THE 2012 CANADIAN ASPHALT EXCHANGE PROGRAM (CAEP)

2012 Detailed Report (July 2013)

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ACKNOWLEDGEMENTS

The author would like to acknowledge the students and staff of the LCMB at École de technologie supérieure who helped with the co-ordination and compilation of the 2012 Canadian Asphalt Exchange Program. The author would also like to acknowledge Magdy Beshara from Saskatchewan Ministry of Highways and Infrastructure for his help with this exchange program.

ABSTRACT

Eleven Canadian engineering organizations participated in the 2012 CANADIAN ASPHALT EXCHANGE PROGRAM. The exchange provides an opportunity for participants to compare their test results to those of other laboratories. It provides a mechanism for review and refinement of existing test methods and equipment. The exchange evaluates the properties of bitumen and asphalt emulsion using Penetration, Solubility, Viscosity, Dynamic Shear Rheometer, Bending Beam Rheometer, Elastic Recovery, etc.

This report documents the test results for the year 2012 CANADIAN ASPHALT EXCHANGE PROGRAM.

The complete report is available on the internet at the following address:
http://www.etsmtl.ca/Unites-de-recherche/LCMB/CAMEP-CAEP

1 INTRODUCTION

The Canadian Asphalt Exchange Program (CAEP) is part of the CANADIAN ASPHALT AND MIX PROGRAM (CAMP). The exchange program is operated by a steering committee under the umbrella of the Canadian User Producer Group for Asphalt (CUPGA).

Eleven participants obtained samples in the four different parts of the asphalt exchange program. The asphalt exchange program consisted of the following testing programs:

- Asphalt Cement Testing (9 labs)
- Emulsified Asphalt Testing (8 labs)
- Polymer Modified Emulsified Asphalt Testing (8 labs)
- SHRP (Strategic Highway Research Program) Binder Testing (10 labs)

Participation in the exchange program is voluntary. The results cannot be used for pre-qualification or specification purposes as indicated on the cover page of the report. Laboratory results are confidential and are tabulated based on a randomly assigned laboratory number that is known to the particular laboratory and the co-ordinating agency only. The names of the participating laboratories are shown in Appendix C. The order in which the names are presented is not related to the laboratory numbers used in the other tables contained in this report.

The exchange program operates on an annual basis with samples shipped to participants in June. Test results are returned to the co-ordinating agency by the middle of November. The final report is distributed in June of the following year. Asphalt exchange test results were analysed according to ASTM (American Society for Testing and Materials) test procedure E 691-92 Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method.

École de technologie supérieure Laboratoire sur les Chaussées et Matériaux Bitumineux (LCMB) is the coordinating agency for the asphalt exchange program. Their responsibilities include:

- developing participant lists
- providing instructions for handling and testing of the materials
- arranging and co-ordinating material suppliers
- supplying data collection forms
- collecting and compiling the test data
- preparing and distributing a final report to all participants
- preparing a final report for the CTAA (Canadian Technical Asphalt Association) Proceedings

The material samples were shipped collect to the participants directly by the asphalt suppliers. The coordinating agency provided the asphalt suppliers with the participant lists and addresses. The instruction and test forms are posted on the university’s web site.

2 INSTRUCTIONS TO PARTICIPANTS (Asphalt Cement)

The package of materials for the testing of a 150-200A asphalt cement contains three replicate samples of two litres each. Each of the tests specified should be performed on each replicate sample.

Report the results of a single determination only, not the average of two or more except in cases where an average is called for in the method. Each specified test should be made on the three replicates by the same operator. However, it is not necessary that all tests listed be done by the same operator.

Directions for the individual tests on each of the three replicates of the asphalt cement samples.
The following tests shall be performed:

Original Materials

1. Penetration of Bituminous Materials - ASTM D5

   Report to the nearest whole unit the average of three penetrations at 25° C, 100 g, 5 s, whose values do not differ more than the amount given in ASTM D5.

2. Penetration of Bituminous Materials - ASTM Method D5

   Report to the nearest whole unit the average of three penetrations at 4° C, 100 g, 5 s, whose values do not differ more than the amount given in ASTM D5.

3. Solubility of Bituminous Materials in Organic Solvents - ASTM Method D2042

   Report the percentage of material soluble in trichloroethylene to the nearest 0.01%.

4. Specific Gravity of Semi-Solid Bituminous Materials - ASTM Method D70

   Determine the specific gravity at 25° C relative to water at 25° C. Report the results to the nearest 0.001 gravity unit.

5. Kinematic Viscosity of Asphalts - ASTM Method D2170

   Report to the nearest whole unit the kinematic viscosity at 135° C, mm^2/s.

6. Absolute Viscosity of Asphalts - ASTM Method D2171

   Report to the nearest 0.1 unit the absolute viscosity at 60° C, 300 mm Hg vacuum, Pa·s.

Tests After Thin Film Oven Test

7. Thin Film Oven Test - ASTM Method D1754

   Weigh the sample and container to the nearest milligram. Report the average loss or gain of the material in the two containers. Record the barometric pressure on the day the testing is done in kPa.

8. Penetration of the Residue - ASTM Method D5

   Report to the nearest whole unit the average of three penetrations at 25° C, 100 g, 5 s, whose values do not differ by more than the amount given in method D5.

9. Penetration of the Residue - ASTM Method D5

   Report to the nearest whole unit the average of three penetrations at 4° C, 100 g, 5 s, whose values do not differ by more than the amount given in ASTM D5.

10. Retained Penetration After T.F.O. Test - ASTM Method D5

    Report as percent of the original penetration (at 25° C) to the nearest percent.

11. Kinematic Viscosity of the Residue - ASTM Method D2170

    Report to the nearest whole unit the kinematic viscosity at 135° C, mm^2/s.

12. Absolute Viscosity of the Residue - ASTM Method D2171

    Report to the nearest 0.1 unit the absolute viscosity of the residue at 60° C, 300 mm Hg vacuum Pa·s.

OPTIONAL TESTING

The Rolling Thin Film Oven Test is optional.

Tests After Rolling Thin Film Oven Test

13. Rolling Thin Film Oven Test - ASTM Method D2872

    Weigh the sample and container to the nearest milligram. Report the average loss or gain of the material in the two containers. Record the barometric pressure on the day the testing is done in kPa.

14. Penetration of the Residue - ASTM Method D5

    Report to the nearest whole unit the average of three penetrations at 25° C, 100 g, 5 s, whose values do not differ by more than the amount given in method D5.

15. Penetration of the Residue - ASTM Method D5

    Report to the nearest whole unit the average of three penetrations at 4° C, 100 g, 5 s, whose values do not differ by more than the amount given in ASTM D5.

16. Retained Penetration After R.T.F.O. Test - ASTM Method D5

    Report as percent of the original penetration (at 25° C) to the nearest percent.

17. Kinematic Viscosity of the Residue - ASTM Method D2170

    Report to the nearest whole unit the kinematic viscosity at 135° C, mm^2/s.

18. Absolute Viscosity of the Residue - ASTM Method D2171

    Report to the nearest 0.1 unit the absolute viscosity of the residue at 60° C, 300 mm Hg vacuum, Pa·s.

3 INSTRUCTIONS TO PARTICIPANTS (Asphalt Cement – SHRP Binder Tests)

The package of materials for SHRP binder testing on a PG 58-28 asphalt cement contains three replicate samples of two litres each. Each of the tests specified should be performed on each replicate sample according to the AASHTO or ASTM Standards Method indicated.

Report the results of a single determination only, not the average of two or more except in cases where an average is called for in the method. Each specified test should be made on the three replicates by the same operator. However, it is not necessary that all tests listed be done by the same operator.

Directions for the individual tests on each of the three replicates of the asphalt cement samples.

The following tests shall be performed:

Tests on Original Binder

1. Rotational Viscosity – ASTM D4402

   Determine the viscosity at 135° C using the rotational viscosity apparatus. Report the viscosity to the nearest 0.01 Pa·s.

2. Dynamic Shear Rheometer (DSR) - AASHTO T315

   Determine the complex shear modulus (G*) and the phase angle (δ) at 58° C and at 64° C, using a frequency of 10 rad/s, a 25 mm plate, a 1mm gap and the strain or stress values specified in the method. Report G* to the nearest 0.01 kPa, δ to the nearest 0.1 degree and G*/sin (δ) to the nearest 0.01 kPa. Also report the testing mode (constant stress or constant strain), the actual stress or strain level used, the test temperature, the DSR manufacturer and model number.

Tests on TFO or RTFO Residue

1. Thin-Film Oven Test AASHTO T179 or ASTM D1754: Change in Mass
   OR
   Rolling Thin-Film Oven Test AASHTO T240 or ASTM D2872: Change in Mass

   Weigh the sample and containers to the nearest milligram. Report to the nearest 0.001 percent of the average change in mass of the material in all of the containers if the Thin-Film Oven is used, but only two of the containers if the Rolling Thin-Film Oven is used. Also check the appropriate boxes to indicate the oven used and a mass gain or loss.

2. Dynamic Shear Rheometer (DSR), AASHTO T315

   Determine the complex shear modulus (G*) and the phase angle (δ) at 58° C and 64° C, using a frequency of 10 rad/s, a 25 mm plate, a 1 mm gap and the strain or stress values specified in the method. Report G* to the nearest 0.01 kPa, δ to the nearest 0.1 degree and G*/sin (δ) to the nearest 0.01 kPa.

Tests on PAV Residue

1. Accelerated Aging of Asphalt Binder Using a Pressurized Aging Vessel (PAV), AASHTO R28

   Age the asphalt binder at a temperature of 100° C using the pressurized aging vessel.

2. Dynamic Shear Rheometer (DSR), AASHTO T315

   Determine the complex shear modulus (G*) and the phase angle (δ) at 19° C and 16° C, using a frequency of 10 rad/s, an 8 mm plate, a 2 mm gap and the strain or stress values specified in the method. Report G* to the nearest kPa, δ to the nearest 0.1 degree and G* × sin (δ) to the nearest kPa.

3. Bending Beam Rheometer (BBR), AASHTO T313

   Determine the flexural creep stiffness at -18° C and -24° C. Report the creep stiffness after 60 s in MPa to three significant figures. Report the slope (m) to the nearest 0.001.

4. Direct Tension (DT), AASHTO T314

   Determine the failure stress and failure strain at a temperature of -18° C and -24° C and a strain rate of 1 mm/min. Report the failure stress to the nearest 0.01 MPa and the failure strain to the nearest 0.01 percent.

4 PARTICIPANT SAMPLE PACKAGES (Emulsified Asphalt)

The package of materials for the testing of an HF-150S emulsified asphalt contains three replicate samples.

Each of the following tests should be performed on each of the three replicate samples.

Tests on Emulsion:

1. Saybolt-Furol Viscosity at 50°C, (seconds)
   (Use the same orifice for each test)

2. Residue by Distillation, (% by mass)
   (Use the same still apparatus for each test)

3. Oil Portion of Distillate, (% by volume)

4. Demulsibility, 50 ml, 5.55 g/l $CaCl_2$, (% by mass)

Tests on Residue

1. Penetration at 25°C, 100g, 5 seconds, (dmm)
   In addition to test procedure given in ASTM D244, please use the following procedure to prepare the distillation residue for penetration testing:

   a. Follow ASTM D5 except for the following. As soon as possible after the completion of the distillation test, pour residual asphalt into the penetration container until it is approximately half full. Pour an additional 25 mL of residue into a preheated container with a pouring spout and set this on a hot plate at 260°C for viscosity and float tests. Pour remaining residue into penetration container to a depth of approximately 60mm. Do not pour residual asphalt through a sieve.

   b. Immediately remove the pen can from the hot plate after pouring of the sample. Place the pen can on a 3/4" thick plywood base covered with a paper towel. Note that the piece of plywood should be large enough to ensure full contact with the inverted glass beaker.

   c. Cover the pen can with a 600 ml low-form glass beaker. Condition the sample 1 1/2 hours at room temperature and 1 1/2 hours in the temperature bath (25 °C exactly) before running the penetration test.

   d. Distilled water should be used in the temperature bath for conditioning sample.

   e. Report to nearest whole unit the average of three penetrations whose values do not differ by more than the following:

If first reading is between:	Maximum difference between highest and lowest reading:
101 - 150	20
151 - 200	25
201 - 250	30
251 - 300	35

- If, after five penetrations of an individual residue sample three acceptable values are not obtained, then a second residue shall be prepared from the same emulsion sample.

- The intent is to standardise the procedure for residue conditioning in air. The described procedure will reduce the effects of variable heat loss due to air conditioning, drafts and varying types of counter tops.

2. Apparent Viscosity at 60° C, (Pa·s)
   (Use the same viscosity tube for each test)

Follow ASTM D4957 Standard Test Method for APPARENT VISCOSITY OF ASPHALT EMULSION RESIDUES AND NON-NEWTONIAN BITUMENS BY VACUUM CAPILLARY VISCOMETER.

- Select a viscometer that will give a flow time between 50 s and 200 s for the C zone of a Modified Koppers viscometer.
- All viscosity testing shall be conducted at 60 °C under a 30 cm Hg vacuum. Viscosity determinations with Modified Koppers shall be reported at the shear rate of 0.5 s^{-1}.
- If the residues rise into be B zone of Modified Koppers tubes prior to applying the vacuum, use only the C, D, E and F zone flow times for viscosity and shear rate determinations.
- Cooling of residues to ambient temperature and re-heating for testing at a later time shall not be permitted.
- Koch Materials Ltd. suggests a tube size of mK 100 for testing this emulsion residue.

Each sample should be thoroughly mixed before pouring for the individual tests. Care should be taken not to entrain air in the samples during mixing.

Report the results of a single determination only, not the average of two or more except in cases where an average is called for in the method. Each individual test should be made on the three replicates by the same operator. However, it is not necessary that all tests listed be done by the same operator.

PLEASE PLAN TO CONDUCT YOUR TESTING OF THE EMULSION SAMPLES WITHIN FOUR WEEKS OF THE DISPATCH OF THE SAMPLE.

5 INSTRUCTIONS TO PARTICIPANTS (Polymer Emulsified Asphalt)

The package of materials for the testing of an HF-150P emulsified asphalt contains three replicate samples.

Each of the following tests should be performed on each of the three replicate samples:

Tests on Emulsion

1. Saybolt-Furol Viscosity at 50 °C, (seconds)
   (Use the same orifice for each test)
2. Residue by Distillation, (% by mass)
   (Use the same still apparatus for each test)
3. Oil Portion of Distillate, (% by volume)
4. Demulsibility, 50 ml, 5.55 g/l $CaCl_2$, (% by mass)
5. Sieve Test

Tests on Residue

1. Penetration at 25 °C, 100 g, 5 seconds, (dmm)
2. Apparent Viscosity at 60 °C, (Pa·s)
   (Use the same viscosity tube for each test)

3. Float Test

4. Solubility Test

5. Ash Content Test

6. Elastic Recovery Test

All testing for the specified properties shall be conducted in accordance with the attached HF150P Testing Procedures.

Report the results of a single determination only, not the average of two or more except in cases where an average is called for in the method. Each individual test should be made on the two replicates by the same operator. However, it is not necessary that all tests listed be done by the same operator.

PLEASE PLAN TO CONDUCT YOUR TESTING OF THE POLYMER MODIFIED EMULSION SAMPLES WITHIN FOUR WEEKS OF THE DISPATCH OF THE SAMPLE.

6 SUMMARY OF TEST RESULTS

The 2012 asphalt exchange test results were analysed using ASTM test procedure E691-92, Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method. A summary of the results for the Asphalt Cement, Emulsified Asphalt, Polymer Emulsified Asphalt, and SHRP Binder testing is presented in Tables A1-A4. The average of the test values along with the repeatability standard deviation, s_r, and reproducibility standard deviation, s_R, is provided for each test procedure. For example, in Table A1 for the Penetration @ 25 C, 100 g, 5 seconds, the average value reported by all of the laboratories was 182. The repeatability standard deviation, s_r, was 6.1 and reproducibility standard deviation, s_R, was 19.4. The 95 % confidence limit for repeatability is computed with the following equation:
95 % Repeatability Confidence Limit = $1.96 \times 2 \times s_r$
The 95 % confidence limit for repeatability means that approximately 95 % of all pairs of test results on a given material from within a laboratory could be expected to differ in absolute value by 1.96 x 2 x sr.
For example, the 95 % Repeatability Confidence Limit in Table A1 for Penetration @ 25 C, 100 g, 5 seconds was computed to be $1.96 \times \sqrt{2} \times 6.1 = 16.9$. This means that approximately 95 % of all pairs of test results on a given material from within a laboratory could be expected to differ in absolute value by 16.9. In other words, two test results from the same lab on the same material would be considered suspect if they differed in absolute value by more than 16.9.
The 95 % confidence limit for reproducibility is computed with the following equation:
95 % Reproducibility Confidence Limit = $1.96 \times \sqrt{2} \times s_R$
The 95 % confidence limit for reproducibility means that approximately 95 % of all pairs of test results on a given material from between laboratories could be expected to differ in absolute value by $1.96 \times 2 \times s_R$.
For example, the 95 % Reproducibility Confidence Limit in Table A1 for Penetration @ 25 C, 100 g, 5 seconds was computed to be $1.96 \times \sqrt{2} \times 19.4 = 53.8$. This means that approximately 95 % of all pairs of test results on a given material from between two laboratories could be expected to differ in absolute value by 53.8. Two test results from different labs on the same material would be considered suspect if they differed in absolute value by more than 53.8.
Tables A1-A4 also indicate which labs have between laboratory consistency statistics (*h* consistency statistic) that exceed (Labs Out *h*-stat) or are close (Labs Close *h*-stat) to the critical between laboratory consistency statistic, *hcrit*.
These tables also show the laboratories that have within laboratory consistency statistics (*k* consistency statistic) that exceed (Labs Out *k*-stat) or are close (Labs Close *k*-stat) to the critical within laboratory consistency statistic, *kcrit*.
If a lab has a between laboratory consistency statistic (*h* consistency statistic) that exceeds the critical between laboratory consistency statistic, *hcrit*, then its average test result is significantly different from the average obtained by the other laboratories. It may have difficulty correlating to other laboratories and should investigate its testing equipment and procedures.

If a lab has a between laboratory consistency statistic (*h* consistency statistic) that was close to the critical between laboratory consistency statistic, *hcrit*, then its average test result is not significantly different from the average obtained by the other laboratories. However, the lab may want to consider taking precautions to ensure that there are not any problems with its testing procedures and equipment.

If a lab has a within laboratory consistency statistic (*k* consistency statistic) that exceeds the critical within laboratory consistency statistic, *kcrit*, then its within laboratory standard deviation is significantly different from that obtained by all of the laboratories combined. The laboratory is having problems repeating test results in its own laboratory and should investigate its testing procedures and equipment.

If a lab has a within laboratory consistency statistic (*k* consistency statistic) that was close to the critical within laboratory consistency statistic, *kcrit*, then its within laboratory standard deviation is not significantly different from that obtained by all of the laboratories combined. However, the lab may want to consider taking precautions to ensure that there are not any problems with its testing procedures and equipment.

Using Demulsability from Table A3 as an example, Lab 3 had a between laboratory consistency statistic (*h* consistency statistic) that is close to the critical consistency statistic, *hcrit*. This indicates that this laboratory's average test result is not significantly different from the average obtained by the other laboratories, but should verify their testing procedure in order to facilitate the correlation to other laboratories. From Table A4 for Rotational Viscosity @ 135 C, Lab 3 had a within laboratory consistency statistic (*k* consistency statistic) that exceeded the critical consistency statistic, *kcrit*. Its within laboratory standard deviation is significantly different from that obtained by all of the laboratories combined. This laboratory is having problems repeating test results in its own laboratory and should investigate its testing procedures and equipment.

It should be noted that the limited number of laboratories who participated in the 2012 CAEP made the results of analysis complicated for some tests. For example, only 2 labs tested the RTFO Kinematic Viscosity of Residue on the asphalt cement (test 117), which results in no hcritic value. Also, for the Direct Tesion tests for the SHRP asphalt Cement (test 525 to 528) only one lab made the test. Finally, for the Float test for polymer emulsion (test 411), most lab simply reported > 1200 s, which makes the analysis of a precise time not possible.

7. ADDITIONAL ASPHALT EXCHANGE INFORMATION

The test results are summarised in Tables A1-A4. A list of participating laboratories is shown in Appendix C. The order of the participating laboratories shown in Appendix C does not relate to the listing of test results by laboratory number shown in Tables A1-A4.

The definitions and formulae for the statistical equations used in the analysis of the test results are included in Appendix B. Additional elaboration on the statistical analysis can be found in ASTM E691-92 Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method. The entire report is available for viewing and/or printing from the following Saskatchewan Ministry of Highways and Infrastructure web site:

http://en.etsmtl.ca/Unites-de-recherche/LCMB/CAMEP-CAEP?lang=en-CA

8. CONTACTING THE AUTHOR

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Appendix A
2012 CAEP – SUMMARY OF RESULTS

Table A1 – Asphalt Cement Testing 2012 Summary

Test	Asphalt Cement 2012									
		1	2	3	4	5	Labs Out		Labs Close	
	Average	Sx	Sr	SR	2.77SR	2.77Sx	h-stat	k-stat	h-stat	k-stat
101 - Penetration @ 25°C, 100g, 5s (dmm)	182	18.749	6.110	19.401	16.936	53.778		1		
102 - Penetration @ 4°C, 100g, 5s (dmm)	21	3.283	0.943	3.372	2.613	9.347			1	
103 - Solubility in Trichloroethylene (%)	99.97	0.044	0.010	0.044	0.028	0.123		1	1	
104 - Specific Gravity 25/25°C	1.024	0.002	0.001	0.002	0.002	0.005		1		
105 - Kinematic Viscosity @ 135°C (mm2/s)	269	3.480	1.670	3.747	4.711	10.385			1	
106 - Absolute Viscosity @ 60°C (Pa·s)	73.6	12.372	1.659	12.446	4.598	34.498		1	1	
113 - RTFO Loss on Heating (%)	0.574	0.076	0.024	0.078	0.068	0.217				
114 - RTFO Penetration of Residue @ 25°C, 100g, 5s (dmm)	102	10.361	1.571	10.440	4.353	28.939		1		
115 - RTFO Penetration of Residue @ 4°C, 100g, 5s (dmm)	13	2.082	0.817	2.186	2.263	6.059			1	
116 - RTFO Percent of Original Penetration (%)	56.2	1.758	2.129	2.472	5.902	6.852		1		
117 - RTFO Kinematic Viscosity of Residue (mm2/s)	393.8	9.664	15.642	16.016	43.357	44.393				1
118 - RTFO Absolute Viscosity of Residue (Pa·s)	181.6	31.342	5.477	31.659	15.180	87.754			1	

Legend
1 - Standard Deviation
2 - Repeatibility Standard Deviation
3 - Reproducibility Standard Deviation
4 - 95% Confidence Limits for Repeatability (k-stat)
5 - 95% Confidence Limits for Reproducibility (h-stat)
RTFO - Rolling Thin Film Oven

Table A2 – Emulsified Asphalt Testing 2012 Summary

Test	Asphalt Cement 2012									
		1	2	3	4	5	Labs Out		Labs Close	
	Average	Sx	Sr	SR	2.77SR	2.77Sx	h-stat	k-stat	h-stat	k-stat
301 - Saybolt-Furol Viscosity @ 50°C (s)	51.1	10.414	3.522	10.804	9.763	29.948		1		
302 - Residue by Distillation (% by mass)	64.0	0.218	0.229	0.287	0.633	0.795		1		
303 - Total Distillation Time (minutes)	60.5	3.354	2.925	4.118	8.108	11.413		1		
304 - Oil Portion of Distillate (% by Volume of Emulsion)	1.3	0.665	0.149	0.676	0.413	1.875	1			
305 - Demulsibility, 50 mL, 5.55 g/CaCl2 (% by Mass)	98.0	1.576	1.018	1.782	2.822	4.938		1	1	
306 - Penetration of Residue @ 25°C, 100g, 5s (dmm)	169.1	24.347	5.066	24.696	14.043	68.454				
307 - Residue Conditioning Time in Air (minutes)	90	0	0	0	0	0				
308 - Residue Conditioning Time in Water Bath (minutes)	90	0	0	0	0	0				
309 - Apparent Viscosity @ 60°C (Pa·s)	321.8	74.395	52.043	86.675	144.255	237.479				

Legend
1 - Standard Deviation
2 - Repeatibility Standard Deviation
3 - Reproducibility Standard Deviation
4 - 95% Confidence Limits for Repeatability (k-stat)
5 - 95% Confidence Limits for Reproducibility (h-stat)

Table A3 – Polymer Modified Emulsion Testing 2012 Summary

Test	Polymer Emulsion 2012									
		1	2	3	4	5	Labs Out		Labs Close	
	Average	Sx	Sr	SR	2.77SR	2.77Sx	h-stat	k-stat	h-stat	k-stat
401 - Saybolt-Furol Viscosity @ 50°C (s)	71.8	22.575	9.673	23.917	26.813	66.294		1		
402 - Residue by Distillation (% by mass)	65.0	0.420	0.278	0.478	0.771	1.324	1			
403 - Total Distillation Time (minutes)	60.1	0.623	1.552	1.552	4.301	4.301	1	1		
404 - Oil Portion of Distillate (% by Volume of Emulsion)	1.2	0.270	0.098	0.281	0.272	0.779		1		
405 - Demulsibility, 50 mL, 5.55 g/CaCl2 (% by Mass)	92.0	6.839	0.590	6.856	1.635	19.004			1	
406 - Penetration of Residue @ 25°C, 100g, 5s (dmm)	186.0	19.068	9.888	20.707	27.409	57.396		1		
407 - Residue Conditioning Time in Air (minutes)	90.0	0.111	0.193	0.193	0.533	0.533	1	1		
408 - Residue Conditioning Time in Water Bath (minutes)	90.1	0.444	0.509	0.609	1.411	1.687	1	1		
409 - Apparent Viscosity @ 60°C (Pa·s)	204.9	29.663	27.847	37.375	77.187	103.597				
410 - Sieve Test	0.0	0.038	0.007	0.040	0.018	0.105				
411 - Float Test (s)	>1200	0	0	0	0	0				
413 - Ash Content	0.6	0.148	0.028	0.150	0.078	0.416				
414 - Elastic Recovery (%)	64.4	10.187	2.274	10.354	6.303	28.701		1		

Legend
1 - Standard Deviation
2 - Repeatibility Standard Deviation
3 - Reproducibility Standard Deviation
4 - 95% Confidence Limits for Repeatability (k-stat)
5 - 95% Confidence Limits for Reproducibility (h-stat)

Table A4 – SHRP Binder Testing 2012 Summary

Test	SHRP Asphalt Cement 2012									
		1	2	3	4	5	Labs Out		Labs Close	
	Average	S_x	S_r	S_R	$2.77S_R$	$2.77S_x$	h-stat	k-stat	h-stat	k-stat
501 - Rotational Viscosity @ 135°C (Pa·s)	0.30	0.013	0.004	0.014	0.012	0.037		1		
502 - DSR 58°C, 25mm Plate, 1mm Gap, Complex Shear Modulus, G* (kPa)	1.38	0.051	0.037	0.059	0.101	0.164				
503 - DSR 58°C, 25mm Plate, 1mm Gap, Phase Angle (°)	85.76	0.143	0.123	0.175	0.342	0.485				1
504 - DSR 58°C, 25mm Plate, 1mm Gap, G*/Sin d (kPa)	1.38	0.051	0.034	0.058	0.095	0.161				1
505 - DSR 64°C, 25mm Plate, 1mm Gap, Complex Shear Modulus, G* (kPa)	0.66	0.024	0.013	0.026	0.036	0.073		1	1	
506 - DSR 64°C, 25mm Plate, 1mm Gap, Phase Angle (°)	87.09	0.215	0.135	0.242	0.373	0.670		1		
507 - DSR 64°C, 25mm Plate, 1mm Gap, G*/Sin d (kPa)	0.66	0.023	0.012	0.025	0.033	0.070		1	1	
508 - TFO/RTFO Change in Mass (%)	-0.10	0.042	0.043	0.055	0.118	0.152		1		
509 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, Complex Shear Modulus G* (kPa)	3.81	0.269	0.111	0.284	0.306	0.787				
510 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, Phase Angle (°)	80.66	0.227	0.213	0.286	0.589	0.791				1
511 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, G*/Sin d (kPa)	3.86	0.276	0.113	0.291	0.313	0.808				
512 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, Complex Shear Modulus G* (kPa)	1.76	0.106	0.041	0.111	0.115	0.308				1
513 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, Phase Angle (°)	83.04	0.247	0.173	0.285	0.480	0.789				
514 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, G*/Sin d (kPa)	1.77	0.115	0.035	0.119	0.097	0.328		1		
515 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, Complex Shear Modulus G* (kPa)	5245.67	496.557	267.771	542.559	742.223	1503.896				
516 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, Phase Angle (°)	42.80	1.240	0.436	1.291	1.208	3.577		1		
517 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, G*xSin d (kPa)	3559.63	302.624	178.939	336.046	495.993	931.473				
518 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, Complex Shear Modulus G* (kPa)	7859.89	636.266	376.236	706.544	1042.872	1958.439				
519 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, Phase Angle (°)	40.46	1.276	0.364	1.310	1.008	3.630				
520 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, G*xSin d (kPa)	5094.85	372.100	230.303	416.915	638.369	1155.630				
521 - BBR Creep Stiffness @ -18°C, 60s (MPa)	168.26	7.468	4.032	8.162	11.177	22.623				
522 - BBR Slope, m, @ - 18°C, 60s	0.32	0.006	0.003	0.006	0.008	0.018				
523 - BBR Creep Stiffness @ - 24°C, 60s	348.37	14.870	8.046	16.257	22.303	45.062		1		
524 - BBR Slope, m, @ -24°C, 60s	0.27	0.005	0.004	0.006	0.011	0.018		1		
525 - DT Failure Stress @ -18°C, 1mm/min (MPa)	4.77	0	0	0	0	0				
526 - DT Failure Strain @ -18°C, 1mm/min (%)	2.47	0	0	0	0	0				
527 - DT Failure Stress @ -24°C, 1mm/min (MPa)	5.25	0	0	0	0	0				
528 - DT Failure Strain @ -24°C, 1mm/min (%)	1.17	0	0	0	0	0				

Legend	
1 - Standard Deviation	TFO - Thin Film Oven
2 - Repeatibility Standard Deviation	RTFO - Rolling Thin Film Oven
3 - Reproducibility Standard Deviation	PAV - Pressurized Aging Vessel
4 - 95% Confidence Limits for Repeatability (k-stat)	BBR - Bending Bean Rheometer
5 - 95% Confidence Limits for Reproducibility (h-stat)	DSR - Dynamic Shear Rheometer
	DT - Direct Tension

Appendix B
Formulas Used in Calculating Precision Tests

Formulas Used in Calculating Precision Results

x = Individual test result

n = Number of test results per lab

p = Number of laboratories

$\bar{x}$ = Lab Average = $\dfrac{\sum_{1}^{n} x}{n}$

x_a = Average of lab averages = $\dfrac{\sum_{1}^{p} \bar{x}}{p}$

s = Lab standard deviation = $\sqrt{\dfrac{\sum_{1}^{n} (x - \bar{x})^2}{(n-1)}}$

d = Lab standard deviation = $\bar{x} - x_a$

s_{Xave} = Standard deviation of lab averages = $\sqrt{\dfrac{\sum_{1}^{p} d^2}{(p-1)}}$

s_r = Repeatability standard deviation = $\sqrt{\dfrac{\sum_{1}^{p} s^2}{p}}$

s_R = Reproducibility standard Deviation

= the larger of s_r and $\sqrt{(s_{Xave})^2 + (s_r)^2 \times \dfrac{(n-1)}{n}}$

h = The between-laboratory consistency statistic = $\dfrac{d}{s_{Xave}}$

k = The within-laboratory consistency statistic = $\dfrac{s}{s_r}$

Reference: ASTM E691, Standard Practice for Conducting an Interlaboratory Study to Determine the Precision of a Test Method.

Appendix C
2012 CAEP Participating Laboratories

Table C1 – Participating Laboratories

AMEC Environment and Infrastructure
Darmouth, NS

Manitoba Infrastructure and Transportation
Materials Engineering Central Lab
Winnipeg, MB

Golder Associates Ltd
Whitby, ON

LVM Inc
Toronto, ON

Transport Québec
Montreal, QC

Pounder Emulsions
Saskatoon, SK

GECAN
Acheson, AB

Transport Québec
Direction du laboratoire des chaussée
Québec, QC

DBA Engineering Ltd
Vaughan, ON

Suncor R&D
Montreal, QC

General Liquids Canada
Bedford, NS

Appendix D
2012 CAEP TEST RESULTS

100 - Asphalt Cement
101 - Penetration @ 25°C, 100g, 5s (dmm)
2012

Data						
n =	3	$(X_{ave})_{ave}$ =	182.4000	s_r =	6.1101	Check s_{Xave} = 18.7489
p =	5	s_{Xave} =	18.7489	s_{R*} =	19.4013	r = 2.8 s_r = 16.9363
Significance Level =		0.5%		s_R =	19.4013	R = 2.8 s_R = 53.7777

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	162.0000	163.0000	162.0000		162.3333	0.5774	-20.0667	0.3333	-1.07	0.09	1.74	-1.74	1.92
Lab 2											1.74	-1.74	1.92
Lab 3	199.0000	205.0000	224.0000		209.3333	13.0512	26.9333	170.3333	1.44	2.14	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7	177.0000	171.0000	172.0000		173.3333	3.2146	-9.0667	10.3333	-0.48	0.53	1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	173.0000	175.0000	173.0000		173.6667	1.1547	-8.7333	1.3333	-0.47	0.19	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11	191.0000	195.0000	194.0000		193.3333	2.0817	10.9333	4.3333	0.58	0.34	1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
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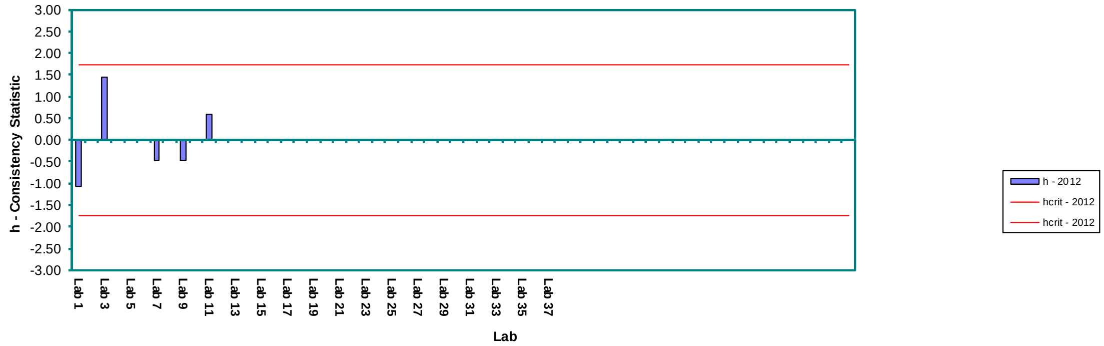
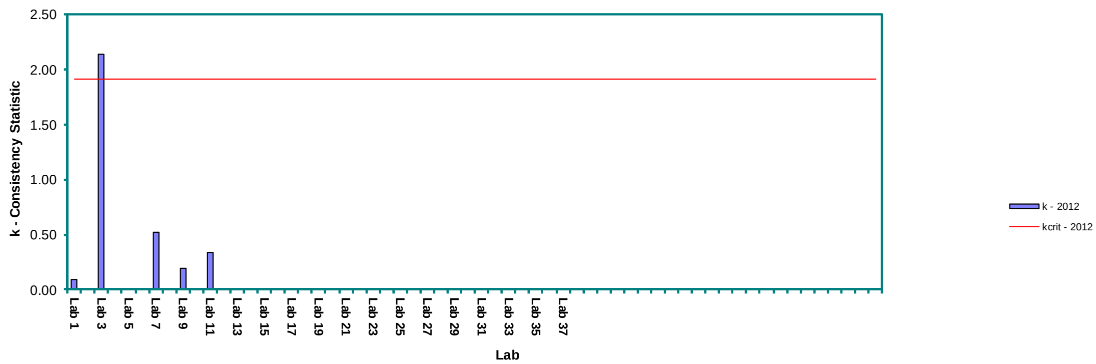
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	162.3333	r = 2.8 s_r =	16.9363	h_{crit} =	1.74
	Maximum X_{ave}	209.3333	R = 2.8 s_R =	53.7777	h_{crit} =	-1.74
	Check s_{Xave} =	18.7489			k_{crit} =	1.92

Where: $x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
102 - Penetration @ 4°C, 100g, 5s (dmm)
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	21.0000	s_r =	0.9428	Check s_{Xave} =	3.2830
p =	3	s_{Xave} =	3.2830	s_{R*} =	3.3720	$r = 2.8\ s_r$ =	2.6133
Significance Level =		0.5%		s_R =	3.3720	$R = 2.8\ s_R$ =	9.3467

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.15	-1.15	1.67
Lab 2											1.15	-1.15	1.67
Lab 3	21.0000	19.0000	20.0000		20.0000	1.0000	-1.0000	1.0000	-0.30	1.06	1.15	-1.15	1.67
Lab 4											1.15	-1.15	1.67
Lab 5											1.15	-1.15	1.67
Lab 6											1.15	-1.15	1.67
Lab 7	25.0000	24.0000	25.0000		24.6667	0.5774	3.6667	0.3333	1.12	0.61	1.15	-1.15	1.67
Lab 8											1.15	-1.15	1.67
Lab 9	17.0000	19.0000	19.0000		18.3333	1.1547	-2.6667	1.3333	-0.81	1.22	1.15	-1.15	1.67
Lab 10											1.15	-1.15	1.67
Lab 11											1.15	-1.15	1.67
Lab 12											1.15	-1.15	1.67
Lab 13											1.15	-1.15	1.67
Lab 14											1.15	-1.15	1.67
Lab 15											1.15	-1.15	1.67
Lab 16											1.15	-1.15	1.67
Lab 17											1.15	-1.15	1.67
Lab 18											1.15	-1.15	1.67
Lab 19											1.15	-1.15	1.67
Lab 20											1.15	-1.15	1.67
Lab 21											1.15	-1.15	1.67
Lab 22											1.15	-1.15	1.67
Lab 23											1.15	-1.15	1.67
Lab 24											1.15	-1.15	1.67
Lab 25											1.15	-1.15	1.67
Lab 26											1.15	-1.15	1.67
Lab 27											1.15	-1.15	1.67
Lab 28											1.15	-1.15	1.67
Lab 29											1.15	-1.15	1.67
Lab 30											1.15	-1.15	1.67
Lab 31											1.15	-1.15	1.67
Lab 32											1.15	-1.15	1.67
Lab 33											1.15	-1.15	1.67
Lab 34											1.15	-1.15	1.67
Lab 35											1.15	-1.15	1.67
Lab 36											1.15	-1.15	1.67
Lab 37											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
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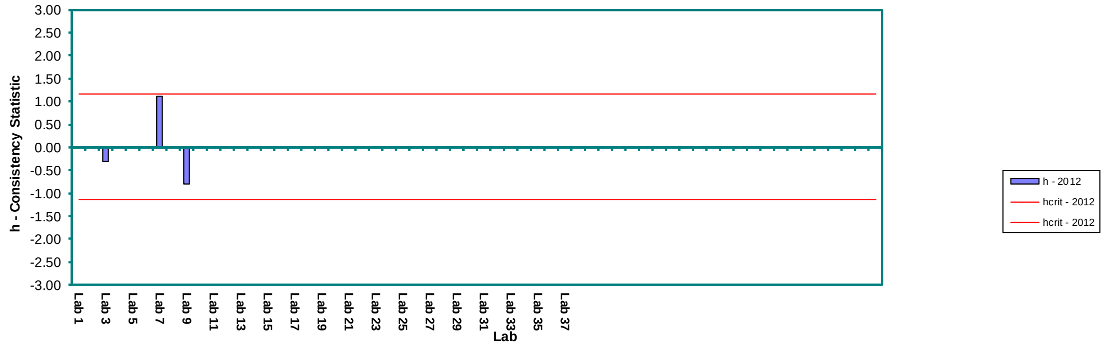
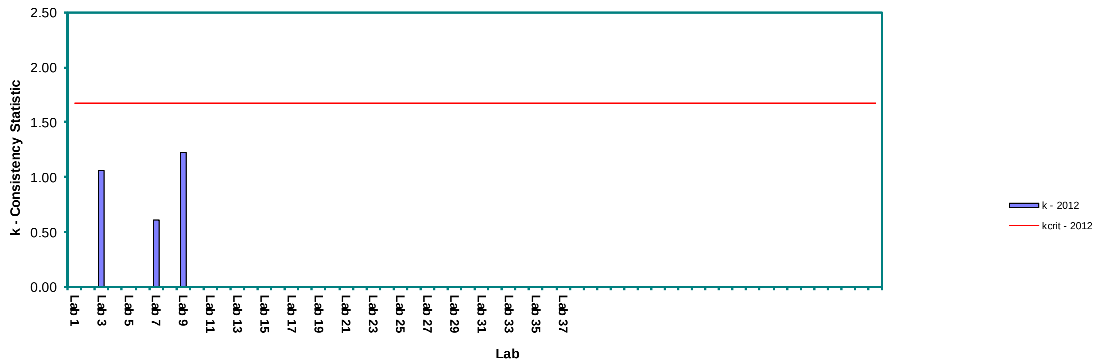
											1.15	-1.15	1.67
											1.15	-1.15	1.67

Additional Statistics						
	Minimum X_{ave}	18.3333	$r = 2.8\ s_r$ =	2.6133	h_{crit} =	1.15
	Maximum X_{ave}	24.6667	$R = 2.8\ s_R$ =	9.3467	h_{crit} =	-1.15
	Check s_{Xave} =	3.2830			k_{crit} =	1.67

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement

103 - Solubility in Trichloroethylene (%)

2012

Data						
n = 3	$(X_{ave})_{ave}$ =	99.9700	s_r =	0.0100	Check s_{Xave} =	0.0436
p = 3	s_{Xave} =	0.0436	s_{R*} =	0.0443	r = 2.8 s_r =	0.0277
Significance Level =	0.5%		s_R =	0.0443	R = 2.8 s_R =	0.1229

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.15	-1.15	1.67
Lab 2											1.15	-1.15	1.67
Lab 3	99.9900	99.9900	99.9900		99.9900	0.0000	0.0200	0.0000	0.46	0.00	1.15	-1.15	1.67
Lab 4											1.15	-1.15	1.67
Lab 5											1.15	-1.15	1.67
Lab 6											1.15	-1.15	1.67
Lab 7	99.9000	99.9300	99.9300		99.9200	0.0173	-0.0500	0.0003	-1.15	1.73	1.15	-1.15	1.67
Lab 8											1.15	-1.15	1.67
Lab 9											1.15	-1.15	1.67
Lab 10											1.15	-1.15	1.67
Lab 11	100.0000	100.0000	100.0000		100.0000	0.0000	0.0300	0.0000	0.69	0.00	1.15	-1.15	1.67
Lab 12											1.15	-1.15	1.67
Lab 13											1.15	-1.15	1.67
Lab 14											1.15	-1.15	1.67
Lab 15											1.15	-1.15	1.67
Lab 16											1.15	-1.15	1.67
Lab 17											1.15	-1.15	1.67
Lab 18											1.15	-1.15	1.67
Lab 19											1.15	-1.15	1.67
Lab 20											1.15	-1.15	1.67
Lab 21											1.15	-1.15	1.67
Lab 22											1.15	-1.15	1.67
Lab 23											1.15	-1.15	1.67
Lab 24											1.15	-1.15	1.67
Lab 25											1.15	-1.15	1.67
Lab 26											1.15	-1.15	1.67
Lab 27											1.15	-1.15	1.67
Lab 28											1.15	-1.15	1.67
Lab 29											1.15	-1.15	1.67
Lab 30											1.15	-1.15	1.67
Lab 31											1.15	-1.15	1.67
Lab 32											1.15	-1.15	1.67
Lab 33											1.15	-1.15	1.67
Lab 34											1.15	-1.15	1.67
Lab 35											1.15	-1.15	1.67
Lab 36											1.15	-1.15	1.67
Lab 37											1.15	-1.15	1.67
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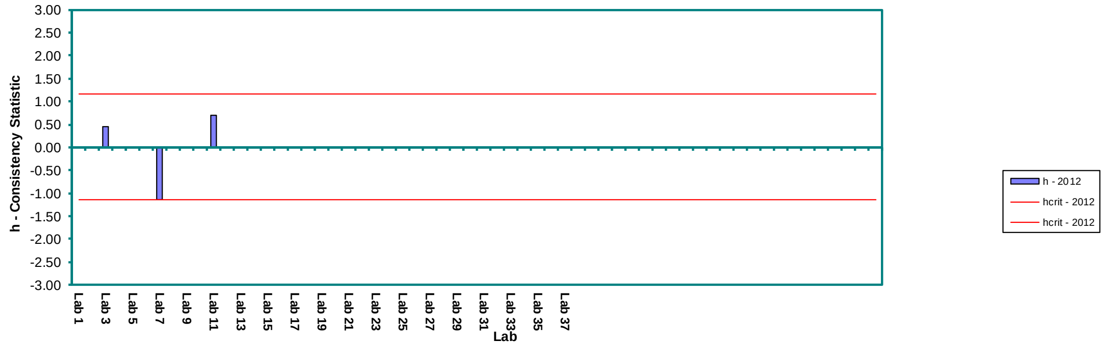
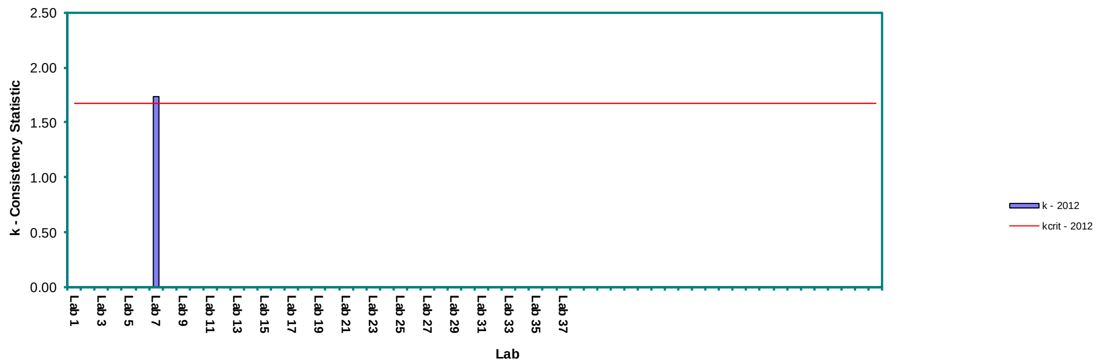
											1.15	-1.15	1.67
											1.15	-1.15	1.67

Additional Statistics						
	Minimum X_{ave}	99.9200	r = 2.8 s_r =	0.0277	h_{crit} =	1.15
	Maximum X_{ave}	100.0000	R = 2.8 s_R =	0.1229	h_{crit} =	-1.15
	Check s_{Xave} =	0.0436			k_{crit} =	1.67

Where:

$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Betw een Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
104 - Specific Gravity 25/25°C
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	1.0240	s_r =	0.0008	Check s_{Xave} =	0.0018
p =	5	s_{Xave} =	0.0018	s_{R*} =	0.0019	$r = 2.8\ s_r$ =	0.0021
Significance Level =		0.5%		s_R =	0.0019	$R = 2.8\ s_R$ =	0.0052

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	1.0240	1.0240	1.0250		1.0243	0.0006	0.0003	0.0000	0.19	0.75	1.74	-1.74	1.92
Lab 2											1.74	-1.74	1.92
Lab 3	1.0260	1.0260	1.0270		1.0263	0.0006	0.0023	0.0000	1.31	0.75	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7	1.0210	1.0230	1.0200		1.0213	0.0015	-0.0027	0.0000	-1.50	1.97	1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	1.0240	1.0240	1.0240		1.0240	0.0000	0.0000	0.0000	0.00	0.00	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11	1.0240	1.0240	1.0240		1.0240	0.0000	0.0000	0.0000	0.00	0.00	1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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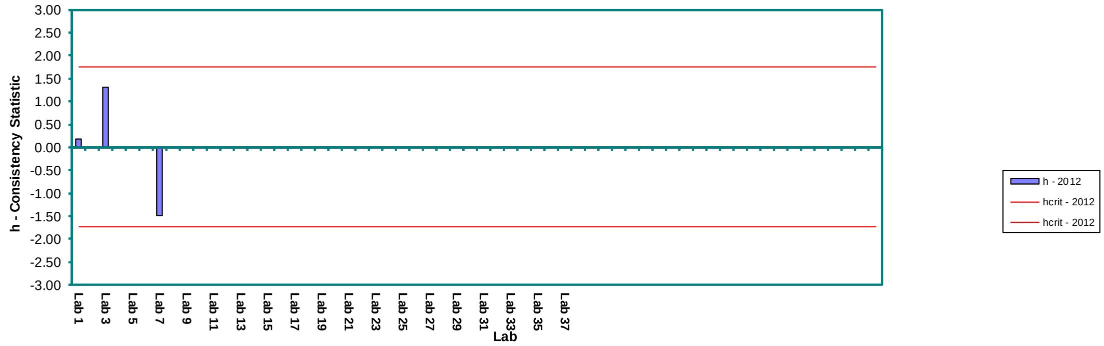
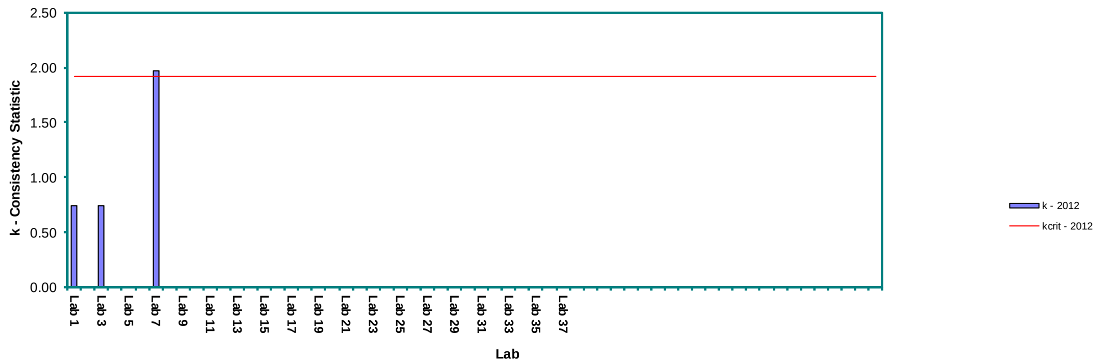
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	1.0213	$r = 2.8\ s_r$ =	0.0021	h_{crit} =	1.74
	Maximum X_{ave}	1.0263	$R = 2.8\ s_R$ =	0.0052	h_{crit} =	-1.74
	Check s_{Xave} =	0.0018			k_{crit} =	1.92

Where: $x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
105 - Kinematic Viscosity @ 135°C (mm2/s)
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	269.0000	s_r =	1.6997	Check s_{Xave} =	3.4801
p =	3	s_{Xave} =	3.4801	s_{R*} =	3.7466	r = 2.8 s_r =	4.7113
Significance Level =		0.5%		s_R =	3.7466	R = 2.8 s_R =	10.3851

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	269.0000	272.0000	273.0000		271.3333	2.0817	2.3333	4.3333	0.67	1.22	1.15	-1.15	1.67
Lab 2											1.15	-1.15	1.67
Lab 3	266.0000	263.0000	266.0000		265.0000	1.7321	-4.0000	3.0000	-1.15	1.02	1.15	-1.15	1.67
Lab 4											1.15	-1.15	1.67
Lab 5											1.15	-1.15	1.67
Lab 6											1.15	-1.15	1.67
Lab 7											1.15	-1.15	1.67
Lab 8											1.15	-1.15	1.67
Lab 9	270.0000	270.0000	272.0000		270.6667	1.1547	1.6667	1.3333	0.48	0.68	1.15	-1.15	1.67
Lab 10											1.15	-1.15	1.67
Lab 11											1.15	-1.15	1.67
Lab 12											1.15	-1.15	1.67
Lab 13											1.15	-1.15	1.67
Lab 14											1.15	-1.15	1.67
Lab 15											1.15	-1.15	1.67
Lab 16											1.15	-1.15	1.67
Lab 17											1.15	-1.15	1.67
Lab 18											1.15	-1.15	1.67
Lab 19											1.15	-1.15	1.67
Lab 20											1.15	-1.15	1.67
Lab 21											1.15	-1.15	1.67
Lab 22											1.15	-1.15	1.67
Lab 23											1.15	-1.15	1.67
Lab 24											1.15	-1.15	1.67
Lab 25											1.15	-1.15	1.67
Lab 26											1.15	-1.15	1.67
Lab 27											1.15	-1.15	1.67
Lab 28											1.15	-1.15	1.67
Lab 29											1.15	-1.15	1.67
Lab 30											1.15	-1.15	1.67
Lab 31											1.15	-1.15	1.67
Lab 32											1.15	-1.15	1.67
Lab 33											1.15	-1.15	1.67
Lab 34											1.15	-1.15	1.67
Lab 35											1.15	-1.15	1.67
Lab 36											1.15	-1.15	1.67
Lab 37											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
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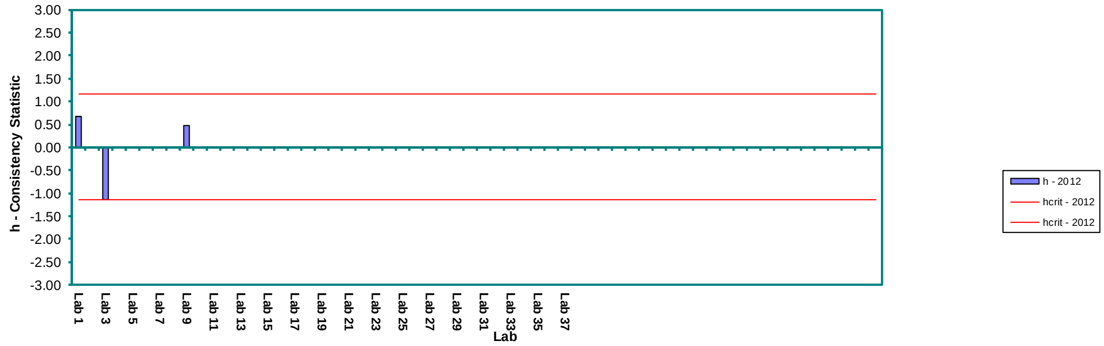
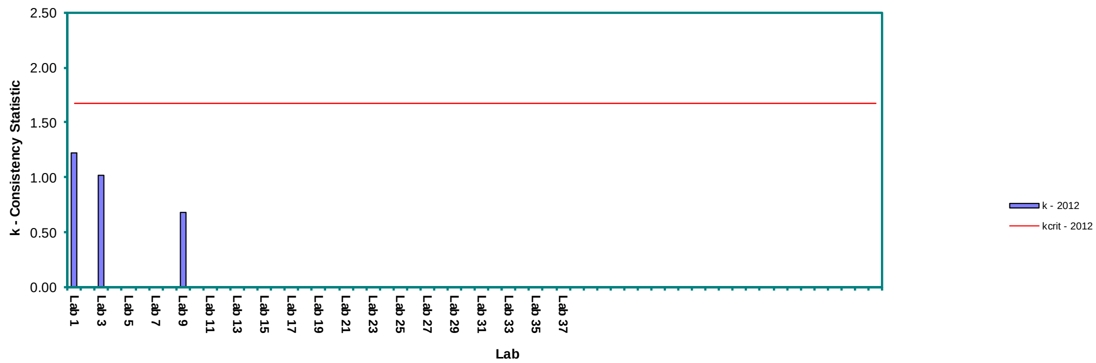
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67

Additional Statistics						
	Minimum X_{ave}	265.0000	r = 2.8 s_r =	4.7113	h_{crit} =	1.15
	Maximum X_{ave}	271.3333	R = 2.8 s_R =	10.3851	h_{crit} =	-1.15
	Check s_{Xave} =	3.4801			k_{crit} =	1.67

Where:			Where:		
	$x_1....x_n$ =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
106 - Absolute Viscosity @ 60℃ (Pa·s)
2012

Data				
n = 3	$(X_{ave})_{ave}$ = 73.5833	s_r = 1.6588	Check s_{Xave} =	12.3720
p = 4	s_{Xave} = 12.3720	s_{R*} = 12.4459	r = 2.8 s_r =	4.5980
Significance Level = 0.5%		s_R = 12.4459	R = 2.8 s_R =	34.4984

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	77.5000	77.9000	78.2000		77.8667	0.3512	4.2833	0.1233	0.35	0.21	1.49	-1.49	1.82
Lab 2											1.49	-1.49	1.82
Lab 3	79.8000	79.7000	85.3000		81.6000	3.2047	8.0167	10.2700	0.65	1.93	1.49	-1.49	1.82
Lab 4											1.49	-1.49	1.82
Lab 5											1.49	-1.49	1.82
Lab 6											1.49	-1.49	1.82
Lab 7	55.8000	54.5000	55.2000		55.1667	0.6506	-18.4167	0.4233	-1.49	0.39	1.49	-1.49	1.82
Lab 8											1.49	-1.49	1.82
Lab 9	79.2000	80.0000	79.9000		79.7000	0.4359	6.1167	0.1900	0.49	0.26	1.49	-1.49	1.82
Lab 10											1.49	-1.49	1.82
Lab 11											1.49	-1.49	1.82
Lab 12											1.49	-1.49	1.82
Lab 13											1.49	-1.49	1.82
Lab 14											1.49	-1.49	1.82
Lab 15											1.49	-1.49	1.82
Lab 16											1.49	-1.49	1.82
Lab 17											1.49	-1.49	1.82
Lab 18											1.49	-1.49	1.82
Lab 19											1.49	-1.49	1.82
Lab 20											1.49	-1.49	1.82
Lab 21											1.49	-1.49	1.82
Lab 22											1.49	-1.49	1.82
Lab 23											1.49	-1.49	1.82
Lab 24											1.49	-1.49	1.82
Lab 25											1.49	-1.49	1.82
Lab 26											1.49	-1.49	1.82
Lab 27											1.49	-1.49	1.82
Lab 28											1.49	-1.49	1.82
Lab 29											1.49	-1.49	1.82
Lab 30											1.49	-1.49	1.82
Lab 31											1.49	-1.49	1.82
Lab 32											1.49	-1.49	1.82
Lab 33											1.49	-1.49	1.82
Lab 34											1.49	-1.49	1.82
Lab 35											1.49	-1.49	1.82
Lab 36											1.49	-1.49	1.82
Lab 37											1.49	-1.49	1.82
											1.49	-1.49	1.82
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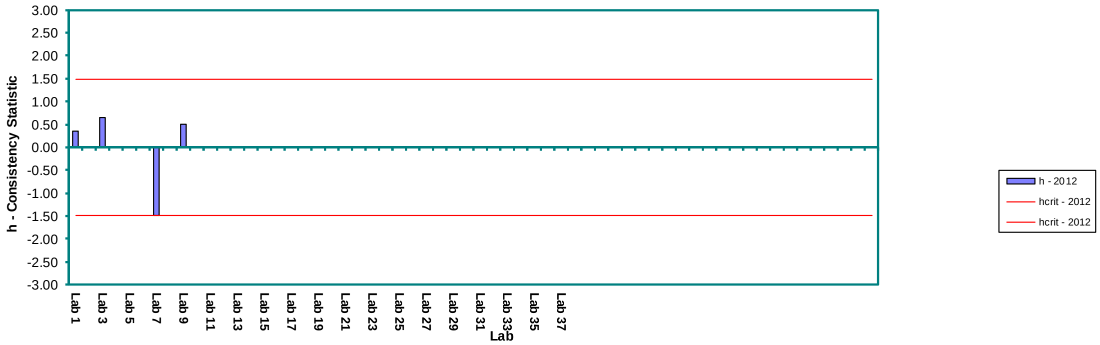
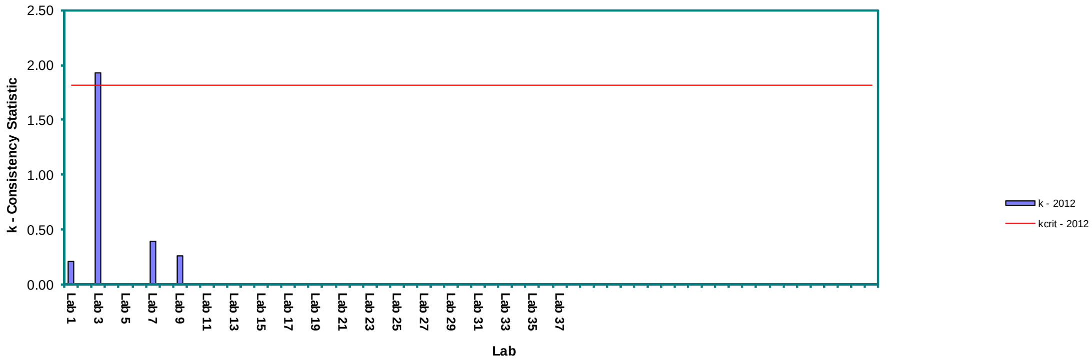
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82

Additional Statistics						
	Minimum X_{ave}	55.1667	r = 2.8 s_r =	4.5980	h_{crit} =	1.49
	Maximum X_{ave}	81.6000	R = 2.8 s_R =	34.4984	h_{crit} =	-1.49
	Check s_{Xave} =	12.3720			k_{crit} =	1.82

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
113 - RTFO Loss on Heating (%)
2012

Data				
n = 3	$(X_{ave})_{ave}$ = 0.5740	s_r = 0.0243	Check s_{Xave} =	0.0756
p = 5	s_{Xave} = 0.0756	s_{R*} = 0.0782	$r = 2.8\ s_r$ =	0.0675
Significance Level = 0.5%		s_R = 0.0782	$R = 2.8\ s_R$ =	0.2168

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	0.6960	0.7130	0.6700		0.6930	0.0217	0.1190	0.0005	1.57	0.89	1.74	-1.74	1.92
Lab 2											1.74	-1.74	1.92
Lab 3	0.6040	0.6260	0.5850		0.6050	0.0205	0.0310	0.0004	0.41	0.84	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7	0.5520	0.4750	0.5530		0.5267	0.0447	-0.0473	0.0020	-0.63	1.84	1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	0.5300	0.5370	0.5350		0.5340	0.0036	-0.0400	0.0000	-0.53	0.15	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11	0.5200	0.5070	0.5070		0.5113	0.0075	-0.0627	0.0001	-0.83	0.31	1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
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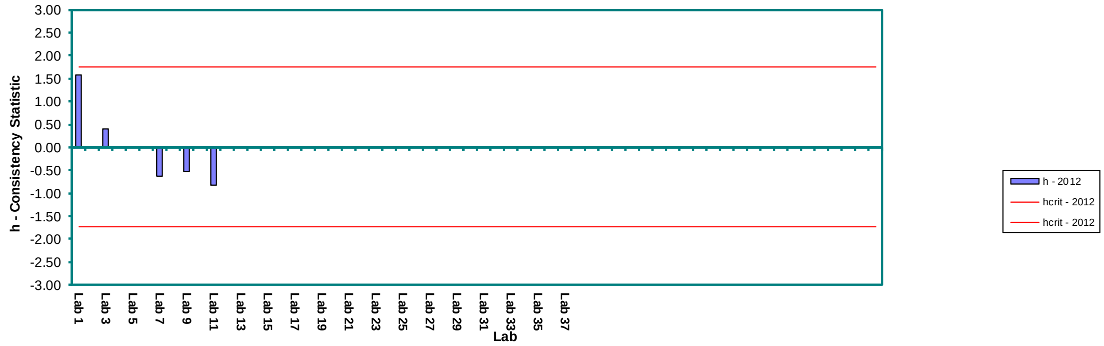
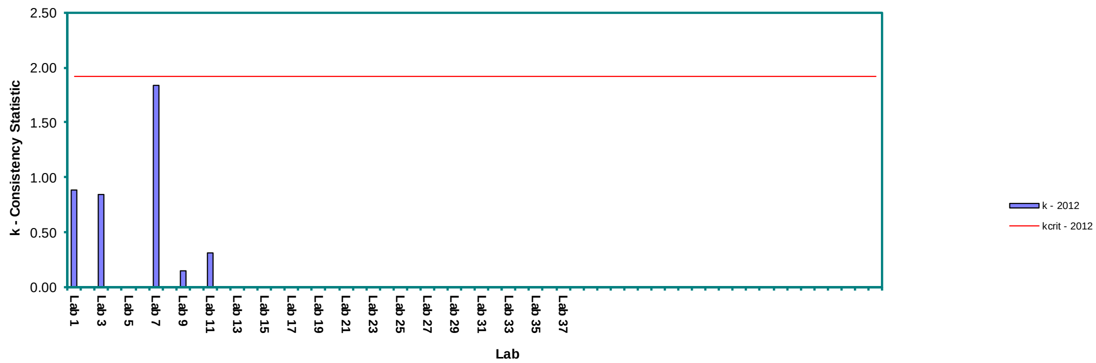
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics					
Minimum X_{ave}	0.5113	$r = 2.8\ s_r$ =	0.0675	h_{crit} =	1.74
Maximum X_{ave}	0.6930	$R = 2.8\ s_R$ =	0.2168	h_{crit} =	-1.74
Check s_{Xave} =	0.0756			k_{crit} =	1.92

Where:
- $x_1....x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
114 - RTFO Penetration of Residue @ 25°C, 100g, 5s (dmm)
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	102.0667	s_r =	1.5706	Check s_{Xave} =	10.3613
p =	5	s_{Xave} =	10.3613	s_{R*} =	10.4403	r = 2.8 s_r =	4.3534
Significance Level =		0.5%		s_R =	10.4403	R = 2.8 s_R =	28.9391

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	90.0000	91.0000	91.0000		90.6667	0.5774	-11.4000	0.3333	-1.10	0.37	1.74	-1.74	1.92
Lab 2											1.74	-1.74	1.92
Lab 3	122.0000	118.0000	116.0000		118.6667	3.0551	16.6000	9.3333	1.60	1.95	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7	100.0000	98.0000	101.0000		99.6667	1.5275	-2.4000	2.3333	-0.23	0.97	1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	98.0000	98.0000	98.0000		98.0000	0.0000	-4.0667	0.0000	-0.39	0.00	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11	104.0000	103.0000	103.0000		103.3333	0.5774	1.2667	0.3333	0.12	0.37	1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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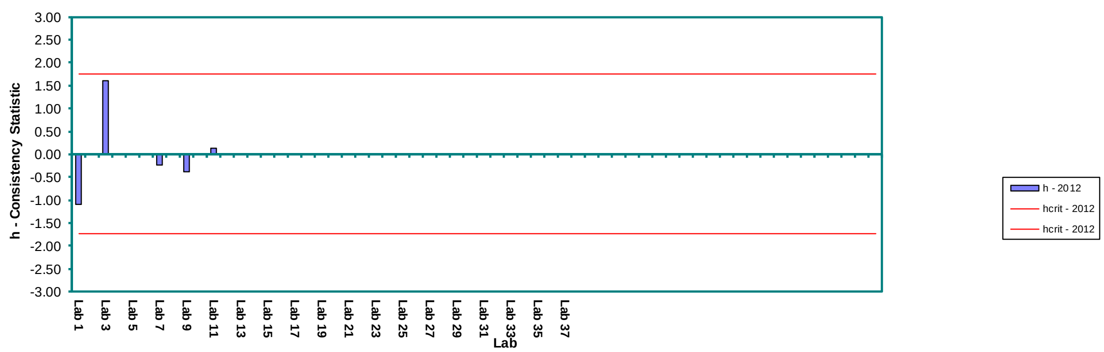
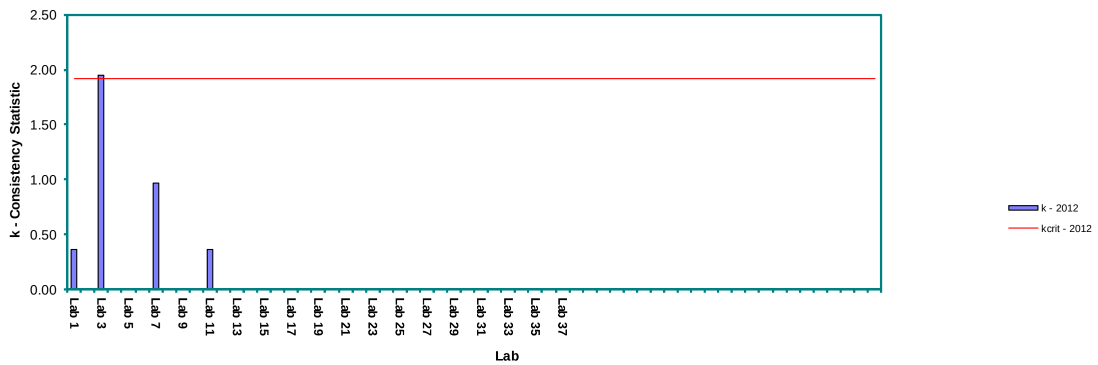
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	90.6667	r = 2.8 s_r =	4.3534	h_{crit} =	1.74
	Maximum X_{ave}	118.6667	R = 2.8 s_R =	28.9391	h_{crit} =	-1.74
	Check s_{Xave} =	10.3613			k_{crit} =	1.92

Where:			Where:	
x_1....x_n =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
115 - RTFO Penetration of Residue @ 4°C, 100g, 5s (dmm)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	13.0000	s_r =	0.8165
p =	3	$s_{X_{ave}}$ =	2.0817	s_{R*} =	2.1858
Significance Level =		0.5%		s_R =	2.1858

Check $s_{X_{ave}}$ =	2.0817
$r = 2.8\ s_r$ =	2.2632
$R = 2.8\ s_R$ =	6.0588

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.15	-1.15	1.67
Lab 2											1.15	-1.15	1.67
Lab 3	12.0000	13.0000	12.0000		12.3333	0.5774	-0.6667	0.3333	-0.32	0.71	1.15	-1.15	1.67
Lab 4											1.15	-1.15	1.67
Lab 5											1.15	-1.15	1.67
Lab 6											1.15	-1.15	1.67
Lab 7	15.0000	16.0000	15.0000		15.3333	0.5774	2.3333	0.3333	1.12	0.71	1.15	-1.15	1.67
Lab 8											1.15	-1.15	1.67
Lab 9	10.0000	12.0000	12.0000		11.3333	1.1547	-1.6667	1.3333	-0.80	1.41	1.15	-1.15	1.67
Lab 10											1.15	-1.15	1.67
Lab 11											1.15	-1.15	1.67
Lab 12											1.15	-1.15	1.67
Lab 13											1.15	-1.15	1.67
Lab 14											1.15	-1.15	1.67
Lab 15											1.15	-1.15	1.67
Lab 16											1.15	-1.15	1.67
Lab 17											1.15	-1.15	1.67
Lab 18											1.15	-1.15	1.67
Lab 19											1.15	-1.15	1.67
Lab 20											1.15	-1.15	1.67
Lab 21											1.15	-1.15	1.67
Lab 22											1.15	-1.15	1.67
Lab 23											1.15	-1.15	1.67
Lab 24											1.15	-1.15	1.67
Lab 25											1.15	-1.15	1.67
Lab 26											1.15	-1.15	1.67
Lab 27											1.15	-1.15	1.67
Lab 28											1.15	-1.15	1.67
Lab 29											1.15	-1.15	1.67
Lab 30											1.15	-1.15	1.67
Lab 31											1.15	-1.15	1.67
Lab 32											1.15	-1.15	1.67
Lab 33											1.15	-1.15	1.67
Lab 34											1.15	-1.15	1.67
Lab 35											1.15	-1.15	1.67
Lab 36											1.15	-1.15	1.67
Lab 37											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
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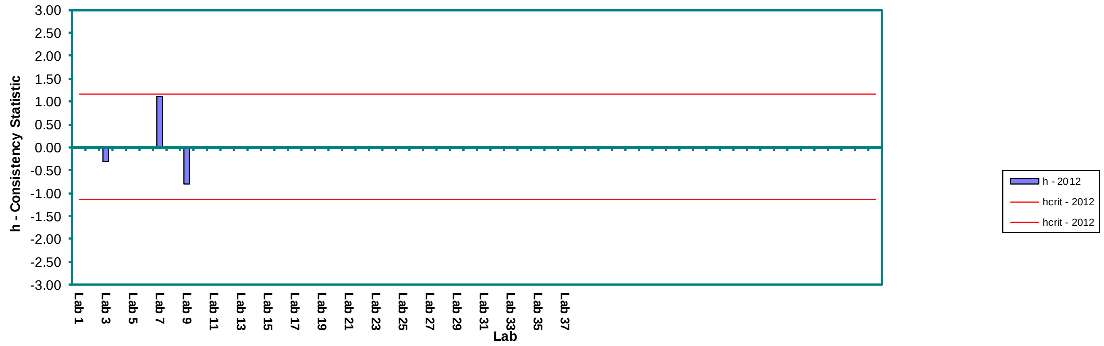
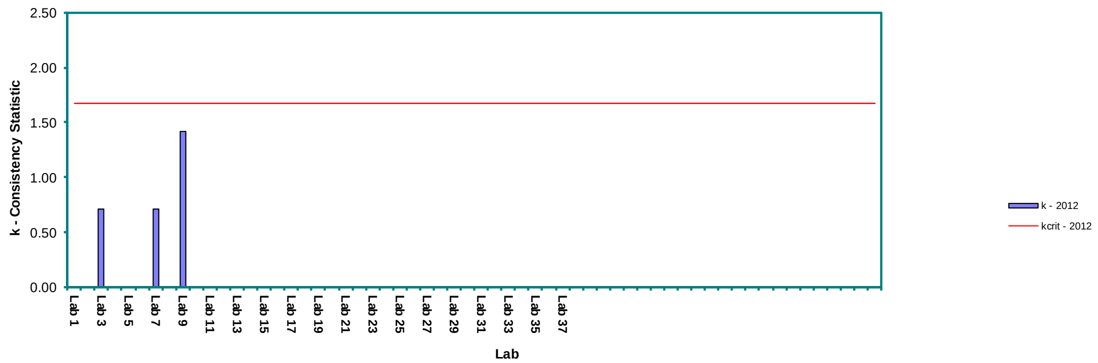
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67

Additional Statistics						
Minimum X_{ave}	11.3333	$r = 2.8\ s_r$ =	2.2632	h_{crit} =	1.15
Maximum X_{ave}	15.3333	$R = 2.8\ s_R$ =	6.0588	h_{crit} =	-1.15
Check $s_{X_{ave}}$ =	2.0817			k_{crit} =	1.67

Where:

$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	$s_{X_{ave}}$ =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
116 - RTFO Percent of Original Penetration (%)
2012

Data

n =	3	$(X_{ave})_{ave}$ =	56.2000	s_r =	2.1292
p =	5	s_{Xave} =	1.7575	s_{R^*} =	2.4721
Significance Level =		0.5%		s_R =	2.4721

Check s_{Xave} =	1.7575
r = 2.8 s_r =	5.9017
R = 2.8 s_R =	6.8522

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	56.0000	56.0000	56.0000		56.0000	0.0000	-0.2000	0.0000	-0.11	0.00	1.74	-1.74	1.92
Lab 2											1.74	-1.74	1.92
Lab 3	61.0000	58.0000	52.0000		57.0000	4.5826	0.8000	21.0000	0.46	2.15	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7	58.0000	57.0000	59.0000		58.0000	1.0000	1.8000	1.0000	1.02	0.47	1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	57.0000	56.0000	57.0000		56.6667	0.5774	0.4667	0.3333	0.27	0.27	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11	54.0000	53.0000	53.0000		53.3333	0.5774	-2.8667	0.3333	-1.63	0.27	1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
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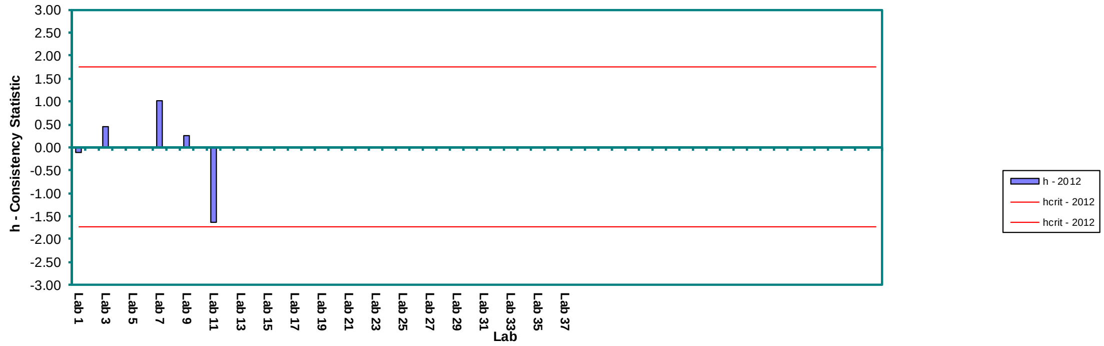
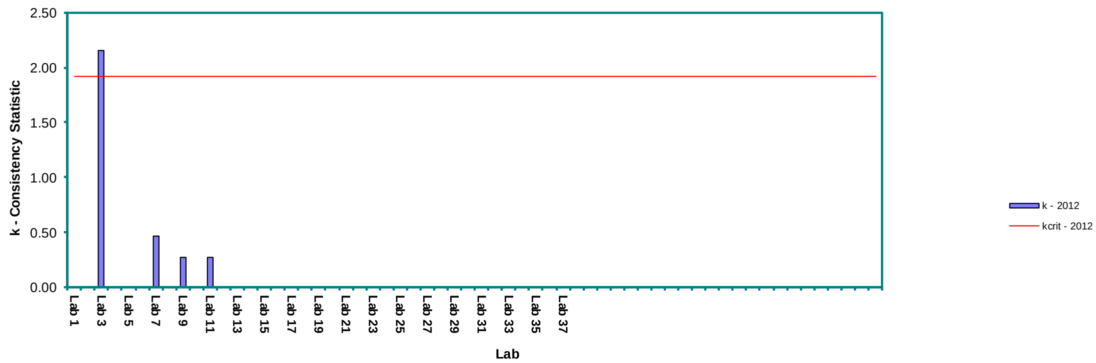
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
Minimum X_{ave}	53.3333	r = 2.8 s_r =	5.9017	h_{crit} =	1.74
Maximum X_{ave}	58.0000	R = 2.8 s_R =	6.8522	h_{crit} =	-1.74
Check s_{Xave} =	1.7575			k_{crit} =	1.92

Where:
- $x_1....x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R^*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
117 - RTFO Kinematic Viscosity of Residue (mm2/s)
2012

Data				
n =	3	$(X_{ave})_{ave}$ =	393.8333	s_r = 15.6418
p =	2	s_{Xave} =	9.6638	s_{R*} = 16.0156
Significance Level =		0.5%		s_R = 16.0156

Check s_{Xave} =	9.6638
r = 2.8 s_r =	43.3569
R = 2.8 s_R =	44.3930

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											#NOMBRE!	#NOMBRE!	1.41
Lab 2											#NOMBRE!	#NOMBRE!	1.41
Lab 3	395.0000	404.0000	362.0000		387.0000	22.1133	-6.8333	489.0000	-0.71	1.41	#NOMBRE!	#NOMBRE!	1.41
Lab 4											#NOMBRE!	#NOMBRE!	1.41
Lab 5											#NOMBRE!	#NOMBRE!	1.41
Lab 6											#NOMBRE!	#NOMBRE!	1.41
Lab 7											#NOMBRE!	#NOMBRE!	1.41
Lab 8											#NOMBRE!	#NOMBRE!	1.41
Lab 9	401.0000	400.0000	401.0000		400.6667	0.5774	6.8333	0.3333	0.71	0.04	#NOMBRE!	#NOMBRE!	1.41
Lab 10											#NOMBRE!	#NOMBRE!	1.41
Lab 11											#NOMBRE!	#NOMBRE!	1.41
Lab 12											#NOMBRE!	#NOMBRE!	1.41
Lab 13											#NOMBRE!	#NOMBRE!	1.41
Lab 14											#NOMBRE!	#NOMBRE!	1.41
Lab 15											#NOMBRE!	#NOMBRE!	1.41
Lab 16											#NOMBRE!	#NOMBRE!	1.41
Lab 17											#NOMBRE!	#NOMBRE!	1.41
Lab 18											#NOMBRE!	#NOMBRE!	1.41
Lab 19											#NOMBRE!	#NOMBRE!	1.41
Lab 20											#NOMBRE!	#NOMBRE!	1.41
Lab 21											#NOMBRE!	#NOMBRE!	1.41
Lab 22											#NOMBRE!	#NOMBRE!	1.41
Lab 23											#NOMBRE!	#NOMBRE!	1.41
Lab 24											#NOMBRE!	#NOMBRE!	1.41
Lab 25											#NOMBRE!	#NOMBRE!	1.41
Lab 26											#NOMBRE!	#NOMBRE!	1.41
Lab 27											#NOMBRE!	#NOMBRE!	1.41
Lab 28											#NOMBRE!	#NOMBRE!	1.41
Lab 29											#NOMBRE!	#NOMBRE!	1.41
Lab 30											#NOMBRE!	#NOMBRE!	1.41
Lab 31											#NOMBRE!	#NOMBRE!	1.41
Lab 32											#NOMBRE!	#NOMBRE!	1.41
Lab 33											#NOMBRE!	#NOMBRE!	1.41
Lab 34											#NOMBRE!	#NOMBRE!	1.41
Lab 35											#NOMBRE!	#NOMBRE!	1.41
Lab 36											#NOMBRE!	#NOMBRE!	1.41
Lab 37											#NOMBRE!	#NOMBRE!	1.41
											#NOMBRE!	#NOMBRE!	1.41
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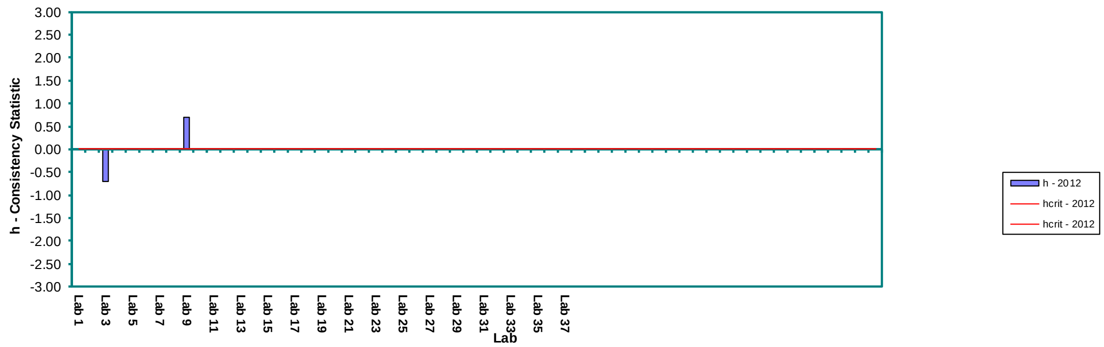
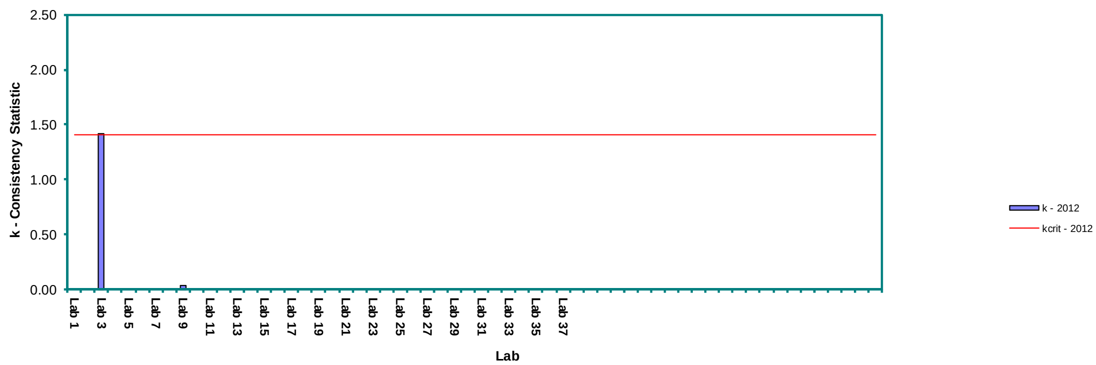
											#NOMBRE!	#NOMBRE!	1.41
											#NOMBRE!	#NOMBRE!	1.41
											#NOMBRE!	#NOMBRE!	1.41

Additional Statistics						
	Minimum X_{ave}	387.0000	r = 2.8 s_r =	43.3569	h_{crit} =	#NOMBRE!
	Maximum X_{ave}	400.6667	R = 2.8 s_R =	44.3930	h_{crit} =	#NOMBRE!
	Check s_{Xave} =	9.6638			k_{crit} =	1.41

Where: $x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		$s_{X_{ave}}$ =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

100 - Asphalt Cement
118 - RTFO Absolute Viscosity of Residue (Pa·s)
2012

Data	n =	3	$(X_{ave})_{ave}$ =	181.6222	s_r =	5.4766	Check s_{Xave} =	31.3415
	p =	3	s_{Xave} =	31.3415	s_{R^*} =	31.6589	$r = 2.8\ s_r$ =	15.1804
	Significance Level =		0.5%		s_R =	31.6589	$R = 2.8\ s_R$ =	87.7539

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.15	-1.15	1.67
Lab 2											1.15	-1.15	1.67
Lab 3	190.7000	202.5000	206.7000		199.9667	8.2954	18.3444	68.8133	0.59	1.51	1.15	-1.15	1.67
Lab 4											1.15	-1.15	1.67
Lab 5											1.15	-1.15	1.67
Lab 6											1.15	-1.15	1.67
Lab 7	149.4000	140.4000	146.5000		145.4333	4.5938	-36.1889	21.1033	-1.15	0.84	1.15	-1.15	1.67
Lab 8											1.15	-1.15	1.67
Lab 9	199.7000	199.2000	199.5000		199.4667	0.2517	17.8444	0.0633	0.57	0.05	1.15	-1.15	1.67
Lab 10											1.15	-1.15	1.67
Lab 11											1.15	-1.15	1.67
Lab 12											1.15	-1.15	1.67
Lab 13											1.15	-1.15	1.67
Lab 14											1.15	-1.15	1.67
Lab 15											1.15	-1.15	1.67
Lab 16											1.15	-1.15	1.67
Lab 17											1.15	-1.15	1.67
Lab 18											1.15	-1.15	1.67
Lab 19											1.15	-1.15	1.67
Lab 20											1.15	-1.15	1.67
Lab 21											1.15	-1.15	1.67
Lab 22											1.15	-1.15	1.67
Lab 23											1.15	-1.15	1.67
Lab 24											1.15	-1.15	1.67
Lab 25											1.15	-1.15	1.67
Lab 26											1.15	-1.15	1.67
Lab 27											1.15	-1.15	1.67
Lab 28											1.15	-1.15	1.67
Lab 29											1.15	-1.15	1.67
Lab 30											1.15	-1.15	1.67
Lab 31											1.15	-1.15	1.67
Lab 32											1.15	-1.15	1.67
Lab 33											1.15	-1.15	1.67
Lab 34											1.15	-1.15	1.67
Lab 35											1.15	-1.15	1.67
Lab 36											1.15	-1.15	1.67
Lab 37											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
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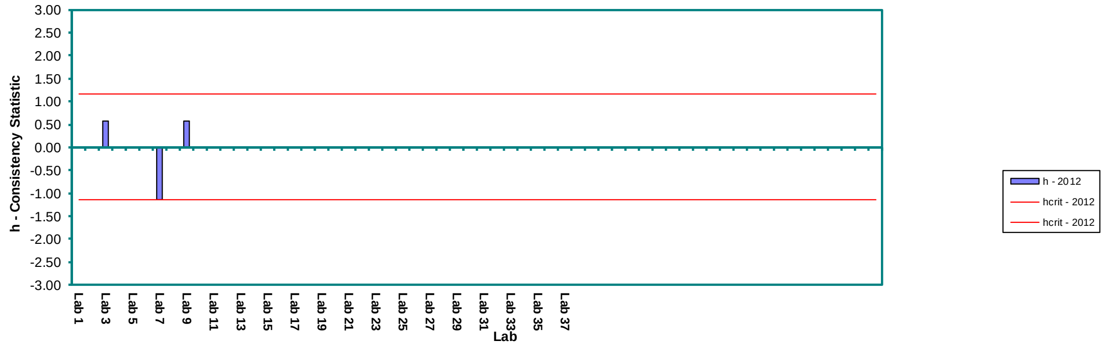
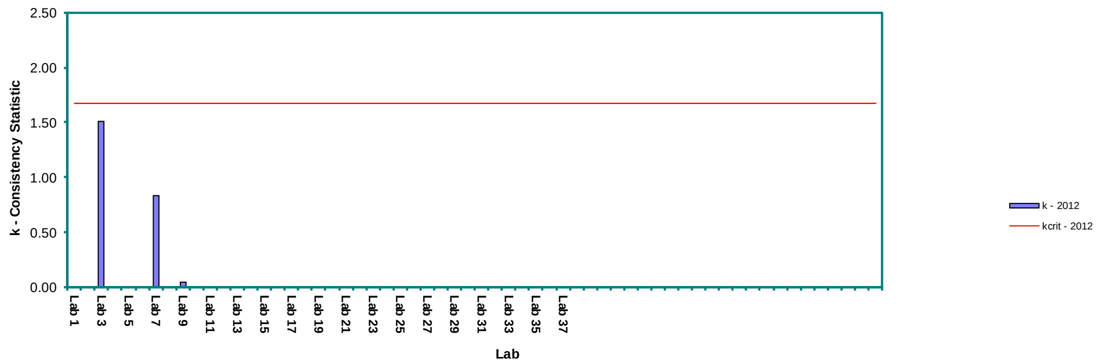
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67
											1.15	-1.15	1.67

Additional Statistics						
	Minimum X_{ave}	145.4333	$r = 2.8\ s_r$ =	15.1804	h_{crit} =	1.15
	Maximum X_{ave}	199.9667	$R = 2.8\ s_R$ =	87.7539	h_{crit} =	-1.15
	Check s_{Xave} =	31.3415			k_{crit} =	1.67

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
301 - Saybolt-Furol Viscosity @ 50°C (s)
2012

Data												
n =	3	$(X_{ave})_{ave}$ =	51.0958	s_r =	3.5223	Check s_{Xave} =	10.4144
p =	8	s_{Xave} =	10.4144	s_{R*} =	10.8042	r = 2.8 s_r =	9.7633
Significance Level =		0.5%		s_R =	10.8042	R = 2.8 s_R =	29.9477

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.15	-2.15	2.06
Lab 2	51.4000	52.1000	52.8000		52.1000	0.7000	1.0042	0.4900	0.10	0.20	2.15	-2.15	2.06
Lab 3	44.4000	37.6000	36.6000		39.5333	4.2442	-11.5625	18.0133	-1.11	1.20	2.15	-2.15	2.06
Lab 4	44.5000	45.6000	44.8000		44.9667	0.5686	-6.1292	0.3233	-0.59	0.16	2.15	-2.15	2.06
Lab 5	45.3000	42.9000	44.5000		44.2333	1.2220	-6.8625	1.4933	-0.66	0.35	2.15	-2.15	2.06
Lab 6	75.7000	68.8000	71.8000		72.1000	3.4598	21.0042	11.9700	2.02	0.98	2.15	-2.15	2.06
Lab 7											2.15	-2.15	2.06
Lab 8											2.15	-2.15	2.06
Lab 9											2.15	-2.15	2.06
Lab 10	36.8000	49.6000	51.1000		45.8333	7.8590	-5.2625	61.7633	-0.51	2.23	2.15	-2.15	2.06
Lab 11	51.1000	50.0000	50.4000		50.5000	0.5568	-0.5958	0.3100	-0.06	0.16	2.15	-2.15	2.06
Lab 12	57.0000	60.3000	61.2000		59.5000	2.2113	8.4042	4.8900	0.81	0.63	2.15	-2.15	2.06
Lab 13											2.15	-2.15	2.06
Lab 14											2.15	-2.15	2.06
Lab 15											2.15	-2.15	2.06
Lab 16											2.15	-2.15	2.06
Lab 17											2.15	-2.15	2.06
Lab 18											2.15	-2.15	2.06
Lab 19											2.15	-2.15	2.06
Lab 20											2.15	-2.15	2.06
Lab 21											2.15	-2.15	2.06
Lab 22											2.15	-2.15	2.06
Lab 23											2.15	-2.15	2.06
Lab 24											2.15	-2.15	2.06
Lab 25											2.15	-2.15	2.06
Lab 26											2.15	-2.15	2.06
Lab 27											2.15	-2.15	2.06
Lab 28											2.15	-2.15	2.06
Lab 29											2.15	-2.15	2.06
Lab 30											2.15	-2.15	2.06
Lab 31											2.15	-2.15	2.06
Lab 32											2.15	-2.15	2.06
Lab 33											2.15	-2.15	2.06
Lab 34											2.15	-2.15	2.06
Lab 35											2.15	-2.15	2.06
Lab 36											2.15	-2.15	2.06
Lab 37											2.15	-2.15	2.06
											2.15	-2.15	2.06
											2.15	-2.15	2.06
											2.15	-2.15	2.06
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											2.15	-2.15	2.06
											2.15	-2.15	2.06
											2.15	-2.15	2.06
											2.15	-2.15	2.06

Additional Statistics						
	Minimum X_{ave}	39.5333	r = 2.8 s_r =	9.7633	h_{crit} =	2.15
	Maximum X_{ave}	72.1000	R = 2.8 s_R =	29.9477	h_{crit} =	-2.15
	Check s_{Xave} =	10.4144			k_{crit} =	2.06

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

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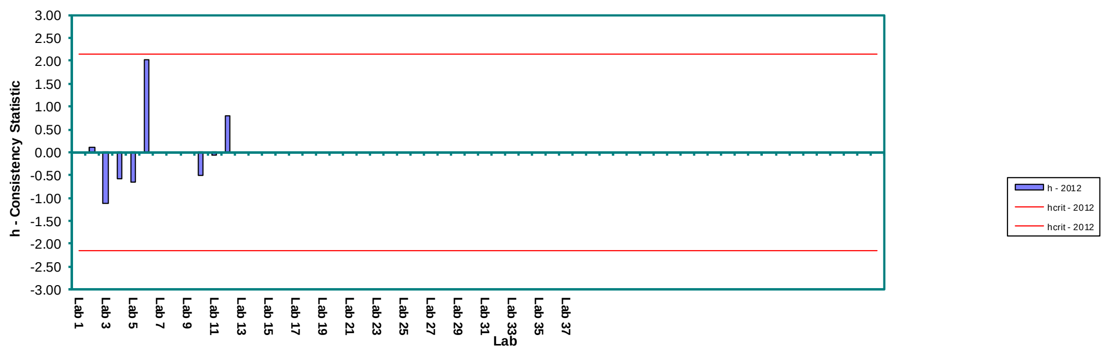

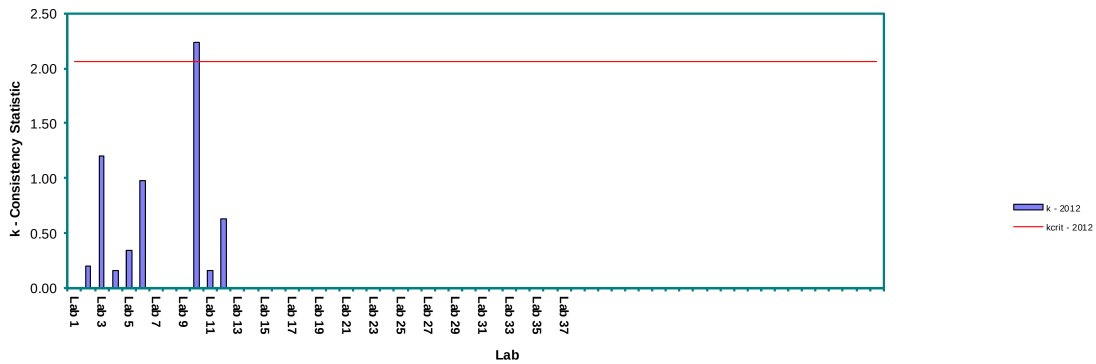

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion

302 - Residue by Distillation (% by mass)

2012

Data				
n =	3	$(X_{ave})_{ave}$ =	63.9704	s_r = 0.2285
p =	9	s_{Xave} =	0.2176	s_{R*} = 0.2866
Significance Level =		0.5%		s_R = 0.2866

Check s_{Xave} =	0.2176
r = 2.8 s_r =	0.6334
R = 2.8 s_R =	0.7945

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	64.1000	64.0000	64.1000		64.0667	0.0577	0.0963	0.0033	0.44	0.25	2.23	-2.23	2.09
Lab 3	63.4000	63.3000	64.2000		63.6333	0.4933	-0.3370	0.2433	-1.55	2.16	2.23	-2.23	2.09
Lab 4	63.6000	63.6000	64.0000		63.7333	0.2309	-0.2370	0.0533	-1.09	1.01	2.23	-2.23	2.09
Lab 5	64.0000	64.0000	64.1000		64.0333	0.0577	0.0630	0.0033	0.29	0.25	2.23	-2.23	2.09
Lab 6	64.4000	63.8000	63.9000		64.0333	0.3215	0.0630	0.1033	0.29	1.41	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	64.3000	64.4000	64.3000		64.3333	0.0577	0.3630	0.0033	1.67	0.25	2.23	-2.23	2.09
Lab 10	63.7000	64.0000	63.9000		63.8667	0.1528	-0.1037	0.0233	-0.48	0.67	2.23	-2.23	2.09
Lab 11	63.7000	63.9000	64.0000		63.8667	0.1528	-0.1037	0.0233	-0.48	0.67	2.23	-2.23	2.09
Lab 12	64.1000	64.1000	64.3000		64.1667	0.1155	0.1963	0.0133	0.90	0.51	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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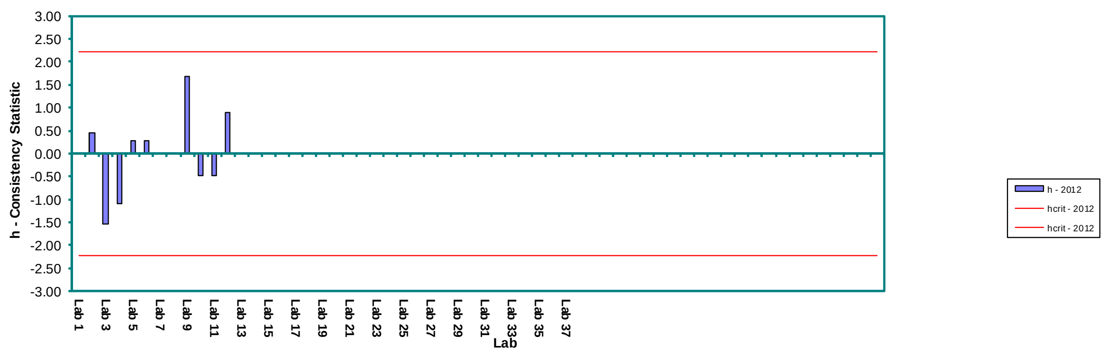
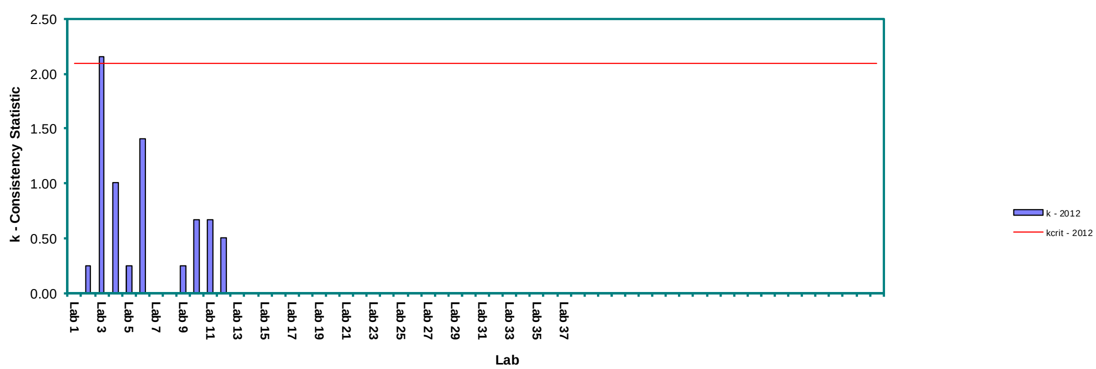
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	63.6333	r = 2.8 s_r =	0.6334	h_{crit} =	2.23
	Maximum X_{ave}	64.3333	R = 2.8 s_R =	0.7945	h_{crit} =	-2.23
	Check s_{Xave} =	0.2176			k_{crit} =	2.09

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
303 - Total Distillation Time (minutes)
2012

Data

n =	3	$(X_{ave})_{ave}$ =	60.0000	s_r =	2.9250
p =	9	s_{Xave} =	3.3541	s_{R^*} =	4.1175
Significance Level =		0.5%		s_R =	4.1175

Check s_{Xave} = 3.3541
$r = 2.8\ s_r$ = 8.1077
$R = 2.8\ s_R$ = 11.4131

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	60.0000	60.0000	60.0000		60.0000	0.0000	0.0000	0.0000	0.00	0.00	2.23	-2.23	2.09
Lab 3	60.0000	60.0000	60.0000		60.0000	0.0000	0.0000	0.0000	0.00	0.00	2.23	-2.23	2.09
Lab 4	51.0000	49.0000	63.0000		54.3333	7.5719	-5.6667	57.3333	-1.69	2.59	2.23	-2.23	2.09
Lab 5	65.0000	62.0000	65.0000		64.0000	1.7321	4.0000	3.0000	1.19	0.59	2.23	-2.23	2.09
Lab 6	59.0000	52.0000	58.0000		56.3333	3.7859	-3.6667	14.3333	-1.09	1.29	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	67.0000	65.0000	64.0000		65.3333	1.5275	5.3333	2.3333	1.59	0.52	2.23	-2.23	2.09
Lab 10	60.0000	60.0000	60.0000		60.0000	0.0000	0.0000	0.0000	0.00	0.00	2.23	-2.23	2.09
Lab 11	60.0000	60.0000	60.0000		60.0000	0.0000	0.0000	0.0000	0.00	0.00	2.23	-2.23	2.09
Lab 12	60.0000	60.0000	60.0000		60.0000	0.0000	0.0000	0.0000	0.00	0.00	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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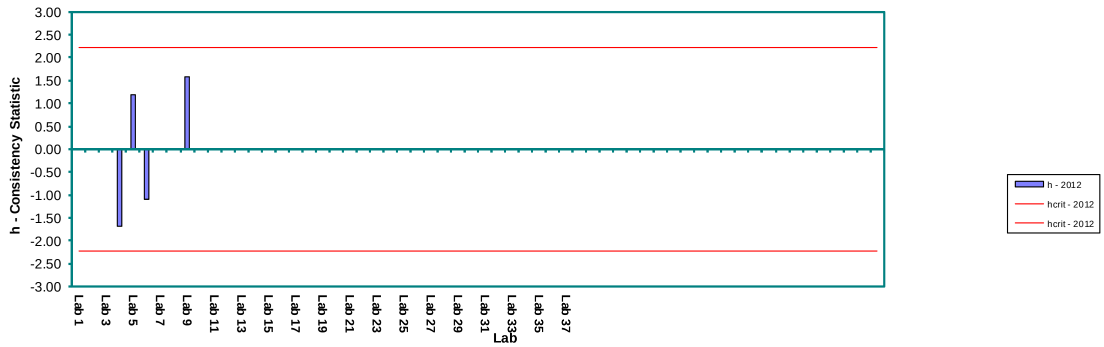
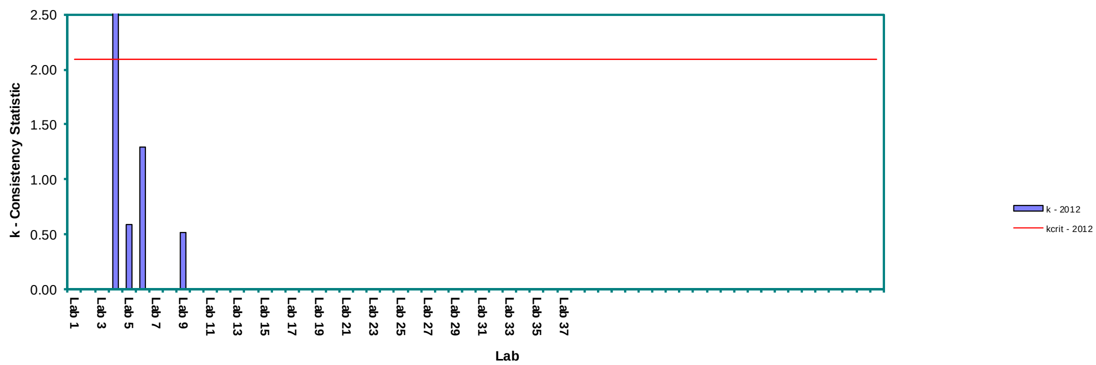
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	54.3333	$r = 2.8\ s_r$ =	8.1077	h_{crit} =	2.23
	Maximum X_{ave}	65.3333	$R = 2.8\ s_R$ =	11.4131	h_{crit} =	-2.23
	Check s_{Xave} =	3.3541			k_{crit} =	2.09

Where:		Where:	
$x_1 \ldots x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R^*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion

304 - Oil Portion of Distillate (% by Volume of Emulsion)

2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	1.3185	s_r =	0.1491	Check s_{Xave} =	0.6652	
					p =	9	s_{Xave} =	0.6652	s_{R^*} =	0.6763	r = 2.8 s_r =	0.4132	
					Significance Level =		0.5%		s_R =	0.6763	R = 2.8 s_R =	1.8745	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1											2.23	-2.23	2.09
Lab 2	1.0000	1.0000	1.0000		1.0000	0.0000	-0.3185	0.0000	-0.48	0.00	2.23	-2.23	2.09
Lab 3	1.5000	1.5000	1.5000		1.5000	0.0000	0.1815	0.0000	0.27	0.00	2.23	-2.23	2.09
Lab 4	1.5000	1.5000	1.0000		1.3333	0.2887	0.0148	0.0833	0.02	1.94	2.23	-2.23	2.09
Lab 5	1.0000	1.0000	1.0000		1.0000	0.0000	-0.3185	0.0000	-0.48	0.00	2.23	-2.23	2.09
Lab 6	3.0000	3.0000	3.0000		3.0000	0.0000	1.6815	0.0000	2.53	0.00	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.7000	0.8000	0.8000		0.7667	0.0577	-0.5519	0.0033	-0.83	0.39	2.23	-2.23	2.09
Lab 10	1.0000	1.0000	1.5000		1.1667	0.2887	-0.1519	0.0833	-0.23	1.94	2.23	-2.23	2.09
Lab 11	1.0000	1.0000	1.3000		1.1000	0.1732	-0.2185	0.0300	-0.33	1.16	2.23	-2.23	2.09
Lab 12	1.0000	1.0000	1.0000		1.0000	0.0000	-0.3185	0.0000	-0.48	0.00	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics	Minimum X_{ave}	0.7667	r = 2.8 s_r =	0.4132	h_{crit} =	2.23
	Maximum X_{ave}	3.0000	R = 2.8 s_R =	1.8745	h_{crit} =	-2.23
	Check s_{Xave} =	0.6652			k_{crit} =	2.09

Where: $x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic

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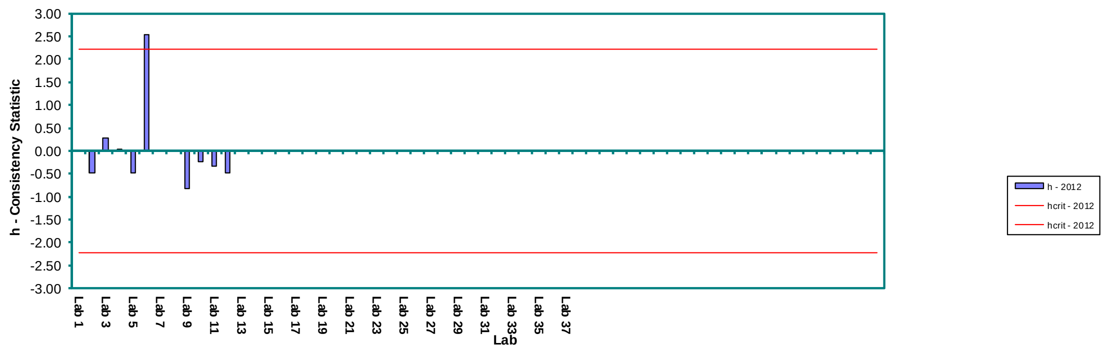

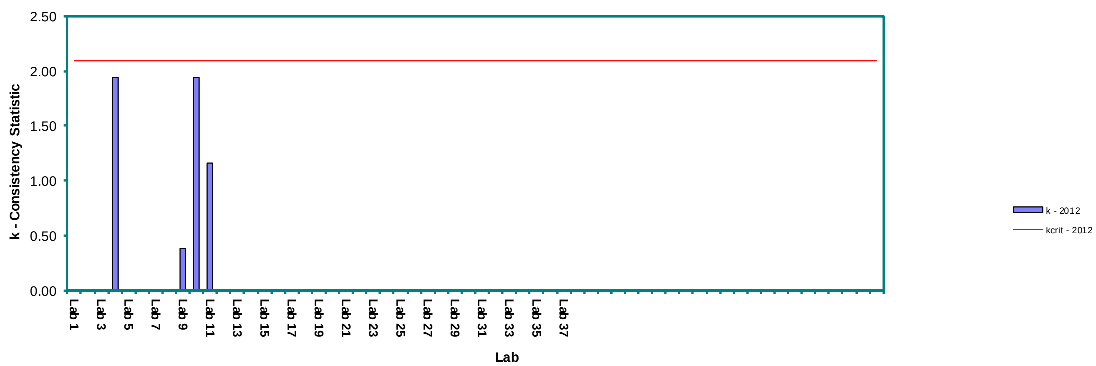

Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
305 - Demulsibility, 50 mL, 5.55 g/CaCl2 (% by Mass)
2012

Data						
n = 3	$(X_{ave})_{ave}$ =	98.0467	s_r =	1.0182	Check s_{Xave} =	1.5756
p = 5	s_{Xave} =	1.5756	s_{R*} =	1.7815	r = 2.8 s_r =	2.8222
Significance Level =	0.5%		s_R =	1.7815	R = 2.8 s_R =	4.9380

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.74	-1.74	1.92
Lab 2	98.8000	98.9000	98.9000		98.8667	0.0577	0.8200	0.0033	0.52	0.06	1.74	-1.74	1.92
Lab 3	96.8000	96.3000	92.7000		95.2667	2.2368	-2.7800	5.0033	-1.76	2.20	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5	98.8000	99.1000	98.6000		98.8333	0.2517	0.7867	0.0633	0.50	0.25	1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9											1.74	-1.74	1.92
Lab 10	98.6000	99.1000	99.2000		98.9667	0.3215	0.9200	0.1033	0.58	0.32	1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12	98.2000	98.4000	98.3000		98.3000	0.1000	0.2533	0.0100	0.16	0.10	1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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											1.74	-1.74	1.92
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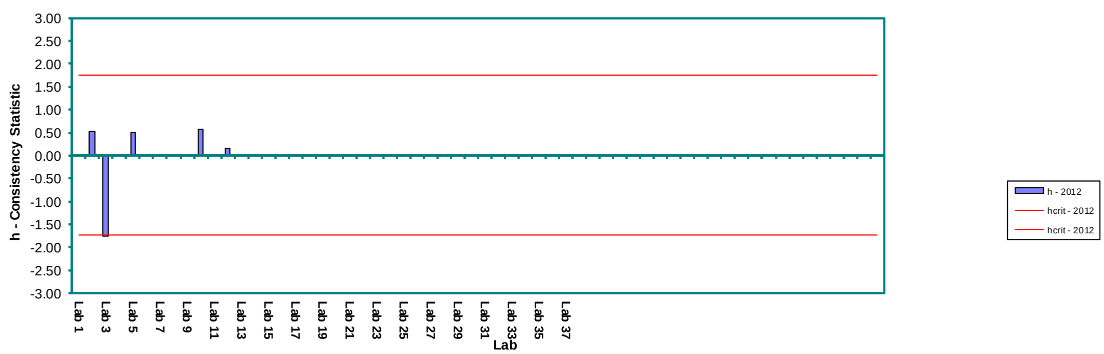
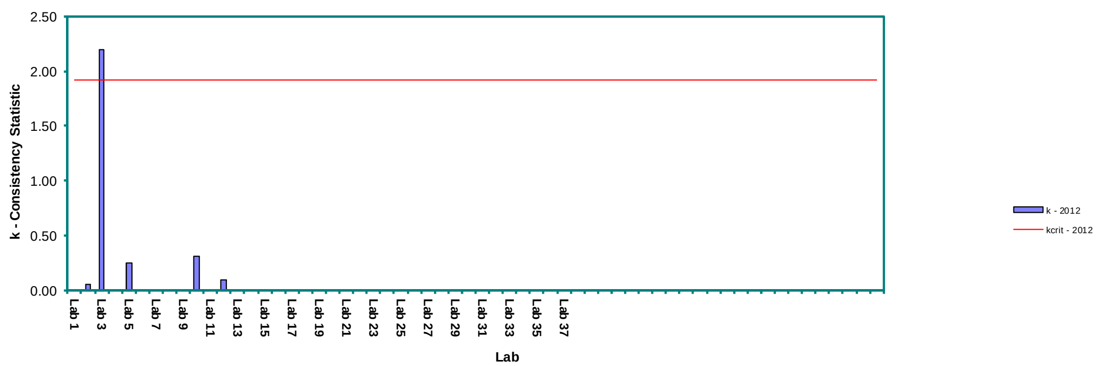
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	95.2667	r = 2.8 s_r =	2.8222	h_{crit} =	1.74
	Maximum X_{ave}	98.9667	R = 2.8 s_R =	4.9380	h_{crit} =	-1.74
	Check s_{Xave} =	1.5756			k_{crit} =	1.92

Where:			Where:	
	$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
306 - Penetration of Residue @ 25°C, 100g, 5s (dmm)
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	169.1111	s_r =	5.0662	Check s_{Xave} =	24.3470	
					p =	9	s_{Xave} =	24.3470	s_{R*} =	24.6959	$r = 2.8\ s_r$ =	14.0429	
					Significance Level =		0.5%		s_R =	24.6959	$R = 2.8\ s_R$ =	68.4536	
Lab #	x_1	x_2	x_3	x_4	X_{ave}	**s**	**d**	s^2	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1											2.23	-2.23	2.09
Lab 2	166.0000	165.0000	167.0000		166.0000	1.0000	-3.1111	1.0000	-0.13	0.20	2.23	-2.23	2.09
Lab 3	216.0000	208.0000	205.0000		209.6667	5.6862	40.5556	32.3333	1.67	1.12	2.23	-2.23	2.09
Lab 4	140.0000	135.0000	145.0000		140.0000	5.0000	-29.1111	25.0000	-1.20	0.99	2.23	-2.23	2.09
Lab 5	196.0000	184.0000	189.0000		189.6667	6.0277	20.5556	36.3333	0.84	1.19	2.23	-2.23	2.09
Lab 6	201.0000	182.0000	197.0000		193.3333	10.0167	24.2222	100.3333	0.99	1.98	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	140.0000	139.0000	136.0000		138.3333	2.0817	-30.7778	4.3333	-1.26	0.41	2.23	-2.23	2.09
Lab 10	168.0000	175.0000	165.0000		169.3333	5.1316	0.2222	26.3333	0.01	1.01	2.23	-2.23	2.09
Lab 11	154.0000	155.0000	153.0000		154.0000	1.0000	-15.1111	1.0000	-0.62	0.20	2.23	-2.23	2.09
Lab 12	161.0000	160.0000	164.0000		161.6667	2.0817	-7.4444	4.3333	-0.31	0.41	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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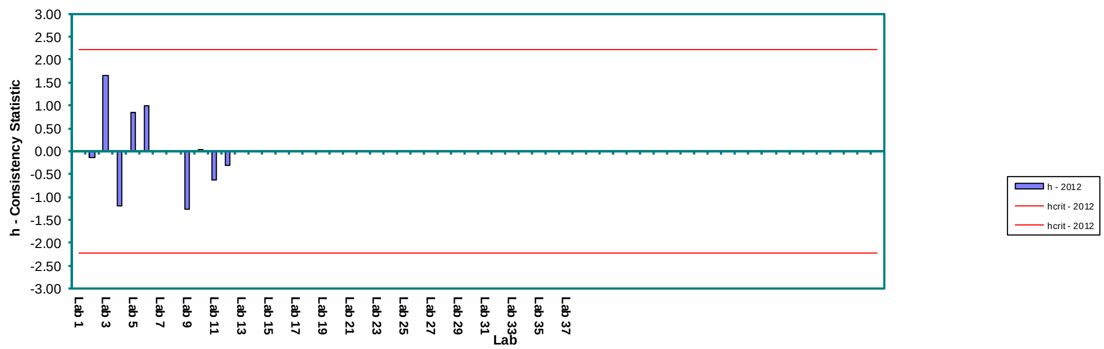
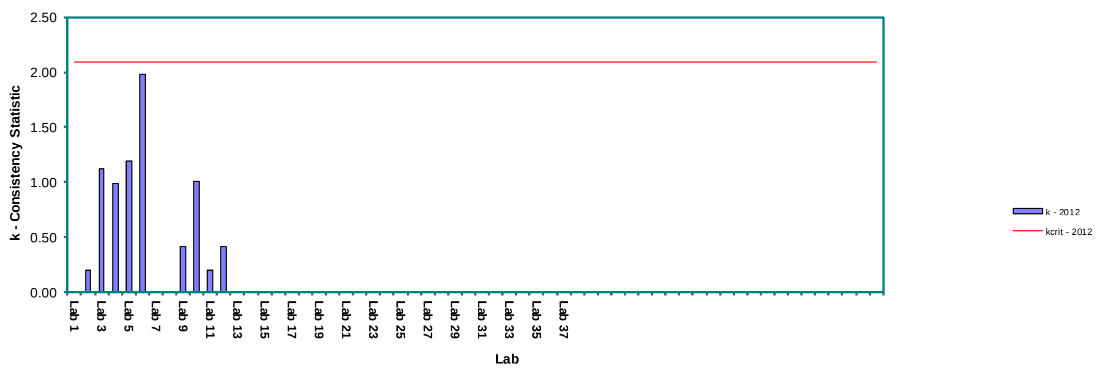
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics					
Minimum X_{ave}	138.3333	$r = 2.8\ s_r$ =	14.0429	h_{crit} =	2.23
Maximum X_{ave}	209.6667	$R = 2.8\ s_R$ =	68.4536	h_{crit} =	-2.23
Check s_{Xave} =	24.3470			k_{crit} =	2.09

Where:		Where:	
$x_1 .... x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
307 - Residue Conditioning Time in Air (minutes)
2012

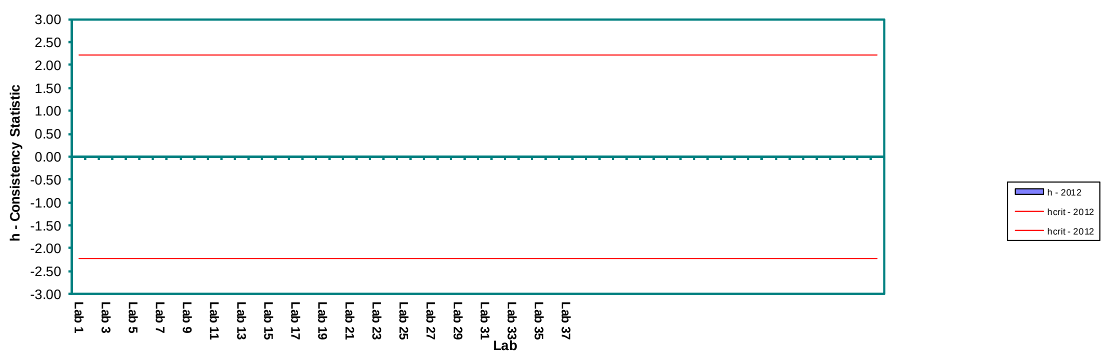
Data						
n =	3	$(X_{ave})_{ave}$ =	90.0000	s_r =	0.0000	Check s_{Xave} = 0.0000
p =	9	s_{Xave} =	0.0000	s_{R*} =	0.0000	$r = 2.8\ s_r$ = 0.0000
Significance Level =		0.5%		s_R =	0.0000	$R = 2.8\ s_R$ = 0.0000

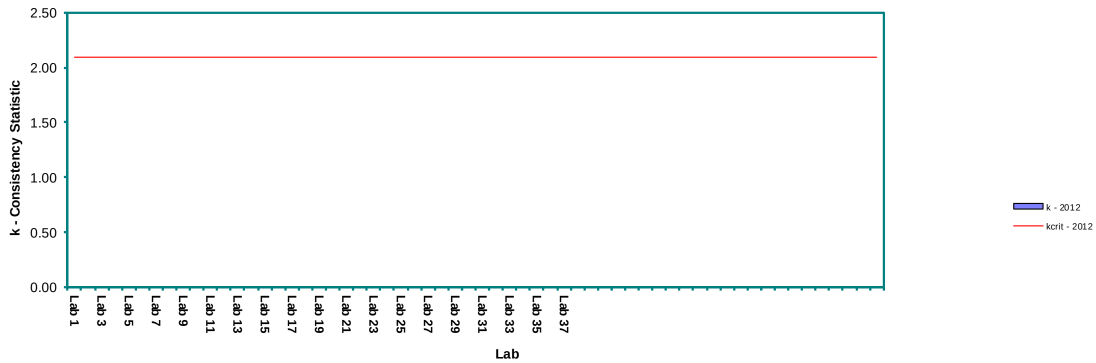
Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 3	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 4	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 5	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 6	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 10	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 11	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 12	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	90.0000	$r = 2.8\ s_r$ =	0.0000	h_{crit} =	2.23
	Maximum X_{ave}	90.0000	$R = 2.8\ s_R$ =	0.0000	h_{crit} =	-2.23
	Check s_{Xave} =	0.0000			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
308 - Residue Conditioning Time in Water Bath (minutes)
2012

Data						
n = 3	$(X_{ave})_{ave}$ =	90.0000	s_r =	0.0000	Check s_{Xave} =	0.0000
p = 9	s_{Xave} =	0.0000	s_{R*} =	0.0000	r = 2.8 s_r =	0.0000
Significance Level =	0.5%		s_R =	0.0000	R = 2.8 s_R =	0.0000

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 3	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 4	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 5	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 6	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 10	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 11	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 12	90.0000	90.0000	90.0000		90.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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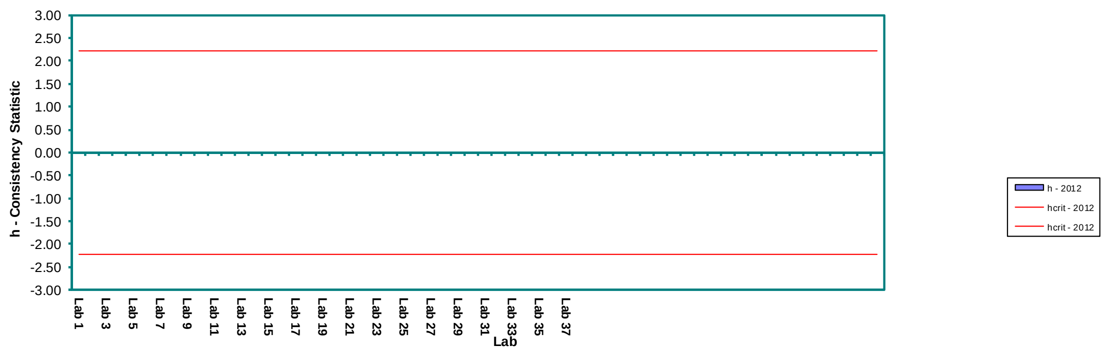
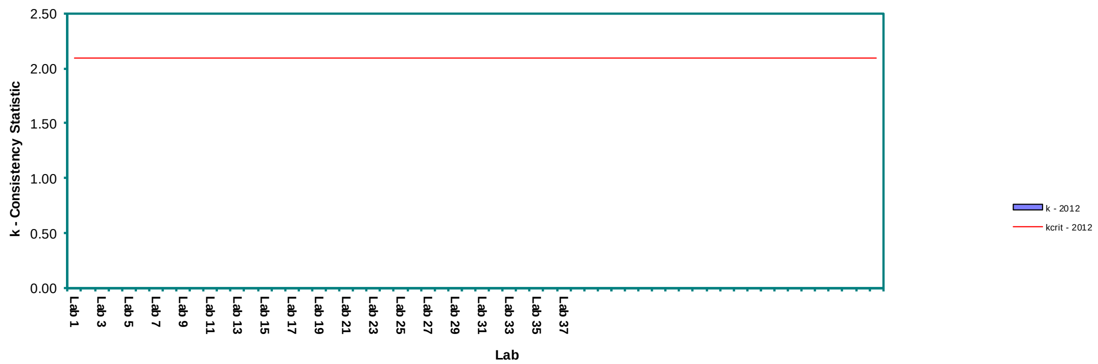
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	90.0000	r = 2.8 s_r =	0.0000	h_{crit} =	2.23
	Maximum X_{ave}	90.0000	R = 2.8 s_R =	0.0000	h_{crit} =	-2.23
	Check s_{Xave} =	0.0000			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

300 - Emulsion
309 - Apparent Viscosity @ 60°C (Pa·s)
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 321.8120	s_r = 52.0425	Check s_{Xave} = 74.3948
p = 5	s_{Xave} = 74.3948	s_{R*} = 85.6750	r = 2.8 s_r = 144.2546
Significance Level = 0.5%		s_R = 85.6750	R = 2.8 s_R = 237.4789

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.74	-1.74	1.92
Lab 2	237.0000	238.0000	233.0000		236.0000	2.6458	-85.8120	7.0000	-1.15	0.05	1.74	-1.74	1.92
Lab 3	355.6600	252.3000	215.4200		274.4600	72.6988	-47.3520	5,285.1136	-0.64	1.40	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5	294.8000	309.4000	307.7000		303.9667	7.9839	-17.8453	63.7433	-0.24	0.15	1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	425.2000	328.5000	377.8000		377.1667	48.3531	55.3547	2,338.0233	0.74	0.93	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12	410.0000	497.4000	345.0000		417.4667	76.4739	95.6547	5,848.2533	1.29	1.47	1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics				
Minimum X_{ave}	236.0000	r = 2.8 s_r = 144.2546	h_{crit} =	1.74
Maximum X_{ave}	417.4667	R = 2.8 s_R = 237.4789	h_{crit} =	-1.74
Check s_{Xave} =	74.3948		k_{crit} =	1.92

Where:

Symbol	Meaning	Symbol	Meaning
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

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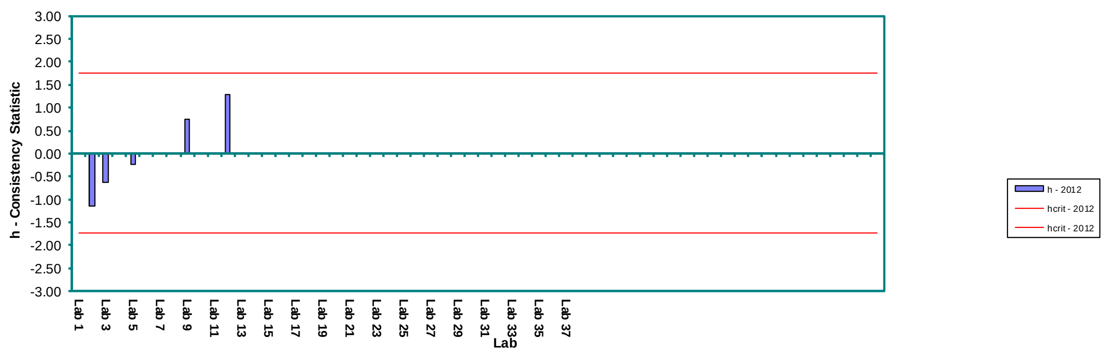

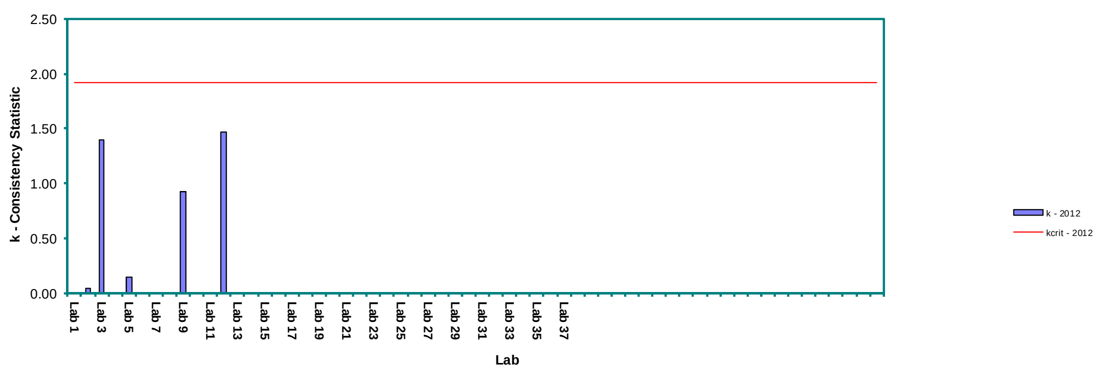

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
401 - Saybolt-Furol Viscosity @ 50°C (s)
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	71.7762	s_r =	9.6733	Check s_{Xave} =	22.5751	
					p =	7	s_{Xave} =	22.5751	s_{R*} =	23.9169	r = 2.8 s_r =	26.8130	
					Significance Level =		0.5%		s_R =	23.9169	R = 2.8 s_R =	66.2942	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1											2.05	-2.05	2.03
Lab 2	63.8000	64.9000	75.0000		67.9000	6.1733	-3.8762	38.1100	-0.17	0.64	2.05	-2.05	2.03
Lab 3	106.4000	82.5000	131.2000		106.7000	24.3514	34.9238	592.9900	1.55	2.52	2.05	-2.05	2.03
Lab 4	63.8000	62.4000	59.3000		61.8333	2.3029	-9.9429	5.3033	-0.44	0.24	2.05	-2.05	2.03
Lab 5	51.0000	49.6000	49.3000		49.9667	0.9074	-21.8095	0.8233	-0.97	0.09	2.05	-2.05	2.03
Lab 6	102.4000	95.4000	98.7000		98.8333	3.5019	27.0571	12.2633	1.20	0.36	2.05	-2.05	2.03
Lab 7											2.05	-2.05	2.03
Lab 8											2.05	-2.05	2.03
Lab 9											2.05	-2.05	2.03
Lab 10	49.2000	47.7000	51.3000		49.4000	1.8083	-22.3762	3.2700	-0.99	0.19	2.05	-2.05	2.03
Lab 11											2.05	-2.05	2.03
Lab 12	69.3000	66.3000	67.8000		67.8000	1.5000	-3.9762	2.2500	-0.18	0.16	2.05	-2.05	2.03
Lab 13											2.05	-2.05	2.03
Lab 14											2.05	-2.05	2.03
Lab 15											2.05	-2.05	2.03
Lab 16											2.05	-2.05	2.03
Lab 17											2.05	-2.05	2.03
Lab 18											2.05	-2.05	2.03
Lab 19											2.05	-2.05	2.03
Lab 20											2.05	-2.05	2.03
Lab 21											2.05	-2.05	2.03
Lab 22											2.05	-2.05	2.03
Lab 23											2.05	-2.05	2.03
Lab 24											2.05	-2.05	2.03
Lab 25											2.05	-2.05	2.03
Lab 26											2.05	-2.05	2.03
Lab 27											2.05	-2.05	2.03
Lab 28											2.05	-2.05	2.03
Lab 29											2.05	-2.05	2.03
Lab 30											2.05	-2.05	2.03
Lab 31											2.05	-2.05	2.03
Lab 32											2.05	-2.05	2.03
Lab 33											2.05	-2.05	2.03
Lab 34											2.05	-2.05	2.03
Lab 35											2.05	-2.05	2.03
Lab 36											2.05	-2.05	2.03
Lab 37											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
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											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03
											2.05	-2.05	2.03

Additional Statistics						
	Minimum X_{ave}	49.4000	r = 2.8 s_r =	26.8130	h_{crit} =	2.05
	Maximum X_{ave}	106.7000	R = 2.8 s_R =	66.2942	h_{crit} =	-2.05
	Check s_{Xave} =	22.5751			k_{crit} =	2.03

Where: $x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic

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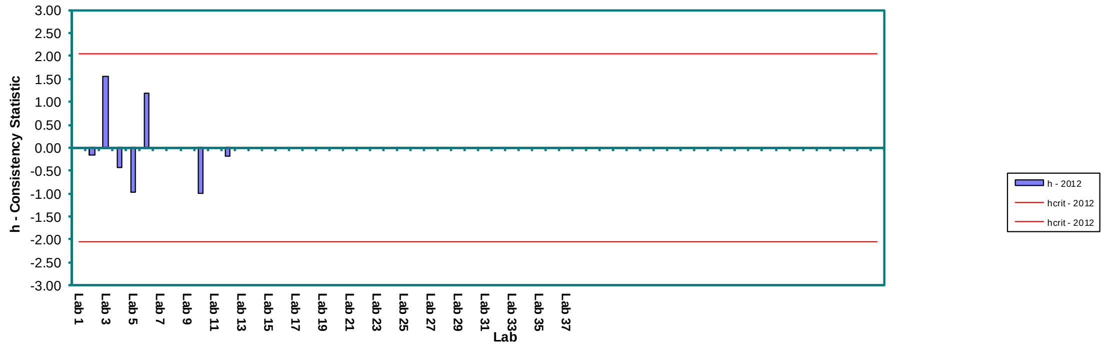

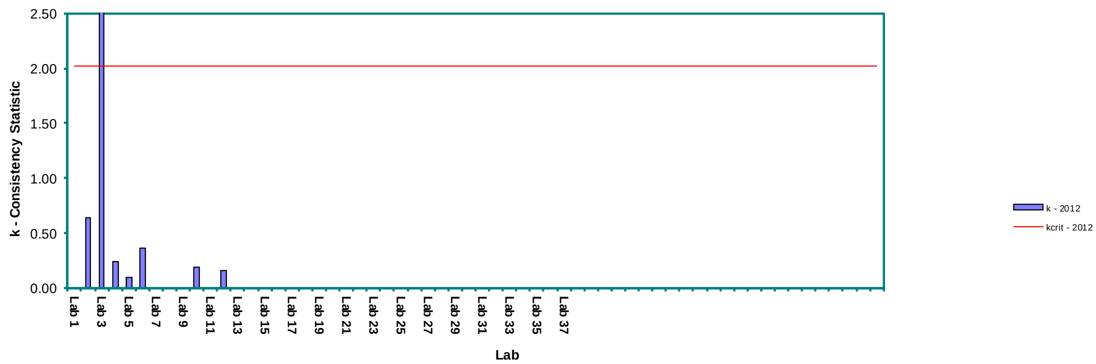

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
402 - Residue by Distillation (% by mass)
2012

Data	n = 3	$(X_{ave})_{ave}$ = 65.0111	s_r = 0.2782	Check s_{Xave} = 0.4200
	p = 9	s_{Xave} = 0.4200	s_{R*} = 0.4775	r = 2.8 s_r = 0.7712
	Significance Level = 0.5%		s_R = 0.4775	R = 2.8 s_R = 1.3235

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	65.2000	65.1000	65.7000		65.3333	0.3215	0.3222	0.1033	0.77	1.16	2.23	-2.23	2.09
Lab 3	65.0000	65.6000	65.0000		65.2000	0.3464	0.1889	0.1200	0.45	1.25	2.23	-2.23	2.09
Lab 4	65.1000	65.1000	64.6000		64.9333	0.2887	-0.0778	0.0833	-0.19	1.04	2.23	-2.23	2.09
Lab 5	64.9000	65.0000	64.9000		64.9333	0.0577	-0.0778	0.0033	-0.19	0.21	2.23	-2.23	2.09
Lab 6	65.4000	65.6000	65.4000		65.4667	0.1155	0.4556	0.0133	1.08	0.42	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	65.2000	65.3000	65.6000		65.3667	0.2082	0.3556	0.0433	0.85	0.75	2.23	-2.23	2.09
Lab 10	64.7000	64.8000	65.0000		64.8333	0.1528	-0.1778	0.0233	-0.42	0.55	2.23	-2.23	2.09
Lab 11	63.7000	64.7000	63.8000		64.0667	0.5508	-0.9444	0.3033	-2.25	1.98	2.23	-2.23	2.09
Lab 12	65.0000	65.0000	64.9000		64.9667	0.0577	-0.0444	0.0033	-0.11	0.21	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics	Minimum X_{ave}	64.0667	r = 2.8 s_r =	0.7712	h_{crit} =	2.23
	Maximum X_{ave}	65.4667	R = 2.8 s_R =	1.3235	h_{crit} =	-2.23
	Check s_{Xave} =	0.4200			k_{crit} =	2.09

Where: x_1....x_n =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic

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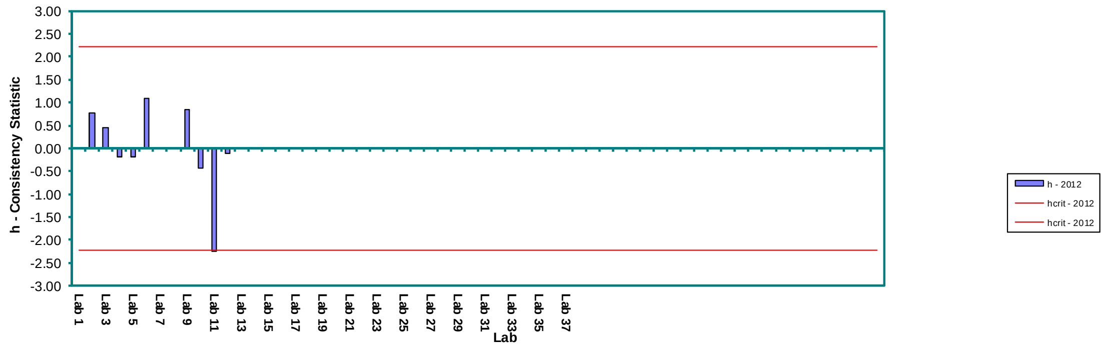

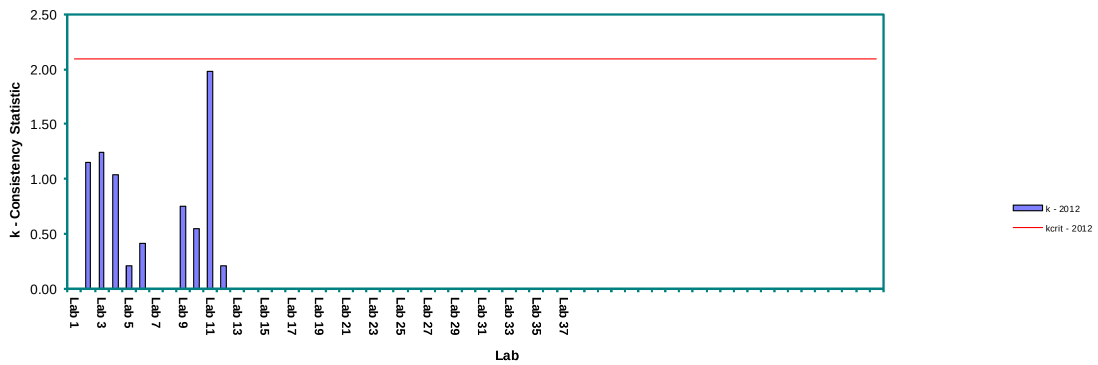

Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
403 - Total Distillation Time (minutes)
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	60.1111	s_r =	1.5516	Check s_{Xave} =	0.6236
p =	9	s_{Xave} =	0.6236	s_{R*} =	1.4120	r = 2.8 s_r =	4.3008
Significance Level =		0.5%		s_R =	1.5516	R = 2.8 s_R =	4.3008

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 3	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 4	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 5	63.0000	57.0000	65.0000		61.6667	4.1633	1.5556	17.3333	2.49	2.68	2.23	-2.23	2.09
Lab 6	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	60.0000	57.0000	61.0000		59.3333	2.0817	-0.7778	4.3333	-1.25	1.34	2.23	-2.23	2.09
Lab 10	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 11	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 12	60.0000	60.0000	60.0000		60.0000	0.0000	-0.1111	0.0000	-0.18	0.00	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	59.3333	r = 2.8 s_r =	4.3008	h_{crit} =	2.23
	Maximum X_{ave}	61.6667	R = 2.8 s_R =	4.3008	h_{crit} =	-2.23
	Check s_{Xave} =	0.6236			k_{crit} =	2.09

Where:
- $x_1....x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Betw een Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic

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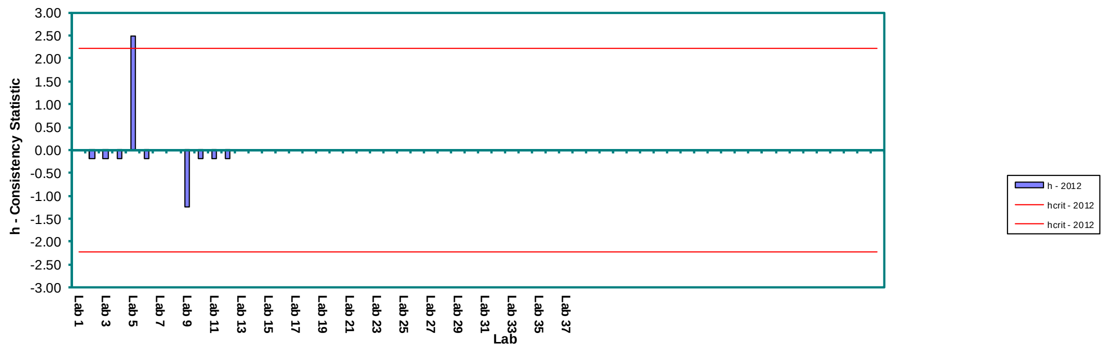

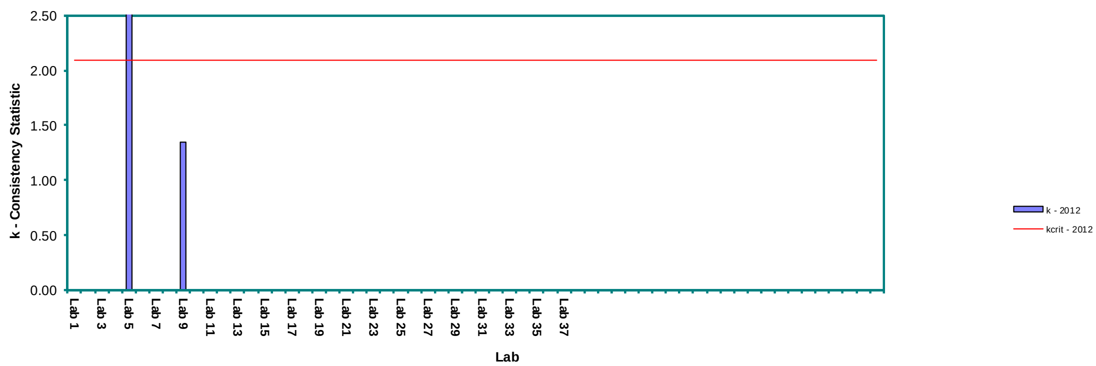

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
404 - Oil Portion of Distillate (% by Volume of Emulsion)
2012

Data						
n = 3	$(X_{ave})_{ave}$ =	1.2389	s_r =	0.0981	Check s_{Xave} =	0.2695
p = 9	s_{Xave} =	0.2695	s_{R*} =	0.2812	r = 2.8 s_r =	0.2720
Significance Level =	0.5%		s_R =	0.2812	R = 2.8 s_R =	0.7794

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	1.2500	1.2500	1.2500		1.2500	0.0000	0.0111	0.0000	0.04	0.00	2.23	-2.23	2.09
Lab 3	1.5000	1.5000	1.5000		1.5000	0.0000	0.2611	0.0000	0.97	0.00	2.23	-2.23	2.09
Lab 4	1.5000	1.5000	1.5000		1.5000	0.0000	0.2611	0.0000	0.97	0.00	2.23	-2.23	2.09
Lab 5	1.0000	1.0000	1.0000		1.0000	0.0000	-0.2389	0.0000	-0.89	0.00	2.23	-2.23	2.09
Lab 6	1.5000	1.5000	1.5000		1.5000	0.0000	0.2611	0.0000	0.97	0.00	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	1.0000	1.0000	1.0000		1.0000	0.0000	-0.2389	0.0000	-0.89	0.00	2.23	-2.23	2.09
Lab 10	1.5000	1.5000	1.5000		1.5000	0.0000	0.2611	0.0000	0.97	0.00	2.23	-2.23	2.09
Lab 11	1.1000	1.1000	1.0000		1.0667	0.0577	-0.1722	0.0033	-0.64	0.59	2.23	-2.23	2.09
Lab 12	1.0000	0.5000	1.0000		0.8333	0.2887	-0.4056	0.0833	-1.50	2.94	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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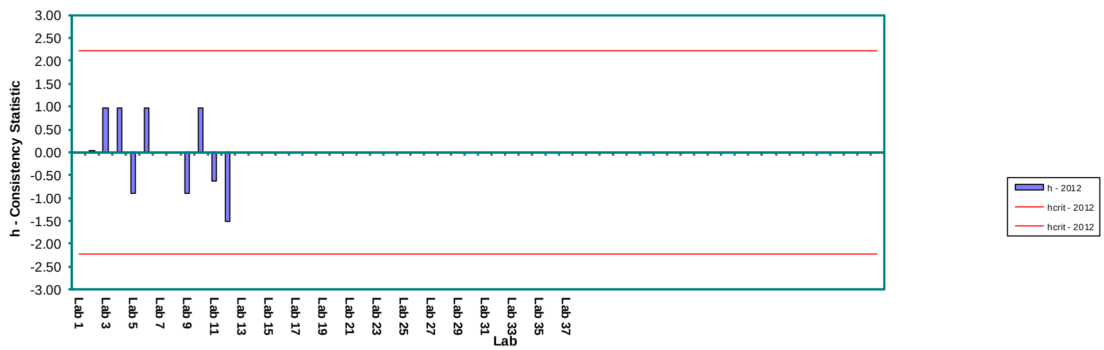
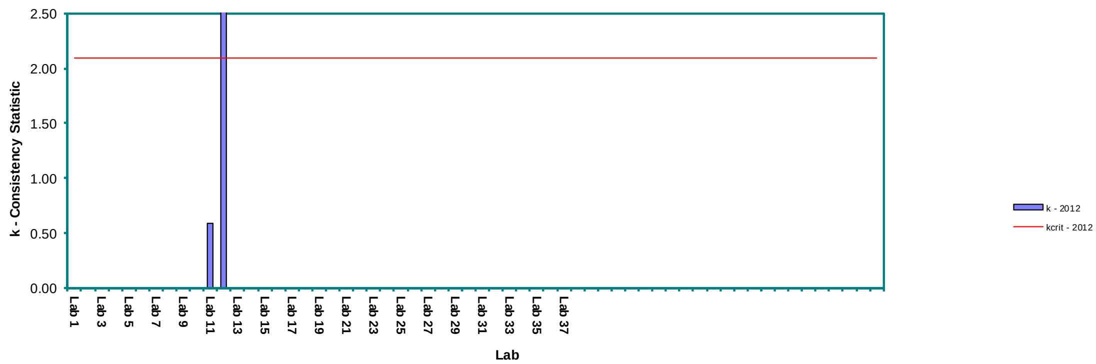
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics					
Minimum X_{ave}	0.8333	r = 2.8 s_r =	0.2720	h_{crit} =	2.23
Maximum X_{ave}	1.5000	R = 2.8 s_R =	0.7794	h_{crit} =	-2.23
Check s_{Xave} =	0.2695			k_{crit} =	2.09

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
405 - Demulsibility, 50 mL, 5.55 g/CaCl2 (% by Mass)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	91.9733	s_r =	0.5899
p =	5	s_{Xave} =	6.8389	s_{R*} =	6.8559
Significance Level =	0.5%			s_R =	6.8559

Check s_{Xave} =	6.8389
$r = 2.8\ s_r$ =	1.6352
$R = 2.8\ s_R$ =	19.0035

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.74	-1.74	1.92
Lab 2	96.0000	96.0000	95.9000		95.9667	0.0577	3.9933	0.0033	0.58	0.10	1.74	-1.74	1.92
Lab 3	80.1000	79.1000	80.8000		80.0000	0.8544	-11.9733	0.7300	-1.75	1.45	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5	95.5000	95.2000	95.5000		95.4000	0.1732	3.4267	0.0300	0.50	0.29	1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9											1.74	-1.74	1.92
Lab 10	95.8000	95.8000	96.2000		95.9333	0.2309	3.9600	0.0533	0.58	0.39	1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12	93.6000	91.7000	92.4000		92.5667	0.9609	0.5933	0.9233	0.09	1.63	1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
Minimum X_{ave}	80.0000	$r = 2.8\ s_r$ =	1.6352	h_{crit} =	1.74
Maximum X_{ave}	95.9667	$R = 2.8\ s_R$ =	19.0035	h_{crit} =	-1.74
Check s_{Xave} =	6.8389			k_{crit} =	1.92

Where:

$x_1 \ldots x_n$ =	Individual Test Result
X_{ave} =	Cell Average
n =	Number of Test Results per Cell
s =	Cell Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
s^2 =	Cell Variation
p =	Number of Laboratories

Where:

$(X_{ave})_{ave}$ =	Average of Cell Averages
s_{Xave} =	Standard Deviation of Cell Averages
s_r =	Repeatability Standard Deviation
s_{R*} =	Interim Reproducibility Standard Deviation
s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
h =	Between Laboratory Consistency Statistic
k =	Within Laboratory Consistency Statistic

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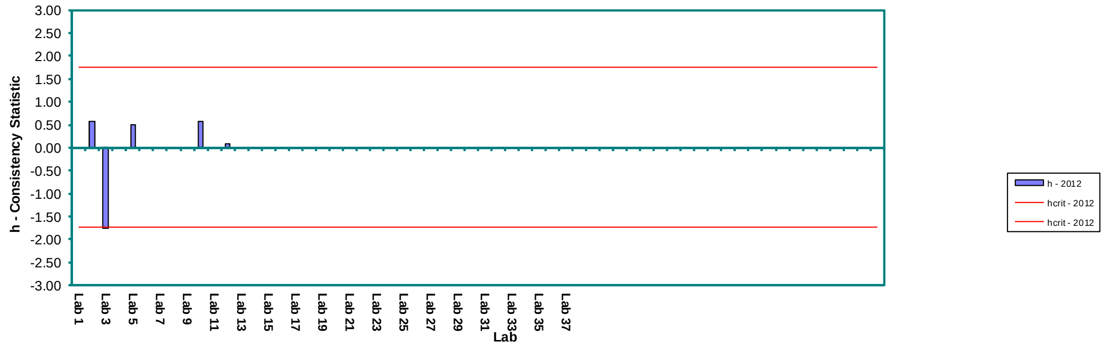

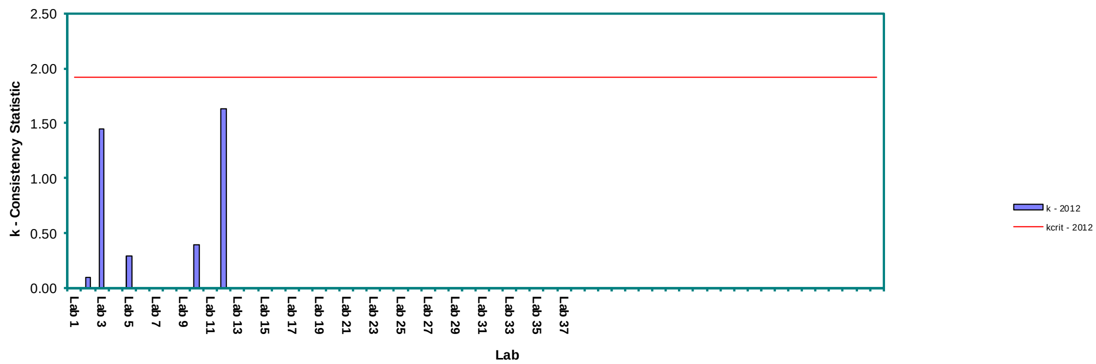

Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
406 - Penetration of Residue @ 25°C, 100g, 5s (dmm)
2012

Data						
n = 3	$(X_{ave})_{ave}$ =	186.0000	s_r =	9.8883	Check s_{Xave} =	19.0679
p = 9	s_{Xave} =	19.0679	s_{R*} =	20.7067	r = 2.8 s_r =	27.4089
Significance Level =	0.5%		s_R =	20.7067	R = 2.8 s_R =	57.3961

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	200.0000	204.0000	203.0000		202.3333	2.0817	16.3333	4.3333	0.86	0.21	2.23	-2.23	2.09
Lab 3	205.0000	164.0000	199.0000		189.3333	22.1435	3.3333	490.3333	0.17	2.24	2.23	-2.23	2.09
Lab 4	146.0000	161.0000	175.0000		160.6667	14.5029	-25.3333	210.3333	-1.33	1.47	2.23	-2.23	2.09
Lab 5	224.0000	210.0000	220.0000		218.0000	7.2111	32.0000	52.0000	1.68	0.73	2.23	-2.23	2.09
Lab 6	183.0000	179.0000	174.0000		178.6667	4.5092	-7.3333	20.3333	-0.38	0.46	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	199.0000	181.0000	188.0000		189.3333	9.0738	3.3333	82.3333	0.17	0.92	2.23	-2.23	2.09
Lab 10	163.0000	170.0000	168.0000		167.0000	3.6056	-19.0000	13.0000	-1.00	0.36	2.23	-2.23	2.09
Lab 11	167.0000	168.0000	169.0000		168.0000	1.0000	-18.0000	1.0000	-0.94	0.10	2.23	-2.23	2.09
Lab 12	201.0000	198.0000	203.0000		200.6667	2.5166	14.6667	6.3333	0.77	0.25	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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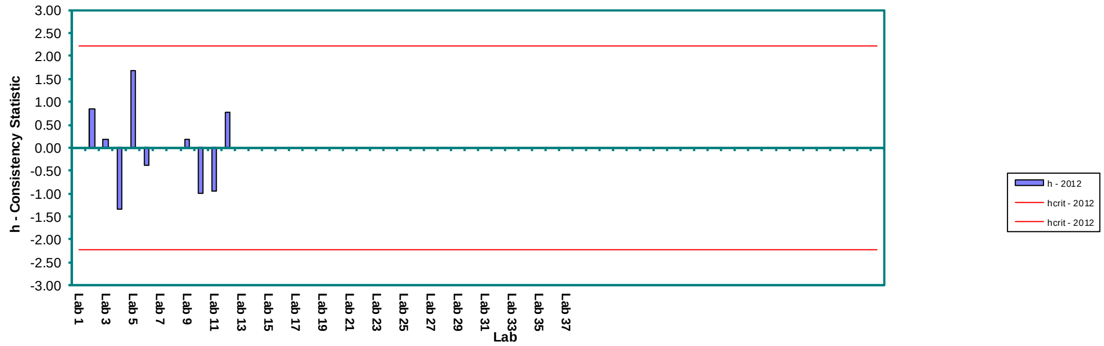
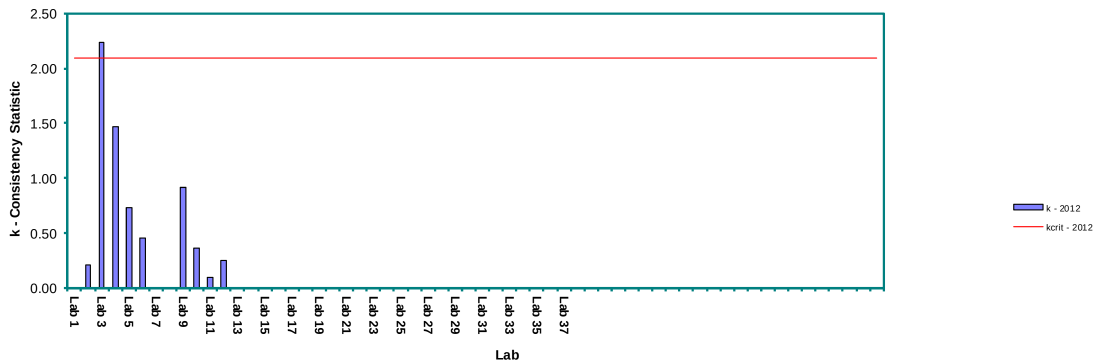
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
Minimum X_{ave}	160.6667	r = 2.8 s_r =	27.4089	h_{crit} =	2.23
Maximum X_{ave}	218.0000	R = 2.8 s_R =	57.3961	h_{crit} =	-2.23
Check s_{Xave} =	19.0679			k_{crit} =	2.09

Where:		Where:	
$x_1 \ldots x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		$s_{X_{ave}}$ =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
407 - Residue Conditioning Time in Air (minutes)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	90.0370	s_r =	0.1925
p =	9	s_{Xave} =	0.1111	s_{R^*} =	0.1925
Significance Level =		0.5%		s_R =	0.1925

Check s_{Xave} =	0.1111
r = 2.8 s_r =	0.5334
R = 2.8 s_R =	0.5334

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 3	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 4	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 5	90.0000	90.0000	91.0000		90.3333	0.5774	0.2963	0.3333	2.67	3.00	2.23	-2.23	2.09
Lab 6	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 10	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 11	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 12	90.0000	90.0000	90.0000		90.0000	0.0000	-0.0370	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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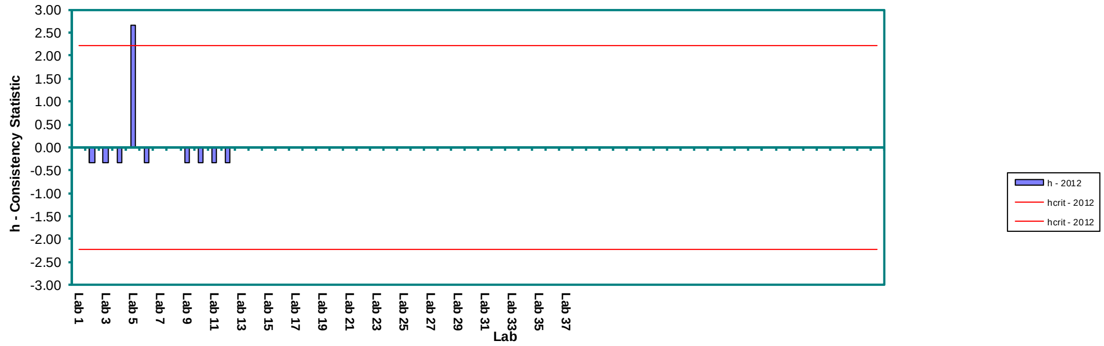
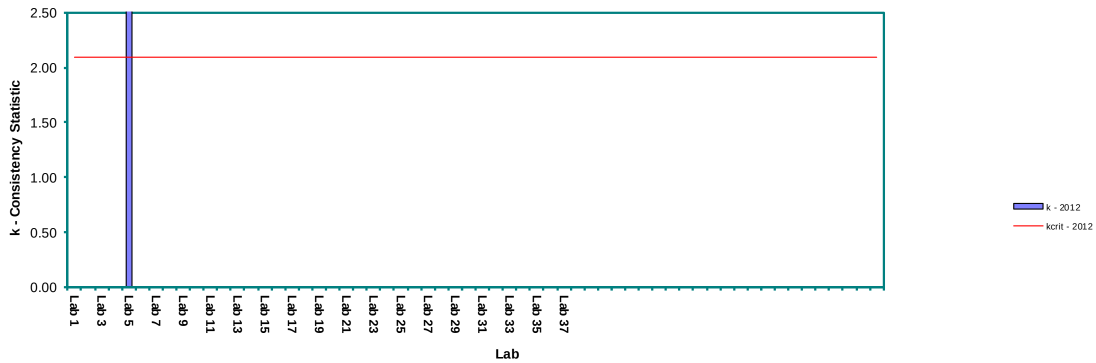
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	90.0000	r = 2.8 s_r =	0.5334	h_{crit} =	2.23
	Maximum X_{ave}	90.3333	R = 2.8 s_R =	0.5334	h_{crit} =	-2.23
	Check s_{Xave} =	0.1111			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R^*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
408 - Residue Conditioning Time in Water Bath (minutes)
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 90.1481	s_r = 0.5092	Check s_{Xave} = 0.4444
p = 9	s_{Xave} = 0.4444	s_{R*} = 0.6086	$r = 2.8\ s_r$ = 1.4114
Significance Level = 0.5%		s_R = 0.6086	$R = 2.8\ s_R$ = 1.6869

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											2.23	-2.23	2.09
Lab 2	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 3	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 4	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 5	90.0000	93.0000	91.0000		91.3333	1.5275	1.1852	2.3333	2.67	3.00	2.23	-2.23	2.09
Lab 6	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 7											2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 10	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 11	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 12	90.0000	90.0000	90.0000		90.0000	0.0000	-0.1481	0.0000	-0.33	0.00	2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
Minimum X_{ave}	90.0000	$r = 2.8\ s_r$ =	1.4114	h_{crit} =	2.23
Maximum X_{ave}	91.3333	$R = 2.8\ s_R$ =	1.6869	h_{crit} =	-2.23
Check s_{Xave} =	0.4444			k_{crit} =	2.09

Where:
- $x_1....x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic

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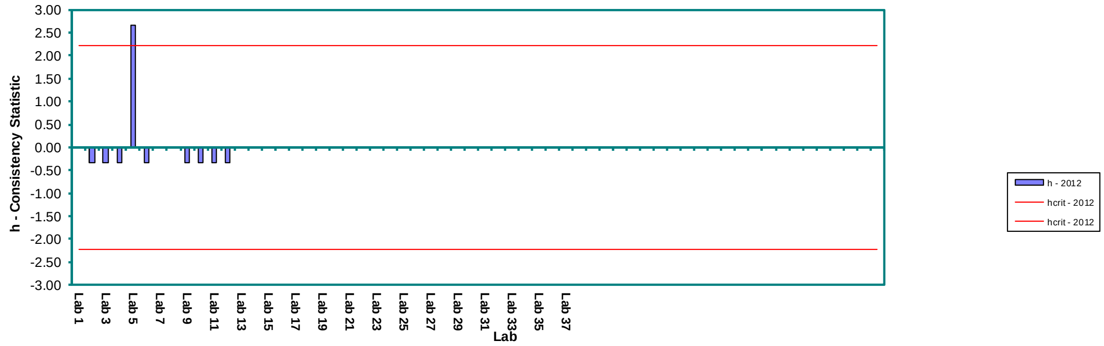

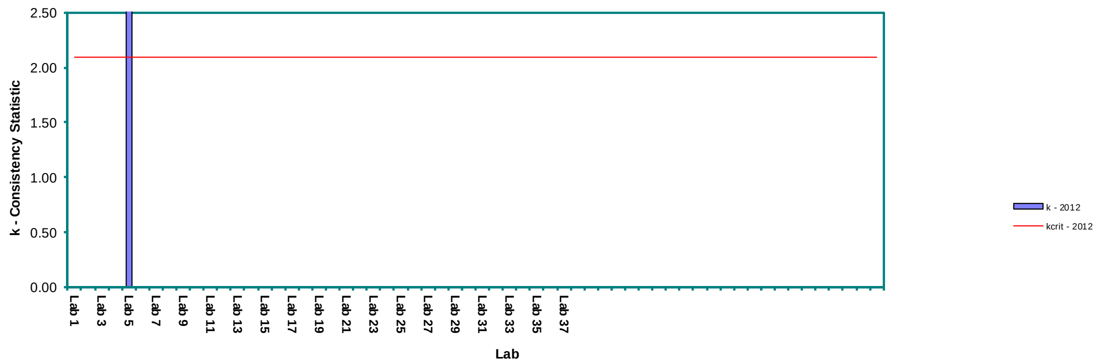

Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
409 - Apparent Viscosity @ 60°C (Pa·s)
2012

Data							
n =	3	$(X_{ave})_{ave}$ =	204.8933	s_r =	27.8468	Check s_{Xave} =	29.6631
p =	5	s_{Xave} =	29.6631	s_{R*} =	37.3746	r = 2.8 s_r =	77.1873
Significance Level =		0.5%		s_R =	37.3746	R = 2.8 s_R =	103.5972

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.74	-1.74	1.92
Lab 2	217.0000	216.0000	222.0000		218.3333	3.2146	13.4400	10.3333	0.45	0.12	1.74	-1.74	1.92
Lab 3	162.0000	244.0000	156.0000		187.3333	49.1664	-17.5600	2,417.3333	-0.59	1.77	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5	167.4000	163.2000	159.1000		163.2333	4.1501	-41.6600	17.2233	-1.40	0.15	1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9	211.1000	257.2000	248.4000		238.9000	24.4743	34.0067	598.9900	1.15	0.88	1.74	-1.74	1.92
Lab 10											1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12	200.0000	250.0000	200.0000		216.6667	28.8675	11.7733	833.3333	0.40	1.04	1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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											1.74	-1.74	1.92
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											1.74	-1.74	1.92
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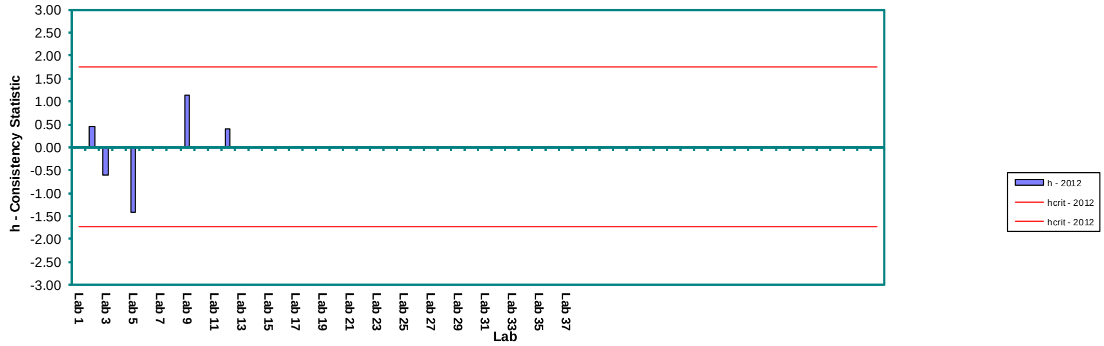
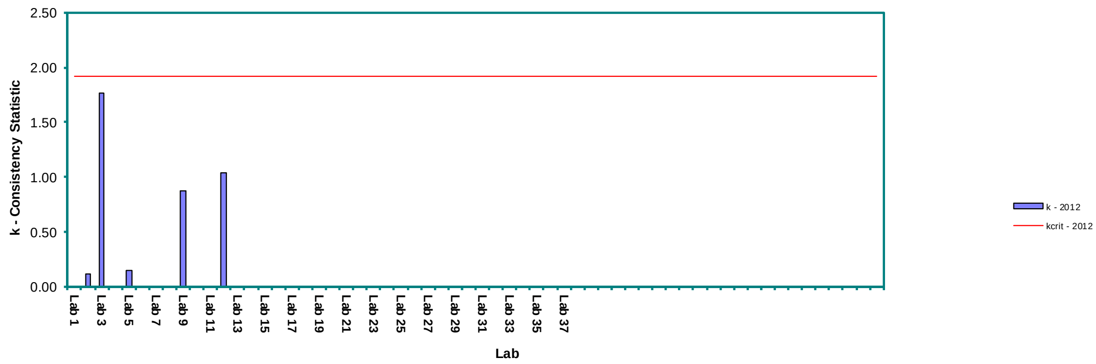
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
Minimum X_{ave}	163.2333	r = 2.8 s_r =	77.1873	h_{crit} =	1.74
Maximum X_{ave}	238.9000	R = 2.8 s_R =	103.5972	h_{crit} =	-1.74
Check s_{Xave} =	29.6631			k_{crit} =	1.92

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Betw een Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
410 - Sieve Test
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 0.0342	s_r = 0.0065	Check s_{Xave} = 0.0377
p = 4	s_{Xave} = 0.0377	s_{R^*} = 0.0380	r = 2.8 s_r = 0.0179
Significance Level = 0.5%		s_R = 0.0380	R = 2.8 s_R = 0.1054

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.49	-1.49	1.82
Lab 2	0.0000	0.0100	0.0000		0.0033	0.0058	-0.0308	0.0000	-0.82	0.89	1.49	-1.49	1.82
Lab 3	0.0700	0.0600	0.0600		0.0633	0.0058	0.0292	0.0000	0.77	0.89	1.49	-1.49	1.82
Lab 4											1.49	-1.49	1.82
Lab 5											1.49	-1.49	1.82
Lab 6											1.49	-1.49	1.82
Lab 7											1.49	-1.49	1.82
Lab 8											1.49	-1.49	1.82
Lab 9											1.49	-1.49	1.82
Lab 10	0.0700	0.0600	0.0800		0.0700	0.0100	0.0358	0.0001	0.95	1.55	1.49	-1.49	1.82
Lab 11											1.49	-1.49	1.82
Lab 12	0.0000	0.0000	0.0000		0.0000	0.0000	-0.0342	0.0000	-0.91	0.00	1.49	-1.49	1.82
Lab 13											1.49	-1.49	1.82
Lab 14											1.49	-1.49	1.82
Lab 15											1.49	-1.49	1.82
Lab 16											1.49	-1.49	1.82
Lab 17											1.49	-1.49	1.82
Lab 18											1.49	-1.49	1.82
Lab 19											1.49	-1.49	1.82
Lab 20											1.49	-1.49	1.82
Lab 21											1.49	-1.49	1.82
Lab 22											1.49	-1.49	1.82
Lab 23											1.49	-1.49	1.82
Lab 24											1.49	-1.49	1.82
Lab 25											1.49	-1.49	1.82
Lab 26											1.49	-1.49	1.82
Lab 27											1.49	-1.49	1.82
Lab 28											1.49	-1.49	1.82
Lab 29											1.49	-1.49	1.82
Lab 30											1.49	-1.49	1.82
Lab 31											1.49	-1.49	1.82
Lab 32											1.49	-1.49	1.82
Lab 33											1.49	-1.49	1.82
Lab 34											1.49	-1.49	1.82
Lab 35											1.49	-1.49	1.82
Lab 36											1.49	-1.49	1.82
Lab 37											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82
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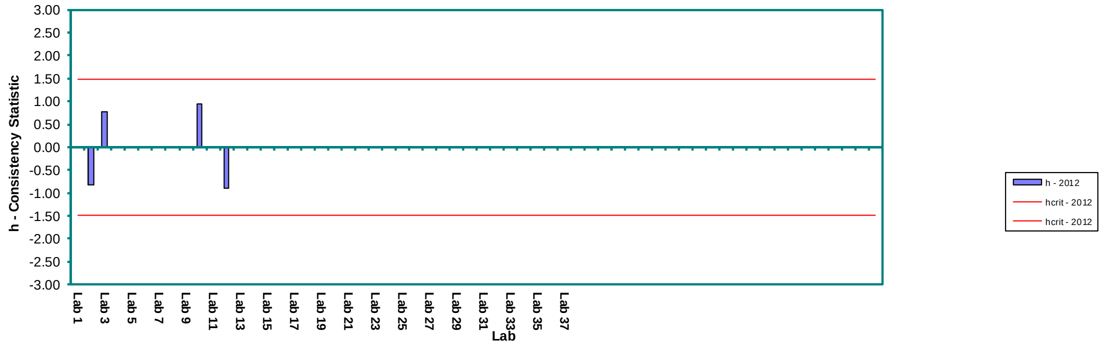
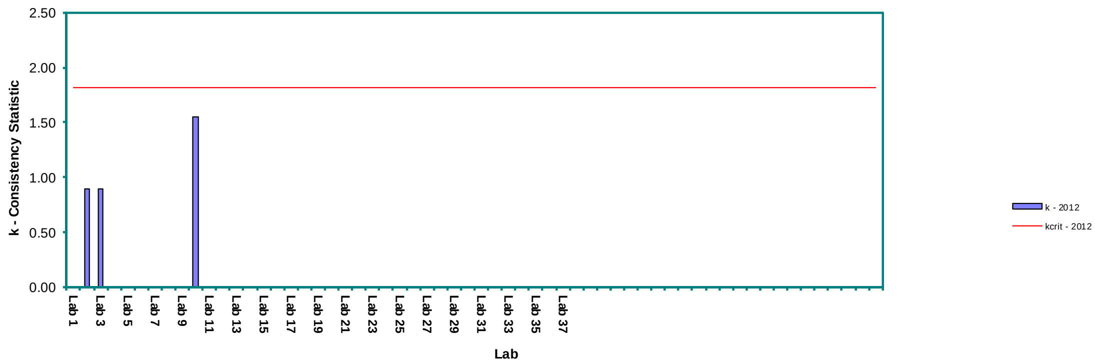
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82
											1.49	-1.49	1.82

Additional Statistics					
Minimum X_{ave}	0.0000	r = 2.8 s_r =	0.0179	h_{crit} =	1.49
Maximum X_{ave}	0.0700	R = 2.8 s_R =	0.1054	h_{crit} =	-1.49
Check s_{Xave} =	0.0377			k_{crit} =	1.82

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R^*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
s^2 =	Cell Variation	h =	Betw een Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
411 - Float Test (s)
2012

Data				
n =	3	$(X_{ave})_{ave}$ =	1,200.0000	s_r = 0.0000
p =	5	s_{Xave} =	0.0000	s_{R*} = 0.0000
Significance Level =		0.5%		s_R = 0.0000

Check s_{Xave} =	0.0000
r = 2.8 s_r =	0.0000
R = 2.8 s_R =	0.0000

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.74	-1.74	1.92
Lab 2	1,200.0000	1,200.0000	1,200.0000		1,200.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	1.74	-1.74	1.92
Lab 3	1,200.0000	1,200.0000	1,200.0000		1,200.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	1.74	-1.74	1.92
Lab 4											1.74	-1.74	1.92
Lab 5	1,200.0000	1,200.0000	1,200.0000		1,200.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	1.74	-1.74	1.92
Lab 6											1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9											1.74	-1.74	1.92
Lab 10	1,200.0000	1,200.0000	1,200.0000		1,200.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12	1,200.0000	1,200.0000	1,200.0000		1,200.0000	0.0000	0.0000	0.0000	#DIV/0!	#DIV/0!	1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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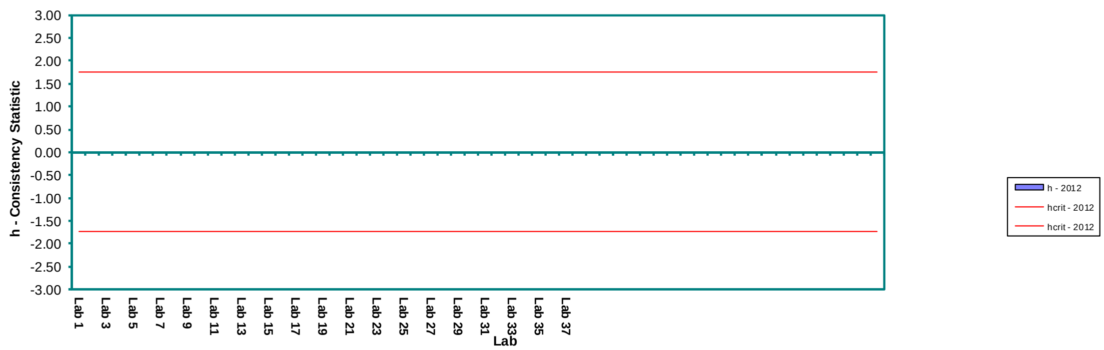
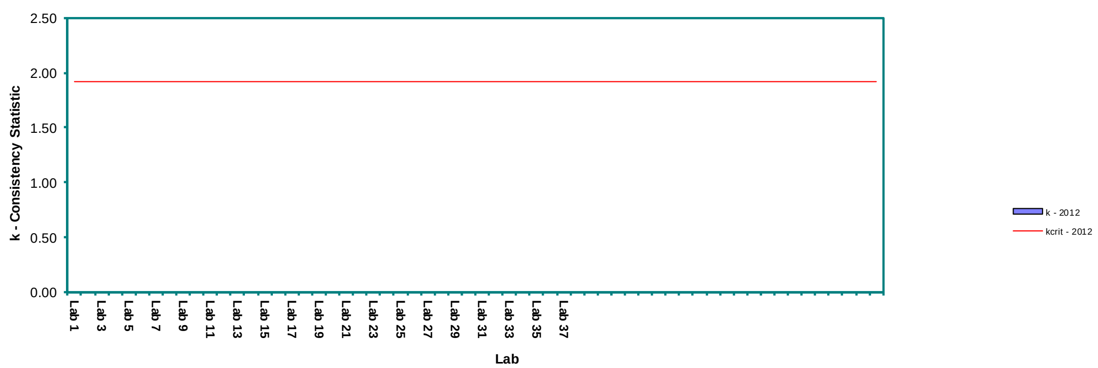
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	1200.0000	r = 2.8 s_r =	0.0000	h_{crit} =	1.74
	Maximum X_{ave}	1200.0000	R = 2.8 s_R =	0.0000	h_{crit} =	-1.74
	Check s_{Xave} =	0.0000			k_{crit} =	1.92

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
413 - Ash Content
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	0.6301	s_r =	0.0280	Check s_{Xave} =	0.1483	
					p =	5	s_{Xave} =	0.1483	s_{R*} =	0.1500	r = 2.8 s_r =	0.0776	
					Significance Level =		0.5%		s_R =	0.1500	R = 2.8 s_R =	0.4159	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1											1.74	-1.74	1.92
Lab 2	0.7790	0.7660	0.7670		0.7707	0.0072	0.1405	0.0001	0.95	0.26	1.74	-1.74	1.92
Lab 3	0.5900	0.5400	0.5000		0.5433	0.0451	-0.0868	0.0020	-0.59	1.61	1.74	-1.74	1.92
Lab 4	0.6100	0.5900	0.5300		0.5767	0.0416	-0.0535	0.0017	-0.36	1.49	1.74	-1.74	1.92
Lab 5											1.74	-1.74	1.92
Lab 6	0.4500	0.4700	0.4600		0.4600	0.0100	-0.1701	0.0001	-1.15	0.36	1.74	-1.74	1.92
Lab 7											1.74	-1.74	1.92
Lab 8											1.74	-1.74	1.92
Lab 9											1.74	-1.74	1.92
Lab 10	0.8000	0.8000	0.8000		0.8000	0.0000	0.1699	0.0000	1.15	0.00	1.74	-1.74	1.92
Lab 11											1.74	-1.74	1.92
Lab 12											1.74	-1.74	1.92
Lab 13											1.74	-1.74	1.92
Lab 14											1.74	-1.74	1.92
Lab 15											1.74	-1.74	1.92
Lab 16											1.74	-1.74	1.92
Lab 17											1.74	-1.74	1.92
Lab 18											1.74	-1.74	1.92
Lab 19											1.74	-1.74	1.92
Lab 20											1.74	-1.74	1.92
Lab 21											1.74	-1.74	1.92
Lab 22											1.74	-1.74	1.92
Lab 23											1.74	-1.74	1.92
Lab 24											1.74	-1.74	1.92
Lab 25											1.74	-1.74	1.92
Lab 26											1.74	-1.74	1.92
Lab 27											1.74	-1.74	1.92
Lab 28											1.74	-1.74	1.92
Lab 29											1.74	-1.74	1.92
Lab 30											1.74	-1.74	1.92
Lab 31											1.74	-1.74	1.92
Lab 32											1.74	-1.74	1.92
Lab 33											1.74	-1.74	1.92
Lab 34											1.74	-1.74	1.92
Lab 35											1.74	-1.74	1.92
Lab 36											1.74	-1.74	1.92
Lab 37											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92
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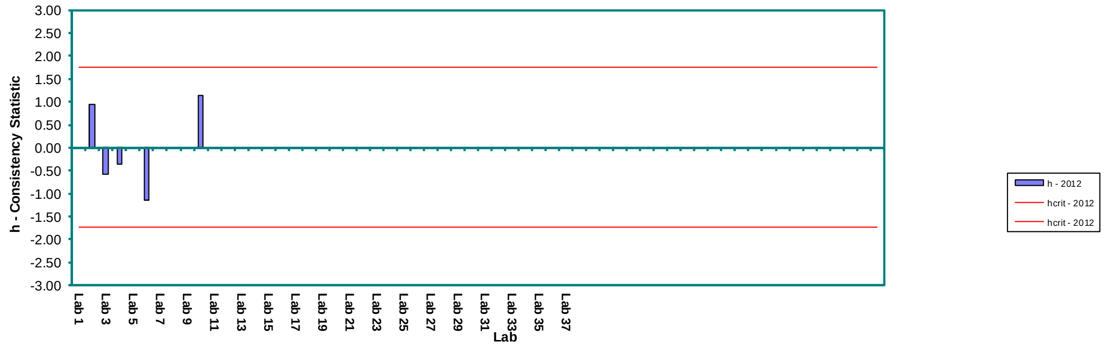
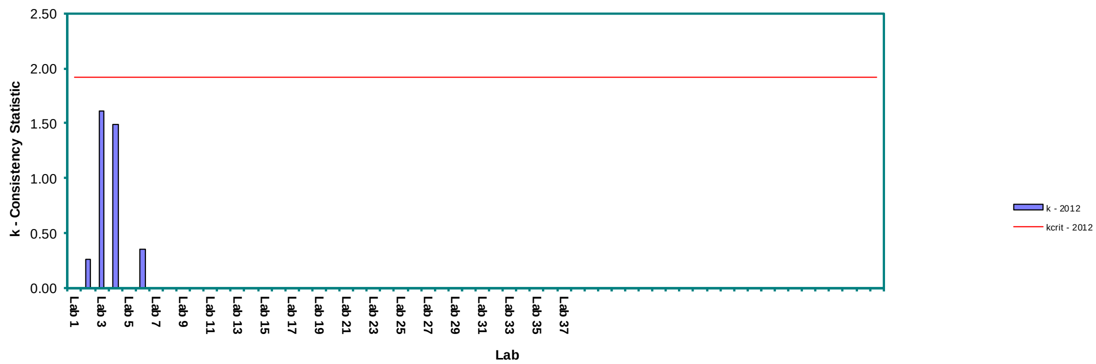
											1.74	-1.74	1.92
											1.74	-1.74	1.92
											1.74	-1.74	1.92

Additional Statistics						
	Minimum X_{ave}	0.4600	r = 2.8 s_r =	0.0776	h_{crit} =	1.74
	Maximum X_{ave}	0.8000	R = 2.8 s_R =	0.4159	h_{crit} =	-1.74
	Check s_{Xave} =	0.1483			k_{crit} =	1.92

Where:	$x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

400 - Emulsion Polymer
414 - Elastic Recovery (%)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	64.3556	s_r =	2.2738
p =	6	s_{Xave} =	10.1865	s_{R*} =	10.3543
Significance Level =		0.5%		s_R =	10.3543

Check s_{Xave} =	10.1865
r = 2.8 s_r =	6.3026
R = 2.8 s_R =	28.7007

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1											1.92	-1.92	1.98
Lab 2	79.3000	78.8000	78.8000		78.9667	0.2887	14.6111	0.0833	1.43	0.13	1.92	-1.92	1.98
Lab 3	55.0000	60.0000	50.0000		55.0000	5.0000	-9.3556	25.0000	-0.92	2.20	1.92	-1.92	1.98
Lab 4	68.0000	69.0000	66.0000		67.6667	1.5275	3.3111	2.3333	0.33	0.67	1.92	-1.92	1.98
Lab 5	60.0000	60.0000	57.5000		59.1667	1.4434	-5.1889	2.0833	-0.51	0.63	1.92	-1.92	1.98
Lab 6	71.0000	73.0000	72.0000		72.0000	1.0000	7.6444	1.0000	0.75	0.44	1.92	-1.92	1.98
Lab 7											1.92	-1.92	1.98
Lab 8											1.92	-1.92	1.98
Lab 9											1.92	-1.92	1.98
Lab 10	53.7500	52.5000	53.7500		53.3333	0.7217	-11.0222	0.5208	-1.08	0.32	1.92	-1.92	1.98
Lab 11											1.92	-1.92	1.98
Lab 12											1.92	-1.92	1.98
Lab 13											1.92	-1.92	1.98
Lab 14											1.92	-1.92	1.98
Lab 15											1.92	-1.92	1.98
Lab 16											1.92	-1.92	1.98
Lab 17											1.92	-1.92	1.98
Lab 18											1.92	-1.92	1.98
Lab 19											1.92	-1.92	1.98
Lab 20											1.92	-1.92	1.98
Lab 21											1.92	-1.92	1.98
Lab 22											1.92	-1.92	1.98
Lab 23											1.92	-1.92	1.98
Lab 24											1.92	-1.92	1.98
Lab 25											1.92	-1.92	1.98
Lab 26											1.92	-1.92	1.98
Lab 27											1.92	-1.92	1.98
Lab 28											1.92	-1.92	1.98
Lab 29											1.92	-1.92	1.98
Lab 30											1.92	-1.92	1.98
Lab 31											1.92	-1.92	1.98
Lab 32											1.92	-1.92	1.98
Lab 33											1.92	-1.92	1.98
Lab 34											1.92	-1.92	1.98
Lab 35											1.92	-1.92	1.98
Lab 36											1.92	-1.92	1.98
Lab 37											1.92	-1.92	1.98
											1.92	-1.92	1.98
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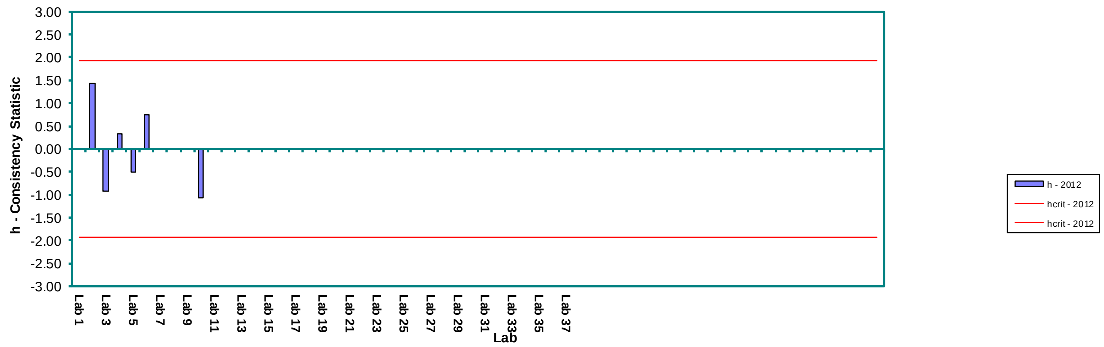
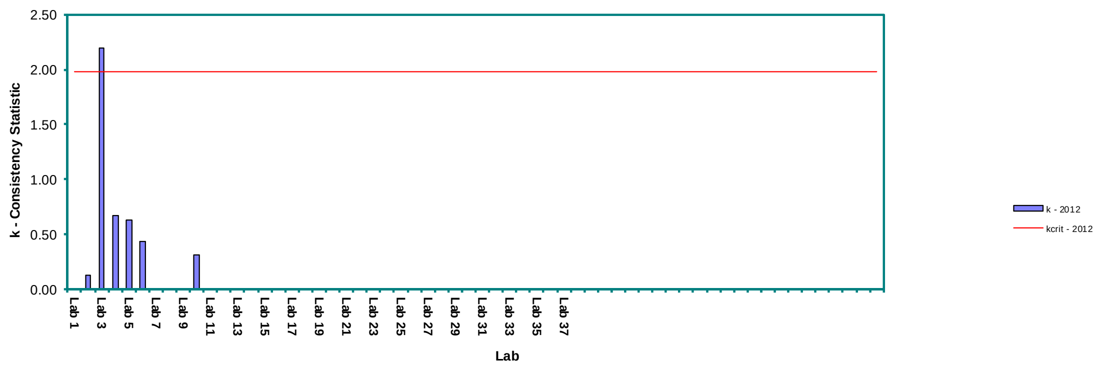
											1.92	-1.92	1.98
											1.92	-1.92	1.98
											1.92	-1.92	1.98

Additional Statistics						
	Minimum X_{ave}	53.3333	r = 2.8 s_r =	6.3026	h_{crit} =	1.92
	Maximum X_{ave}	78.9667	R = 2.8 s_R =	28.7007	h_{crit} =	-1.92
	Check s_{Xave} =	10.1865			k_{crit} =	1.98

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

501 - Rotational Viscosity @ 135°C (Pa·s)

2012

Data

n =	3	$(X_{ave})_{ave}$ =	0.2993	s_r =	0.0043
p =	9	s_{Xave} =	0.0130	s_{R*} =	0.0135
Significance Level =		0.5%		s_R =	0.0135

Check s_{Xave} =	0.0130
r = 2.8 s_r =	0.0119
R = 2.8 s_R =	0.0373

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	0.2900	0.2900	0.2900		0.2900	0.0000	-0.0093	0.0000	-0.71	0.00	2.23	-2.23	2.09
Lab 2	0.3100	0.3100	0.3100		0.3100	0.0000	0.0107	0.0000	0.83	0.00	2.23	-2.23	2.09
Lab 3	0.3200	0.3300	0.3100		0.3200	0.0100	0.0207	0.0001	1.60	2.32	2.23	-2.23	2.09
Lab 4	0.3000	0.3000	0.2900		0.2967	0.0058	-0.0026	0.0000	-0.20	1.34	2.23	-2.23	2.09
Lab 5	0.3000	0.3000	0.3000		0.3000	0.0000	0.0007	0.0000	0.06	0.00	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	0.2800	0.2700	0.2800		0.2767	0.0058	-0.0226	0.0000	-1.74	1.34	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.3100	0.3100	0.3100		0.3100	0.0000	0.0107	0.0000	0.83	0.00	2.23	-2.23	2.09
Lab 10	0.2900	0.2900	0.2900		0.2900	0.0000	-0.0093	0.0000	-0.71	0.00	2.23	-2.23	2.09
Lab 11	0.3000	0.3000	0.3000		0.3000	0.0000	0.0007	0.0000	0.06	0.00	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
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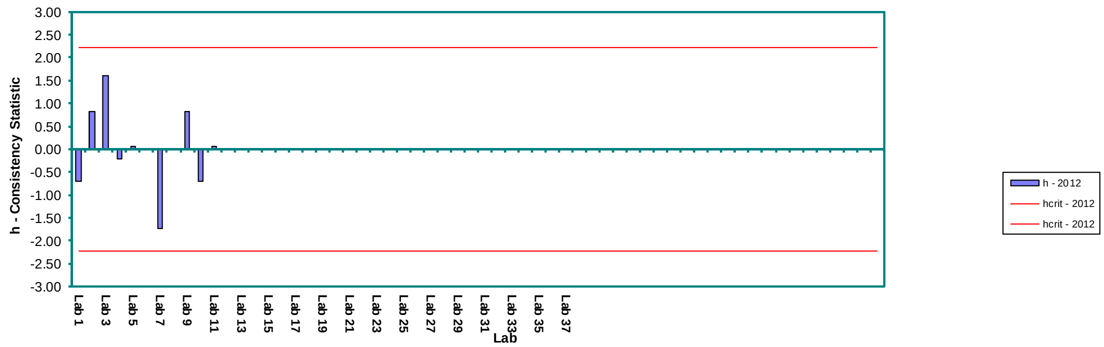
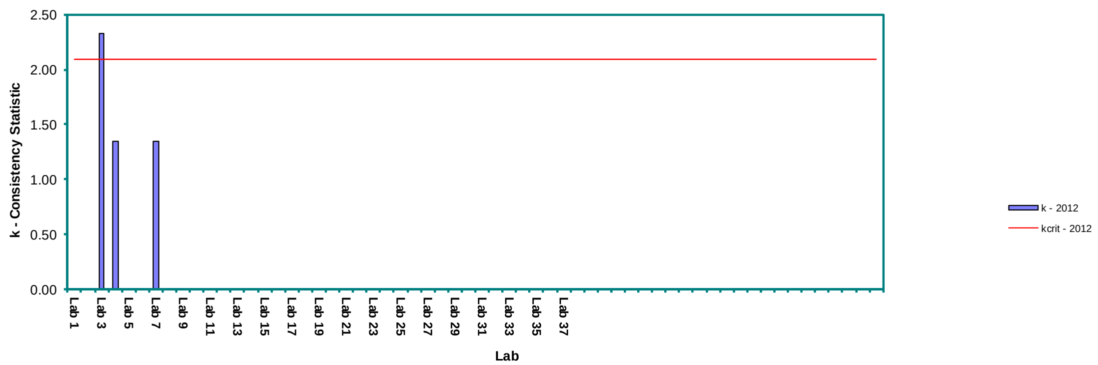
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	0.2767	r = 2.8 s_r =	0.0119	h_{crit} =	2.23
	Maximum X_{ave}	0.3200	R = 2.8 s_R =	0.0373	h_{crit} =	-2.23
	Check s_{Xave} =	0.0130			k_{crit} =	2.09

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
502 - DSR 58°C, 25mm Plate, 1mm Gap, Complex Shear Modulus, G* (kPa)
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 1.3767	s_r = 0.0365	Check s_{Xave} = 0.0511
p = 9	s_{Xave} = 0.0511	s_{R*} = 0.0591	r = 2.8 s_r = 0.1011
Significance Level = 0.5%		s_R = 0.0591	R = 2.8 s_R = 0.1639

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	1.3700	1.3700	1.3700		1.3700	0.0000	-0.0067	0.0000	-0.13	0.00	2.23	-2.23	2.09
Lab 2	1.3300	1.3800	1.3600		1.3567	0.0252	-0.0200	0.0006	-0.39	0.69	2.23	-2.23	2.09
Lab 3	1.3600	1.3400	1.3700		1.3567	0.0153	-0.0200	0.0002	-0.39	0.42	2.23	-2.23	2.09
Lab 4	1.3200	1.3100	1.3200		1.3167	0.0058	-0.0600	0.0000	-1.17	0.16	2.23	-2.23	2.09
Lab 5	1.4000	1.4000	1.3900		1.3967	0.0058	0.0200	0.0000	0.39	0.16	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	1.3500	1.3100	1.2700		1.3100	0.0400	-0.0667	0.0016	-1.30	1.10	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	1.4400	1.4300	1.4200		1.4300	0.0100	0.0533	0.0001	1.04	0.27	2.23	-2.23	2.09
Lab 10	1.4900	1.4000	1.5200		1.4700	0.0624	0.0933	0.0039	1.83	1.71	2.23	-2.23	2.09
Lab 11	1.3000	1.4400	1.4100		1.3833	0.0737	0.0067	0.0054	0.13	2.02	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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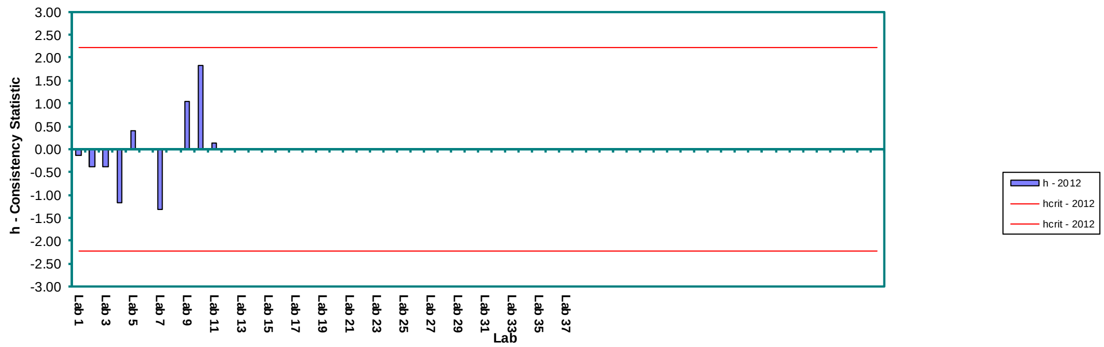
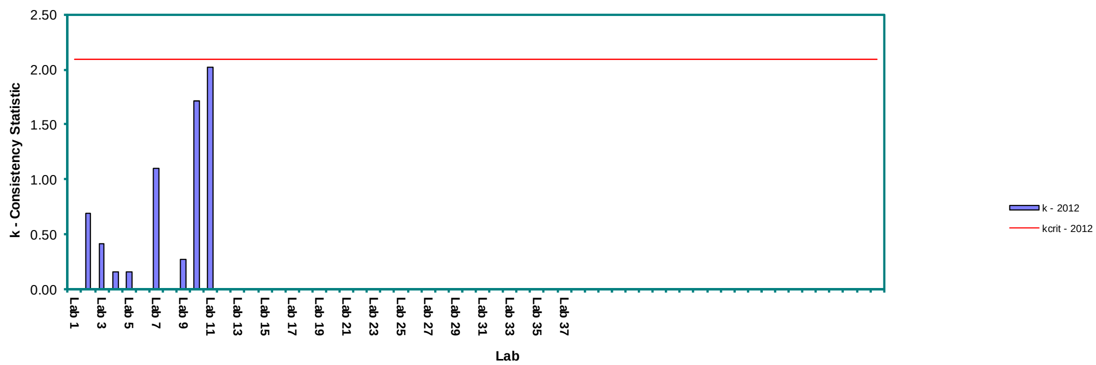
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics				
Minimum X_{ave}	1.3100	r = 2.8 s_r = 0.1011	h_{crit} =	2.23
Maximum X_{ave}	1.4700	R = 2.8 s_R = 0.1639	h_{crit} =	-2.23
Check s_{Xave} =	0.0511		k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

503 - DSR 58°C, 25mm Plate, 1mm Gap, Phase Angle (°)

2012

Data								
	n =	3	$(X_{ave})_{ave}$ =	85.7593	s_r =	0.1232	Check s_{Xave} =	0.1432
	p =	9	s_{Xave} =	0.1432	s_{R*} =	0.1750	r = 2.8 s_r =	0.3416
	Significance Level =		0.5%		s_R =	0.1750	R = 2.8 s_R =	0.4850

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	85.9000	85.9000	85.9000		85.9000	0.0000	0.1407	0.0000	0.98	0.00	2.23	-2.23	2.09
Lab 2	85.7000	85.3000	85.7000		85.5667	0.2309	-0.1926	0.0533	-1.35	1.87	2.23	-2.23	2.09
Lab 3	85.8000	85.8000	85.7000		85.7667	0.0577	0.0074	0.0033	0.05	0.47	2.23	-2.23	2.09
Lab 4	85.7000	85.8000	85.8000		85.7667	0.0577	0.0074	0.0033	0.05	0.47	2.23	-2.23	2.09
Lab 5	85.8000	85.7000	85.7000		85.7333	0.0577	-0.0259	0.0033	-0.18	0.47	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	85.8000	85.9000	85.9000		85.8667	0.0577	0.1074	0.0033	0.75	0.47	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	86.0000	85.9000	86.0000		85.9667	0.0577	0.2074	0.0033	1.45	0.47	2.23	-2.23	2.09
Lab 10	85.8000	85.5000	85.3000		85.5333	0.2517	-0.2259	0.0633	-1.58	2.04	2.23	-2.23	2.09
Lab 11	85.7000	85.8000	85.7000		85.7333	0.0577	-0.0259	0.0033	-0.18	0.47	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
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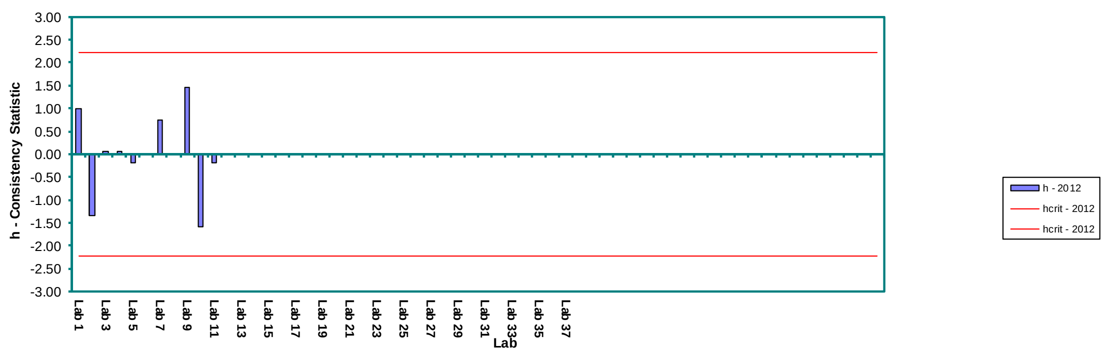
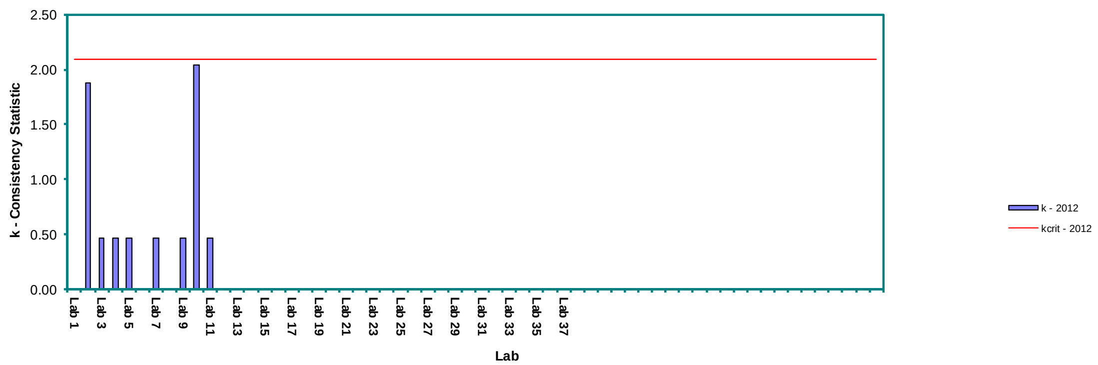
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	85.5333	r = 2.8 s_r =	0.3416	h_{crit} =	2.23
	Maximum X_{ave}	85.9667	R = 2.8 s_R =	0.4850	h_{crit} =	-2.23
	Check s_{Xave} =	0.1432			k_{crit} =	2.09

Where:			Where:		
	$x_1 \ldots x_n$ =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
504 - DSR 58°C, 25mm Plate, 1mm Gap, G*/Sin d (kPa)
2012

Data				
n =	3	$(X_{ave})_{ave}$ =	1.3789	s_r =	0.0344	Check s_{Xave} =	0.0508
p =	9	s_{Xave} =	0.0508	s_{R*} =	0.0581	r = 2.8 s_r =	0.0953
Significance Level =		0.5%		s_R =	0.0581	R = 2.8 s_R =	0.1609

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	1.3700	1.3700	1.3700		1.3700	0.0000	-0.0089	0.0000	-0.17	0.00	2.23	-2.23	2.09
Lab 2	1.3300	1.3800	1.3600		1.3567	0.0252	-0.0222	0.0006	-0.44	0.73	2.23	-2.23	2.09
Lab 3	1.3600	1.3500	1.3700		1.3600	0.0100	-0.0189	0.0001	-0.37	0.29	2.23	-2.23	2.09
Lab 4	1.3200	1.3100	1.3300		1.3200	0.0100	-0.0589	0.0001	-1.16	0.29	2.23	-2.23	2.09
Lab 5	1.4000	1.4000	1.3900		1.3967	0.0058	0.0178	0.0000	0.35	0.17	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	1.3500	1.3100	1.2800		1.3133	0.0351	-0.0656	0.0012	-1.29	1.02	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	1.4400	1.4300	1.4200		1.4300	0.0100	0.0511	0.0001	1.01	0.29	2.23	-2.23	2.09
Lab 10	1.4900	1.4100	1.5200		1.4733	0.0569	0.0944	0.0032	1.86	1.65	2.23	-2.23	2.09
Lab 11	1.3100	1.4500	1.4100		1.3900	0.0721	0.0111	0.0052	0.22	2.10	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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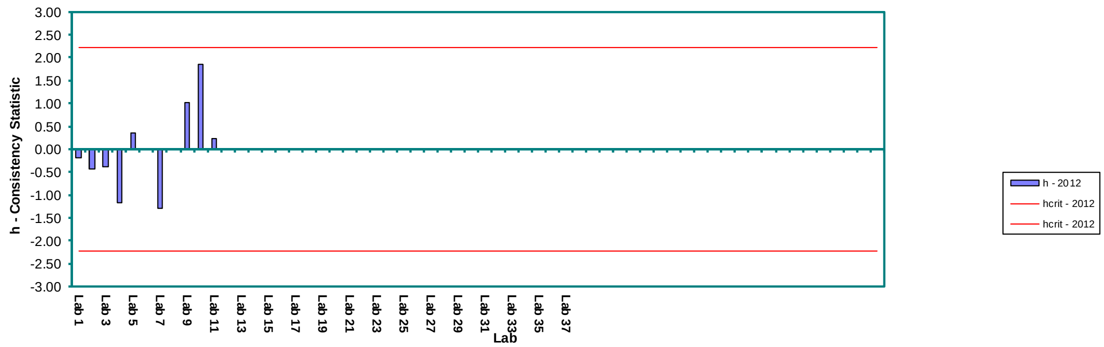
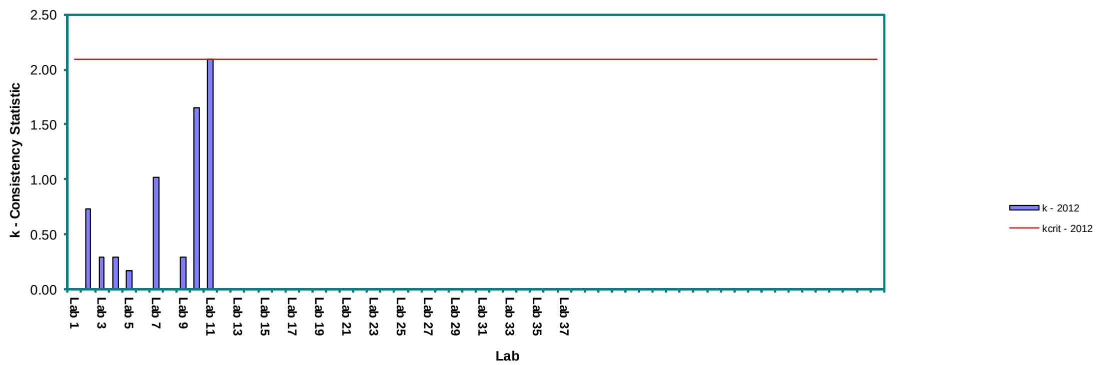
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics							
	Minimum X_{ave}	1.3133	r = 2.8 s_r =	0.0953	h_{crit} =	2.23
	Maximum X_{ave}	1.4733	R = 2.8 s_R =	0.1609	h_{crit} =	-2.23
	Check s_{Xave} =	0.0508			k_{crit} =	2.09

Where:			Where:		
	x_1....x_n =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
505 - DSR 64°C, 25mm Plate, 1mm Gap, Complex Shear Modulus, G* (kPa)
2012

Data						
n =	3	$(X_{ave})_{ave}$ =	0.6622	s_r =	0.0131	Check s_{Xave} = 0.0240
p =	9	s_{Xave} =	0.0240	s_{R*} =	0.0262	$r = 2.8\ s_r$ = 0.0362
Significance Level =		0.5%		s_R =	0.0262	$R = 2.8\ s_R$ = 0.0727

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	0.6600	0.6600	0.6600		0.6600	0.0000	-0.0022	0.0000	-0.09	0.00	2.23	-2.23	2.09
Lab 2	0.6800	0.6800	0.6800		0.6800	0.0000	0.0178	0.0000	0.74	0.00	2.23	-2.23	2.09
Lab 3	0.6500	0.6500	0.6500		0.6500	0.0000	-0.0122	0.0000	-0.51	0.00	2.23	-2.23	2.09
Lab 4	0.6400	0.6400	0.6400		0.6400	0.0000	-0.0222	0.0000	-0.93	0.00	2.23	-2.23	2.09
Lab 5	0.6600	0.6600	0.6600		0.6600	0.0000	-0.0022	0.0000	-0.09	0.00	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	0.6300	0.6400	0.6400		0.6367	0.0058	-0.0256	0.0000	-1.07	0.44	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.6700	0.6700	0.6800		0.6733	0.0058	0.0111	0.0000	0.46	0.44	2.23	-2.23	2.09
Lab 10	0.7200	0.6800	0.7400		0.7133	0.0306	0.0511	0.0009	2.13	2.34	2.23	-2.23	2.09
Lab 11	0.6200	0.6600	0.6600		0.6467	0.0231	-0.0156	0.0005	-0.65	1.77	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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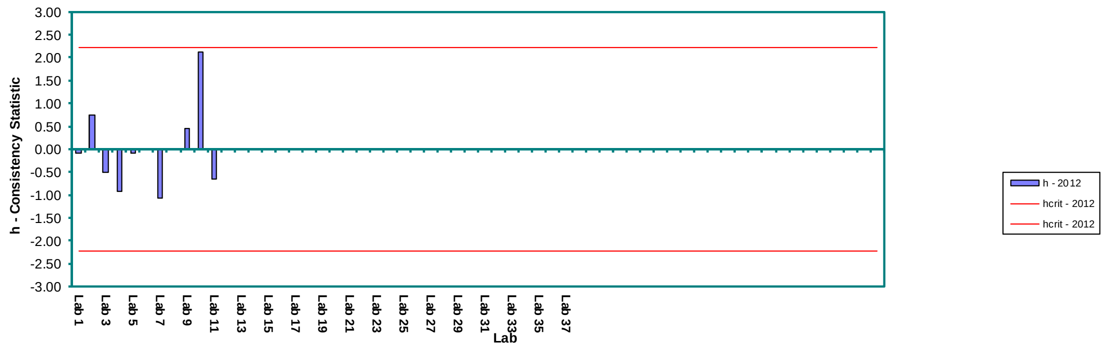
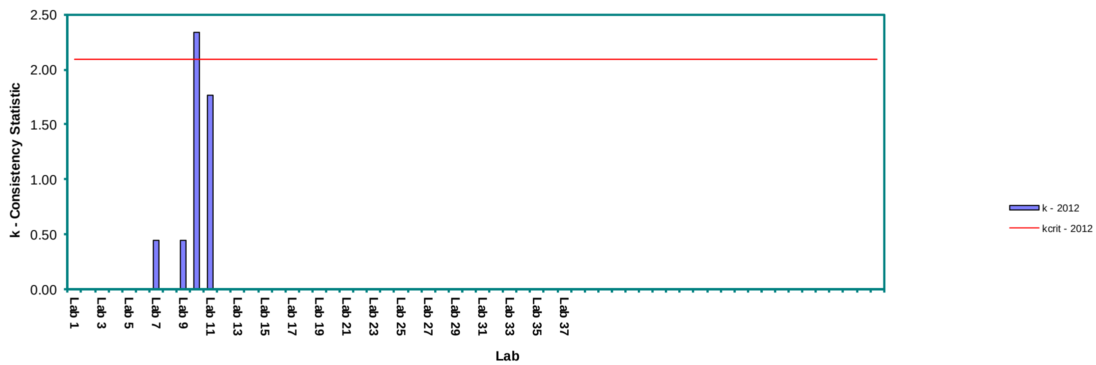
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	0.6367	$r = 2.8\ s_r$ =	0.0362	h_{crit} =	2.23
	Maximum X_{ave}	0.7133	$R = 2.8\ s_R$ =	0.0727	h_{crit} =	-2.23
	Check s_{Xave} =	0.0240			k_{crit} =	2.09

Where:
- $x_1 \ldots x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation ($X_{ave} - (X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
506 - DSR 64°C, 25mm Plate, 1mm Gap, Phase Angle (°)
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 87.0926	s_r = 0.1347	Check s_{Xave} = 0.2152
p = 9	s_{Xave} = 0.2152	s_{R*} = 0.2417	r = 2.8 s_r = 0.3734
Significance Level = 0.5%		s_R = 0.2417	R = 2.8 s_R = 0.6700

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	87.1000	87.2000	87.2000		87.1667	0.0577	0.0741	0.0033	0.34	0.43	2.23	-2.23	2.09
Lab 2	87.0000	87.2000	87.1000		87.1000	0.1000	0.0074	0.0100	0.03	0.74	2.23	-2.23	2.09
Lab 3	87.2000	87.1000	87.1000		87.1333	0.0577	0.0407	0.0033	0.19	0.43	2.23	-2.23	2.09
Lab 4	87.1000	87.2000	87.2000		87.1667	0.0577	0.0741	0.0033	0.34	0.43	2.23	-2.23	2.09
Lab 5	87.1000	87.0000	87.1000		87.0667	0.0577	-0.0259	0.0033	-0.12	0.43	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	87.2000	87.2000	87.3000		87.2333	0.0577	0.1407	0.0033	0.65	0.43	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	87.4000	87.4000	87.5000		87.4333	0.0577	0.3407	0.0033	1.58	0.43	2.23	-2.23	2.09
Lab 10	87.1000	86.4000	86.6000		86.7000	0.3606	-0.3926	0.1300	-1.82	2.68	2.23	-2.23	2.09
Lab 11	86.9000	86.8000	86.8000		86.8333	0.0577	-0.2593	0.0033	-1.20	0.43	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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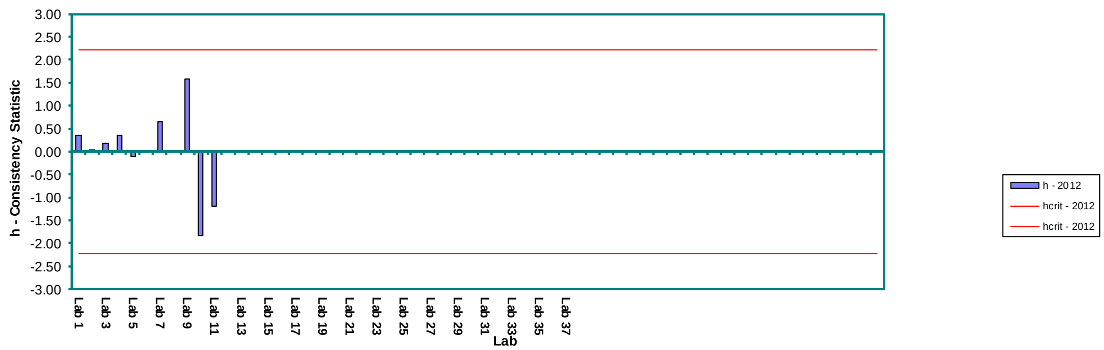
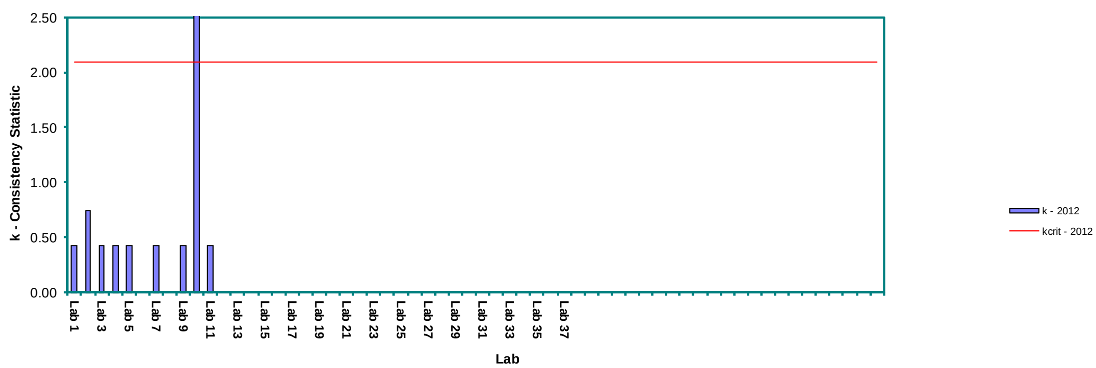
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
Minimum X_{ave}	86.7000	r = 2.8 s_r =	0.3734	h_{crit} =	2.23
Maximum X_{ave}	87.4333	R = 2.8 s_R =	0.6700	h_{crit} =	-2.23
Check s_{Xave} =	0.2152			k_{crit} =	2.09

Where:
- $x_1 \ldots x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
507 - DSR 64°C, 25mm Plate, 1mm Gap, G*/Sin d (kPa)
2012

Data	n =	3	$(X_{ave})_{ave}$ =	0.6633	s_r =	0.0120	Check s_{Xave} =	0.0233
	p =	9	s_{Xave} =	0.0233	s_{R^*} =	0.0253	$r = 2.8\ s_r$ =	0.0333
	Significance Level =		0.5%		s_R =	0.0253	$R = 2.8\ s_R$ =	0.0700

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	0.6600	0.6600	0.6600		0.6600	0.0000	-0.0033	0.0000	-0.14	0.00	2.23	-2.23	2.09
Lab 2	0.6800	0.6800	0.6800		0.6800	0.0000	0.0167	0.0000	0.72	0.00	2.23	-2.23	2.09
Lab 3	0.6500	0.6500	0.6500		0.6500	0.0000	-0.0133	0.0000	-0.57	0.00	2.23	-2.23	2.09
Lab 4	0.6400	0.6400	0.6400		0.6400	0.0000	-0.0233	0.0000	-1.00	0.00	2.23	-2.23	2.09
Lab 5	0.6600	0.6700	0.6600		0.6633	0.0058	0.0000	0.0000	0.00	0.48	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	0.6400	0.6400	0.6400		0.6400	0.0000	-0.0233	0.0000	-1.00	0.00	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.6700	0.6700	0.6800		0.6733	0.0058	0.0100	0.0000	0.43	0.48	2.23	-2.23	2.09
Lab 10	0.7200	0.6800	0.7400		0.7133	0.0306	0.0500	0.0009	2.15	2.54	2.23	-2.23	2.09
Lab 11	0.6300	0.6600	0.6600		0.6500	0.0173	-0.0133	0.0003	-0.57	1.44	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
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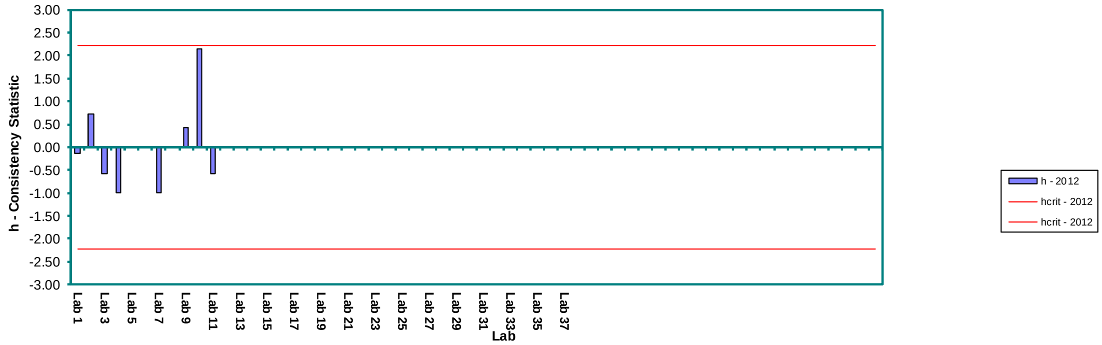
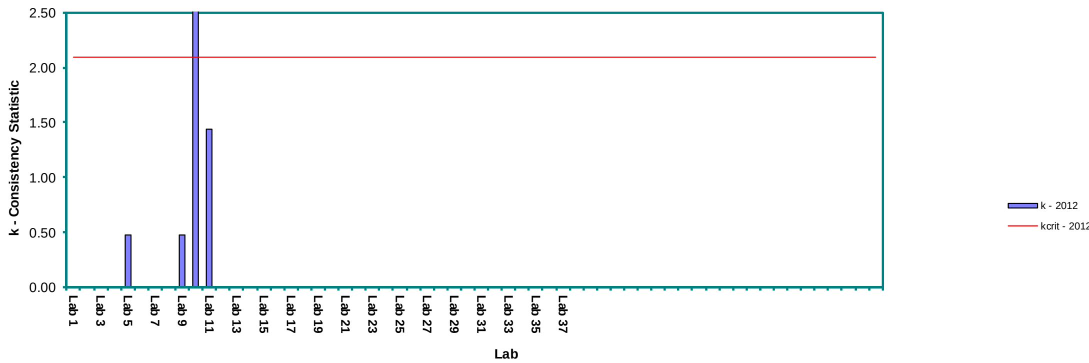
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics					
Minimum X_{ave}	0.6400	$r = 2.8\ s_r$ =	0.0333	h_{crit} =	2.23
Maximum X_{ave}	0.7133	$R = 2.8\ s_R$ =	0.0700	h_{crit} =	-2.23
Check s_{Xave} =	0.0233			k_{crit} =	2.09

Where:		Where:	
$x_1 \ldots x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R^*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic

0.0000





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
508 - TFO/RTFO Change in Mass (%)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	-0.1046	s_r =	0.0425
p =	9	s_{Xave} =	0.0424	s_{R*} =	0.0548
Significance Level =		0.5%		s_R =	0.0548

Check s_{Xave} =	0.0424
r = 2.8 s_r =	0.1177
R = 2.8 s_R =	0.1519

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	(0.1420)	(0.1430)	(0.1420)		(0.1423)	0.0006	-0.0377	0.0000	-0.89	0.01	2.23	-2.23	2.09
Lab 2	(0.0710)	(0.0710)	(0.0710)		(0.0710)	0.0000	0.0336	0.0000	0.79	0.00	2.23	-2.23	2.09
Lab 3	(0.1360)	(0.1410)	(0.0960)		(0.1243)	0.0247	-0.0197	0.0006	-0.47	0.58	2.23	-2.23	2.09
Lab 4	(0.1330)	(0.1210)	(0.1330)		(0.1290)	0.0069	-0.0244	0.0000	-0.58	0.16	2.23	-2.23	2.09
Lab 5	(0.1050)	(0.1020)	(0.1080)		(0.1050)	0.0030	-0.0004	0.0000	-0.01	0.07	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	(0.2050)	(0.2640)	(0.0250)		(0.1647)	0.1245	-0.0601	0.0155	-1.42	2.93	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	(0.0950)	(0.1020)	(0.0980)		(0.0983)	0.0035	0.0063	0.0000	0.15	0.08	2.23	-2.23	2.09
Lab 10	(0.0290)	(0.0170)	(0.0200)		(0.0220)	0.0062	0.0826	0.0000	1.95	0.15	2.23	-2.23	2.09
Lab 11	(0.0890)	(0.0800)	(0.0850)		(0.0847)	0.0045	0.0199	0.0000	0.47	0.11	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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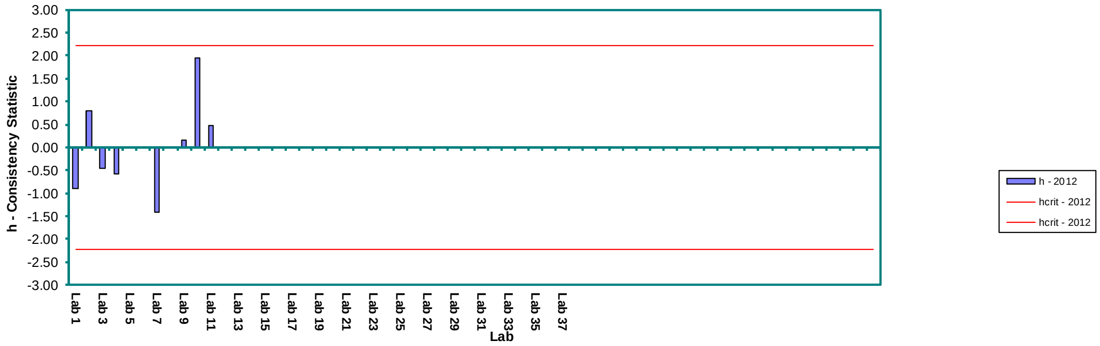
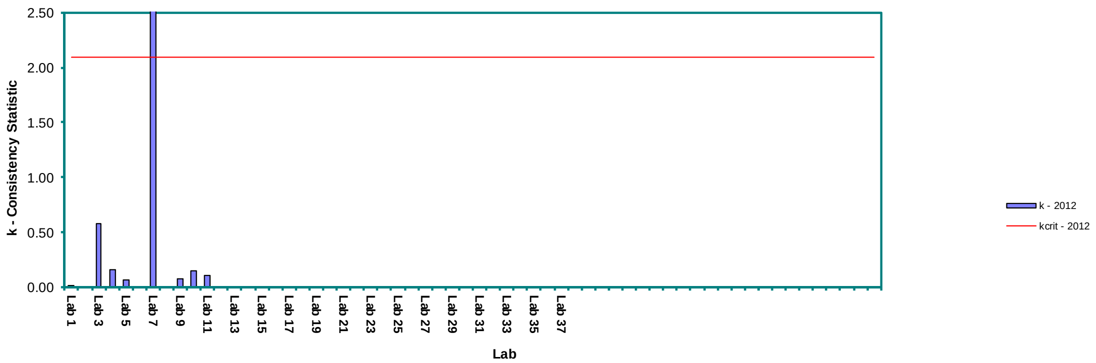
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	-0.1647	r = 2.8 s_r =	0.1177	h_{crit} =	2.23
	Maximum X_{ave}	-0.0220	R = 2.8 s_R =	0.1519	h_{crit} =	-2.23
	Check s_{Xave} =	0.0424			k_{crit} =	2.09

Where:			Where:		
	$x_1....x_n$ =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

509 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, Complex Shear Modulus G* (kPa)

2012

Data					
n =	3	$(X_{ave})_{ave}$ =	3.8070	s_r =	0.1105
p =	9	s_{Xave} =	0.2693	s_{R*} =	0.2840
Significance Level =		0.5%		s_R =	0.2840

Check s_{Xave} =	0.2693
r = 2.8 s_r =	0.3063
R = 2.8 s_R =	0.7873

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	3.9700	3.9100	3.8600		3.9133	0.0551	0.1063	0.0030	0.39	0.50	2.23	-2.23	2.09
Lab 2	3.6800	3.7200	3.6100		3.6700	0.0557	-0.1370	0.0031	-0.51	0.50	2.23	-2.23	2.09
Lab 3	3.4600	3.4900	3.8100		3.5867	0.1940	-0.2204	0.0376	-0.82	1.76	2.23	-2.23	2.09
Lab 4	3.6200	3.6600	3.6700		3.6500	0.0265	-0.1570	0.0007	-0.58	0.24	2.23	-2.23	2.09
Lab 5	3.7700	3.7100	3.7700		3.7500	0.0346	-0.0570	0.0012	-0.21	0.31	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	3.3400	3.5700	3.4700		3.4600	0.1153	-0.3470	0.0133	-1.29	1.04	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	4.2700	4.2400	4.2100		4.2400	0.0300	0.4330	0.0009	1.61	0.27	2.23	-2.23	2.09
Lab 10	4.3200	4.3400	3.9800		4.2133	0.2023	0.4063	0.0409	1.51	1.83	2.23	-2.23	2.09
Lab 11	3.7300	3.8900	3.7200		3.7800	0.0954	-0.0270	0.0091	-0.10	0.86	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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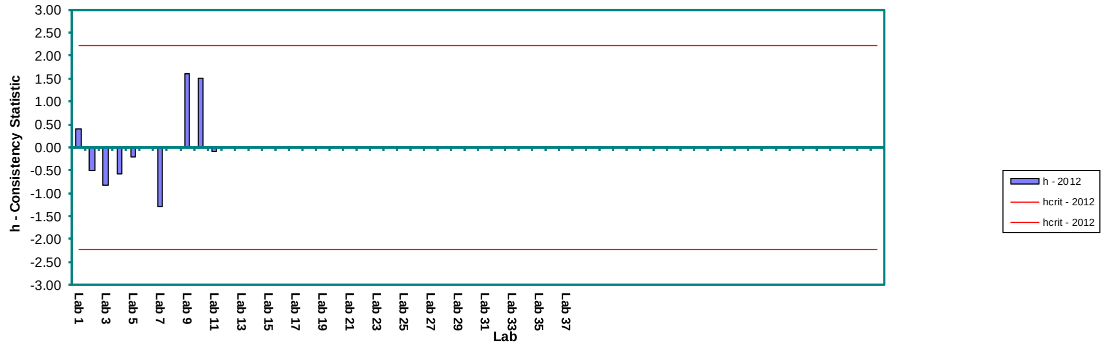
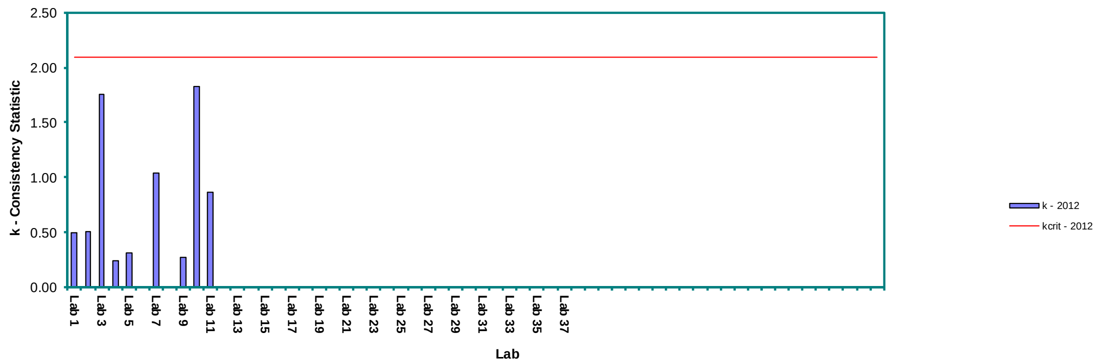
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	3.4600	r = 2.8 s_r =	0.3063	h_{crit} =	2.23
	Maximum X_{ave}	4.2400	R = 2.8 s_R =	0.7873	h_{crit} =	-2.23
	Check s_{Xave} =	0.2693			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
510 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, Phase Angle (°)
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	80.6556	s_r =	0.2126	Check s_{Xave} =	0.2267	
					p =	9	s_{Xave} =	0.2267	s_{R^*} =	0.2855	$r = 2.8\ s_r$ =	0.5892	
					Significance Level =		0.5%		s_R =	0.2855	$R = 2.8\ s_R$ =	0.7914	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1	80.6000	80.7000	80.7000		80.6667	0.0577	0.0111	0.0033	0.05	0.27	2.23	-2.23	2.09
Lab 2	80.6000	81.0000	80.3000		80.6333	0.3512	-0.0222	0.1233	-0.10	1.65	2.23	-2.23	2.09
Lab 3	81.1000	81.0000	80.3000		80.8000	0.4359	0.1444	0.1900	0.64	2.05	2.23	-2.23	2.09
Lab 4	80.7000	80.6000	80.6000		80.6333	0.0577	-0.0222	0.0033	-0.10	0.27	2.23	-2.23	2.09
Lab 5	80.7000	80.9000	80.8000		80.8000	0.1000	0.1444	0.0100	0.64	0.47	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	81.2000	81.1000	80.8000		81.0333	0.2082	0.3778	0.0433	1.67	0.98	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	80.5000	80.5000	80.6000		80.5333	0.0577	-0.1222	0.0033	-0.54	0.27	2.23	-2.23	2.09
Lab 10	80.1000	80.1000	80.4000		80.2000	0.1732	-0.4556	0.0300	-2.01	0.81	2.23	-2.23	2.09
Lab 11	80.6000	80.6000	80.6000		80.6000	0.0000	-0.0556	0.0000	-0.25	0.00	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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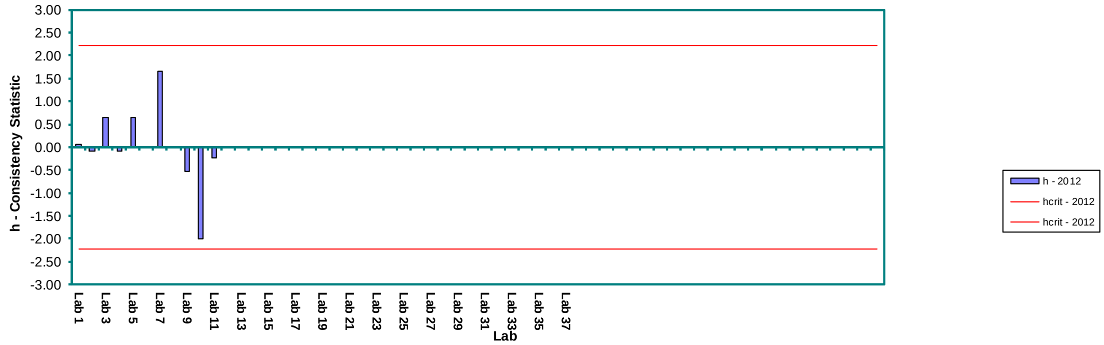
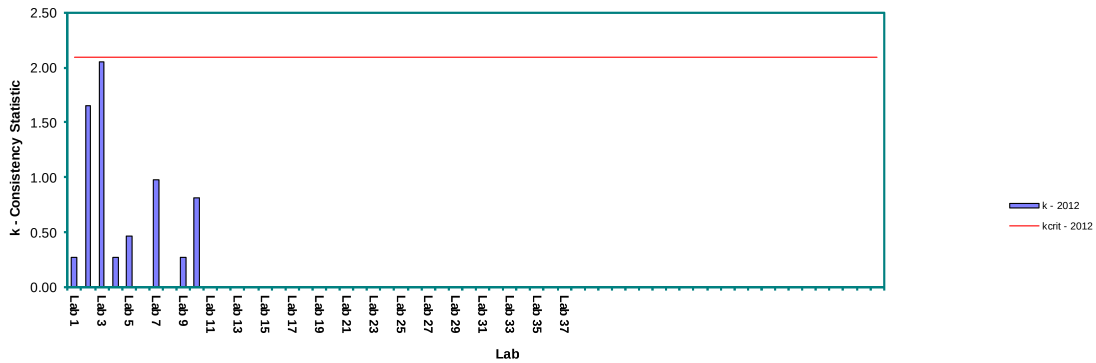
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics	Minimum X_{ave}	80.2000	$r = 2.8\ s_r$ =	0.5892	h_{crit} =	2.23	
	Maximum X_{ave}	81.0333	$R = 2.8\ s_R$ =	0.7914	h_{crit} =	-2.23	
	Check s_{Xave} =	0.2267			k_{crit} =	2.09	

Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation ($X_{ave} - (X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Betw een Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
511 - TFO/RTFO DSR 58°C, 25mm, 1mm Gap, G*/Sin d (kPa)
2012

Data														
					n =	3	$(X_{ave})_{ave}$ =	3.8593	s_r =	0.1128	Check s_{Xave} =	0.2764		
					p =	9	s_{Xave} =	0.2764	s_{R*} =	0.2914	r = 2.8 s_r =	0.3126		
					Significance Level =		0.5%		s_R =	0.2914	R = 2.8 s_R =	0.8077		
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**	
Lab 1	4.0300	3.9700	3.9100		3.9700	0.0600	0.1107	0.0036	0.40	0.53	2.23	-2.23	2.09	
Lab 2	3.7300	3.7700	3.6700		3.7233	0.0503	-0.1359	0.0025	-0.49	0.45	2.23	-2.23	2.09	
Lab 3	3.5000	3.5300	3.8600		3.6300	0.1997	-0.2293	0.0399	-0.83	1.77	2.23	-2.23	2.09	
Lab 4	3.6700	3.7100	3.7200		3.7000	0.0265	-0.1593	0.0007	-0.58	0.23	2.23	-2.23	2.09	
Lab 5	3.8100	3.7600	3.8200		3.7967	0.0321	-0.0626	0.0010	-0.23	0.28	2.23	-2.23	2.09	
Lab 6											2.23	-2.23	2.09	
Lab 7	3.3800	3.6100	3.5200		3.5033	0.1159	-0.3559	0.0134	-1.29	1.03	2.23	-2.23	2.09	
Lab 8											2.23	-2.23	2.09	
Lab 9	4.3300	4.3000	4.2700		4.3000	0.0300	0.4407	0.0009	1.59	0.27	2.23	-2.23	2.09	
Lab 10	4.3900	4.4100	4.0400		4.2800	0.2081	0.4207	0.0433	1.52	1.84	2.23	-2.23	2.09	
Lab 11	3.7800	3.9400	3.7700		3.8300	0.0954	-0.0293	0.0091	-0.11	0.85	2.23	-2.23	2.09	
Lab 12											2.23	-2.23	2.09	
Lab 13											2.23	-2.23	2.09	
Lab 14											2.23	-2.23	2.09	
Lab 15											2.23	-2.23	2.09	
Lab 16											2.23	-2.23	2.09	
Lab 17											2.23	-2.23	2.09	
Lab 18											2.23	-2.23	2.09	
Lab 19											2.23	-2.23	2.09	
Lab 20											2.23	-2.23	2.09	
Lab 21											2.23	-2.23	2.09	
Lab 22											2.23	-2.23	2.09	
Lab 23											2.23	-2.23	2.09	
Lab 24											2.23	-2.23	2.09	
Lab 25											2.23	-2.23	2.09	
Lab 26											2.23	-2.23	2.09	
Lab 27											2.23	-2.23	2.09	
Lab 28											2.23	-2.23	2.09	
Lab 29											2.23	-2.23	2.09	
Lab 30											2.23	-2.23	2.09	
Lab 31											2.23	-2.23	2.09	
Lab 32											2.23	-2.23	2.09	
Lab 33											2.23	-2.23	2.09	
Lab 34											2.23	-2.23	2.09	
Lab 35											2.23	-2.23	2.09	
Lab 36											2.23	-2.23	2.09	
Lab 37											2.23	-2.23	2.09	
											2.23	-2.23	2.09	
											2.23	-2.23	2.09	
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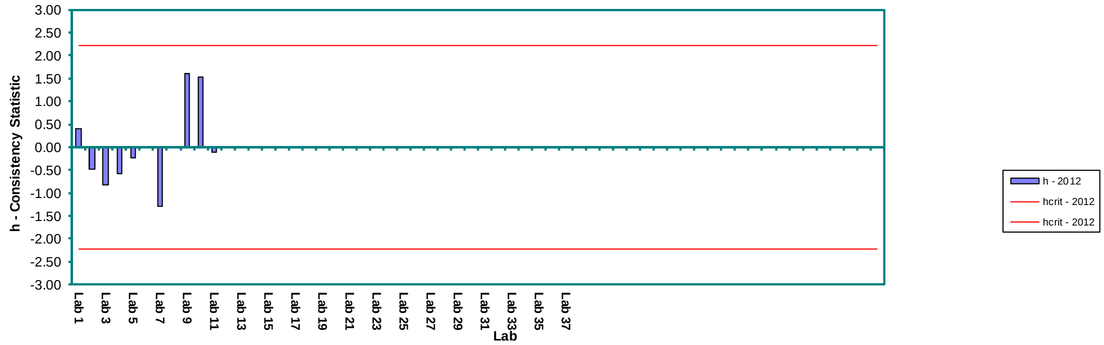
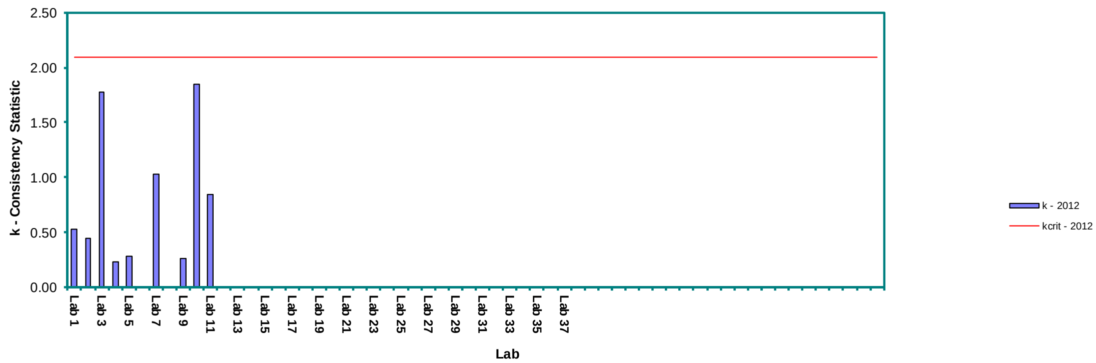
											2.23	-2.23	2.09	
											2.23	-2.23	2.09	
											2.23	-2.23	2.09	
											2.23	-2.23	2.09	
											2.23	-2.23	2.09	

Additional Statistics						
	Minimum X_{ave}	3.5033	r = 2.8 s_r =	0.3126	h_{crit} =	2.23
	Maximum X_{ave}	4.3000	R = 2.8 s_R =	0.8077	h_{crit} =	-2.23
	Check s_{Xave} =	0.2764			k_{crit} =	2.09

Where:	$x_1....x_n$ =	Individual Test Result	Where: $(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Betw een Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

512 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, Complex Shear Modulus G* (kPa)

2012

Data				
n = 3	$(X_{ave})_{ave}$ = 1.7567	s_r = 0.0414	Check s_{Xave} =	0.1057
p = 9	s_{Xave} = 0.1057	s_{R*} = 0.1110	$r = 2.8\ s_r$ =	0.1148
Significance Level = 0.5%		s_R = 0.1110	$R = 2.8\ s_R$ =	0.3076

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	1.8300	1.7900	1.8000		1.8067	0.0208	0.0500	0.0004	0.47	0.50	2.23	-2.23	2.09
Lab 2	1.6900	1.6700	1.6900		1.6833	0.0115	-0.0733	0.0001	-0.69	0.28	2.23	-2.23	2.09
Lab 3	1.6000	1.6200	1.7600		1.6600	0.0872	-0.0967	0.0076	-0.91	2.11	2.23	-2.23	2.09
Lab 4	1.6900	1.7300	1.7300		1.7167	0.0231	-0.0400	0.0005	-0.38	0.56	2.23	-2.23	2.09
Lab 5	1.7300	1.7200	1.7400		1.7300	0.0100	-0.0267	0.0001	-0.25	0.24	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	1.6200	1.6700	1.6200		1.6367	0.0289	-0.1200	0.0008	-1.14	0.70	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	1.9000	1.9100	1.9100		1.9067	0.0058	0.1500	0.0000	1.42	0.14	2.23	-2.23	2.09
Lab 10	2.0100	1.9400	1.8600		1.9367	0.0751	0.1800	0.0056	1.70	1.81	2.23	-2.23	2.09
Lab 11	1.7400	1.7200	1.7400		1.7333	0.0115	-0.0233	0.0001	-0.22	0.28	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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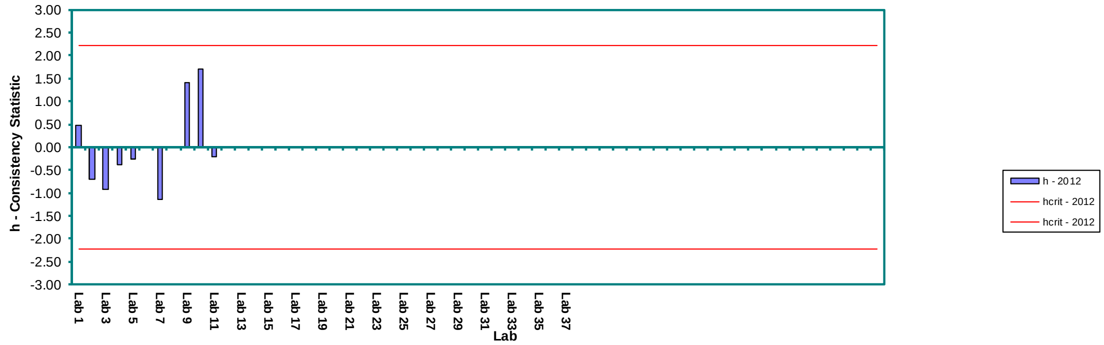
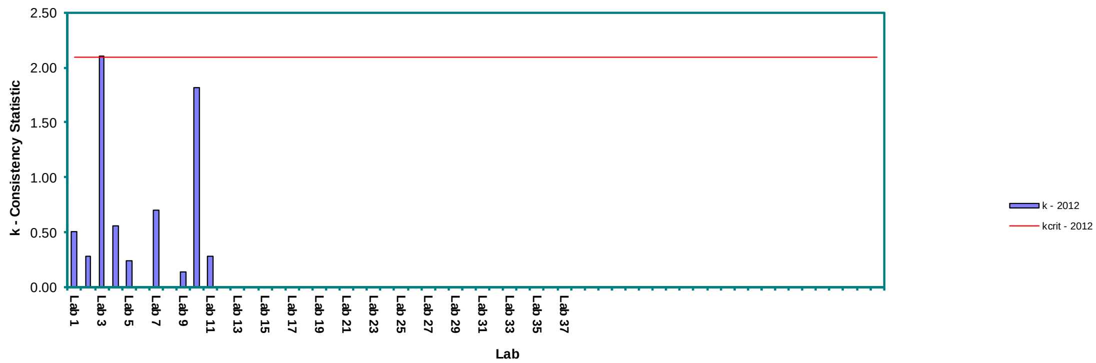
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics				
Minimum X_{ave}	1.6367	$r = 2.8\ s_r$ = 0.1148	h_{crit} =	2.23
Maximum X_{ave}	1.9367	$R = 2.8\ s_R$ = 0.3076	h_{crit} =	-2.23
Check s_{Xave} =	0.1057		k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
513 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, Phase Angle (°)
2012

Data			
n = 3	$(X_{ave})_{ave}$ = 83.0407	s_r = 0.1732	Check s_{Xave} = 0.2471
p = 9	s_{Xave} = 0.2471	s_{R*} = 0.2847	$r = 2.8\ s_r$ = 0.4801
Significance Level = 0.5%		s_R = 0.2847	$R = 2.8\ s_R$ = 0.7891

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	82.9000	83.0000	83.0000		82.9667	0.0577	-0.0741	0.0033	-0.30	0.33	2.23	-2.23	2.09
Lab 2	83.3000	82.9000	83.0000		83.0667	0.2082	0.0259	0.0433	0.10	1.20	2.23	-2.23	2.09
Lab 3	83.4000	83.3000	82.8000		83.1667	0.3215	0.1259	0.1033	0.51	1.86	2.23	-2.23	2.09
Lab 4	83.1000	83.0000	83.0000		83.0333	0.0577	-0.0074	0.0033	-0.03	0.33	2.23	-2.23	2.09
Lab 5	83.1000	83.2000	83.2000		83.1667	0.0577	0.1259	0.0033	0.51	0.33	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	83.6000	83.5000	83.2000		83.4333	0.2082	0.3926	0.0433	1.59	1.20	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	83.1000	83.1000	83.2000		83.1333	0.0577	0.0926	0.0033	0.37	0.33	2.23	-2.23	2.09
Lab 10	82.3000	82.5000	82.8000		82.5333	0.2517	-0.5074	0.0633	-2.05	1.45	2.23	-2.23	2.09
Lab 11	82.8000	82.9000	82.9000		82.8667	0.0577	-0.1741	0.0033	-0.70	0.33	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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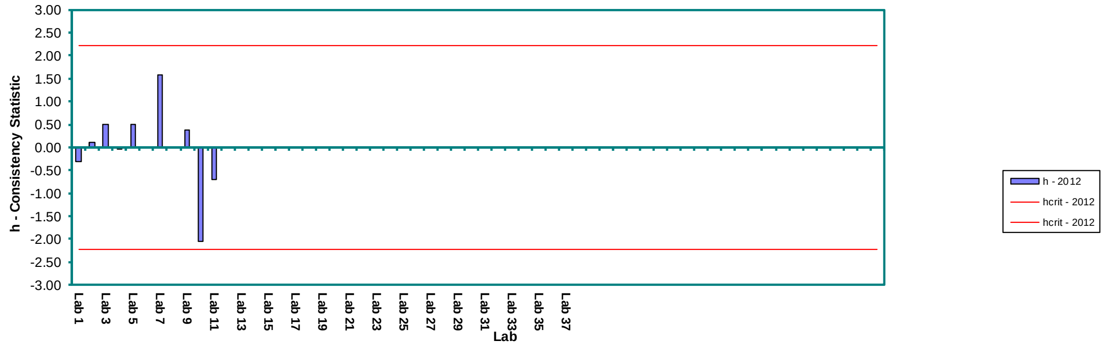
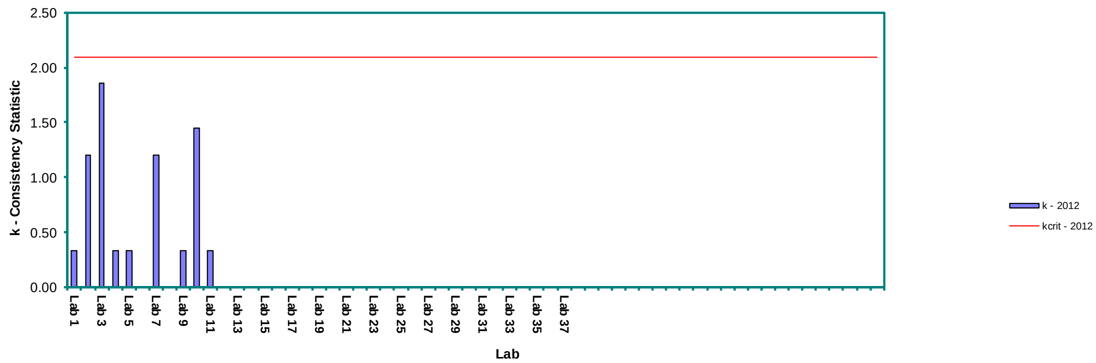
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics					
Minimum X_{ave}	82.5333	$r = 2.8\ s_r$ =	0.4801	h_{crit} =	2.23
Maximum X_{ave}	83.4333	$R = 2.8\ s_R$ =	0.7891	h_{crit} =	-2.23
Check s_{Xave} =	0.2471			k_{crit} =	2.09

Where:		Where:	
$x_1 .... x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		$s_{X_{ave}}$ =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
514 - TFO/RTFO DSR 64°C, 25mm, 1mm Gap, G*/Sin d (kPa)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	1.7733	s_r =	0.0349
p =	9	s_{Xave} =	0.1150	s_{R*} =	0.1185
Significance Level =		0.5%		s_R =	0.1185

Check s_{Xave} =	0.1150
r = 2.8 s_r =	0.0968
R = 2.8 s_R =	0.3283

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	1.8400	1.8100	1.8100		1.8200	0.0173	0.0467	0.0003	0.41	0.50	2.23	-2.23	2.09
Lab 2	1.7000	1.6800	1.7100		1.6967	0.0153	-0.0767	0.0002	-0.67	0.44	2.23	-2.23	2.09
Lab 3	1.6100	1.6300	1.7700		1.6700	0.0872	-0.1033	0.0076	-0.90	2.50	2.23	-2.23	2.09
Lab 4	1.7100	1.7400	1.7400		1.7300	0.0173	-0.0433	0.0003	-0.38	0.50	2.23	-2.23	2.09
Lab 5	1.7500	1.7300	1.7500		1.7433	0.0115	-0.0300	0.0001	-0.26	0.33	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	1.6300	1.6800	1.6300		1.6467	0.0289	-0.1267	0.0008	-1.10	0.83	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	1.9100	1.9200	1.9200		1.9167	0.0058	0.1433	0.0000	1.25	0.17	2.23	-2.23	2.09
Lab 10	2.0300	1.9600	1.9800		1.9900	0.0361	0.2167	0.0013	1.88	1.03	2.23	-2.23	2.09
Lab 11	1.7600	1.7300	1.7500		1.7467	0.0153	-0.0267	0.0002	-0.23	0.44	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
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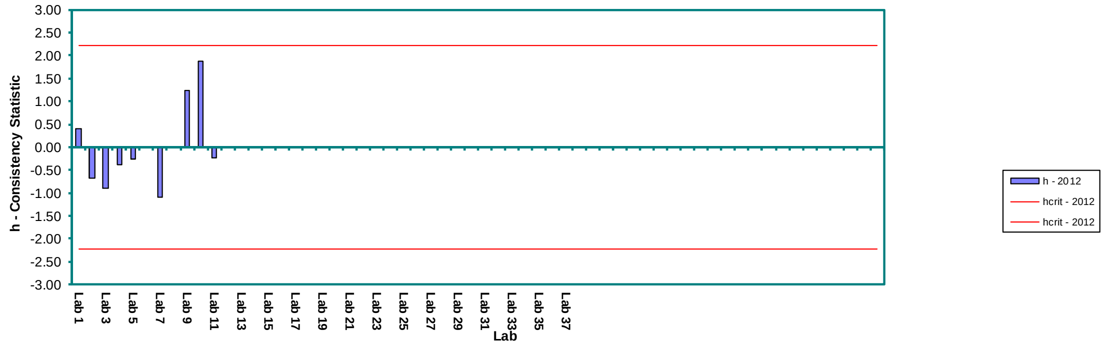
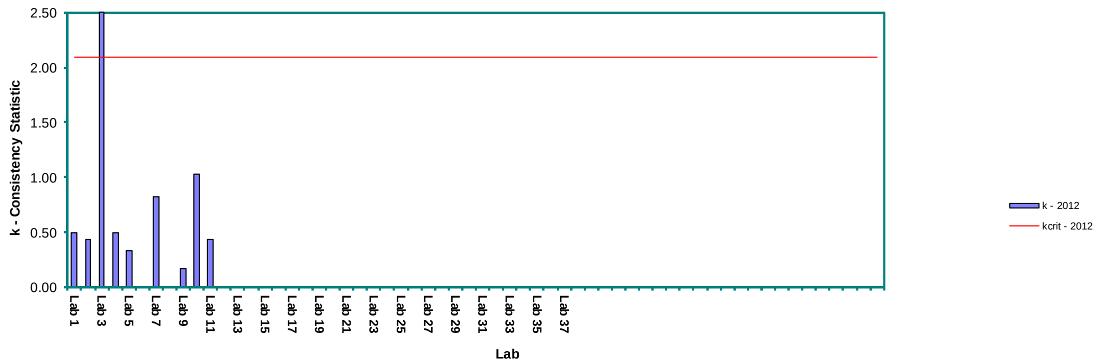
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	1.6467	r = 2.8 s_r =	0.0968	h_{crit} =	2.23
	Maximum X_{ave}	1.9900	R = 2.8 s_R =	0.3283	h_{crit} =	-2.23
	Check s_{Xave} =	0.1150			k_{crit} =	2.09

Where:			Where:	
	$x_1 \ldots x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

515 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, Complex Shear Modulus G* (kPa)

2012

Data						
n = 3	$(X_{ave})_{ave}$ =	5,245.6667	s_r =	267.7709	Check s_{Xave} =	496.5574
p = 9	s_{Xave} =	496.5574	s_{R*} =	542.5588	r = 2.8 s_r =	742.2231
Significance Level =	0.5%		s_R =	542.5588	R = 2.8 s_R =	1,503.8963

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	5,325.0000	5,890.0000	5,329.0000		5,514.6667	325.0544	269.0000	105,660.3333	0.54	1.21	2.23	-2.23	2.09
Lab 2	5,370.0000	5,530.0000	5,550.0000		5,483.3333	98.6577	237.6667	9,733.3333	0.48	0.37	2.23	-2.23	2.09
Lab 3	5,491.0000	6,195.0000	6,187.0000		5,957.6667	404.1650	712.0000	163,349.3333	1.43	1.51	2.23	-2.23	2.09
Lab 4	5,230.0000	4,925.0000	5,089.0000		5,081.3333	152.6445	-164.3333	23,300.3333	-0.33	0.57	2.23	-2.23	2.09
Lab 5	5,210.0000	5,230.0000	4,880.0000		5,106.6667	196.5536	-139.0000	38,633.3333	-0.28	0.73	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	4,510.0000	4,302.0000	4,490.0000		4,434.0000	114.7519	-811.6667	13,168.0000	-1.63	0.43	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	4,910.0000	4,940.0000	4,930.0000		4,926.6667	15.2753	-319.0000	233.3333	-0.64	0.06	2.23	-2.23	2.09
Lab 10	5,970.0000	6,120.0000	5,480.0000		5,856.6667	334.7138	611.0000	112,033.3333	1.23	1.25	2.23	-2.23	2.09
Lab 11	4,690.0000	4,530.0000	5,330.0000		4,850.0000	423.3202	-395.6667	179,200.0000	-0.80	1.58	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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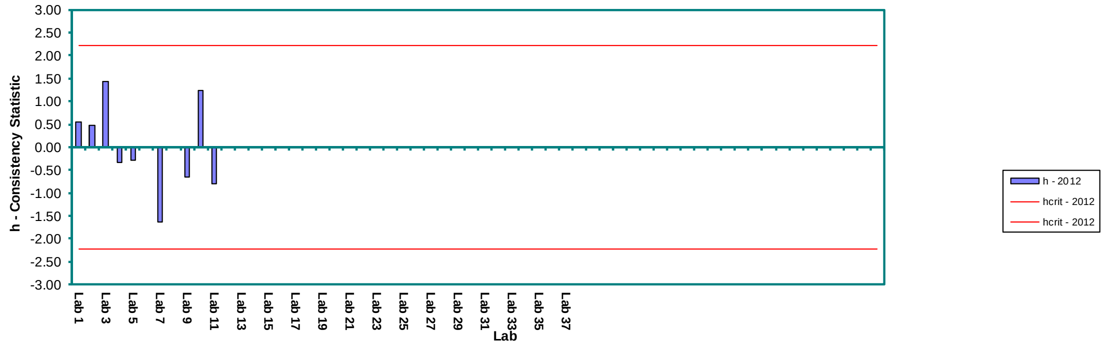
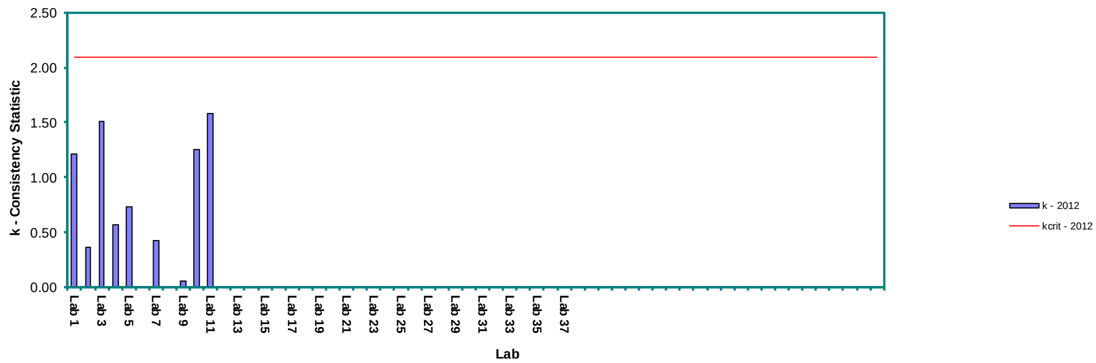
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
Minimum X_{ave}	4434.0000	r = 2.8 s_r =	742.2231	h_{crit} =	2.23
Maximum X_{ave}	5957.6667	R = 2.8 s_R =	1,503.8963	h_{crit} =	-2.23
Check s_{Xave} =	496.5574			k_{crit} =	2.09

Where:		Where:	
x_1....x_n =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Betw een Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP

516 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, Phase Angle (°)

2012

Data						
n = 3	$(X_{ave})_{ave}$ =	42.7963	s_r =	0.4359	Check s_{Xave} =	1.2405
p = 9	s_{Xave} =	1.2405	s_{R*} =	1.2905	r = 2.8 s_r =	1.2082
Significance Level =	0.5%		s_R =	1.2905	R = 2.8 s_R =	3.5771

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	41.7000	41.1000	42.1000		41.6333	0.5033	-1.1630	0.2533	-0.94	1.15	2.23	-2.23	2.09
Lab 2	42.4000	42.9000	42.5000		42.6000	0.2646	-0.1963	0.0700	-0.16	0.61	2.23	-2.23	2.09
Lab 3	42.5000	41.7000	43.6000		42.6000	0.9539	-0.1963	0.9100	-0.16	2.19	2.23	-2.23	2.09
Lab 4	41.0000	40.8000	40.5000		40.7667	0.2517	-2.0296	0.0633	-1.64	0.58	2.23	-2.23	2.09
Lab 5	42.6000	42.8000	42.5000		42.6333	0.1528	-0.1630	0.0233	-0.13	0.35	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	45.6000	44.8000	44.9000		45.1000	0.4359	2.3037	0.1900	1.86	1.00	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	43.4000	43.4000	43.3000		43.3667	0.0577	0.5704	0.0033	0.46	0.13	2.23	-2.23	2.09
Lab 10	42.5000	42.3000	43.1000		42.6333	0.4163	-0.1630	0.1733	-0.13	0.96	2.23	-2.23	2.09
Lab 11	44.0000	43.7000	43.8000		43.8333	0.1528	1.0370	0.0233	0.84	0.35	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
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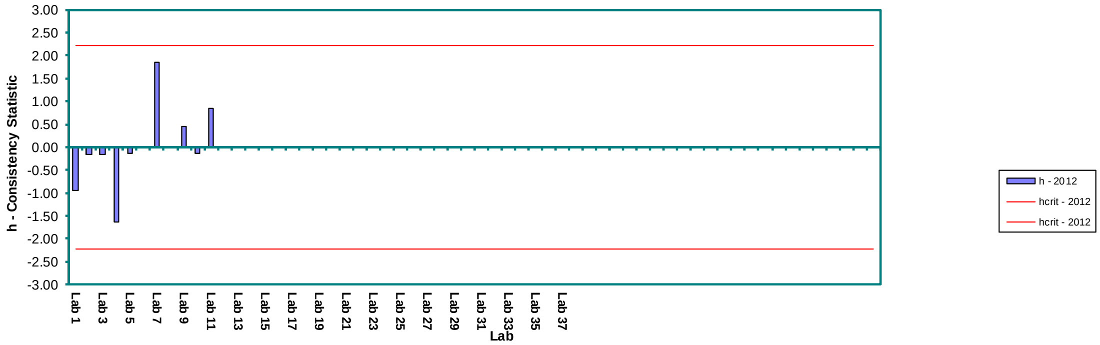
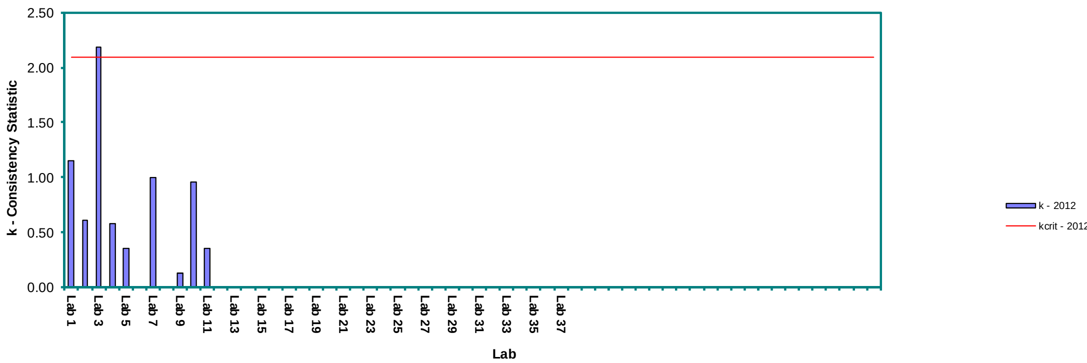
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	40.7667	r = 2.8 s_r =	1.2082	h_{crit} =	2.23
	Maximum X_{ave}	45.1000	R = 2.8 s_R =	3.5771	h_{crit} =	-2.23
	Check s_{Xave} =	1.2405			k_{crit} =	2.09

Where:			Where:		
	$x_1....x_n$ =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
517 - PAV @ 100°C DSR 19°C, 8mm Plate, 2mm Gap, G*xSin d (kPa)
2012

Data												
n =	3	$(X_{ave})_{ave}$ =	3,559.6296	s_r =	178.9387	Check s_{Xave} =	302.6237					
p =	9	s_{Xave} =	302.6237	s_{R*} =	336.0464	r = 2.8 s_r =	495.9929					
Significance Level =		0.5%		s_R =	336.0464	R = 2.8 s_R =	931.4731					

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	3,546.0000	3,875.0000	3,569.0000		3,663.3333	183.6691	103.7037	33,734.3333	0.34	1.03	2.23	-2.23	2.09
Lab 2	3,620.0000	3,760.0000	3,750.0000		3,710.0000	78.1025	150.3704	6,100.0000	0.50	0.44	2.23	-2.23	2.09
Lab 3	3,712.0000	4,124.0000	4,268.0000		4,034.6667	288.5643	475.0370	83,269.3333	1.57	1.61	2.23	-2.23	2.09
Lab 4	3,428.0000	3,220.0000	3,308.0000		3,318.6667	104.4095	-240.9630	10,901.3333	-0.80	0.58	2.23	-2.23	2.09
Lab 5	3,530.0000	3,550.0000	3,300.0000		3,460.0000	138.9244	-99.6296	19,300.0000	-0.33	0.78	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	3,230.0000	3,040.0000	3,170.0000		3,146.6667	97.1253	-412.9630	9,433.3333	-1.36	0.54	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	3,370.0000	3,390.0000	3,380.0000		3,380.0000	10.0000	-179.6296	100.0000	-0.59	0.06	2.23	-2.23	2.09
Lab 10	4,030.0000	4,120.0000	3,740.0000		3,963.3333	198.5783	403.7037	39,433.3333	1.33	1.11	2.23	-2.23	2.09
Lab 11	3,260.0000	3,130.0000	3,690.0000		3,360.0000	293.0870	-199.6296	85,900.0000	-0.66	1.64	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
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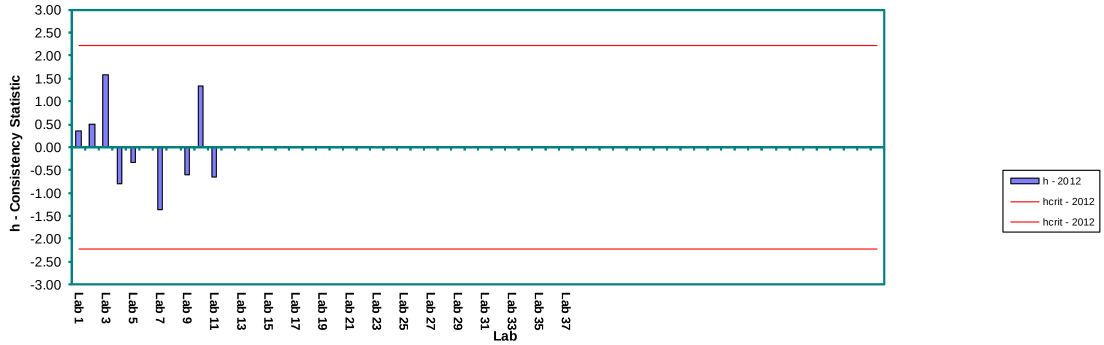
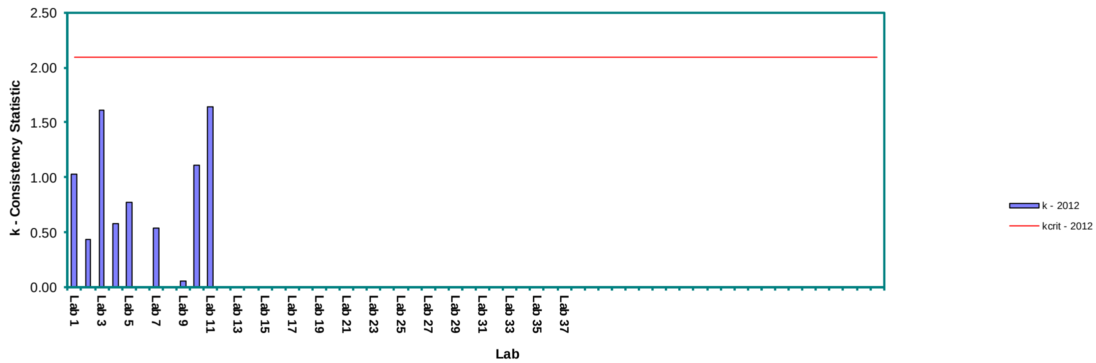
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	3146.6667	r = 2.8 s_r =	495.9929	h_{crit} =	2.23
	Maximum X_{ave}	4034.6667	R = 2.8 s_R =	931.4731	h_{crit} =	-2.23
	Check s_{Xave} =	302.6237			k_{crit} =	2.09

Where:			Where:		
	x_1....x_n =	Individual Test Result		$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
518 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, Complex Shear Modulus G* (kPa)
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	7,859.8889	s_r =	376.2357	Check s_{Xave} =	636.2663	
					p =	9	s_{Xave} =	636.2663	s_{R*} =	706.5435	r = 2.8 s_r =	1,042.8723	
					Significance Level =		0.5%		s_R =	706.5435	R = 2.8 s_R =	1,958.4387	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1	7,855.0000	8,609.0000	7,907.0000		8,123.6667	421.1144	263.7778	177,337.3333	0.41	1.12	2.23	-2.23	2.09
Lab 2	8,350.0000	8,220.0000	8,300.0000		8,290.0000	65.5744	430.1111	4,300.0000	0.68	0.17	2.23	-2.23	2.09
Lab 3	8,294.0000	9,322.0000	9,141.0000		8,919.0000	548.7796	1,059.1111	301,159.0000	1.66	1.46	2.23	-2.23	2.09
Lab 4	7,681.0000	7,246.0000	7,452.0000		7,459.6667	217.6013	-400.2222	47,350.3333	-0.63	0.58	2.23	-2.23	2.09
Lab 5	7,840.0000	7,880.0000	7,350.0000		7,690.0000	295.1271	-169.8889	87,100.0000	-0.27	0.78	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	7,170.0000	7,630.0000	7,240.0000		7,346.6667	247.8575	-513.2222	61,433.3333	-0.81	0.66	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	6,970.0000	7,060.0000	7,120.0000		7,050.0000	75.4983	-809.8889	5,700.0000	-1.27	0.20	2.23	-2.23	2.09
Lab 10	8,670.0000	8,900.0000	8,050.0000		8,540.0000	439.6590	680.1111	193,300.0000	1.07	1.17	2.23	-2.23	2.09
Lab 11	7,100.0000	6,830.0000	8,030.0000		7,320.0000	629.5236	-539.8889	396,300.0000	-0.85	1.67	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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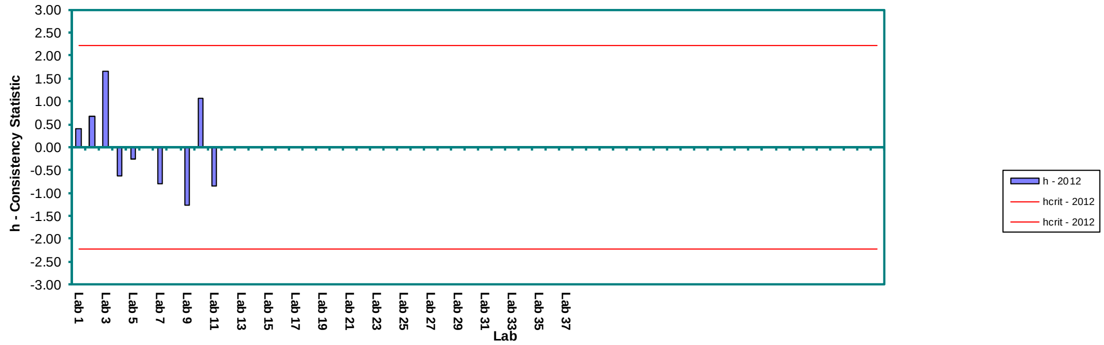
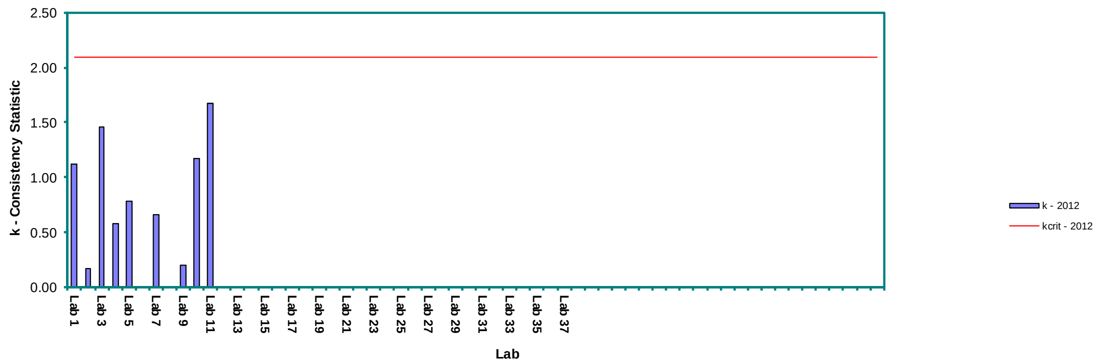
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	7050.0000	r = 2.8 s_r =	1,042.8723	h_{crit} =	2.23
	Maximum X_{ave}	8919.0000	R = 2.8 s_R =	1,958.4387	h_{crit} =	-2.23
	Check s_{Xave} =	636.2663			k_{crit} =	2.09

Where: x_1....x_n =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
519 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, Phase Angle (°)
2012

Data					
n =	3	$(X_{ave})_{ave}$ =	40.4630	s_r =	0.3636
p =	9	s_{Xave} =	1.2755	s_{R*} =	1.3096
Significance Level =		0.5%		s_R =	1.3096

Check s_{Xave} =	1.2755
r = 2.8 s_r =	1.0079
R = 2.8 s_R =	3.6299

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	39.5000	39.1000	39.7000		39.4333	0.3055	-1.0296	0.0933	-0.81	0.84	2.23	-2.23	2.09
Lab 2	39.9000	40.6000	40.4000		40.3000	0.3606	-0.1630	0.1300	-0.13	0.99	2.23	-2.23	2.09
Lab 3	40.0000	39.2000	40.5000		39.9000	0.6557	-0.5630	0.4300	-0.44	1.80	2.23	-2.23	2.09
Lab 4	38.6000	38.5000	38.2000		38.4333	0.2082	-2.0296	0.0433	-1.59	0.57	2.23	-2.23	2.09
Lab 5	40.1000	40.3000	40.0000		40.1333	0.1528	-0.3296	0.0233	-0.26	0.42	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	43.2000	42.2000	42.6000		42.6667	0.5033	2.2037	0.2533	1.73	1.38	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	41.7000	41.8000	41.8000		41.7667	0.0577	1.3037	0.0033	1.02	0.16	2.23	-2.23	2.09
Lab 10	40.0000	39.9000	40.7000		40.2000	0.4359	-0.2630	0.1900	-0.21	1.20	2.23	-2.23	2.09
Lab 11	41.5000	41.2000	41.3000		41.3333	0.1528	0.8704	0.0233	0.68	0.42	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
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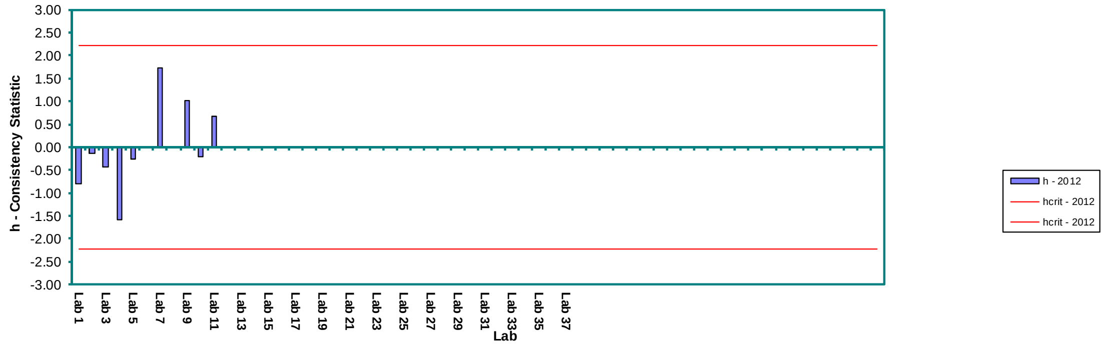
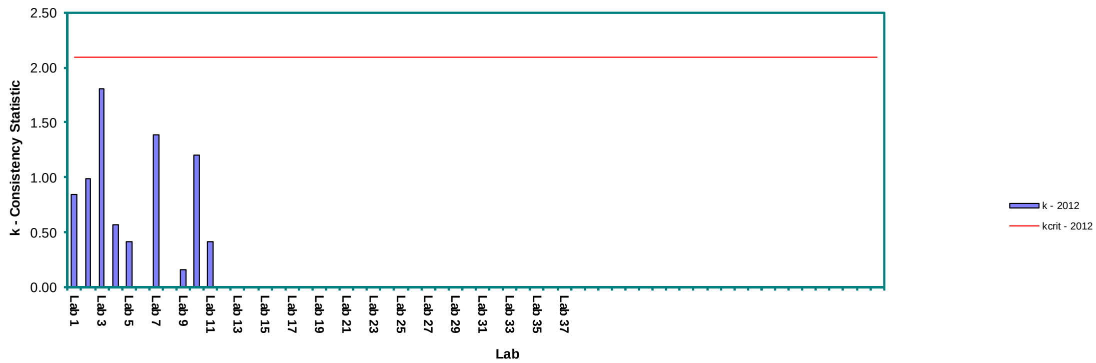
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	38.4333	r = 2.8 s_r =	1.0079	h_{crit} =	2.23
	Maximum X_{ave}	42.6667	R = 2.8 s_R =	3.6299	h_{crit} =	-2.23
	Check s_{Xave} =	1.2755			k_{crit} =	2.09

Where:
- $x_1....x_n$ = Individual Test Result
- X_{ave} = Cell Average
- n = Number of Test Results per Cell
- s = Cell Standard Deviation
- d = Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)
- s^2 = Cell Variation
- p = Number of Laboratories

Where:
- $(X_{ave})_{ave}$ = Average of Cell Averages
- s_{Xave} = Standard Deviation of Cell Averages
- s_r = Repeatability Standard Deviation
- s_{R*} = Interim Reproducibility Standard Deviation
- s_R = Reproducibility Standard Deviation (Larger of s_r and s_{R*})
- h = Between Laboratory Consistency Statistic
- k = Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R^*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R^*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
520 - PAV @ 100°C DSR 16°C, 8mm Plate, 2mm Gap, G*xSin d (kPa)
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	5,094.8519	s_r =	230.3034	Check s_{Xave} =	372.1001	
					p =	9	s_{Xave} =	372.1001	s_{R*} =	416.9152	$r = 2.8\ s_r$ =	638.3685	
					Significance Level =		0.5%		s_R =	416.9152	$R = 2.8\ s_R$ =	1,155.6299	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1	4,998.0000	5,427.0000	5,046.0000		5,157.0000	235.0553	62.1481	55,251.0000	0.17	1.02	2.23	-2.23	2.09
Lab 2	5,356.0000	5,349.0000	5,379.0000		5,361.3333	15.6950	266.4815	246.3333	0.72	0.07	2.23	-2.23	2.09
Lab 3	5,327.0000	5,893.0000	5,934.0000		5,718.0000	339.2359	623.1481	115,081.0000	1.67	1.47	2.23	-2.23	2.09
Lab 4	4,792.0000	4,508.0000	4,612.0000		4,637.3333	143.6848	-457.5185	20,645.3333	-1.23	0.62	2.23	-2.23	2.09
Lab 5	5,060.0000	5,090.0000	4,730.0000		4,960.0000	199.7498	-134.8519	39,900.0000	-0.36	0.87	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	4,910.0000	5,120.0000	4,900.0000		4,976.6667	124.2310	-118.1852	15,433.3333	-0.32	0.54	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	4,640.0000	4,700.0000	4,740.0000		4,693.3333	50.3322	-401.5185	2,533.3333	-1.08	0.22	2.23	-2.23	2.09
Lab 10	5,580.0000	5,710.0000	5,250.0000		5,513.3333	237.1357	418.4815	56,233.3333	1.12	1.03	2.23	-2.23	2.09
Lab 11	4,710.0000	4,500.0000	5,300.0000		4,836.6667	414.7690	-258.1852	172,033.3333	-0.69	1.80	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
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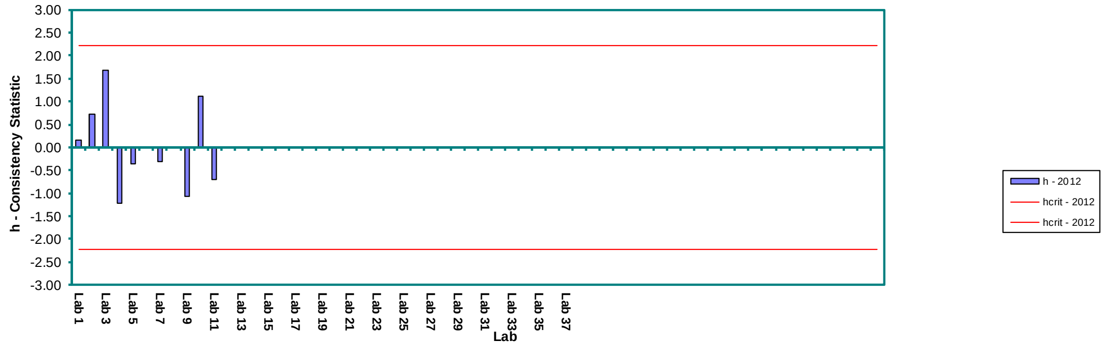
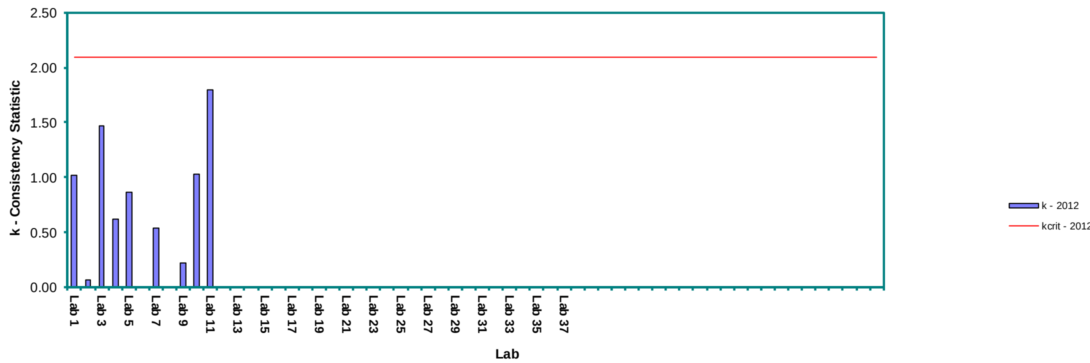
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	4637.3333	$r = 2.8\ s_r$ =	638.3685	h_{crit} =	2.23
	Maximum X_{ave}	5718.0000	$R = 2.8\ s_R$ =	1,155.6299	h_{crit} =	-2.23
	Check s_{Xave} =	372.1001			k_{crit} =	2.09

Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where: $(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
521 - BBR Creep Stiffness @ -18°C, 60s (MPa)
2012

Data						
n =	3	$(X_{ave})_{ave}$ =	168.2593	s_r =	4.0323	Check s_{Xave} = 7.4680
p =	9	s_{Xave} =	7.4680	s_{R*} =	8.1616	r = 2.8 s_r = 11.1769
Significance Level =		0.5%		s_R =	8.1616	R = 2.8 s_R = 22.6227

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	175.0000	177.0000	168.0000		173.3333	4.7258	5.0741	22.3333	0.68	1.17	2.23	-2.23	2.09
Lab 2	174.0000	172.0000	177.0000		174.3333	2.5166	6.0741	6.3333	0.81	0.62	2.23	-2.23	2.09
Lab 3	174.0000	177.0000	176.0000		175.6667	1.5275	7.4074	2.3333	0.99	0.38	2.23	-2.23	2.09
Lab 4	177.0000	180.0000	183.0000		180.0000	3.0000	11.7407	9.0000	1.57	0.74	2.23	-2.23	2.09
Lab 5	161.0000	162.0000	160.0000		161.0000	1.0000	-7.2593	1.0000	-0.97	0.25	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	155.0000	167.0000	165.0000		162.3333	6.4291	-5.9259	41.3333	-0.79	1.59	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	165.0000	162.0000	155.0000		160.6667	5.1316	-7.5926	26.3333	-1.02	1.27	2.23	-2.23	2.09
Lab 10	165.0000	165.0000	161.0000		163.6667	2.3094	-4.5926	5.3333	-0.61	0.57	2.23	-2.23	2.09
Lab 11	165.0000	168.0000	157.0000		163.3333	5.6862	-4.9259	32.3333	-0.66	1.41	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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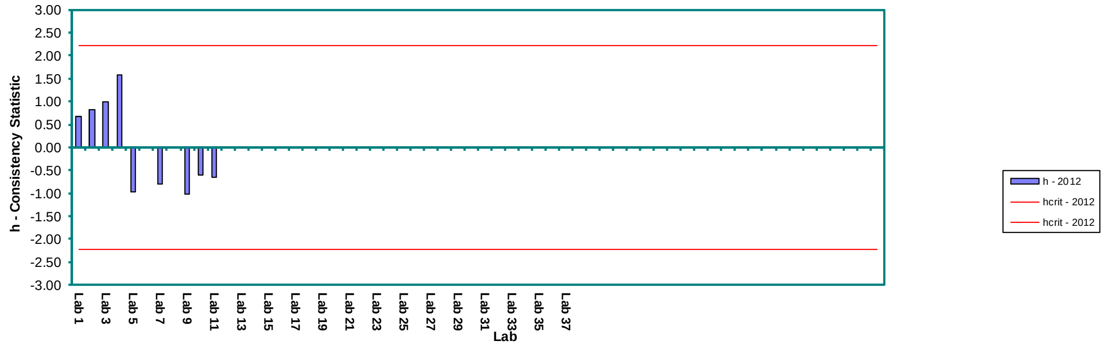
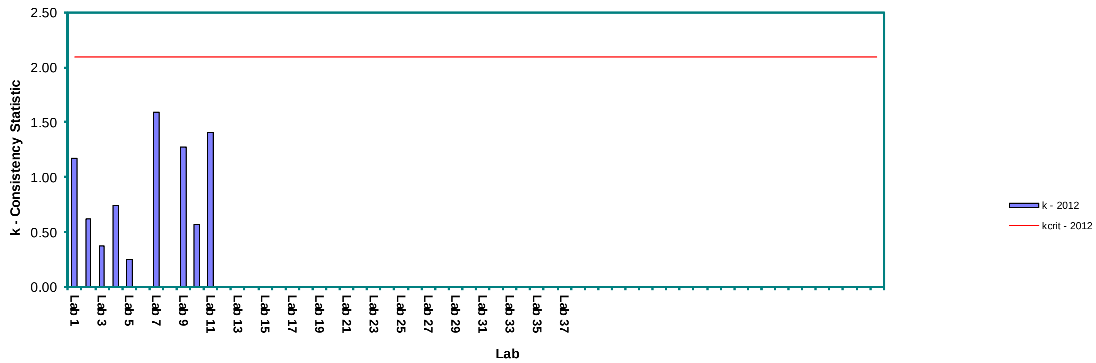
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	160.6667	r = 2.8 s_r =	11.1769	h_{crit} =	2.23
	Maximum X_{ave}	180.0000	R = 2.8 s_R =	22.6227	h_{crit} =	-2.23
	Check s_{Xave} =	7.4680			k_{crit} =	2.09

Where:		Where:	
$x_1 \ldots x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
522 - BBR Slope, m, @ - 18°C, 60s
2012

Data													
					n =	3	$(X_{ave})_{ave}$ =	0.3186	s_r =	0.0029	Check s_{Xave} =	0.0060	
					p =	9	s_{Xave} =	0.0060	s_{R*} =	0.0064	r = 2.8 s_r =	0.0080	
					Significance Level =		0.5%		s_R =	0.0064	R = 2.8 s_R =	0.0178	
Lab #	**x_1**	**x_2**	**x_3**	**x_4**	**X_{ave}**	**s**	**d**	**s^2**	**h - 2012**	**k - 2012**	**hcrit - 2012**	**hcrit - 2012**	**kcrit - 2012**
Lab 1	0.3180	0.3160	0.3230		0.3190	0.0036	0.0004	0.0000	0.07	1.25	2.23	-2.23	2.09
Lab 2	0.3170	0.3230	0.3150		0.3183	0.0042	-0.0002	0.0000	-0.04	1.44	2.23	-2.23	2.09
Lab 3	0.3200	0.3120	0.3160		0.3160	0.0040	-0.0026	0.0000	-0.43	1.38	2.23	-2.23	2.09
Lab 4	0.3070	0.3090	0.3060		0.3073	0.0015	-0.0112	0.0000	-1.88	0.53	2.23	-2.23	2.09
Lab 5	0.3160	0.3160	0.3160		0.3160	0.0000	-0.0026	0.0000	-0.43	0.00	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	0.3340	0.3270	0.3280		0.3297	0.0038	0.0111	0.0000	1.86	1.31	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.3180	0.3190	0.3230		0.3200	0.0026	0.0014	0.0000	0.24	0.91	2.23	-2.23	2.09
Lab 10	0.3190	0.3160	0.3180		0.3177	0.0015	-0.0009	0.0000	-0.15	0.53	2.23	-2.23	2.09
Lab 11	0.3210	0.3240	0.3240		0.3230	0.0017	0.0044	0.0000	0.74	0.60	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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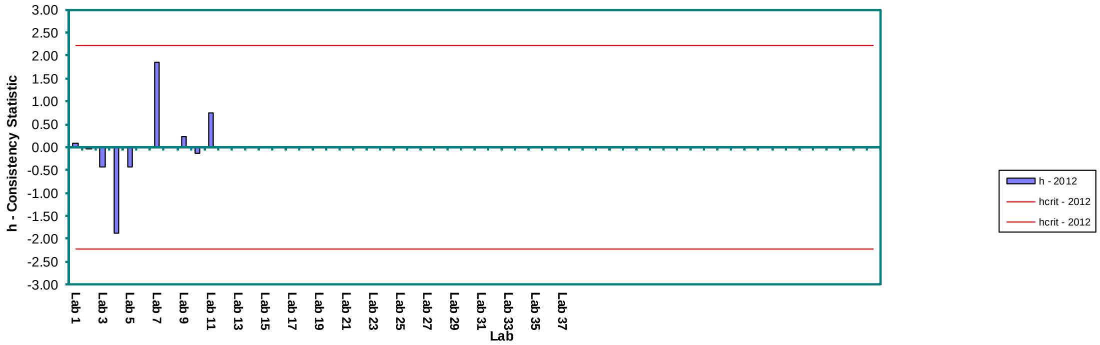
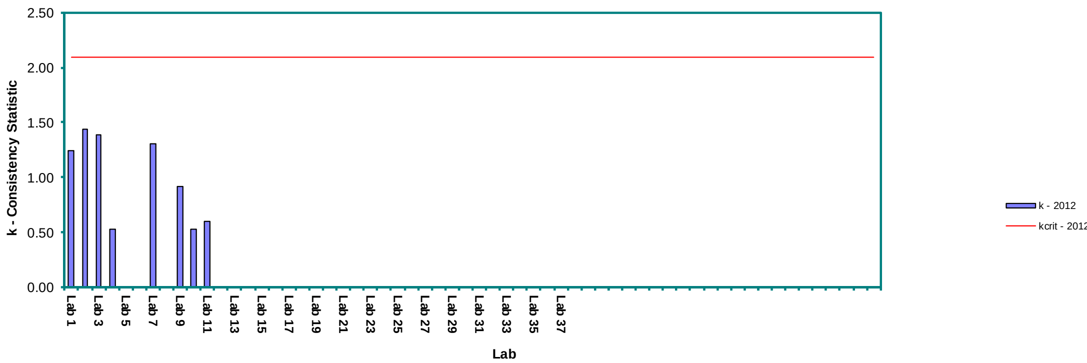
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	0.3073	r = 2.8 s_r =	0.0080	h_{crit} =	2.23
	Maximum X_{ave}	0.3297	R = 2.8 s_R =	0.0178	h_{crit} =	-2.23
	Check s_{Xave} =	0.0060			k_{crit} =	2.09

Where: $x_1....x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation		h =	Betw een Laboratory Consistency Statistic
p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
523 - BBR Creep Stiffness @ - 24°C, 60s
2012

Data				
n =	3	$(X_{ave})_{ave}$ =	348.3704	s_r =	8.0462	Check s_{Xave} =	14.8702
p =	9	s_{Xave} =	14.8702	s_{R*} =	16.2568	r = 2.8 s_r =	22.3028
Significance Level =		0.5%		s_R =	16.2568	R = 2.8 s_R =	45.0616

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	359.0000	370.0000	334.0000		354.3333	18.4481	5.9630	340.3333	0.40	2.29	2.23	-2.23	2.09
Lab 2	343.0000	345.0000	341.0000		343.0000	2.0000	-5.3704	4.0000	-0.36	0.25	2.23	-2.23	2.09
Lab 3	339.0000	338.0000	346.0000		341.0000	4.3589	-7.3704	19.0000	-0.50	0.54	2.23	-2.23	2.09
Lab 4	376.0000	378.0000	372.0000		375.3333	3.0551	26.9630	9.3333	1.81	0.38	2.23	-2.23	2.09
Lab 5	341.0000	334.0000	333.0000		336.0000	4.3589	-12.3704	19.0000	-0.83	0.54	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	366.0000	373.0000	365.0000		368.0000	4.3589	19.6296	19.0000	1.32	0.54	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	337.0000	332.0000	335.0000		334.6667	2.5166	-13.7037	6.3333	-0.92	0.31	2.23	-2.23	2.09
Lab 10	341.0000	360.0000	345.0000		348.6667	10.0167	0.2963	100.3333	0.02	1.24	2.23	-2.23	2.09
Lab 11	343.0000	333.0000	327.0000		334.3333	8.0829	-14.0370	65.3333	-0.94	1.00	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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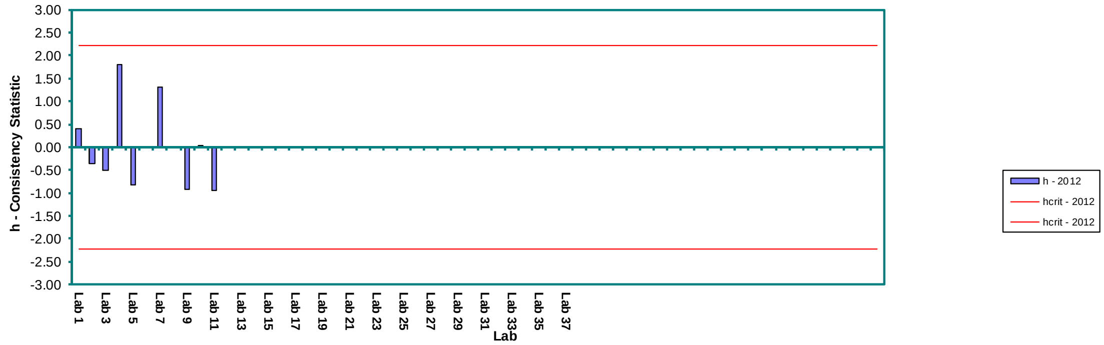
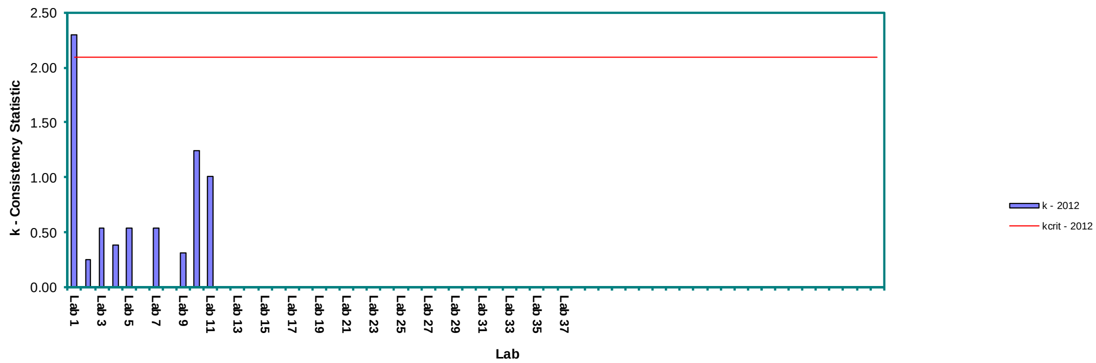
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	334.3333	r = 2.8 s_r =	22.3028	h_{crit} =	2.23
	Maximum X_{ave}	375.3333	R = 2.8 s_R =	45.0616	h_{crit} =	-2.23
	Check s_{Xave} =	14.8702			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
s =	Cell Standard Deviation	s_{R*} =	Interim Reproducibility Standard Deviation
d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)	s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 \ldots x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility

500 - SHRP
524 - BBR Slope, m, @ -24°C, 60s
2012

Data			
n =	3	$(X_{ave})_{ave}$ =	0.2737
p =	9	s_{Xave} =	0.0054
Significance Level =		0.5%	
s_r =	0.0041	Check s_{Xave} =	0.0054
s_{R*} =	0.0063	$r = 2.8\ s_r$ =	0.0113
s_R =	0.0063	$R = 2.8\ s_R$ =	0.0175

Lab #	x_1	x_2	x_3	x_4	X_{ave}	s	d	s^2	h - 2012	k - 2012	hcrit - 2012	hcrit - 2012	kcrit - 2012
Lab 1	0.2790	0.2810	0.2760		0.2787	0.0025	0.0050	0.0000	0.92	0.62	2.23	-2.23	2.09
Lab 2	0.2760	0.2680	0.2870		0.2770	0.0095	0.0033	0.0001	0.61	2.34	2.23	-2.23	2.09
Lab 3	0.2730	0.2740	0.2730		0.2733	0.0006	-0.0004	0.0000	-0.07	0.14	2.23	-2.23	2.09
Lab 4	0.2650	0.2610	0.2630		0.2630	0.0020	-0.0107	0.0000	-1.99	0.49	2.23	-2.23	2.09
Lab 5	0.2750	0.2680	0.2710		0.2713	0.0035	-0.0024	0.0000	-0.44	0.86	2.23	-2.23	2.09
Lab 6											2.23	-2.23	2.09
Lab 7	0.2820	0.2810	0.2820		0.2817	0.0006	0.0080	0.0000	1.48	0.14	2.23	-2.23	2.09
Lab 8											2.23	-2.23	2.09
Lab 9	0.2740	0.2720	0.2740		0.2733	0.0012	-0.0004	0.0000	-0.07	0.28	2.23	-2.23	2.09
Lab 10	0.2740	0.2740	0.2760		0.2747	0.0012	0.0010	0.0000	0.18	0.28	2.23	-2.23	2.09
Lab 11	0.2720	0.2750	0.2640		0.2703	0.0057	-0.0034	0.0000	-0.63	1.40	2.23	-2.23	2.09
Lab 12											2.23	-2.23	2.09
Lab 13											2.23	-2.23	2.09
Lab 14											2.23	-2.23	2.09
Lab 15											2.23	-2.23	2.09
Lab 16											2.23	-2.23	2.09
Lab 17											2.23	-2.23	2.09
Lab 18											2.23	-2.23	2.09
Lab 19											2.23	-2.23	2.09
Lab 20											2.23	-2.23	2.09
Lab 21											2.23	-2.23	2.09
Lab 22											2.23	-2.23	2.09
Lab 23											2.23	-2.23	2.09
Lab 24											2.23	-2.23	2.09
Lab 25											2.23	-2.23	2.09
Lab 26											2.23	-2.23	2.09
Lab 27											2.23	-2.23	2.09
Lab 28											2.23	-2.23	2.09
Lab 29											2.23	-2.23	2.09
Lab 30											2.23	-2.23	2.09
Lab 31											2.23	-2.23	2.09
Lab 32											2.23	-2.23	2.09
Lab 33											2.23	-2.23	2.09
Lab 34											2.23	-2.23	2.09
Lab 35											2.23	-2.23	2.09
Lab 36											2.23	-2.23	2.09
Lab 37											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
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											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09
											2.23	-2.23	2.09

Additional Statistics						
	Minimum X_{ave}	0.2630	$r = 2.8\ s_r$ =	0.0113	h_{crit} =	2.23
	Maximum X_{ave}	0.2817	$R = 2.8\ s_R$ =	0.0175	h_{crit} =	-2.23
	Check s_{Xave} =	0.0054			k_{crit} =	2.09

Where:		Where:	
$x_1....x_n$ =	Individual Test Result	$(X_{ave})_{ave}$ =	Average of Cell Averages
X_{ave} =	Cell Average	s_{Xave} =	Standard Deviation of Cell Averages
n =	Number of Test Results per Cell	s_r =	Repeatability Standard Deviation
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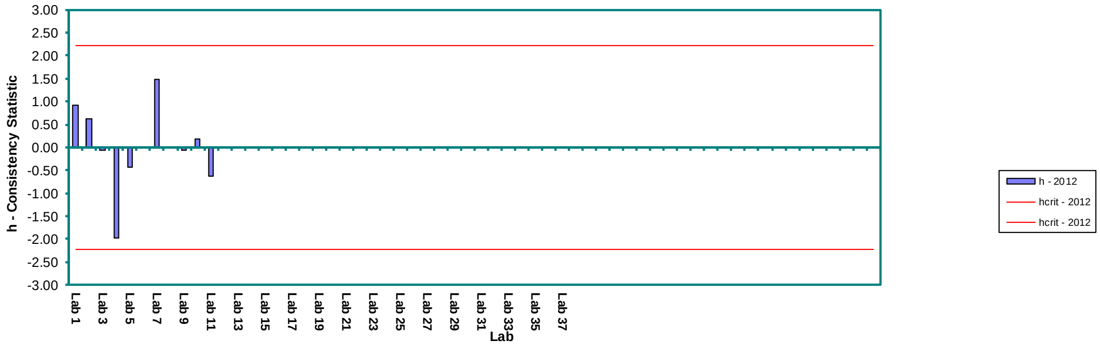
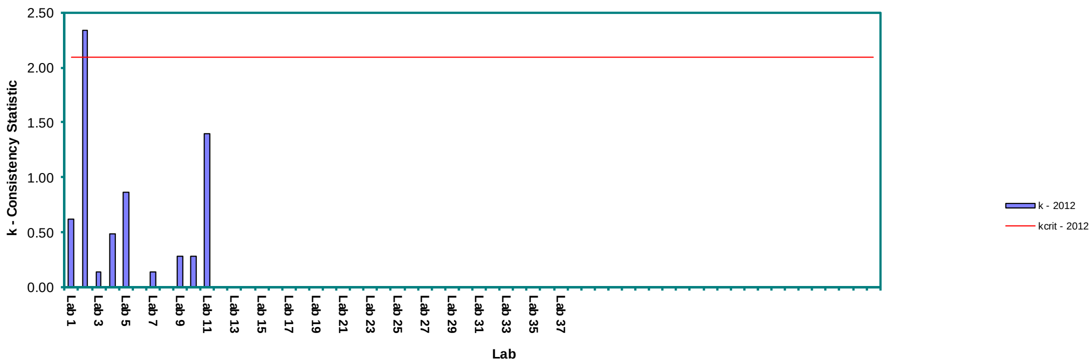
s^2 =	Cell Variation	h =	Between Laboratory Consistency Statistic
p =	Number of Laboratories	k =	Within Laboratory Consistency Statistic





Where:	$x_1 .... x_n$ =	Individual Test Result	Where:	$(X_{ave})_{ave}$ =	Average of Cell Averages
	X_{ave} =	Cell Average		s_{Xave} =	Standard Deviation of Cell Averages
	n =	Number of Test Results per Cell		s_r =	Repeatability Standard Deviation
	s =	Cell Standard Deviation		s_{R*} =	Interim Reproducibility Standard Deviation
	d =	Cell Deviation (X_{ave} - $(X_{ave})_{ave}$)		s_R =	Reproducibility Standard Deviation (Larger of s_r and s_{R*})
	s^2 =	Cell Variation		h =	Between Laboratory Consistency Statistic
	p =	Number of Laboratories		k =	Within Laboratory Consistency Statistic
	h_{crit} =	Critical Between Laboratory Consistency Statistic		r =	95% Confidence Limit for Repeatability
	k_{crit} =	Critical Within Laboratory Consistency Statistic		R =	95% Confidence Limit for Reproducibility