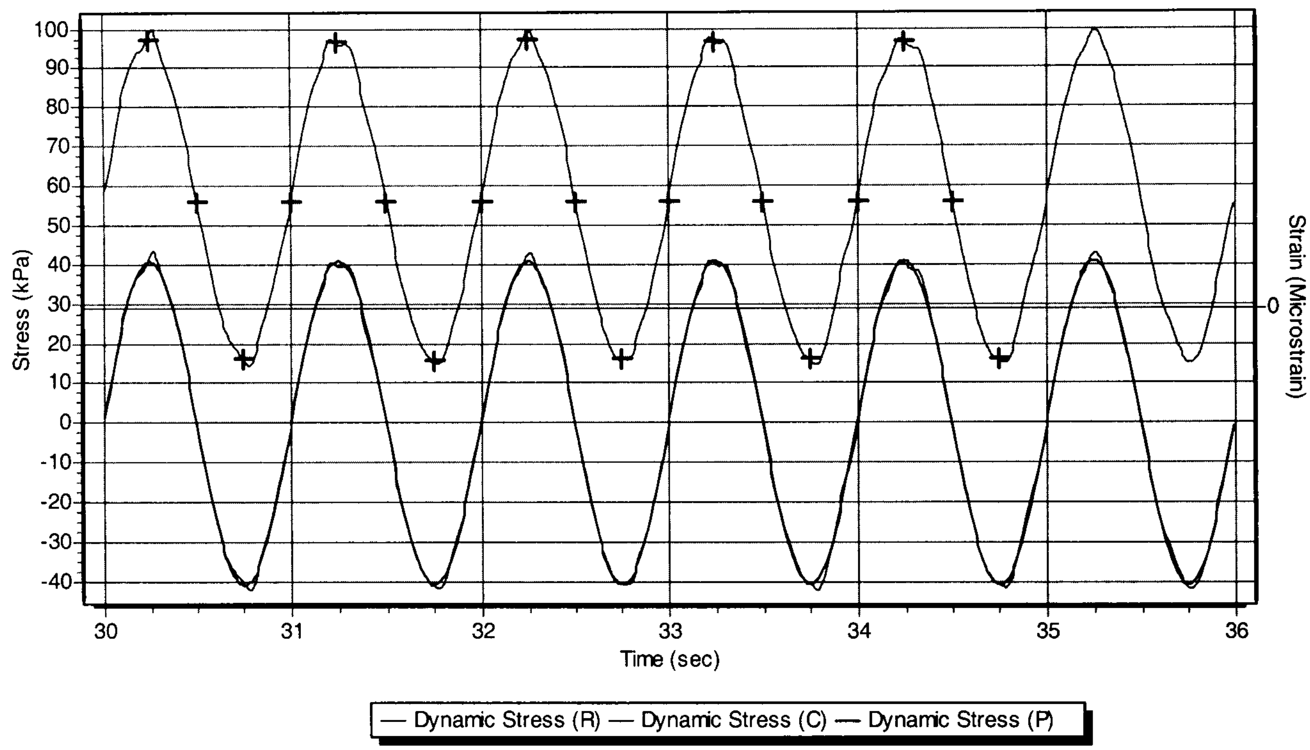
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#22.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:43 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	80.9	81.0	80.9	80.6	80.9
Recoverable axial micro-strain	1461.8	1465.6	1460.9	1465.3	1453.5	1461.4
Permanent axial micro-strain	7	11	24	32	47	
Dynamic modulus (MPa)	55.4	55.2	55.5	55.2	55.5	55.3
Phase angle (Deg)	6.32	6.12	7.34	7.53	7.01	6.86
Dyn.Modulus/sine(phase angle)	1005.9	1033.6	865.8	841.1	907.7	930.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.635	0.636	0.635	0.633	0.635
Maximum load (kN)	0.764 (30.244s)	0.759 (31.241s)	0.763 (32.246s)	0.761 (33.241s)	0.759 (34.246s)	0.761
Minimum load (kN)	0.127 (30.745s)	0.124 (31.744s)	0.127 (32.744s)	0.126 (33.749s)	0.126 (34.745s)	0.126
Maximum averaged axial (mm)	0.148 (30.261s)	0.149 (31.258s)	0.150 (32.266s)	0.151 (33.262s)	0.152 (34.265s)	0.150
Minimum averaged axial (mm)	0.001 (30.765s)	0.001 (31.762s)	0.002 (32.765s)	0.003 (33.766s)	0.005 (34.763s)	0.002
Maximum axial #1 (mm)	0.135 (30.260s)	0.136 (31.257s)	0.137 (32.267s)	0.138 (33.261s)	0.139 (34.265s)	0.137
Minimum axial #1 (mm)	-0.008 (30.764s)	-0.007 (31.762s)	-0.006 (32.764s)	-0.005 (33.765s)	-0.004 (34.763s)	-0.006
Maximum axial #2 (mm)	0.161 (30.263s)	0.162 (31.259s)	0.163 (32.266s)	0.165 (33.261s)	0.164 (34.266s)	0.163
Minimum axial #2 (mm)	0.009 (30.765s)	0.010 (31.764s)	0.011 (32.764s)	0.012 (33.766s)	0.013 (34.764s)	0.011

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#22

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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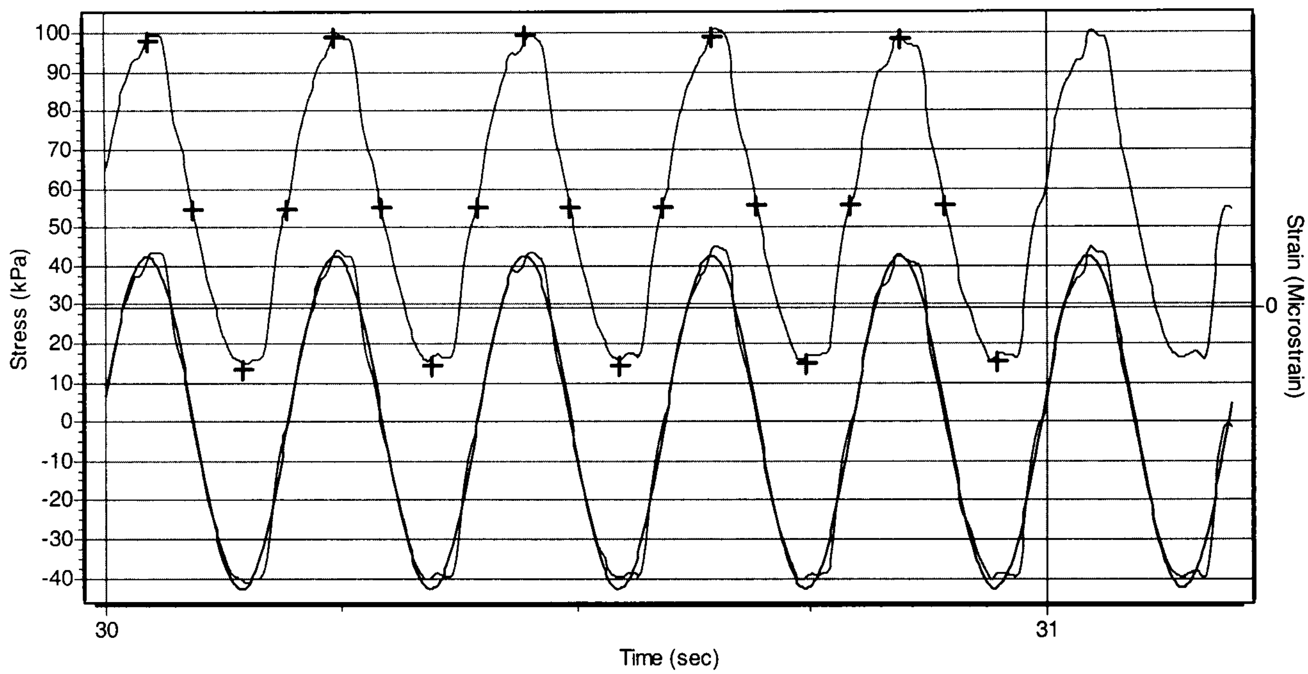

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:43 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	85.0	84.6	84.9	84.5	83.5	84.5
Recoverable axial micro-strain	1456.3	1413.5	1406.9	1408.9	1402.6	1417.6
Permanent axial micro-strain	676	628	608	612	613	
Dynamic modulus (MPa)	58.4	59.9	60.3	60.0	59.5	59.6
Phase angle (Deg)	5.42	8.62	5.22	6.30	5.81	6.27
Dyn.Modulus/sine(phase angle)	1235.2	796.4	1325.0	1091.4	1175.2	1124.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.668	0.665	0.667	0.664	0.656	0.664
Maximum load (kN)	0.771 (30.046s)	0.778 (30.245s)	0.781 (30.446s)	0.780 (30.645s)	0.776 (30.845s)	0.777
Minimum load (kN)	0.104 (30.146s)	0.114 (30.346s)	0.114 (30.546s)	0.116 (30.746s)	0.120 (30.947s)	0.114
Maximum averaged axial (mm)	0.079 (30.049s)	0.079 (30.249s)	0.081 (30.448s)	0.080 (30.649s)	0.080 (30.848s)	0.080
Minimum averaged axial (mm)	-0.068 (30.150s)	-0.063 (30.350s)	-0.061 (30.551s)	-0.062 (30.749s)	-0.062 (30.949s)	-0.063
Maximum axial #1 (mm)	0.074 (30.050s)	0.075 (30.250s)	0.076 (30.449s)	0.076 (30.650s)	0.075 (30.848s)	0.075
Minimum axial #1 (mm)	-0.069 (30.150s)	-0.065 (30.350s)	-0.066 (30.550s)	-0.065 (30.750s)	-0.063 (30.949s)	-0.066
Maximum axial #2 (mm)	0.083 (30.049s)	0.085 (30.248s)	0.086 (30.448s)	0.085 (30.648s)	0.085 (30.847s)	0.085
Minimum axial #2 (mm)	-0.063 (30.150s)	-0.063 (30.351s)	-0.061 (30.551s)	-0.061 (30.749s)	-0.061 (30.950s)	-0.062

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#22

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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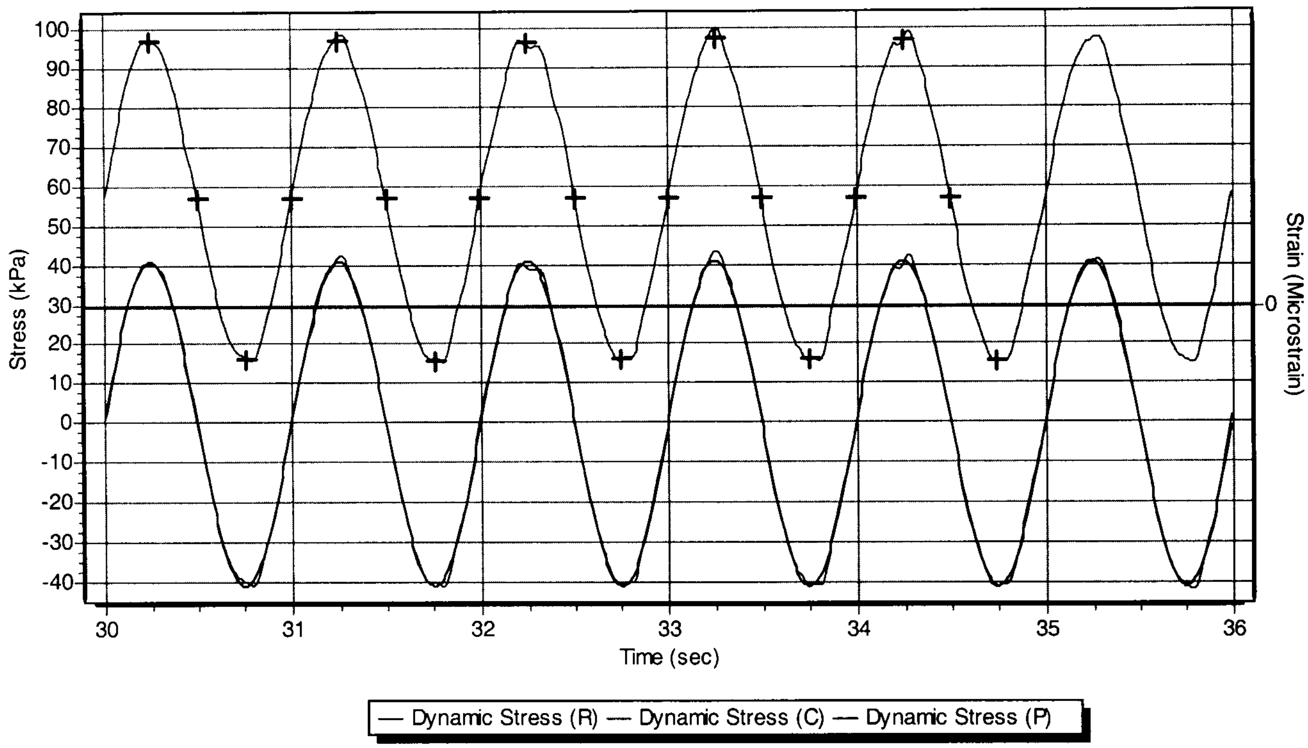


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:48 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	81.4	80.7	81.4	81.7	81.2
Recoverable axial micro-strain	1417.1	1411.2	1401.8	1409.9	1404.3	1408.9
Permanent axial micro-strain	73	61	44	39	32	
Dynamic modulus (MPa)	57.1	57.7	57.5	57.7	58.1	57.7
Phase angle (Deg)	6.86	7.46	6.25	6.86	5.65	6.62
Dyn.Modulus/sine(phase angle)	955.1	886.3	1056.4	964.8	1179.0	1008.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.639	0.634	0.639	0.641	0.638
Maximum load (kN)	0.764 (30.243s)	0.763 (31.246s)	0.760 (32.246s)	0.767 (33.245s)	0.764 (34.247s)	0.764
Minimum load (kN)	0.128 (30.749s)	0.124 (31.747s)	0.127 (32.743s)	0.128 (33.747s)	0.123 (34.741s)	0.126
Maximum averaged axial (mm)	0.136 (30.262s)	0.136 (31.267s)	0.137 (32.263s)	0.139 (33.264s)	0.139 (34.263s)	0.137
Minimum averaged axial (mm)	-0.007 (30.767s)	-0.006 (31.765s)	-0.004 (32.766s)	-0.004 (33.766s)	-0.003 (34.764s)	-0.005
Maximum axial #1 (mm)	0.132 (30.262s)	0.133 (31.267s)	0.133 (32.265s)	0.135 (33.264s)	0.135 (34.263s)	0.134
Minimum axial #1 (mm)	-0.006 (30.767s)	-0.005 (31.765s)	-0.004 (32.760s)	-0.003 (33.765s)	-0.003 (34.763s)	-0.004
Maximum axial #2 (mm)	0.139 (30.262s)	0.140 (31.266s)	0.141 (32.263s)	0.142 (33.264s)	0.142 (34.262s)	0.141
Minimum axial #2 (mm)	-0.008 (30.767s)	-0.007 (31.766s)	-0.005 (32.766s)	-0.005 (33.766s)	-0.004 (34.764s)	-0.006

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#23

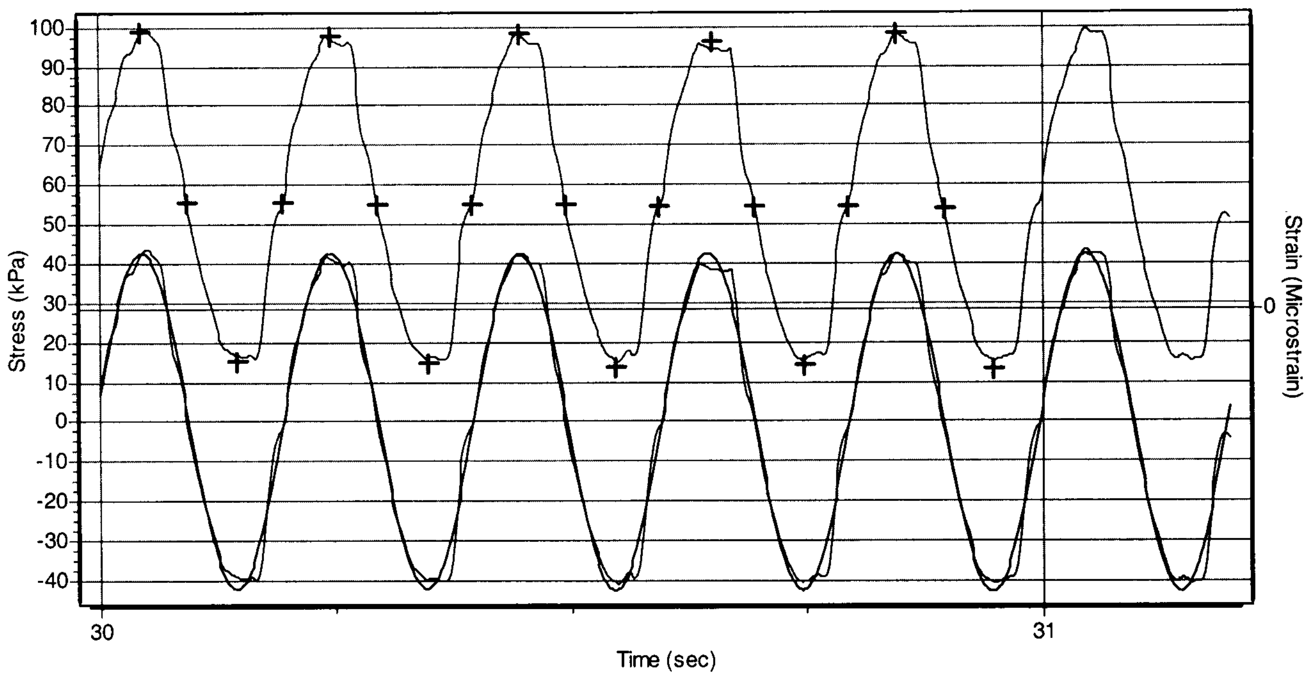
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#23.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:48 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.7	83.1	84.3	82.2	85.1	83.7
Recoverable axial micro-strain	1342.1	1343.2	1375.8	1327.3	1389.9	1355.7
Permanent axial micro-strain	638	649	681	641	684	
Dynamic modulus (MPa)	62.3	61.9	61.3	61.9	61.2	61.7
Phase angle (Deg)	5.88	6.60	5.12	2.48	6.38	5.29
Dyn.Modulus/sine(phase angle)	1214.7	1074.5	1371.5	2863.4	1100.0	1524.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.657	0.653	0.662	0.645	0.668	0.657
Maximum load (kN)	0.777 (30.045s)	0.768 (30.245s)	0.771 (30.445s)	0.758 (30.649s)	0.773 (30.845s)	0.769
Minimum load (kN)	0.120 (30.147s)	0.116 (30.346s)	0.109 (30.546s)	0.113 (30.746s)	0.105 (30.946s)	0.112
Maximum averaged axial (mm)	0.071 (30.049s)	0.070 (30.249s)	0.070 (30.448s)	0.069 (30.651s)	0.071 (30.849s)	0.070
Minimum averaged axial (mm)	-0.064 (30.149s)	-0.066 (30.350s)	-0.069 (30.550s)	-0.065 (30.750s)	-0.069 (30.951s)	-0.067
Maximum axial #1 (mm)	0.069 (30.049s)	0.069 (30.249s)	0.068 (30.448s)	0.068 (30.652s)	0.070 (30.849s)	0.069
Minimum axial #1 (mm)	-0.063 (30.149s)	-0.064 (30.350s)	-0.064 (30.550s)	-0.064 (30.750s)	-0.063 (30.949s)	-0.063
Maximum axial #2 (mm)	0.073 (30.049s)	0.072 (30.249s)	0.072 (30.448s)	0.071 (30.650s)	0.073 (30.848s)	0.072
Minimum axial #2 (mm)	-0.066 (30.150s)	-0.066 (30.350s)	-0.070 (30.550s)	-0.066 (30.750s)	-0.070 (30.950s)	-0.068

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#23

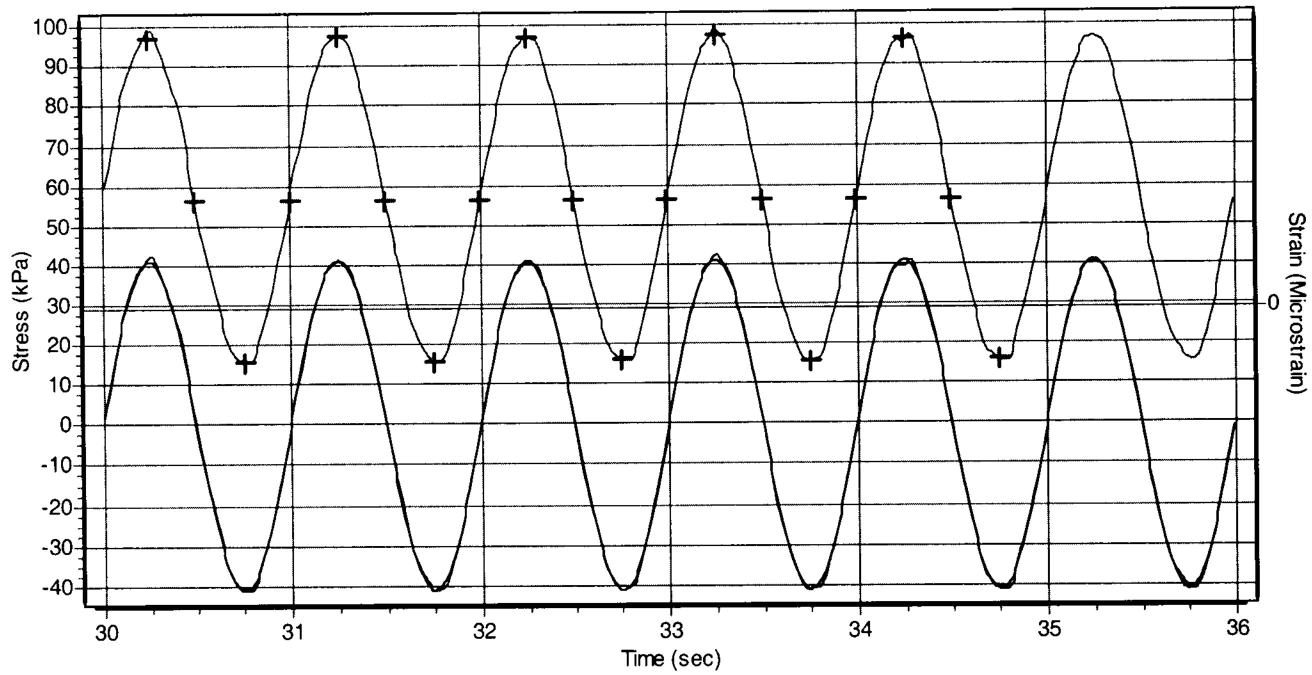
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: [illegible] 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#24.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:52 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	81.8	81.2	82.1	80.8	81.5
Recoverable axial micro-strain	1428.0	1422.7	1413.2	1426.7	1401.2	1418.4
Permanent axial micro-strain	41	51	67	71	87	
Dynamic modulus (MPa)	57.1	57.5	57.4	57.6	57.7	57.4
Phase angle (Deg)	7.62	6.64	6.03	6.74	5.34	6.47
Dyn.Modulus/sine(phase angle)	859.4	993.2	1092.8	980.0	1237.3	1032.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.642	0.638	0.645	0.635	0.640
Maximum load (kN)	0.764 (30.247s)	0.765 (31.246s)	0.763 (32.244s)	0.767 (33.245s)	0.760 (34.244s)	0.763
Minimum load (kN)	0.124 (30.748s)	0.122 (31.748s)	0.125 (32.742s)	0.122 (33.742s)	0.125 (34.745s)	0.124
Maximum averaged axial (mm)	0.148 (30.269s)	0.149 (31.264s)	0.150 (32.261s)	0.151 (33.264s)	0.150 (34.259s)	0.150
Minimum averaged axial (mm)	0.004 (30.765s)	0.005 (31.767s)	0.007 (32.765s)	0.007 (33.764s)	0.009 (34.764s)	0.006
Maximum axial #1 (mm)	0.152 (30.270s)	0.152 (31.265s)	0.153 (32.260s)	0.155 (33.264s)	0.154 (34.259s)	0.153
Minimum axial #1 (mm)	0.013 (30.765s)	0.015 (31.768s)	0.016 (32.764s)	0.017 (33.765s)	0.019 (34.764s)	0.016
Maximum axial #2 (mm)	0.145 (30.267s)	0.145 (31.263s)	0.146 (32.261s)	0.148 (33.264s)	0.147 (34.259s)	0.146
Minimum axial #2 (mm)	-0.005 (30.765s)	-0.004 (31.766s)	-0.003 (32.765s)	-0.003 (33.764s)	-0.001 (34.763s)	-0.003

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#24

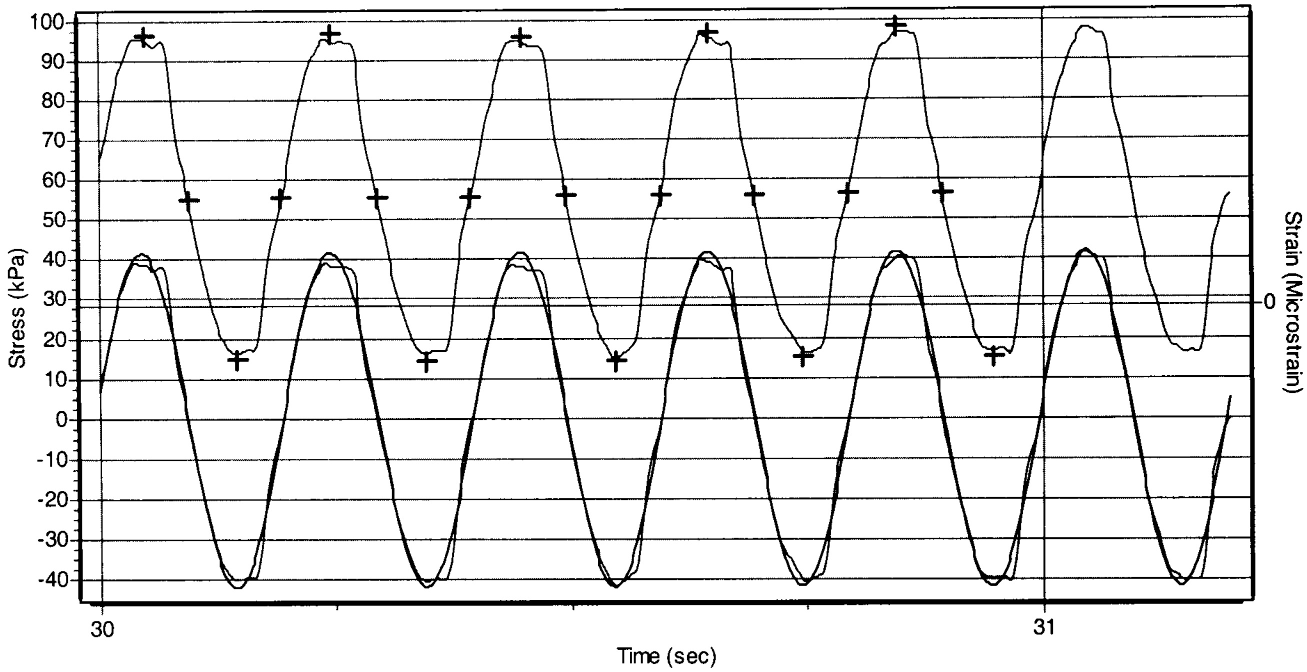
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#24.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:52 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	82.5	81.7	81.8	82.9	82.1
Recoverable axial micro-strain	1298.2	1299.8	1331.3	1305.1	1302.9	1307.5
Permanent axial micro-strain	626	626	660	634	623	
Dynamic modulus (MPa)	63.0	63.4	61.4	62.7	63.7	62.8
Phase angle (Deg)	5.06	4.27	3.35	1.80	5.03	3.90
Dyn.Modulus/sine(phase angle)	1426.7	1702.4	2100.5	3992.9	1451.8	2134.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.648	0.642	0.642	0.651	0.645
Maximum load (kN)	0.758 (30.048s)	0.760 (30.246s)	0.755 (30.447s)	0.762 (30.647s)	0.773 (30.845s)	0.762
Minimum load (kN)	0.116 (30.145s)	0.113 (30.345s)	0.113 (30.545s)	0.120 (30.745s)	0.122 (30.946s)	0.117
Maximum averaged axial (mm)	0.068 (30.051s)	0.068 (30.248s)	0.068 (30.449s)	0.068 (30.648s)	0.069 (30.848s)	0.068
Minimum averaged axial (mm)	-0.063 (30.150s)	-0.063 (30.350s)	-0.067 (30.549s)	-0.064 (30.750s)	-0.063 (30.950s)	-0.064
Maximum axial #1 (mm)	0.066 (30.052s)	0.066 (30.249s)	0.066 (30.449s)	0.066 (30.648s)	0.066 (30.848s)	0.066
Minimum axial #1 (mm)	-0.060 (30.150s)	-0.058 (30.349s)	-0.061 (30.550s)	-0.059 (30.750s)	-0.057 (30.950s)	-0.059
Maximum axial #2 (mm)	0.070 (30.048s)	0.070 (30.248s)	0.069 (30.448s)	0.070 (30.647s)	0.071 (30.847s)	0.070
Minimum axial #2 (mm)	-0.069 (30.150s)	-0.069 (30.350s)	-0.072 (30.549s)	-0.070 (30.749s)	-0.069 (30.950s)	-0.070

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#24

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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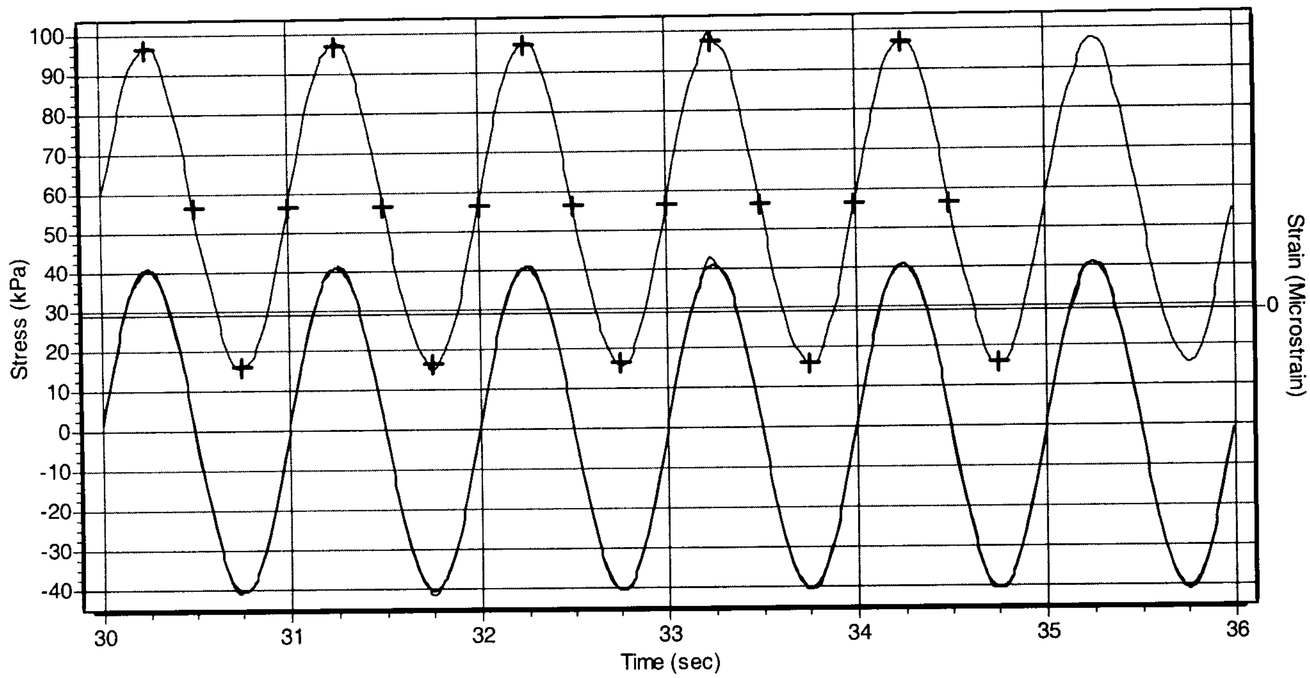


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 6:57 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.4	80.9	80.7	81.4	80.8	80.8
Recoverable axial micro-strain	1500.9	1504.5	1492.7	1507.6	1497.5	1500.6
Permanent axial micro-strain	182	206	221	230	237	
Dynamic modulus (MPa)	53.6	53.8	54.1	54.0	53.9	53.9
Phase angle (Deg)	7.68	6.59	6.53	6.92	7.35	7.02
Dyn.Modulus/sine(phase angle)	799.9	935.0	949.2	893.8	841.4	883.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.635	0.634	0.639	0.634	0.635
Maximum load (kN)	0.757 (30.247s)	0.763 (31.246s)	0.761 (32.248s)	0.765 (33.244s)	0.759 (34.246s)	0.761
Minimum load (kN)	0.126 (30.744s)	0.127 (31.745s)	0.127 (32.745s)	0.126 (33.745s)	0.125 (34.744s)	0.126
Maximum averaged axial (mm)	0.170 (30.268s)	0.173 (31.264s)	0.173 (32.266s)	0.175 (33.263s)	0.175 (34.266s)	0.173
Minimum averaged axial (mm)	0.018 (30.767s)	0.021 (31.765s)	0.022 (32.765s)	0.023 (33.767s)	0.024 (34.766s)	0.022
Maximum axial #1 (mm)	0.177 (30.268s)	0.180 (31.265s)	0.181 (32.267s)	0.183 (33.264s)	0.182 (34.266s)	0.181
Minimum axial #1 (mm)	0.023 (30.768s)	0.026 (31.765s)	0.027 (32.764s)	0.028 (33.768s)	0.029 (34.767s)	0.027
Maximum axial #2 (mm)	0.163 (30.269s)	0.166 (31.264s)	0.166 (32.265s)	0.168 (33.262s)	0.168 (34.266s)	0.166
Minimum axial #2 (mm)	0.014 (30.766s)	0.016 (31.764s)	0.018 (32.765s)	0.018 (33.766s)	0.019 (34.766s)	0.017

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#25

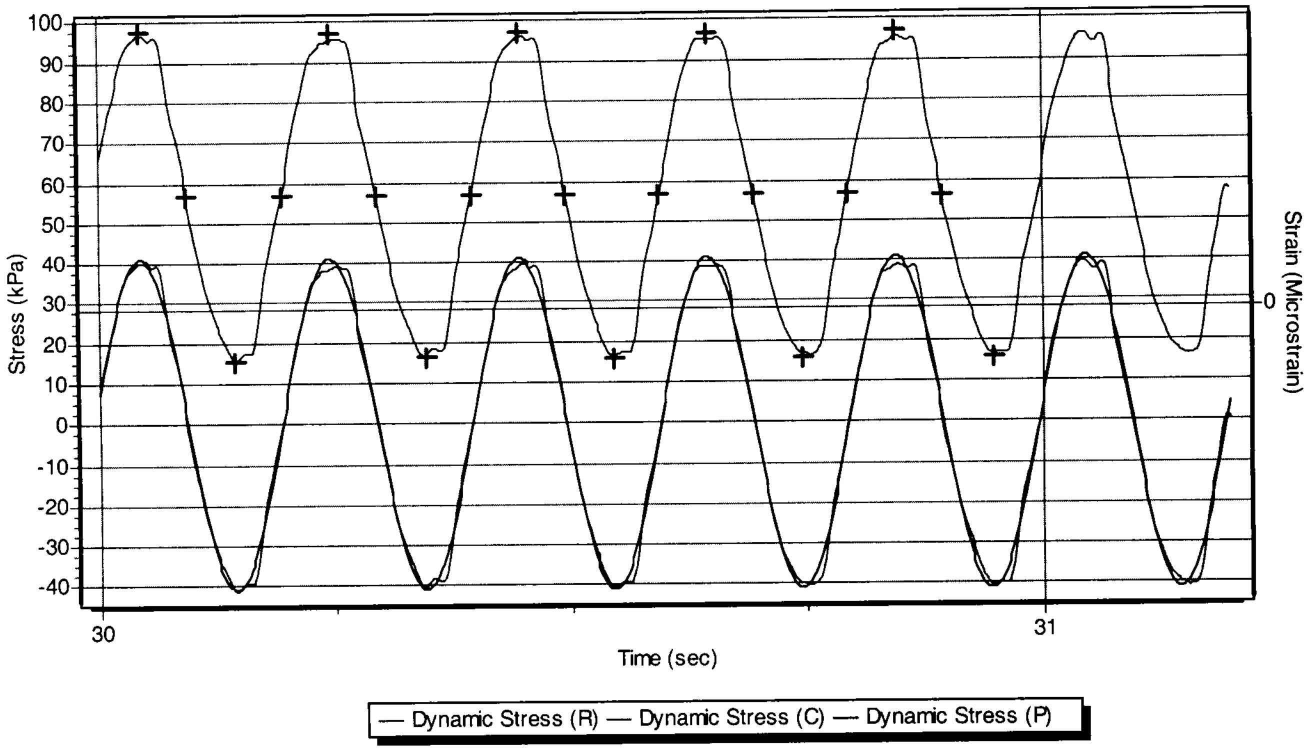
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#25.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 6:57 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 101
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.3	80.8	81.6	81.0	81.2	81.4
Recoverable axial micro-strain	1350.6	1321.8	1333.2	1353.4	1325.9	1337.0
Permanent axial micro-strain	534	524	532	548	525	
Dynamic modulus (MPa)	60.9	61.1	61.2	59.9	61.2	60.9
Phase angle (Deg)	7.03	4.51	8.31	6.24	7.98	6.82
Dyn.Modulus/sine(phase angle)	992.9	1554.1	845.0	1099.4	879.8	1074.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.634	0.641	0.636	0.638	0.639
Maximum load (kN)	0.768 (30.045s)	0.764 (30.245s)	0.766 (30.445s)	0.761 (30.645s)	0.764 (30.845s)	0.764
Minimum load (kN)	0.122 (30.145s)	0.129 (30.344s)	0.124 (30.545s)	0.125 (30.746s)	0.127 (30.945s)	0.125
Maximum averaged axial (mm)	0.082 (30.049s)	0.081 (30.247s)	0.081 (30.450s)	0.081 (30.648s)	0.081 (30.849s)	0.081
Minimum averaged axial (mm)	-0.054 (30.150s)	-0.053 (30.350s)	-0.054 (30.551s)	-0.055 (30.751s)	-0.053 (30.951s)	-0.054
Maximum axial #1 (mm)	0.084 (30.049s)	0.082 (30.248s)	0.082 (30.450s)	0.083 (30.648s)	0.082 (30.850s)	0.082
Minimum axial #1 (mm)	-0.053 (30.150s)	-0.053 (30.350s)	-0.054 (30.551s)	-0.054 (30.750s)	-0.053 (30.951s)	-0.053
Maximum axial #2 (mm)	0.081 (30.049s)	0.080 (30.247s)	0.080 (30.449s)	0.080 (30.648s)	0.080 (30.848s)	0.080
Minimum axial #2 (mm)	-0.055 (30.151s)	-0.054 (30.350s)	-0.055 (30.551s)	-0.056 (30.751s)	-0.054 (30.951s)	-0.055

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#25

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	101						101	

Cross-Sectional Area: 7853.982
Volume: 793252.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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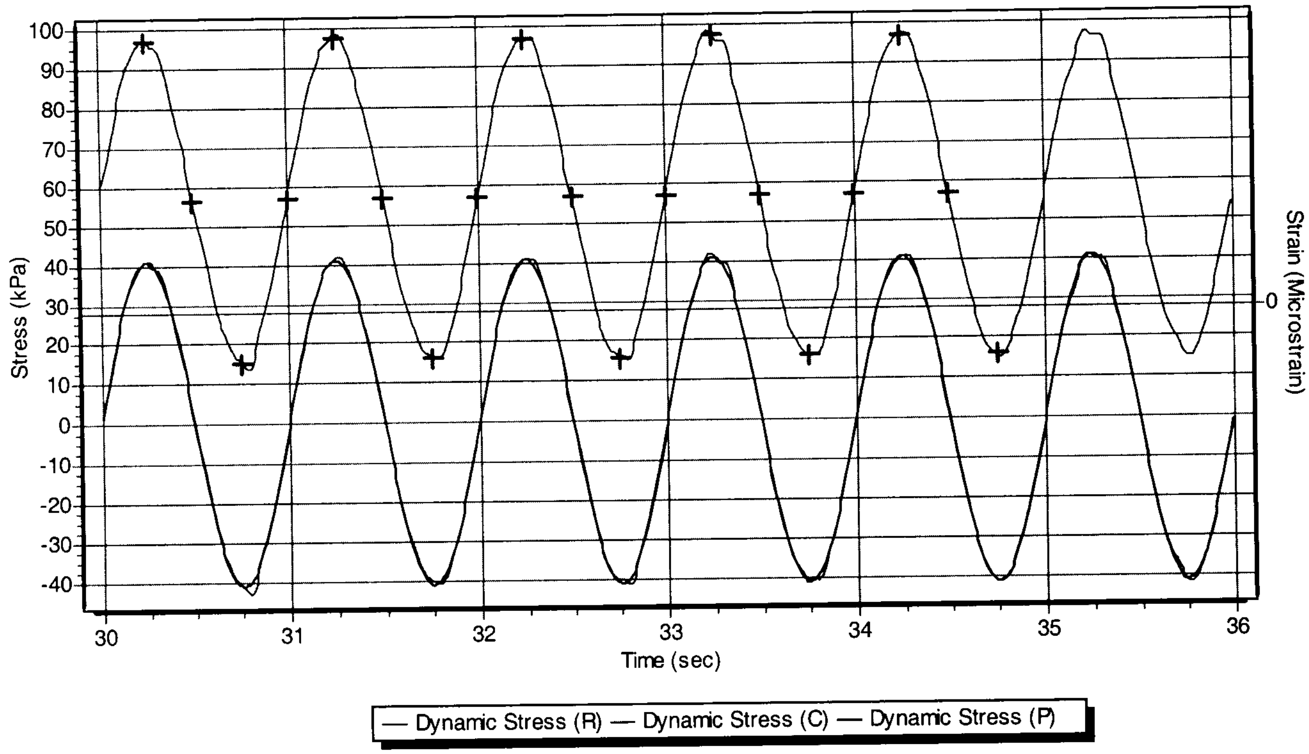

Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 7:02 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.6	81.1	81.0	81.5	81.3	81.3
Recoverable axial micro-strain	1514.0	1504.1	1499.8	1499.4	1510.4	1505.5
Permanent axial micro-strain	287	311	320	337	335	
Dynamic modulus (MPa)	53.9	53.9	54.0	54.4	53.8	54.0
Phase angle (Deg)	7.53	6.87	7.02	7.11	7.37	7.18
Dyn.Modulus/sine(phase angle)	821.1	900.2	882.1	877.7	837.7	863.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.637	0.636	0.640	0.638	0.639
Maximum load (kN)	0.762 (30.243s)	0.765 (31.247s)	0.761 (32.247s)	0.766 (33.244s)	0.764 (34.246s)	0.764
Minimum load (kN)	0.121 (30.746s)	0.128 (31.746s)	0.125 (32.744s)	0.126 (33.745s)	0.125 (34.742s)	0.125
Maximum averaged axial (mm)	0.180 (30.264s)	0.182 (31.266s)	0.182 (32.267s)	0.184 (33.264s)	0.185 (34.266s)	0.182
Minimum averaged axial (mm)	0.029 (30.765s)	0.031 (31.767s)	0.032 (32.764s)	0.034 (33.767s)	0.033 (34.764s)	0.032
Maximum axial #1 (mm)	0.182 (30.265s)	0.183 (31.267s)	0.184 (32.267s)	0.186 (33.263s)	0.186 (34.267s)	0.184
Minimum axial #1 (mm)	0.041 (30.764s)	0.044 (31.766s)	0.045 (32.763s)	0.046 (33.766s)	0.046 (34.764s)	0.044
Maximum axial #2 (mm)	0.178 (30.263s)	0.179 (31.265s)	0.180 (32.266s)	0.181 (33.264s)	0.183 (34.265s)	0.180
Minimum axial #2 (mm)	0.016 (30.766s)	0.019 (31.766s)	0.019 (32.765s)	0.021 (33.768s)	0.021 (34.765s)	0.019

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#26

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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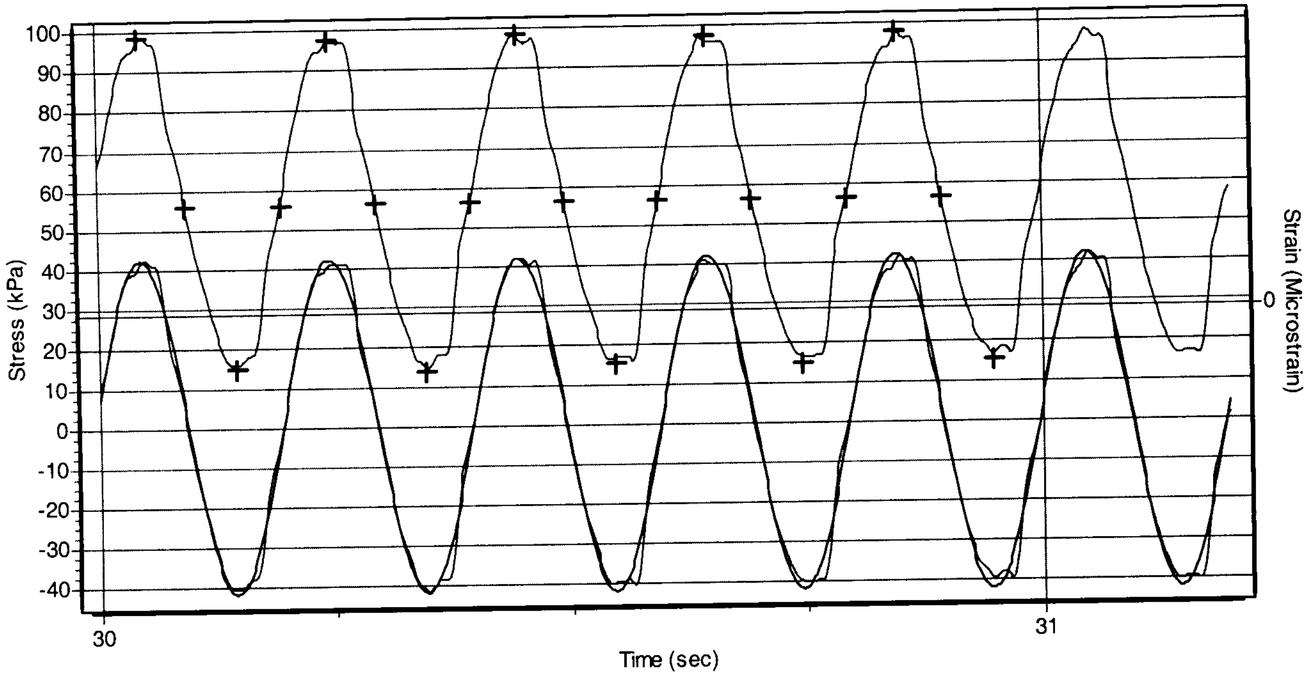

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 7:02 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.0	84.0	83.3	83.4	82.6	83.4
Recoverable axial micro-strain	1431.1	1439.7	1399.5	1392.7	1383.1	1409.2
Permanent axial micro-strain	536	541	506	490	488	
Dynamic modulus (MPa)	58.7	58.3	59.5	59.9	59.7	59.2
Phase angle (Deg)	6.00	6.62	7.89	6.36	7.70	6.92
Dyn.Modulus/sine(phase angle)	1120.6	1009.6	865.5	1079.4	889.3	992.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.660	0.659	0.654	0.655	0.649	0.655
Maximum load (kN)	0.775 (30.045s)	0.769 (30.245s)	0.775 (30.445s)	0.769 (30.645s)	0.771 (30.846s)	0.772
Minimum load (kN)	0.116 (30.145s)	0.109 (30.345s)	0.121 (30.546s)	0.114 (30.746s)	0.122 (30.945s)	0.116
Maximum averaged axial (mm)	0.090 (30.048s)	0.090 (30.249s)	0.089 (30.449s)	0.090 (30.649s)	0.089 (30.850s)	0.090
Minimum averaged axial (mm)	-0.054 (30.150s)	-0.054 (30.349s)	-0.051 (30.551s)	-0.049 (30.750s)	-0.049 (30.951s)	-0.051
Maximum axial #1 (mm)	0.089 (30.049s)	0.090 (30.250s)	0.089 (30.450s)	0.090 (30.649s)	0.089 (30.851s)	0.090
Minimum axial #1 (mm)	-0.045 (30.150s)	-0.045 (30.349s)	-0.042 (30.551s)	-0.040 (30.750s)	-0.040 (30.951s)	-0.042
Maximum axial #2 (mm)	0.090 (30.048s)	0.090 (30.248s)	0.089 (30.448s)	0.090 (30.648s)	0.089 (30.849s)	0.090
Minimum axial #2 (mm)	-0.062 (30.149s)	-0.063 (30.349s)	-0.060 (30.551s)	-0.058 (30.750s)	-0.058 (30.951s)	-0.060

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#26

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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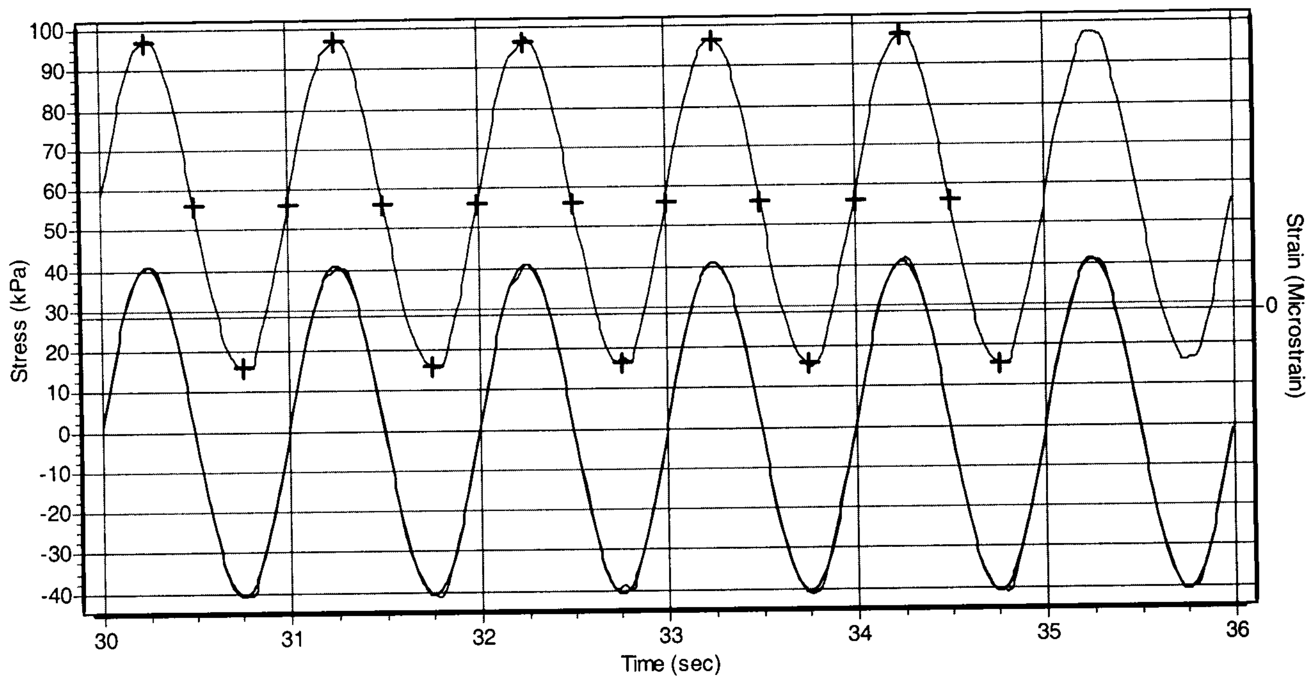


Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 7:08 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	80.9	80.2	80.5	81.7	80.9
Recoverable axial micro-strain	1498.9	1492.3	1474.5	1493.7	1498.2	1491.5
Permanent axial micro-strain	249	258	284	281	288	
Dynamic modulus (MPa)	54.1	54.2	54.4	53.9	54.6	54.2
Phase angle (Deg)	186.83	186.94	187.46	187.04	186.87	187.03 ← ?
Dyn.Modulus/sine(phase angle)	54.2	54.3	54.5	54.0	54.6	54.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.636	0.630	0.632	0.642	0.635
Maximum load (kN)	0.763 (30.247s)	0.761 (31.246s)	0.760 (32.246s)	0.757 (33.245s)	0.765 (34.246s)	0.761
Minimum load (kN)	0.127 (30.747s)	0.125 (31.745s)	0.130 (32.747s)	0.125 (33.744s)	0.123 (34.749s)	0.126
Maximum averaged axial (mm)	0.175 (31.265s)	0.175 (32.266s)	0.176 (33.266s)	0.177 (34.264s)	0.179 (35.264s)	0.176
Minimum averaged axial (mm)	0.025 (30.766s)	0.026 (31.766s)	0.028 (32.767s)	0.028 (33.764s)	0.029 (34.765s)	0.027
Maximum axial #1 (mm)	0.196 (31.265s)	0.197 (32.267s)	0.198 (33.268s)	0.199 (34.265s)	0.201 (35.265s)	0.198
Minimum axial #1 (mm)	0.047 (30.767s)	0.047 (31.765s)	0.050 (32.767s)	0.050 (33.766s)	0.051 (34.765s)	0.049
Maximum axial #2 (mm)	0.153 (31.265s)	0.154 (32.265s)	0.154 (33.264s)	0.156 (34.264s)	0.156 (35.262s)	0.155
Minimum axial #2 (mm)	0.004 (30.767s)	0.004 (31.765s)	0.006 (32.767s)	0.006 (33.762s)	0.007 (34.765s)	0.005

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

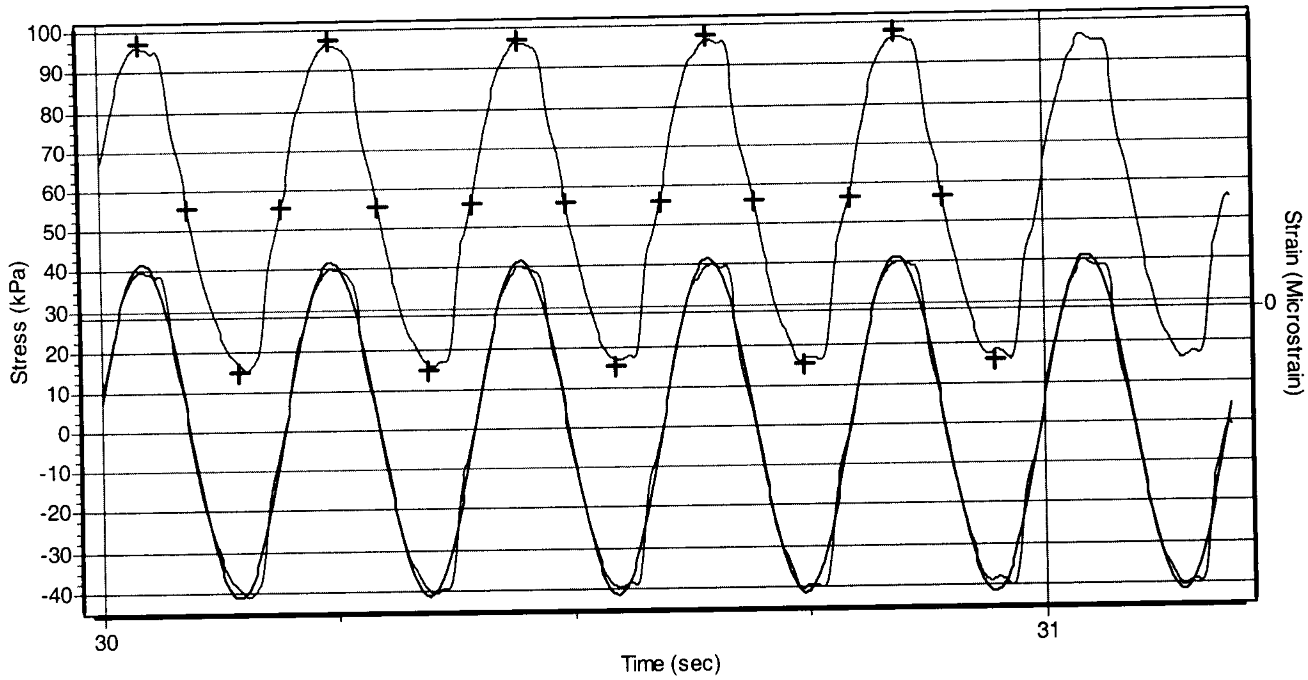
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2c_#27.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 7:08 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.2	82.6	82.0	82.3	82.2	82.3
Recoverable axial micro-strain	1370.2	1375.7	1328.6	1358.5	1356.3	1357.9
Permanent axial micro-strain	618	621	578	599	596	
Dynamic modulus (MPa)	60.0	60.1	61.7	60.6	60.6	60.6
Phase angle (Deg)	190.33	188.73	188.62	189.12	190.09	189.38 ← ?
Dyn.Modulus/sine(phase angle)	60.2	60.3	61.9	60.8	60.8	60.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.649	0.644	0.646	0.645	0.646
Maximum load (kN)	0.764 (30.045s)	0.766 (30.245s)	0.764 (30.445s)	0.767 (30.645s)	0.771 (30.845s)	0.766
Minimum load (kN)	0.119 (30.147s)	0.116 (30.345s)	0.120 (30.545s)	0.121 (30.745s)	0.126 (30.946s)	0.120
Maximum averaged axial (mm)	0.075 (30.248s)	0.075 (30.448s)	0.075 (30.648s)	0.076 (30.849s)	0.076 (31.049s)	0.076
Minimum averaged axial (mm)	-0.062 (30.150s)	-0.062 (30.349s)	-0.058 (30.549s)	-0.060 (30.750s)	-0.060 (30.951s)	-0.060
Maximum axial #1 (mm)	0.078 (30.249s)	0.078 (30.449s)	0.078 (30.649s)	0.079 (30.849s)	0.079 (31.050s)	0.078
Minimum axial #1 (mm)	-0.060 (30.150s)	-0.061 (30.350s)	-0.056 (30.549s)	-0.058 (30.750s)	-0.058 (30.951s)	-0.059
Maximum axial #2 (mm)	0.073 (30.248s)	0.073 (30.448s)	0.072 (30.647s)	0.073 (30.848s)	0.073 (31.048s)	0.073
Minimum axial #2 (mm)	-0.063 (30.150s)	-0.063 (30.350s)	-0.059 (30.549s)	-0.062 (30.750s)	-0.061 (30.951s)	-0.062

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

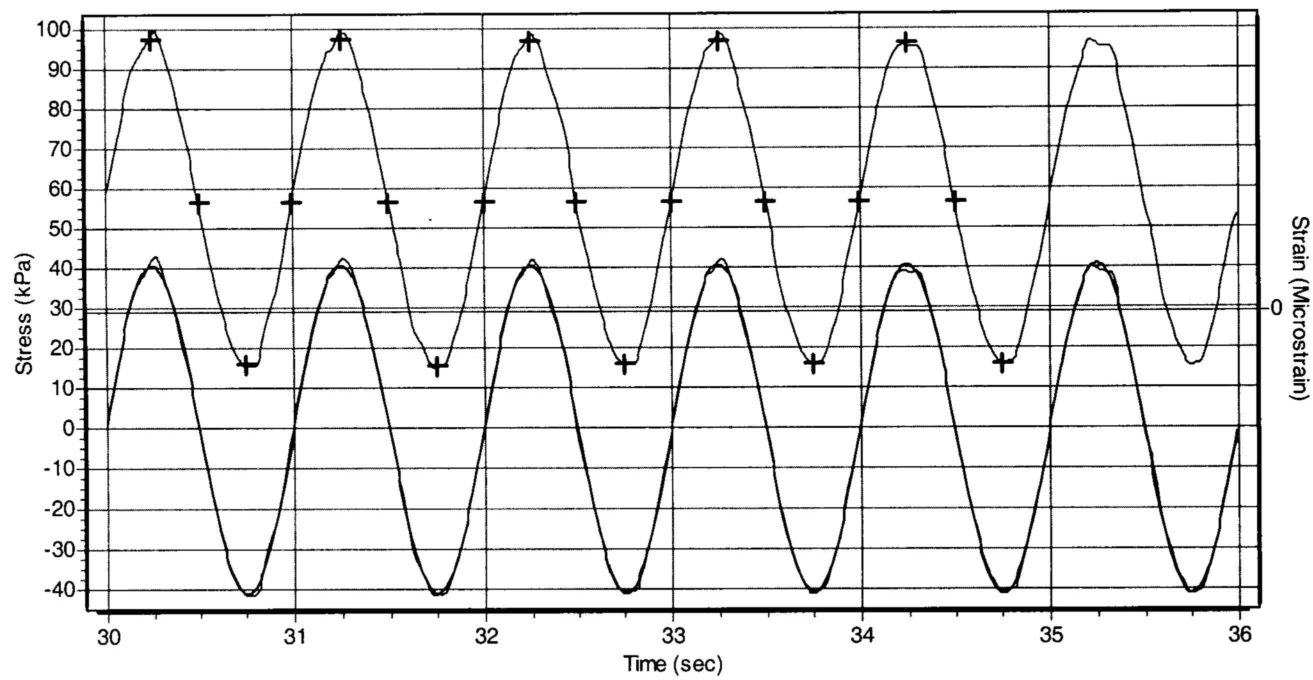
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 59 'C
Final Temp: 57 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 2\NETC_01-02_P2ca_#27.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 13, 2002, at 7:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.7	82.0	80.9	80.8	80.2	81.1
Recoverable axial micro-strain	1629.8	1634.3	1624.2	1606.9	1609.7	1621.0
Permanent axial micro-strain	350	350	341	318	323	
Dynamic modulus (MPa)	50.1	50.2	49.8	50.3	49.8	50.0
Phase angle (Deg)	6.35	6.53	6.71	6.70	7.28	6.71
Dyn.Modulus/sine(phase angle)	905.0	881.1	851.0	860.0	784.5	856.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.644	0.636	0.634	0.630	0.637
Maximum load (kN)	0.766 (30.245s)	0.765 (31.244s)	0.761 (32.246s)	0.761 (33.245s)	0.757 (34.244s)	0.762
Minimum load (kN)	0.125 (30.745s)	0.121 (31.744s)	0.125 (32.744s)	0.126 (33.744s)	0.127 (34.746s)	0.125
Maximum averaged axial (mm)	0.128 (30.262s)	0.128 (31.262s)	0.128 (32.265s)	0.129 (33.264s)	0.129 (34.265s)	0.128
Minimum averaged axial (mm)	-0.035 (30.764s)	-0.035 (31.765s)	-0.034 (32.763s)	-0.032 (33.765s)	-0.032 (34.764s)	-0.034
Maximum axial #1 (mm)	0.114 (30.261s)	0.115 (31.262s)	0.115 (32.263s)	0.115 (33.264s)	0.115 (34.264s)	0.115
Minimum axial #1 (mm)	-0.042 (30.764s)	-0.042 (31.764s)	-0.041 (32.759s)	-0.039 (33.765s)	-0.039 (34.764s)	-0.041
Maximum axial #2 (mm)	0.142 (30.263s)	0.142 (31.262s)	0.142 (32.266s)	0.143 (33.265s)	0.142 (34.266s)	0.142
Minimum axial #2 (mm)	-0.028 (30.765s)	-0.028 (31.765s)	-0.027 (32.764s)	-0.025 (33.766s)	-0.025 (34.766s)	-0.027

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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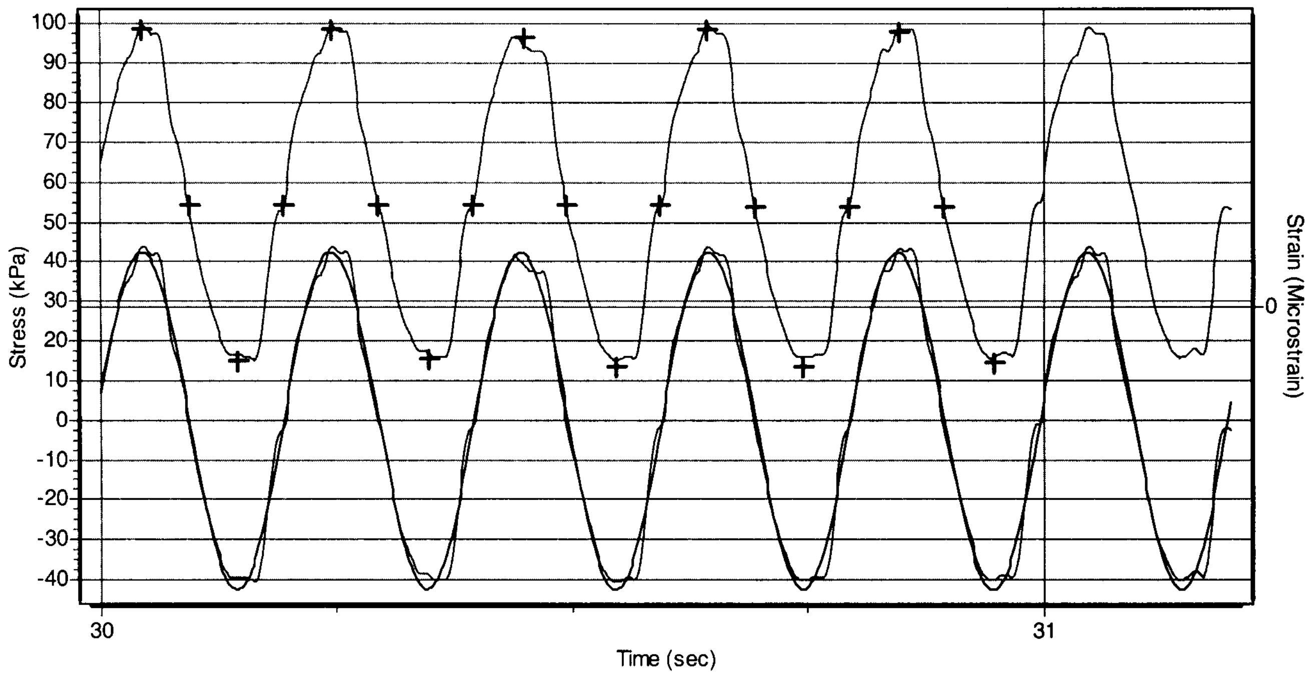

Sweep 2 (5Hz)

Test Date and Time: Monday, May 13, 2002, at 7:27 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 100
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.9	83.3	83.5	85.1	83.8	83.9
Recoverable axial micro-strain	1534.8	1528.3	1521.5	1571.3	1524.0	1536.0
Permanent axial micro-strain	696	692	681	695	696	
Dynamic modulus (MPa)	54.6	54.5	54.9	54.2	55.0	54.6
Phase angle (Deg)	9.01	8.02	4.17	6.13	4.80	6.43
Dyn.Modulus/sine(phase angle)	695.4	779.9	1508.6	1013.2	1314.1	1062.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.659	0.654	0.656	0.669	0.658	0.659
Maximum load (kN)	0.775 (30.045s)	0.775 (30.245s)	0.761 (30.448s)	0.776 (30.644s)	0.771 (30.846s)	0.771
Minimum load (kN)	0.116 (30.147s)	0.120 (30.347s)	0.105 (30.546s)	0.107 (30.746s)	0.112 (30.946s)	0.112
Maximum averaged axial (mm)	0.070 (30.050s)	0.069 (30.250s)	0.068 (30.450s)	0.069 (30.648s)	0.070 (30.849s)	0.069
Minimum averaged axial (mm)	-0.084 (30.150s)	-0.084 (30.350s)	-0.084 (30.550s)	-0.088 (30.750s)	-0.083 (30.950s)	-0.084
Maximum axial #1 (mm)	0.067 (30.050s)	0.066 (30.250s)	0.065 (30.451s)	0.066 (30.648s)	0.066 (30.849s)	0.066
Minimum axial #1 (mm)	-0.082 (30.149s)	-0.082 (30.350s)	-0.086 (30.549s)	-0.086 (30.750s)	-0.085 (30.949s)	-0.084
Maximum axial #2 (mm)	0.073 (30.050s)	0.072 (30.249s)	0.072 (30.450s)	0.073 (30.648s)	0.073 (30.849s)	0.072
Minimum axial #2 (mm)	-0.086 (30.150s)	-0.085 (30.351s)	-0.086 (30.551s)	-0.085 (30.750s)	-0.084 (30.950s)	-0.085

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 2
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P2_#27

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	100						100	

Cross-Sectional Area: 7853.982
Volume: 785398.2

Comments/Properties: Initial Temp: 57 'C
Final Temp: 57 'C

Sample	Modulus, Mpa				Phase Angle, °		Temp.
	1 Hz		5 Hz		1 Hz	5 Hz	
1	47.4	(1.9)	57.2	(5.2)	8.8	8.3	59-55
2	46.9	(3.2)	52.5	(6.9)	7.8	7.5	60-56
3	53.5	(2.1)	67.7	(5.9)	7.5	7.5	58-55
4	48.3	(2.7)	53.0	(8.6)	7.1	6.8	58-55
5	51.9	(2.5)	57.0	(8.0)	7.1	2.3	58-56
6	51.8	(2.4)	55.4	(7.4)	6.4	4.6	59-56
7	44.3	(3.0)	49.1	(9.5)	6.8	-0.3	58-56
8	49.5	(2.5)	54.3	(8.0)	7.4	2.6	59-56
9	52.2	(2.4)	57.4	(6.7)	6.8	5.6	60-57
10	53.0	(2.0)	60.1	(6.9)	8.3	5.3	59-56
11	58.0	(1.8)	64.6	(6.0)	7.9	7.6	59-56
12	61.4	(1.9)	67.5	(6.7)	8.2	7.5	59-56
13	50.5	(3.0)	55.4	(8.9)	6.2	6.9	58-55
14	51.7	(2.7)	56.1	(8.5)	6.9	4.1	59-56
15	53.3	(2.9)	57.9	(8.7)	6.4	5.9	58-55
16	51.1	(2.2)	55.2	(7.4)	7.1	4.6	58-56
17	55.7	(1.9)	60.6	(7.4)	6.6	3.6	58-56
18	54.6	(2.0)	59.0	(6.9)	7.5	6.1	59-56
19	60.8	(2.0)	65.9	(6.6)	6.8	5.3	58-56
20	58.2	(2.1)	61.2	(7.5)	7.2	8.6	58-56
21	62.6	(2.1)	67.9	(7.0)	6.9	6.6	58-56
22	55.3	(2.3)	59.6	(7.0)	6.7	6.3	58-55
23	57.7	(2.3)	61.7	(7.1)	6.6	5.3	59-56
24	57.4	(1.8)	62.8	(6.1)	6.5	3.9	59-57
25	53.9	(1.5)	60.9	(4.8)	7.0	6.8	58-56
26	54.0	(1.9)	59.2	(5.9)	7.2	6.9	59-57
27	50.0	(2.2)	54.6	(6.9)	6.7	6.4	57-54

Phase 3
Two Mixes, 9.5/12.5 APA Testing

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report #02

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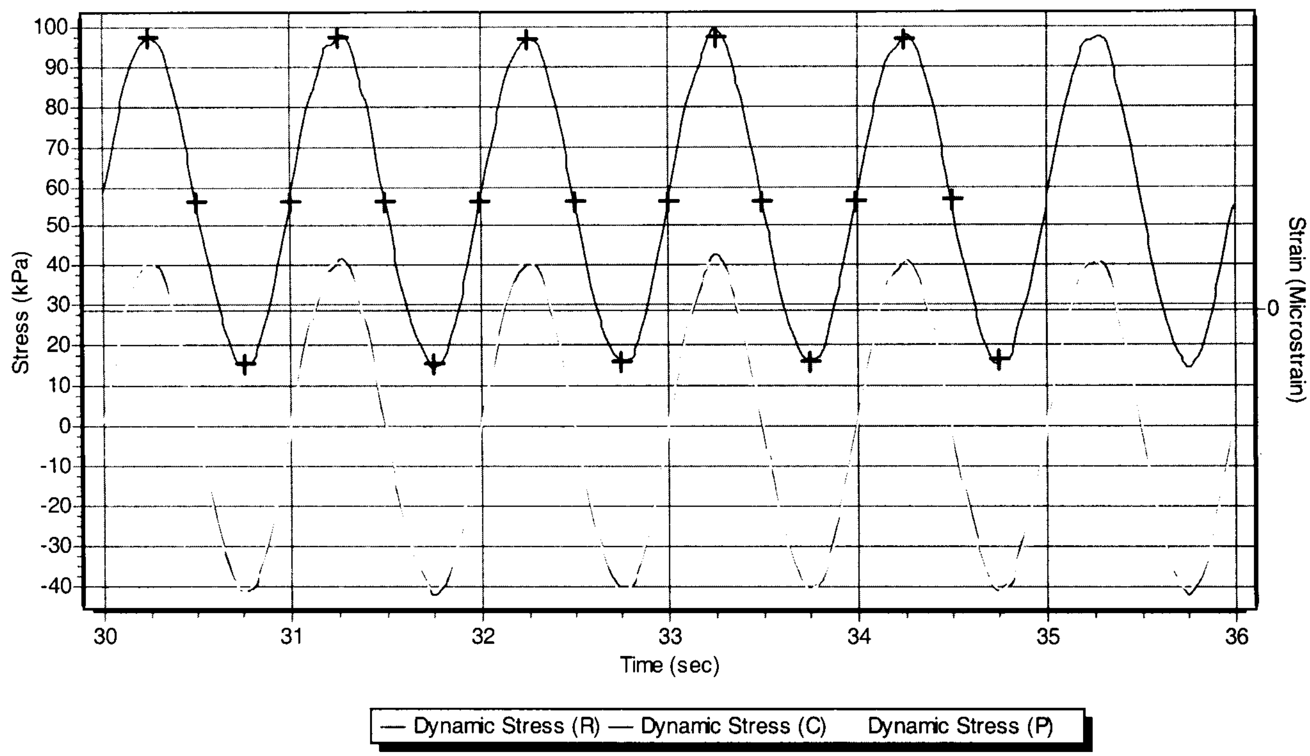

Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 12:48 PM   St Dev = 1.83

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 115.1

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.6	81.8	80.6	81.2	80.8	81.2
Recoverable axial micro-strain	2029.3	2032.5	2012.0	1996.8	2000.0	2014.1
Permanent axial micro-strain	2571	2626	2701	2770	2822	
Dynamic modulus (MPa)	40.2	40.2	40.1	40.6	40.4	40.3
Phase angle (Deg)	11.94	11.81	11.15	12.44	12.04	11.88
Dyn.Modulus/sine(phase angle)	386.6	391.3	412.4	375.1	385.0	390.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.642	0.633	0.637	0.634	0.638
Maximum load (kN)	0.764 (30.247s)	0.763 (31.246s)	0.760 (32.248s)	0.765 (33.245s)	0.762 (34.246s)	0.763
Minimum load (kN)	0.123 (30.748s)	0.121 (31.745s)	0.127 (32.746s)	0.127 (33.744s)	0.128 (34.745s)	0.125
Maximum averaged axial (mm)	0.529 (30.280s)	0.536 (31.279s)	0.542 (32.279s)	0.549 (33.279s)	0.555 (34.279s)	0.542
Minimum averaged axial (mm)	0.296 (30.773s)	0.302 (31.770s)	0.311 (32.774s)	0.319 (33.773s)	0.325 (34.774s)	0.311
Maximum axial #1 (mm)	0.540 (30.280s)	0.547 (31.279s)	0.553 (32.278s)	0.559 (33.278s)	0.565 (34.279s)	0.553
Minimum axial #1 (mm)	0.303 (30.774s)	0.309 (31.771s)	0.317 (32.775s)	0.325 (33.773s)	0.331 (34.774s)	0.317
Maximum axial #2 (mm)	0.519 (30.281s)	0.525 (31.280s)	0.532 (32.281s)	0.538 (33.281s)	0.545 (34.279s)	0.532
Minimum axial #2 (mm)	0.289 (30.773s)	0.296 (31.770s)	0.304 (32.774s)	0.312 (33.772s)	0.318 (34.774s)	0.304

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115.1						115.1	

Cross-Sectional Area: 7853.982

Volume: 903993.3

Comments/Properties: Initial Temp: 57 'C

Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report #02

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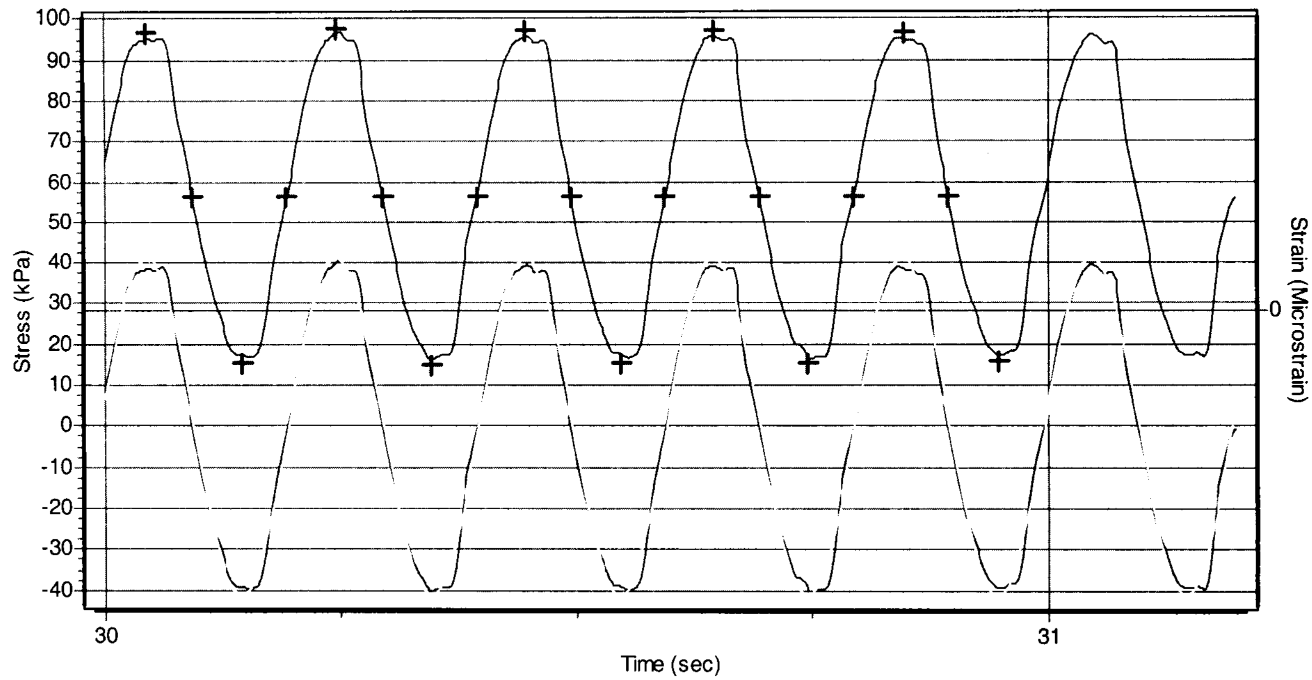

Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 12:48 PM   St dev = 5,71

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 115.1

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.0	82.6	82.0	82.1	80.6	81.7
Recoverable axial micro-strain	1717.4	1713.5	1716.6	1712.6	1703.0	1712.6
Permanent axial micro-strain	870	887	899	909	928	
Dynamic modulus (MPa)	47.1	48.2	47.8	47.9	47.4	47.7
Phase angle (Deg)	10.13	9.08	11.33	10.82	8.18	9.91
Dyn.Modulus/sine(phase angle)	534.0	608.8	483.9	508.4	663.9	559.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.649	0.644	0.645	0.633	0.641
Maximum load (kN)	0.759 (30.045s)	0.768 (30.245s)	0.765 (30.445s)	0.765 (30.645s)	0.760 (30.846s)	0.763
Minimum load (kN)	0.123 (30.146s)	0.119 (30.346s)	0.121 (30.546s)	0.121 (30.746s)	0.127 (30.946s)	0.122
Maximum averaged axial (mm)	0.298 (30.051s)	0.299 (30.250s)	0.301 (30.451s)	0.302 (30.651s)	0.303 (30.851s)	0.301
Minimum averaged axial (mm)	0.100 (30.152s)	0.102 (30.352s)	0.103 (30.552s)	0.105 (30.752s)	0.107 (30.952s)	0.103
Maximum axial #1 (mm)	0.299 (30.051s)	0.300 (30.250s)	0.302 (30.452s)	0.303 (30.652s)	0.304 (30.851s)	0.302
Minimum axial #1 (mm)	0.097 (30.152s)	0.099 (30.351s)	0.100 (30.552s)	0.095 (30.751s)	0.103 (30.952s)	0.099
Maximum axial #2 (mm)	0.297 (30.050s)	0.298 (30.250s)	0.300 (30.451s)	0.300 (30.651s)	0.302 (30.850s)	0.299
Minimum axial #2 (mm)	0.104 (30.152s)	0.105 (30.352s)	0.107 (30.552s)	0.108 (30.752s)	0.110 (30.952s)	0.107

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115.1						115.1	

Cross-Sectional Area: 7853.982

Volume: 903993.3

Comments/Properties: Initial Temp: 57 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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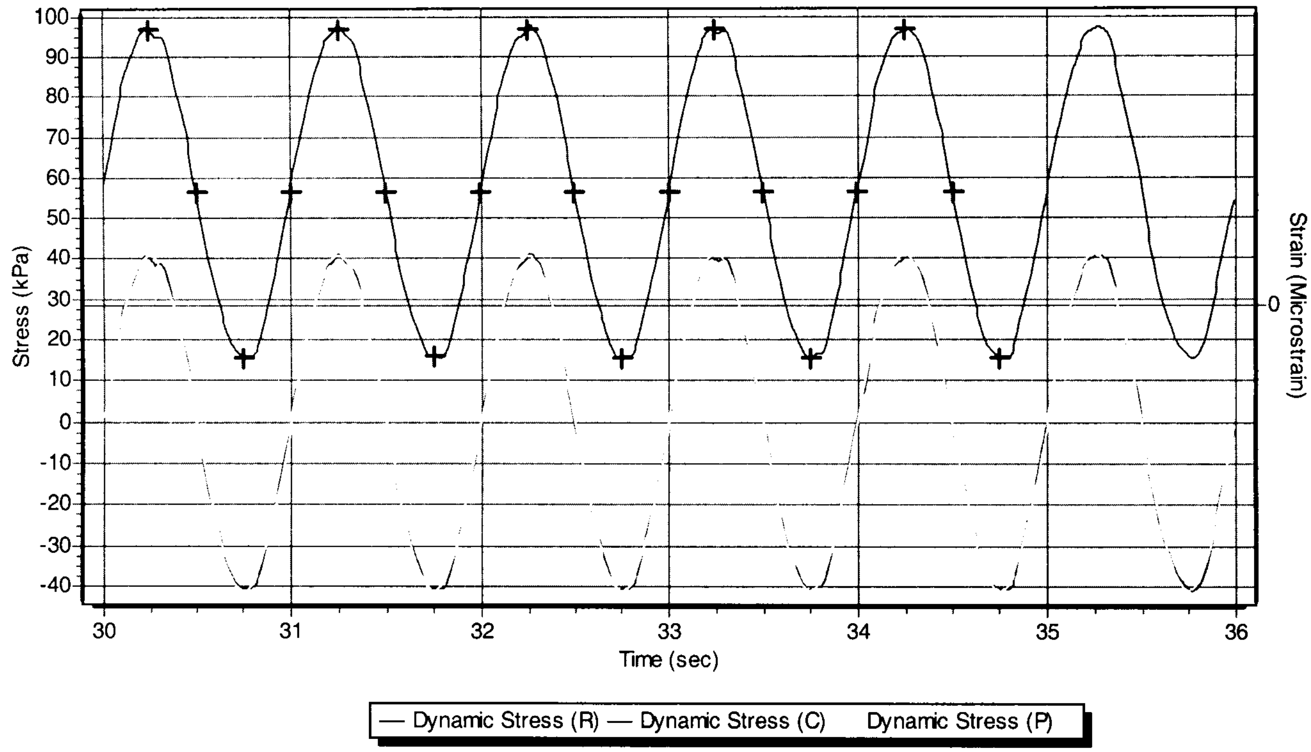

Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 12:57 PM   St dev = 1.83
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.6
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.3	81.0	81.2	81.5	81.3	81.3
Recoverable axial micro-strain	1759.4	1749.8	1750.3	1749.6	1741.7	1750.1
Permanent axial micro-strain	2167	2223	2279	2326	2383	
Dynamic modulus (MPa)	46.2	46.3	46.4	46.6	46.7	46.4
Phase angle (Deg)	11.71	11.83	12.22	13.02	12.40	12.23
Dyn.Modulus/sine(phase angle)	453.3	449.5	435.9	410.7	432.4	436.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.637	0.638	0.640	0.639	0.638
Maximum load (kN)	0.761 (30.245s)	0.761 (31.246s)	0.762 (32.246s)	0.763 (33.244s)	0.762 (34.245s)	0.762
Minimum load (kN)	0.122 (30.745s)	0.125 (31.748s)	0.124 (32.744s)	0.123 (33.746s)	0.124 (34.746s)	0.124
Maximum averaged axial (mm)	0.450 (30.278s)	0.455 (31.279s)	0.462 (32.280s)	0.467 (33.280s)	0.473 (34.279s)	0.461
Minimum averaged axial (mm)	0.248 (30.772s)	0.255 (31.774s)	0.261 (32.773s)	0.267 (33.774s)	0.273 (34.772s)	0.261
Maximum axial #1 (mm)	0.441 (30.276s)	0.446 (31.279s)	0.453 (32.279s)	0.458 (33.279s)	0.463 (34.277s)	0.452
Minimum axial #1 (mm)	0.240 (30.773s)	0.246 (31.774s)	0.252 (32.774s)	0.258 (33.776s)	0.264 (34.773s)	0.252
Maximum axial #2 (mm)	0.458 (30.279s)	0.464 (31.279s)	0.471 (32.280s)	0.477 (33.281s)	0.482 (34.280s)	0.470
Minimum axial #2 (mm)	0.257 (30.772s)	0.263 (31.774s)	0.269 (32.772s)	0.275 (33.773s)	0.282 (34.772s)	0.269

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982
Volume: 900066.3

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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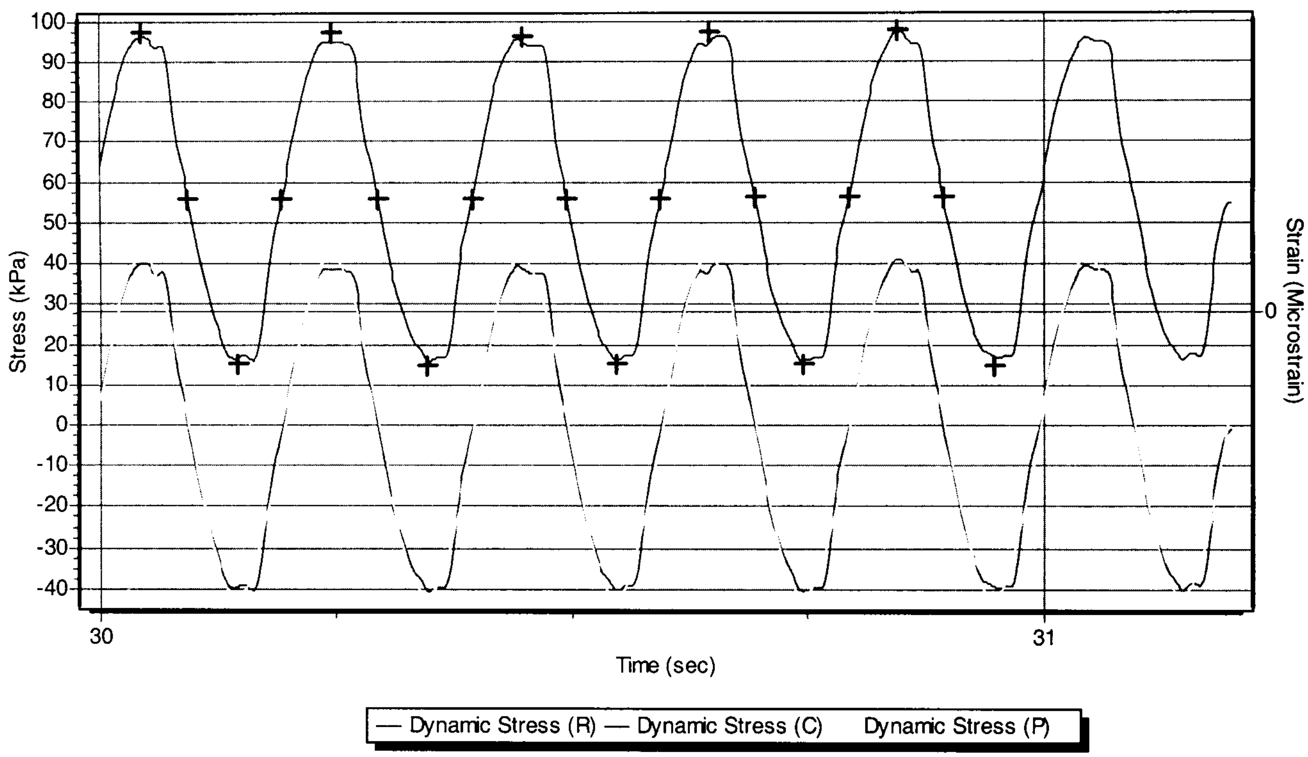


Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 12:57 PM

St dev = 6.01

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.6

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.3	82.2	81.3	82.4	83.0	82.2
Recoverable axial micro-strain	1554.5	1536.1	1543.6	1549.9	1534.1	1543.6
Permanent axial micro-strain	829	850	861	867	895	
Dynamic modulus (MPa)	52.9	53.5	52.6	53.2	54.1	53.3
Phase angle (Deg)	11.52	8.22	8.07	10.45	9.10	9.47
Dyn.Modulus/sine(phase angle)	527.4	746.6	747.8	583.5	682.5	657.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.646	0.638	0.647	0.652	0.646
Maximum load (kN)	0.766 (30.045s)	0.764 (30.246s)	0.759 (30.447s)	0.766 (30.646s)	0.769 (30.845s)	0.765
Minimum load (kN)	0.120 (30.147s)	0.118 (30.346s)	0.120 (30.545s)	0.119 (30.745s)	0.117 (30.945s)	0.119
Maximum averaged axial (mm)	0.273 (30.052s)	0.273 (30.250s)	0.276 (30.451s)	0.277 (30.651s)	0.278 (30.851s)	0.275
Minimum averaged axial (mm)	0.095 (30.152s)	0.097 (30.352s)	0.099 (30.552s)	0.099 (30.752s)	0.103 (30.951s)	0.099
Maximum axial #1 (mm)	0.265 (30.053s)	0.267 (30.253s)	0.268 (30.453s)	0.269 (30.652s)	0.270 (30.851s)	0.268
Minimum axial #1 (mm)	0.084 (30.152s)	0.090 (30.351s)	0.087 (30.551s)	0.091 (30.752s)	0.089 (30.950s)	0.088
Maximum axial #2 (mm)	0.281 (30.050s)	0.282 (30.250s)	0.284 (30.450s)	0.285 (30.651s)	0.287 (30.850s)	0.284
Minimum axial #2 (mm)	0.103 (30.152s)	0.105 (30.352s)	0.106 (30.552s)	0.107 (30.752s)	0.110 (30.952s)	0.106

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982

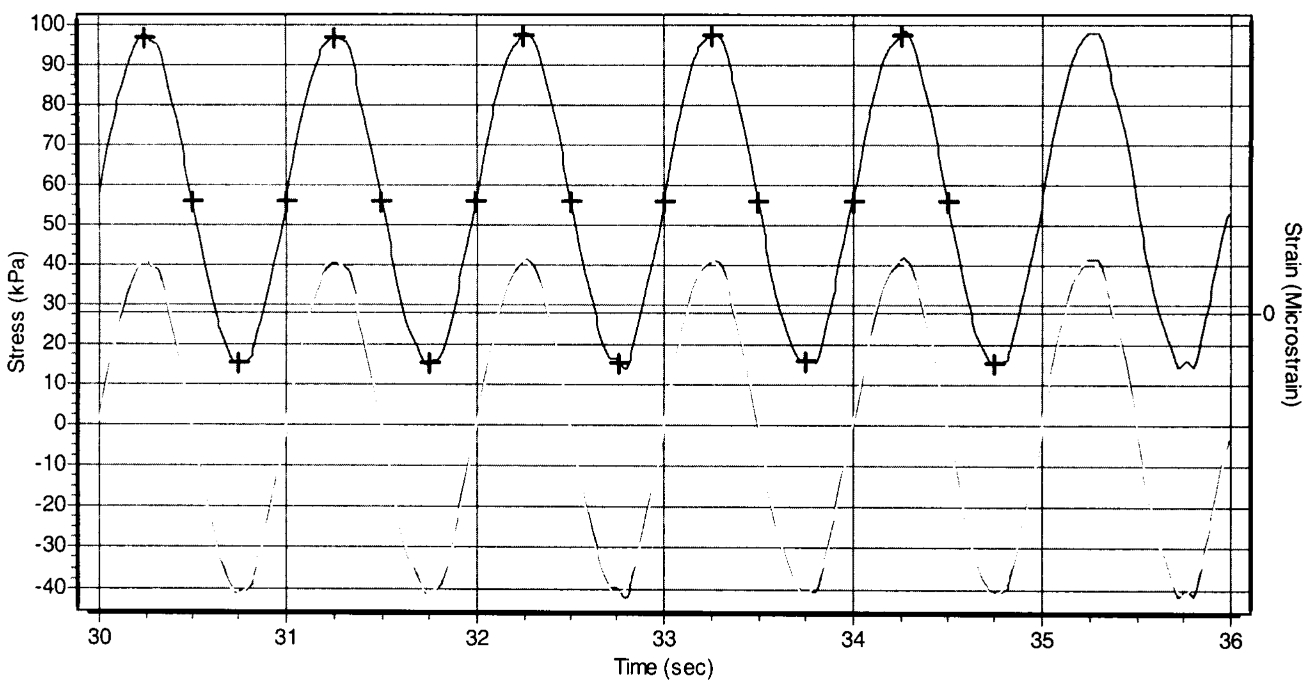
Volume: 900066.3

Comments/Properties: Initial Temp: 58 'C

Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_9.5_#04.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:02 PM   St dev = 2.01

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.6

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.6	81.6	81.1	81.8	81.5
Recoverable axial micro-strain	1628.5	1628.2	1628.2	1619.7	1630.5	1627.0
Permanent axial micro-strain	1098	1140	1182	1231	1268	
Dynamic modulus (MPa)	49.9	50.1	50.1	50.1	50.2	50.1
Phase angle (Deg)	11.59	11.90	10.79	11.10	11.22	11.32
Dyn.Modulus/sine(phase angle)	493.9	483.6	533.4	517.7	513.1	508.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.641	0.641	0.637	0.642	0.640
Maximum load (kN)	0.760 (30.246s)	0.762 (31.246s)	0.763 (32.247s)	0.764 (33.245s)	0.763 (34.249s)	0.762
Minimum load (kN)	0.123 (30.746s)	0.121 (31.743s)	0.122 (32.750s)	0.127 (33.746s)	0.121 (34.746s)	0.123
Maximum averaged axial (mm)	0.312 (30.278s)	0.317 (31.279s)	0.322 (32.277s)	0.327 (33.275s)	0.332 (34.280s)	0.322
Minimum averaged axial (mm)	0.126 (30.773s)	0.131 (31.771s)	0.135 (32.773s)	0.141 (33.773s)	0.145 (34.773s)	0.136
Maximum axial #1 (mm)	0.311 (30.276s)	0.315 (31.278s)	0.320 (32.275s)	0.324 (33.274s)	0.329 (34.279s)	0.320
Minimum axial #1 (mm)	0.122 (30.773s)	0.126 (31.772s)	0.131 (32.773s)	0.136 (33.773s)	0.141 (34.773s)	0.131
Maximum axial #2 (mm)	0.314 (30.280s)	0.319 (31.280s)	0.324 (32.278s)	0.330 (33.277s)	0.335 (34.282s)	0.325
Minimum axial #2 (mm)	0.130 (30.771s)	0.135 (31.771s)	0.140 (32.773s)	0.146 (33.772s)	0.150 (34.773s)	0.140

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982

Volume: 900066.3

Comments/Properties: Initial Temp: 59 'C

Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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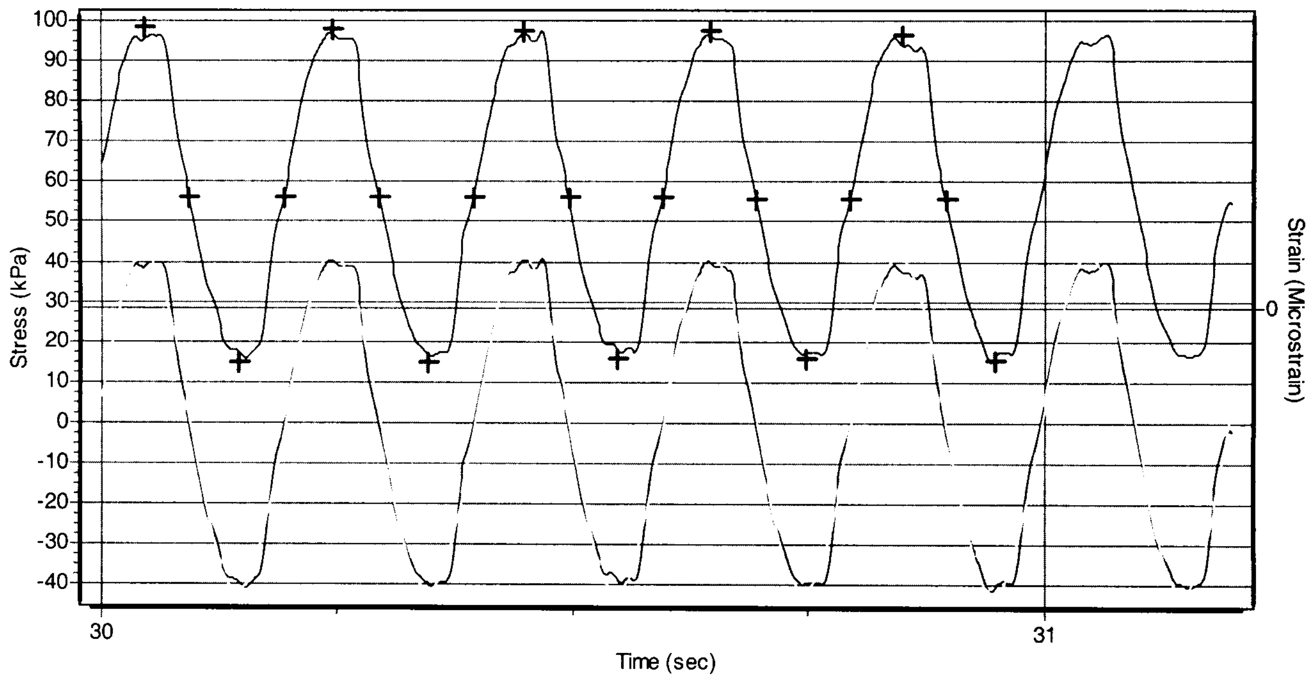

Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:02 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

St dev = 6.62

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 114.6
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.6	83.1	81.6	81.5	80.9	82.2
Recoverable axial micro-strain	1484.3	1446.9	1440.5	1444.8	1440.1	1451.3
Permanent axial micro-strain	710	754	775	772	777	
Dynamic modulus (MPa)	56.3	57.4	56.7	56.4	56.2	56.6
Phase angle (Deg)	11.07	11.74	11.69	10.32	9.22	10.81
Dyn.Modulus/sine(phase angle)	583.7	561.2	556.7	627.0	699.4	605.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.656	0.652	0.641	0.640	0.636	0.645
Maximum load (kN)	0.774 (30.046s)	0.770 (30.245s)	0.766 (30.446s)	0.766 (30.645s)	0.756 (30.848s)	0.766
Minimum load (kN)	0.117 (30.147s)	0.118 (30.346s)	0.124 (30.546s)	0.126 (30.747s)	0.121 (30.946s)	0.121
Maximum averaged axial (mm)	0.251 (30.052s)	0.252 (30.252s)	0.254 (30.453s)	0.254 (30.651s)	0.254 (30.853s)	0.253
Minimum averaged axial (mm)	0.081 (30.151s)	0.086 (30.352s)	0.089 (30.552s)	0.088 (30.751s)	0.089 (30.951s)	0.087
Maximum axial #1 (mm)	0.241 (30.053s)	0.242 (30.253s)	0.244 (30.454s)	0.244 (30.652s)	0.244 (30.854s)	0.243
Minimum axial #1 (mm)	0.071 (30.151s)	0.077 (30.351s)	0.079 (30.551s)	0.079 (30.750s)	0.079 (30.951s)	0.077
Maximum axial #2 (mm)	0.262 (30.051s)	0.263 (30.250s)	0.264 (30.452s)	0.264 (30.650s)	0.264 (30.850s)	0.263
Minimum axial #2 (mm)	0.096 (30.152s)	0.097 (30.352s)	0.099 (30.552s)	0.098 (30.752s)	0.099 (30.952s)	0.098

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982
Volume: 900066.3

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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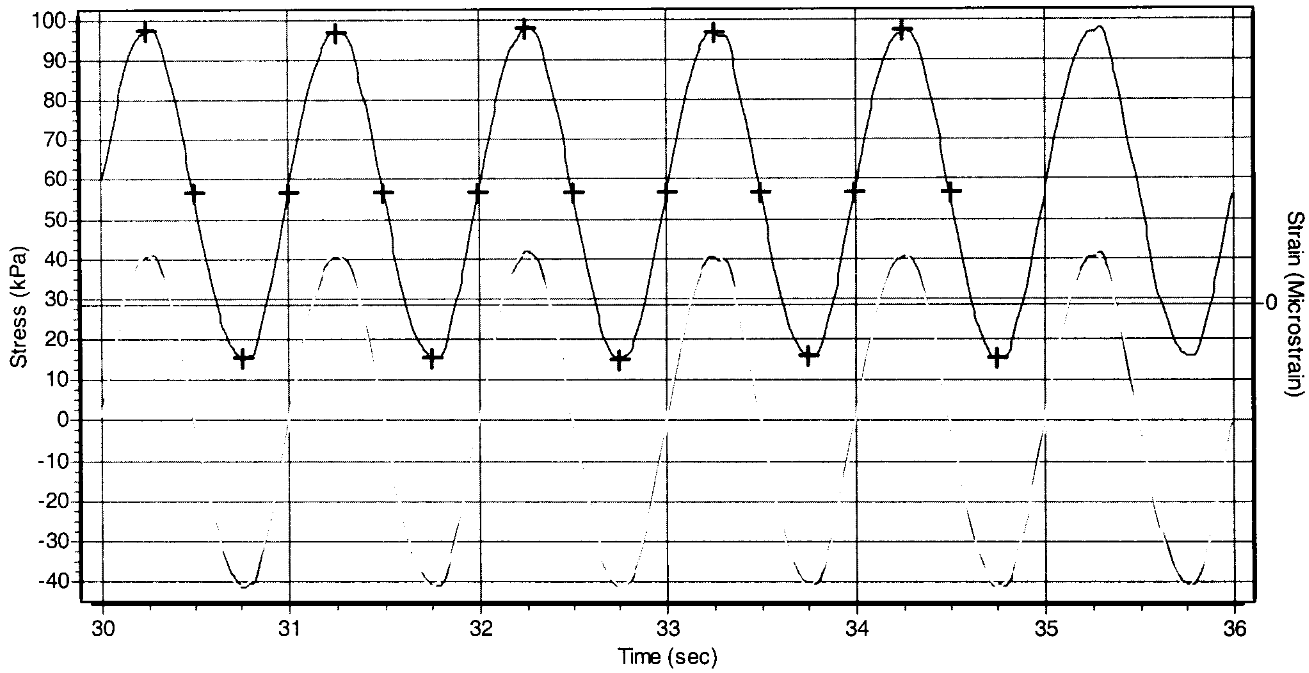

Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:07 PM

St dev = 1.84

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 114.6

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.9	81.3	82.4	81.0	81.6	81.6
Recoverable axial micro-strain	1568.6	1569.5	1582.8	1568.2	1572.3	1572.3
Permanent axial micro-strain	2238	2292	2337	2392	2441	
Dynamic modulus (MPa)	52.2	51.8	52.1	51.6	51.9	51.9
Phase angle (Deg)	11.08	11.54	11.45	11.23	12.13	11.49
Dyn.Modulus/sine(phase angle)	541.3	515.2	522.2	527.6	491.0	519.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.644	0.639	0.648	0.636	0.641	0.641
Maximum load (kN)	0.764 (30.247s)	0.762 (31.247s)	0.768 (32.247s)	0.763 (33.247s)	0.763 (34.247s)	0.764
Minimum load (kN)	0.121 (30.748s)	0.123 (31.745s)	0.120 (32.744s)	0.127 (33.746s)	0.122 (34.744s)	0.123
Maximum averaged axial (mm)	0.436 (30.278s)	0.443 (31.279s)	0.449 (32.279s)	0.454 (33.278s)	0.460 (34.281s)	0.448
Minimum averaged axial (mm)	0.256 (30.773s)	0.263 (31.772s)	0.268 (32.771s)	0.274 (33.771s)	0.280 (34.770s)	0.268
Maximum axial #1 (mm)	0.437 (30.278s)	0.443 (31.279s)	0.450 (32.280s)	0.455 (33.278s)	0.461 (34.282s)	0.449
Minimum axial #1 (mm)	0.260 (30.774s)	0.266 (31.772s)	0.272 (32.771s)	0.278 (33.772s)	0.284 (34.770s)	0.272
Maximum axial #2 (mm)	0.436 (30.278s)	0.442 (31.278s)	0.449 (32.278s)	0.453 (33.277s)	0.459 (34.280s)	0.448
Minimum axial #2 (mm)	0.253 (30.773s)	0.259 (31.772s)	0.264 (32.770s)	0.270 (33.771s)	0.276 (34.770s)	0.264

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982

Volume: 900066.3

Comments/Properties: Initial Temp: 58 'C

Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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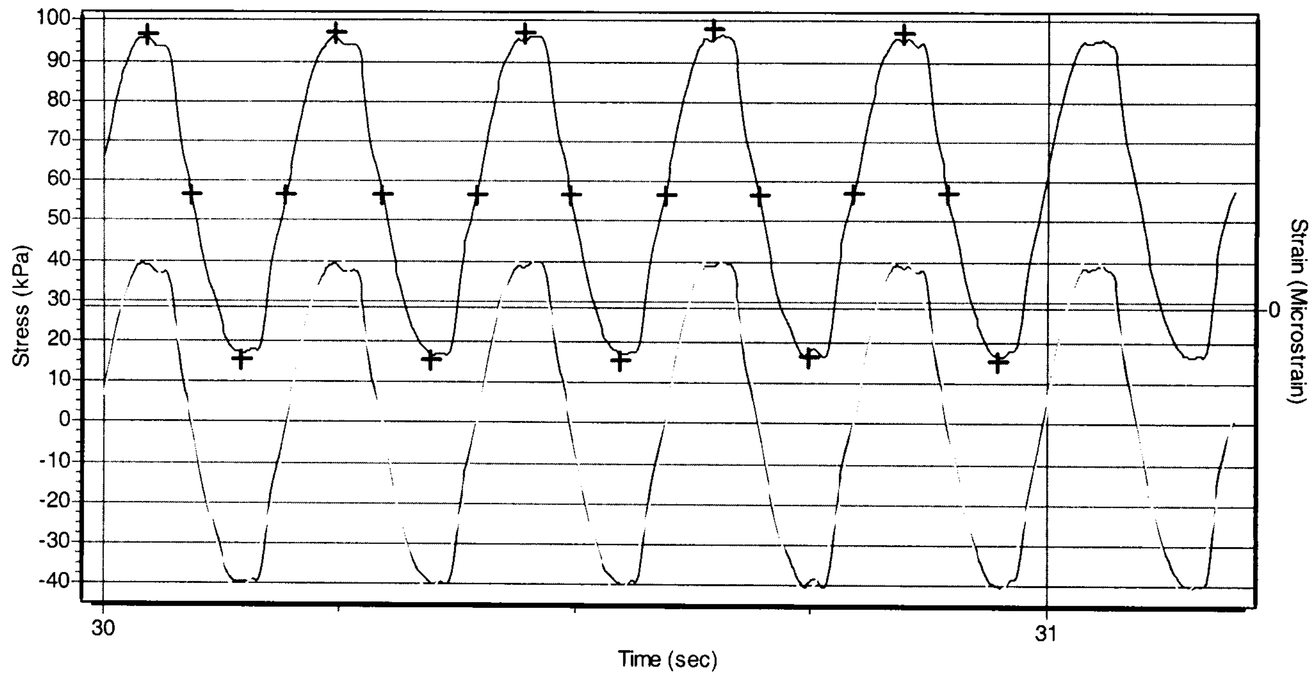


Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:07 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

St dev = 5.98

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.6
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.1	81.8	81.8	81.7	81.7	81.6
Recoverable axial micro-strain	1387.4	1383.4	1384.7	1396.6	1390.4	1388.5
Permanent axial micro-strain	895	908	920	926	934	
Dynamic modulus (MPa)	58.5	59.1	59.1	58.5	58.8	58.8
Phase angle (Deg)	6.19	8.93	8.93	8.64	6.87	7.91
Dyn.Modulus/sine(phase angle)	1083.6	759.8	758.8	776.0	980.9	871.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.642	0.643	0.642	0.642	0.641
Maximum load (kN)	0.760 (30.046s)	0.763 (30.246s)	0.765 (30.445s)	0.771 (30.646s)	0.764 (30.846s)	0.765
Minimum load (kN)	0.122 (30.145s)	0.121 (30.345s)	0.122 (30.545s)	0.130 (30.746s)	0.122 (30.946s)	0.123
Maximum averaged axial (mm)	0.262 (30.049s)	0.263 (30.251s)	0.264 (30.450s)	0.266 (30.650s)	0.266 (30.850s)	0.264
Minimum averaged axial (mm)	0.103 (30.151s)	0.104 (30.351s)	0.105 (30.551s)	0.106 (30.751s)	0.107 (30.951s)	0.105
Maximum axial #1 (mm)	0.260 (30.052s)	0.261 (30.252s)	0.262 (30.452s)	0.265 (30.652s)	0.265 (30.853s)	0.263
Minimum axial #1 (mm)	0.105 (30.151s)	0.103 (30.350s)	0.108 (30.551s)	0.109 (30.751s)	0.106 (30.951s)	0.106
Maximum axial #2 (mm)	0.264 (30.049s)	0.265 (30.250s)	0.266 (30.449s)	0.268 (30.650s)	0.269 (30.850s)	0.266
Minimum axial #2 (mm)	0.100 (30.151s)	0.102 (30.352s)	0.103 (30.551s)	0.104 (30.751s)	0.105 (30.952s)	0.103

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#05

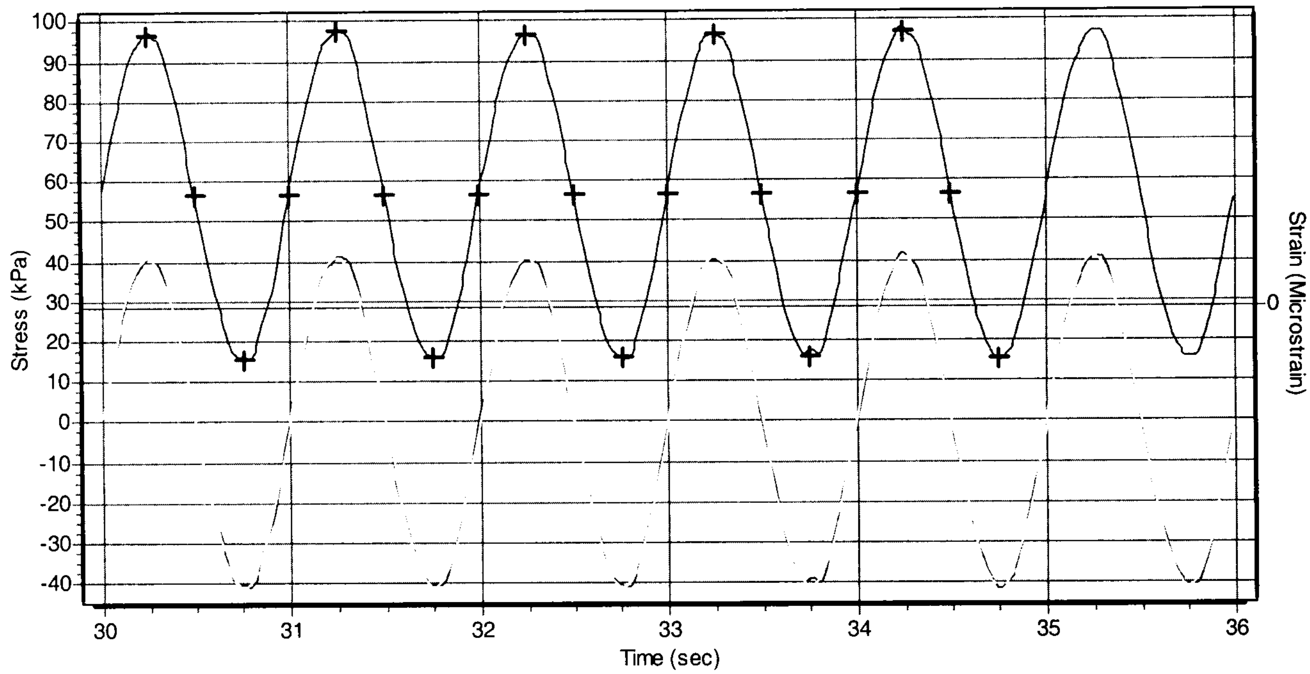
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982
Volume: 900066.3

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_9.5_#06.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:11 PM st dev = 1.72
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 114.8
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.1	81.7	81.1	80.5	81.5	81.2
Recoverable axial micro-strain	1492.5	1504.4	1490.2	1485.0	1501.4	1494.7
Permanent axial micro-strain	1533	1574	1612	1656	1684	
Dynamic modulus (MPa)	54.3	54.3	54.4	54.2	54.3	54.3
Phase angle (Deg)	11.75	11.25	11.88	11.31	12.27	11.69
Dyn.Modulus/sine(phase angle)	530.7	553.6	525.6	550.3	508.2	533.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.641	0.637	0.632	0.640	0.638
Maximum load (kN)	0.760 (30.246s)	0.767 (31.248s)	0.761 (32.245s)	0.759 (33.244s)	0.764 (34.245s)	0.762
Minimum load (kN)	0.123 (30.748s)	0.125 (31.744s)	0.124 (32.746s)	0.126 (33.743s)	0.124 (34.745s)	0.125
Maximum averaged axial (mm)	0.347 (30.279s)	0.353 (31.279s)	0.356 (32.278s)	0.361 (33.276s)	0.366 (34.279s)	0.357
Minimum averaged axial (mm)	0.176 (30.773s)	0.181 (31.771s)	0.185 (32.771s)	0.190 (33.772s)	0.193 (34.767s)	0.185
Maximum axial #1 (mm)	0.346 (30.278s)	0.352 (31.280s)	0.355 (32.278s)	0.359 (33.276s)	0.364 (34.279s)	0.355
Minimum axial #1 (mm)	0.177 (30.772s)	0.181 (31.772s)	0.186 (32.771s)	0.191 (33.773s)	0.194 (34.767s)	0.186
Maximum axial #2 (mm)	0.348 (30.279s)	0.354 (31.278s)	0.357 (32.278s)	0.362 (33.276s)	0.367 (34.279s)	0.358
Minimum axial #2 (mm)	0.175 (30.773s)	0.180 (31.771s)	0.184 (32.770s)	0.189 (33.772s)	0.193 (34.767s)	0.184

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#06

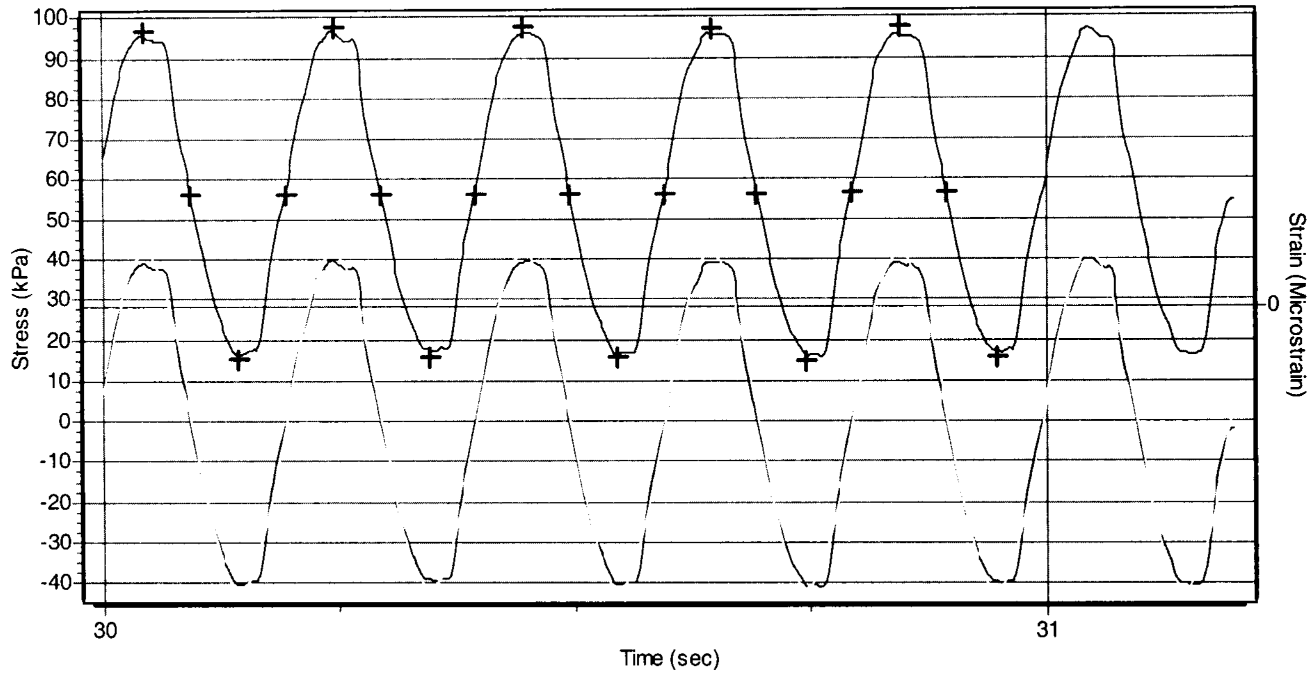
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.8						114.8	

Cross-Sectional Area: 7853.982
Volume: 901637.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_9.5_#06.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:11 PM — St dev = 5.53

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 114.8

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	81.6	82.0	82.2	81.7	81.8
Recoverable axial micro-strain	1327.5	1319.6	1327.2	1334.2	1321.8	1326.1
Permanent axial micro-strain	341	360	355	355	374	
Dynamic modulus (MPa)	61.3	61.8	61.8	61.6	61.8	61.7
Phase angle (Deg)	11.15	9.32	9.00	8.77	8.06	9.26
Dyn.Modulus/sine(phase angle)	631.3	761.3	787.1	805.6	879.8	773.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.641	0.644	0.646	0.642	0.642
Maximum load (kN)	0.761 (30.045s)	0.766 (30.245s)	0.767 (30.445s)	0.764 (30.645s)	0.765 (30.845s)	0.765
Minimum load (kN)	0.122 (30.145s)	0.125 (30.346s)	0.123 (30.545s)	0.119 (30.745s)	0.123 (30.945s)	0.122
Maximum averaged axial (mm)	0.192 (30.051s)	0.193 (30.250s)	0.193 (30.450s)	0.194 (30.650s)	0.195 (30.849s)	0.193
Minimum averaged axial (mm)	0.039 (30.151s)	0.041 (30.351s)	0.041 (30.551s)	0.041 (30.751s)	0.043 (30.951s)	0.041
Maximum axial #1 (mm)	0.185 (30.052s)	0.186 (30.251s)	0.187 (30.451s)	0.187 (30.651s)	0.188 (30.850s)	0.187
Minimum axial #1 (mm)	0.036 (30.151s)	0.038 (30.351s)	0.039 (30.550s)	0.038 (30.751s)	0.040 (30.950s)	0.038
Maximum axial #2 (mm)	0.198 (30.051s)	0.199 (30.249s)	0.199 (30.450s)	0.200 (30.649s)	0.201 (30.849s)	0.200
Minimum axial #2 (mm)	0.043 (30.151s)	0.044 (30.351s)	0.044 (30.551s)	0.044 (30.752s)	0.046 (30.951s)	0.044

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_9.5_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.8						114.8	

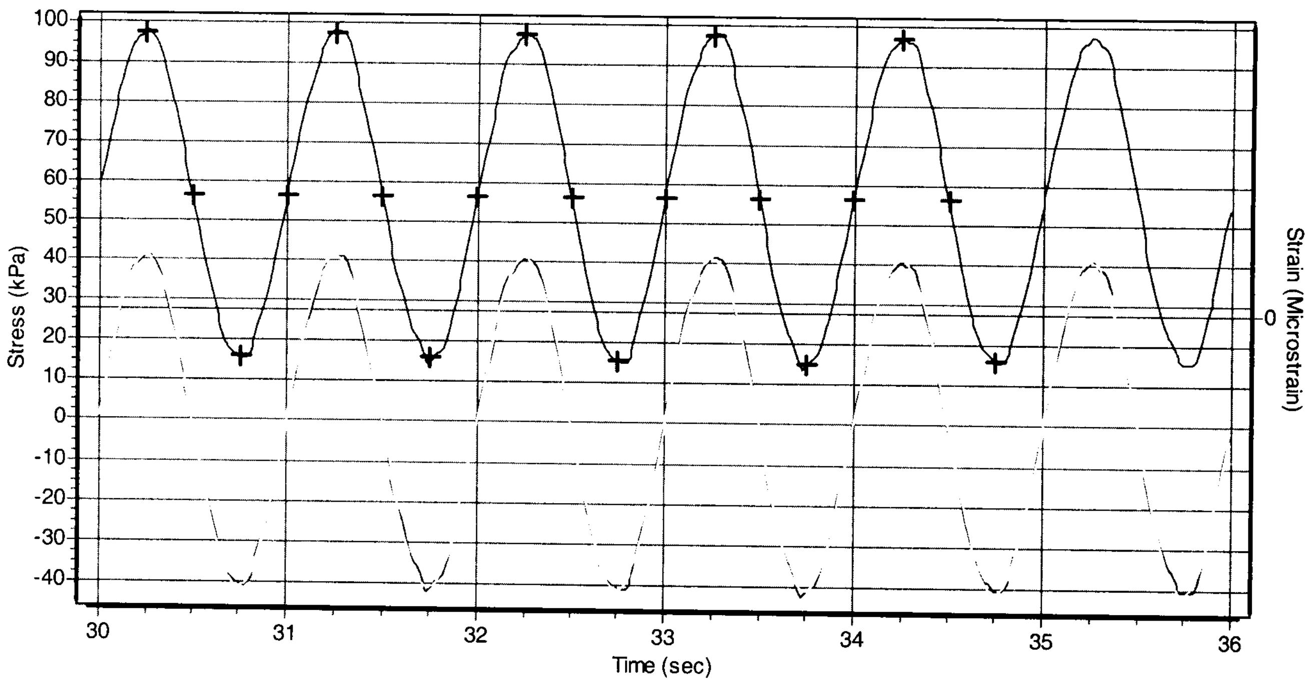
Cross-Sectional Area: 7853.982

Volume: 901637.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#01.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:15 PM   St dev = 1.46

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.3
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.4	81.2	82.0	82.1	81.0	81.5
Recoverable axial micro-strain	1480.9	1486.0	1493.6	1496.0	1475.9	1486.5
Permanent axial micro-strain	1711	1750	1786	1823	1872	
Dynamic modulus (MPa)	54.9	54.6	54.9	54.9	54.9	54.8
Phase angle (Deg)	10.20	11.05	10.19	9.04	9.65	10.03
Dyn.Modulus/sine(phase angle)	617.9	567.6	618.1	696.3	652.4	630.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.638	0.644	0.645	0.636	0.640
Maximum load (kN)	0.764 (30.245s)	0.764 (31.246s)	0.765 (32.246s)	0.765 (33.247s)	0.762 (34.245s)	0.764
Minimum load (kN)	0.125 (30.748s)	0.126 (31.747s)	0.121 (32.746s)	0.120 (33.743s)	0.125 (34.744s)	0.124
Maximum averaged axial (mm)	0.365 (30.274s)	0.370 (31.277s)	0.375 (32.274s)	0.379 (33.273s)	0.383 (34.272s)	0.374
Minimum averaged axial (mm)	0.196 (30.770s)	0.200 (31.769s)	0.204 (32.769s)	0.208 (33.770s)	0.214 (34.769s)	0.204
Maximum axial #1 (mm)	0.362 (30.274s)	0.368 (31.277s)	0.373 (32.275s)	0.377 (33.274s)	0.381 (34.272s)	0.372
Minimum axial #1 (mm)	0.201 (30.770s)	0.205 (31.769s)	0.210 (32.770s)	0.214 (33.770s)	0.220 (34.768s)	0.210
Maximum axial #2 (mm)	0.367 (30.273s)	0.372 (31.277s)	0.377 (32.274s)	0.381 (33.272s)	0.385 (34.272s)	0.376
Minimum axial #2 (mm)	0.190 (30.770s)	0.195 (31.769s)	0.198 (32.769s)	0.202 (33.770s)	0.208 (34.769s)	0.198

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.3						114.3	

Cross-Sectional Area: 7853.982
Volume: 897710.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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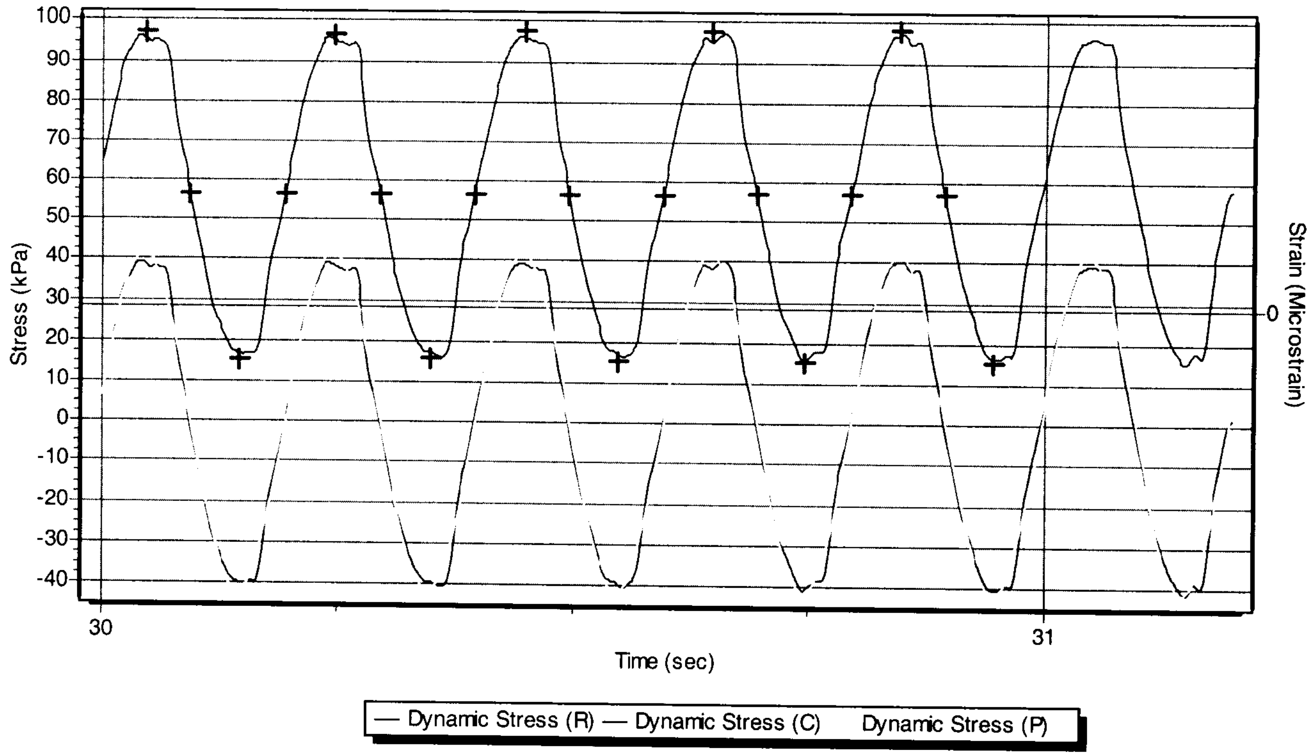

Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:15 PM

St dev = 5.69

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 114.3

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	81.0	82.1	82.2	82.9	82.0
Recoverable axial micro-strain	1333.7	1333.9	1333.7	1328.8	1327.9	1331.6
Permanent axial micro-strain	521	527	538	546	553	
Dynamic modulus (MPa)	61.3	60.7	61.6	61.9	62.4	61.6
Phase angle (Deg)	6.32	7.89	10.18	7.44	6.90	7.75
Dyn.Modulus/sine(phase angle)	1112.6	883.1	693.6	953.8	1037.8	936.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.636	0.645	0.646	0.651	0.644
Maximum load (kN)	0.763 (30.046s)	0.761 (30.246s)	0.767 (30.446s)	0.769 (30.646s)	0.771 (30.845s)	0.766
Minimum load (kN)	0.121 (30.146s)	0.125 (30.347s)	0.122 (30.546s)	0.123 (30.745s)	0.120 (30.945s)	0.122
Maximum averaged axial (mm)	0.212 (30.050s)	0.213 (30.251s)	0.214 (30.451s)	0.214 (30.650s)	0.215 (30.848s)	0.214
Minimum averaged axial (mm)	0.060 (30.151s)	0.060 (30.351s)	0.061 (30.551s)	0.062 (30.751s)	0.063 (30.951s)	0.061
Maximum axial #1 (mm)	0.211 (30.051s)	0.212 (30.252s)	0.213 (30.452s)	0.213 (30.651s)	0.214 (30.849s)	0.212
Minimum axial #1 (mm)	0.066 (30.151s)	0.066 (30.351s)	0.065 (30.550s)	0.068 (30.750s)	0.069 (30.950s)	0.067
Maximum axial #2 (mm)	0.213 (30.049s)	0.214 (30.249s)	0.215 (30.450s)	0.216 (30.649s)	0.217 (30.848s)	0.215
Minimum axial #2 (mm)	0.053 (30.152s)	0.054 (30.351s)	0.056 (30.551s)	0.057 (30.751s)	0.057 (30.951s)	0.056

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.3						114.3	

Cross-Sectional Area: 7853.982

Volume: 897710.1

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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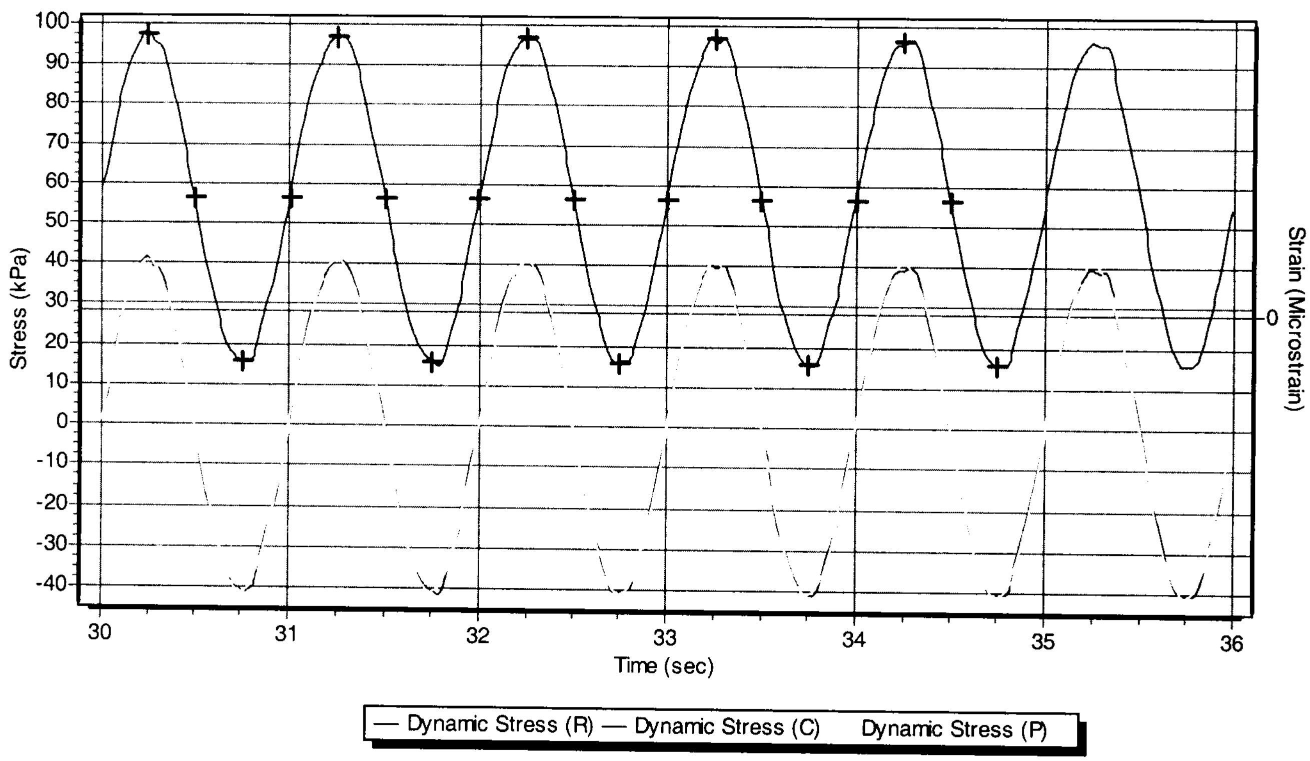


Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

St dev = 1.83

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.4	81.0	81.1	80.8	80.6	81.0
Recoverable axial micro-strain	1531.6	1530.1	1528.1	1526.4	1527.3	1528.7
Permanent axial micro-strain	1674	1716	1764	1806	1849	
Dynamic modulus (MPa)	53.2	52.9	53.1	52.9	52.8	53.0
Phase angle (Deg)	10.57	10.06	10.78	11.22	10.38	10.60
Dyn.Modulus/sine(phase angle)	577.1	604.0	564.8	541.4	583.2	574.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.639	0.636	0.637	0.635	0.633	0.636
Maximum load (kN)	0.764 (30.245s)	0.761 (31.247s)	0.762 (32.244s)	0.761 (33.247s)	0.757 (34.249s)	0.761
Minimum load (kN)	0.124 (30.747s)	0.124 (31.748s)	0.126 (32.745s)	0.126 (33.745s)	0.124 (34.744s)	0.125
Maximum averaged axial (mm)	0.368 (30.275s)	0.372 (31.275s)	0.378 (32.273s)	0.382 (33.278s)	0.387 (34.278s)	0.377
Minimum averaged axial (mm)	0.192 (30.770s)	0.197 (31.771s)	0.202 (32.766s)	0.207 (33.769s)	0.212 (34.770s)	0.202
Maximum axial #1 (mm)	0.348 (30.273s)	0.352 (31.274s)	0.357 (32.272s)	0.361 (33.276s)	0.365 (34.276s)	0.357
Minimum axial #1 (mm)	0.171 (30.770s)	0.176 (31.771s)	0.181 (32.766s)	0.185 (33.769s)	0.190 (34.770s)	0.180
Maximum axial #2 (mm)	0.388 (30.276s)	0.393 (31.276s)	0.398 (32.275s)	0.404 (33.280s)	0.409 (34.280s)	0.398
Minimum axial #2 (mm)	0.213 (30.770s)	0.218 (31.771s)	0.224 (32.768s)	0.230 (33.770s)	0.234 (34.770s)	0.224

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#02

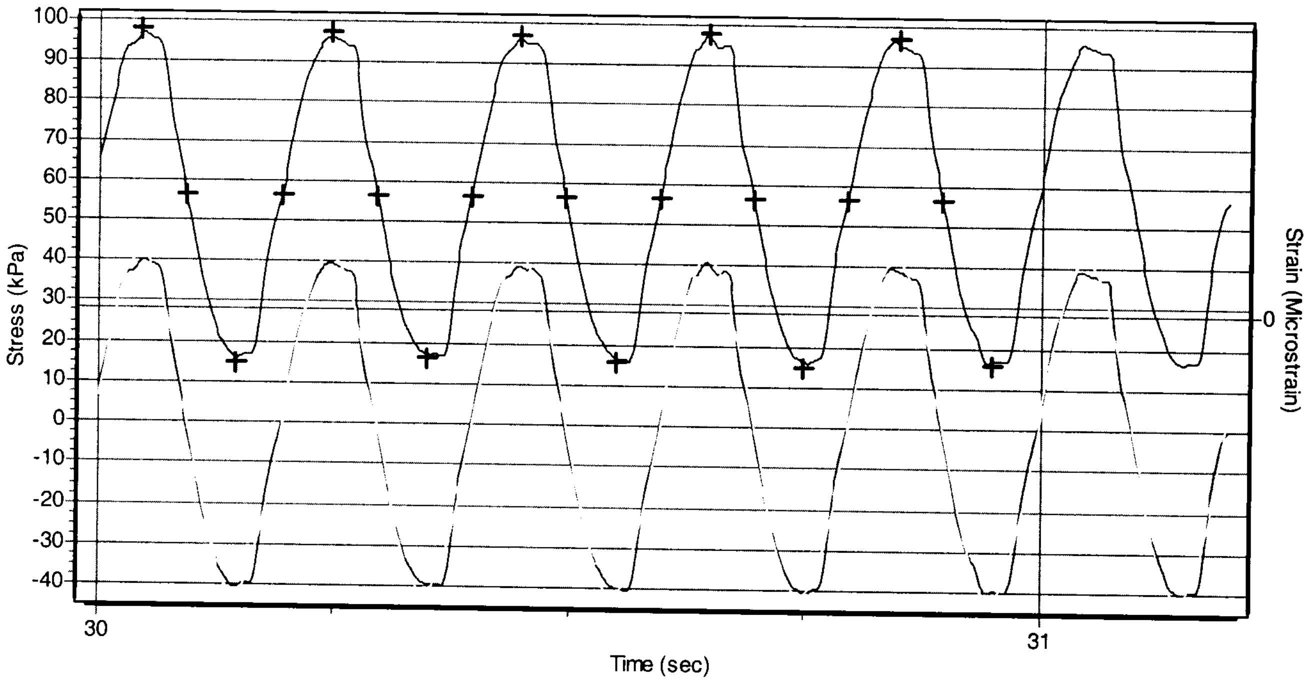
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.7						114.7	

Cross-Sectional Area: 7853.982
Volume: 900851.7

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#02.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:19 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

St dev = 5.83

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.7
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.0	81.4	81.4	83.3	81.2	82.1
Recoverable axial micro-strain	1363.7	1368.2	1365.4	1374.2	1359.7	1366.2
Permanent axial micro-strain	608	615	619	624	645	
Dynamic modulus (MPa)	60.9	59.5	59.6	60.6	59.7	60.1
Phase angle (Deg)	8.22	14.04	8.37	10.42	9.09	10.03
Dyn.Modulus/sine(phase angle)	850.0	486.4	817.1	668.1	753.4	715.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.652	0.639	0.639	0.655	0.637	0.644
Maximum load (kN)	0.769 (30.045s)	0.766 (30.246s)	0.764 (30.445s)	0.770 (30.645s)	0.762 (30.846s)	0.766
Minimum load (kN)	0.117 (30.145s)	0.127 (30.347s)	0.125 (30.547s)	0.115 (30.746s)	0.125 (30.945s)	0.122
Maximum averaged axial (mm)	0.226 (30.050s)	0.227 (30.253s)	0.228 (30.450s)	0.229 (30.651s)	0.230 (30.851s)	0.228
Minimum averaged axial (mm)	0.070 (30.151s)	0.071 (30.351s)	0.071 (30.551s)	0.072 (30.751s)	0.074 (30.952s)	0.071
Maximum axial #1 (mm)	0.213 (30.050s)	0.214 (30.254s)	0.214 (30.450s)	0.216 (30.653s)	0.217 (30.852s)	0.215
Minimum axial #1 (mm)	0.054 (30.150s)	0.055 (30.351s)	0.056 (30.551s)	0.052 (30.750s)	0.058 (30.951s)	0.055
Maximum axial #2 (mm)	0.240 (30.049s)	0.241 (30.253s)	0.241 (30.450s)	0.242 (30.650s)	0.242 (30.850s)	0.241
Minimum axial #2 (mm)	0.085 (30.151s)	0.086 (30.351s)	0.086 (30.552s)	0.087 (30.751s)	0.090 (30.952s)	0.087

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#02

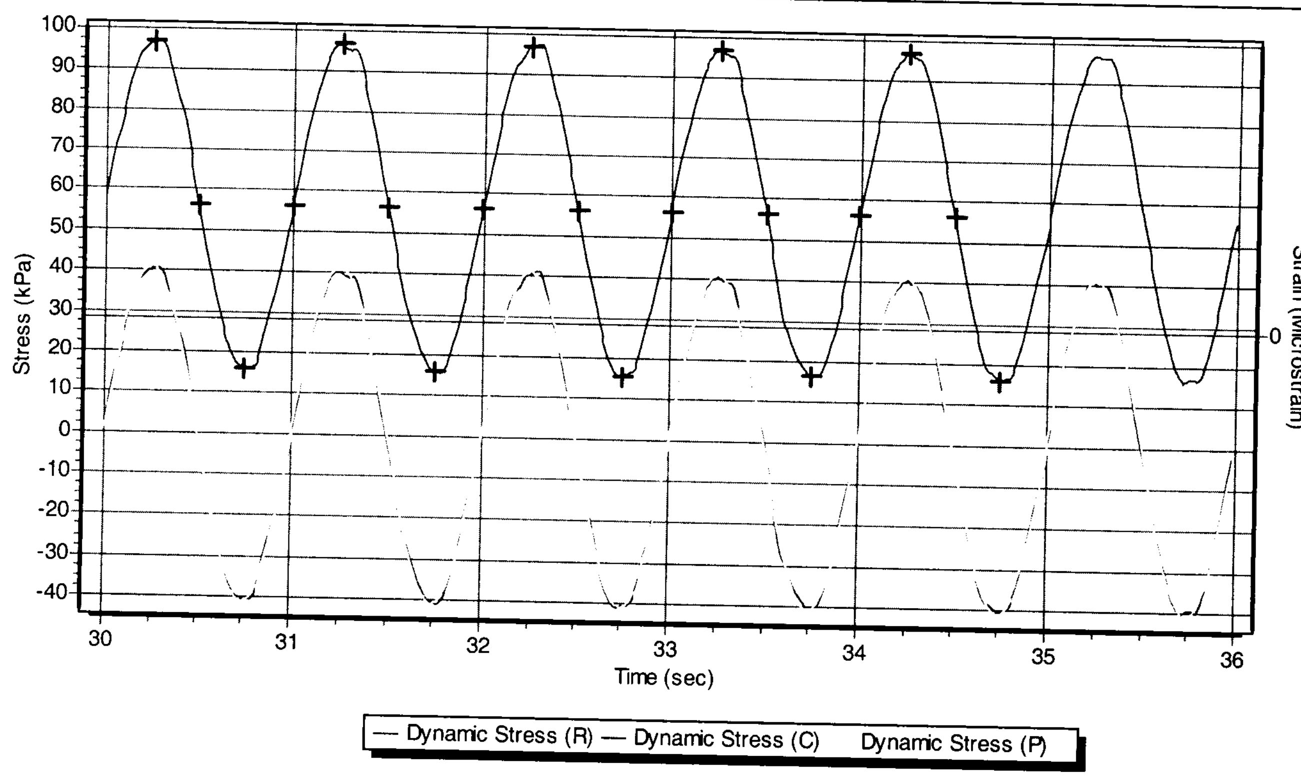
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.7						114.7	

Cross-Sectional Area: 7853.982
Volume: 900851.7

Comments/Properties: Initial Temp: 59 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#03.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:23 PM

St dev = 1.77

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.5

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.0	81.6	80.7	81.4	81.2
Recoverable axial micro-strain	1457.2	1465.8	1470.0	1453.0	1466.3	1462.5
Permanent axial micro-strain	1270	1300	1324	1374	1398	
Dynamic modulus (MPa)	55.7	55.2	55.5	55.5	55.5	55.5
Phase angle (Deg)	9.75	10.93	9.88	10.61	10.25	10.28
Dyn.Modulus/sine(phase angle)	656.0	580.3	644.8	600.6	621.4	620.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.636	0.641	0.634	0.639	0.638
Maximum load (kN)	0.764 (30.250s)	0.763 (31.247s)	0.764 (32.246s)	0.763 (33.246s)	0.763 (34.244s)	0.763
Minimum load (kN)	0.126 (30.745s)	0.127 (31.747s)	0.123 (32.744s)	0.129 (33.744s)	0.124 (34.745s)	0.126
Maximum averaged axial (mm)	0.312 (30.277s)	0.317 (31.277s)	0.320 (32.274s)	0.324 (33.276s)	0.328 (34.273s)	0.320
Minimum averaged axial (mm)	0.145 (30.771s)	0.149 (31.769s)	0.152 (32.769s)	0.157 (33.770s)	0.160 (34.769s)	0.153
Maximum axial #1 (mm)	0.302 (30.275s)	0.306 (31.277s)	0.309 (32.273s)	0.312 (33.274s)	0.317 (34.272s)	0.309
Minimum axial #1 (mm)	0.132 (30.771s)	0.135 (31.769s)	0.138 (32.769s)	0.143 (33.769s)	0.145 (34.769s)	0.139
Maximum axial #2 (mm)	0.323 (30.279s)	0.328 (31.278s)	0.331 (32.274s)	0.335 (33.277s)	0.339 (34.274s)	0.331
Minimum axial #2 (mm)	0.158 (30.769s)	0.162 (31.769s)	0.166 (32.771s)	0.171 (33.770s)	0.175 (34.769s)	0.167

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.5						114.5	

Cross-Sectional Area: 7853.982

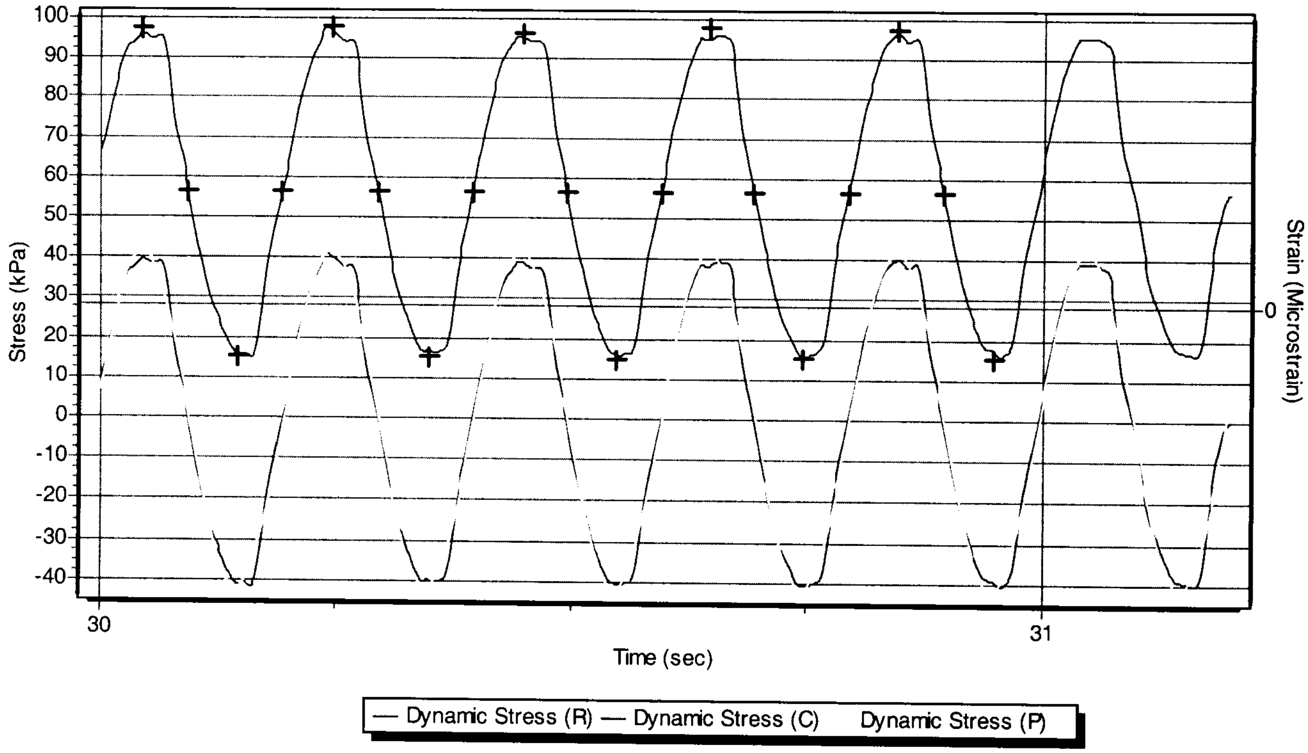
Volume: 899280.9

Comments/Properties: Initial Temp: 58 'C

Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#03.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:23 PM   St dev = 5.82

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.5

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.2	82.7	81.9	83.0	82.1	82.4
Recoverable axial micro-strain	1326.9	1337.0	1323.9	1361.2	1347.2	1339.2
Permanent axial micro-strain	352	359	374	349	362	
Dynamic modulus (MPa)	62.0	61.9	61.9	61.0	60.9	61.5
Phase angle (Deg)	8.37	6.23	9.38	8.74	9.77	8.50
Dyn.Modulus/sine(phase angle)	849.0	1139.3	757.0	799.8	715.3	852.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.650	0.644	0.652	0.645	0.647
Maximum load (kN)	0.767 (30.045s)	0.769 (30.246s)	0.760 (30.446s)	0.770 (30.646s)	0.767 (30.845s)	0.767
Minimum load (kN)	0.122 (30.147s)	0.119 (30.347s)	0.116 (30.546s)	0.119 (30.745s)	0.122 (30.946s)	0.119
Maximum averaged axial (mm)	0.192 (30.050s)	0.194 (30.249s)	0.194 (30.451s)	0.196 (30.651s)	0.196 (30.850s)	0.194
Minimum averaged axial (mm)	0.040 (30.151s)	0.041 (30.351s)	0.043 (30.551s)	0.040 (30.750s)	0.041 (30.951s)	0.041
Maximum axial #1 (mm)	0.183 (30.053s)	0.183 (30.250s)	0.183 (30.452s)	0.185 (30.652s)	0.185 (30.851s)	0.184
Minimum axial #1 (mm)	0.025 (30.151s)	0.026 (30.351s)	0.023 (30.550s)	0.025 (30.750s)	0.026 (30.950s)	0.025
Maximum axial #2 (mm)	0.203 (30.049s)	0.205 (30.249s)	0.205 (30.450s)	0.207 (30.650s)	0.206 (30.849s)	0.205
Minimum axial #2 (mm)	0.055 (30.152s)	0.057 (30.352s)	0.058 (30.551s)	0.058 (30.751s)	0.057 (30.951s)	0.057

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.5						114.5	

Cross-Sectional Area: 7853.982

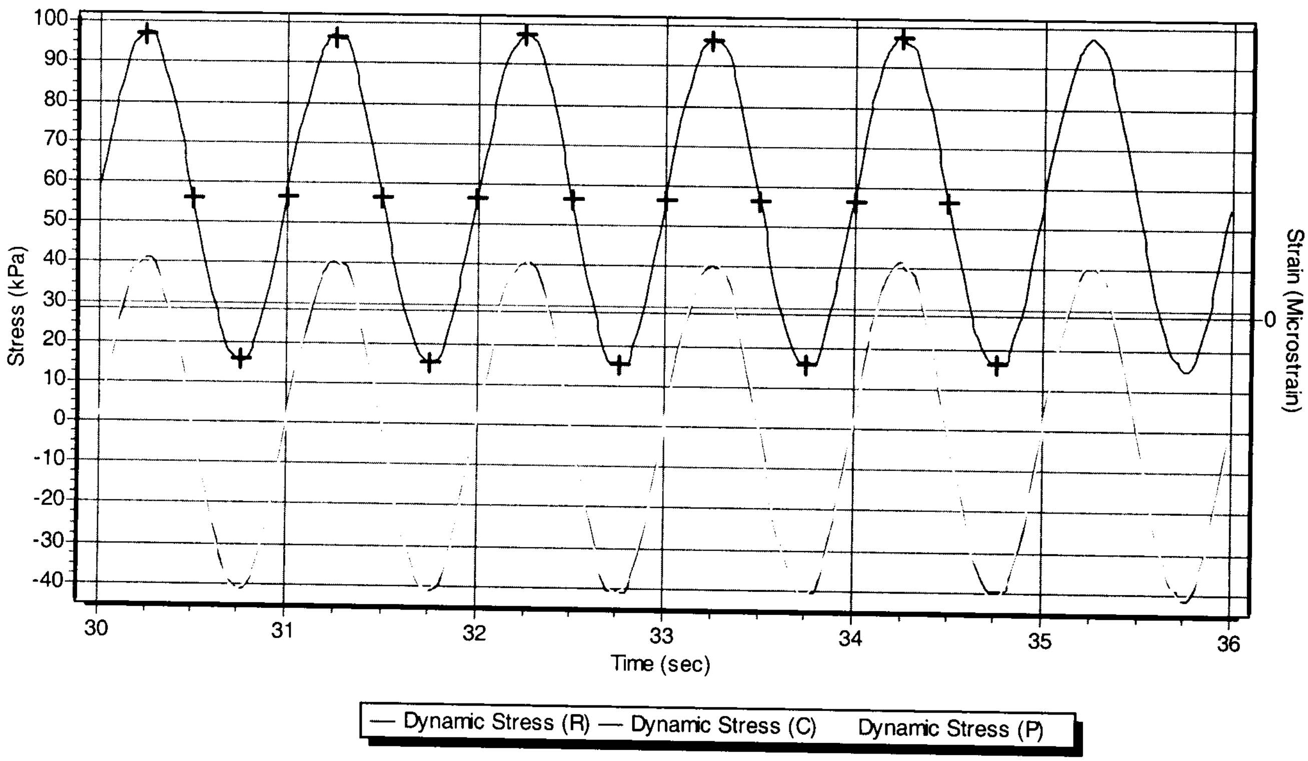
Volume: 899280.9

Comments/Properties: Initial Temp: 58 'C

Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#04.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:28 PM   St dev = 1.88
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 114.6
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.3	81.2	82.4	80.7	81.4	81.4
Recoverable axial micro-strain	1441.5	1437.8	1452.8	1434.7	1438.2	1441.0
Permanent axial micro-strain	1174	1216	1247	1293	1336	
Dynamic modulus (MPa)	56.4	56.5	56.7	56.2	56.6	56.5
Phase angle (Deg)	10.77	11.41	9.57	10.76	10.62	10.63
Dyn.Modulus/sine(phase angle)	600.9	568.3	680.0	599.9	611.9	612.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.638	0.648	0.634	0.640	0.639
Maximum load (kN)	0.763 (30.248s)	0.760 (31.245s)	0.767 (32.246s)	0.760 (33.243s)	0.767 (34.241s)	0.763
Minimum load (kN)	0.124 (30.748s)	0.122 (31.744s)	0.120 (32.748s)	0.127 (33.744s)	0.127 (34.748s)	0.124
Maximum averaged axial (mm)	0.300 (30.278s)	0.304 (31.277s)	0.309 (32.273s)	0.313 (33.273s)	0.318 (34.270s)	0.309
Minimum averaged axial (mm)	0.135 (30.767s)	0.139 (31.766s)	0.143 (32.770s)	0.148 (33.768s)	0.153 (34.769s)	0.144
Maximum axial #1 (mm)	0.297 (30.279s)	0.301 (31.276s)	0.306 (32.272s)	0.309 (33.273s)	0.315 (34.271s)	0.306
Minimum axial #1 (mm)	0.131 (30.767s)	0.135 (31.766s)	0.139 (32.770s)	0.144 (33.767s)	0.149 (34.769s)	0.140
Maximum axial #2 (mm)	0.302 (30.278s)	0.307 (31.277s)	0.312 (32.274s)	0.316 (33.273s)	0.321 (34.270s)	0.312
Minimum axial #2 (mm)	0.138 (30.768s)	0.144 (31.765s)	0.147 (32.770s)	0.152 (33.768s)	0.157 (34.769s)	0.148

Operator: Jonathan S. Gould - NETTCP #503
Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

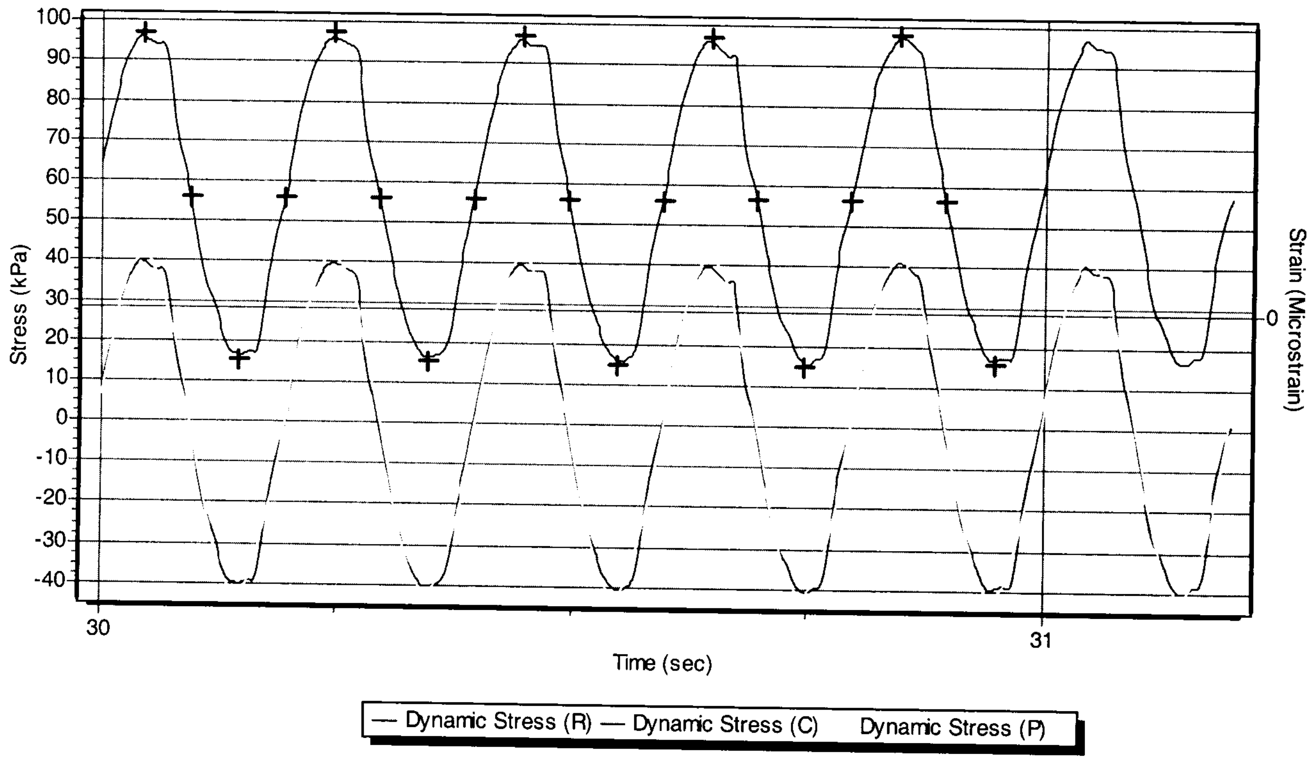
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Core/Sample Number: P3_12.5_#04
Cross-Sectional Area: 7853.982
Volume: 900066.3

Comments/Properties: Initial Temp: ~~98~~ 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#04.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:28 PM

St dev = 5.28

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.6

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	82.2	82.3	82.1	82.4	82.2
Recoverable axial micro-strain	1317.7	1343.2	1359.6	1306.8	1315.7	1328.6
Permanent axial micro-strain	506	483	479	530	537	
Dynamic modulus (MPa)	62.1	61.2	60.5	62.8	62.6	61.9
Phase angle (Deg)	10.76	8.40	7.80	6.25	8.07	8.26
Dyn.Modulus/sine(phase angle)	662.5	835.7	889.6	1152.3	889.5	885.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.646	0.646	0.645	0.647	0.645
Maximum load (kN)	0.762 (30.045s)	0.766 (30.245s)	0.763 (30.445s)	0.761 (30.645s)	0.771 (30.845s)	0.765
Minimum load (kN)	0.119 (30.146s)	0.120 (30.345s)	0.117 (30.546s)	0.117 (30.746s)	0.124 (30.945s)	0.119
Maximum averaged axial (mm)	0.209 (30.051s)	0.209 (30.250s)	0.211 (30.450s)	0.210 (30.649s)	0.212 (30.850s)	0.210
Minimum averaged axial (mm)	0.058 (30.151s)	0.055 (30.351s)	0.055 (30.550s)	0.061 (30.751s)	0.062 (30.951s)	0.058
Maximum axial #1 (mm)	0.204 (30.053s)	0.203 (30.250s)	0.205 (30.452s)	0.206 (30.652s)	0.207 (30.852s)	0.205
Minimum axial #1 (mm)	0.053 (30.150s)	0.049 (30.349s)	0.049 (30.549s)	0.055 (30.751s)	0.057 (30.950s)	0.053
Maximum axial #2 (mm)	0.214 (30.049s)	0.215 (30.249s)	0.217 (30.449s)	0.216 (30.648s)	0.219 (30.849s)	0.216
Minimum axial #2 (mm)	0.063 (30.151s)	0.061 (30.351s)	0.063 (30.551s)	0.066 (30.751s)	0.066 (30.952s)	0.064

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.6						114.6	

Cross-Sectional Area: 7853.982

Volume: 900066.3

Comments/Properties: Initial Temp: ~~98~~ 53 'C

Final Temp: 56° 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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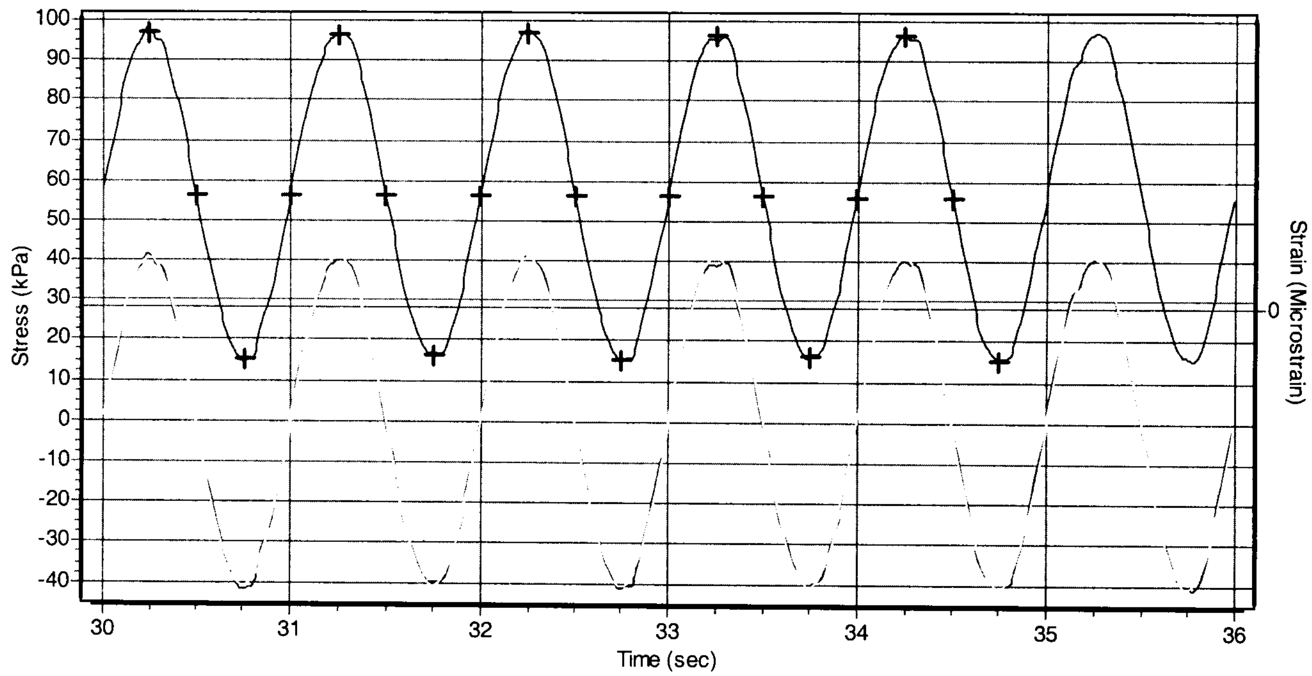


Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:33 PM   St dev = 1.85

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 114.8

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	80.4	81.7	80.4	81.3	81.1
Recoverable axial micro-strain	1517.9	1501.3	1514.4	1489.4	1504.1	1505.4
Permanent axial micro-strain	1301	1355	1383	1430	1459	
Dynamic modulus (MPa)	53.7	53.5	54.0	54.0	54.1	53.8
Phase angle (Deg)	11.51	10.20	10.42	10.25	10.77	10.63
Dyn.Modulus/sine(phase angle)	535.5	602.5	594.5	604.1	575.9	582.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.631	0.642	0.631	0.639	0.637
Maximum load (kN)	0.762 (30.246s)	0.759 (31.247s)	0.763 (32.245s)	0.757 (33.246s)	0.759 (34.246s)	0.760
Minimum load (kN)	0.122 (30.747s)	0.128 (31.746s)	0.121 (32.744s)	0.126 (33.746s)	0.120 (34.744s)	0.123
Maximum averaged axial (mm)	0.324 (30.278s)	0.328 (31.275s)	0.333 (32.274s)	0.335 (33.275s)	0.340 (34.276s)	0.332
Minimum averaged axial (mm)	0.149 (30.768s)	0.156 (31.770s)	0.159 (32.770s)	0.164 (33.770s)	0.168 (34.768s)	0.159
Maximum axial #1 (mm)	0.334 (30.277s)	0.338 (31.274s)	0.343 (32.273s)	0.345 (33.274s)	0.351 (34.275s)	0.342
Minimum axial #1 (mm)	0.156 (30.770s)	0.161 (31.768s)	0.165 (32.769s)	0.170 (33.769s)	0.174 (34.767s)	0.165
Maximum axial #2 (mm)	0.314 (30.279s)	0.318 (31.276s)	0.322 (32.275s)	0.325 (33.275s)	0.330 (34.277s)	0.322
Minimum axial #2 (mm)	0.143 (30.768s)	0.149 (31.770s)	0.152 (32.770s)	0.158 (33.770s)	0.161 (34.767s)	0.153

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.8						114.8	

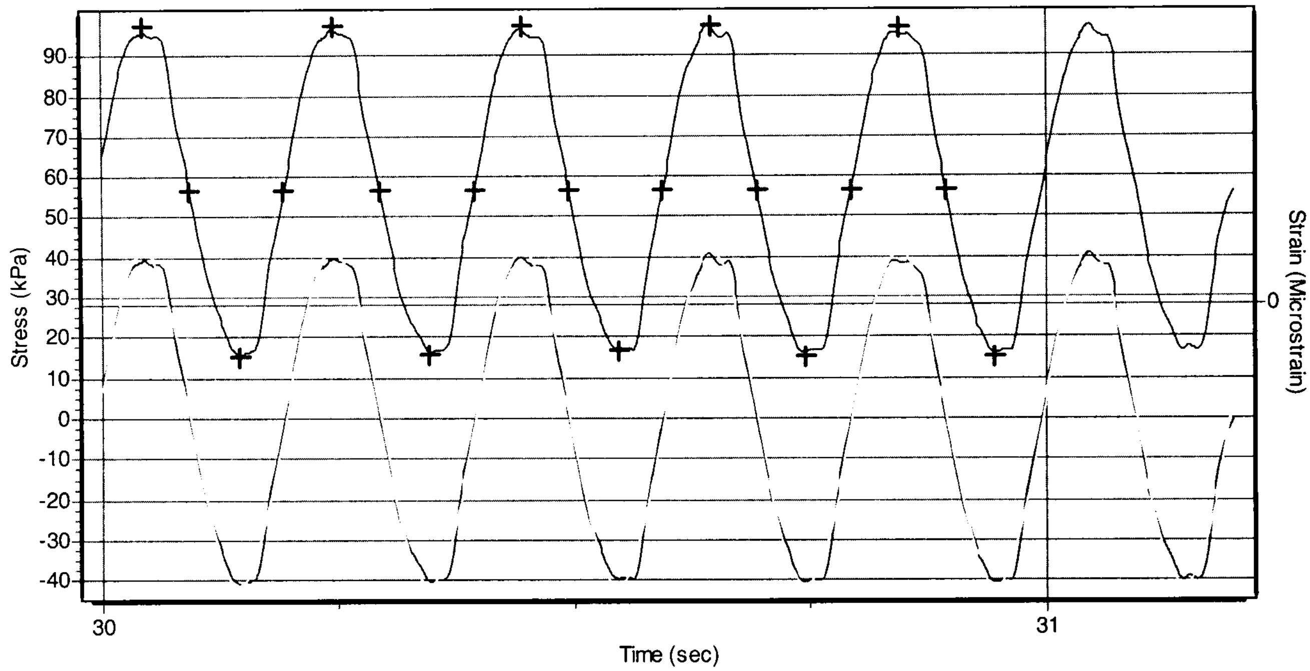
Cross-Sectional Area: 7853.982

Volume: 901637.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#05.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:33 PM   st dev = 5.0
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 114.8
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	81.9	80.8	82.1	81.4	81.7
Recoverable axial micro-strain	1349.5	1346.0	1344.6	1347.1	1350.6	1347.5
Permanent axial micro-strain	384	392	402	402	408	
Dynamic modulus (MPa)	60.9	60.9	60.1	60.9	60.2	60.6
Phase angle (Deg)	9.51	8.73	9.72	8.29	6.90	8.63
Dyn.Modulus/sine(phase angle)	734.0	800.1	709.2	842.7	1000.9	817.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.645	0.643	0.634	0.645	0.639	0.641
Maximum load (kN)	0.765 (30.045s)	0.766 (30.245s)	0.764 (30.445s)	0.766 (30.645s)	0.761 (30.845s)	0.764
Minimum load (kN)	0.120 (30.145s)	0.122 (30.345s)	0.130 (30.547s)	0.121 (30.745s)	0.122 (30.945s)	0.123
Maximum averaged axial (mm)	0.199 (30.050s)	0.199 (30.250s)	0.200 (30.450s)	0.201 (30.650s)	0.202 (30.849s)	0.200
Minimum averaged axial (mm)	0.044 (30.151s)	0.045 (30.351s)	0.046 (30.551s)	0.046 (30.751s)	0.047 (30.951s)	0.046
Maximum axial #1 (mm)	0.204 (30.050s)	0.205 (30.251s)	0.206 (30.451s)	0.207 (30.652s)	0.207 (30.849s)	0.206
Minimum axial #1 (mm)	0.041 (30.149s)	0.046 (30.351s)	0.047 (30.550s)	0.047 (30.751s)	0.046 (30.950s)	0.045
Maximum axial #2 (mm)	0.194 (30.049s)	0.194 (30.249s)	0.195 (30.449s)	0.196 (30.649s)	0.197 (30.849s)	0.195
Minimum axial #2 (mm)	0.043 (30.151s)	0.044 (30.351s)	0.046 (30.551s)	0.045 (30.752s)	0.046 (30.951s)	0.045

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#05

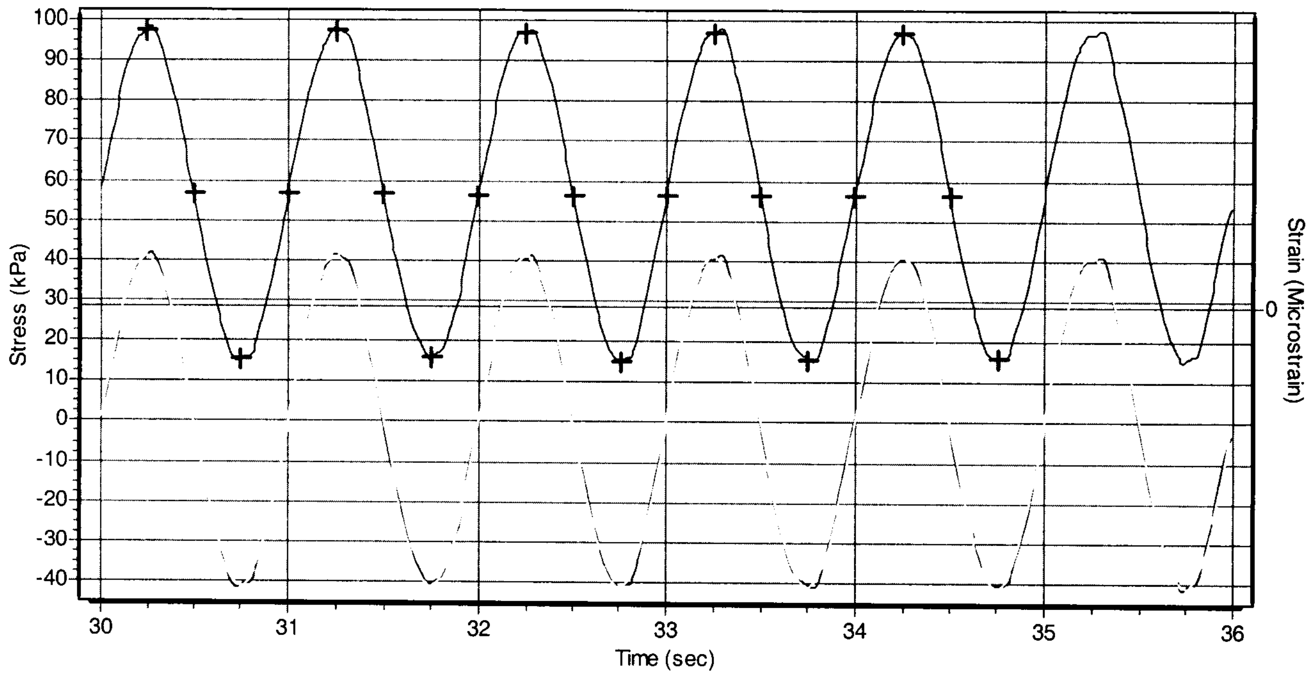
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.8						114.8	

Cross-Sectional Area: 7853.982
Volume: 901637.1

Comments/Properties: Initial Temp: 58 'C
Final Temp: 56 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#06.B38



Sweep 1 (1Hz)

Test Date and Time: Monday, May 20, 2002, at 1:38 PM

St dev = 1.85

Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 114.2
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	82.2	81.3	81.9	81.5	81.1	81.6
Recoverable axial micro-strain	1433.8	1409.6	1422.2	1415.6	1421.3	1420.5
Permanent axial micro-strain	1424	1483	1506	1544	1570	
Dynamic modulus (MPa)	57.3	57.7	57.6	57.5	57.0	57.4
Phase angle (Deg)	9.38	10.86	9.53	9.78	10.70	10.05
Dyn.Modulus/sine(phase angle)	700.9	609.0	693.6	674.8	611.6	658.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.638	0.643	0.640	0.637	0.641
Maximum load (kN)	0.767 (30.247s)	0.766 (31.245s)	0.764 (32.246s)	0.764 (33.249s)	0.762 (34.248s)	0.765
Minimum load (kN)	0.121 (30.744s)	0.128 (31.747s)	0.121 (32.747s)	0.124 (33.744s)	0.125 (34.747s)	0.124
Maximum averaged axial (mm)	0.326 (30.273s)	0.330 (31.275s)	0.334 (32.272s)	0.338 (33.276s)	0.342 (34.278s)	0.334
Minimum averaged axial (mm)	0.163 (30.770s)	0.169 (31.769s)	0.172 (32.769s)	0.176 (33.766s)	0.179 (34.770s)	0.172
Maximum axial #1 (mm)	0.313 (30.274s)	0.317 (31.275s)	0.321 (32.273s)	0.324 (33.276s)	0.327 (34.276s)	0.320
Minimum axial #1 (mm)	0.158 (30.771s)	0.164 (31.770s)	0.166 (32.770s)	0.170 (33.765s)	0.173 (34.769s)	0.166
Maximum axial #2 (mm)	0.340 (30.273s)	0.344 (31.276s)	0.348 (32.272s)	0.352 (33.276s)	0.356 (34.278s)	0.348
Minimum axial #2 (mm)	0.168 (30.770s)	0.175 (31.769s)	0.177 (32.769s)	0.182 (33.766s)	0.185 (34.769s)	0.177

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#06

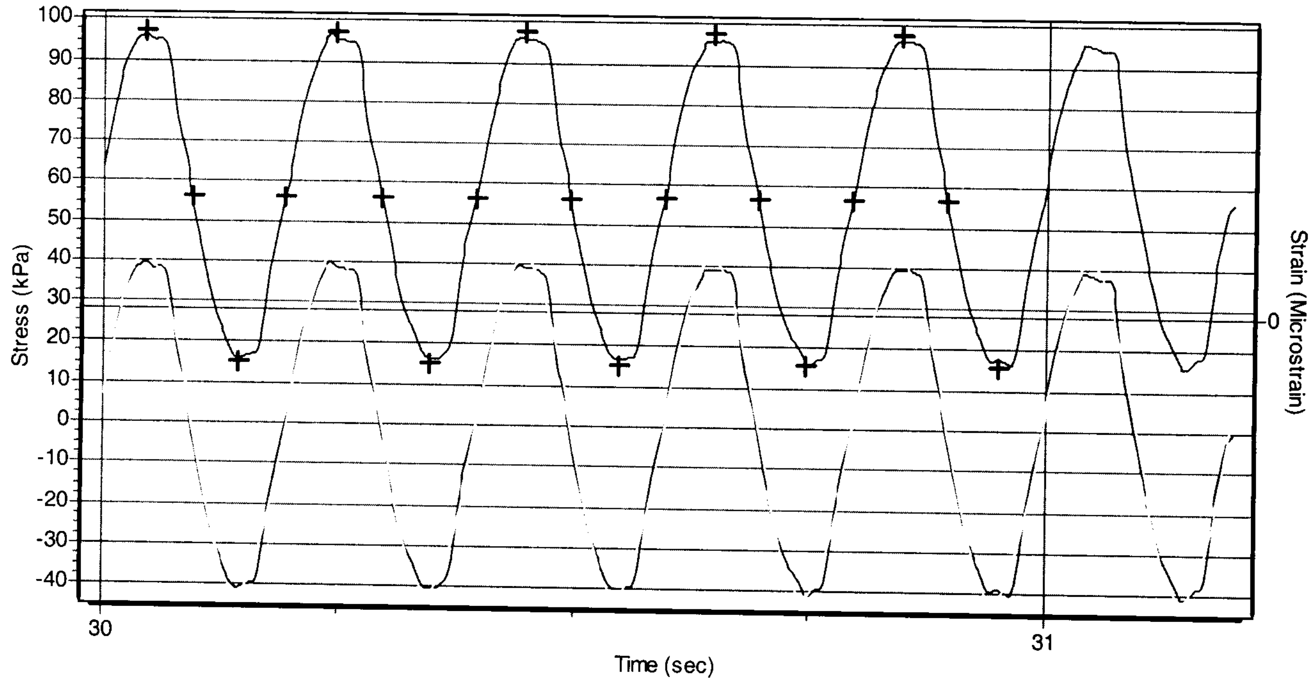
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.2						114.2	

Cross-Sectional Area: 7853.982
Volume: 896924.7

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 3\NETC_01-02_P3_12.5_#06.B38



Sweep 2 (5Hz)

Test Date and Time: Monday, May 20, 2002, at 1:38 PM

St dev = 5.34

Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 114.2
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.1	81.6	82.0	81.8	81.6	81.8
Recoverable axial micro-strain	1295.1	1311.8	1295.8	1309.1	1293.0	1301.0
Permanent axial micro-strain	435	422	447	442	462	
Dynamic modulus (MPa)	63.4	62.2	63.3	62.5	63.1	62.9
Phase angle (Deg)	9.15	7.37	6.07	10.31	10.02	8.58
Dyn.Modulus/sine(phase angle)	795.4	968.6	1195.5	695.3	722.5	875.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.645	0.641	0.644	0.642	0.641	0.643
Maximum load (kN)	0.765 (30.045s)	0.763 (30.246s)	0.766 (30.445s)	0.767 (30.645s)	0.766 (30.845s)	0.765
Minimum load (kN)	0.120 (30.145s)	0.122 (30.346s)	0.122 (30.545s)	0.124 (30.746s)	0.125 (30.947s)	0.123
Maximum averaged axial (mm)	0.198 (30.050s)	0.198 (30.250s)	0.199 (30.449s)	0.200 (30.651s)	0.200 (30.851s)	0.199
Minimum averaged axial (mm)	0.050 (30.151s)	0.048 (30.351s)	0.051 (30.551s)	0.050 (30.750s)	0.053 (30.952s)	0.050
Maximum axial #1 (mm)	0.182 (30.052s)	0.182 (30.250s)	0.182 (30.449s)	0.184 (30.652s)	0.184 (30.853s)	0.183
Minimum axial #1 (mm)	0.038 (30.149s)	0.040 (30.350s)	0.041 (30.550s)	0.042 (30.749s)	0.045 (30.952s)	0.041
Maximum axial #2 (mm)	0.214 (30.049s)	0.214 (30.249s)	0.216 (30.449s)	0.216 (30.649s)	0.217 (30.849s)	0.215
Minimum axial #2 (mm)	0.058 (30.151s)	0.057 (30.352s)	0.060 (30.551s)	0.059 (30.750s)	0.060 (30.952s)	0.059

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 3
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P3_12.5_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.2						114.2	

Cross-Sectional Area: 7853.982
Volume: 896924.7

Comments/Properties: Initial Temp: 58 'C
Final Temp: 55 'C

ASPHALT PAVEMENT ANALYZER

PAVEMENT TECHNOLOGY, INC.

Rutting Test Data Sheet

4" diameter Samples.

Project No. :	NETC-01-02-P3	Test No. :	R0520-0	Temperature :	60 (deg. C)
Mix ID No. :	9.5	Test Date:	05/20/02	Wheel Load :	100 (lbs)
Mix Type :	Allstates	Data File :	R0520_0.ptd	Hose Pressure :	100 (psi)
Operator :	JSG. #503	Run Status :	Complete	Run Time	2:16:19 (hh:mm:ss)

Left Sample ID | Bulk S Gravity | % Air Void

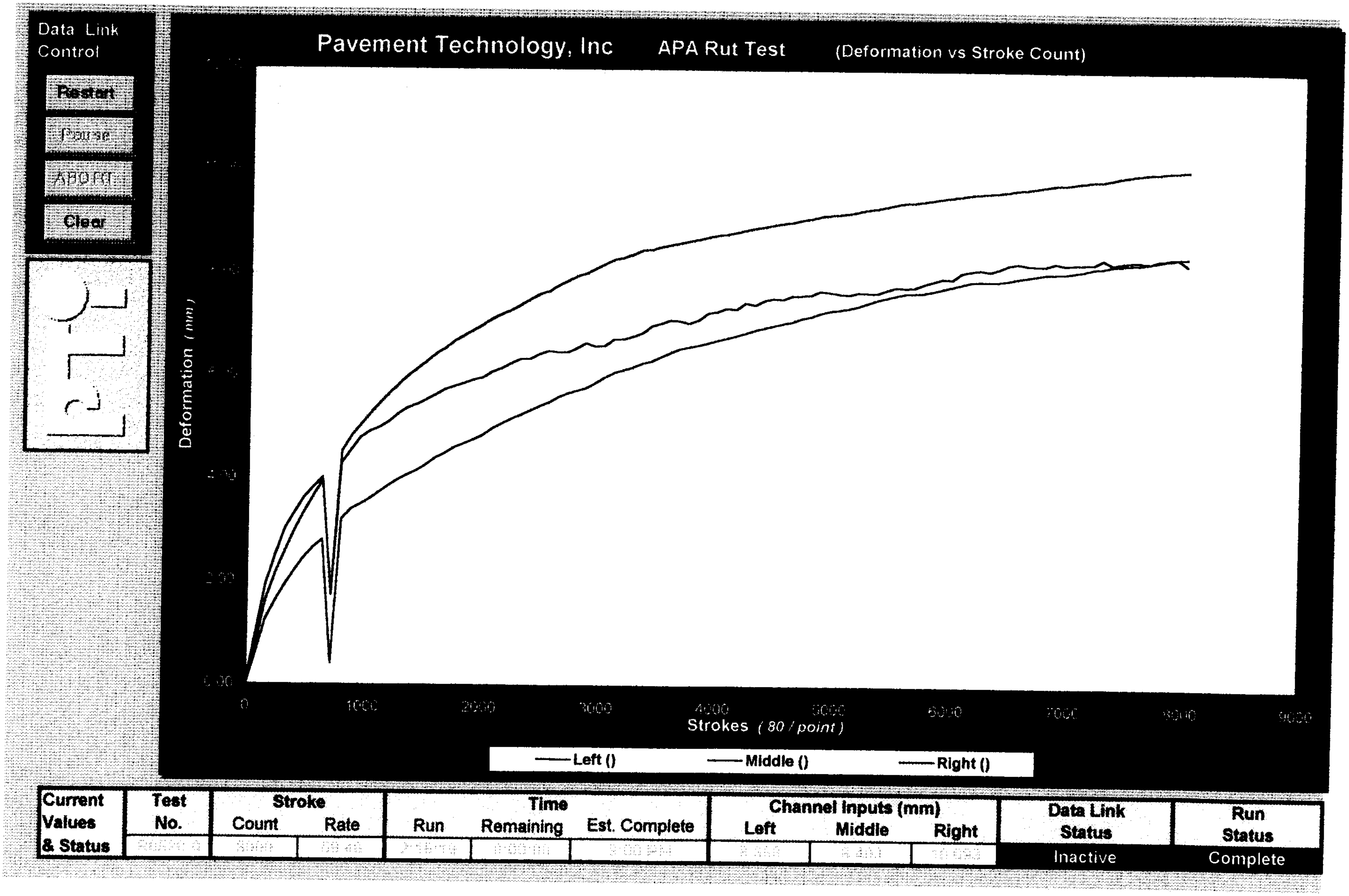
Stroke Count	Temperature F	Temperature C	Depth Gauge Reading (mm) 1 (9.5#1)	2	~~3~~	4 (9.5#2)	5	Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
0									0.000	0.000	
500										3.758	
1,000										4.929	31.2
1,500										5.547	12.5
2,000										6.009	8.3
3,000										6.560	9.2
4,000										7.295	11.2
5,000										7.680	5.0
6,000										7.968	4.0
7,000										8.234	3.3
8,000										8.368	1.6
8,000										8.368	0.0

Middle Sample ID | Bulk S Gravity | % Air Void

Stroke Count	Temperature F	Temperature C	Depth Gauge Reading (mm) 1 (9.5#3)	2	~~3~~	4 (9.5#4)	5	Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
0									0.000	0.000	
500										2.620	
1,000										3.597	37.3
1,500										4.305	19.7
2,000										4.911	14.1
3,000										5.965	21.5
4,000										6.737	12.9
5,000										7.327	8.8
6,000										7.817	6.7
7,000										8.088	3.5
8,000										8.403	3.9
8,000										8.403	0.0

Right Sample ID | Bulk S Gravity | % Air Void

Stroke Count	Temperature F	Temperature C	Depth Gauge Reading (mm) 1 (9.5#5)	2	~~3~~	4 (9.5#6)	5	Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
0									0.000	0.000	
500										3.593	
1,000										5.237	45.8
1,500										6.309	20.5
2,000										7.062	11.9
3,000										8.198	16.1
4,000										8.771	7.0
5,000										9.181	4.7
6,000										9.540	3.9
7,000										9.818	2.9
8,000										10.093	2.8
8,000										10.093	0.0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Restart
Pause
ABORT
Clear
Pavement Technology, Inc
APA Rut Test
(Deformation vs Stroke Count)
Deformation (mm)
0.00
2.00
4.00
Strokes (80 / point)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Left ()
Middle ()
Right ()
Current Values & Status
Test No.
Stroke
Count
Rate
Time
Run
Remaining
Est. Complete
Channel Inputs (mm)
Left
Middle
Right
Data Link Status
Inactive
Run Status
Complete

PTI QCQA_P3_9.5 **Rutting Test**

ASPHALT PAVEMENT ANALYZER

Position	-1.3
Run Strokes	8001
Run Time	02:16:18
Strokes / Min	59.46

Left

8.629

L Average		~~8.375~~
L Point 1	9.5 # 1	7.946
L Point 2		8.687
L Point 3	0	~~7.370~~
L Point 4		10.331
L Point 5	# 2	7.550

ZERO

Middle

8.432

M Average		8.409
M Point 1	# 3	9.316
M Point 2		8.229
M Point 3	0	~~8.300~~
M Point 4	# 4	9.589
M Point 5		6.594

ZERO

Right

9.993

R Average		10.100
R Point 1	# 5	10.002
R Point 2		10.516
R Point 3	0	~~10.533~~
R Point 4		11.095
R Point 5	# 6	8.360

ZERO

Stroke Output

0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Carriage Position (mm)

PTi PAVEMENT TECHNOLOGY, INC.

ASPHALT PAVEMENT ANALYZER

Rutting Test Data Sheet

4" diameter Samples.

Project No. : NETC_01-02_P3
Mix ID No. : 12.5
Mix Type : Allstates
Operator : JSG. #503

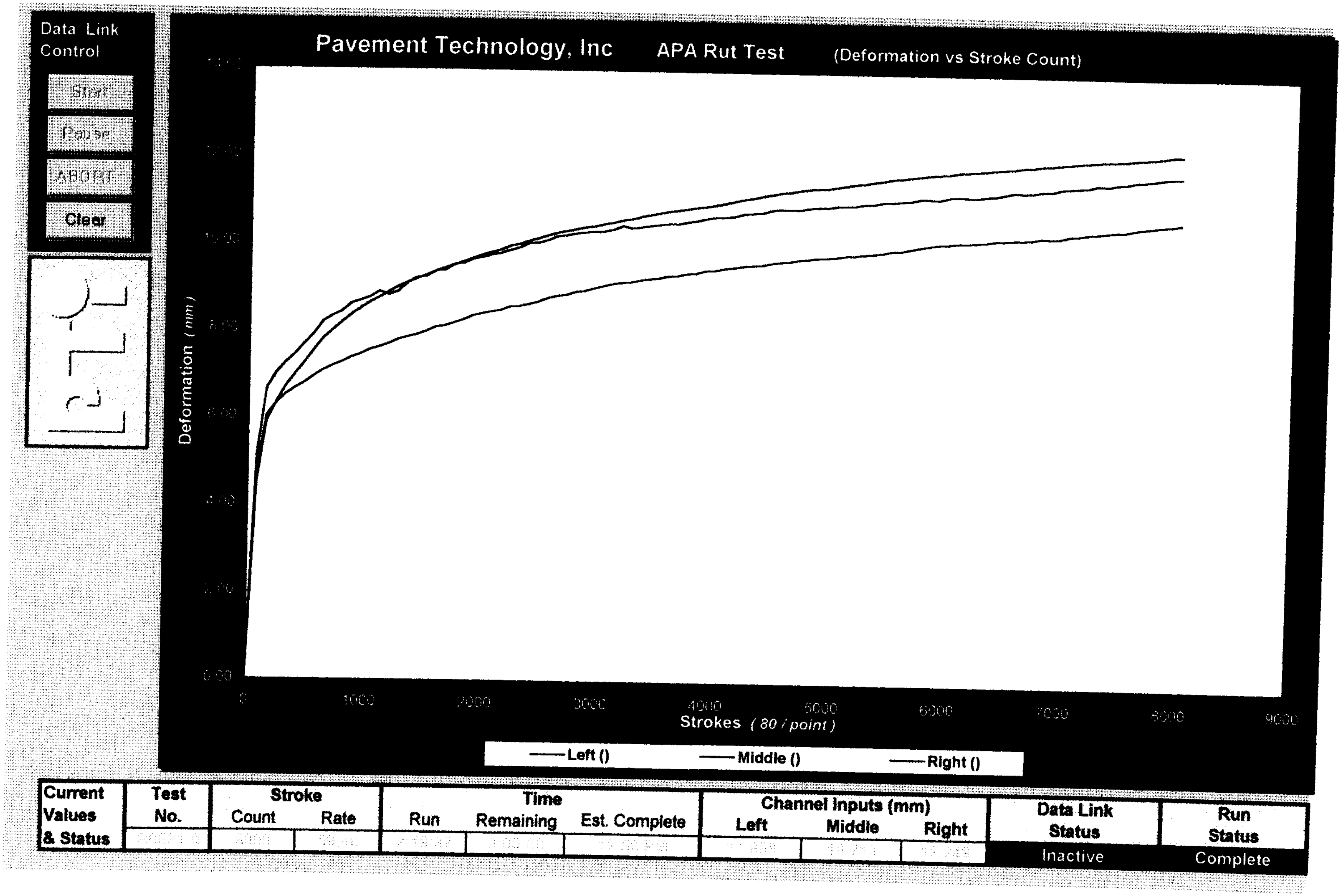
Test No. : R0521-0
Test Date: 05/21/02
Data File : R0521_0.ptd
Run Status : Complete

Temperature : 60 (deg. C)
Wheel Load : 100 (lbs)
Hose Pressure : 100 (psi)
Run Time 2:19:37 (hh:mm:ss)

Left Sample ID			Bulk S Gravity					% Air Void			
Stroke Count	Temperature		12.5#1 Depth Gauge Reading (mm) 12.5#2					Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
	F	C	1	2	~~3~~	4	5				
0											
500									0.000	0.000	
1,000										7.690	
1,500										8.732	13.5
2,000										9.232	5.7
3,000										9.714	5.2
4,000										10.266	5.7
5,000										10.618	3.4
6,000										10.984	3.4
7,000										11.194	1.9
8,000										11.461	2.4
8,000										11.688	2.0
										11.688	0.0

Middle Sample ID			Bulk S Gravity					% Air Void			
Stroke Count	Temperature		12.5#3 Depth Gauge Reading (mm) 12.5 #4					Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
	F	C	1	2	~~3~~	4	5				
0											
500									0.000	0.000	
1,000										6.862	
1,500										7.573	10.4
2,000										7.987	5.5
3,000										8.416	5.4
4,000										9.061	7.7
5,000										9.469	4.5
6,000										9.782	3.3
7,000										10.164	3.9
8,000										10.356	1.9
8,000										10.713	3.5
										10.713	0.0

Right Sample ID			Bulk S Gravity					% Air Void			
Stroke Count	Temperature		12.5#5 Depth Gauge Reading (mm) 12.5 #6					Manual Average	Net Man Deflection	APA-DAS Average	Percent Change
	F	C	1	2	~~3~~	4	5				
0											
500									0.000	0.000	
1,000										7.435	
1,500										8.657	16.4
2,000										9.274	7.1
3,000										9.767	5.3
4,000										10.469	7.2
5,000										10.976	4.8
6,000										11.390	3.8
7,000										11.757	3.2
8,000										12.007	2.1
8,000										12.249	2.0
										12.249	0.0


Data Link Control
Start
Pause
ABORT
Clear
Pavement Technology, Inc
APA Rut Test
(Deformation vs Stroke Count)
Deformation (mm)
Strokes (80 / point)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
Left ()
Middle ()
Right ()
Current Values & Status
Test No.
Stroke
Count
Rate
Time
Run
Remaining
Est. Complete
Channel Inputs (mm)
Left
Middle
Right
Data Link Status
Inactive
Run Status
Complete

PTI

Rutting Test

ASPHALT PAVEMENT ANALYZER

Position	5.4
Run Strokes	8001
Run Time	02:19:36
Strokes / Min	59.52

Left

L Average		11.694
L Point 1	12.5 #1	11.986
L Point 2		12.136
L Point 3		0.000
L Point 4		11.479
L Point 5	#2	11.166

ZERO

Middle

M Average		10.711
M Point 1	#3	7.781
M Point 2		8.347
M Point 3		0.000
M Point 4		13.925
M Point 5	#4	12.681

ZERO

Right

R Average		12.247
R Point 1	#5	12.720
R Point 2		12.991
R Point 3		0.000
R Point 4	#6	11.836
R Point 5		11.414

ZERO

Stroke Output

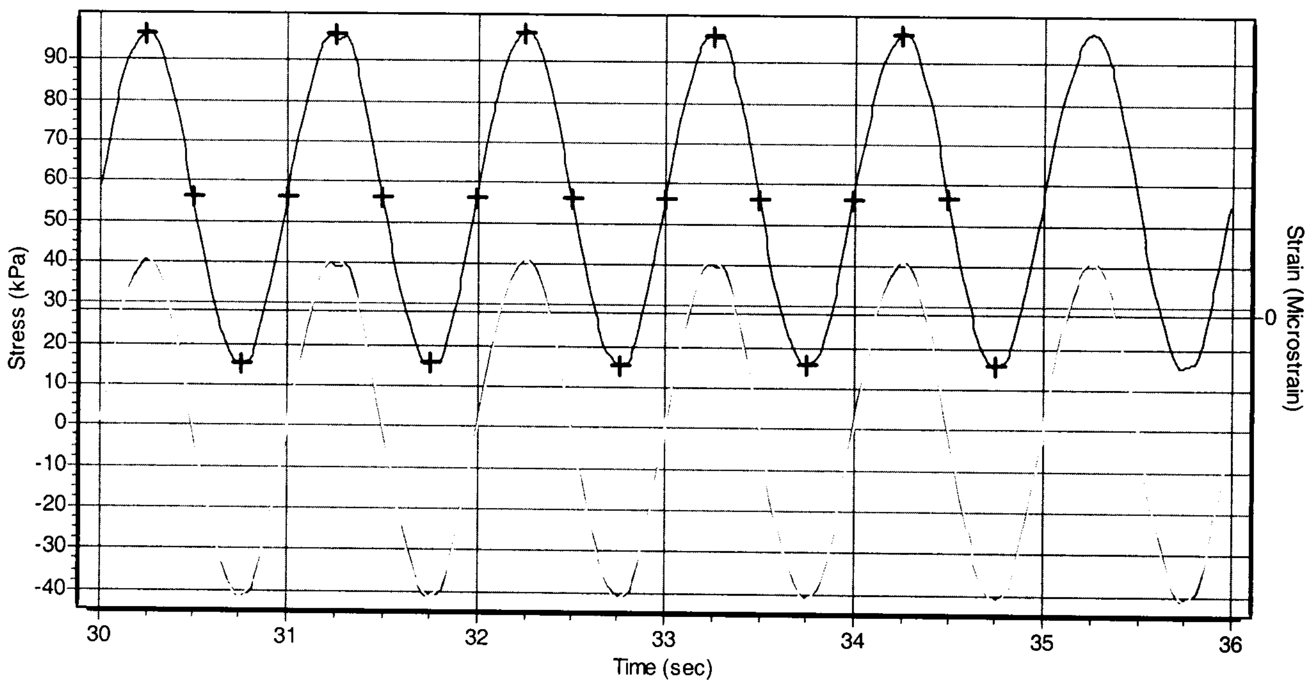
0 20 40 60 80 100 120 140 160 180 200 220 240 260 280 300

Carriage Position (mm)

Phase 4
Belfast Aggregate (shaken out)

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#03.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:43 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 112.5
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	80.9	81.4	80.7	80.9	81.0
Recoverable axial micro-strain	1627.3	1646.1	1648.2	1641.3	1639.8	1640.6
Permanent axial micro-strain	365	370	379	397	402	
Dynamic modulus (MPa)	49.7	49.2	49.4	49.2	49.3	49.4
Phase angle (Deg)	9.64	8.45	8.86	8.91	8.27	8.82
Dyn.Modulus/sine(phase angle)	591.5	667.2	639.8	633.5	684.5	643.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.636	0.640	0.634	0.635	0.636
Maximum load (kN)	0.758 (30.245s)	0.759 (31.247s)	0.762 (32.246s)	0.759 (33.247s)	0.760 (34.246s)	0.760
Minimum load (kN)	0.122 (30.746s)	0.124 (31.744s)	0.123 (32.747s)	0.125 (33.744s)	0.125 (34.742s)	0.124
Maximum averaged axial (mm)	0.224 (30.272s)	0.227 (31.270s)	0.228 (32.271s)	0.229 (33.271s)	0.230 (34.269s)	0.228
Minimum averaged axial (mm)	0.041 (30.767s)	0.042 (31.767s)	0.043 (32.764s)	0.045 (33.766s)	0.045 (34.761s)	0.043
Maximum axial #1 (mm)	0.226 (30.271s)	0.228 (31.269s)	0.229 (32.269s)	0.231 (33.270s)	0.231 (34.268s)	0.229
Minimum axial #1 (mm)	0.035 (30.765s)	0.036 (31.767s)	0.037 (32.763s)	0.039 (33.766s)	0.039 (34.761s)	0.037
Maximum axial #2 (mm)	0.223 (30.273s)	0.225 (31.272s)	0.227 (32.273s)	0.228 (33.272s)	0.228 (34.270s)	0.226
Minimum axial #2 (mm)	0.046 (30.767s)	0.047 (31.767s)	0.048 (32.765s)	0.050 (33.766s)	0.051 (34.762s)	0.049

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Core/Sample Number: P4_#03

Cross-Sectional Area: 7853.982
Volume: 883572.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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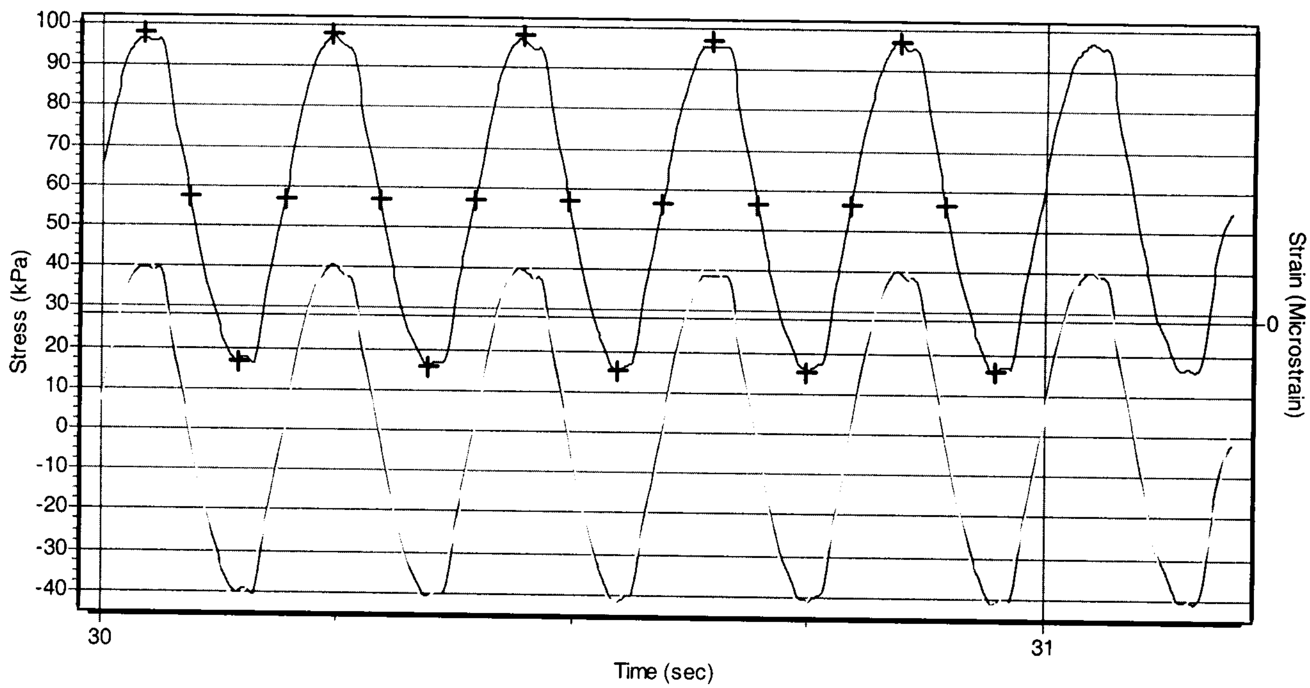

Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:43 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.5
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	82.2	82.4	81.6	81.5	81.8
Recoverable axial micro-strain	1486.8	1475.9	1513.7	1478.7	1484.9	1488.0
Permanent axial micro-strain	720	704	712	710	709	
Dynamic modulus (MPa)	54.6	55.7	54.4	55.2	54.9	55.0
Phase angle (Deg)	9.23	7.85	7.63	7.80	8.31	8.16
Dyn.Modulus/sine(phase angle)	678.7	814.2	818.5	811.7	756.8	776.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.646	0.647	0.641	0.640	0.642
Maximum load (kN)	0.769 (30.045s)	0.768 (30.244s)	0.768 (30.444s)	0.762 (30.645s)	0.763 (30.844s)	0.766
Minimum load (kN)	0.131 (30.147s)	0.123 (30.345s)	0.120 (30.545s)	0.121 (30.747s)	0.123 (30.946s)	0.124
Maximum averaged axial (mm)	0.081 (30.050s)	0.079 (30.249s)	0.080 (30.448s)	0.080 (30.649s)	0.080 (30.849s)	0.080
Minimum averaged axial (mm)	-0.086 (30.151s)	-0.087 (30.350s)	-0.090 (30.549s)	-0.086 (30.751s)	-0.087 (30.951s)	-0.087
Maximum axial #1 (mm)	0.080 (30.050s)	0.078 (30.249s)	0.080 (30.449s)	0.079 (30.650s)	0.080 (30.850s)	0.080
Minimum axial #1 (mm)	-0.095 (30.150s)	-0.098 (30.349s)	-0.098 (30.549s)	-0.098 (30.750s)	-0.098 (30.949s)	-0.097
Maximum axial #2 (mm)	0.082 (30.050s)	0.080 (30.248s)	0.081 (30.448s)	0.080 (30.649s)	0.081 (30.849s)	0.081
Minimum axial #2 (mm)	-0.079 (30.151s)	-0.079 (30.350s)	-0.082 (30.549s)	-0.079 (30.751s)	-0.079 (30.951s)	-0.080

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Cross-Sectional Area: 7853.982
Volume: 883572.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

WRONG

Redone

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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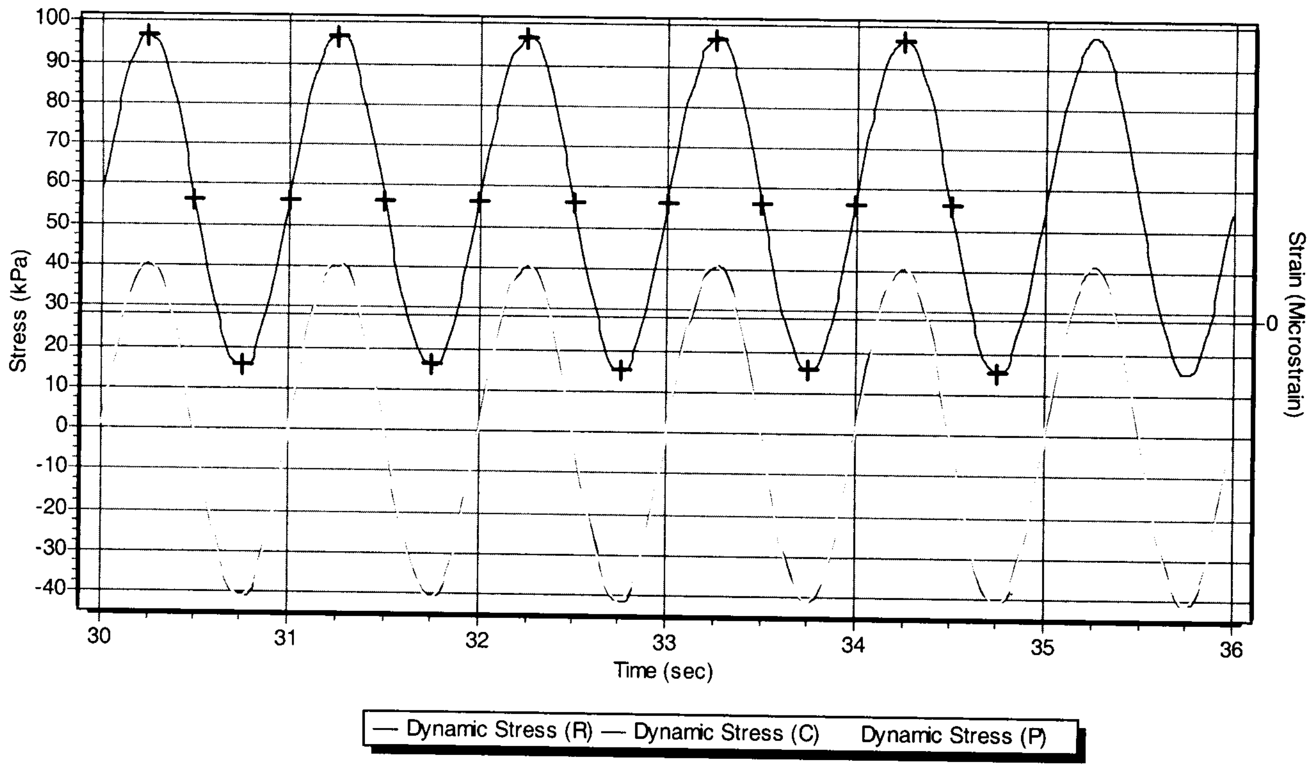


Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:37 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 112.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.8	80.4	81.3	81.1	81.1	80.9
Recoverable axial micro-strain	1644.0	1632.2	1641.2	1638.8	1641.4	1639.5
Permanent axial micro-strain	198	214	223	234	237	
Dynamic modulus (MPa)	49.1	49.3	49.5	49.5	49.4	49.4
Phase angle (Deg)	8.70	8.53	8.55	8.24	9.01	8.61
Dyn.Modulus/sine(phase angle)	647.3	662.4	664.3	688.4	628.5	658.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.632	0.639	0.637	0.637	0.636
Maximum load (kN)	0.758 (30.246s)	0.758 (31.246s)	0.760 (32.246s)	0.761 (33.249s)	0.759 (34.243s)	0.759
Minimum load (kN)	0.124 (30.746s)	0.127 (31.746s)	0.122 (32.749s)	0.124 (33.747s)	0.122 (34.745s)	0.124
Maximum averaged axial (mm)	0.208 (30.271s)	0.208 (31.270s)	0.210 (32.270s)	0.211 (33.272s)	0.212 (34.268s)	0.210
Minimum averaged axial (mm)	0.022 (30.765s)	0.024 (31.764s)	0.025 (32.766s)	0.026 (33.765s)	0.027 (34.764s)	0.025
Maximum axial #1 (mm)	0.208 (30.271s)	0.209 (31.268s)	0.211 (32.268s)	0.213 (33.273s)	0.213 (34.267s)	0.211
Minimum axial #1 (mm)	0.020 (30.765s)	0.021 (31.764s)	0.022 (32.767s)	0.023 (33.765s)	0.024 (34.764s)	0.022
Maximum axial #2 (mm)	0.207 (30.272s)	0.208 (31.271s)	0.209 (32.270s)	0.210 (33.272s)	0.211 (34.269s)	0.209
Minimum axial #2 (mm)	0.025 (30.766s)	0.027 (31.766s)	0.028 (32.766s)	0.030 (33.767s)	0.030 (34.763s)	0.028

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

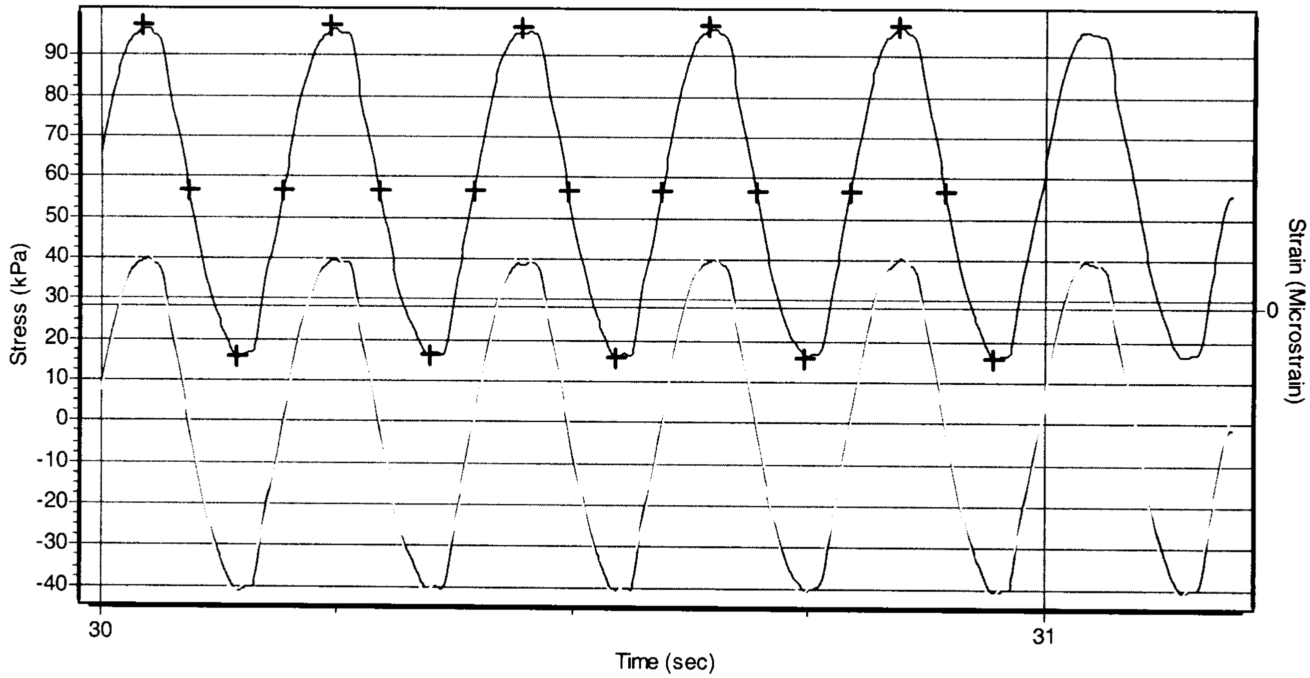
Cross-Sectional Area: 7853.982
Volume: 885143.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

WRONG
REDONE

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#02.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:37 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.5
Axial Gauge Length (mm): 112.7
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.4	80.9	80.9	81.7	81.4	81.3
Recoverable axial micro-strain	1487.9	1488.7	1477.7	1476.1	1469.7	1480.0
Permanent axial micro-strain	699	705	698	702	700	
Dynamic modulus (MPa)	54.7	54.4	54.7	55.3	55.4	54.9
Phase angle (Deg)	7.22	8.61	6.73	6.53	7.24	7.26
Dyn.Modulus/sine(phase angle)	869.1	724.4	933.2	971.6	877.0	875.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.636	0.635	0.641	0.639	0.638
Maximum load (kN)	0.764 (30.044s)	0.764 (30.244s)	0.761 (30.445s)	0.765 (30.644s)	0.765 (30.844s)	0.764
Minimum load (kN)	0.124 (30.145s)	0.128 (30.347s)	0.126 (30.545s)	0.124 (30.745s)	0.126 (30.945s)	0.126
Maximum averaged axial (mm)	0.079 (30.048s)	0.079 (30.249s)	0.079 (30.448s)	0.079 (30.648s)	0.079 (30.848s)	0.079
Minimum averaged axial (mm)	-0.089 (30.150s)	-0.088 (30.350s)	-0.088 (30.550s)	-0.087 (30.750s)	-0.087 (30.950s)	-0.088
Maximum axial #1 (mm)	0.077 (30.048s)	0.078 (30.249s)	0.077 (30.448s)	0.078 (30.648s)	0.077 (30.848s)	0.077
Minimum axial #1 (mm)	-0.097 (30.149s)	-0.095 (30.350s)	-0.094 (30.550s)	-0.094 (30.750s)	-0.094 (30.950s)	-0.095
Maximum axial #2 (mm)	0.081 (30.048s)	0.081 (30.249s)	0.080 (30.449s)	0.081 (30.648s)	0.081 (30.848s)	0.081
Minimum axial #2 (mm)	-0.082 (30.150s)	-0.081 (30.351s)	-0.081 (30.550s)	-0.081 (30.750s)	-0.080 (30.950s)	-0.081

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

Cross-Sectional Area: 7853.982
Volume: 885143.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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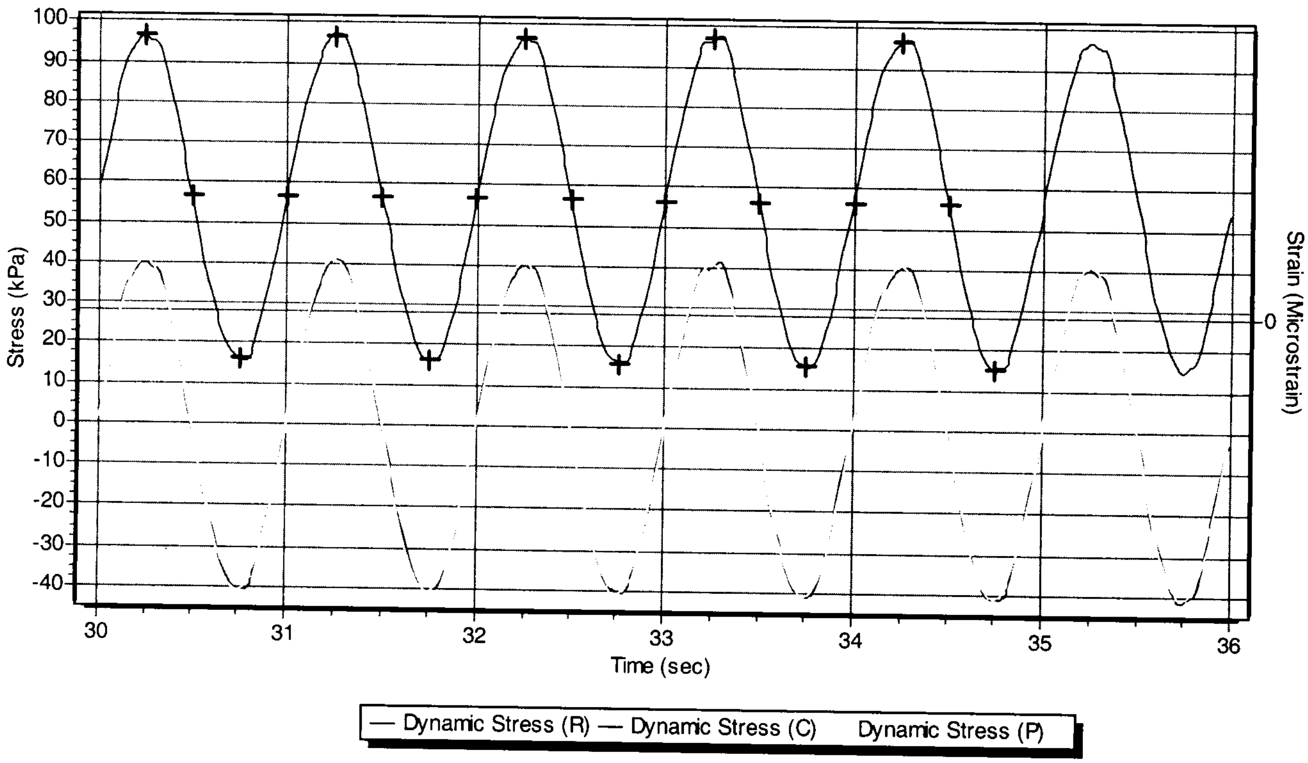

Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 115
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.7	80.5	80.6	81.9	81.6	81.1
Recoverable axial micro-strain	1538.7	1537.6	1534.0	1543.9	1546.8	1540.2
Permanent axial micro-strain	137	132	125	114	113	
Dynamic modulus (MPa)	52.4	52.4	52.6	53.0	52.7	52.6
Phase angle (Deg)	8.34	8.77	9.21	8.67	8.19	8.63
Dyn.Modulus/sine(phase angle)	721.5	685.4	655.0	701.6	738.5	700.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.633	0.633	0.643	0.641	0.637
Maximum load (kN)	0.761 (30.245s)	0.760 (31.247s)	0.759 (32.244s)	0.765 (33.248s)	0.761 (34.246s)	0.761
Minimum load (kN)	0.127 (30.749s)	0.127 (31.750s)	0.126 (32.747s)	0.122 (33.744s)	0.120 (34.744s)	0.125
Maximum averaged axial (mm)	0.161 (30.268s)	0.162 (31.271s)	0.162 (32.269s)	0.164 (33.272s)	0.165 (34.269s)	0.163
Minimum averaged axial (mm)	-0.016 (30.767s)	-0.015 (31.769s)	-0.014 (32.766s)	-0.013 (33.766s)	-0.013 (34.764s)	-0.014
Maximum axial #1 (mm)	0.163 (30.268s)	0.164 (31.271s)	0.164 (32.268s)	0.167 (33.272s)	0.167 (34.269s)	0.165
Minimum axial #1 (mm)	-0.015 (30.767s)	-0.015 (31.769s)	-0.014 (32.765s)	-0.012 (33.765s)	-0.013 (34.762s)	-0.014
Maximum axial #2 (mm)	0.159 (30.268s)	0.159 (31.272s)	0.160 (32.270s)	0.162 (33.271s)	0.163 (34.269s)	0.161
Minimum axial #2 (mm)	-0.016 (30.768s)	-0.016 (31.768s)	-0.015 (32.766s)	-0.014 (33.766s)	-0.014 (34.766s)	-0.015

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115						115	

Cross-Sectional Area: 7853.982
Volume: 903207.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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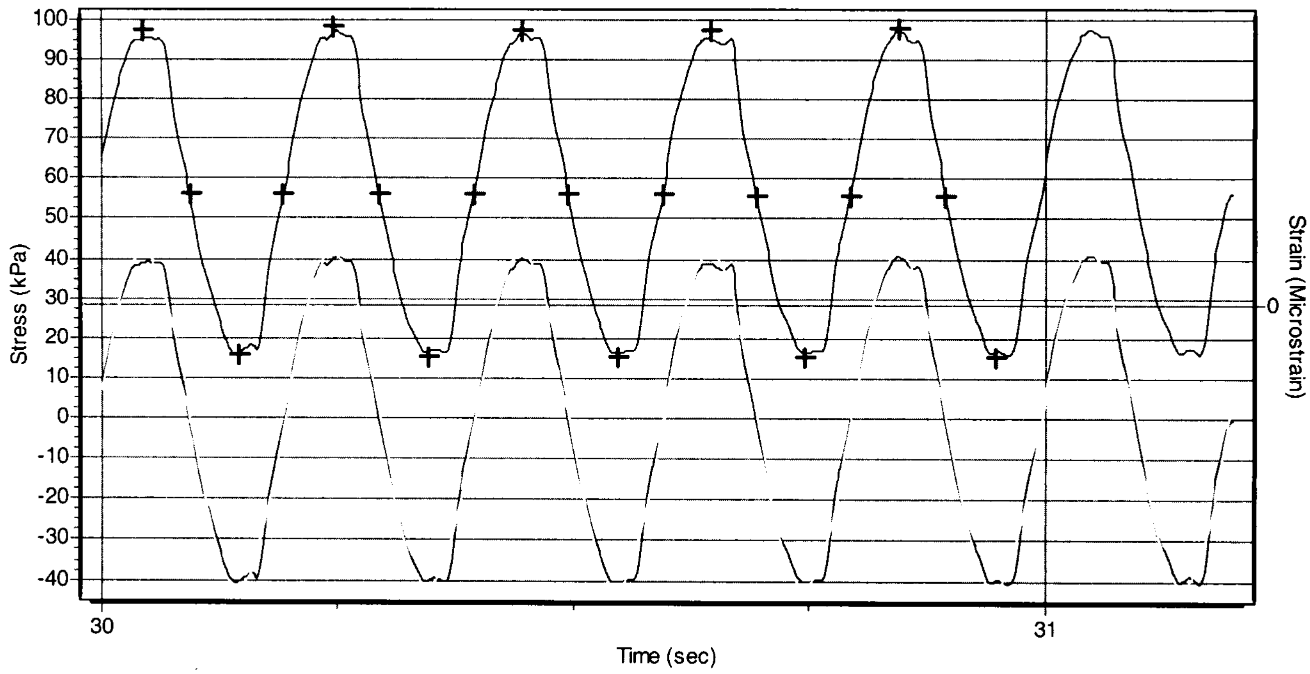

Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:50 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 115
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.7	83.1	81.8	81.9	82.3	82.2
Recoverable axial micro-strain	1398.6	1411.3	1407.4	1397.4	1410.8	1405.1
Permanent axial micro-strain	631	635	636	635	639	
Dynamic modulus (MPa)	58.4	58.9	58.1	58.6	58.3	58.5
Phase angle (Deg)	10.95	7.59	10.54	10.47	8.60	9.63
Dyn.Modulus/sine(phase angle)	612.2	890.0	633.1	643.0	778.6	711.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.653	0.643	0.644	0.647	0.646
Maximum load (kN)	0.765 (30.045s)	0.773 (30.245s)	0.765 (30.445s)	0.763 (30.645s)	0.768 (30.845s)	0.767
Minimum load (kN)	0.124 (30.146s)	0.120 (30.345s)	0.123 (30.546s)	0.120 (30.745s)	0.121 (30.947s)	0.121
Maximum averaged axial (mm)	0.073 (30.051s)	0.073 (30.249s)	0.073 (30.450s)	0.073 (30.651s)	0.073 (30.850s)	0.073
Minimum averaged axial (mm)	-0.088 (30.149s)	-0.089 (30.350s)	-0.089 (30.550s)	-0.088 (30.750s)	-0.089 (30.950s)	-0.089
Maximum axial #1 (mm)	0.071 (30.051s)	0.071 (30.249s)	0.072 (30.451s)	0.072 (30.651s)	0.072 (30.850s)	0.072
Minimum axial #1 (mm)	-0.090 (30.149s)	-0.091 (30.349s)	-0.095 (30.550s)	-0.095 (30.749s)	-0.092 (30.950s)	-0.093
Maximum axial #2 (mm)	0.074 (30.050s)	0.075 (30.249s)	0.074 (30.450s)	0.074 (30.650s)	0.075 (30.850s)	0.075
Minimum axial #2 (mm)	-0.086 (30.150s)	-0.087 (30.350s)	-0.087 (30.551s)	-0.085 (30.750s)	-0.086 (30.951s)	-0.086

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115						115	

Cross-Sectional Area: 7853.982
Volume: 903207.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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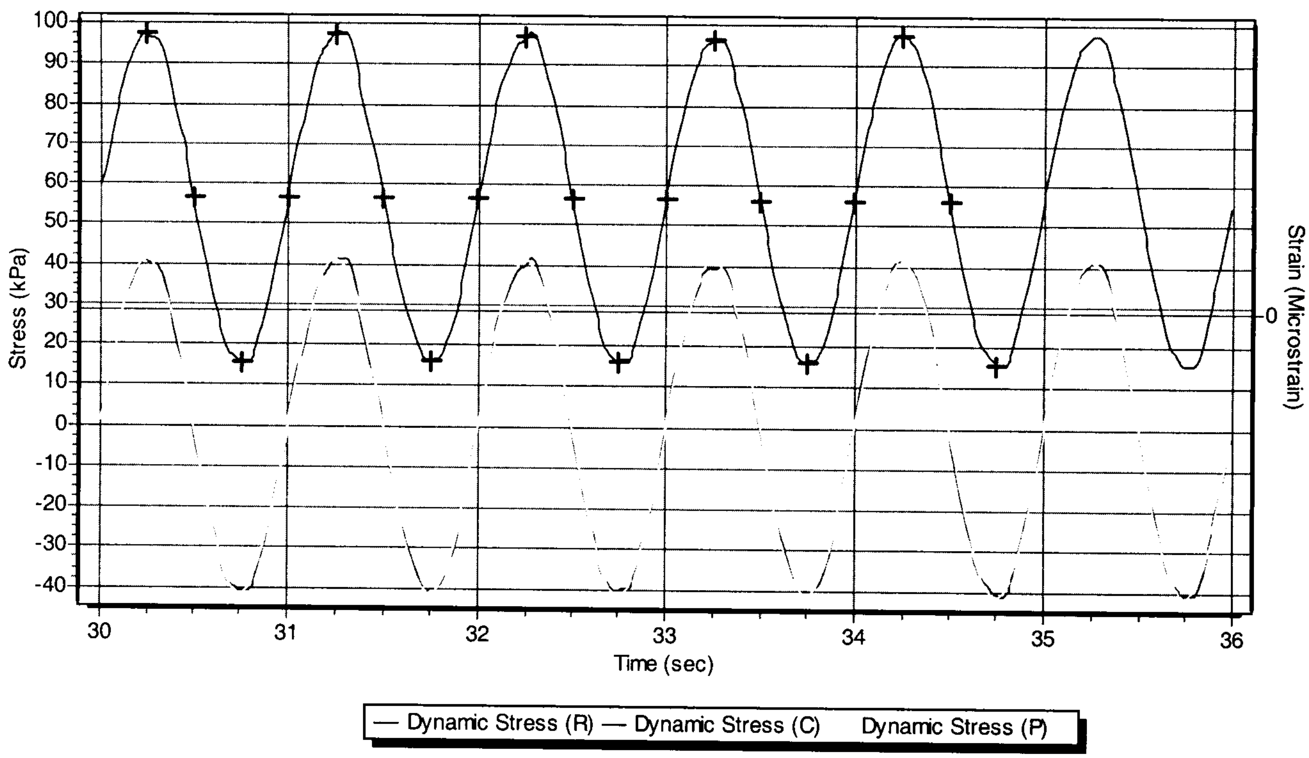

Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.8
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.8	81.5	80.9	80.4	81.8	81.3
Recoverable axial micro-strain	1688.1	1685.4	1674.9	1685.1	1688.9	1684.5
Permanent axial micro-strain	229	247	261	261	274	
Dynamic modulus (MPa)	48.5	48.4	48.3	47.7	48.4	48.2
Phase angle (Deg)	9.83	8.30	8.34	9.23	8.74	8.89
Dyn.Modulus/sine(phase angle)	565.5	668.1	664.3	593.0	635.6	625.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.640	0.635	0.631	0.642	0.638
Maximum load (kN)	0.765 (30.245s)	0.768 (31.247s)	0.761 (32.247s)	0.757 (33.248s)	0.765 (34.245s)	0.763
Minimum load (kN)	0.122 (30.749s)	0.128 (31.747s)	0.126 (32.746s)	0.126 (33.747s)	0.123 (34.745s)	0.125
Maximum averaged axial (mm)	0.216 (30.272s)	0.218 (31.270s)	0.218 (32.271s)	0.219 (33.274s)	0.221 (34.269s)	0.219
Minimum averaged axial (mm)	0.026 (30.766s)	0.028 (31.767s)	0.029 (32.767s)	0.029 (33.766s)	0.031 (34.764s)	0.029
Maximum axial #1 (mm)	0.218 (30.272s)	0.220 (31.270s)	0.220 (32.270s)	0.222 (33.273s)	0.223 (34.270s)	0.221
Minimum axial #1 (mm)	0.030 (30.766s)	0.032 (31.768s)	0.033 (32.768s)	0.033 (33.767s)	0.034 (34.765s)	0.032
Maximum axial #2 (mm)	0.214 (30.272s)	0.216 (31.271s)	0.217 (32.272s)	0.217 (33.274s)	0.220 (34.269s)	0.217
Minimum axial #2 (mm)	0.022 (30.766s)	0.024 (31.766s)	0.026 (32.766s)	0.026 (33.766s)	0.028 (34.764s)	0.025

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.8						112.8	

Cross-Sectional Area: 7853.982
Volume: 885929.1

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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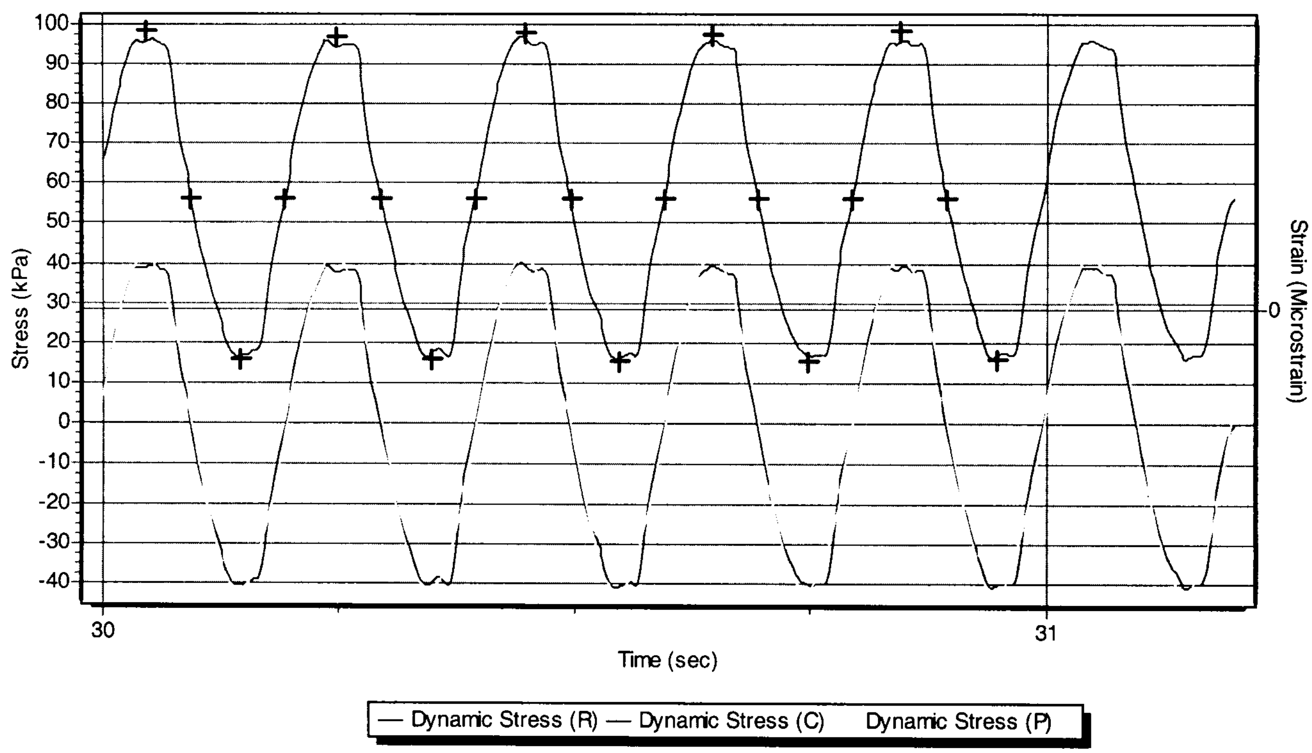

Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:54 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.8
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.5	81.0	82.2	82.5	82.6	82.2
Recoverable axial micro-strain	1573.3	1553.3	1561.3	1560.5	1566.4	1563.0
Permanent axial micro-strain	764	757	763	752	763	
Dynamic modulus (MPa)	52.5	52.1	52.6	52.9	52.7	52.6
Phase angle (Deg)	7.21	6.86	9.76	7.54	9.87	8.25
Dyn.Modulus/sine(phase angle)	834.1	871.8	618.9	804.1	612.7	748.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.648	0.636	0.645	0.648	0.649	0.645
Maximum load (kN)	0.774 (30.046s)	0.762 (30.247s)	0.768 (30.446s)	0.768 (30.645s)	0.772 (30.845s)	0.769
Minimum load (kN)	0.125 (30.146s)	0.126 (30.347s)	0.123 (30.546s)	0.119 (30.747s)	0.123 (30.946s)	0.123
Maximum averaged axial (mm)	0.086 (30.050s)	0.085 (30.251s)	0.086 (30.451s)	0.085 (30.650s)	0.086 (30.851s)	0.086
Minimum averaged axial (mm)	-0.091 (30.151s)	-0.090 (30.350s)	-0.090 (30.550s)	-0.091 (30.751s)	-0.091 (30.951s)	-0.091
Maximum axial #1 (mm)	0.088 (30.051s)	0.086 (30.252s)	0.087 (30.452s)	0.086 (30.650s)	0.087 (30.851s)	0.087
Minimum axial #1 (mm)	-0.092 (30.150s)	-0.091 (30.350s)	-0.091 (30.550s)	-0.096 (30.751s)	-0.091 (30.950s)	-0.092
Maximum axial #2 (mm)	0.085 (30.049s)	0.084 (30.250s)	0.085 (30.450s)	0.084 (30.649s)	0.084 (30.849s)	0.085
Minimum axial #2 (mm)	-0.091 (30.151s)	-0.089 (30.350s)	-0.089 (30.550s)	-0.090 (30.751s)	-0.090 (30.951s)	-0.090

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.8						112.8	

Cross-Sectional Area: 7853.982
Volume: 885929.1

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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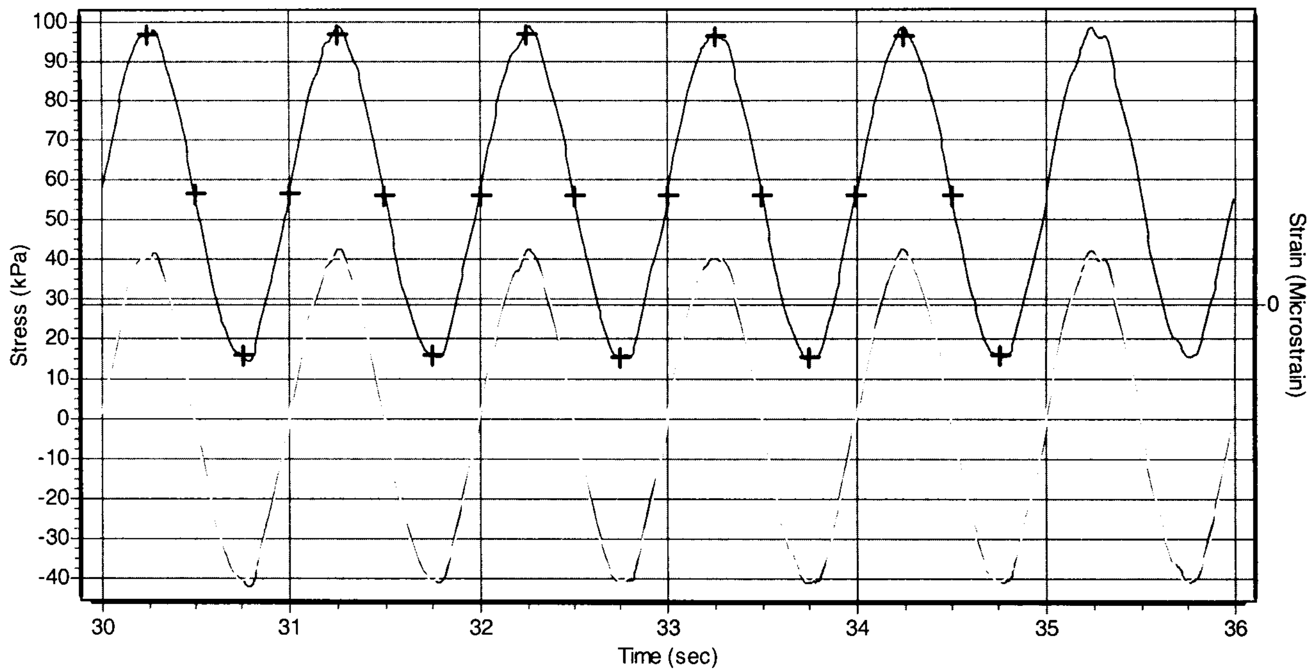

Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:58 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	80.8	81.4	81.2	81.0	81.2
Recoverable axial micro-strain	1507.9	1499.9	1499.7	1494.5	1499.4	1500.3
Permanent axial micro-strain	139	153	166	173	184	
Dynamic modulus (MPa)	54.0	53.9	54.3	54.4	54.0	54.1
Phase angle (Deg)	9.45	9.02	9.87	9.76	10.42	9.70
Dyn.Modulus/sine(phase angle)	655.6	685.3	630.5	638.9	594.9	641.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.635	0.639	0.638	0.636	0.638
Maximum load (kN)	0.764 (30.248s)	0.762 (31.246s)	0.762 (32.246s)	0.759 (33.244s)	0.761 (34.246s)	0.762
Minimum load (kN)	0.124 (30.746s)	0.127 (31.746s)	0.123 (32.745s)	0.121 (33.743s)	0.124 (34.747s)	0.124
Maximum averaged axial (mm)	0.187 (30.274s)	0.187 (31.271s)	0.189 (32.274s)	0.189 (33.271s)	0.191 (34.275s)	0.188
Minimum averaged axial (mm)	0.016 (30.768s)	0.017 (31.768s)	0.019 (32.770s)	0.020 (33.767s)	0.021 (34.771s)	0.018
Maximum axial #1 (mm)	0.172 (30.275s)	0.173 (31.271s)	0.174 (32.277s)	0.174 (33.272s)	0.176 (34.277s)	0.174
Minimum axial #1 (mm)	0.018 (30.767s)	0.020 (31.767s)	0.021 (32.769s)	0.021 (33.767s)	0.023 (34.770s)	0.020
Maximum axial #2 (mm)	0.201 (30.273s)	0.202 (31.271s)	0.204 (32.272s)	0.204 (33.270s)	0.206 (34.274s)	0.203
Minimum axial #2 (mm)	0.014 (30.769s)	0.016 (31.770s)	0.017 (32.771s)	0.018 (33.767s)	0.019 (34.771s)	0.017

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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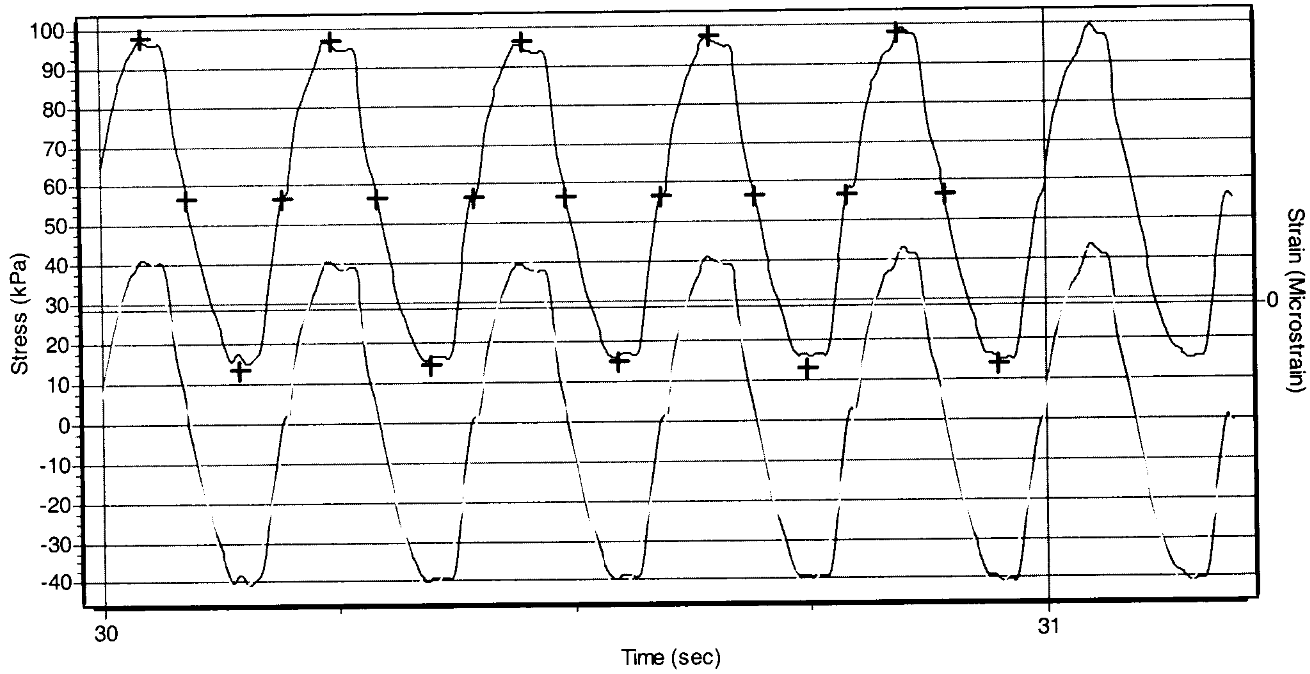


Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:58 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.4	82.4	81.3	84.0	83.8	83.2
Recoverable axial micro-strain	1434.4	1401.1	1387.8	1400.9	1406.1	1406.1
Permanent axial micro-strain	677	678	673	684	681	
Dynamic modulus (MPa)	58.8	58.8	58.6	60.0	59.6	59.2
Phase angle (Deg)	10.85	8.06	8.87	7.42	7.76	8.59
Dyn.Modulus/sine(phase angle)	622.0	836.8	758.0	926.9	880.4	804.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.662	0.647	0.639	0.660	0.658	0.653
Maximum load (kN)	0.769 (30.045s)	0.762 (30.246s)	0.755 (30.447s)	0.764 (30.646s)	0.770 (30.845s)	0.764
Minimum load (kN)	0.107 (30.146s)	0.114 (30.346s)	0.117 (30.546s)	0.104 (30.746s)	0.112 (30.948s)	0.111
Maximum averaged axial (mm)	0.077 (30.051s)	0.077 (30.251s)	0.076 (30.452s)	0.077 (30.650s)	0.077 (30.849s)	0.077
Minimum averaged axial (mm)	-0.086 (30.150s)	-0.082 (30.351s)	-0.081 (30.550s)	-0.081 (30.750s)	-0.082 (30.951s)	-0.082
Maximum axial #1 (mm)	0.068 (30.052s)	0.068 (30.253s)	0.068 (30.453s)	0.069 (30.653s)	0.068 (30.850s)	0.068
Minimum axial #1 (mm)	-0.078 (30.150s)	-0.074 (30.350s)	-0.073 (30.549s)	-0.073 (30.750s)	-0.074 (30.950s)	-0.074
Maximum axial #2 (mm)	0.085 (30.050s)	0.086 (30.249s)	0.086 (30.449s)	0.086 (30.649s)	0.086 (30.849s)	0.086
Minimum axial #2 (mm)	-0.094 (30.151s)	-0.090 (30.351s)	-0.089 (30.550s)	-0.089 (30.751s)	-0.090 (30.952s)	-0.091

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#06

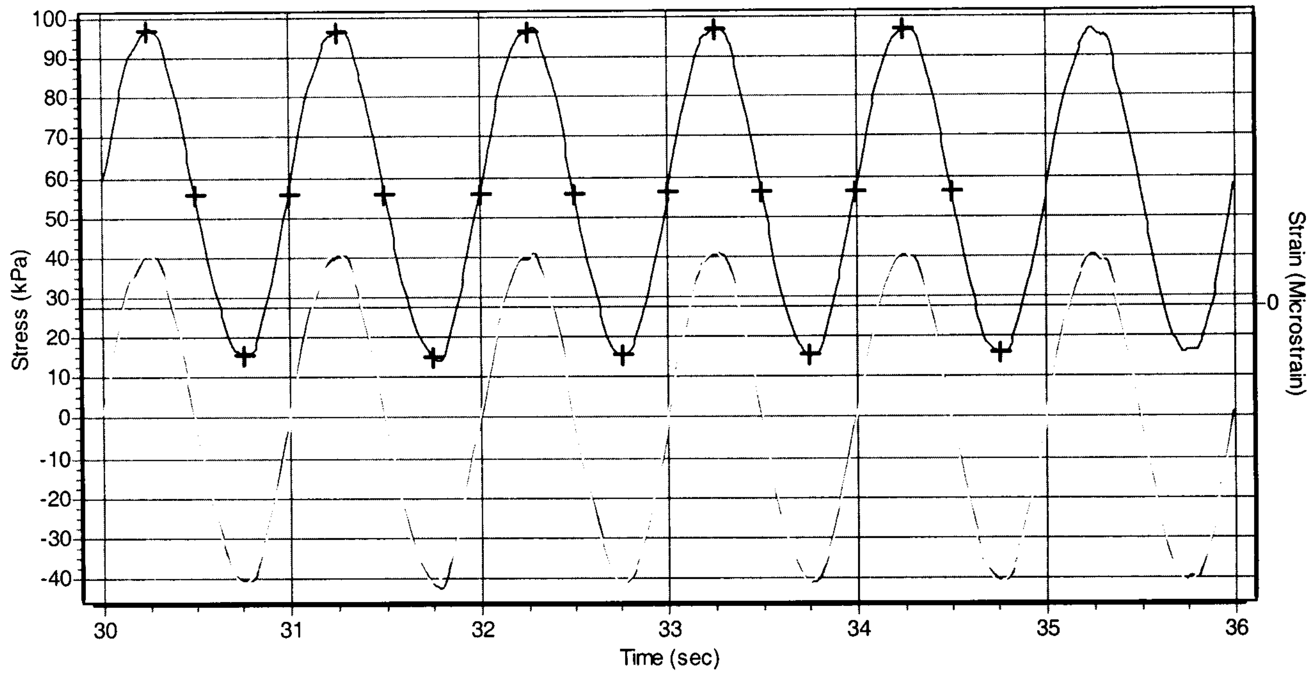
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#07.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:01 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.3	80.9	81.7	80.9	81.2
Recoverable axial micro-strain	1634.5	1634.0	1632.6	1637.5	1633.9	1634.5
Permanent axial micro-strain	858	868	899	913	936	
Dynamic modulus (MPa)	49.7	49.8	49.6	49.9	49.5	49.7
Phase angle (Deg)	9.97	9.92	9.50	9.25	9.82	9.69
Dyn.Modulus/sine(phase angle)	571.9	576.0	598.7	618.6	578.9	588.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.639	0.636	0.642	0.636	0.638
Maximum load (kN)	0.762 (30.244s)	0.758 (31.244s)	0.760 (32.250s)	0.764 (33.247s)	0.762 (34.247s)	0.761
Minimum load (kN)	0.124 (30.747s)	0.119 (31.750s)	0.124 (32.748s)	0.122 (33.744s)	0.126 (34.748s)	0.123
Maximum averaged axial (mm)	0.283 (30.272s)	0.285 (31.272s)	0.288 (32.277s)	0.290 (33.272s)	0.292 (34.275s)	0.288
Minimum averaged axial (mm)	0.098 (30.769s)	0.099 (31.772s)	0.102 (32.770s)	0.104 (33.769s)	0.106 (34.770s)	0.102
Maximum axial #1 (mm)	0.280 (30.272s)	0.281 (31.272s)	0.284 (32.277s)	0.286 (33.273s)	0.288 (34.275s)	0.284
Minimum axial #1 (mm)	0.097 (30.769s)	0.098 (31.773s)	0.101 (32.769s)	0.103 (33.769s)	0.106 (34.770s)	0.101
Maximum axial #2 (mm)	0.287 (30.272s)	0.288 (31.271s)	0.291 (32.277s)	0.294 (33.271s)	0.296 (34.275s)	0.291
Minimum axial #2 (mm)	0.098 (30.768s)	0.099 (31.772s)	0.103 (32.771s)	0.104 (33.768s)	0.107 (34.769s)	0.102

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#07

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

Cross-Sectional Area: 7853.982
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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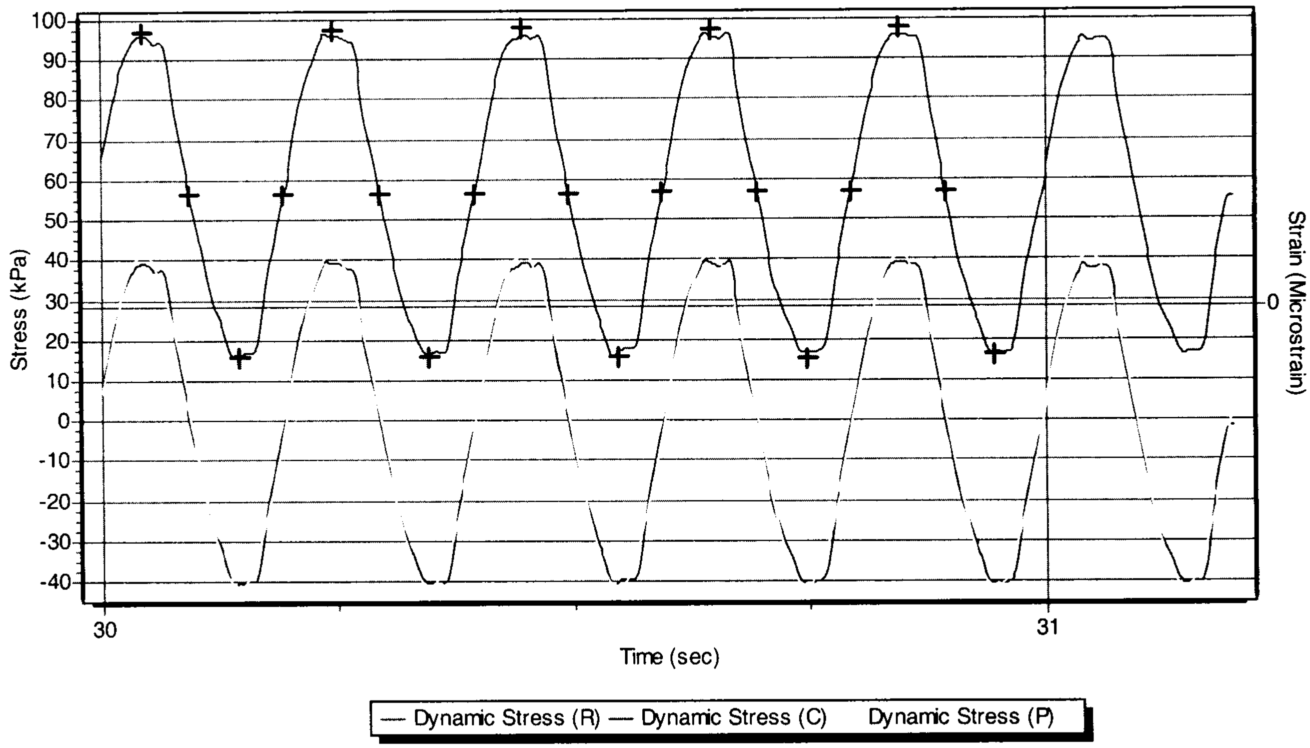

Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:01 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.7
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.5	81.8	81.7	81.6	81.6
Recoverable axial micro-strain	1455.1	1457.8	1443.9	1486.7	1448.7	1458.4
Permanent axial micro-strain	550	550	537	568	540	
Dynamic modulus (MPa)	55.8	55.9	56.6	55.0	56.3	55.9
Phase angle (Deg)	11.74	8.23	9.53	11.03	8.05	9.72
Dyn.Modulus/sine(phase angle)	545.8	780.0	681.5	571.7	802.2	676.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.640	0.642	0.642	0.641	0.641
Maximum load (kN)	0.762 (30.045s)	0.765 (30.246s)	0.769 (30.445s)	0.764 (30.646s)	0.770 (30.845s)	0.766
Minimum load (kN)	0.125 (30.145s)	0.124 (30.345s)	0.127 (30.546s)	0.123 (30.746s)	0.129 (30.945s)	0.125
Maximum averaged axial (mm)	0.103 (30.052s)	0.103 (30.250s)	0.103 (30.450s)	0.104 (30.652s)	0.103 (30.850s)	0.103
Minimum averaged axial (mm)	-0.063 (30.151s)	-0.062 (30.351s)	-0.061 (30.551s)	-0.065 (30.751s)	-0.061 (30.951s)	-0.062
Maximum axial #1 (mm)	0.098 (30.052s)	0.098 (30.251s)	0.099 (30.452s)	0.100 (30.652s)	0.099 (30.851s)	0.099
Minimum axial #1 (mm)	-0.068 (30.149s)	-0.065 (30.351s)	-0.064 (30.550s)	-0.068 (30.751s)	-0.067 (30.950s)	-0.067
Maximum axial #2 (mm)	0.107 (30.050s)	0.108 (30.250s)	0.108 (30.450s)	0.109 (30.651s)	0.108 (30.849s)	0.108
Minimum axial #2 (mm)	-0.060 (30.151s)	-0.060 (30.351s)	-0.058 (30.551s)	-0.060 (30.752s)	-0.059 (30.951s)	-0.059

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#07

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

Cross-Sectional Area: 7853.982
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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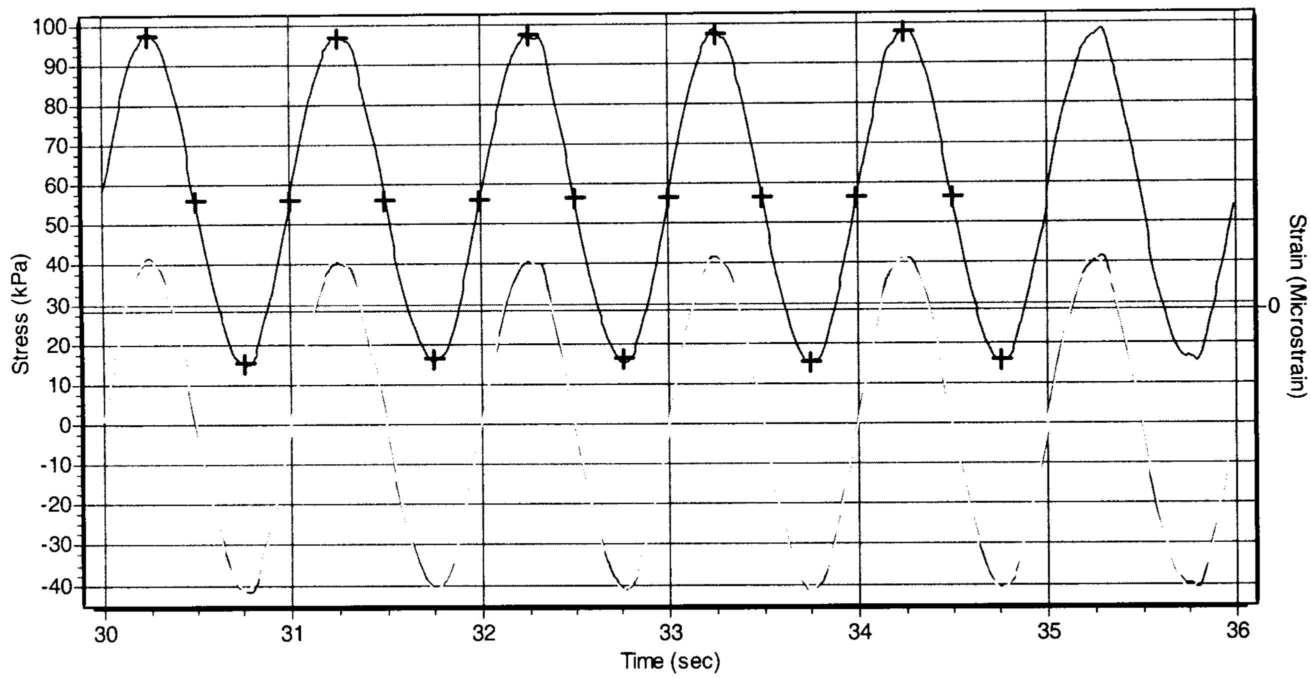


Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:06 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.7	80.6	81.1	81.8	81.9	81.4
Recoverable axial micro-strain	1612.7	1586.9	1602.8	1598.0	1604.3	1600.9
Permanent axial micro-strain	616	645	652	666	683	
Dynamic modulus (MPa)	50.6	50.8	50.6	51.2	51.0	50.8
Phase angle (Deg)	10.05	9.88	10.38	10.28	10.03	10.12
Dyn.Modulus/sine(phase angle)	578.2	589.6	559.0	571.6	583.5	576.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.633	0.637	0.643	0.643	0.639
Maximum load (kN)	0.764 (30.246s)	0.760 (31.247s)	0.763 (32.249s)	0.764 (33.245s)	0.768 (34.246s)	0.764
Minimum load (kN)	0.122 (30.749s)	0.127 (31.745s)	0.127 (32.747s)	0.122 (33.745s)	0.125 (34.748s)	0.125
Maximum averaged axial (mm)	0.253 (30.274s)	0.253 (31.275s)	0.256 (32.278s)	0.256 (33.274s)	0.259 (34.274s)	0.255
Minimum averaged axial (mm)	0.070 (30.769s)	0.073 (31.768s)	0.074 (32.768s)	0.075 (33.768s)	0.077 (34.769s)	0.074
Maximum axial #1 (mm)	0.247 (30.275s)	0.248 (31.275s)	0.250 (32.277s)	0.251 (33.273s)	0.254 (34.272s)	0.250
Minimum axial #1 (mm)	0.064 (30.769s)	0.068 (31.766s)	0.068 (32.767s)	0.069 (33.766s)	0.071 (34.767s)	0.068
Maximum axial #2 (mm)	0.258 (30.273s)	0.258 (31.275s)	0.261 (32.278s)	0.262 (33.275s)	0.265 (34.275s)	0.261
Minimum axial #2 (mm)	0.076 (30.769s)	0.079 (31.770s)	0.079 (32.769s)	0.082 (33.770s)	0.084 (34.771s)	0.080

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#08

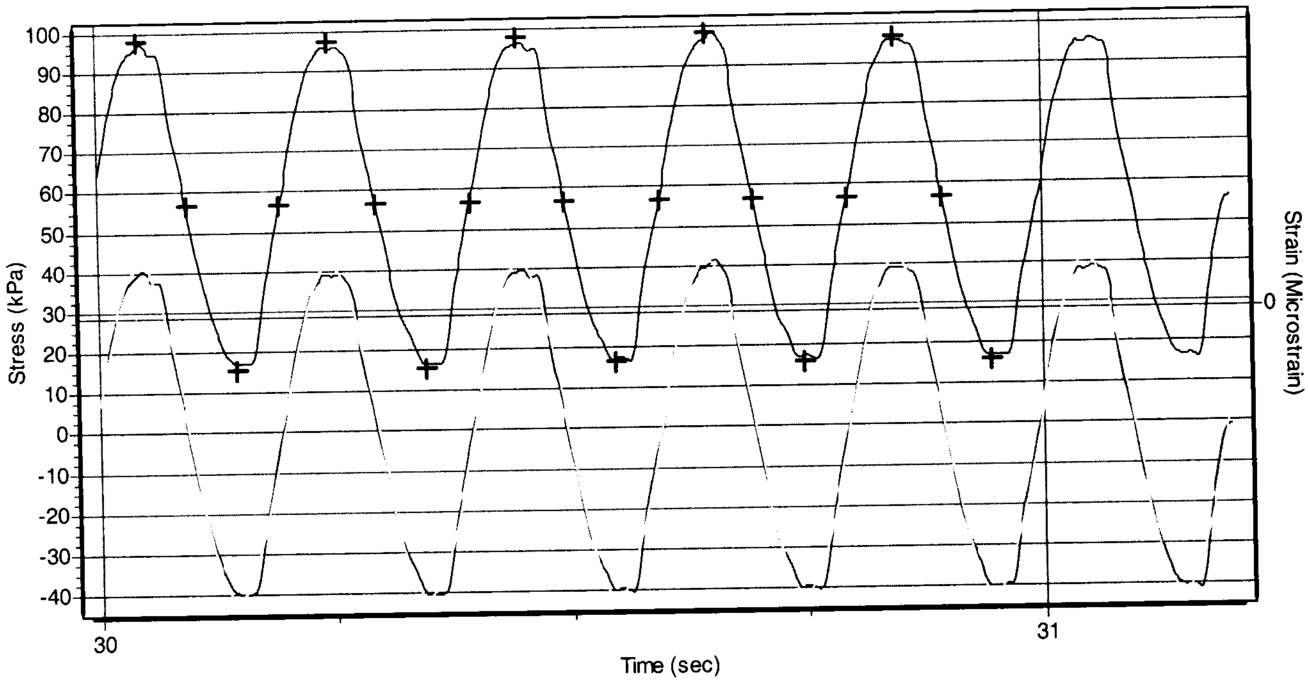
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#08.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:06 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.9	81.6	81.2	82.1	80.9	81.5
Recoverable axial micro-strain	1417.8	1429.9	1435.6	1444.0	1450.1	1435.5
Permanent axial micro-strain	655	669	665	664	686	
Dynamic modulus (MPa)	57.8	57.1	56.6	56.9	55.8	56.8
Phase angle (Deg)	9.01	8.17	10.59	8.11	7.95	8.77
Dyn.Modulus/sine(phase angle)	735.4	801.6	612.7	803.5	804.5	751.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.641	0.638	0.645	0.635	0.640
Maximum load (kN)	0.767 (30.045s)	0.765 (30.245s)	0.768 (30.445s)	0.773 (30.646s)	0.763 (30.845s)	0.767
Minimum load (kN)	0.124 (30.146s)	0.124 (30.345s)	0.130 (30.547s)	0.128 (30.746s)	0.127 (30.945s)	0.127
Maximum averaged axial (mm)	0.086 (30.050s)	0.086 (30.249s)	0.087 (30.450s)	0.088 (30.650s)	0.087 (30.850s)	0.087
Minimum averaged axial (mm)	-0.074 (30.151s)	-0.076 (30.351s)	-0.075 (30.551s)	-0.075 (30.751s)	-0.078 (30.950s)	-0.076
Maximum axial #1 (mm)	0.083 (30.052s)	0.082 (30.250s)	0.083 (30.451s)	0.084 (30.650s)	0.082 (30.850s)	0.083
Minimum axial #1 (mm)	-0.084 (30.149s)	-0.081 (30.350s)	-0.081 (30.550s)	-0.081 (30.750s)	-0.084 (30.950s)	-0.082
Maximum axial #2 (mm)	0.091 (30.050s)	0.091 (30.249s)	0.092 (30.450s)	0.093 (30.650s)	0.091 (30.849s)	0.092
Minimum axial #2 (mm)	-0.069 (30.151s)	-0.071 (30.351s)	-0.070 (30.551s)	-0.070 (30.751s)	-0.070 (30.951s)	-0.070

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#08

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

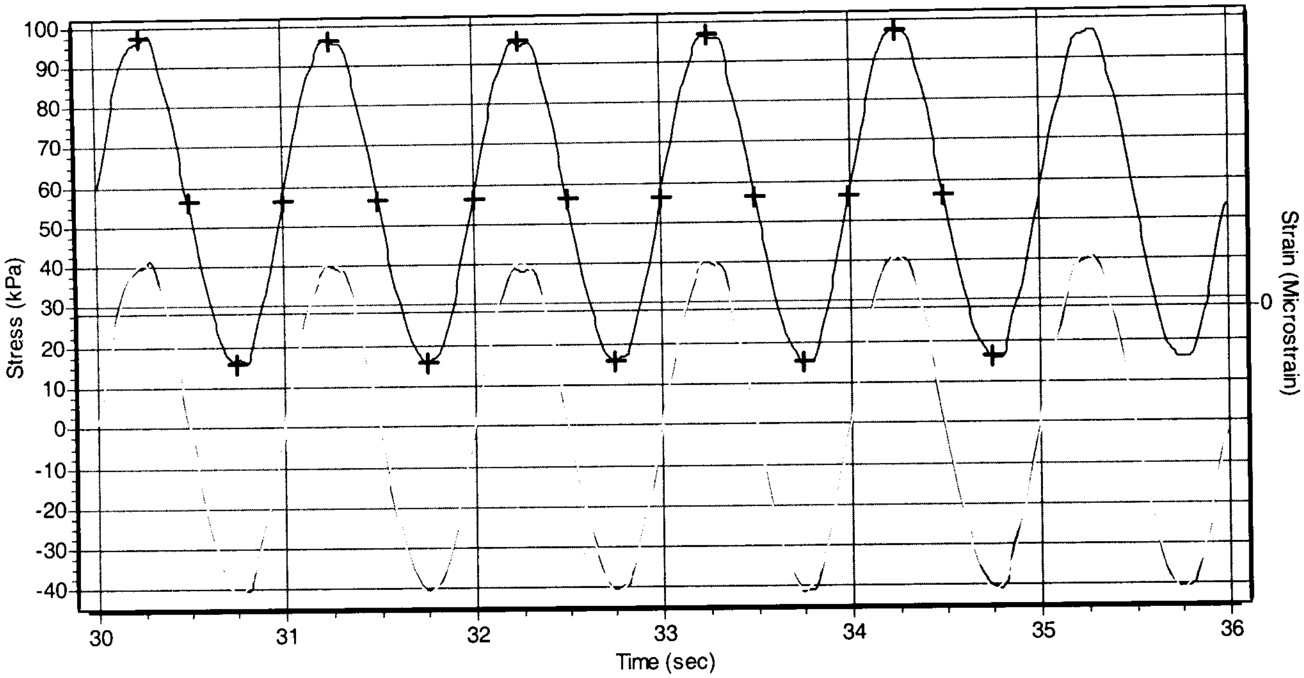
Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/GA Phase 4 'optimum dust.' *

E = Standard error (Transducer)

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#01.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:42 PM St. error = 2.0
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.6
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.1	80.4	79.6	81.4	81.1	80.7
Recoverable axial micro-strain	1444.1	1432.6	1432.6	1443.4	1444.4	1439.4
Permanent axial micro-strain	224	237	245	257	270	
Dynamic modulus (MPa)	56.1	56.1	55.6	56.4	56.2	56.1
Phase angle (Deg)	8.52	9.75	9.69	10.04	8.39	9.28
Dyn.Modulus/sine(phase angle)	755.3	659.9	657.9	644.4	767.6	697.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.631	0.625	0.639	0.637	0.634
Maximum load (kN)	0.763 (30.245s)	0.758 (31.244s)	0.752 (32.246s)	0.759 (33.246s)	0.766 (34.244s)	0.760
Minimum load (kN)	0.127 (30.746s)	0.126 (31.744s)	0.127 (32.745s)	0.120 (33.746s)	0.129 (34.745s)	0.126
Maximum averaged axial (mm)	0.188 (30.268s)	0.188 (31.271s)	0.189 (32.273s)	0.191 (33.274s)	0.193 (34.267s)	0.190
Minimum averaged axial (mm)	0.025 (30.768s)	0.027 (31.766s)	0.028 (32.769s)	0.029 (33.769s)	0.030 (34.767s)	0.028
Maximum axial #1 (mm)	0.183 (30.267s)	0.182 (31.270s)	0.183 (32.272s)	0.186 (33.274s)	0.188 (34.268s)	0.184
Minimum axial #1 (mm)	0.022 (30.768s)	0.023 (31.767s)	0.024 (32.768s)	0.025 (33.768s)	0.027 (34.767s)	0.024
Maximum axial #2 (mm)	0.193 (30.270s)	0.193 (31.272s)	0.194 (32.275s)	0.197 (33.274s)	0.199 (34.268s)	0.195
Minimum axial #2 (mm)	0.028 (30.769s)	0.030 (31.767s)	0.031 (32.769s)	0.032 (33.769s)	0.034 (34.767s)	0.031

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.6						112.6	

Cross-Sectional Area: 7853.982
Volume: 884358.3

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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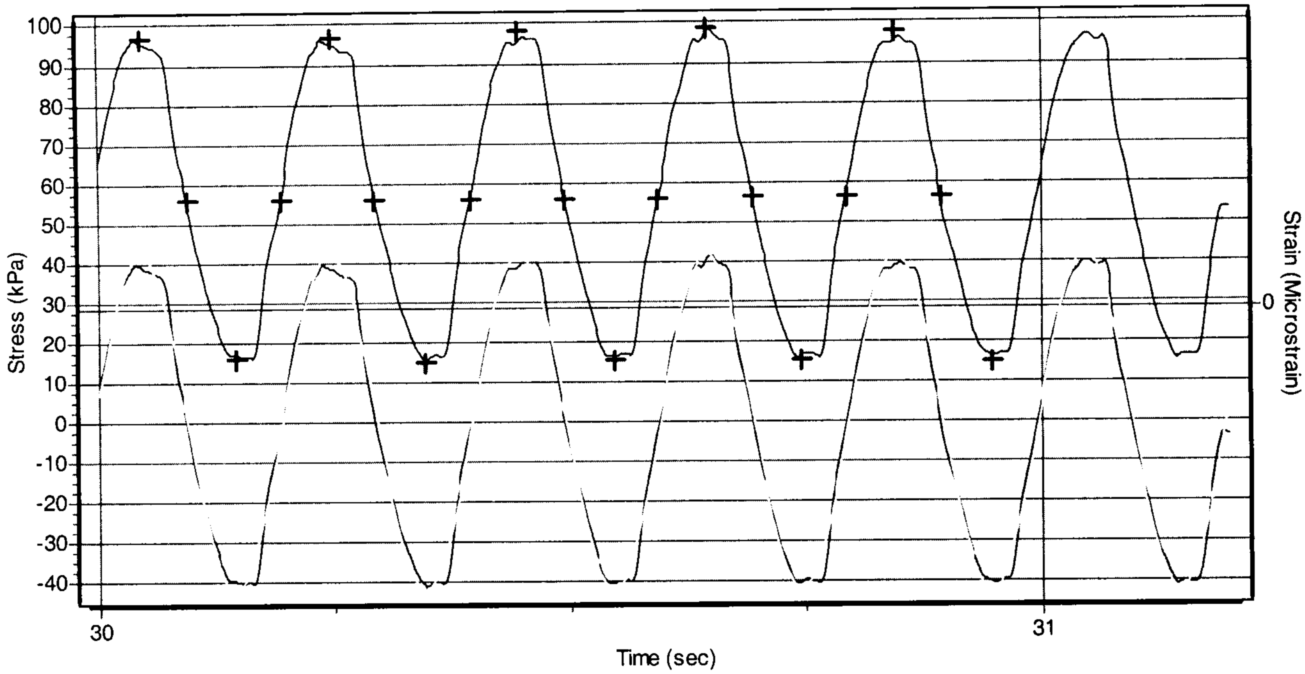

Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:42 PM 51 error = 6.0

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.6

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.1	82.0	83.1	83.3	83.0	82.5
Recoverable axial micro-strain	1320.3	1321.1	1337.9	1326.8	1314.3	1324.1
Permanent axial micro-strain	609	606	623	617	614	
Dynamic modulus (MPa)	61.4	62.1	62.1	62.8	63.2	62.3
Phase angle (Deg)	6.27	4.34	9.84	6.82	7.94	7.04
Dyn.Modulus/sine(phase angle)	1122.3	1639.4	724.7	1055.4	911.8	1090.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.637	0.644	0.653	0.655	0.652	0.648
Maximum load (kN)	0.760 (30.046s)	0.760 (30.247s)	0.772 (30.445s)	0.776 (30.645s)	0.769 (30.845s)	0.767
Minimum load (kN)	0.124 (30.147s)	0.116 (30.346s)	0.119 (30.546s)	0.121 (30.746s)	0.117 (30.945s)	0.119
Maximum averaged axial (mm)	0.069 (30.050s)	0.068 (30.249s)	0.070 (30.451s)	0.069 (30.649s)	0.069 (30.849s)	0.069
Minimum averaged axial (mm)	-0.080 (30.150s)	-0.081 (30.350s)	-0.080 (30.550s)	-0.080 (30.750s)	-0.079 (30.950s)	-0.080
Maximum axial #1 (mm)	0.066 (30.050s)	0.065 (30.250s)	0.068 (30.452s)	0.066 (30.649s)	0.067 (30.852s)	0.066
Minimum axial #1 (mm)	-0.081 (30.150s)	-0.082 (30.350s)	-0.082 (30.550s)	-0.081 (30.749s)	-0.080 (30.949s)	-0.081
Maximum axial #2 (mm)	0.071 (30.050s)	0.071 (30.249s)	0.073 (30.450s)	0.073 (30.649s)	0.072 (30.849s)	0.072
Minimum axial #2 (mm)	-0.079 (30.151s)	-0.079 (30.351s)	-0.079 (30.551s)	-0.079 (30.750s)	-0.078 (30.950s)	-0.079

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#01

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.6						112.6	

Cross-Sectional Area: 7853.982

Volume: 884358.3

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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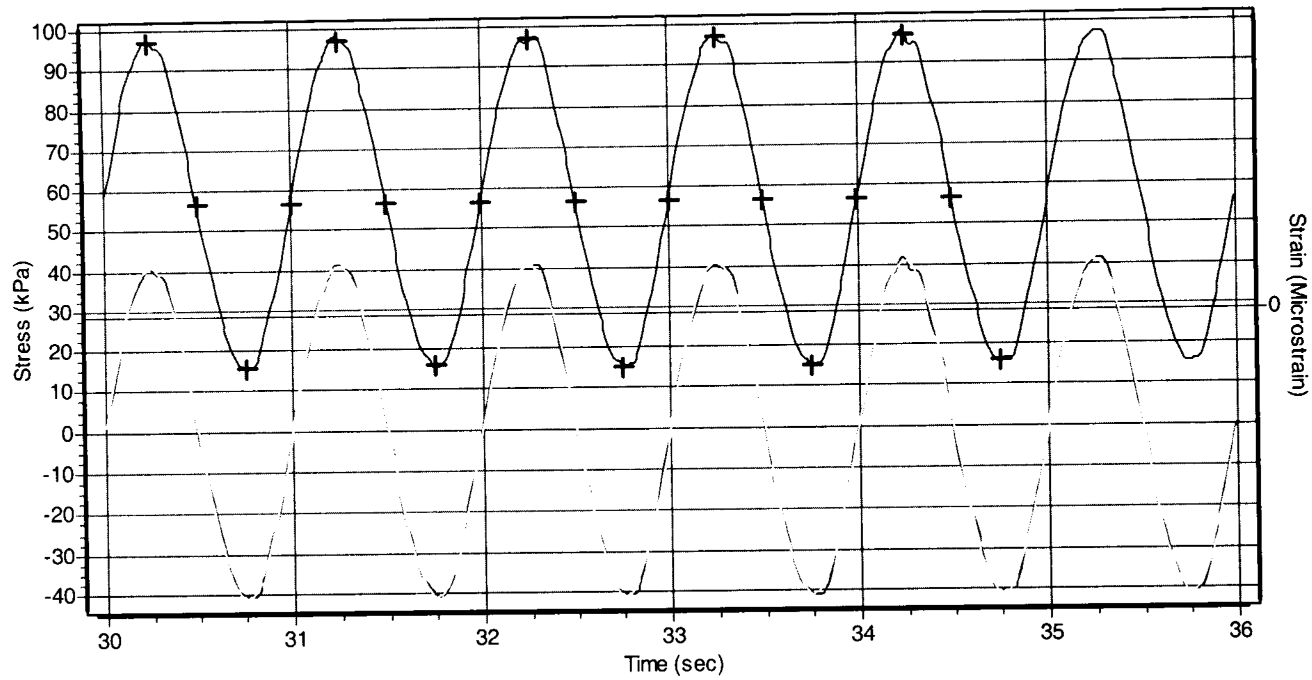


Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:46 PM Error = 2.0
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.4
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.0	81.1	81.6	81.5	81.1	81.3
Recoverable axial micro-strain	1427.0	1433.5	1440.5	1441.8	1422.2	1433.0
Permanent axial micro-strain	130	122	123	118	102	
Dynamic modulus (MPa)	56.8	56.6	56.7	56.6	57.0	56.7
Phase angle (Deg)	9.65	9.69	8.60	9.47	9.19	9.32
Dyn.Modulus/sine(phase angle)	675.0	669.8	755.9	685.3	711.8	699.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.636	0.637	0.641	0.640	0.637	0.638
Maximum load (kN)	0.761 (30.246s)	0.763 (31.244s)	0.762 (32.249s)	0.761 (33.246s)	0.762 (34.243s)	0.762
Minimum load (kN)	0.125 (30.748s)	0.126 (31.745s)	0.121 (32.746s)	0.120 (33.748s)	0.125 (34.745s)	0.123
Maximum averaged axial (mm)	0.147 (30.273s)	0.149 (31.271s)	0.149 (32.273s)	0.150 (33.272s)	0.150 (34.268s)	0.149
Minimum averaged axial (mm)	-0.015 (30.768s)	-0.014 (31.766s)	-0.014 (32.767s)	-0.013 (33.769s)	-0.012 (34.769s)	-0.014
Maximum axial #1 (mm)	0.142 (30.274s)	0.143 (31.272s)	0.144 (32.273s)	0.144 (33.273s)	0.144 (34.268s)	0.143
Minimum axial #1 (mm)	-0.011 (30.769s)	-0.011 (31.764s)	-0.011 (32.767s)	-0.010 (33.768s)	-0.008 (34.769s)	-0.010
Maximum axial #2 (mm)	0.153 (30.272s)	0.154 (31.271s)	0.155 (32.273s)	0.156 (33.272s)	0.155 (34.269s)	0.155
Minimum axial #2 (mm)	-0.018 (30.768s)	-0.017 (31.766s)	-0.017 (32.767s)	-0.017 (33.769s)	-0.015 (34.769s)	-0.017

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#02

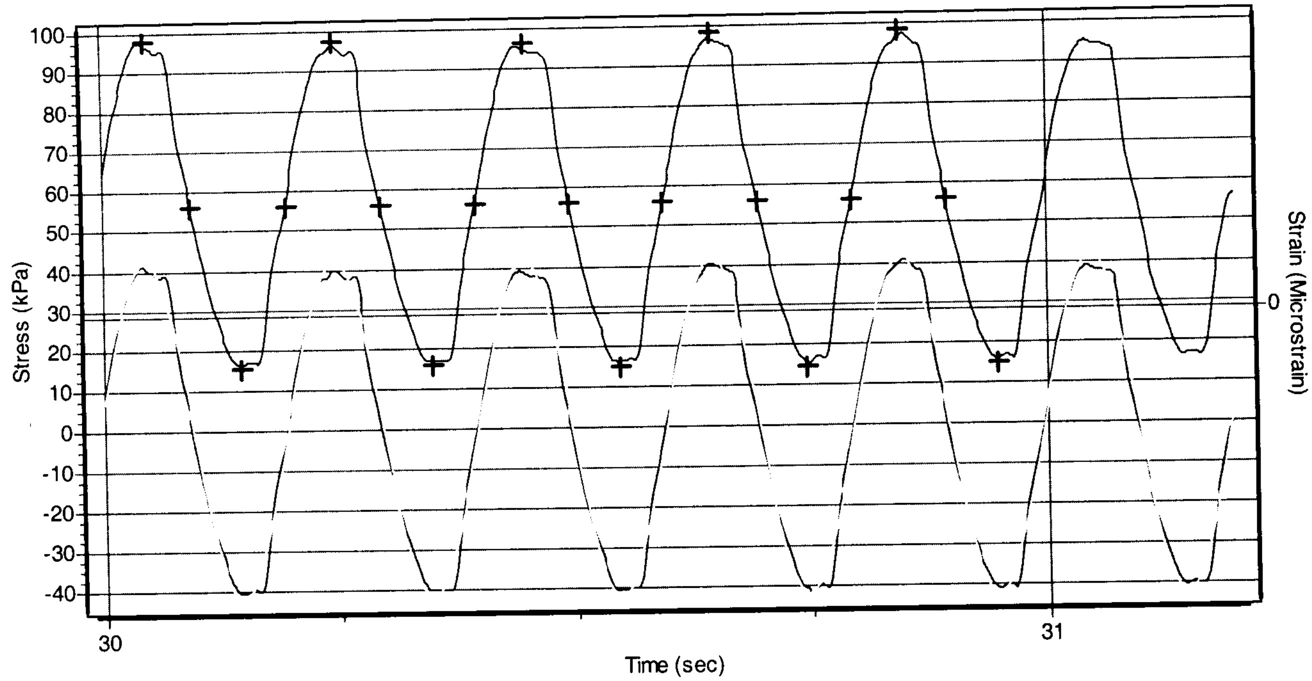
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.4						113.4	

Cross-Sectional Area: 7853.982
Volume: 890641.5

Comments/Properties: Initial Temp: 57 'C
Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#02.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:46 PM E= 5.96

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.4

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	83.0	82.0	81.7	84.0	83.8	82.9
Recoverable axial micro-strain	1306.9	1304.2	1311.4	1321.4	1322.3	1313.2
Permanent axial micro-strain	549	549	556	557	564	
Dynamic modulus (MPa)	63.5	62.9	62.3	63.6	63.4	63.1
Phase angle (Deg)	7.40	9.98	5.76	8.58	7.74	7.89
Dyn.Modulus/sine(phase angle)	984.0	723.0	1240.2	849.5	938.5	947.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.652	0.644	0.641	0.660	0.658	0.651
Maximum load (kN)	0.771 (30.046s)	0.768 (30.245s)	0.759 (30.447s)	0.773 (30.645s)	0.774 (30.845s)	0.769
Minimum load (kN)	0.119 (30.145s)	0.124 (30.347s)	0.118 (30.545s)	0.113 (30.746s)	0.116 (30.945s)	0.118
Maximum averaged axial (mm)	0.062 (30.050s)	0.062 (30.250s)	0.063 (30.450s)	0.063 (30.650s)	0.064 (30.849s)	0.063
Minimum averaged axial (mm)	-0.086 (30.150s)	-0.086 (30.351s)	-0.086 (30.550s)	-0.087 (30.750s)	-0.086 (30.950s)	-0.086
Maximum axial #1 (mm)	0.059 (30.051s)	0.059 (30.251s)	0.060 (30.451s)	0.060 (30.652s)	0.060 (30.850s)	0.060
Minimum axial #1 (mm)	-0.080 (30.150s)	-0.080 (30.350s)	-0.079 (30.549s)	-0.085 (30.749s)	-0.080 (30.950s)	-0.081
Maximum axial #2 (mm)	0.066 (30.049s)	0.065 (30.250s)	0.065 (30.451s)	0.066 (30.649s)	0.067 (30.849s)	0.066
Minimum axial #2 (mm)	-0.092 (30.151s)	-0.092 (30.351s)	-0.092 (30.551s)	-0.092 (30.751s)	-0.092 (30.951s)	-0.092

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#02

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.4						113.4	

Cross-Sectional Area: 7853.982

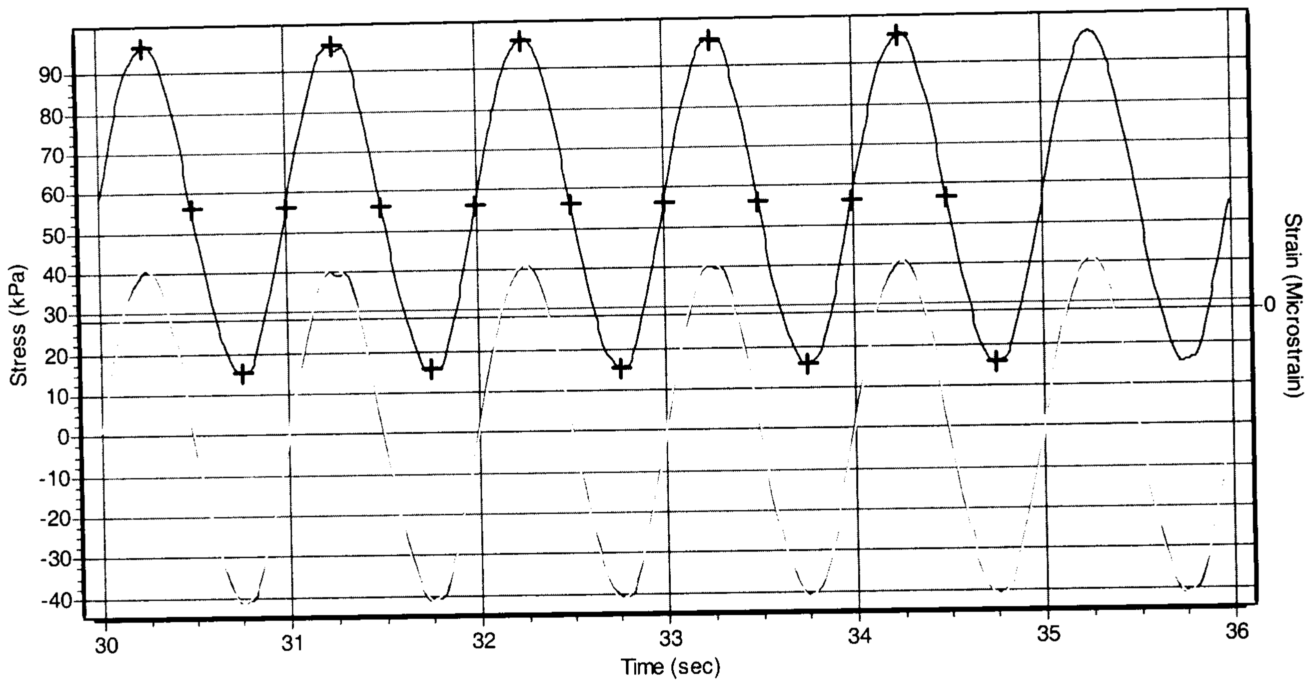
Volume: 890641.5

Comments/Properties: Initial Temp: 57 'C

Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#03.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:43 PM E= 1.60

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.5

Axial Gauge Length (mm): 112.5

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.9	80.9	81.4	80.7	80.9	81.0
Recoverable axial micro-strain	1627.3	1646.1	1648.2	1641.3	1639.8	1640.6
Permanent axial micro-strain	365	370	379	397	402	
Dynamic modulus (MPa)	49.7	49.2	49.4	49.2	49.3	49.4
Phase angle (Deg)	9.64	8.45	8.86	8.91	8.27	8.82
Dyn.Modulus/sine(phase angle)	591.5	667.2	639.8	633.5	684.5	643.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.636	0.640	0.634	0.635	0.636
Maximum load (kN)	0.758 (30.245s)	0.759 (31.247s)	0.762 (32.246s)	0.759 (33.247s)	0.760 (34.246s)	0.760
Minimum load (kN)	0.122 (30.746s)	0.124 (31.744s)	0.123 (32.747s)	0.125 (33.744s)	0.125 (34.742s)	0.124
Maximum averaged axial (mm)	0.224 (30.272s)	0.227 (31.270s)	0.228 (32.271s)	0.229 (33.271s)	0.230 (34.269s)	0.228
Minimum averaged axial (mm)	0.041 (30.767s)	0.042 (31.767s)	0.043 (32.764s)	0.045 (33.766s)	0.045 (34.761s)	0.043
Maximum axial #1 (mm)	0.226 (30.271s)	0.228 (31.269s)	0.229 (32.269s)	0.231 (33.270s)	0.231 (34.268s)	0.229
Minimum axial #1 (mm)	0.035 (30.765s)	0.036 (31.767s)	0.037 (32.763s)	0.039 (33.766s)	0.039 (34.761s)	0.037
Maximum axial #2 (mm)	0.223 (30.273s)	0.225 (31.272s)	0.227 (32.273s)	0.228 (33.272s)	0.228 (34.270s)	0.226
Minimum axial #2 (mm)	0.046 (30.767s)	0.047 (31.767s)	0.048 (32.765s)	0.050 (33.766s)	0.051 (34.762s)	0.049

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Cross-Sectional Area: 7853.982

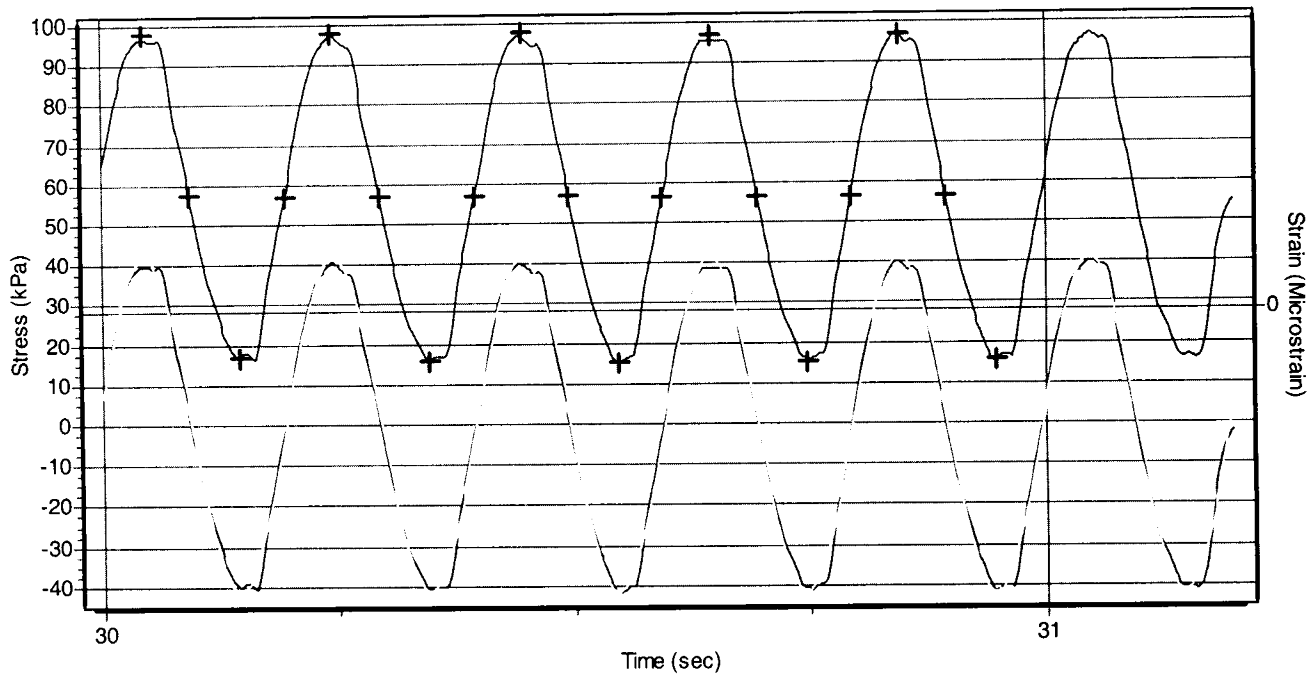
Volume: 883572.9

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#03.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:43 PM   E = 4.68

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.5

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	82.2	82.4	81.6	81.5	81.8
Recoverable axial micro-strain	1486.8	1475.9	1513.7	1478.7	1484.9	1488.0
Permanent axial micro-strain	720	704	712	710	709	
Dynamic modulus (MPa)	54.6	55.7	54.4	55.2	54.9	55.0
Phase angle (Deg)	9.23	7.85	7.63	7.80	8.31	8.16
Dyn.Modulus/sine(phase angle)	678.7	814.2	818.5	811.7	756.8	776.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.646	0.647	0.641	0.640	0.642
Maximum load (kN)	0.769 (30.045s)	0.768 (30.244s)	0.768 (30.444s)	0.762 (30.645s)	0.763 (30.844s)	0.766
Minimum load (kN)	0.131 (30.147s)	0.123 (30.345s)	0.120 (30.545s)	0.121 (30.747s)	0.123 (30.946s)	0.124
Maximum averaged axial (mm)	0.081 (30.050s)	0.079 (30.249s)	0.080 (30.448s)	0.080 (30.649s)	0.080 (30.849s)	0.080
Minimum averaged axial (mm)	-0.086 (30.151s)	-0.087 (30.350s)	-0.090 (30.549s)	-0.086 (30.751s)	-0.087 (30.951s)	-0.087
Maximum axial #1 (mm)	0.080 (30.050s)	0.078 (30.249s)	0.080 (30.449s)	0.079 (30.650s)	0.080 (30.850s)	0.080
Minimum axial #1 (mm)	-0.095 (30.150s)	-0.098 (30.349s)	-0.098 (30.549s)	-0.098 (30.750s)	-0.098 (30.949s)	-0.097
Maximum axial #2 (mm)	0.082 (30.050s)	0.080 (30.248s)	0.081 (30.448s)	0.080 (30.649s)	0.081 (30.849s)	0.081
Minimum axial #2 (mm)	-0.079 (30.151s)	-0.079 (30.350s)	-0.082 (30.549s)	-0.079 (30.751s)	-0.079 (30.951s)	-0.080

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#03

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Cross-Sectional Area: 7853.982

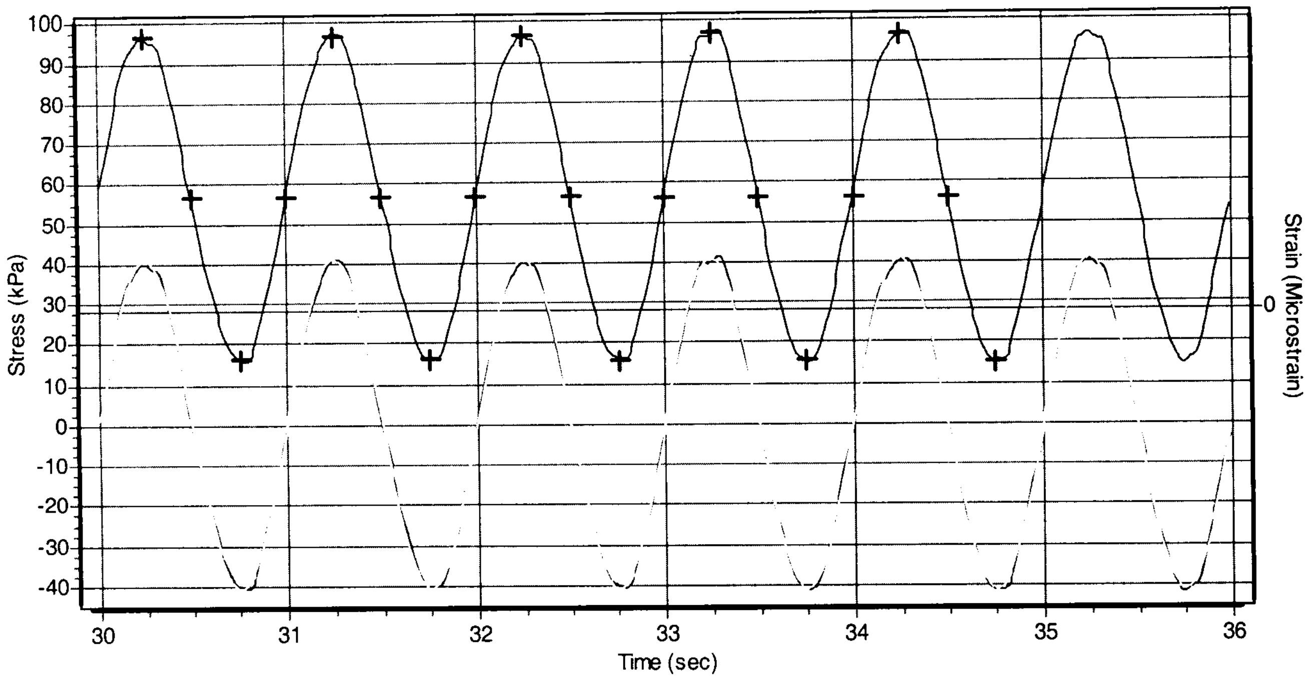
Volume: 883572.9

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#04.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:50 PM   E= 1.84

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 115

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.7	80.5	80.6	81.9	81.6	81.1
Recoverable axial micro-strain	1538.7	1537.6	1534.0	1543.9	1546.8	1540.2
Permanent axial micro-strain	137	132	125	114	113	
Dynamic modulus (MPa)	52.4	52.4	52.6	53.0	52.7	52.6
Phase angle (Deg)	8.34	8.77	9.21	8.67	8.19	8.63
Dyn.Modulus/sine(phase angle)	721.5	685.4	655.0	701.6	738.5	700.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.634	0.633	0.633	0.643	0.641	0.637
Maximum load (kN)	0.761 (30.245s)	0.760 (31.247s)	0.759 (32.244s)	0.765 (33.248s)	0.761 (34.246s)	0.761
Minimum load (kN)	0.127 (30.749s)	0.127 (31.750s)	0.126 (32.747s)	0.122 (33.744s)	0.120 (34.744s)	0.125
Maximum averaged axial (mm)	0.161 (30.268s)	0.162 (31.271s)	0.162 (32.269s)	0.164 (33.272s)	0.165 (34.269s)	0.163
Minimum averaged axial (mm)	-0.016 (30.767s)	-0.015 (31.769s)	-0.014 (32.766s)	-0.013 (33.766s)	-0.013 (34.764s)	-0.014
Maximum axial #1 (mm)	0.163 (30.268s)	0.164 (31.271s)	0.164 (32.268s)	0.167 (33.272s)	0.167 (34.269s)	0.165
Minimum axial #1 (mm)	-0.015 (30.767s)	-0.015 (31.769s)	-0.014 (32.765s)	-0.012 (33.765s)	-0.013 (34.762s)	-0.014
Maximum axial #2 (mm)	0.159 (30.268s)	0.159 (31.272s)	0.160 (32.270s)	0.162 (33.271s)	0.163 (34.269s)	0.161
Minimum axial #2 (mm)	-0.016 (30.768s)	-0.016 (31.768s)	-0.015 (32.766s)	-0.014 (33.766s)	-0.014 (34.766s)	-0.015

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115						115	

Cross-Sectional Area: 7853.982

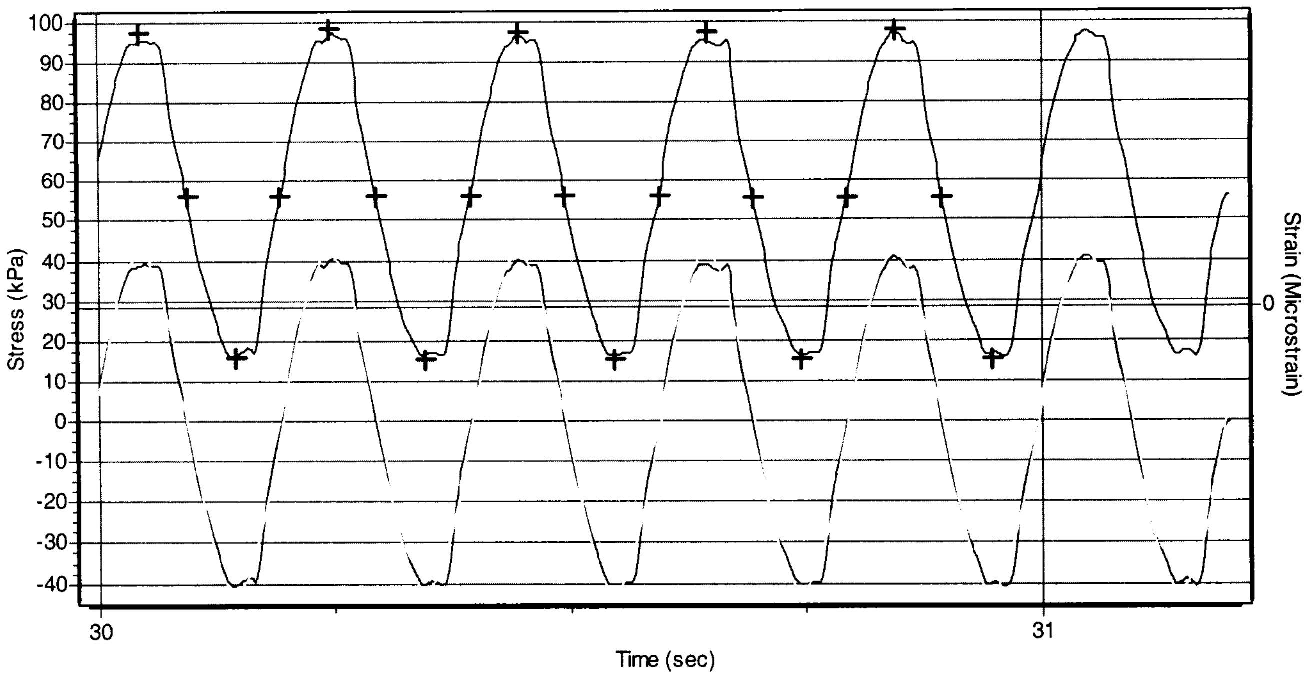
Volume: 903207.9

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#04.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:50 PM   E: 5.67

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 115

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.7	83.1	81.8	81.9	82.3	82.2
Recoverable axial micro-strain	1398.6	1411.3	1407.4	1397.4	1410.8	1405.1
Permanent axial micro-strain	631	635	636	635	639	
Dynamic modulus (MPa)	58.4	58.9	58.1	58.6	58.3	58.5
Phase angle (Deg)	10.95	7.59	10.54	10.47	8.60	9.63
Dyn.Modulus/sine(phase angle)	612.2	890.0	633.1	643.0	778.6	711.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.653	0.643	0.644	0.647	0.646
Maximum load (kN)	0.765 (30.045s)	0.773 (30.245s)	0.765 (30.445s)	0.763 (30.645s)	0.768 (30.845s)	0.767
Minimum load (kN)	0.124 (30.146s)	0.120 (30.345s)	0.123 (30.546s)	0.120 (30.745s)	0.121 (30.947s)	0.121
Maximum averaged axial (mm)	0.073 (30.051s)	0.073 (30.249s)	0.073 (30.450s)	0.073 (30.651s)	0.073 (30.850s)	0.073
Minimum averaged axial (mm)	-0.088 (30.149s)	-0.089 (30.350s)	-0.089 (30.550s)	-0.088 (30.750s)	-0.089 (30.950s)	-0.089
Maximum axial #1 (mm)	0.071 (30.051s)	0.071 (30.249s)	0.072 (30.451s)	0.072 (30.651s)	0.072 (30.850s)	0.072
Minimum axial #1 (mm)	-0.090 (30.149s)	-0.091 (30.349s)	-0.095 (30.550s)	-0.095 (30.749s)	-0.092 (30.950s)	-0.093
Maximum axial #2 (mm)	0.074 (30.050s)	0.075 (30.249s)	0.074 (30.450s)	0.074 (30.650s)	0.075 (30.850s)	0.075
Minimum axial #2 (mm)	-0.086 (30.150s)	-0.087 (30.350s)	-0.087 (30.551s)	-0.085 (30.750s)	-0.086 (30.951s)	-0.086

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#04

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	115						115	

Cross-Sectional Area: 7853.982

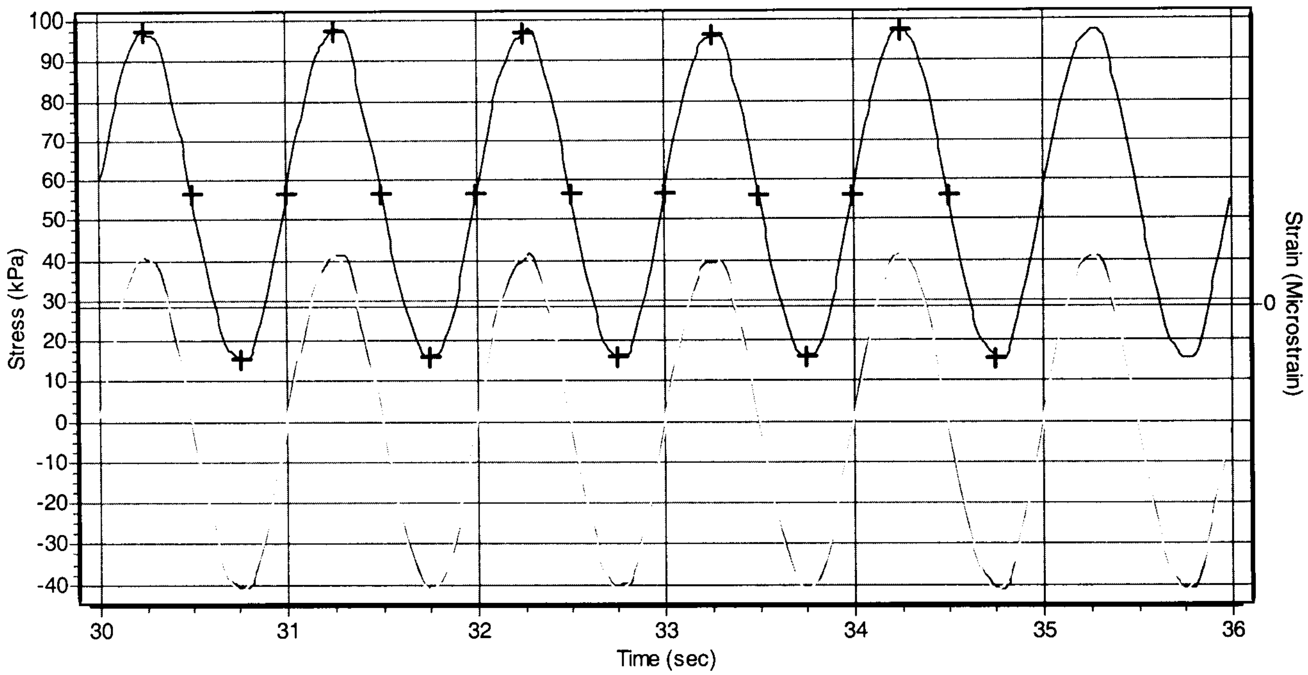
Volume: 903207.9

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#05.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:54 PM   E = 1.91

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.8

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.8	81.5	80.9	80.4	81.8	81.3
Recoverable axial micro-strain	1688.1	1685.4	1674.9	1685.1	1688.9	1684.5
Permanent axial micro-strain	229	247	261	261	274	
Dynamic modulus (MPa)	48.5	48.4	48.3	47.7	48.4	48.2
Phase angle (Deg)	9.83	8.30	8.34	9.23	8.74	8.89
Dyn.Modulus/sine(phase angle)	565.5	668.1	664.3	593.0	635.6	625.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.640	0.635	0.631	0.642	0.638
Maximum load (kN)	0.765 (30.245s)	0.768 (31.247s)	0.761 (32.247s)	0.757 (33.248s)	0.765 (34.245s)	0.763
Minimum load (kN)	0.122 (30.749s)	0.128 (31.747s)	0.126 (32.746s)	0.126 (33.747s)	0.123 (34.745s)	0.125
Maximum averaged axial (mm)	0.216 (30.272s)	0.218 (31.270s)	0.218 (32.271s)	0.219 (33.274s)	0.221 (34.269s)	0.219
Minimum averaged axial (mm)	0.026 (30.766s)	0.028 (31.767s)	0.029 (32.767s)	0.029 (33.766s)	0.031 (34.764s)	0.029
Maximum axial #1 (mm)	0.218 (30.272s)	0.220 (31.270s)	0.220 (32.270s)	0.222 (33.273s)	0.223 (34.270s)	0.221
Minimum axial #1 (mm)	0.030 (30.766s)	0.032 (31.768s)	0.033 (32.768s)	0.033 (33.767s)	0.034 (34.765s)	0.032
Maximum axial #2 (mm)	0.214 (30.272s)	0.216 (31.271s)	0.217 (32.272s)	0.217 (33.274s)	0.220 (34.269s)	0.217
Minimum axial #2 (mm)	0.022 (30.766s)	0.024 (31.766s)	0.026 (32.766s)	0.026 (33.766s)	0.028 (34.764s)	0.025

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.8						112.8	

Cross-Sectional Area: 7853.982

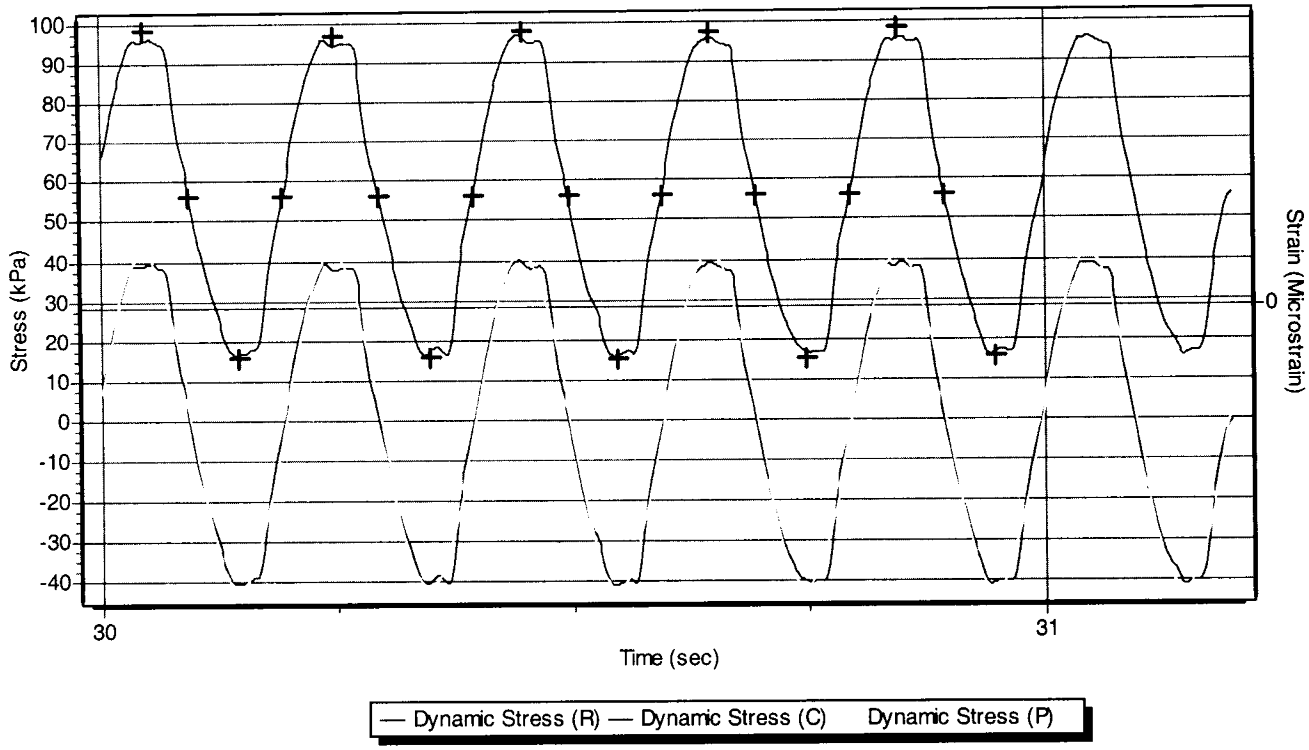
Volume: 885929.1

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#05.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:54 PM   E = 616

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.8

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.5	81.0	82.2	82.5	82.6	82.2
Recoverable axial micro-strain	1573.3	1553.3	1561.3	1560.5	1566.4	1563.0
Permanent axial micro-strain	764	757	763	752	763	
Dynamic modulus (MPa)	52.5	52.1	52.6	52.9	52.7	52.6
Phase angle (Deg)	7.21	6.86	9.76	7.54	9.87	8.25
Dyn.Modulus/sine(phase angle)	834.1	871.8	618.9	804.1	612.7	748.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.648	0.636	0.645	0.648	0.649	0.645
Maximum load (kN)	0.774 (30.046s)	0.762 (30.247s)	0.768 (30.446s)	0.768 (30.645s)	0.772 (30.845s)	0.769
Minimum load (kN)	0.125 (30.146s)	0.126 (30.347s)	0.123 (30.546s)	0.119 (30.747s)	0.123 (30.946s)	0.123
Maximum averaged axial (mm)	0.086 (30.050s)	0.085 (30.251s)	0.086 (30.451s)	0.085 (30.650s)	0.086 (30.851s)	0.086
Minimum averaged axial (mm)	-0.091 (30.151s)	-0.090 (30.350s)	-0.090 (30.550s)	-0.091 (30.751s)	-0.091 (30.951s)	-0.091
Maximum axial #1 (mm)	0.088 (30.051s)	0.086 (30.252s)	0.087 (30.452s)	0.086 (30.650s)	0.087 (30.851s)	0.087
Minimum axial #1 (mm)	-0.092 (30.150s)	-0.091 (30.350s)	-0.091 (30.550s)	-0.096 (30.751s)	-0.091 (30.950s)	-0.092
Maximum axial #2 (mm)	0.085 (30.049s)	0.084 (30.250s)	0.085 (30.450s)	0.084 (30.649s)	0.084 (30.849s)	0.085
Minimum axial #2 (mm)	-0.091 (30.151s)	-0.089 (30.350s)	-0.089 (30.550s)	-0.090 (30.751s)	-0.090 (30.951s)	-0.090

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#05

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.8						112.8	

Cross-Sectional Area: 7853.982

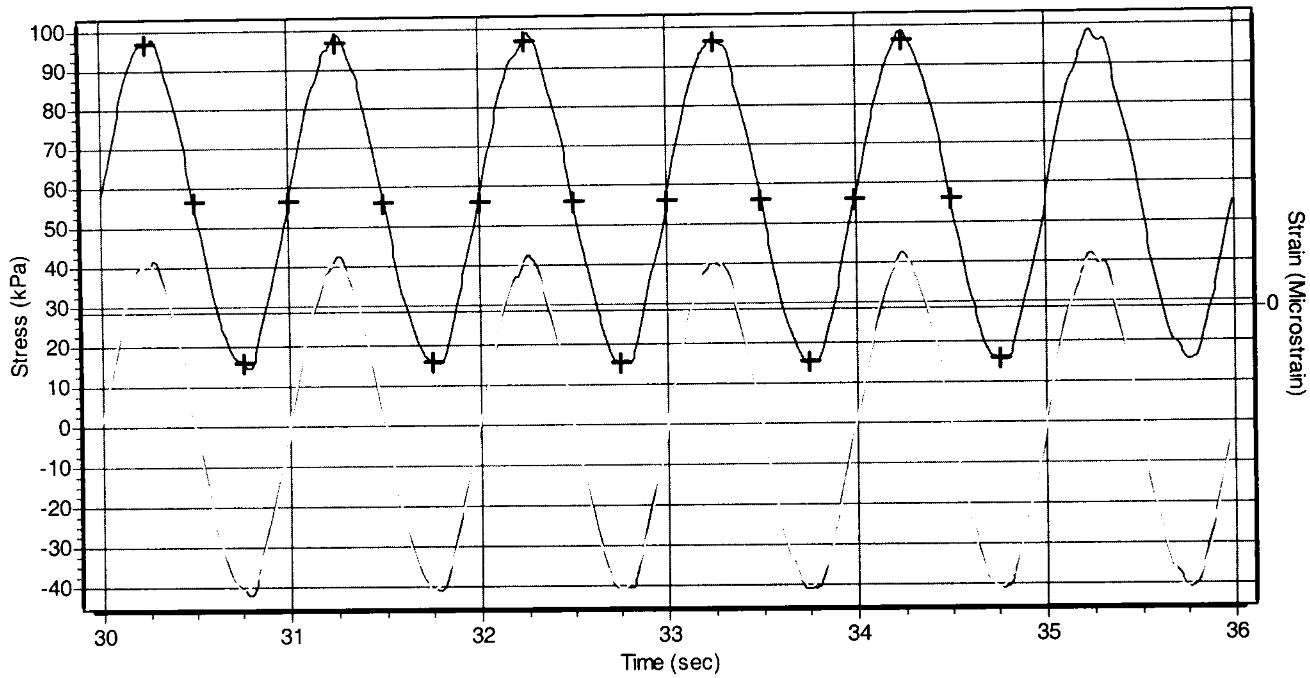
Volume: 885929.1

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#06.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:58 PM

E= 2.23

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.3

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.5	80.8	81.4	81.2	81.0	81.2
Recoverable axial micro-strain	1507.9	1499.9	1499.7	1494.5	1499.4	1500.3
Permanent axial micro-strain	139	153	166	173	184	
Dynamic modulus (MPa)	54.0	53.9	54.3	54.4	54.0	54.1
Phase angle (Deg)	9.45	9.02	9.87	9.76	10.42	9.70
Dyn.Modulus/sine(phase angle)	655.6	685.3	630.5	638.9	594.9	641.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.635	0.639	0.638	0.636	0.638
Maximum load (kN)	0.764 (30.248s)	0.762 (31.246s)	0.762 (32.246s)	0.759 (33.244s)	0.761 (34.246s)	0.762
Minimum load (kN)	0.124 (30.746s)	0.127 (31.746s)	0.123 (32.745s)	0.121 (33.743s)	0.124 (34.747s)	0.124
Maximum averaged axial (mm)	0.187 (30.274s)	0.187 (31.271s)	0.189 (32.274s)	0.189 (33.271s)	0.191 (34.275s)	0.188
Minimum averaged axial (mm)	0.016 (30.768s)	0.017 (31.768s)	0.019 (32.770s)	0.020 (33.767s)	0.021 (34.771s)	0.018
Maximum axial #1 (mm)	0.172 (30.275s)	0.173 (31.271s)	0.174 (32.277s)	0.174 (33.272s)	0.176 (34.277s)	0.174
Minimum axial #1 (mm)	0.018 (30.767s)	0.020 (31.767s)	0.021 (32.769s)	0.021 (33.767s)	0.023 (34.770s)	0.020
Maximum axial #2 (mm)	0.201 (30.273s)	0.202 (31.271s)	0.204 (32.272s)	0.204 (33.270s)	0.206 (34.274s)	0.203
Minimum axial #2 (mm)	0.014 (30.769s)	0.016 (31.770s)	0.017 (32.771s)	0.018 (33.767s)	0.019 (34.771s)	0.017

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#06

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982

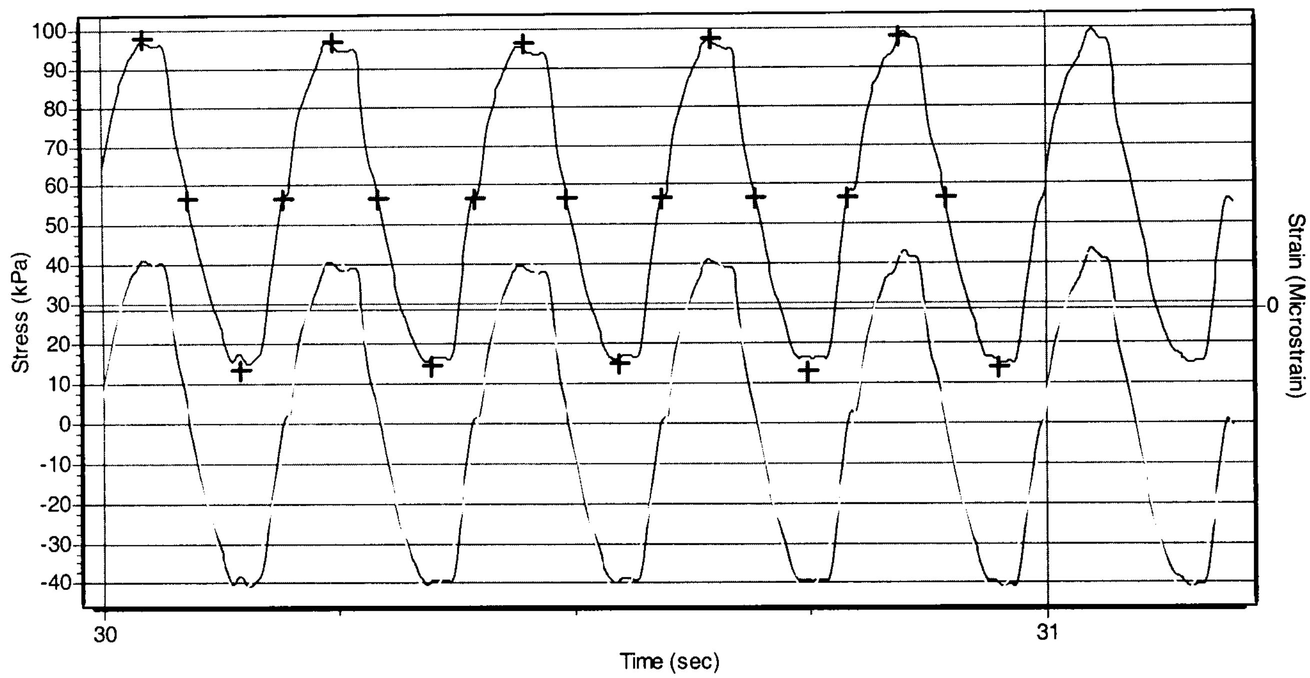
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#06.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 3:58 PM   E = 7.21   Temperature (Deg.C): -0.0
Data Filtering: Spencers 15 Point   Confining Pressure (kPa): 5.2
Curve fitting: Applied to 41 data points   Axial Gauge Length (mm): 113.3
Phase angle: Calculated from max and min values   Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.4	82.4	81.3	84.0	83.8	83.2
Recoverable axial micro-strain	1434.4	1401.1	1387.8	1400.9	1406.1	1406.1
Permanent axial micro-strain	677	678	673	684	681	
Dynamic modulus (MPa)	58.8	58.8	58.6	60.0	59.6	59.2
Phase angle (Deg)	10.85	8.06	8.87	7.42	7.76	8.59
Dyn.Modulus/sine(phase angle)	622.0	836.8	758.0	926.9	880.4	804.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.662	0.647	0.639	0.660	0.658	0.653
Maximum load (kN)	0.769 (30.045s)	0.762 (30.246s)	0.755 (30.447s)	0.764 (30.646s)	0.770 (30.845s)	0.764
Minimum load (kN)	0.107 (30.146s)	0.114 (30.346s)	0.117 (30.546s)	0.104 (30.746s)	0.112 (30.948s)	0.111
Maximum averaged axial (mm)	0.077 (30.051s)	0.077 (30.251s)	0.076 (30.452s)	0.077 (30.650s)	0.077 (30.849s)	0.077
Minimum averaged axial (mm)	-0.086 (30.150s)	-0.082 (30.351s)	-0.081 (30.550s)	-0.081 (30.750s)	-0.082 (30.951s)	-0.082
Maximum axial #1 (mm)	0.068 (30.052s)	0.068 (30.253s)	0.068 (30.453s)	0.069 (30.653s)	0.068 (30.850s)	0.068
Minimum axial #1 (mm)	-0.078 (30.150s)	-0.074 (30.350s)	-0.073 (30.549s)	-0.073 (30.750s)	-0.074 (30.950s)	-0.074
Maximum axial #2 (mm)	0.085 (30.050s)	0.086 (30.249s)	0.086 (30.449s)	0.086 (30.649s)	0.086 (30.849s)	0.086
Minimum axial #2 (mm)	-0.094 (30.151s)	-0.090 (30.351s)	-0.089 (30.550s)	-0.089 (30.751s)	-0.090 (30.952s)	-0.091

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)   Core/Sample Number: P4_#06

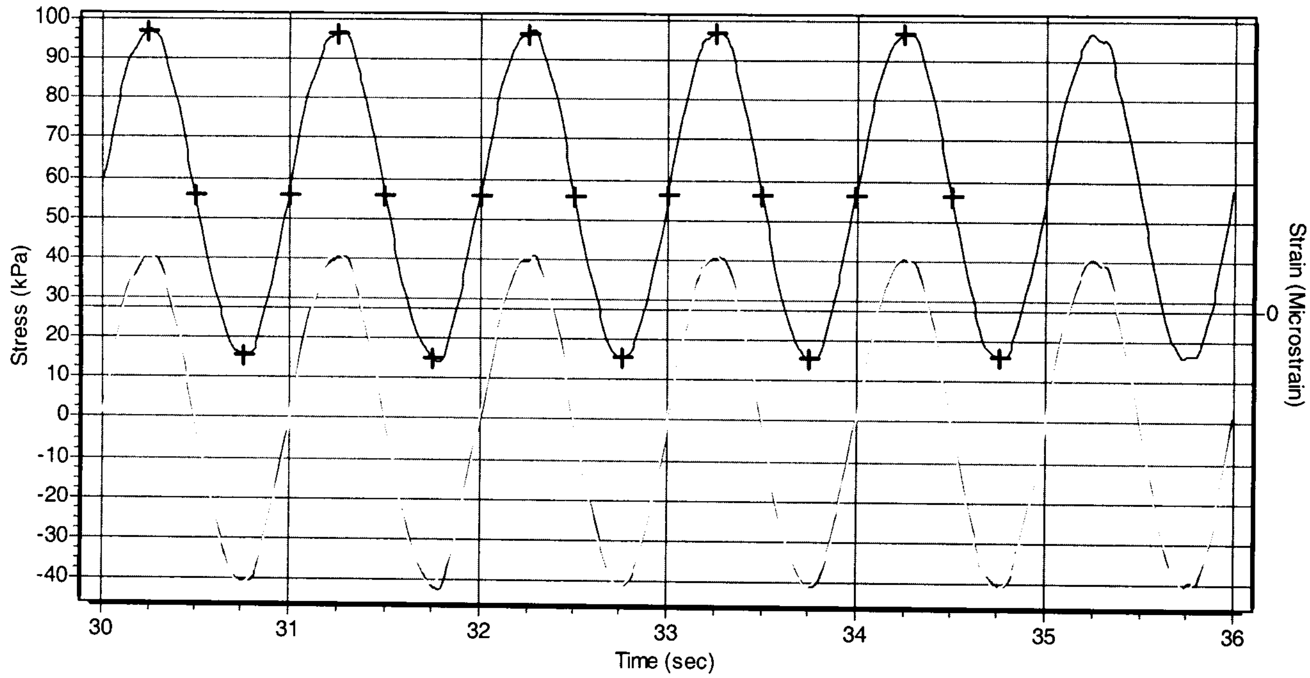
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#07.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:01 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

E = 1.92

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.3	80.9	81.7	80.9	81.2
Recoverable axial micro-strain	1634.5	1634.0	1632.6	1637.5	1633.9	1634.5
Permanent axial micro-strain	858	868	899	913	936	
Dynamic modulus (MPa)	49.7	49.8	49.6	49.9	49.5	49.7
Phase angle (Deg)	9.97	9.92	9.50	9.25	9.82	9.69
Dyn.Modulus/sine(phase angle)	571.9	576.0	598.7	618.6	578.9	588.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.639	0.636	0.642	0.636	0.638
Maximum load (kN)	0.762 (30.244s)	0.758 (31.244s)	0.760 (32.250s)	0.764 (33.247s)	0.762 (34.247s)	0.761
Minimum load (kN)	0.124 (30.747s)	0.119 (31.750s)	0.124 (32.748s)	0.122 (33.744s)	0.126 (34.748s)	0.123
Maximum averaged axial (mm)	0.283 (30.272s)	0.285 (31.272s)	0.288 (32.277s)	0.290 (33.272s)	0.292 (34.275s)	0.288
Minimum averaged axial (mm)	0.098 (30.769s)	0.099 (31.772s)	0.102 (32.770s)	0.104 (33.769s)	0.106 (34.770s)	0.102
Maximum axial #1 (mm)	0.280 (30.272s)	0.281 (31.272s)	0.284 (32.277s)	0.286 (33.273s)	0.288 (34.275s)	0.284
Minimum axial #1 (mm)	0.097 (30.769s)	0.098 (31.773s)	0.101 (32.769s)	0.103 (33.769s)	0.106 (34.770s)	0.101
Maximum axial #2 (mm)	0.287 (30.272s)	0.288 (31.271s)	0.291 (32.277s)	0.294 (33.271s)	0.296 (34.275s)	0.291
Minimum axial #2 (mm)	0.098 (30.768s)	0.099 (31.772s)	0.103 (32.771s)	0.104 (33.768s)	0.107 (34.769s)	0.102

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

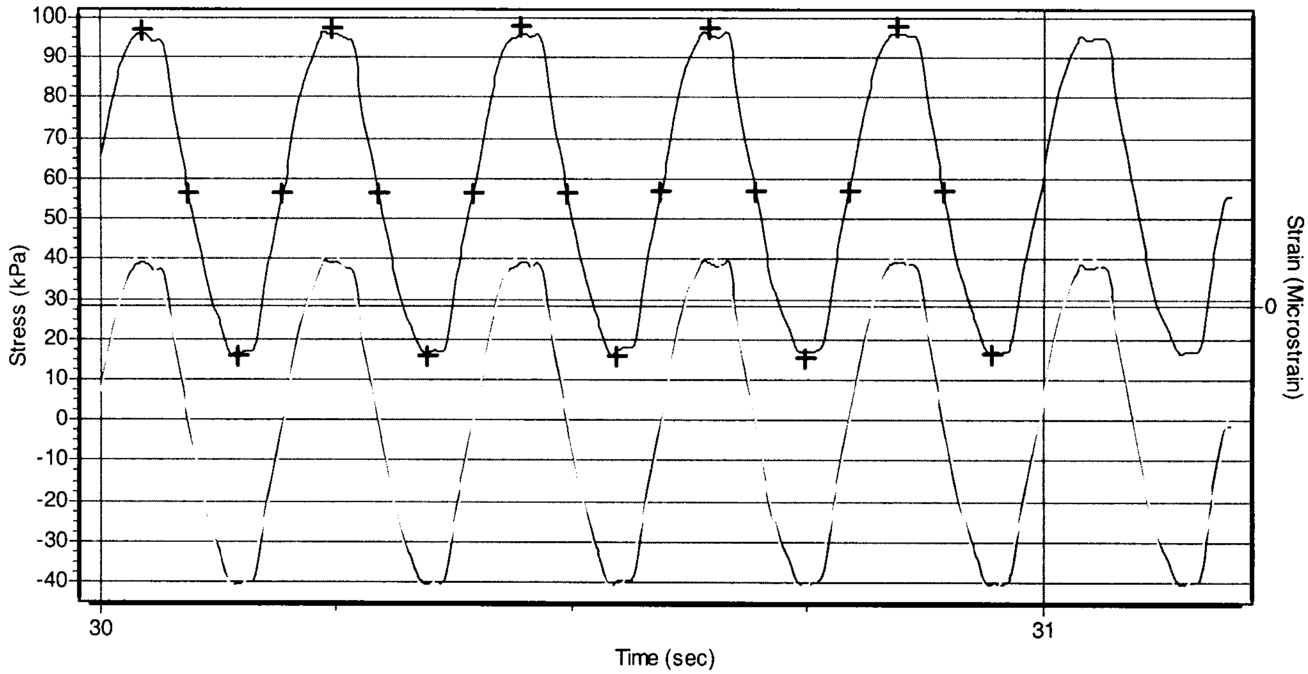
Core/Sample Number: P4_#07

Cross-Sectional Area: 7853.982
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#07.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:01 PM

E = 5.11

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.7

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.2	81.5	81.8	81.7	81.6	81.6
Recoverable axial micro-strain	1455.1	1457.8	1443.9	1486.7	1448.7	1458.4
Permanent axial micro-strain	550	550	537	568	540	
Dynamic modulus (MPa)	55.8	55.9	56.6	55.0	56.3	55.9
Phase angle (Deg)	11.74	8.23	9.53	11.03	8.05	9.72
Dyn.Modulus/sine(phase angle)	545.8	780.0	681.5	571.7	802.2	676.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.640	0.642	0.642	0.641	0.641
Maximum load (kN)	0.762 (30.045s)	0.765 (30.246s)	0.769 (30.445s)	0.764 (30.646s)	0.770 (30.845s)	0.766
Minimum load (kN)	0.125 (30.145s)	0.124 (30.345s)	0.127 (30.546s)	0.123 (30.746s)	0.129 (30.945s)	0.125
Maximum averaged axial (mm)	0.103 (30.052s)	0.103 (30.250s)	0.103 (30.450s)	0.104 (30.652s)	0.103 (30.850s)	0.103
Minimum averaged axial (mm)	-0.063 (30.151s)	-0.062 (30.351s)	-0.061 (30.551s)	-0.065 (30.751s)	-0.061 (30.951s)	-0.062
Maximum axial #1 (mm)	0.098 (30.052s)	0.098 (30.251s)	0.099 (30.452s)	0.100 (30.652s)	0.099 (30.851s)	0.099
Minimum axial #1 (mm)	-0.068 (30.149s)	-0.065 (30.351s)	-0.064 (30.550s)	-0.068 (30.751s)	-0.067 (30.950s)	-0.067
Maximum axial #2 (mm)	0.107 (30.050s)	0.108 (30.250s)	0.108 (30.450s)	0.109 (30.651s)	0.108 (30.849s)	0.108
Minimum axial #2 (mm)	-0.060 (30.151s)	-0.060 (30.351s)	-0.058 (30.551s)	-0.060 (30.752s)	-0.059 (30.951s)	-0.059

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#07

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

Cross-Sectional Area: 7853.982

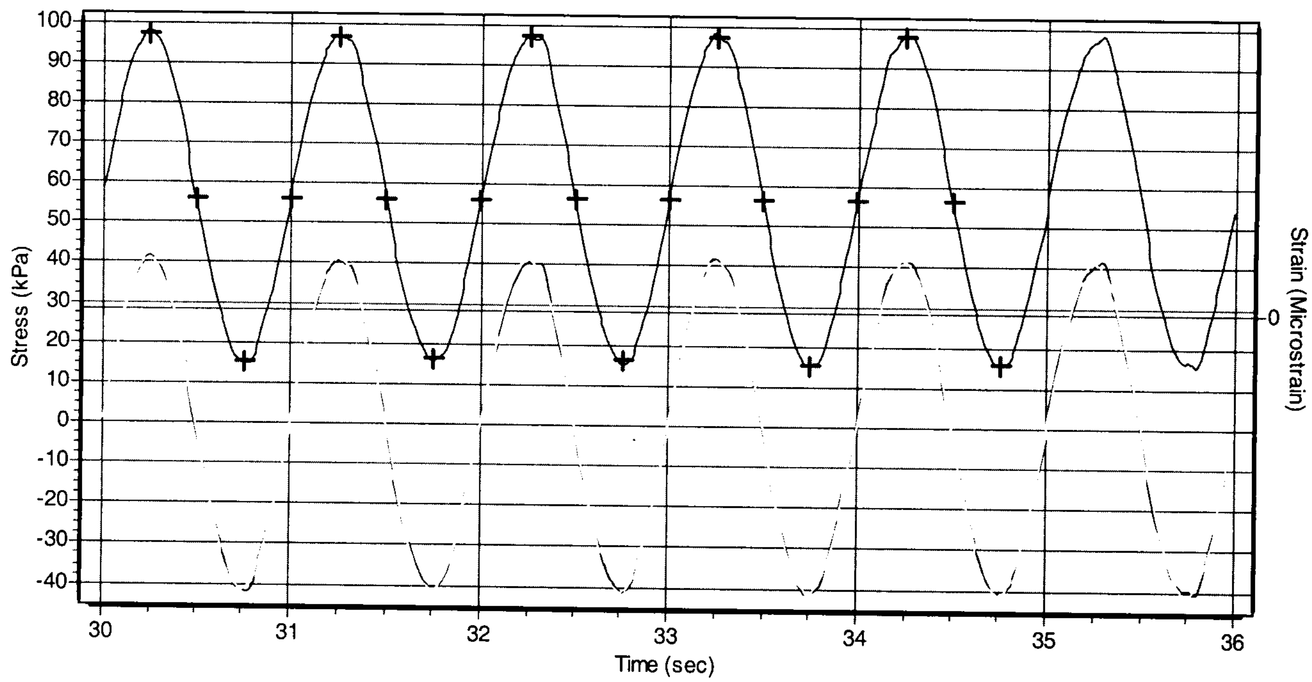
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#08.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:06 PM

E = 1.83

Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.7	80.6	81.1	81.8	81.9	81.4
Recoverable axial micro-strain	1612.7	1586.9	1602.8	1598.0	1604.3	1600.9
Permanent axial micro-strain	616	645	652	666	683	
Dynamic modulus (MPa)	50.6	50.8	50.6	51.2	51.0	50.8
Phase angle (Deg)	10.05	9.88	10.38	10.28	10.03	10.12
Dyn.Modulus/sine(phase angle)	578.2	589.6	559.0	571.6	583.5	576.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.633	0.637	0.643	0.643	0.639
Maximum load (kN)	0.764 (30.246s)	0.760 (31.247s)	0.763 (32.249s)	0.764 (33.245s)	0.768 (34.246s)	0.764
Minimum load (kN)	0.122 (30.749s)	0.127 (31.745s)	0.127 (32.747s)	0.122 (33.745s)	0.125 (34.748s)	0.125
Maximum averaged axial (mm)	0.253 (30.274s)	0.253 (31.275s)	0.256 (32.278s)	0.256 (33.274s)	0.259 (34.274s)	0.255
Minimum averaged axial (mm)	0.070 (30.769s)	0.073 (31.768s)	0.074 (32.768s)	0.075 (33.768s)	0.077 (34.769s)	0.074
Maximum axial #1 (mm)	0.247 (30.275s)	0.248 (31.275s)	0.250 (32.277s)	0.251 (33.273s)	0.254 (34.272s)	0.250
Minimum axial #1 (mm)	0.064 (30.769s)	0.068 (31.766s)	0.068 (32.767s)	0.069 (33.766s)	0.071 (34.767s)	0.068
Maximum axial #2 (mm)	0.258 (30.273s)	0.258 (31.275s)	0.261 (32.278s)	0.262 (33.275s)	0.265 (34.275s)	0.261
Minimum axial #2 (mm)	0.076 (30.769s)	0.079 (31.770s)	0.079 (32.769s)	0.082 (33.770s)	0.084 (34.771s)	0.080

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#08

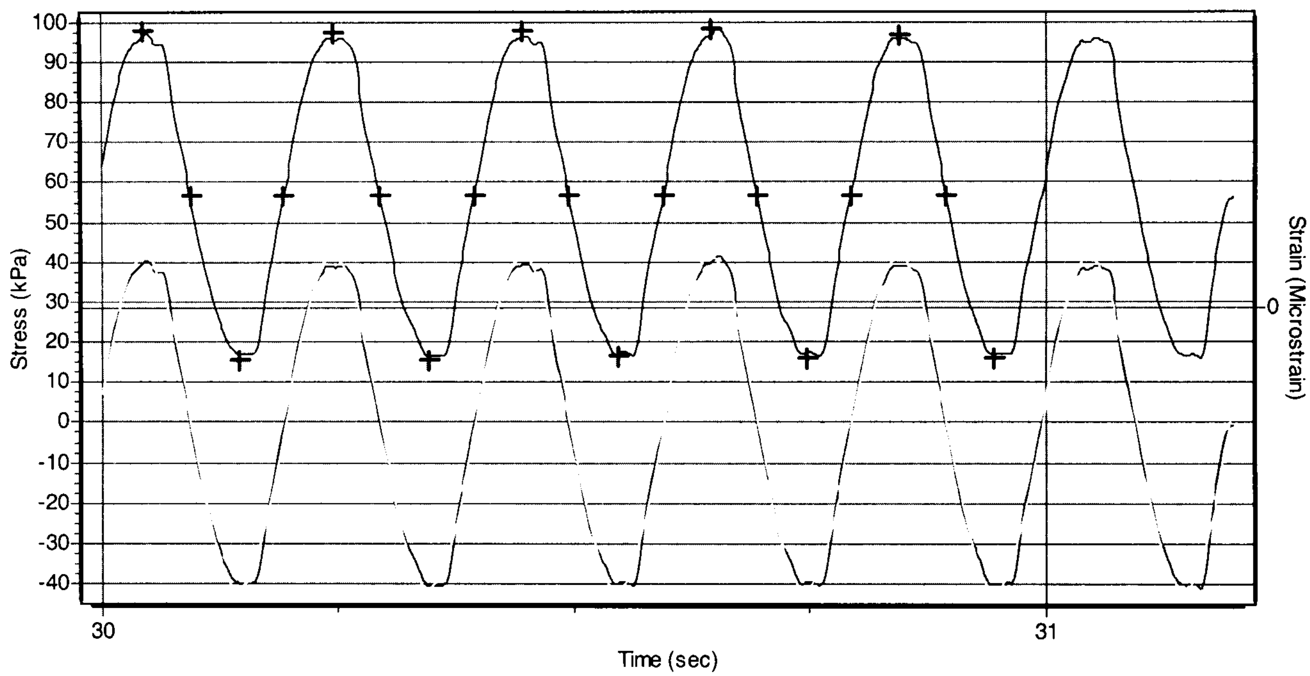
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#08.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:06 PM

E = 5.06

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.3

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.9	81.6	81.2	82.1	80.9	81.5
Recoverable axial micro-strain	1417.8	1429.9	1435.6	1444.0	1450.1	1435.5
Permanent axial micro-strain	655	669	665	664	686	
Dynamic modulus (MPa)	57.8	57.1	56.6	56.9	55.8	56.8
Phase angle (Deg)	9.01	8.17	10.59	8.11	7.95	8.77
Dyn.Modulus/sine(phase angle)	735.4	801.6	612.7	803.5	804.5	751.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.641	0.638	0.645	0.635	0.640
Maximum load (kN)	0.767 (30.045s)	0.765 (30.245s)	0.768 (30.445s)	0.773 (30.646s)	0.763 (30.845s)	0.767
Minimum load (kN)	0.124 (30.146s)	0.124 (30.345s)	0.130 (30.547s)	0.128 (30.746s)	0.127 (30.945s)	0.127
Maximum averaged axial (mm)	0.086 (30.050s)	0.086 (30.249s)	0.087 (30.450s)	0.088 (30.650s)	0.087 (30.850s)	0.087
Minimum averaged axial (mm)	-0.074 (30.151s)	-0.076 (30.351s)	-0.075 (30.551s)	-0.075 (30.751s)	-0.078 (30.950s)	-0.076
Maximum axial #1 (mm)	0.083 (30.052s)	0.082 (30.250s)	0.083 (30.451s)	0.084 (30.650s)	0.082 (30.850s)	0.083
Minimum axial #1 (mm)	-0.084 (30.149s)	-0.081 (30.350s)	-0.081 (30.550s)	-0.081 (30.750s)	-0.084 (30.950s)	-0.082
Maximum axial #2 (mm)	0.091 (30.050s)	0.091 (30.249s)	0.092 (30.450s)	0.093 (30.650s)	0.091 (30.849s)	0.092
Minimum axial #2 (mm)	-0.069 (30.151s)	-0.071 (30.351s)	-0.070 (30.551s)	-0.070 (30.751s)	-0.070 (30.951s)	-0.070

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#08

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982

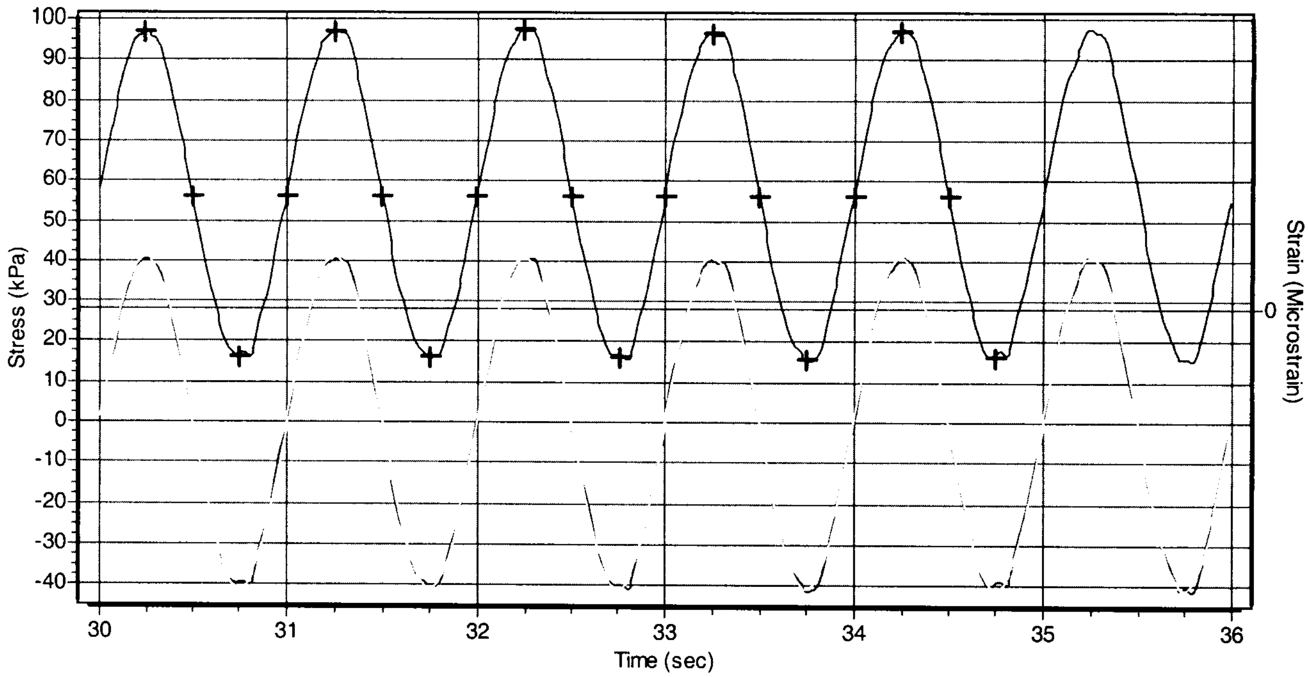
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C

Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#09.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:11 PM

E = 1.97

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.5

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.5	80.9	81.2	81.2	80.8	80.9
Recoverable axial micro-strain	1585.1	1580.1	1583.8	1591.5	1572.6	1582.6
Permanent axial micro-strain	70	85	94	98	125	
Dynamic modulus (MPa)	50.8	51.2	51.3	51.0	51.4	51.1
Phase angle (Deg)	9.90	9.97	9.37	10.27	10.44	9.99
Dyn.Modulus/sine(phase angle)	588.2	588.8	627.7	570.2	564.8	587.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.635	0.638	0.638	0.635	0.635
Maximum load (kN)	0.762 (30.246s)	0.764 (31.246s)	0.765 (32.246s)	0.761 (33.246s)	0.762 (34.246s)	0.763
Minimum load (kN)	0.130 (30.745s)	0.129 (31.744s)	0.127 (32.750s)	0.123 (33.746s)	0.128 (34.742s)	0.127
Maximum averaged axial (mm)	0.188 (30.274s)	0.189 (31.274s)	0.190 (32.272s)	0.192 (33.275s)	0.193 (34.275s)	0.190
Minimum averaged axial (mm)	0.008 (30.771s)	0.010 (31.770s)	0.011 (32.773s)	0.011 (33.771s)	0.014 (34.770s)	0.011
Maximum axial #1 (mm)	0.164 (30.273s)	0.165 (31.272s)	0.166 (32.272s)	0.167 (33.274s)	0.168 (34.275s)	0.166
Minimum axial #1 (mm)	-0.008 (30.770s)	-0.007 (31.770s)	-0.006 (32.773s)	-0.006 (33.771s)	-0.003 (34.770s)	-0.006
Maximum axial #2 (mm)	0.212 (30.274s)	0.213 (31.275s)	0.215 (32.272s)	0.216 (33.276s)	0.218 (34.276s)	0.215
Minimum axial #2 (mm)	0.024 (30.771s)	0.026 (31.771s)	0.028 (32.773s)	0.029 (33.771s)	0.032 (34.770s)	0.028

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#09

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.5						113.5	

Cross-Sectional Area: 7853.982

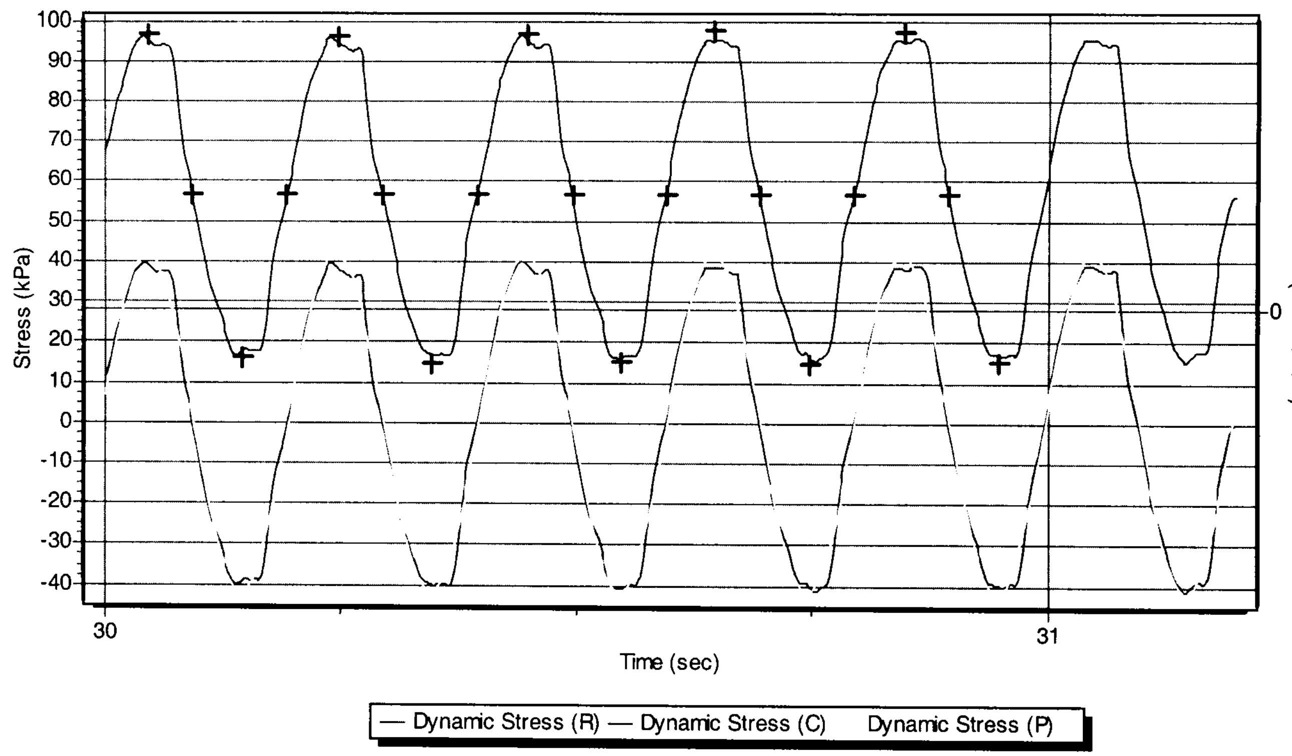
Volume: 891426.9

Comments/Properties: Initial Temp: 55 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#09.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:11 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

E = 6.66

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.5
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	80.5	81.6	82.0	83.1	82.5	82.0
Recoverable axial micro-strain	1373.8	1389.7	1403.2	1425.8	1393.3	1397.2
Permanent axial micro-strain	661	680	684	704	676	
Dynamic modulus (MPa)	58.6	58.7	58.4	58.3	59.2	58.7
Phase angle (Deg)	11.48	8.38	8.84	8.75	8.33	9.16
Dyn.Modulus/sine(phase angle)	585.6	803.9	758.2	764.6	815.9	745.6
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.632	0.641	0.644	0.653	0.648	0.644
Maximum load (kN)	0.759 (30.046s)	0.756 (30.247s)	0.762 (30.446s)	0.768 (30.646s)	0.766 (30.847s)	0.762
Minimum load (kN)	0.127 (30.145s)	0.115 (30.345s)	0.118 (30.545s)	0.115 (30.747s)	0.118 (30.946s)	0.119
Maximum averaged axial (mm)	0.081 (30.052s)	0.081 (30.252s)	0.082 (30.451s)	0.082 (30.651s)	0.081 (30.851s)	0.081
Minimum averaged axial (mm)	-0.075 (30.150s)	-0.077 (30.351s)	-0.078 (30.551s)	-0.080 (30.751s)	-0.077 (30.952s)	-0.077
Maximum axial #1 (mm)	0.070 (30.053s)	0.069 (30.253s)	0.070 (30.452s)	0.071 (30.654s)	0.070 (30.852s)	0.070
Minimum axial #1 (mm)	-0.079 (30.148s)	-0.081 (30.350s)	-0.084 (30.551s)	-0.084 (30.750s)	-0.080 (30.951s)	-0.082
Maximum axial #2 (mm)	0.091 (30.051s)	0.092 (30.250s)	0.093 (30.451s)	0.094 (30.651s)	0.093 (30.852s)	0.093
Minimum axial #2 (mm)	-0.072 (30.151s)	-0.074 (30.352s)	-0.074 (30.552s)	-0.073 (30.752s)	-0.073 (30.952s)	-0.073

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#09

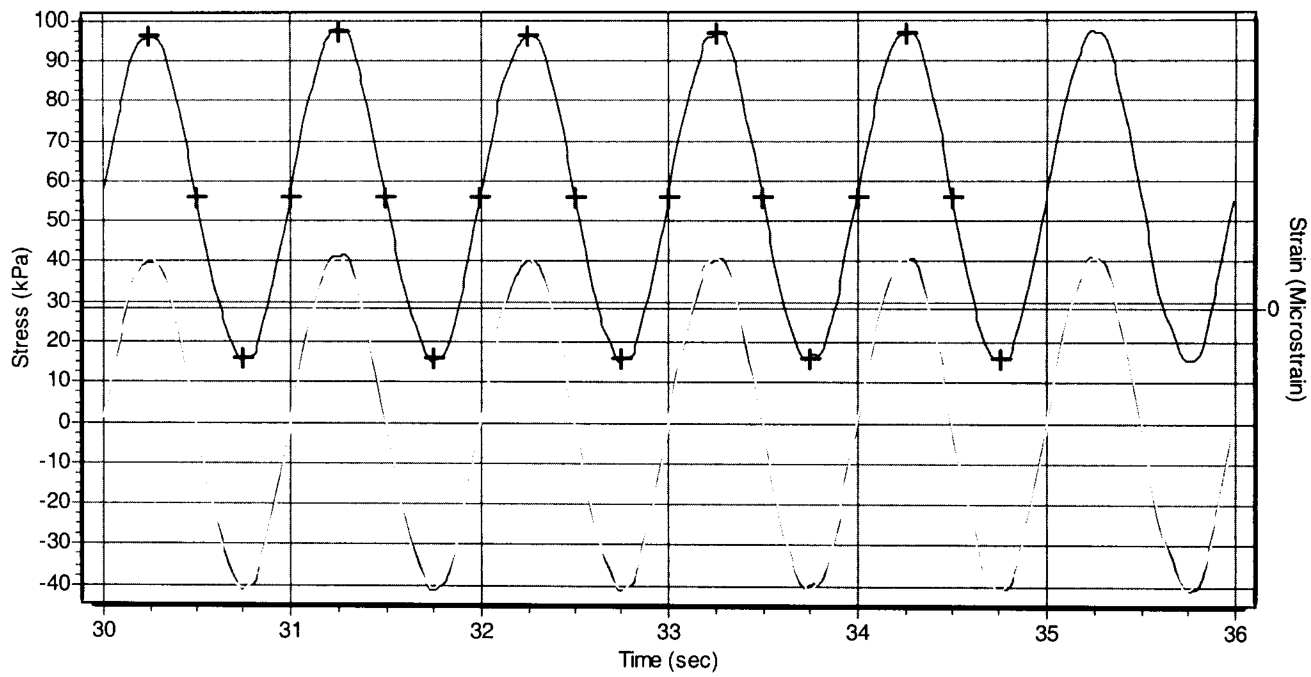
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.5						113.5	

Cross-Sectional Area: 7853.982
Volume: 891426.9

Comments/Properties: Initial Temp: 55 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#10.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:15 PM
E = 1.85
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.4
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.3	81.9	80.4	80.9	81.2	80.9
Recoverable axial micro-strain	1543.2	1574.7	1544.7	1563.3	1561.9	1557.5
Permanent axial micro-strain	602	601	631	641	659	
Dynamic modulus (MPa)	52.0	52.0	52.1	51.8	52.0	52.0
Phase angle (Deg)	10.33	9.23	9.82	10.24	9.55	9.83
Dyn.Modulus/sine(phase angle)	578.1	645.8	608.0	580.2	624.6	607.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.631	0.643	0.632	0.635	0.638	0.636
Maximum load (kN)	0.758 (30.247s)	0.767 (31.246s)	0.758 (32.247s)	0.761 (33.247s)	0.762 (34.250s)	0.761
Minimum load (kN)	0.128 (30.745s)	0.124 (31.747s)	0.126 (32.745s)	0.125 (33.745s)	0.125 (34.747s)	0.126
Maximum averaged axial (mm)	0.241 (30.276s)	0.245 (31.271s)	0.245 (32.274s)	0.248 (33.276s)	0.250 (34.277s)	0.246
Minimum averaged axial (mm)	0.068 (30.771s)	0.068 (31.770s)	0.071 (32.771s)	0.072 (33.770s)	0.074 (34.769s)	0.070
Maximum axial #1 (mm)	0.242 (30.276s)	0.246 (31.270s)	0.246 (32.274s)	0.249 (33.276s)	0.251 (34.275s)	0.247
Minimum axial #1 (mm)	0.068 (30.771s)	0.068 (31.768s)	0.071 (32.771s)	0.073 (33.770s)	0.075 (34.769s)	0.071
Maximum axial #2 (mm)	0.240 (30.276s)	0.243 (31.272s)	0.243 (32.275s)	0.246 (33.276s)	0.248 (34.279s)	0.244
Minimum axial #2 (mm)	0.067 (30.772s)	0.067 (31.771s)	0.070 (32.770s)	0.072 (33.769s)	0.074 (34.769s)	0.070

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#10

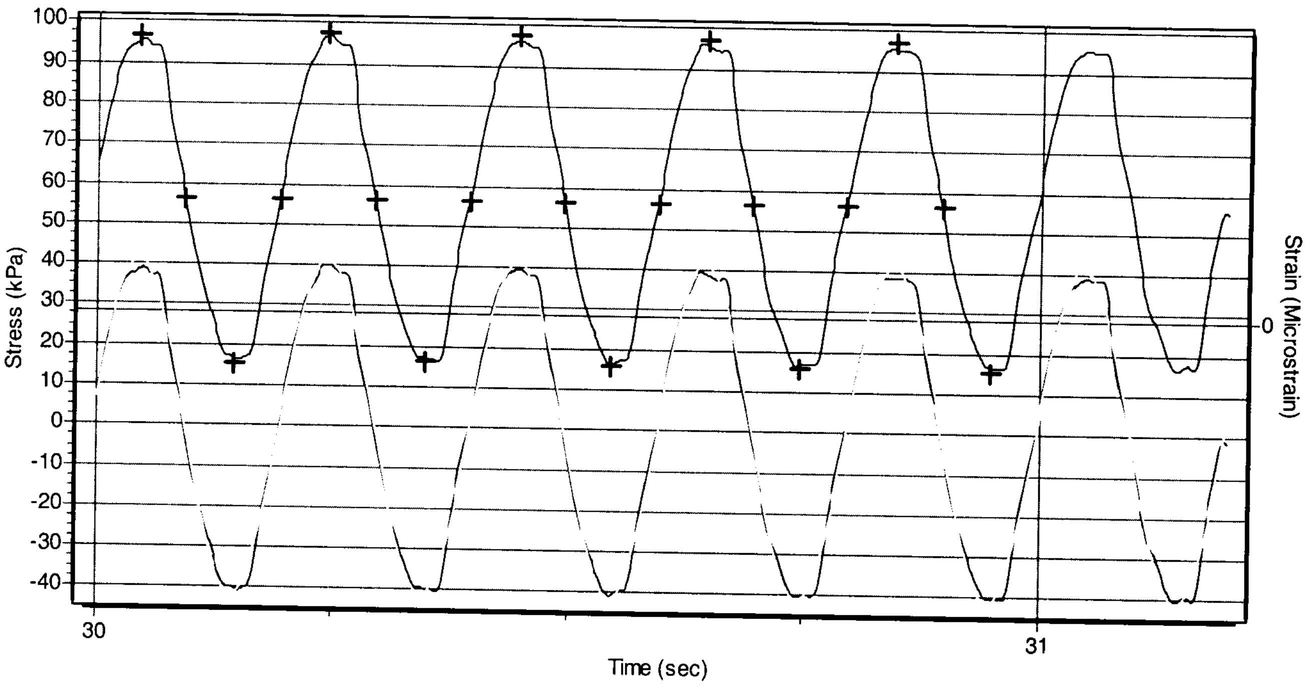
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.4						112.4	

Cross-Sectional Area: 7853.982
Volume: 882787.5

Comments/Properties: Initial Temp: 57 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#10.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:15 PM
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

E = 5.10

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.4
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.5	81.4	81.6	81.6	81.6	81.5
Recoverable axial micro-strain	1393.9	1381.0	1402.2	1383.0	1382.0	1388.4
Permanent axial micro-strain	604	580	597	573	573	
Dynamic modulus (MPa)	58.5	59.0	58.2	59.0	59.0	58.7
Phase angle (Deg)	9.21	9.59	10.03	8.33	9.64	9.36
Dyn.Modulus/sine(phase angle)	728.8	705.8	666.3	811.8	702.2	723.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.640	0.640	0.641	0.641	0.641	0.640
Maximum load (kN)	0.762 (30.045s)	0.767 (30.244s)	0.768 (30.444s)	0.764 (30.645s)	0.763 (30.845s)	0.765
Minimum load (kN)	0.121 (30.146s)	0.127 (30.346s)	0.126 (30.544s)	0.123 (30.745s)	0.123 (30.946s)	0.124
Maximum averaged axial (mm)	0.089 (30.050s)	0.090 (30.249s)	0.091 (30.450s)	0.091 (30.650s)	0.091 (30.850s)	0.090
Minimum averaged axial (mm)	-0.068 (30.150s)	-0.065 (30.351s)	-0.067 (30.550s)	-0.064 (30.751s)	-0.064 (30.951s)	-0.066
Maximum axial #1 (mm)	0.085 (30.050s)	0.086 (30.250s)	0.087 (30.450s)	0.088 (30.650s)	0.087 (30.851s)	0.087
Minimum axial #1 (mm)	-0.073 (30.150s)	-0.069 (30.351s)	-0.072 (30.549s)	-0.068 (30.750s)	-0.072 (30.950s)	-0.071
Maximum axial #2 (mm)	0.093 (30.050s)	0.094 (30.249s)	0.094 (30.449s)	0.094 (30.649s)	0.094 (30.850s)	0.094
Minimum axial #2 (mm)	-0.061 (30.152s)	-0.061 (30.351s)	-0.062 (30.551s)	-0.060 (30.751s)	-0.060 (30.951s)	-0.061

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.4						112.4	

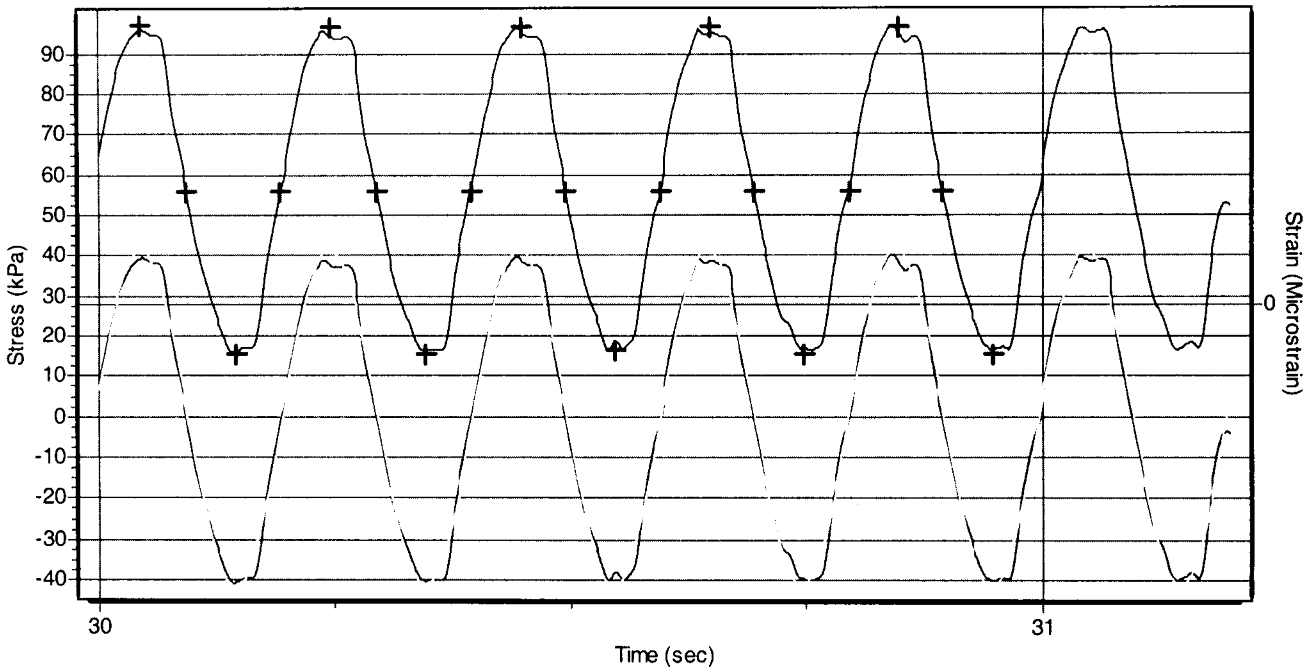
Core/Sample Number: P4_#10

Cross-Sectional Area: 7853.982
Volume: 882787.5

Comments/Properties: Initial Temp: 57 'C
Final Temp: 51 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#11.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:19 PM   E=1.72

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.5

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.8	81.2	80.3	81.2	81.3	81.2
Recoverable axial micro-strain	1375.9	1360.0	1388.9	1383.3	1355.2	1372.7
Permanent axial micro-strain	619	613	629	630	603	
Dynamic modulus (MPa)	59.5	59.7	57.8	58.7	60.0	59.1
Phase angle (Deg)	11.90	7.30	9.09	5.39	9.90	8.72
Dyn.Modulus/sine(phase angle)	573.7	937.0	729.3	1248.4	695.7	836.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.638	0.631	0.638	0.639	0.637
Maximum load (kN)	0.763 (30.045s)	0.758 (30.246s)	0.761 (30.446s)	0.760 (30.647s)	0.760 (30.846s)	0.760
Minimum load (kN)	0.120 (30.146s)	0.121 (30.345s)	0.130 (30.546s)	0.122 (30.747s)	0.121 (30.945s)	0.123
Maximum averaged axial (mm)	0.086 (30.052s)	0.085 (30.250s)	0.086 (30.451s)	0.086 (30.650s)	0.085 (30.851s)	0.086
Minimum averaged axial (mm)	-0.070 (30.151s)	-0.070 (30.351s)	-0.071 (30.551s)	-0.072 (30.751s)	-0.068 (30.951s)	-0.070
Maximum axial #1 (mm)	0.087 (30.053s)	0.086 (30.251s)	0.087 (30.452s)	0.086 (30.652s)	0.087 (30.852s)	0.087
Minimum axial #1 (mm)	-0.078 (30.150s)	-0.073 (30.350s)	-0.076 (30.550s)	-0.075 (30.751s)	-0.072 (30.951s)	-0.075
Maximum axial #2 (mm)	0.085 (30.051s)	0.084 (30.250s)	0.086 (30.451s)	0.085 (30.650s)	0.085 (30.851s)	0.085
Minimum axial #2 (mm)	-0.067 (30.152s)	-0.066 (30.351s)	-0.065 (30.551s)	-0.068 (30.751s)	-0.065 (30.952s)	-0.066

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#11

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.5						113.5	

Cross-Sectional Area: 7853.982

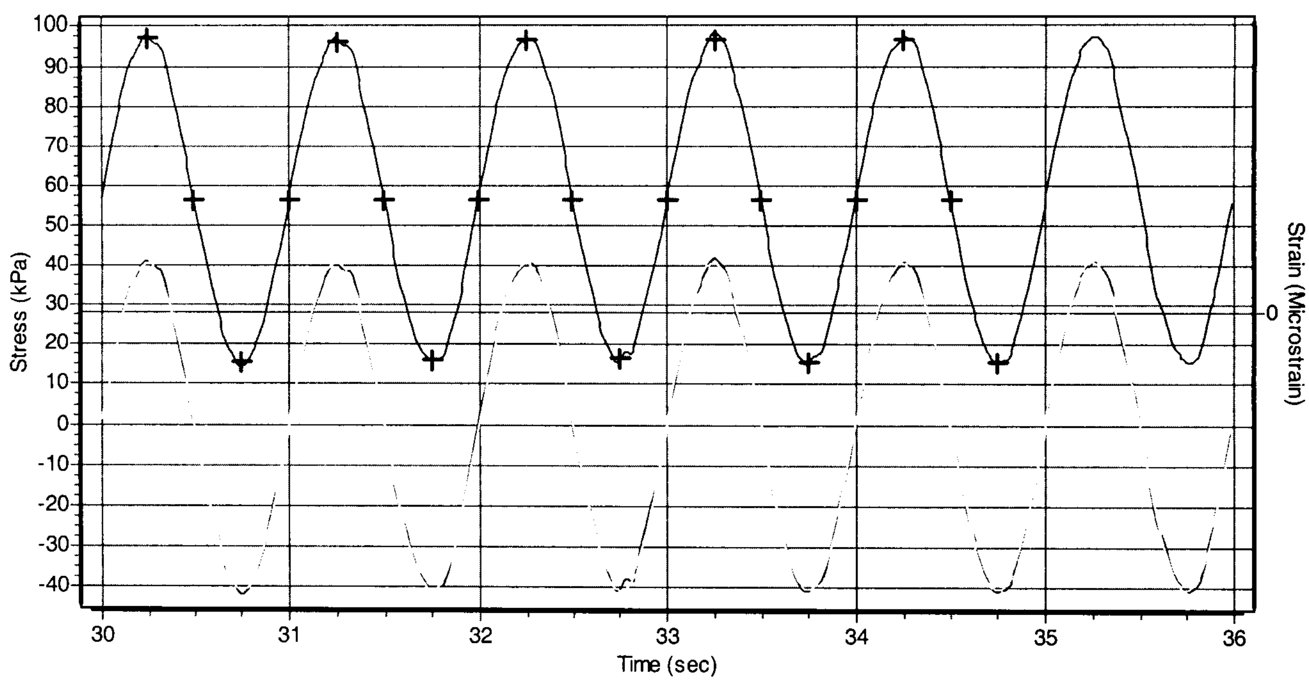
Volume: 891426.9

Comments/Properties: Initial Temp: 57 'C

Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#11.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:19 PM

E = 5.49

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.5

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.7	80.5	80.2	81.2	81.1	80.9
Recoverable axial micro-strain	1521.2	1502.3	1495.1	1519.5	1513.6	1510.3
Permanent axial micro-strain	677	698	729	726	745	
Dynamic modulus (MPa)	53.7	53.6	53.7	53.4	53.6	53.6
Phase angle (Deg)	10.12	10.28	10.05	9.95	10.93	10.27
Dyn.Modulus/sine(phase angle)	608.6	597.9	612.5	615.8	562.7	599.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.642	0.632	0.630	0.637	0.637	0.636
Maximum load (kN)	0.763 (30.243s)	0.758 (31.245s)	0.760 (32.245s)	0.761 (33.246s)	0.761 (34.245s)	0.761
Minimum load (kN)	0.122 (30.744s)	0.126 (31.745s)	0.130 (32.742s)	0.123 (33.743s)	0.124 (34.746s)	0.125
Maximum averaged axial (mm)	0.250 (30.271s)	0.250 (31.274s)	0.252 (32.273s)	0.255 (33.274s)	0.256 (34.276s)	0.253
Minimum averaged axial (mm)	0.077 (30.766s)	0.079 (31.770s)	0.083 (32.769s)	0.082 (33.764s)	0.085 (34.771s)	0.081
Maximum axial #1 (mm)	0.253 (30.271s)	0.253 (31.274s)	0.255 (32.272s)	0.257 (33.273s)	0.259 (34.275s)	0.255
Minimum axial #1 (mm)	0.077 (30.765s)	0.079 (31.770s)	0.082 (32.762s)	0.082 (33.763s)	0.084 (34.771s)	0.081
Maximum axial #2 (mm)	0.246 (30.273s)	0.247 (31.275s)	0.250 (32.274s)	0.252 (33.274s)	0.254 (34.278s)	0.250
Minimum axial #2 (mm)	0.077 (30.766s)	0.080 (31.770s)	0.083 (32.769s)	0.083 (33.763s)	0.085 (34.771s)	0.082

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#11

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.5						113.5	

Cross-Sectional Area: 7853.982

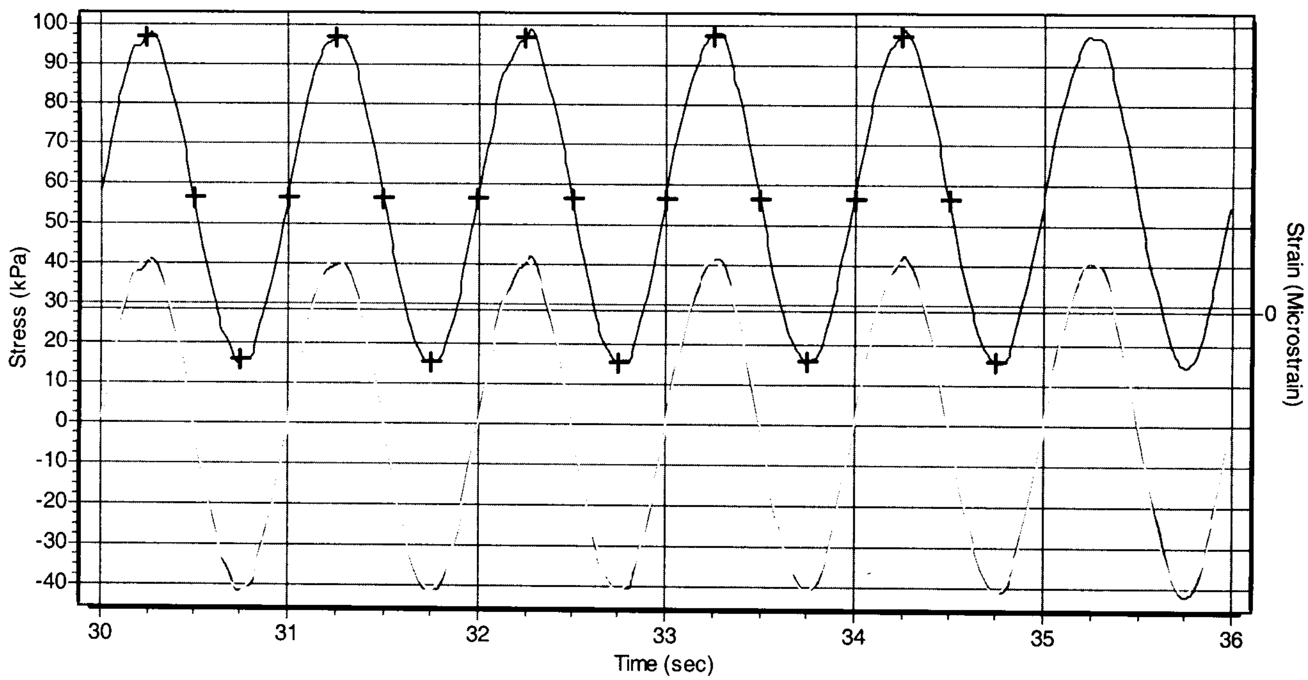
Volume: 891426.9

Comments/Properties: Initial Temp: 57 'C

Final Temp: 55 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#12.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:23 PM

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

E = 1.87

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	80.8	81.2	81.2	81.2	81.5	81.2
Recoverable axial micro-strain	1459.7	1463.9	1459.7	1463.9	1465.5	1462.6
Permanent axial micro-strain	122	126	141	155	159	
Dynamic modulus (MPa)	55.3	55.5	55.6	55.5	55.6	55.5
Phase angle (Deg)	8.26	7.76	8.45	8.56	8.56	8.32
Dyn.Modulus/sine(phase angle)	768.5	819.5	755.2	743.5	745.2	766.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.635	0.638	0.638	0.638	0.640	0.638
Maximum load (kN)	0.761 (30.247s)	0.760 (31.247s)	0.760 (32.246s)	0.764 (33.249s)	0.766 (34.245s)	0.762
Minimum load (kN)	0.126 (30.744s)	0.123 (31.744s)	0.122 (32.745s)	0.126 (33.744s)	0.126 (34.746s)	0.125
Maximum averaged axial (mm)	0.178 (30.270s)	0.179 (31.268s)	0.180 (32.269s)	0.182 (33.273s)	0.183 (34.269s)	0.181
Minimum averaged axial (mm)	0.014 (30.767s)	0.014 (31.767s)	0.016 (32.767s)	0.017 (33.766s)	0.018 (34.764s)	0.016
Maximum axial #1 (mm)	0.180 (30.269s)	0.181 (31.268s)	0.183 (32.270s)	0.184 (33.272s)	0.185 (34.269s)	0.183
Minimum axial #1 (mm)	0.012 (30.761s)	0.013 (31.766s)	0.014 (32.766s)	0.016 (33.766s)	0.016 (34.765s)	0.014
Maximum axial #2 (mm)	0.176 (30.271s)	0.177 (31.269s)	0.178 (32.269s)	0.180 (33.273s)	0.182 (34.269s)	0.179
Minimum axial #2 (mm)	0.015 (30.767s)	0.016 (31.767s)	0.017 (32.767s)	0.019 (33.766s)	0.020 (34.765s)	0.017

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#12

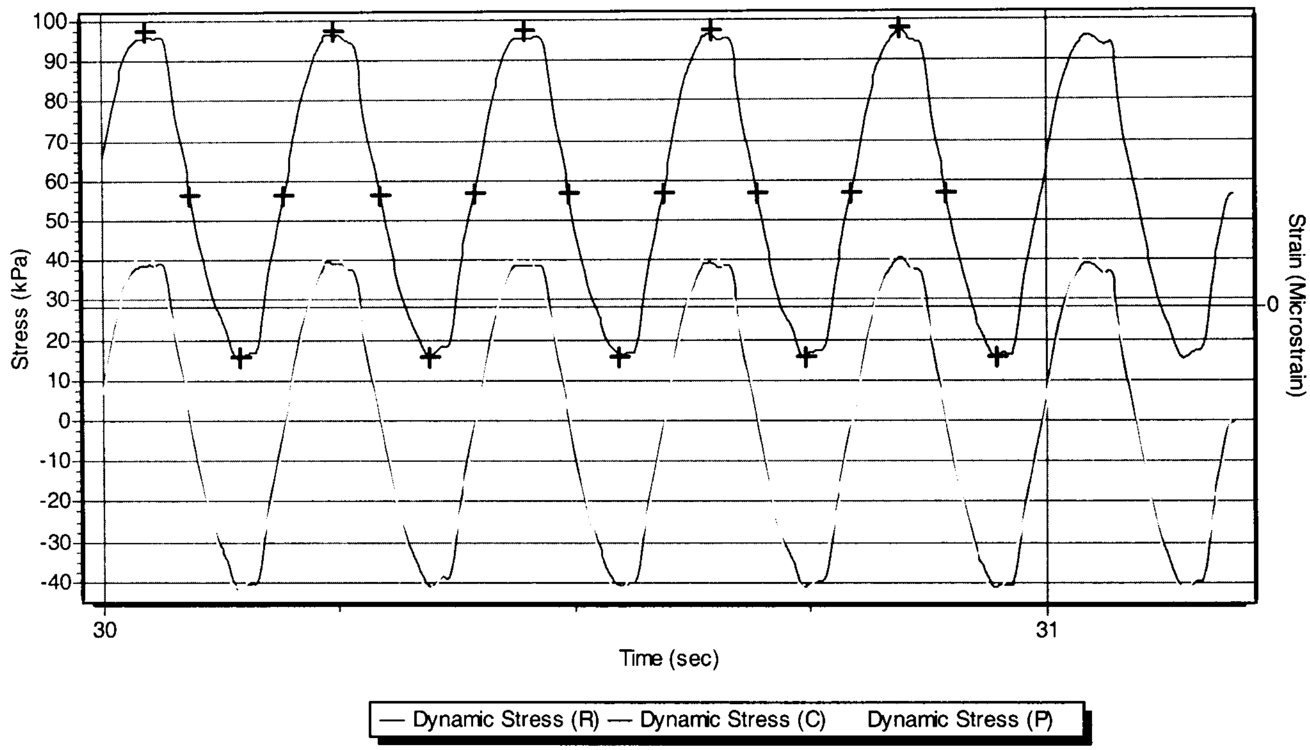
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

Cross-Sectional Area: 7853.982
Volume: 885143.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#12.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:23 PM

E = 5.30

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.7

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.9	81.8	81.9	81.8	82.4	81.9
Recoverable axial micro-strain	1329.5	1347.4	1321.3	1331.9	1321.7	1330.4
Permanent axial micro-strain	610	607	605	606	603	
Dynamic modulus (MPa)	61.6	60.7	62.0	61.4	62.3	61.6
Phase angle (Deg)	9.72	7.48	7.82	8.72	7.94	8.34
Dyn.Modulus/sine(phase angle)	726.5	930.5	909.0	807.7	900.0	854.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.642	0.643	0.642	0.647	0.644
Maximum load (kN)	0.766 (30.046s)	0.766 (30.245s)	0.766 (30.446s)	0.768 (30.645s)	0.770 (30.845s)	0.767
Minimum load (kN)	0.123 (30.145s)	0.124 (30.345s)	0.123 (30.545s)	0.125 (30.745s)	0.122 (30.945s)	0.123
Maximum averaged axial (mm)	0.069 (30.051s)	0.068 (30.249s)	0.068 (30.450s)	0.068 (30.650s)	0.068 (30.849s)	0.068
Minimum averaged axial (mm)	-0.081 (30.150s)	-0.083 (30.349s)	-0.081 (30.551s)	-0.082 (30.750s)	-0.081 (30.950s)	-0.082
Maximum axial #1 (mm)	0.069 (30.051s)	0.069 (30.249s)	0.068 (30.451s)	0.068 (30.649s)	0.068 (30.850s)	0.069
Minimum axial #1 (mm)	-0.088 (30.149s)	-0.088 (30.349s)	-0.085 (30.550s)	-0.088 (30.749s)	-0.085 (30.950s)	-0.087
Maximum axial #2 (mm)	0.069 (30.051s)	0.068 (30.249s)	0.068 (30.449s)	0.068 (30.649s)	0.068 (30.849s)	0.068
Minimum axial #2 (mm)	-0.077 (30.151s)	-0.079 (30.349s)	-0.077 (30.551s)	-0.078 (30.751s)	-0.077 (30.951s)	-0.077

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#12

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

Cross-Sectional Area: 7853.982

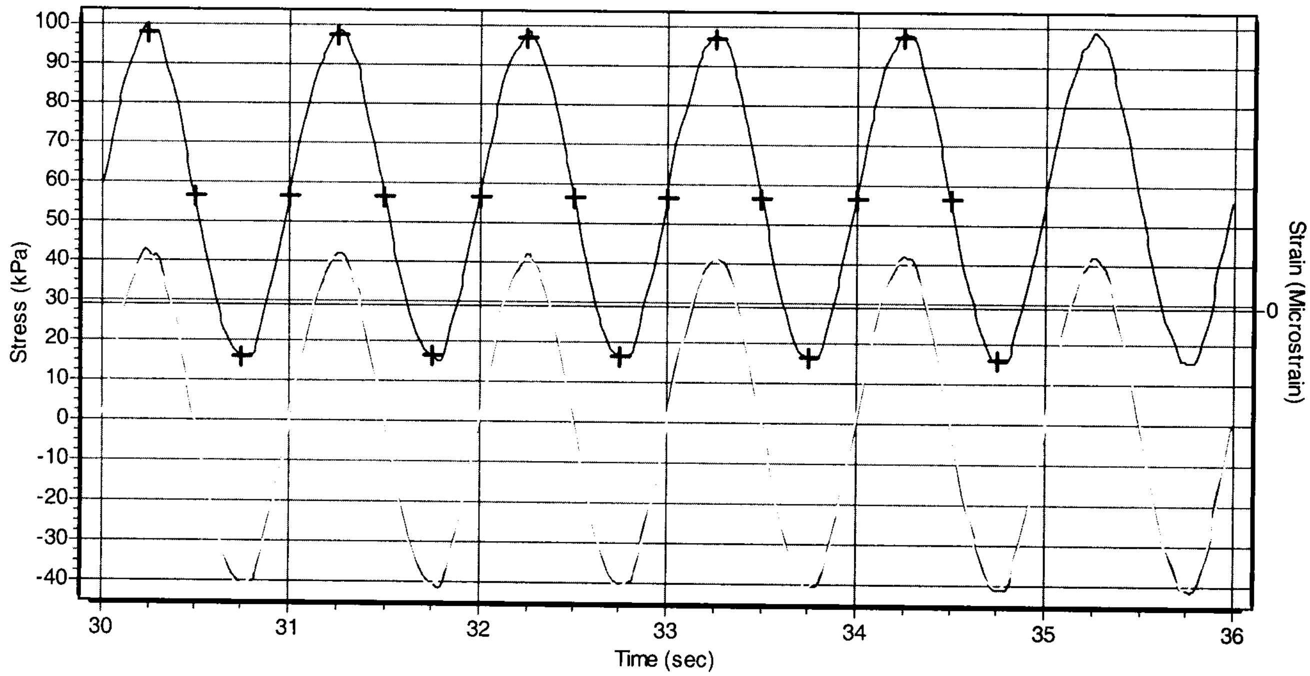
Volume: 885143.7

Comments/Properties: Initial Temp: 56 'C

Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#13.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:30 PM   E = 2.07
Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.3
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	82.1	81.0	80.7	80.9	81.5	81.2
Recoverable axial micro-strain	1524.8	1506.1	1498.8	1511.3	1508.4	1509.9
Permanent axial micro-strain	338	355	372	380	398	
Dynamic modulus (MPa)	53.8	53.8	53.9	53.5	54.0	53.8
Phase angle (Deg)	10.25	8.86	9.19	9.62	9.51	9.49
Dyn.Modulus/sine(phase angle)	602.7	696.1	672.3	638.8	651.7	652.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.645	0.636	0.634	0.636	0.640	0.638
Maximum load (kN)	0.769 (30.245s)	0.763 (31.248s)	0.762 (32.245s)	0.762 (33.247s)	0.766 (34.245s)	0.764
Minimum load (kN)	0.124 (30.745s)	0.127 (31.749s)	0.128 (32.746s)	0.127 (33.747s)	0.126 (34.744s)	0.126
Maximum averaged axial (mm)	0.211 (30.273s)	0.211 (31.272s)	0.212 (32.271s)	0.214 (33.273s)	0.216 (34.272s)	0.213
Minimum averaged axial (mm)	0.038 (30.766s)	0.040 (31.770s)	0.042 (32.767s)	0.043 (33.770s)	0.045 (34.770s)	0.042
Maximum axial #1 (mm)	0.196 (30.273s)	0.196 (31.273s)	0.197 (32.272s)	0.199 (33.275s)	0.200 (34.272s)	0.197
Minimum axial #1 (mm)	0.035 (30.764s)	0.037 (31.770s)	0.039 (32.767s)	0.040 (33.770s)	0.042 (34.770s)	0.038
Maximum axial #2 (mm)	0.226 (30.272s)	0.226 (31.272s)	0.227 (32.269s)	0.230 (33.272s)	0.232 (34.271s)	0.228
Minimum axial #2 (mm)	0.042 (30.768s)	0.044 (31.769s)	0.046 (32.768s)	0.047 (33.770s)	0.049 (34.770s)	0.045

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#13

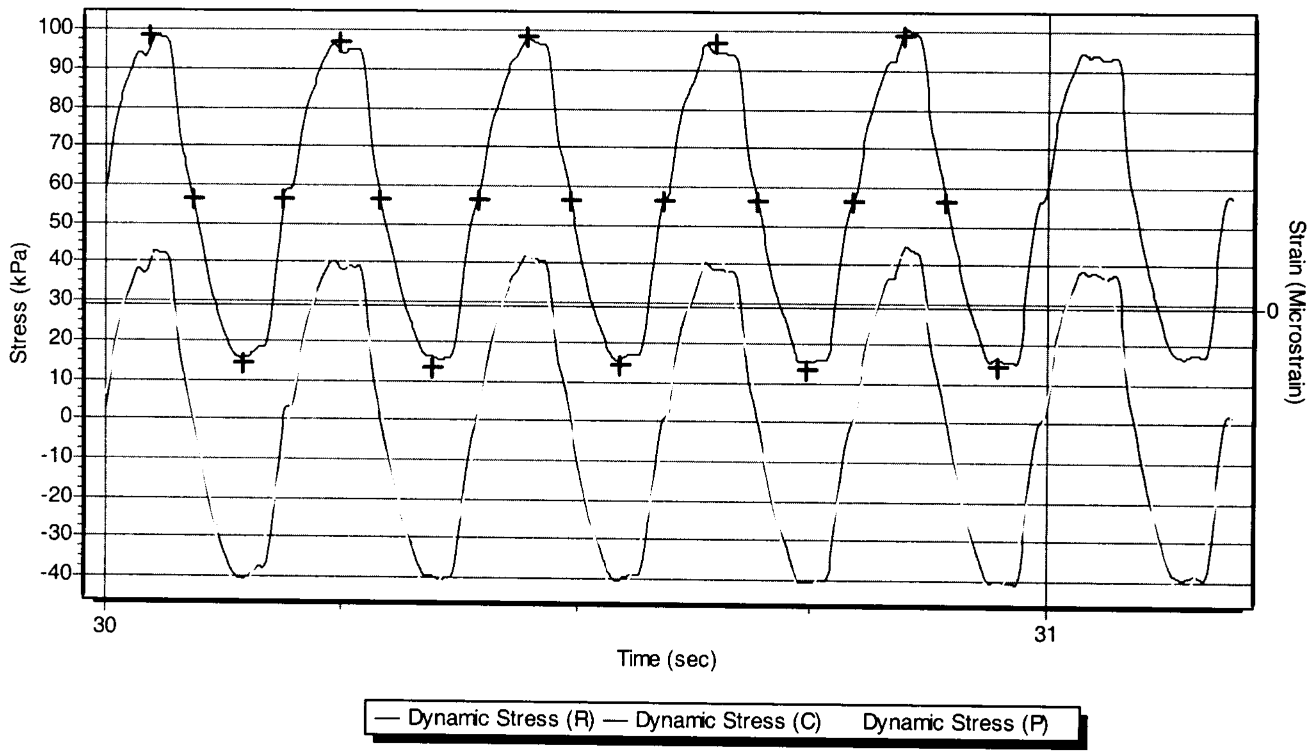
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#13.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:30 PM

E = 7.93

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.3

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	84.1	83.4	83.8	83.8	84.7	84.0
Recoverable axial micro-strain	1495.8	1464.7	1461.8	1471.1	1480.5	1474.8
Permanent axial micro-strain	642	607	597	610	605	
Dynamic modulus (MPa)	56.3	57.0	57.3	56.9	57.2	56.9
Phase angle (Deg)	5.82	7.59	10.15	2.15	6.84	6.51
Dyn.Modulus/sine(phase angle)	1108.0	860.5	648.2	3031.1	958.4	1321.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.661	0.655	0.658	0.658	0.665	0.660
Maximum load (kN)	0.773 (30.047s)	0.761 (30.248s)	0.773 (30.445s)	0.761 (30.649s)	0.778 (30.847s)	0.769
Minimum load (kN)	0.113 (30.146s)	0.106 (30.347s)	0.114 (30.546s)	0.103 (30.746s)	0.113 (30.947s)	0.110
Maximum averaged axial (mm)	0.097 (30.050s)	0.097 (30.252s)	0.098 (30.451s)	0.098 (30.650s)	0.099 (30.850s)	0.098
Minimum averaged axial (mm)	-0.073 (30.150s)	-0.069 (30.351s)	-0.068 (30.550s)	-0.069 (30.750s)	-0.069 (30.951s)	-0.069
Maximum axial #1 (mm)	0.085 (30.053s)	0.085 (30.253s)	0.086 (30.452s)	0.086 (30.652s)	0.087 (30.851s)	0.086
Minimum axial #1 (mm)	-0.070 (30.150s)	-0.065 (30.351s)	-0.065 (30.550s)	-0.071 (30.751s)	-0.066 (30.951s)	-0.067
Maximum axial #2 (mm)	0.109 (30.050s)	0.109 (30.251s)	0.110 (30.450s)	0.109 (30.651s)	0.111 (30.850s)	0.110
Minimum axial #2 (mm)	-0.076 (30.151s)	-0.072 (30.351s)	-0.071 (30.551s)	-0.072 (30.751s)	-0.071 (30.951s)	-0.072

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#13

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.3						113.3	

Cross-Sectional Area: 7853.982

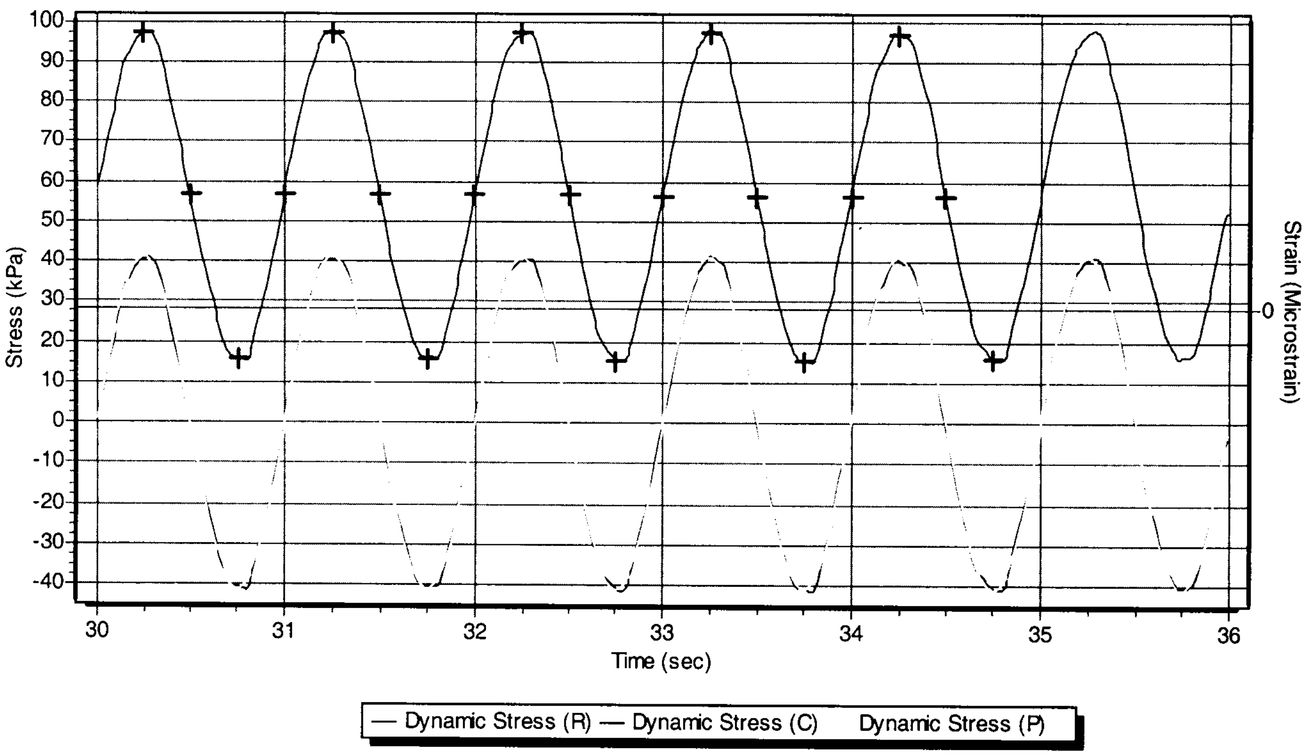
Volume: 889856.1

Comments/Properties: Initial Temp: 57 'C

Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#14.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:34 PM E=2.0

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.5

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.6	81.4	81.5	81.9	81.2	81.5
Recoverable axial micro-strain	1507.5	1501.4	1501.1	1511.5	1493.6	1503.0
Permanent axial micro-strain	229	242	253	255	277	
Dynamic modulus (MPa)	54.1	54.2	54.3	54.2	54.4	54.2
Phase angle (Deg)	9.15	9.43	8.33	8.81	8.23	8.79
Dyn.Modulus/sine(phase angle)	678.6	659.6	747.8	705.9	757.4	709.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.639	0.640	0.643	0.638	0.640
Maximum load (kN)	0.764 (30.249s)	0.764 (31.244s)	0.763 (32.248s)	0.764 (33.248s)	0.761 (34.245s)	0.763
Minimum load (kN)	0.123 (30.751s)	0.125 (31.748s)	0.122 (32.745s)	0.121 (33.749s)	0.124 (34.744s)	0.123
Maximum averaged axial (mm)	0.195 (30.274s)	0.196 (31.270s)	0.197 (32.271s)	0.199 (33.273s)	0.199 (34.268s)	0.197
Minimum averaged axial (mm)	0.026 (30.769s)	0.027 (31.768s)	0.028 (32.765s)	0.029 (33.767s)	0.031 (34.767s)	0.028
Maximum axial #1 (mm)	0.204 (30.273s)	0.205 (31.270s)	0.206 (32.272s)	0.208 (33.273s)	0.208 (34.267s)	0.206
Minimum axial #1 (mm)	0.035 (30.769s)	0.037 (31.768s)	0.038 (32.766s)	0.038 (33.768s)	0.041 (34.768s)	0.038
Maximum axial #2 (mm)	0.187 (30.275s)	0.187 (31.270s)	0.189 (32.271s)	0.190 (33.272s)	0.191 (34.269s)	0.189
Minimum axial #2 (mm)	0.017 (30.769s)	0.018 (31.767s)	0.019 (32.765s)	0.020 (33.767s)	0.022 (34.767s)	0.019

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#14

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Cross-Sectional Area: 7853.982

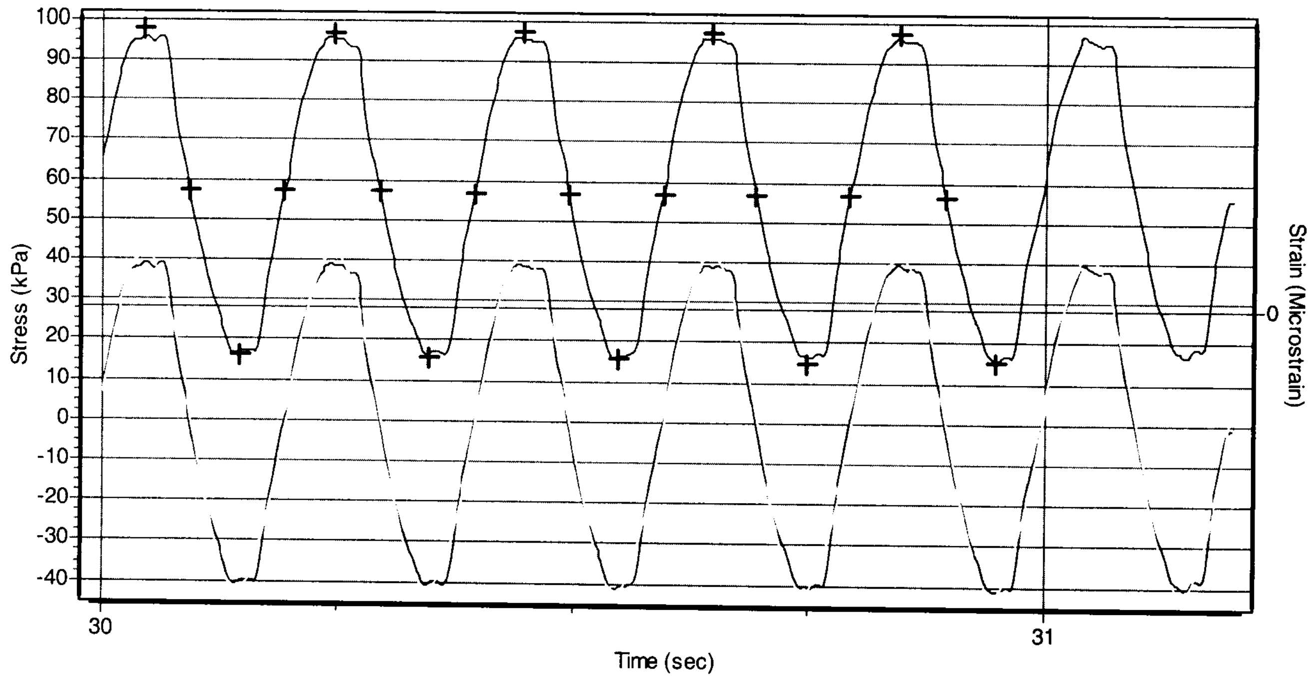
Volume: 883572.9

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#14.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:34 PM

E = 5.99

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.5

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.9	81.1	81.7	82.7	82.5	82.0
Recoverable axial micro-strain	1361.4	1358.5	1392.5	1409.6	1364.4	1377.3
Permanent axial micro-strain	647	634	640	649	648	
Dynamic modulus (MPa)	60.2	59.7	58.7	58.7	60.4	59.5
Phase angle (Deg)	10.89	6.76	6.62	8.61	9.00	8.38
Dyn.Modulus/sine(phase angle)	633.7	1012.2	1016.3	781.6	770.3	842.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.637	0.642	0.650	0.648	0.644
Maximum load (kN)	0.769 (30.045s)	0.763 (30.245s)	0.765 (30.445s)	0.767 (30.645s)	0.766 (30.845s)	0.766
Minimum load (kN)	0.126 (30.146s)	0.126 (30.346s)	0.123 (30.545s)	0.117 (30.747s)	0.118 (30.946s)	0.122
Maximum averaged axial (mm)	0.073 (30.051s)	0.071 (30.249s)	0.072 (30.449s)	0.073 (30.650s)	0.073 (30.850s)	0.072
Minimum averaged axial (mm)	-0.080 (30.150s)	-0.081 (30.351s)	-0.085 (30.550s)	-0.086 (30.750s)	-0.081 (30.950s)	-0.083
Maximum axial #1 (mm)	0.073 (30.051s)	0.071 (30.249s)	0.073 (30.451s)	0.072 (30.649s)	0.073 (30.851s)	0.072
Minimum axial #1 (mm)	-0.081 (30.150s)	-0.082 (30.351s)	-0.086 (30.550s)	-0.086 (30.750s)	-0.086 (30.950s)	-0.084
Maximum axial #2 (mm)	0.073 (30.050s)	0.071 (30.249s)	0.072 (30.449s)	0.073 (30.650s)	0.073 (30.850s)	0.073
Minimum axial #2 (mm)	-0.080 (30.150s)	-0.081 (30.351s)	-0.084 (30.550s)	-0.085 (30.750s)	-0.080 (30.951s)	-0.082

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#14

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.5						112.5	

Cross-Sectional Area: 7853.982

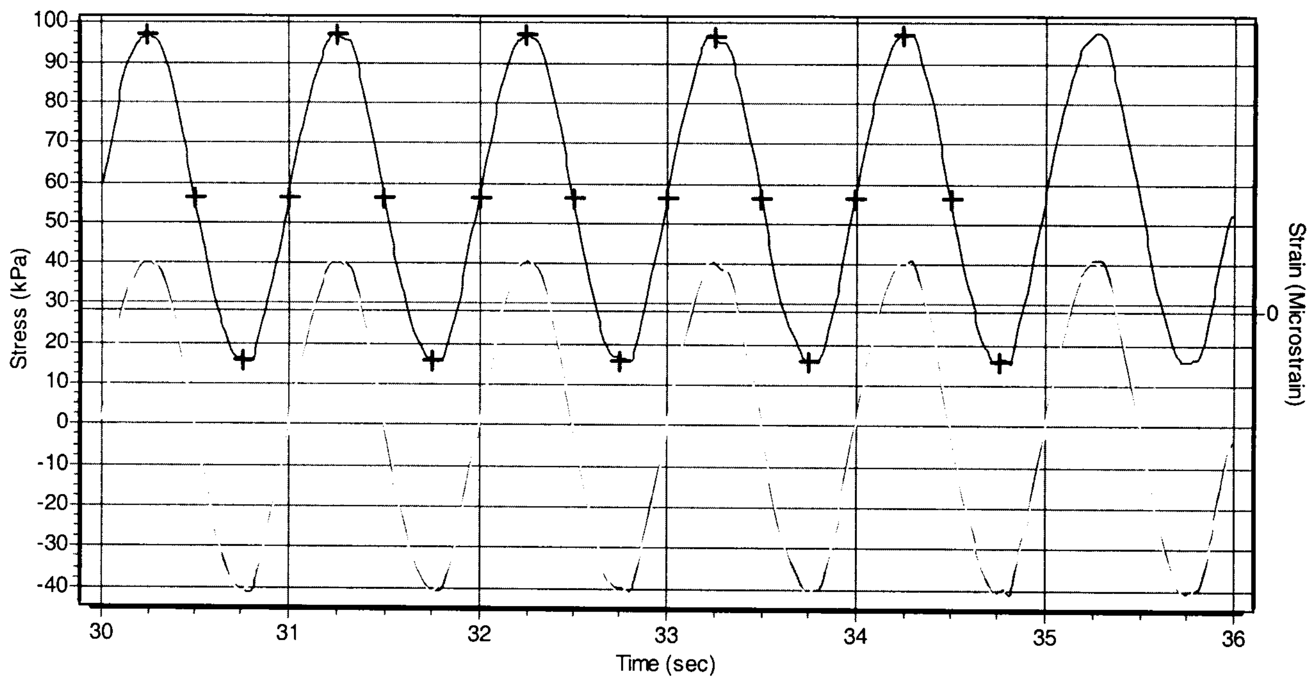
Volume: 883572.9

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#15.B38



Sweep 1 (1Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:38 PM

E=2.08

Data Filtering: Spencers 15 Point
Curve fitting: Applied to 41 data points
Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	81.0	81.1	80.6	81.2	81.0
Recoverable axial micro-strain	1416.1	1411.1	1409.4	1400.2	1407.7	1408.9
Permanent axial micro-strain	25	17	3	6	12	
Dynamic modulus (MPa)	57.4	57.4	57.6	57.6	57.7	57.5
Phase angle (Deg)	8.62	9.62	9.61	9.97	8.43	9.25
Dyn.Modulus/sine(phase angle)	763.7	684.2	686.7	662.5	785.5	716.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.636	0.637	0.633	0.638	0.636
Maximum load (kN)	0.764 (30.245s)	0.762 (31.248s)	0.763 (32.245s)	0.759 (33.246s)	0.762 (34.248s)	0.762
Minimum load (kN)	0.125 (30.748s)	0.126 (31.749s)	0.126 (32.746s)	0.126 (33.748s)	0.124 (34.750s)	0.125
Maximum averaged axial (mm)	0.157 (30.269s)	0.157 (31.275s)	0.159 (32.272s)	0.158 (33.274s)	0.160 (34.272s)	0.158
Minimum averaged axial (mm)	-0.003 (30.767s)	-0.002 (31.770s)	0.000 (32.768s)	0.001 (33.768s)	0.001 (34.769s)	-0.001
Maximum axial #1 (mm)	0.158 (30.266s)	0.158 (31.275s)	0.160 (32.270s)	0.160 (33.275s)	0.162 (34.271s)	0.160
Minimum axial #1 (mm)	-0.002 (30.769s)	-0.001 (31.770s)	0.000 (32.768s)	0.001 (33.768s)	0.002 (34.770s)	0.000
Maximum axial #2 (mm)	0.155 (30.271s)	0.156 (31.275s)	0.157 (32.274s)	0.157 (33.273s)	0.158 (34.272s)	0.157
Minimum axial #2 (mm)	-0.003 (30.767s)	-0.003 (31.769s)	-0.002 (32.767s)	0.000 (33.768s)	0.001 (34.769s)	-0.001

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#15

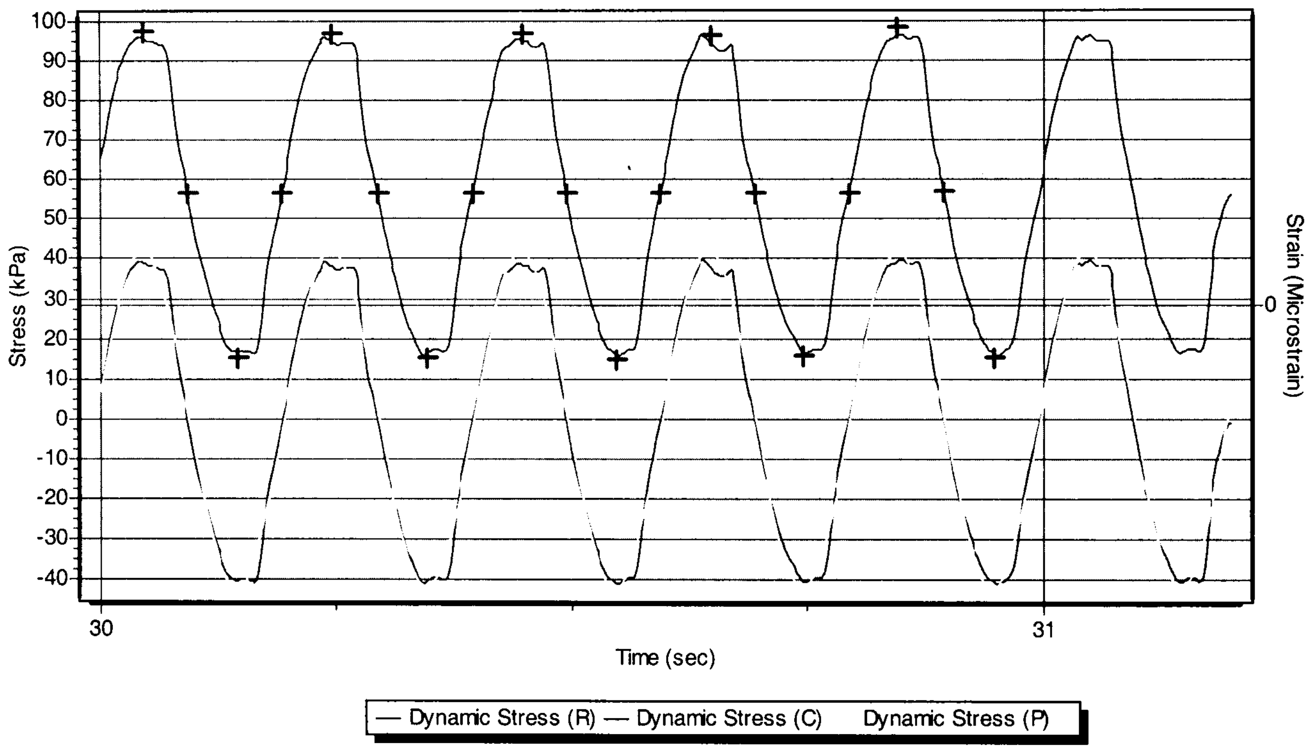
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

Cross-Sectional Area: 7853.982
Volume: 885143.7

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#15.B38



Sweep 2 (5Hz)

Test Date and Time: Wednesday, May 22, 2002, at 4:38 PM

E=6.52

Data Filtering: Spencers 15 Point

Curve fitting: Applied to 41 data points

Phase angle: Calculated from max and min values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.7

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	81.6	81.2	82.2	80.9	83.1	81.8
Recoverable axial micro-strain	1305.2	1311.4	1327.5	1287.6	1327.2	1311.8
Permanent axial micro-strain	619	623	613	607	628	
Dynamic modulus (MPa)	62.5	61.9	61.9	62.8	62.6	62.3
Phase angle (Deg)	7.24	9.26	10.46	8.37	11.71	9.41
Dyn.Modulus/sine(phase angle)	990.0	766.8	679.7	860.8	613.3	782.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.641	0.638	0.646	0.635	0.652	0.642
Maximum load (kN)	0.763 (30.046s)	0.760 (30.246s)	0.761 (30.446s)	0.758 (30.647s)	0.773 (30.845s)	0.763
Minimum load (kN)	0.122 (30.147s)	0.122 (30.346s)	0.115 (30.546s)	0.123 (30.746s)	0.120 (30.946s)	0.121
Maximum averaged axial (mm)	0.070 (30.050s)	0.070 (30.251s)	0.069 (30.452s)	0.068 (30.652s)	0.071 (30.852s)	0.070
Minimum averaged axial (mm)	-0.077 (30.150s)	-0.078 (30.351s)	-0.081 (30.550s)	-0.077 (30.751s)	-0.079 (30.950s)	-0.078
Maximum axial #1 (mm)	0.071 (30.052s)	0.071 (30.252s)	0.070 (30.453s)	0.070 (30.653s)	0.072 (30.853s)	0.071
Minimum axial #1 (mm)	-0.080 (30.150s)	-0.080 (30.350s)	-0.083 (30.550s)	-0.079 (30.751s)	-0.082 (30.950s)	-0.081
Maximum axial #2 (mm)	0.069 (30.050s)	0.069 (30.251s)	0.068 (30.451s)	0.067 (30.651s)	0.070 (30.851s)	0.069
Minimum axial #2 (mm)	-0.075 (30.151s)	-0.075 (30.351s)	-0.074 (30.550s)	-0.074 (30.751s)	-0.076 (30.950s)	-0.075

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments:

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#15

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.7						112.7	

Cross-Sectional Area: 7853.982

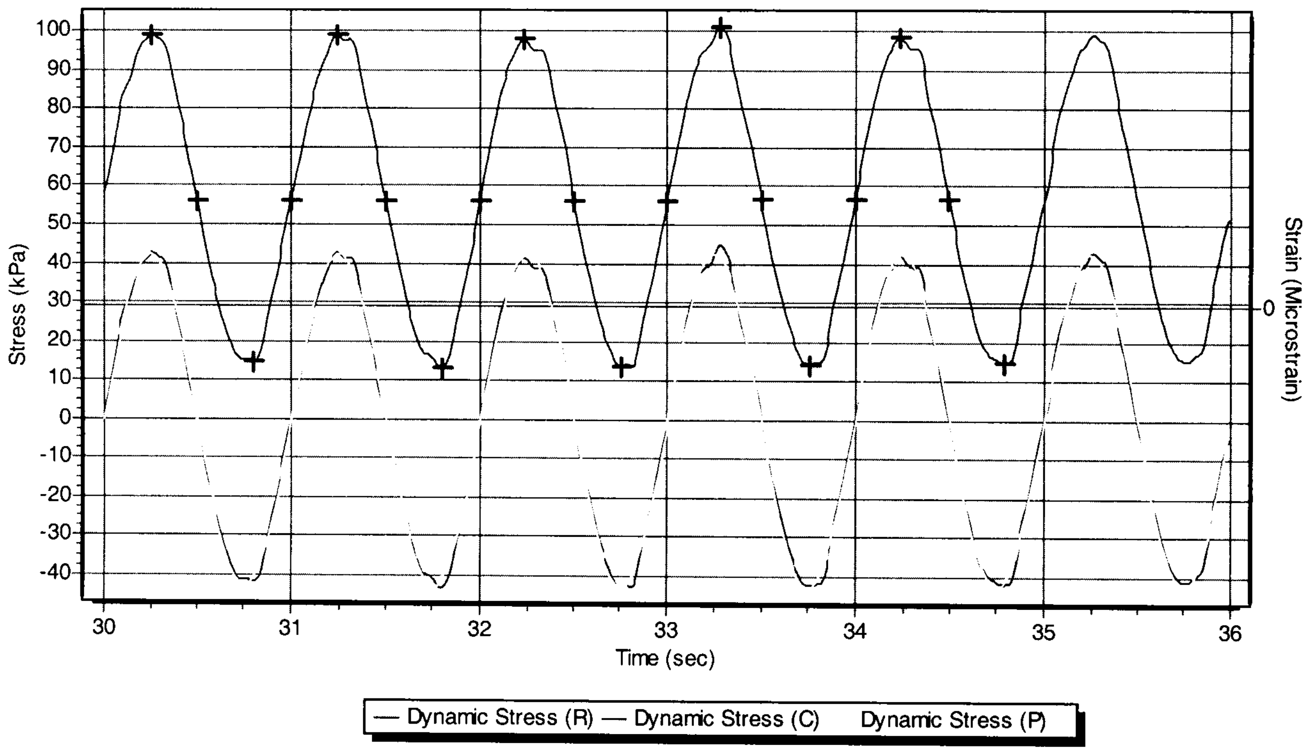
Volume: 885143.7

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#16.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:08 PM   E = 3.0 %
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 112.9
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	84.2	85.7	84.2	86.8	84.0	85.0
Recoverable axial micro-strain	2047.7	2096.1	2068.6	2075.4	2046.5	2066.9
Permanent axial micro-strain	917	926	907	958	930	
Dynamic modulus (MPa)	41.1	40.9	40.7	41.8	41.0	41.1
Phase angle (Deg)	8.76	10.37	10.23	9.93	10.05	9.87
Dyn.Modulus/sine(phase angle)	538.1	452.2	456.5	483.1	468.5	479.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.661	0.673	0.661	0.682	0.659	0.667
Maximum load (kN)	0.778 (30.260s)	0.778 (31.240s)	0.769 (32.230s)	0.795 (33.280s)	0.774 (34.240s)	0.779
Minimum load (kN)	0.117 (30.800s)	0.105 (31.790s)	0.107 (32.750s)	0.113 (33.760s)	0.115 (34.790s)	0.111
Maximum averaged axial (mm)	0.104 (30.300s)	0.104 (31.310s)	0.102 (32.240s)	0.108 (33.280s)	0.105 (34.250s)	0.105
Minimum averaged axial (mm)	-0.128 (30.810s)	-0.132 (31.800s)	-0.131 (32.810s)	-0.126 (33.810s)	-0.126 (34.800s)	-0.129
Maximum axial #1 (mm)	0.107 (30.300s)	0.107 (31.310s)	0.105 (32.240s)	0.111 (33.280s)	0.108 (34.250s)	0.108
Minimum axial #1 (mm)	-0.131 (30.810s)	-0.136 (31.800s)	-0.135 (32.810s)	-0.130 (33.810s)	-0.129 (34.800s)	-0.132
Maximum axial #2 (mm)	0.100 (30.290s)	0.102 (31.310s)	0.099 (32.240s)	0.105 (33.280s)	0.102 (34.240s)	0.102
Minimum axial #2 (mm)	-0.124 (30.810s)	-0.128 (31.800s)	-0.128 (32.810s)	-0.123 (33.810s)	-0.123 (34.800s)	-0.125

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#16

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.9						112.9	

Cross-Sectional Area: 7853.982
Volume: 886714.5

Comments/Properties: Initial Temp: 57 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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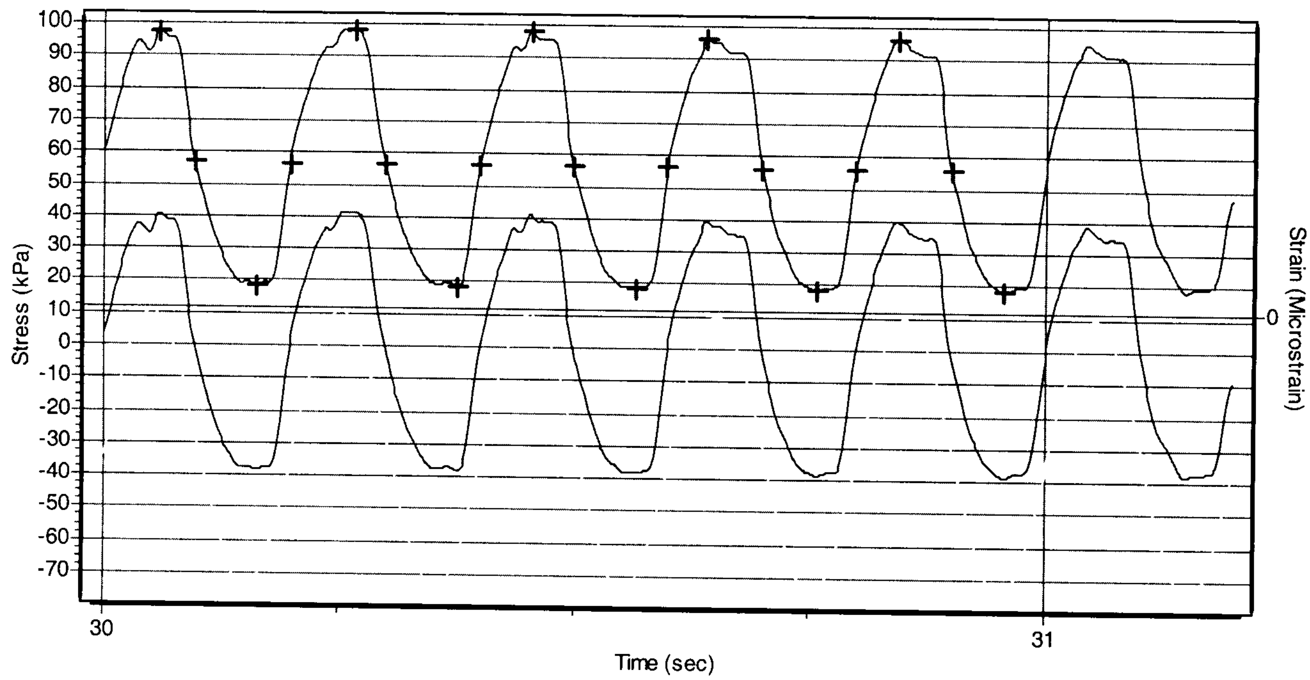

Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:08 PM   E = 10.39 /.

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.9

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	79.1	79.5	79.7	78.0	78.3	78.9
Recoverable axial micro-strain	1786.7	1822.8	1804.3	1761.6	1753.6	1785.8
Permanent axial micro-strain	228	221	242	249	238	
Dynamic modulus (MPa)	44.3	43.6	44.1	44.3	44.7	44.2
Phase angle (Deg)	8.77	8.20	8.65	8.66	8.76	8.61
Dyn.Modulus/sine(phase angle)	578.8	610.5	585.7	586.6	584.5	589.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.621	0.625	0.626	0.612	0.615	0.620
Maximum load (kN)	0.767 (30.060s)	0.772 (30.266s)	0.771 (30.452s)	0.756 (30.640s)	0.759 (30.842s)	0.765
Minimum load (kN)	0.146 (30.162s)	0.147 (30.374s)	0.146 (30.566s)	0.144 (30.758s)	0.144 (30.954s)	0.145
Maximum averaged axial (mm)	0.227 (30.076s)	0.231 (30.266s)	0.231 (30.476s)	0.227 (30.652s)	0.225 (30.846s)	0.228
Minimum averaged axial (mm)	0.026 (30.178s)	0.025 (30.378s)	0.027 (30.566s)	0.028 (30.778s)	0.027 (30.978s)	0.027
Maximum axial #1 (mm)	0.230 (30.074s)	0.233 (30.266s)	0.233 (30.476s)	0.229 (30.678s)	0.227 (30.846s)	0.231
Minimum axial #1 (mm)	0.023 (30.178s)	0.023 (30.378s)	0.025 (30.566s)	0.026 (30.778s)	0.024 (30.978s)	0.024
Maximum axial #2 (mm)	0.225 (30.062s)	0.228 (30.266s)	0.229 (30.476s)	0.225 (30.652s)	0.223 (30.878s)	0.226
Minimum axial #2 (mm)	0.028 (30.178s)	0.027 (30.376s)	0.030 (30.566s)	0.030 (30.778s)	0.030 (30.978s)	0.029

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#16

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.9						112.9	

Cross-Sectional Area: 7853.982

Volume: 886714.5

Comments/Properties: Initial Temp: 57 'C

Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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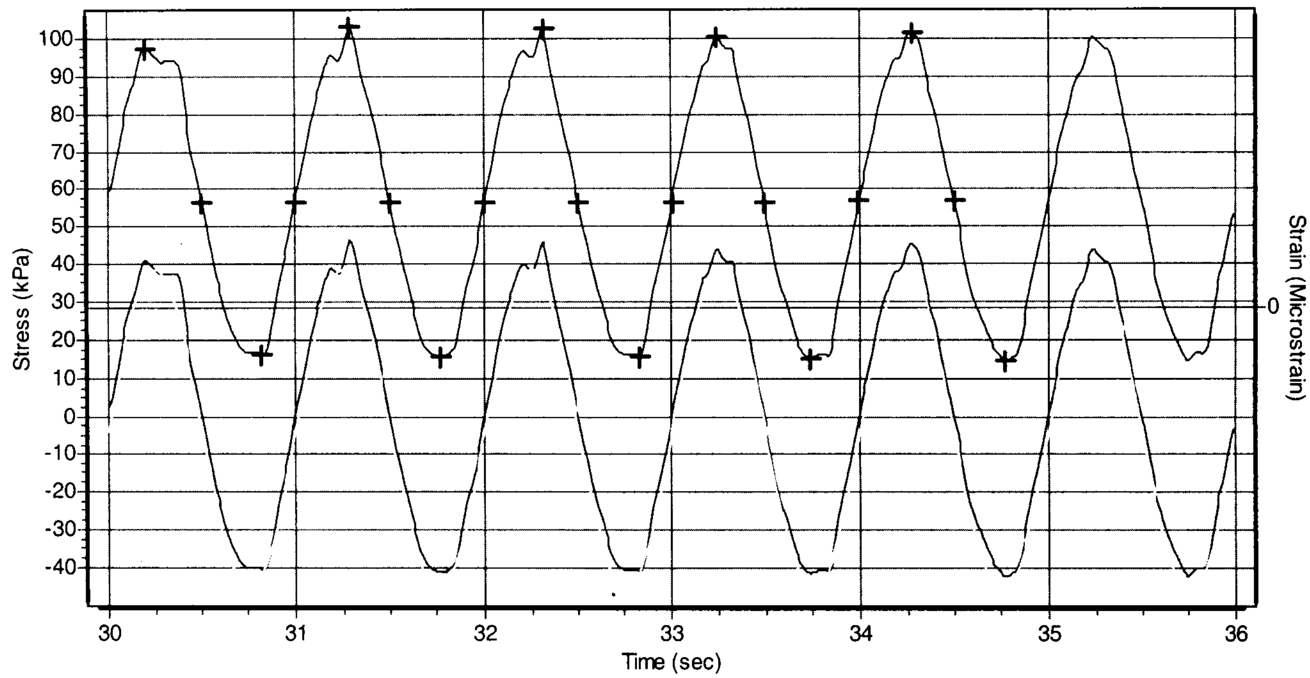


Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:14 PM

E = 4.19%

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.9

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.2	87.4	86.8	85.2	87.4	85.6
Recoverable axial micro-strain	1934.5	2010.2	2040.0	1980.7	2048.5	2002.8
Permanent axial micro-strain	895	982	990	950	993	
Dynamic modulus (MPa)	42.0	43.5	42.5	43.0	42.6	42.7
Phase angle (Deg)	9.65	11.22	11.27	10.11	10.90	10.63
Dyn.Modulus/sine(phase angle)	498.9	444.8	433.4	488.0	449.0	462.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.638	0.687	0.682	0.669	0.686	0.672
Maximum load (kN)	0.767 (30.200s)	0.811 (31.290s)	0.806 (32.310s)	0.790 (33.240s)	0.800 (34.280s)	0.795
Minimum load (kN)	0.129 (30.820s)	0.124 (31.760s)	0.124 (32.830s)	0.120 (33.740s)	0.114 (34.770s)	0.122
Maximum averaged axial (mm)	0.101 (30.370s)	0.111 (31.300s)	0.112 (32.320s)	0.107 (33.320s)	0.112 (34.290s)	0.109
Minimum averaged axial (mm)	-0.117 (30.820s)	-0.116 (31.820s)	-0.119 (32.830s)	-0.116 (33.830s)	-0.119 (34.820s)	-0.117
Maximum axial #1 (mm)	0.107 (30.370s)	0.118 (31.300s)	0.119 (32.320s)	0.115 (33.250s)	0.119 (34.290s)	0.116
Minimum axial #1 (mm)	-0.125 (30.820s)	-0.125 (31.780s)	-0.127 (32.830s)	-0.124 (33.820s)	-0.127 (34.820s)	-0.126
Maximum axial #2 (mm)	0.095 (30.370s)	0.104 (31.300s)	0.105 (32.320s)	0.101 (33.320s)	0.105 (34.300s)	0.102
Minimum axial #2 (mm)	-0.109 (30.820s)	-0.108 (31.820s)	-0.110 (32.830s)	-0.109 (33.830s)	-0.111 (34.820s)	-0.110

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.9						112.9	

Cross-Sectional Area: 7853.982

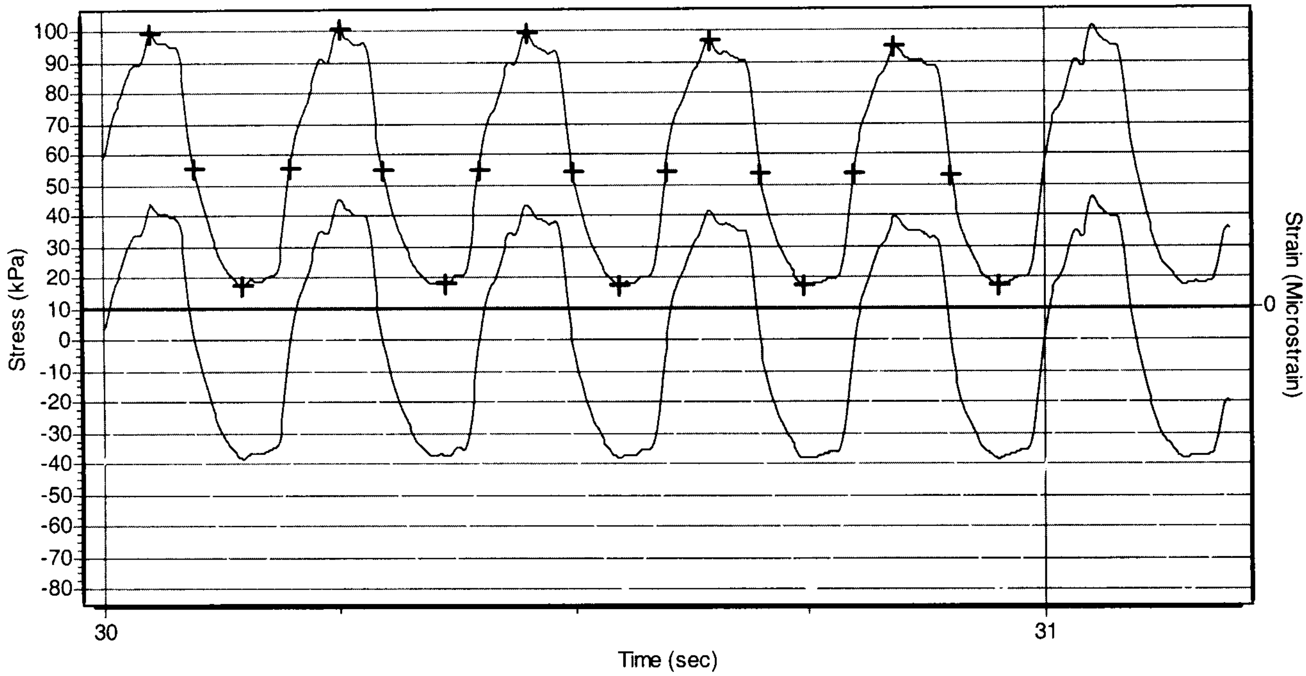
Volume: 886714.5

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#17.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:14 PM

E = 11.9 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 112.9

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	82.3	82.7	81.7	79.6	78.0	80.8
Recoverable axial micro-strain	1769.0	1797.7	1768.9	1755.8	1718.2	1761.9
Permanent axial micro-strain	1029	1021	1032	1015	1035	
Dynamic modulus (MPa)	46.5	46.0	46.2	45.4	45.4	45.9
Phase angle (Deg)	13.44	12.07	11.32	11.44	10.11	11.68
Dyn.Modulus/sine(phase angle)	397.3	437.5	467.9	455.2	514.9	454.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.646	0.649	0.641	0.626	0.612	0.635
Maximum load (kN)	0.781 (30.052s)	0.792 (30.252s)	0.779 (30.450s)	0.763 (30.646s)	0.748 (30.842s)	0.773
Minimum load (kN)	0.135 (30.148s)	0.143 (30.364s)	0.138 (30.548s)	0.137 (30.746s)	0.136 (30.952s)	0.138
Maximum averaged axial (mm)	0.316 (30.068s)	0.318 (30.278s)	0.316 (30.480s)	0.313 (30.668s)	0.311 (30.870s)	0.315
Minimum averaged axial (mm)	0.116 (30.182s)	0.115 (30.366s)	0.116 (30.580s)	0.115 (30.780s)	0.117 (30.982s)	0.116
Maximum axial #1 (mm)	0.316 (30.078s)	0.319 (30.276s)	0.317 (30.452s)	0.314 (30.646s)	0.311 (30.846s)	0.315
Minimum axial #1 (mm)	0.112 (30.182s)	0.110 (30.366s)	0.111 (30.564s)	0.110 (30.780s)	0.112 (30.982s)	0.111
Maximum axial #2 (mm)	0.316 (30.068s)	0.318 (30.278s)	0.316 (30.482s)	0.313 (30.668s)	0.311 (30.870s)	0.315
Minimum axial #2 (mm)	0.121 (30.182s)	0.121 (30.380s)	0.122 (30.580s)	0.120 (30.780s)	0.122 (30.982s)	0.121

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#17

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	112.9						112.9	

Cross-Sectional Area: 7853.982

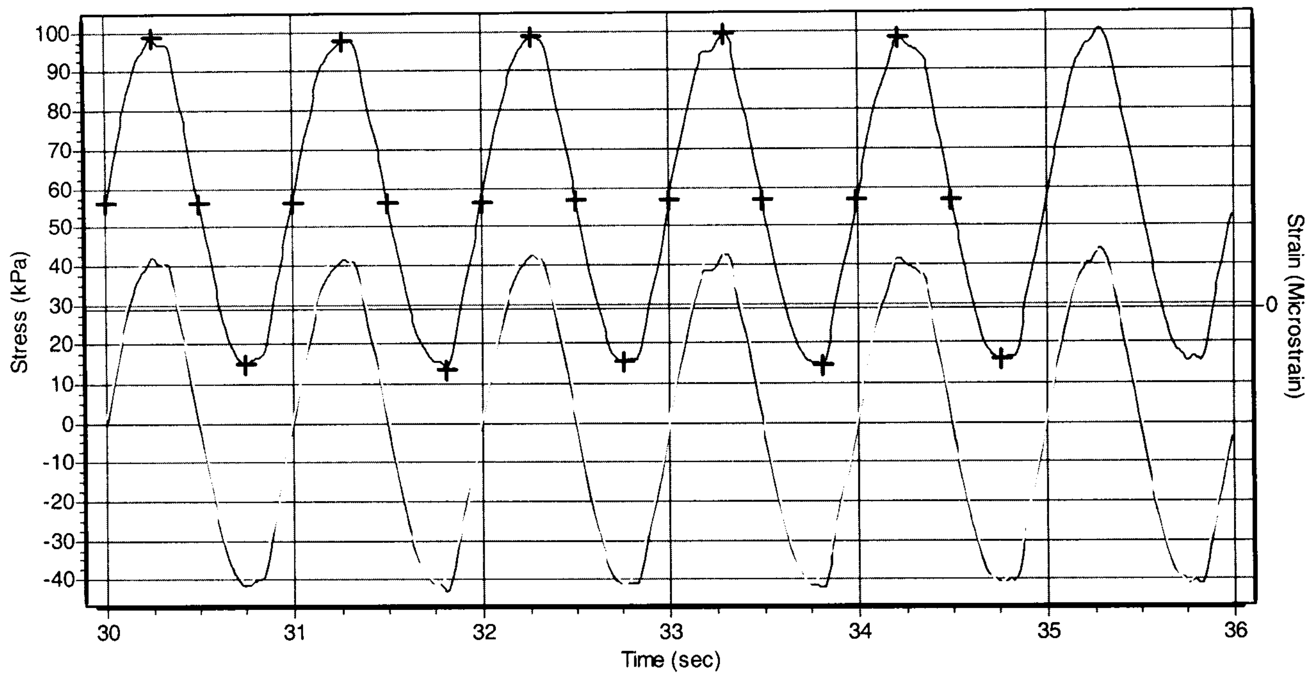
Volume: 886714.5

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#18.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:19 PM E = 3.29 %
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	83.6	84.1	83.3	84.6	82.1	83.5
Recoverable axial micro-strain	1652.6	1732.9	1711.4	1726.3	1642.2	1693.1
Permanent axial micro-strain	719	735	744	749	740	
Dynamic modulus (MPa)	50.6	48.5	48.7	49.0	50.0	49.4
Phase angle (Deg)	11.63	11.21	11.50	12.97	11.22	11.71
Dyn.Modulus/sine(phase angle)	499.3	496.9	485.7	433.9	511.4	485.4
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.656	0.660	0.654	0.665	0.645	0.656
Maximum load (kN)	0.775 (30.250s)	0.769 (31.260s)	0.777 (32.260s)	0.779 (33.290s)	0.771 (34.220s)	0.774
Minimum load (kN)	0.119 (30.740s)	0.108 (31.810s)	0.123 (32.750s)	0.115 (33.810s)	0.126 (34.760s)	0.118
Maximum averaged axial (mm)	0.081 (30.330s)	0.083 (31.320s)	0.084 (32.330s)	0.085 (33.320s)	0.084 (34.300s)	0.083
Minimum averaged axial (mm)	-0.106 (30.820s)	-0.113 (31.810s)	-0.109 (32.810s)	-0.110 (33.810s)	-0.102 (34.820s)	-0.108
Maximum axial #1 (mm)	0.080 (30.330s)	0.082 (31.320s)	0.083 (32.300s)	0.083 (33.320s)	0.082 (34.310s)	0.082
Minimum axial #1 (mm)	-0.107 (30.820s)	-0.115 (31.810s)	-0.111 (32.810s)	-0.113 (33.810s)	-0.103 (34.820s)	-0.110
Maximum axial #2 (mm)	0.082 (30.330s)	0.084 (31.320s)	0.085 (32.330s)	0.086 (33.320s)	0.085 (34.300s)	0.085
Minimum axial #2 (mm)	-0.104 (30.830s)	-0.111 (31.810s)	-0.108 (32.810s)	-0.108 (33.810s)	-0.101 (34.820s)	-0.106

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#18

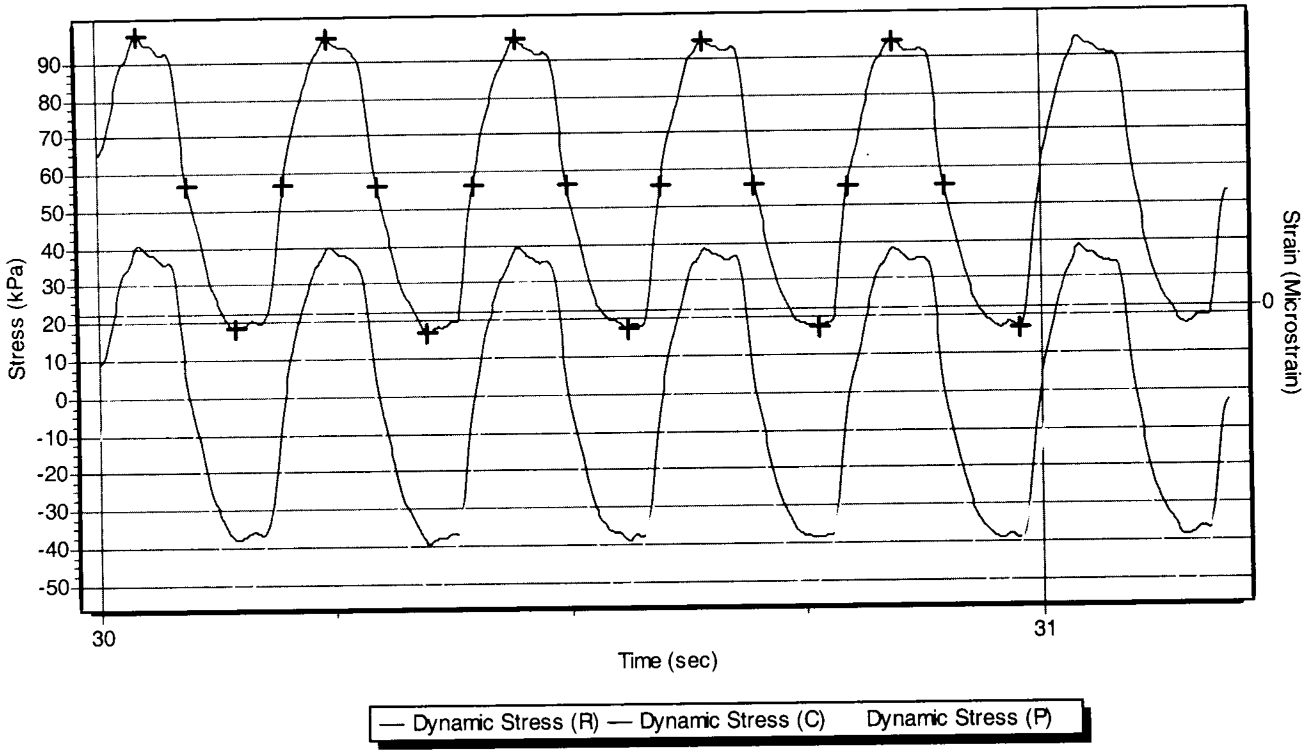
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

Cross-Sectional Area: 7853.982
Volume: 887499.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#18.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:19 PM

E = 10.67 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.9	79.4	78.3	77.1	77.3	78.2
Recoverable axial micro-strain	1363.7	1389.0	1411.9	1426.2	1421.6	1402.5
Permanent axial micro-strain	662	641	614	618	615	
Dynamic modulus (MPa)	57.9	57.2	55.5	54.0	54.4	55.8
Phase angle (Deg)	12.19	10.76	10.25	11.21	11.89	11.26
Dyn.Modulus/sine(phase angle)	545.0	610.0	620.9	553.1	525.2	570.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.620	0.624	0.615	0.605	0.607	0.614
Maximum load (kN)	0.764 (30.044s)	0.755 (30.246s)	0.751 (30.444s)	0.744 (30.644s)	0.741 (30.844s)	0.751
Minimum load (kN)	0.144 (30.146s)	0.131 (30.348s)	0.135 (30.560s)	0.139 (30.764s)	0.134 (30.976s)	0.137
Maximum averaged axial (mm)	0.229 (30.060s)	0.229 (30.262s)	0.229 (30.458s)	0.231 (30.674s)	0.230 (30.876s)	0.230
Minimum averaged axial (mm)	0.075 (30.174s)	0.072 (30.378s)	0.069 (30.576s)	0.070 (30.776s)	0.069 (30.976s)	0.071
Maximum axial #1 (mm)	0.217 (30.046s)	0.216 (30.260s)	0.217 (30.458s)	0.219 (30.676s)	0.218 (30.876s)	0.217
Minimum axial #1 (mm)	0.063 (30.174s)	0.060 (30.364s)	0.056 (30.576s)	0.057 (30.776s)	0.056 (30.976s)	0.058
Maximum axial #2 (mm)	0.242 (30.058s)	0.242 (30.262s)	0.242 (30.478s)	0.243 (30.674s)	0.243 (30.876s)	0.243
Minimum axial #2 (mm)	0.087 (30.176s)	0.085 (30.378s)	0.082 (30.562s)	0.083 (30.776s)	0.083 (30.976s)	0.084

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#18

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113						113	

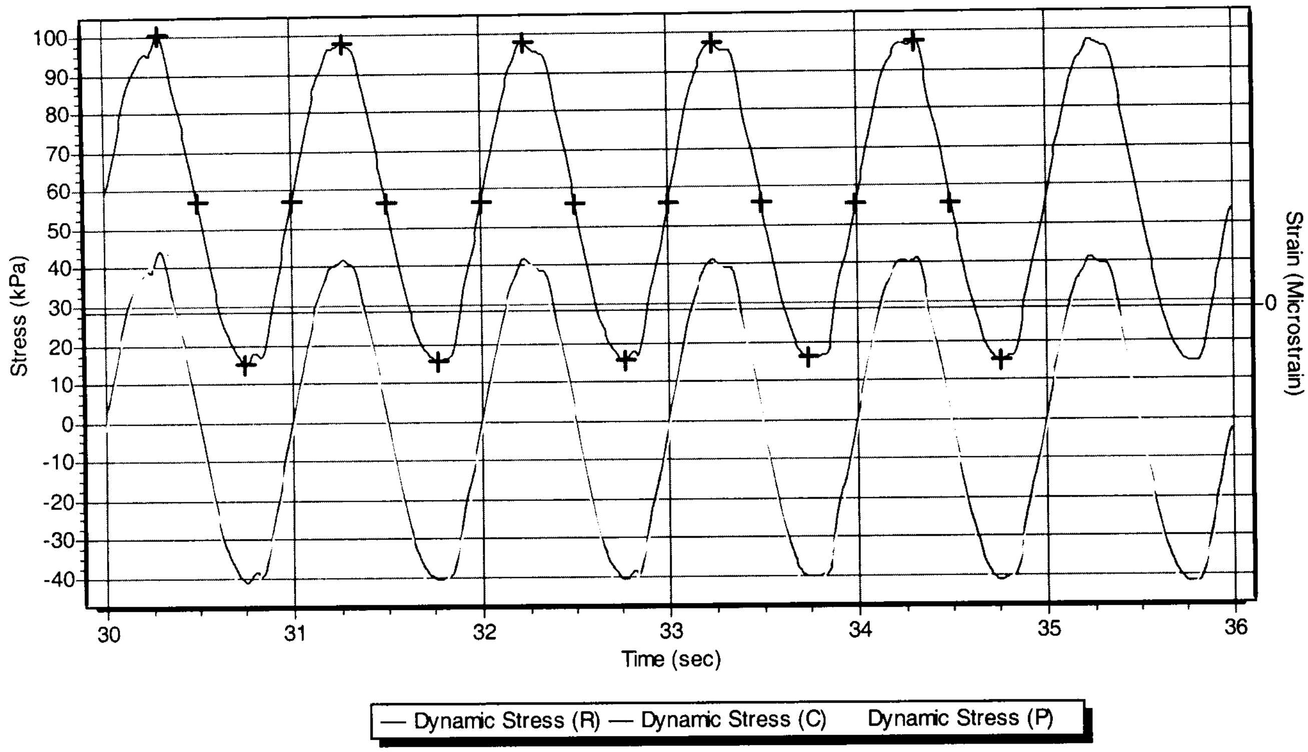
Cross-Sectional Area: 7853.982

Volume: 887499.9

Comments/Properties: Initial Temp: 56 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#19.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:23 PM

E = 3.30%

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.2

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	85.3	82.4	82.7	81.7	82.6	82.9
Recoverable axial micro-strain	1692.8	1682.2	1662.4	1664.6	1705.0	1681.4
Permanent axial micro-strain	723	717	702	704	739	
Dynamic modulus (MPa)	50.4	49.0	49.7	49.1	48.4	49.3
Phase angle (Deg)	11.72	11.07	11.13	12.38	11.93	11.65
Dyn.Modulus/sine(phase angle)	493.6	508.1	513.0	454.8	465.8	487.1
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.670	0.647	0.649	0.641	0.648	0.651
Maximum load (kN)	0.791 (30.300s)	0.770 (31.270s)	0.771 (32.230s)	0.767 (33.240s)	0.766 (34.310s)	0.773
Minimum load (kN)	0.121 (30.740s)	0.123 (31.760s)	0.121 (32.760s)	0.126 (33.740s)	0.118 (34.760s)	0.122
Maximum averaged axial (mm)	0.082 (30.310s)	0.081 (31.300s)	0.080 (32.240s)	0.080 (33.340s)	0.084 (34.320s)	0.081
Minimum averaged axial (mm)	-0.110 (30.830s)	-0.109 (31.830s)	-0.109 (32.770s)	-0.109 (33.830s)	-0.109 (34.770s)	-0.109
Maximum axial #1 (mm)	0.082 (30.310s)	0.082 (31.310s)	0.080 (32.320s)	0.080 (33.340s)	0.083 (34.310s)	0.081
Minimum axial #1 (mm)	-0.110 (30.830s)	-0.109 (31.830s)	-0.109 (32.770s)	-0.109 (33.830s)	-0.109 (34.820s)	-0.109
Maximum axial #2 (mm)	0.081 (30.310s)	0.081 (31.290s)	0.080 (32.240s)	0.079 (33.340s)	0.084 (34.320s)	0.081
Minimum axial #2 (mm)	-0.109 (30.830s)	-0.110 (31.830s)	-0.109 (32.820s)	-0.108 (33.820s)	-0.110 (34.770s)	-0.109

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#19

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.2						113.2	

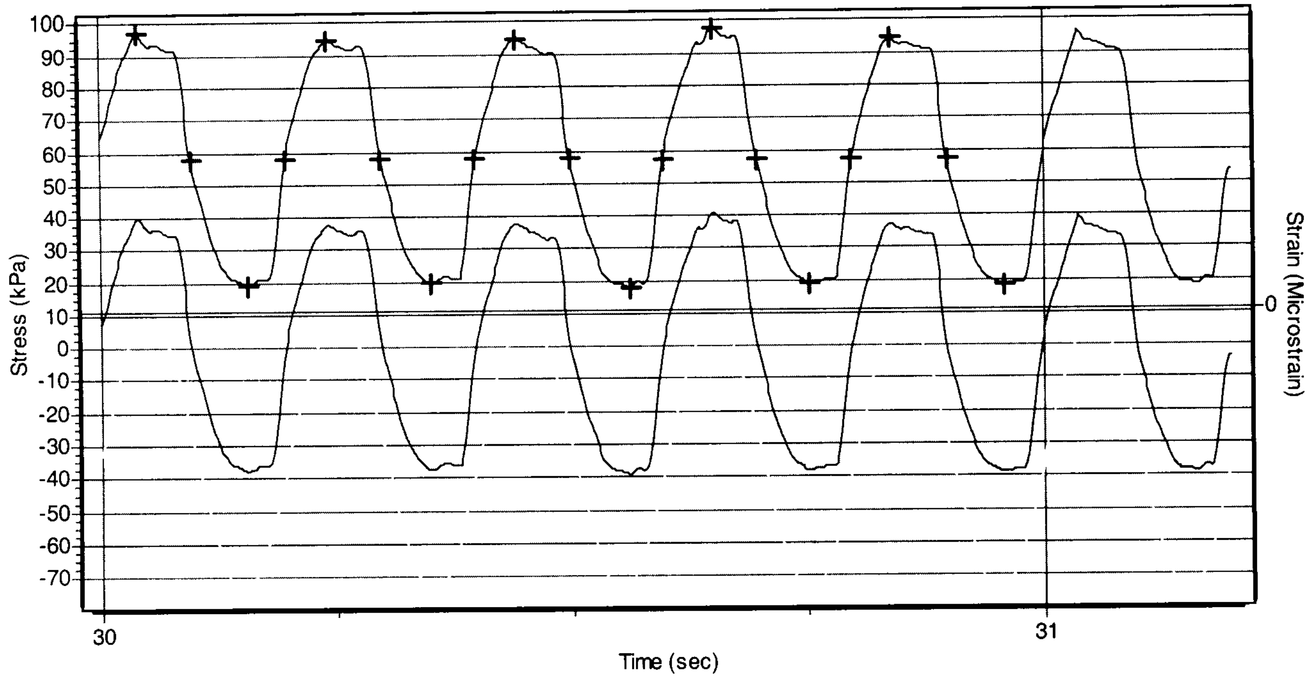
Cross-Sectional Area: 7853.982

Volume: 889070.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#19.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:23 PM

E = 10.91 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.2

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	77.8	75.4	76.9	78.9	76.0	77.0
Recoverable axial micro-strain	1319.7	1328.4	1366.9	1371.3	1373.8	1352.0
Permanent axial micro-strain	555	546	489	531	499	
Dynamic modulus (MPa)	58.9	56.8	56.2	57.5	55.3	57.0
Phase angle (Deg)	10.18	11.84	11.63	12.22	10.97	11.37
Dyn.Modulus/sine(phase angle)	664.1	550.5	555.4	540.3	579.0	577.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.611	0.592	0.604	0.620	0.597	0.605
Maximum load (kN)	0.763 (30.040s)	0.745 (30.242s)	0.747 (30.440s)	0.768 (30.650s)	0.742 (30.838s)	0.753
Minimum load (kN)	0.152 (30.156s)	0.153 (30.350s)	0.143 (30.560s)	0.149 (30.752s)	0.145 (30.956s)	0.148
Maximum averaged axial (mm)	0.212 (30.062s)	0.212 (30.276s)	0.210 (30.462s)	0.215 (30.676s)	0.212 (30.880s)	0.212
Minimum averaged axial (mm)	0.063 (30.160s)	0.062 (30.378s)	0.055 (30.576s)	0.060 (30.778s)	0.056 (30.976s)	0.059
Maximum axial #1 (mm)	0.211 (30.062s)	0.211 (30.276s)	0.209 (30.480s)	0.214 (30.676s)	0.210 (30.864s)	0.211
Minimum axial #1 (mm)	0.060 (30.156s)	0.059 (30.378s)	0.052 (30.576s)	0.057 (30.778s)	0.054 (30.976s)	0.056
Maximum axial #2 (mm)	0.213 (30.062s)	0.213 (30.276s)	0.212 (30.462s)	0.217 (30.676s)	0.214 (30.880s)	0.214
Minimum axial #2 (mm)	0.066 (30.178s)	0.065 (30.378s)	0.059 (30.576s)	0.063 (30.778s)	0.059 (30.976s)	0.062

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#19

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.2						113.2	

Cross-Sectional Area: 7853.982

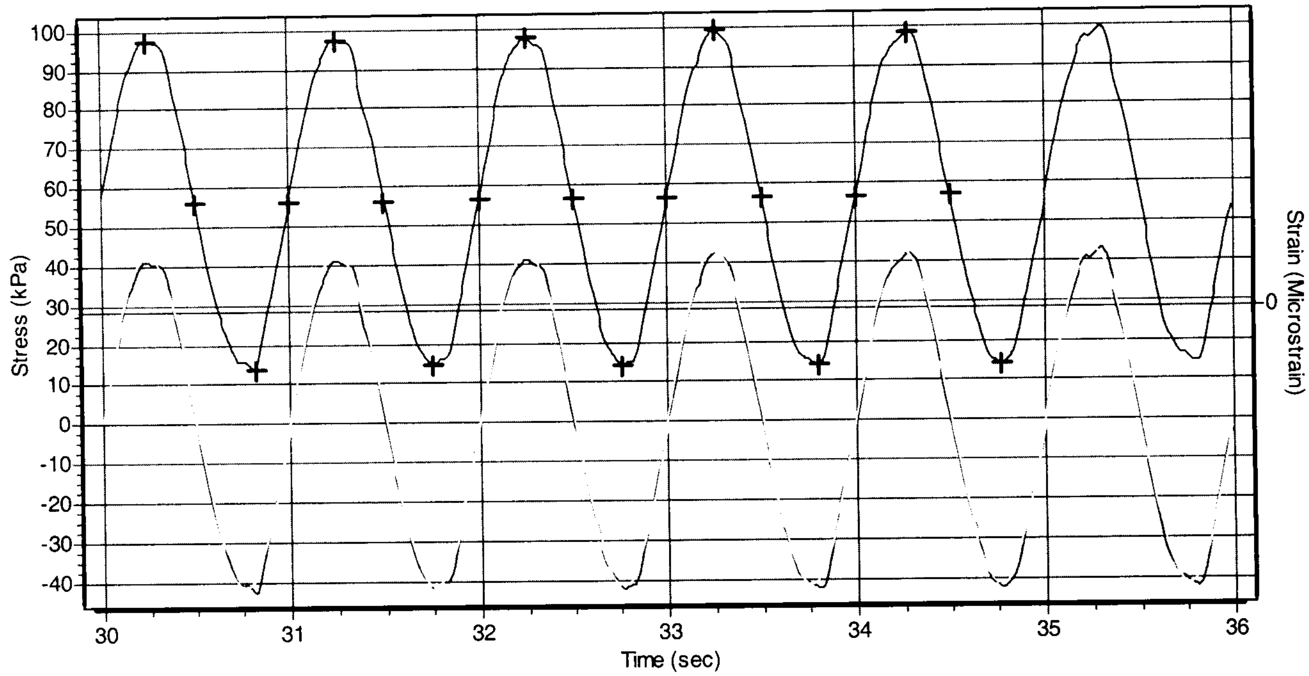
Volume: 889070.7

Comments/Properties: Initial Temp: 56 'C

Final Temp: 52 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#20.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:28 PM

E = 2.70 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.2

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	83.5	82.5	83.1	84.8	84.2	83.6
Recoverable axial micro-strain	1647.8	1602.4	1609.2	1629.6	1614.0	1620.6
Permanent axial micro-strain	703	717	713	723	731	
Dynamic modulus (MPa)	50.7	51.5	51.6	52.0	52.2	51.6
Phase angle (Deg)	10.05	10.76	11.96	11.58	10.49	10.97
Dyn.Modulus/sine(phase angle)	578.3	549.1	495.7	516.0	570.8	542.0
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.656	0.648	0.653	0.666	0.661	0.657
Maximum load (kN)	0.764 (30.240s)	0.765 (31.250s)	0.766 (32.250s)	0.778 (33.260s)	0.774 (34.280s)	0.770
Minimum load (kN)	0.108 (30.810s)	0.117 (31.750s)	0.114 (32.750s)	0.112 (33.800s)	0.112 (34.760s)	0.113
Maximum averaged axial (mm)	0.080 (30.320s)	0.081 (31.320s)	0.081 (32.300s)	0.082 (33.270s)	0.083 (34.310s)	0.081
Minimum averaged axial (mm)	-0.107 (30.810s)	-0.100 (31.760s)	-0.102 (32.800s)	-0.103 (33.810s)	-0.100 (34.790s)	-0.102
Maximum axial #1 (mm)	0.077 (30.310s)	0.079 (31.320s)	0.078 (32.300s)	0.080 (33.320s)	0.081 (34.300s)	0.079
Minimum axial #1 (mm)	-0.107 (30.810s)	-0.100 (31.760s)	-0.101 (32.800s)	-0.102 (33.800s)	-0.100 (34.790s)	-0.102
Maximum axial #2 (mm)	0.082 (30.320s)	0.083 (31.310s)	0.083 (32.300s)	0.084 (33.270s)	0.085 (34.310s)	0.084
Minimum axial #2 (mm)	-0.107 (30.810s)	-0.101 (31.760s)	-0.102 (32.810s)	-0.103 (33.810s)	-0.100 (34.790s)	-0.102

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#20

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.2						113.2	

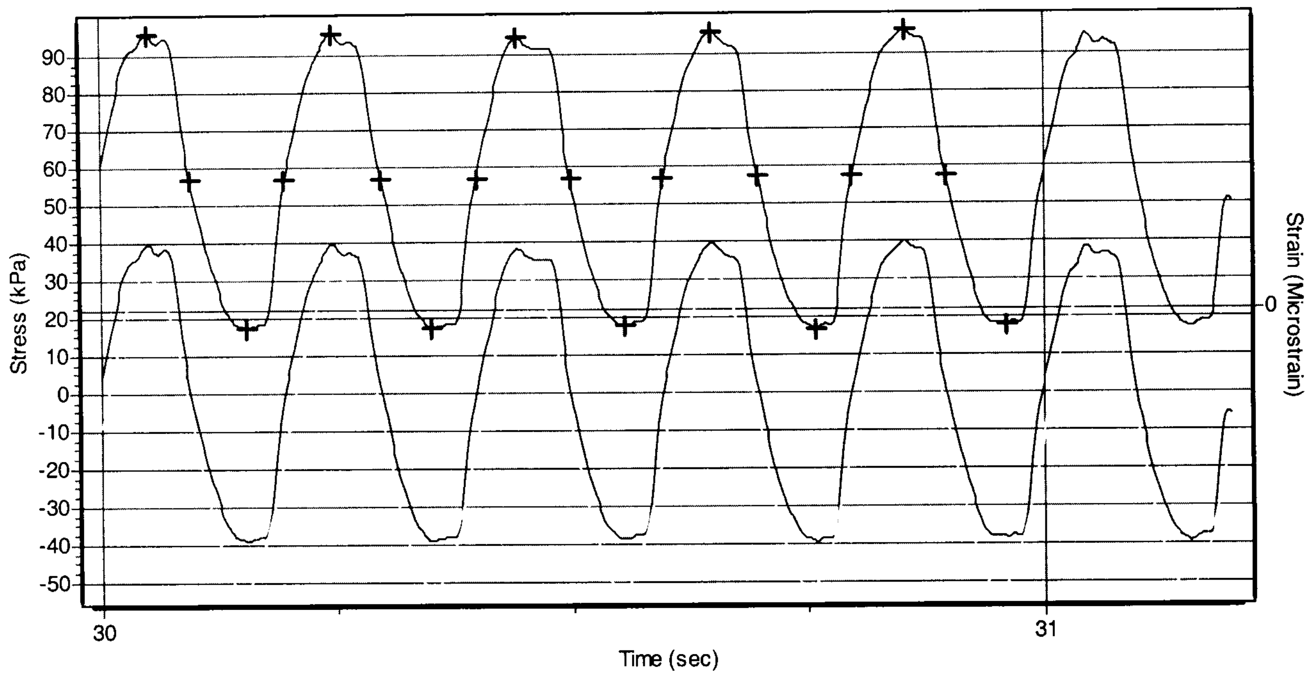
Cross-Sectional Area: 7853.982

Volume: 889070.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#20.B38



Sweep 1 (5Hz)

E = 8.62%

Test Date and Time: Monday, June 10, 2002, at 4:28 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.2
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.6	78.7	76.8	78.8	78.2	78.2
Recoverable axial micro-strain	1417.6	1390.1	1359.4	1407.0	1408.0	1396.4
Permanent axial micro-strain	521	530	543	522	532	
Dynamic modulus (MPa)	55.4	56.6	56.5	56.0	55.6	56.0
Phase angle (Deg)	11.73	11.64	10.58	11.58	11.55	11.42
Dyn.Modulus/sine(phase angle)	542.6	558.3	613.0	555.0	552.1	564.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.617	0.618	0.604	0.619	0.614	0.614
Maximum load (kN)	0.754 (30.050s)	0.754 (30.246s)	0.742 (30.440s)	0.753 (30.648s)	0.756 (30.852s)	0.752
Minimum load (kN)	0.137 (30.154s)	0.136 (30.350s)	0.139 (30.554s)	0.134 (30.758s)	0.142 (30.958s)	0.137
Maximum averaged axial (mm)	0.219 (30.070s)	0.217 (30.264s)	0.215 (30.478s)	0.218 (30.652s)	0.220 (30.860s)	0.218
Minimum averaged axial (mm)	0.059 (30.172s)	0.060 (30.372s)	0.061 (30.560s)	0.059 (30.774s)	0.060 (30.974s)	0.060
Maximum axial #1 (mm)	0.210 (30.070s)	0.207 (30.266s)	0.205 (30.476s)	0.208 (30.652s)	0.210 (30.860s)	0.208
Minimum axial #1 (mm)	0.049 (30.172s)	0.051 (30.374s)	0.052 (30.558s)	0.050 (30.774s)	0.051 (30.974s)	0.050
Maximum axial #2 (mm)	0.229 (30.070s)	0.228 (30.264s)	0.225 (30.478s)	0.229 (30.654s)	0.229 (30.870s)	0.228
Minimum axial #2 (mm)	0.068 (30.156s)	0.069 (30.370s)	0.071 (30.574s)	0.069 (30.774s)	0.070 (30.974s)	0.069

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#20

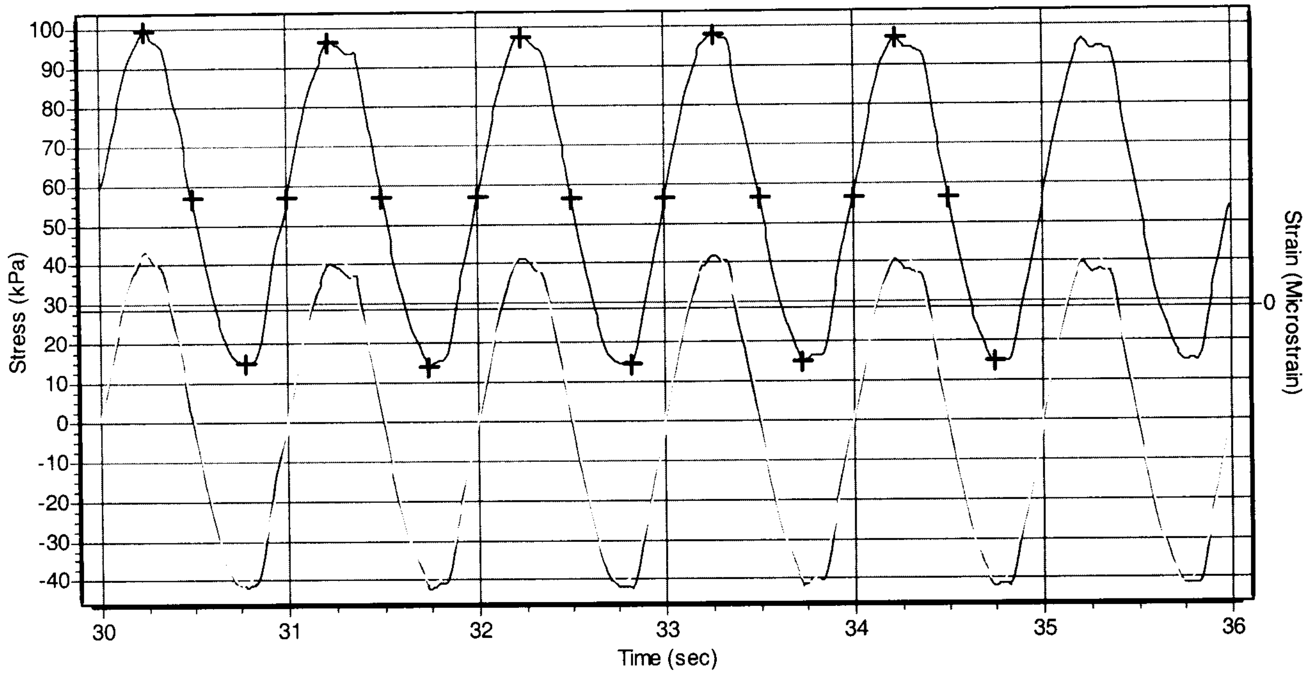
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.2						113.2	

Cross-Sectional Area: 7853.982
Volume: 889070.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#21.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:32 PM

ε̄ = 3.75%

Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.7
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	84.6	82.5	83.4	83.4	82.4	83.3
Recoverable axial micro-strain	1682.3	1671.9	1689.2	1664.3	1675.2	1676.6
Permanent axial micro-strain	782	771	791	807	787	
Dynamic modulus (MPa)	50.3	49.3	49.4	50.1	49.2	49.7
Phase angle (Deg)	12.19	11.53	11.52	11.47	10.83	11.51
Dyn.Modulus/sine(phase angle)	473.9	491.3	491.7	501.4	521.4	495.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.665	0.648	0.655	0.655	0.647	0.654
Maximum load (kN)	0.782 (30.240s)	0.760 (31.220s)	0.768 (32.230s)	0.772 (33.260s)	0.764 (34.220s)	0.769
Minimum load (kN)	0.117 (30.770s)	0.112 (31.740s)	0.113 (32.810s)	0.117 (33.730s)	0.116 (34.740s)	0.115
Maximum averaged axial (mm)	0.089 (30.310s)	0.088 (31.350s)	0.090 (32.260s)	0.092 (33.330s)	0.090 (34.230s)	0.090
Minimum averaged axial (mm)	-0.102 (30.820s)	-0.102 (31.810s)	-0.102 (32.810s)	-0.098 (33.820s)	-0.101 (34.810s)	-0.101
Maximum axial #1 (mm)	0.093 (30.320s)	0.092 (31.260s)	0.094 (32.260s)	0.096 (33.330s)	0.095 (34.230s)	0.094
Minimum axial #1 (mm)	-0.103 (30.820s)	-0.103 (31.810s)	-0.104 (32.810s)	-0.098 (33.830s)	-0.102 (34.810s)	-0.102
Maximum axial #2 (mm)	0.085 (30.310s)	0.084 (31.350s)	0.085 (32.260s)	0.088 (33.330s)	0.085 (34.350s)	0.085
Minimum axial #2 (mm)	-0.102 (30.820s)	-0.102 (31.810s)	-0.101 (32.810s)	-0.097 (33.820s)	-0.100 (34.810s)	-0.100

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#21

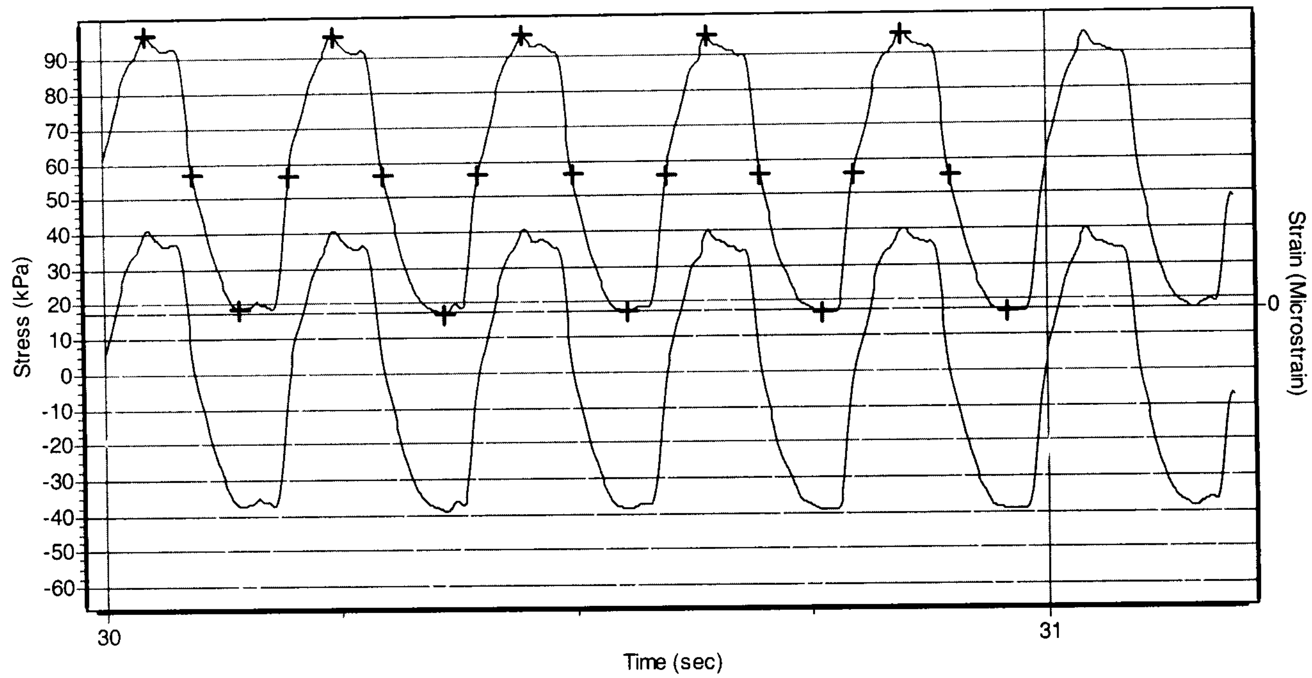
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

Cross-Sectional Area: 7853.982
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#21.B38



Sweep 1 (5Hz)

E = 16.79 %

Test Date and Time: Monday, June 10, 2002, at 4:32 PM
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.7
Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.6	79.7	79.1	79.2	79.5	79.2
Recoverable axial micro-strain	1380.3	1428.3	1418.2	1434.8	1453.9	1423.1
Permanent axial micro-strain	1253	1204	1217	1199	1190	
Dynamic modulus (MPa)	57.0	55.8	55.7	55.2	54.7	55.7
Phase angle (Deg)	11.92	11.54	13.05	11.23	12.17	11.98
Dyn.Modulus/sine(phase angle)	548.6	554.9	490.6	564.4	516.1	534.9
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.618	0.626	0.621	0.622	0.625	0.622
Maximum load (kN)	0.762 (30.046s)	0.758 (30.246s)	0.757 (30.444s)	0.753 (30.642s)	0.755 (30.846s)	0.757
Minimum load (kN)	0.145 (30.144s)	0.132 (30.360s)	0.136 (30.554s)	0.130 (30.762s)	0.130 (30.956s)	0.135
Maximum averaged axial (mm)	0.299 (30.048s)	0.299 (30.246s)	0.300 (30.446s)	0.299 (30.682s)	0.301 (30.878s)	0.300
Minimum averaged axial (mm)	0.142 (30.180s)	0.137 (30.378s)	0.138 (30.576s)	0.136 (30.776s)	0.135 (30.976s)	0.138
Maximum axial #1 (mm)	0.309 (30.048s)	0.308 (30.246s)	0.309 (30.446s)	0.308 (30.682s)	0.309 (30.850s)	0.309
Minimum axial #1 (mm)	0.149 (30.180s)	0.144 (30.378s)	0.146 (30.558s)	0.143 (30.776s)	0.142 (30.976s)	0.145
Maximum axial #2 (mm)	0.290 (30.078s)	0.290 (30.246s)	0.291 (30.470s)	0.291 (30.682s)	0.292 (30.876s)	0.291
Minimum axial #2 (mm)	0.136 (30.180s)	0.130 (30.378s)	0.131 (30.576s)	0.130 (30.776s)	0.128 (30.976s)	0.131

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#21

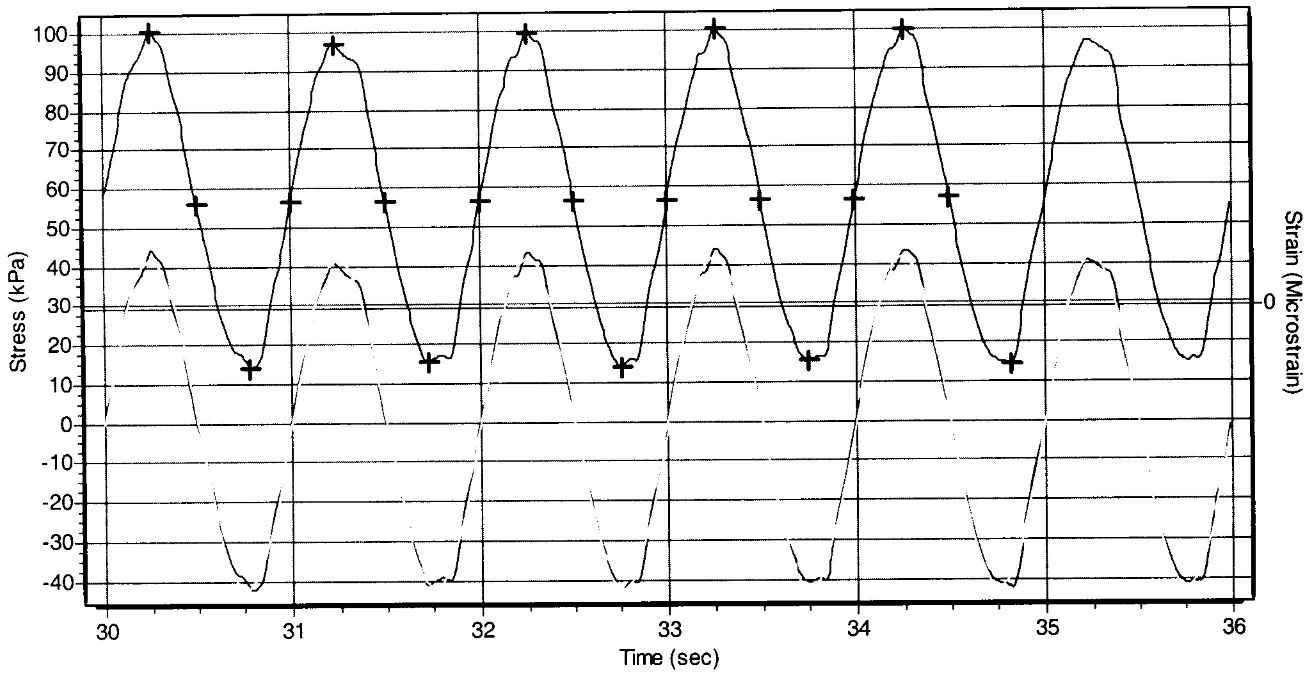
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.7						113.7	

Cross-Sectional Area: 7853.982
Volume: 892997.7

Comments/Properties: Initial Temp: 56 'C
Final Temp: 53 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#22.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:36 PM   E = 3.53%
Data Filtering: Spencers 15 Point
Curve fitting: Not used
Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0
Confining Pressure (kPa): 5.2
Axial Gauge Length (mm): 113.9
Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	86.5	82.0	85.5	84.7	85.6	84.9
Recoverable axial micro-strain	1714.2	1601.5	1673.8	1642.8	1694.8	1665.4
Permanent axial micro-strain	705	673	718	716	734	
Dynamic modulus (MPa)	50.5	51.2	51.1	51.6	50.5	51.0
Phase angle (Deg)	13.14	11.44	11.63	11.32	11.44	11.79
Dyn.Modulus/sine(phase angle)	441.2	513.2	504.2	523.0	507.1	497.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.680	0.644	0.671	0.665	0.673	0.667
Maximum load (kN)	0.791 (30.260s)	0.764 (31.230s)	0.783 (32.250s)	0.789 (33.260s)	0.786 (34.260s)	0.783
Minimum load (kN)	0.111 (30.780s)	0.121 (31.720s)	0.112 (32.750s)	0.124 (33.750s)	0.113 (34.820s)	0.116
Maximum averaged axial (mm)	0.080 (30.270s)	0.077 (31.260s)	0.082 (32.320s)	0.082 (33.270s)	0.084 (34.320s)	0.081
Minimum averaged axial (mm)	-0.115 (30.810s)	-0.106 (31.830s)	-0.109 (32.760s)	-0.106 (33.830s)	-0.109 (34.820s)	-0.109
Maximum axial #1 (mm)	0.082 (30.270s)	0.079 (31.250s)	0.083 (32.270s)	0.083 (33.270s)	0.085 (34.310s)	0.082
Minimum axial #1 (mm)	-0.120 (30.800s)	-0.111 (31.830s)	-0.114 (32.820s)	-0.111 (33.830s)	-0.114 (34.820s)	-0.114
Maximum axial #2 (mm)	0.079 (30.310s)	0.075 (31.360s)	0.081 (32.320s)	0.080 (33.270s)	0.082 (34.320s)	0.079
Minimum axial #2 (mm)	-0.109 (30.810s)	-0.101 (31.830s)	-0.104 (32.760s)	-0.100 (33.830s)	-0.105 (34.820s)	-0.104

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#22

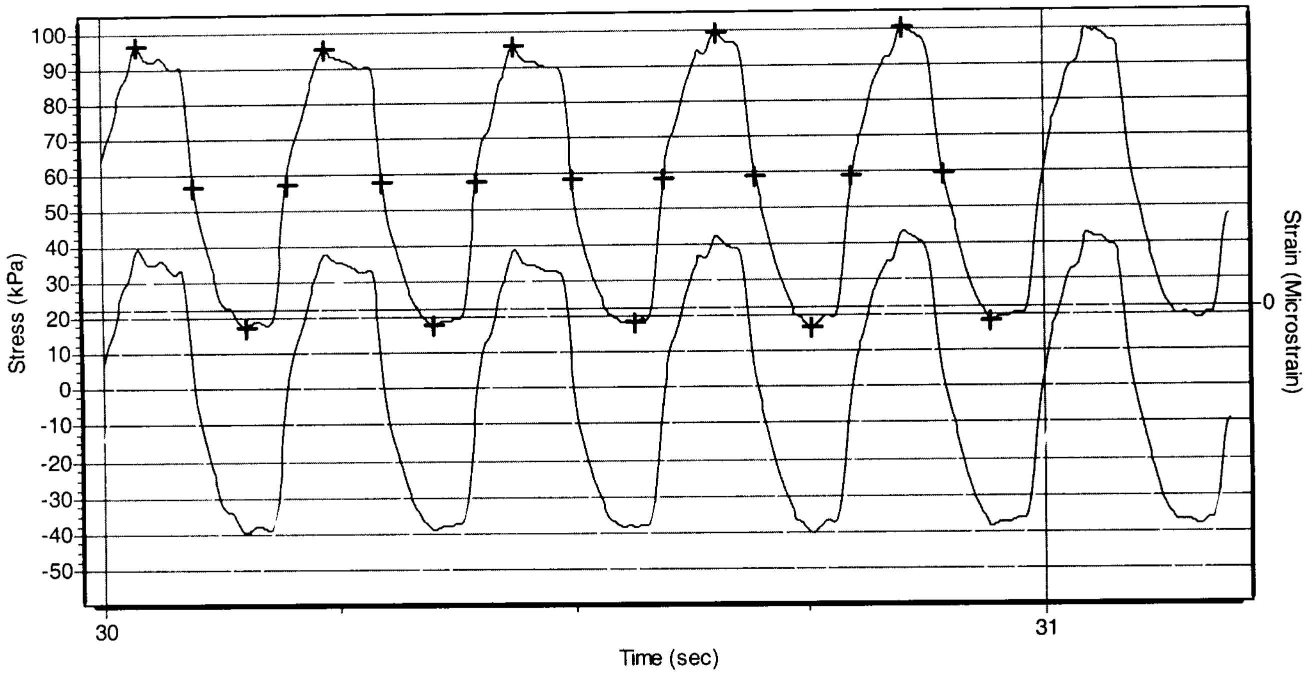
Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.9						113.9	

Cross-Sectional Area: 7853.982
Volume: 894568.5

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#22.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:36 PM

E = 11.90%

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 113.9

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	79.3	77.3	77.7	82.9	82.1	79.9
Recoverable axial micro-strain	1388.9	1336.4	1378.2	1402.0	1382.6	1377.6
Permanent axial micro-strain	839	878	844	853	893	
Dynamic modulus (MPa)	57.1	57.8	56.4	59.1	59.4	58.0
Phase angle (Deg)	8.68	9.38	8.94	11.88	12.77	10.33
Dyn.Modulus/sine(phase angle)	754.4	707.6	724.1	571.0	533.8	658.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.623	0.607	0.611	0.651	0.645	0.627
Maximum load (kN)	0.760 (30.038s)	0.750 (30.238s)	0.757 (30.438s)	0.783 (30.654s)	0.790 (30.852s)	0.768
Minimum load (kN)	0.137 (30.152s)	0.143 (30.350s)	0.146 (30.566s)	0.132 (30.754s)	0.146 (30.944s)	0.141
Maximum averaged axial (mm)	0.254 (30.064s)	0.252 (30.254s)	0.253 (30.440s)	0.257 (30.656s)	0.259 (30.856s)	0.255
Minimum averaged axial (mm)	0.096 (30.178s)	0.100 (30.356s)	0.096 (30.578s)	0.097 (30.754s)	0.102 (30.958s)	0.098
Maximum axial #1 (mm)	0.256 (30.064s)	0.254 (30.252s)	0.256 (30.440s)	0.259 (30.656s)	0.262 (30.854s)	0.258
Minimum axial #1 (mm)	0.094 (30.178s)	0.098 (30.356s)	0.094 (30.580s)	0.096 (30.754s)	0.100 (30.958s)	0.096
Maximum axial #2 (mm)	0.251 (30.064s)	0.250 (30.284s)	0.250 (30.440s)	0.255 (30.676s)	0.256 (30.856s)	0.253
Minimum axial #2 (mm)	0.097 (30.178s)	0.102 (30.378s)	0.098 (30.566s)	0.099 (30.754s)	0.104 (30.960s)	0.100

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#22

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	113.9						113.9	

Cross-Sectional Area: 7853.982

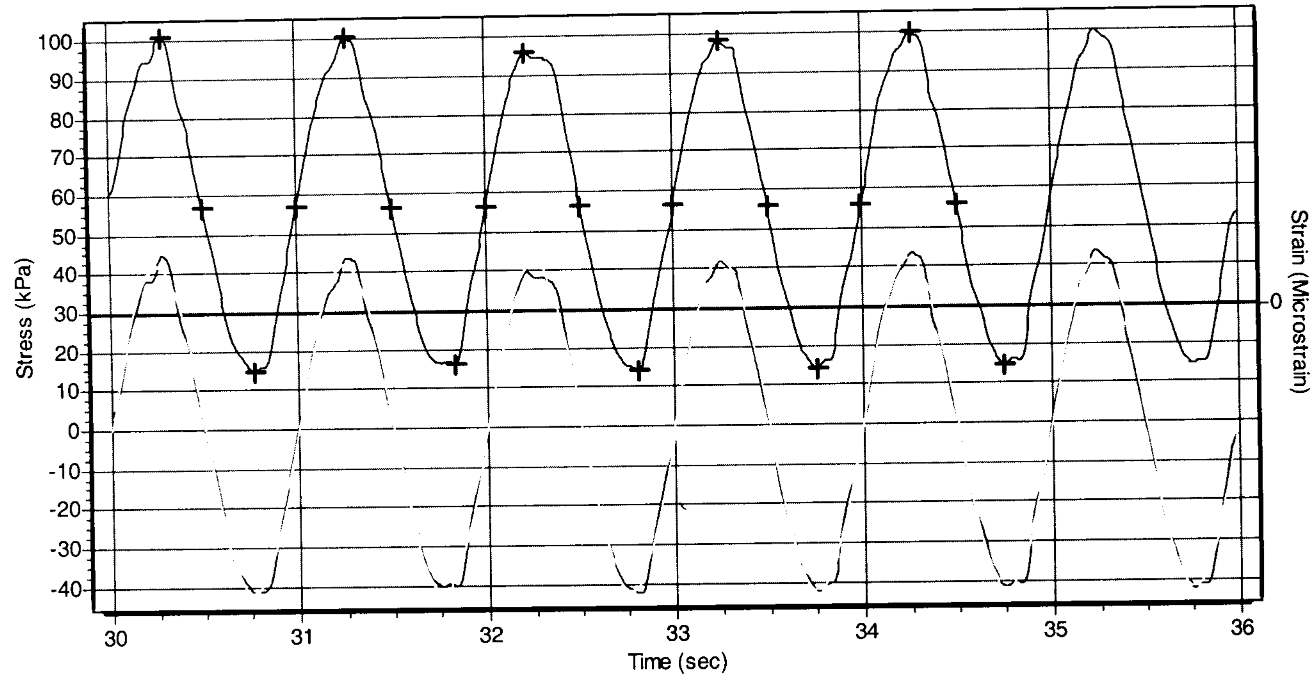
Volume: 894568.5

Comments/Properties: Initial Temp: 57 'C

Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#23.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:40 PM

E = 3.82 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.3

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	86.6	84.2	82.0	84.1	85.1	84.4
Recoverable axial micro-strain	1639.5	1537.1	1638.4	1620.0	1614.5	1609.9
Permanent axial micro-strain	726	675	715	734	741	
Dynamic modulus (MPa)	52.8	54.8	50.0	51.9	52.7	52.5
Phase angle (Deg)	192.97	191.23	190.87	190.90	190.80	191.35
Dyn.Modulus/sine(phase angle)	53.2	55.1	50.3	52.2	53.0	52.7
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.680	0.661	0.644	0.661	0.669	0.663
Maximum load (kN)	0.795 (30.290s)	0.790 (31.260s)	0.756 (32.210s)	0.774 (33.250s)	0.786 (34.270s)	0.780
Minimum load (kN)	0.115 (30.760s)	0.128 (31.830s)	0.112 (32.800s)	0.113 (33.760s)	0.117 (34.750s)	0.117
Maximum averaged axial (mm)	0.083 (31.300s)	0.077 (32.320s)	0.082 (33.330s)	0.084 (34.310s)	0.085 (35.250s)	0.082
Minimum averaged axial (mm)	-0.104 (30.770s)	-0.099 (31.830s)	-0.106 (32.800s)	-0.101 (33.770s)	-0.100 (34.830s)	-0.102
Maximum axial #1 (mm)	0.083 (31.310s)	0.077 (32.330s)	0.082 (33.330s)	0.083 (34.310s)	0.084 (35.250s)	0.082
Minimum axial #1 (mm)	-0.110 (30.810s)	-0.104 (31.830s)	-0.111 (32.800s)	-0.106 (33.770s)	-0.105 (34.830s)	-0.107
Maximum axial #2 (mm)	0.083 (31.300s)	0.077 (32.310s)	0.082 (33.330s)	0.084 (34.310s)	0.085 (35.250s)	0.082
Minimum axial #2 (mm)	-0.099 (30.770s)	-0.093 (31.830s)	-0.100 (32.800s)	-0.096 (33.770s)	-0.095 (34.830s)	-0.097

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#23

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.3						114.3	

Cross-Sectional Area: 7853.982

Volume: 897710.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

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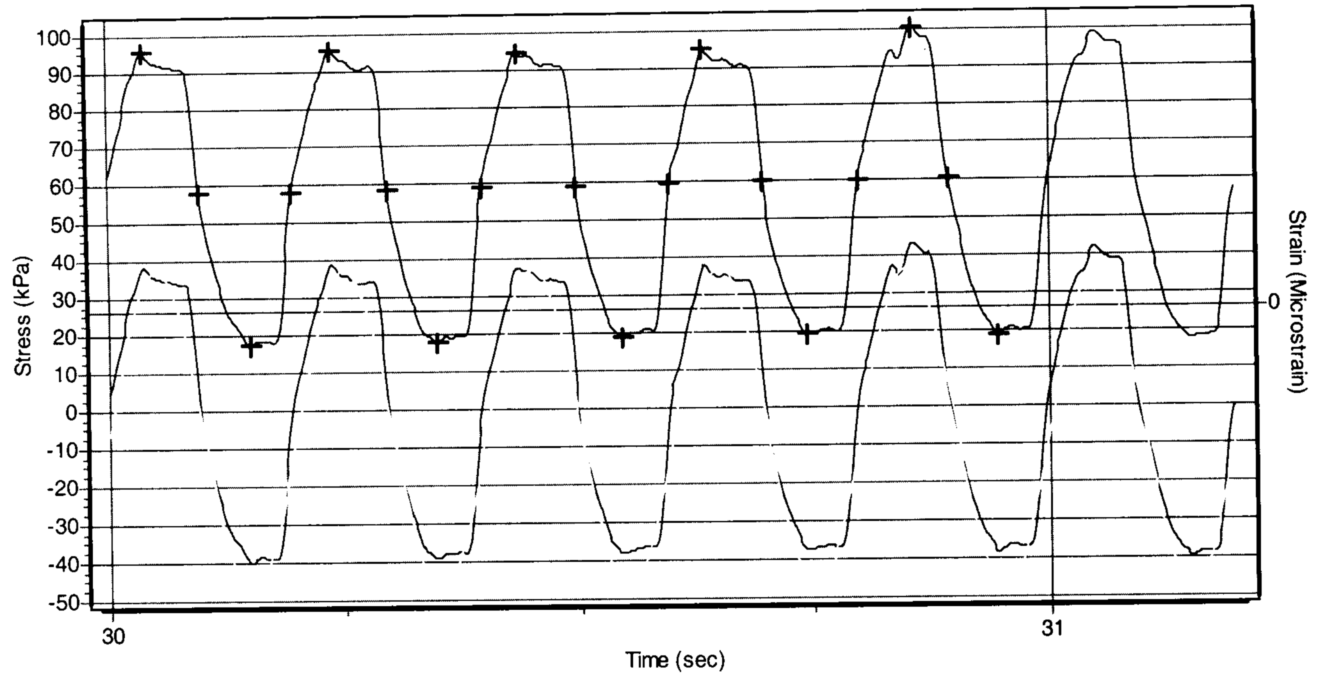


Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:40 PM

E = 11.97 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.3

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.3	77.9	75.5	75.6	81.5	77.7
Recoverable axial micro-strain	1323.9	1301.2	1250.8	1311.2	1283.8	1294.2
Permanent axial micro-strain	895	926	973	974	986	
Dynamic modulus (MPa)	59.1	59.8	60.4	57.7	63.5	60.1
Phase angle (Deg)	185.03	190.05	189.70	189.62	191.85	189.25
Dyn.Modulus/sine(phase angle)	59.2	60.1	60.6	57.9	63.8	60.3
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.615	0.612	0.593	0.594	0.640	0.611
Maximum load (kN)	0.749 (30.038s)	0.752 (30.238s)	0.742 (30.436s)	0.747 (30.634s)	0.788 (30.856s)	0.756
Minimum load (kN)	0.134 (30.150s)	0.141 (30.348s)	0.149 (30.546s)	0.153 (30.744s)	0.148 (30.946s)	0.145
Maximum averaged axial (mm)	0.254 (30.278s)	0.255 (30.448s)	0.254 (30.684s)	0.261 (30.874s)	0.259 (31.054s)	0.257
Minimum averaged axial (mm)	0.102 (30.176s)	0.106 (30.378s)	0.111 (30.580s)	0.111 (30.778s)	0.113 (30.970s)	0.109
Maximum axial #1 (mm)	0.255 (30.278s)	0.256 (30.448s)	0.255 (30.658s)	0.263 (30.868s)	0.261 (31.070s)	0.258
Minimum axial #1 (mm)	0.100 (30.176s)	0.103 (30.378s)	0.108 (30.580s)	0.109 (30.778s)	0.110 (30.970s)	0.106
Maximum axial #2 (mm)	0.253 (30.278s)	0.253 (30.470s)	0.253 (30.682s)	0.261 (30.874s)	0.259 (31.056s)	0.256
Minimum axial #2 (mm)	0.105 (30.178s)	0.108 (30.378s)	0.114 (30.580s)	0.114 (30.778s)	0.115 (30.978s)	0.111

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#23

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.3						114.3	

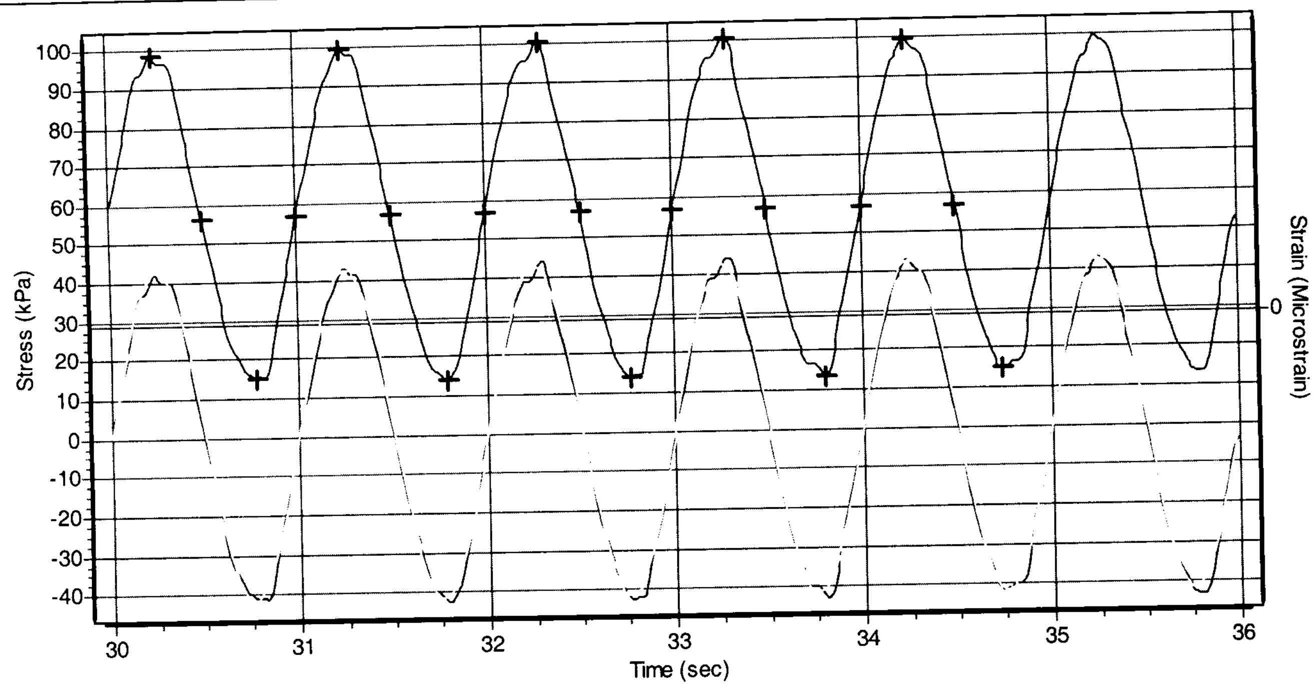
Cross-Sectional Area: 7853.982

Volume: 897710.1

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#24.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:45 PM   E = 3.26 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 108.6

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	83.5	85.8	86.5	86.9	84.8	85.5
Recoverable axial micro-strain	2176.1	2189.7	2235.0	2253.1	2108.9	2192.6
Permanent axial micro-strain	993	1019	1056	1068	1046	
Dynamic modulus (MPa)	38.3	39.2	38.7	38.6	40.2	39.0
Phase angle (Deg)	12.43	11.30	10.85	11.75	11.40	11.54
Dyn.Modulus/sine(phase angle)	354.3	398.2	409.4	377.0	405.1	388.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.655	0.674	0.679	0.683	0.666	0.672
Maximum load (kN)	0.774 (30.240s)	0.783 (31.240s)	0.790 (32.290s)	0.790 (33.290s)	0.783 (34.240s)	0.784
Minimum load (kN)	0.119 (30.770s)	0.108 (31.780s)	0.110 (32.760s)	0.108 (33.800s)	0.117 (34.740s)	0.112
Maximum averaged axial (mm)	0.108 (30.310s)	0.111 (31.310s)	0.115 (32.300s)	0.116 (33.300s)	0.114 (34.260s)	0.113
Minimum averaged axial (mm)	-0.129 (30.820s)	-0.127 (31.780s)	-0.128 (32.810s)	-0.129 (33.810s)	-0.115 (34.830s)	-0.126
Maximum axial #1 (mm)	0.106 (30.320s)	0.109 (31.300s)	0.113 (32.300s)	0.114 (33.300s)	0.111 (34.250s)	0.111
Minimum axial #1 (mm)	-0.132 (30.820s)	-0.130 (31.780s)	-0.131 (32.810s)	-0.132 (33.810s)	-0.119 (34.820s)	-0.129
Maximum axial #2 (mm)	0.110 (30.310s)	0.113 (31.310s)	0.116 (32.300s)	0.118 (33.300s)	0.116 (34.270s)	0.115
Minimum axial #2 (mm)	-0.125 (30.820s)	-0.124 (31.780s)	-0.125 (32.810s)	-0.125 (33.810s)	-0.112 (34.830s)	-0.122

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#24

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	108.6						108.6	

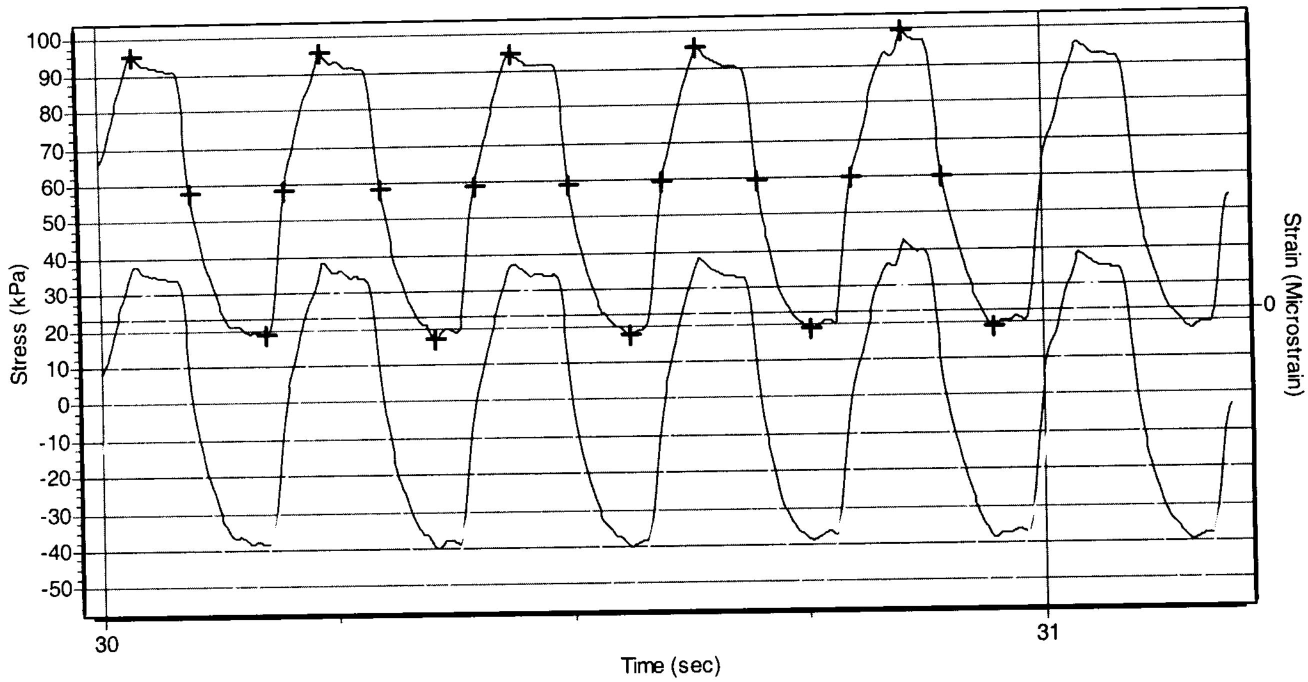
Cross-Sectional Area: 7853.982

Volume: 852942.4

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#24.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:45 PM

E = 11.82%

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): 0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 108.6

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	76.4	78.5	77.2	77.2	80.8	78.0
Recoverable axial micro-strain	1771.6	1780.9	1772.3	1733.7	1753.5	1762.4
Permanent axial micro-strain	1279	1272	1283	1316	1374	
Dynamic modulus (MPa)	43.1	44.1	43.5	44.5	46.1	44.3
Phase angle (Deg)	11.66	10.06	9.31	8.93	11.75	10.34
Dyn.Modulus/sine(phase angle)	424.7	502.4	536.4	571.9	450.3	497.2
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.600	0.616	0.606	0.606	0.635	0.613
Maximum load (kN)	0.748 (30.038s)	0.752 (30.238s)	0.742 (30.438s)	0.752 (30.636s)	0.782 (30.854s)	0.755
Minimum load (kN)	0.147 (30.176s)	0.135 (30.354s)	0.136 (30.560s)	0.146 (30.754s)	0.148 (30.946s)	0.142
Maximum averaged axial (mm)	0.331 (30.082s)	0.332 (30.256s)	0.332 (30.470s)	0.331 (30.658s)	0.340 (30.874s)	0.333
Minimum averaged axial (mm)	0.139 (30.178s)	0.138 (30.376s)	0.139 (30.562s)	0.143 (30.778s)	0.149 (30.980s)	0.142
Maximum axial #1 (mm)	0.316 (30.082s)	0.316 (30.256s)	0.317 (30.474s)	0.316 (30.676s)	0.324 (30.874s)	0.318
Minimum axial #1 (mm)	0.125 (30.178s)	0.124 (30.376s)	0.125 (30.576s)	0.128 (30.778s)	0.135 (30.980s)	0.127
Maximum axial #2 (mm)	0.347 (30.082s)	0.347 (30.282s)	0.347 (30.482s)	0.346 (30.660s)	0.355 (30.874s)	0.348
Minimum axial #2 (mm)	0.153 (30.178s)	0.152 (30.376s)	0.153 (30.562s)	0.158 (30.778s)	0.164 (30.980s)	0.156

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#24

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	108.6						108.6	

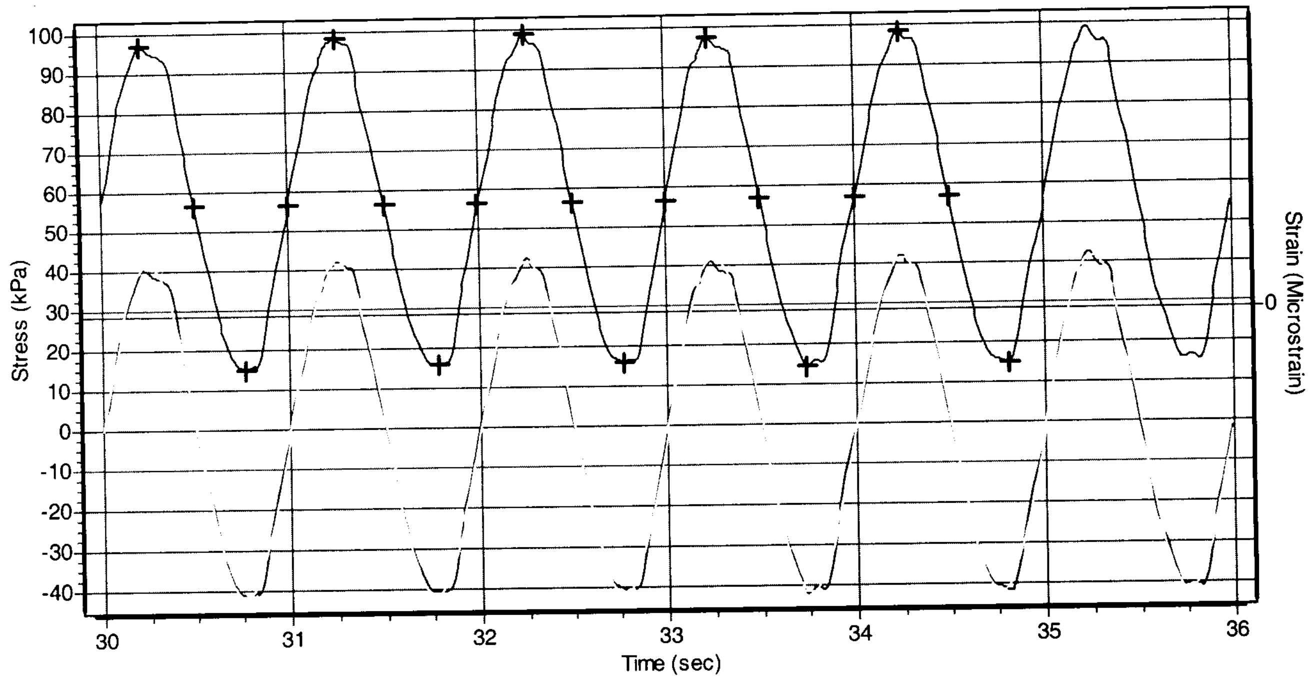
Cross-Sectional Area: 7853.982

Volume: 852942.4

Comments/Properties: Initial Temp: 57 'C
Final Temp: 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#25.B38



Sweep 2 (1Hz)

Test Date and Time: Monday, June 10, 2002, at 4:49 PM

E = 3.34 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.2

Radial Gauge Length (mm): 50

	Cycle #31	Cycle #32	Cycle #33	Cycle #34	Cycle #35	Average
Loading stress (kPa)	81.9	82.4	82.7	83.0	83.8	82.8
Recoverable axial micro-strain	1578.0	1577.9	1611.4	1577.7	1634.2	1595.8
Permanent axial micro-strain	716	744	755	737	763	
Dynamic modulus (MPa)	51.9	52.2	51.3	52.6	51.3	51.9
Phase angle (Deg)	11.17	11.94	13.53	11.81	12.01	12.09
Dyn.Modulus/sine(phase angle)	533.2	502.3	435.3	511.5	490.1	494.5
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.643	0.647	0.649	0.652	0.658	0.650
Maximum load (kN)	0.760 (30.220s)	0.772 (31.260s)	0.776 (32.250s)	0.766 (33.230s)	0.775 (34.240s)	0.770
Minimum load (kN)	0.117 (30.760s)	0.125 (31.780s)	0.127 (32.760s)	0.114 (33.740s)	0.117 (34.800s)	0.120
Maximum averaged axial (mm)	0.082 (30.310s)	0.085 (31.320s)	0.086 (32.270s)	0.084 (33.240s)	0.087 (34.310s)	0.085
Minimum averaged axial (mm)	-0.098 (30.770s)	-0.095 (31.820s)	-0.098 (32.820s)	-0.096 (33.820s)	-0.100 (34.810s)	-0.097
Maximum axial #1 (mm)	0.079 (30.270s)	0.082 (31.330s)	0.083 (32.270s)	0.081 (33.290s)	0.083 (34.310s)	0.082
Minimum axial #1 (mm)	-0.097 (30.820s)	-0.094 (31.820s)	-0.097 (32.820s)	-0.095 (33.810s)	-0.098 (34.810s)	-0.096
Maximum axial #2 (mm)	0.085 (30.310s)	0.088 (31.320s)	0.089 (32.260s)	0.087 (33.240s)	0.091 (34.320s)	0.088
Minimum axial #2 (mm)	-0.100 (30.770s)	-0.096 (31.820s)	-0.099 (32.820s)	-0.097 (33.820s)	-0.101 (34.810s)	-0.099

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#25

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.2						114.2	

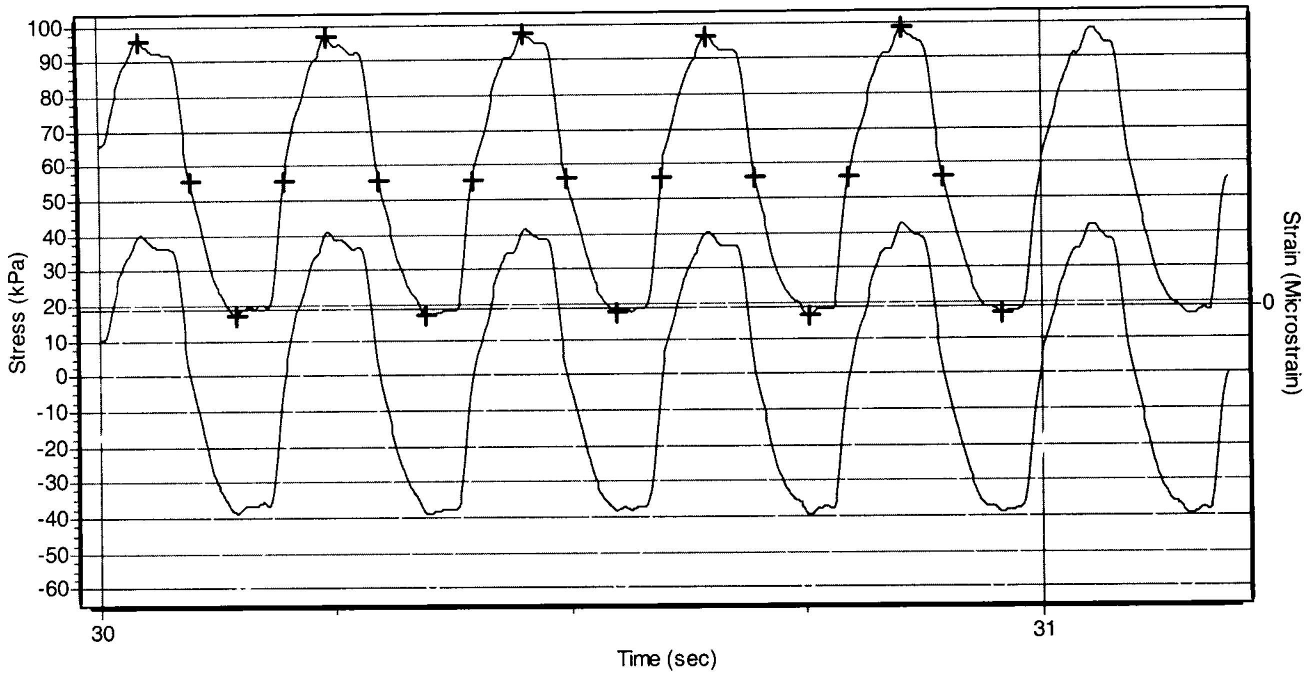
Cross-Sectional Area: 7853.982

Volume: 896924.7

Comments/Properties: Initial Temp: 57 'C
Final Temp: 54 'C

QC/QA of HMA (NETC 01-02) - Dynamic Modulus Report

FileName: C:\UTM\UTM_38\Tests\NETC_01-02_QCQA\Phase 4\NETC_01-02_P4_#25.B38



Sweep 1 (5Hz)

Test Date and Time: Monday, June 10, 2002, at 4:49 PM

E = 10.23 %

Data Filtering: Spencers 15 Point

Curve fitting: Not used

Phase angle: Calculated from mid point values

Temperature (Deg.C): -0.0

Confining Pressure (kPa): 5.2

Axial Gauge Length (mm): 114.2

Radial Gauge Length (mm): 50

	Cycle #151	Cycle #152	Cycle #153	Cycle #154	Cycle #155	Average
Loading stress (kPa)	78.8	80.0	79.9	79.8	81.7	80.0
Recoverable axial micro-strain	1321.8	1359.3	1331.3	1368.9	1399.6	1356.2
Permanent axial micro-strain	1018	1000	1043	992	991	
Dynamic modulus (MPa)	59.6	58.9	60.0	58.3	58.4	59.0
Phase angle (Deg)	12.22	11.55	12.60	11.34	11.11	11.77
Dyn.Modulus/sine(phase angle)	559.8	585.1	546.5	590.3	602.6	576.8
Poisson's ratio						
Recoverable radial micro-strain						
Permanent radial micro-strain						
Dynamic load (kN)	0.619	0.628	0.627	0.627	0.641	0.629
Maximum load (kN)	0.754 (30.044s)	0.761 (30.244s)	0.766 (30.450s)	0.756 (30.646s)	0.775 (30.852s)	0.762
Minimum load (kN)	0.136 (30.146s)	0.133 (30.346s)	0.139 (30.548s)	0.129 (30.754s)	0.134 (30.956s)	0.134
Maximum averaged axial (mm)	0.267 (30.056s)	0.269 (30.246s)	0.271 (30.474s)	0.270 (30.676s)	0.273 (30.856s)	0.270
Minimum averaged axial (mm)	0.116 (30.180s)	0.114 (30.376s)	0.119 (30.566s)	0.113 (30.776s)	0.113 (30.976s)	0.115
Maximum axial #1 (mm)	0.255 (30.056s)	0.257 (30.246s)	0.259 (30.474s)	0.256 (30.676s)	0.260 (30.856s)	0.257
Minimum axial #1 (mm)	0.106 (30.178s)	0.104 (30.378s)	0.109 (30.566s)	0.104 (30.776s)	0.104 (30.978s)	0.105
Maximum axial #2 (mm)	0.280 (30.054s)	0.282 (30.244s)	0.283 (30.474s)	0.283 (30.676s)	0.286 (30.854s)	0.283
Minimum axial #2 (mm)	0.126 (30.180s)	0.124 (30.376s)	0.129 (30.564s)	0.123 (30.776s)	0.123 (30.976s)	0.125

Operator: Jonathan S. Gould - NETTCP #503

Notes/comments: QC/QA of HMA - Dynamic Modulus Testing
NETC 01-02 - Phase 4
1hz & 5hz @ 60'C

Specimen Information

Identification: NETC_01-02 (QC/QA)

Core/Sample Number: P4_#25

Dimensions (mm)	Point 1	Point 2	Point 3	Point 4	Point 5	Point 6	Average	Std Dev.
Diameter (mm)	100						100	
Height (mm)	114.2						114.2	

Cross-Sectional Area: 7853.982

Volume: 896924.7

Comments/Properties: Initial Temp: 57 'C
Final Temp: 'C