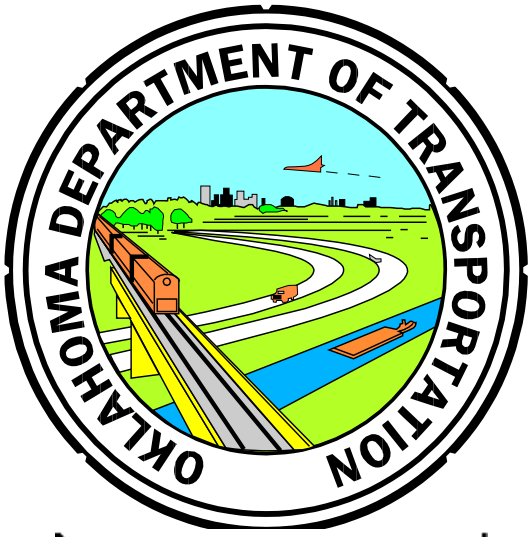


MATERIALS DIVISON

2011
Asphalt Mix
OMRL Report

Sample Numbers
45 & 46

OKLAHOMA DEPARTMENT OF TRANSPORTATION

200 Northeast 21st Street

Oklahoma City, OK 73105-3204

July 27, 2011

TO: Participants in the OMRL Asphalt Mix Proficiency Sample Program

FROM: Materials Division

SUBJECT: Final Report for OMRL Asphalt Mix Proficiency Samples # 45 and # 46

This letter and the accompanying tables and graphical plots constitute the final report for OMRL Asphalt Mix Proficiency Samples # 45 and # 46.

The proficiency samples were prepared in the laboratory. The samples were distributed for testing to March 17, 2011. Results were received from 82 laboratories. Results received after the closing date but prior to the report date were included in the final report.

All data was processed as received. Averages, standard deviations, and coefficients of variations were computed from the data. A rating of "NA" was assigned to any pair of test results in which either result was reported as missing or was found to be an outlier. Outliers were determined according to NCHRP Project 09-26. See Appendix A and B of that report for details of outlier determination. Appendix A of this report shows the actual criterion used for each test characteristic to identify outlier data. The outlier method used in NCHRP Project 09-26 was adopted in 2005 and used in previous reports for information only.

The analysis of the data included in this report consists of the following:

1. Summary table of results for both samples.
2. General scatter diagrams (Youden plots).
3. Table of results for individual laboratories.
4. Yearly performance charts (paired plots) for individual laboratories.
5. Appendix A, outlier criterion tables for each characteristic.

A table of results was produced for each laboratory. Column 1 of the table gives the test title. Column 2 and 3 show the test data submitted by the laboratory. “NA” in either one of these columns indicates that invalid or missing data was supplied by the laboratory. Columns 4 and 5 indicate the average values for each test. Columns 6 and 7 show the laboratory’s ratings based on the following scale:

Rating 5 data within 1.0 standard deviation of the mean
Rating 4 data within 1.5 standard deviation of the mean
Rating 3 data within 2.0 standard deviation of the mean
Rating 2 data within 2.5 standard deviation of the mean
Rating 1 data within 3.0 standard deviation of the mean
Rating 0 data 3.0 or more standard deviations from the mean

A negative sign with rating 1 through 5 indicates a result below the mean; a positive number indicates a result above the mean. An “NA” in this column indicates that valid data was not supplied by the laboratory. A rating less than 3 is considered a low rating. Significance need not necessarily be attached to a single low rating or pair of low ratings, however, a continuing tendency to get low ratings should lead a laboratory to reexamine its equipment and procedures for this test.

A summary table of results was produced for the sample set. The summary table provides the statistics for each test property or characteristic analyzed both before and after the removal of outlier data. Column 1 of the table gives the test description. Column 2 indicates the number of laboratories with no missing data for either sample and those excluded from the analysis by the outlier criterion in Appendix A. Column 3, 4 and 5 indicate the average or mean result, the standard deviation for the first sample, and the coefficient of variation for the first sample. Columns 6, 7, and 8 indicate the average or mean result, the standard deviation for the first sample, and the coefficient of variation for the second sample.

A set of general scatter diagrams or Youden plots was produced for this report. The points on the diagram are located by plotting the test value reported for sample # 46 from a given laboratory on the vertical axis, against the test value reported for sample # 45 by the same laboratory on the horizontal axis. The axes are labeled with the sample numbers. The horizontal and vertical scale limits used in plotting are generally three standard deviations on either side of the mean. The upper limit is set to 100 if the limit exceeds 100. The lower limit is set to 95 if it is equal to 100.

The horizontal red line and the vertical red line represent the mean or average values for the results on sample # 45 and sample #46, respectively. The values for the mean, standard deviation, and coefficient of variation for each sample is tabulated below the diagram. The laboratories eliminated from the statistical calculations based on outlier criterion in Appendix A are shown on the last line.

Yearly performance charts were produced for each laboratory. These charts will enable a comparison to be made of all the test results reported by the laboratory. The points on the comparison chart are located by plotting the normal deviate of each test performed on the vertical axis, by the pair number of the test set on the horizontal axis.

The first set of specimens was sent out in 1987. These specimens were labeled sample number 1 and sample number 2. Pair number 1 shown on the graph indicates the first pair plotted. The last pair shown indicates the last pair of results. These are the results for sample #45 and sample #46. The title of the graph indicates which pair sets are being plotted. For each sample pair plotted, the symbol “x” represents the odd numbered sample of the pair and symbol “o” represents the even numbered sample.

The normal deviate is computed for each test result of each test performed up to 10 years or 10 pairs. It is computed by subtracting the test result of each sample number from the overall average of test results for that sample number and dividing by the standard deviation of that sample number.

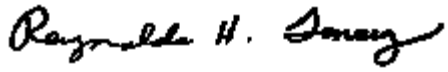
A graphic representation of within-laboratory precision is given in the length of the vertical lines connecting each of the sample pairs. The closer a pair of symbols for a given sample pair, the better the laboratory’s repeatability. Conversely, the farther apart the symbols the greater the laboratory’s random error.

The lines connecting the midpoints between each pair of symbols show the trend in the laboratories performance over the period of time covered by the chart. Midpoints between consecutive pairs are connected with a solid line.

Ideally, a laboratory should have all symbols directly on the center line, thus demonstrating exceptional precision and accuracy of testing. Generally speaking, points within 2 normal deviates of the center line are probably acceptable, and a normal deviate of more than 2 may indicate a problem.

Laboratories listed on the Materials & Testing e-Guide Qualified Labs List are required to submit nonconformity reports for each sample and each rating of 2, 1, 0, -1, and -2 for each test characteristic. Due to the statistical method used, both samples may receive a rating of 0 that requires a response for that test characteristic. Recompute both sample's rating in the response form to determine if both require a response. Nonconformity response forms are not required for the ½" sieve ratings as the standard deviations are very small. The Qualified Labs List may be found at: http://www.okladot.state.ok.us/materials/htm-smap/11069.htm The nonconformity response form may be found at: http://www.okladot.state.ok.us/materials/omrlinfo.htm Nonconformity response forms should be submitted within 45 days of this report. Supporting documentation for any calibrations or equipment purchases to address low ratings should be included with the response forms.

If you have any questions concerning this report, please do not hesitate to contact me.



Reynolds H. Toney, P.E.
Materials Engineer

cc: Division Construction Engineers
Director of Operations
Construction Engineer
Materials Engineer
Assistant Materials Engineer
Bituminous Engineer
Asphalt Design Lab Supervisor
FHWA

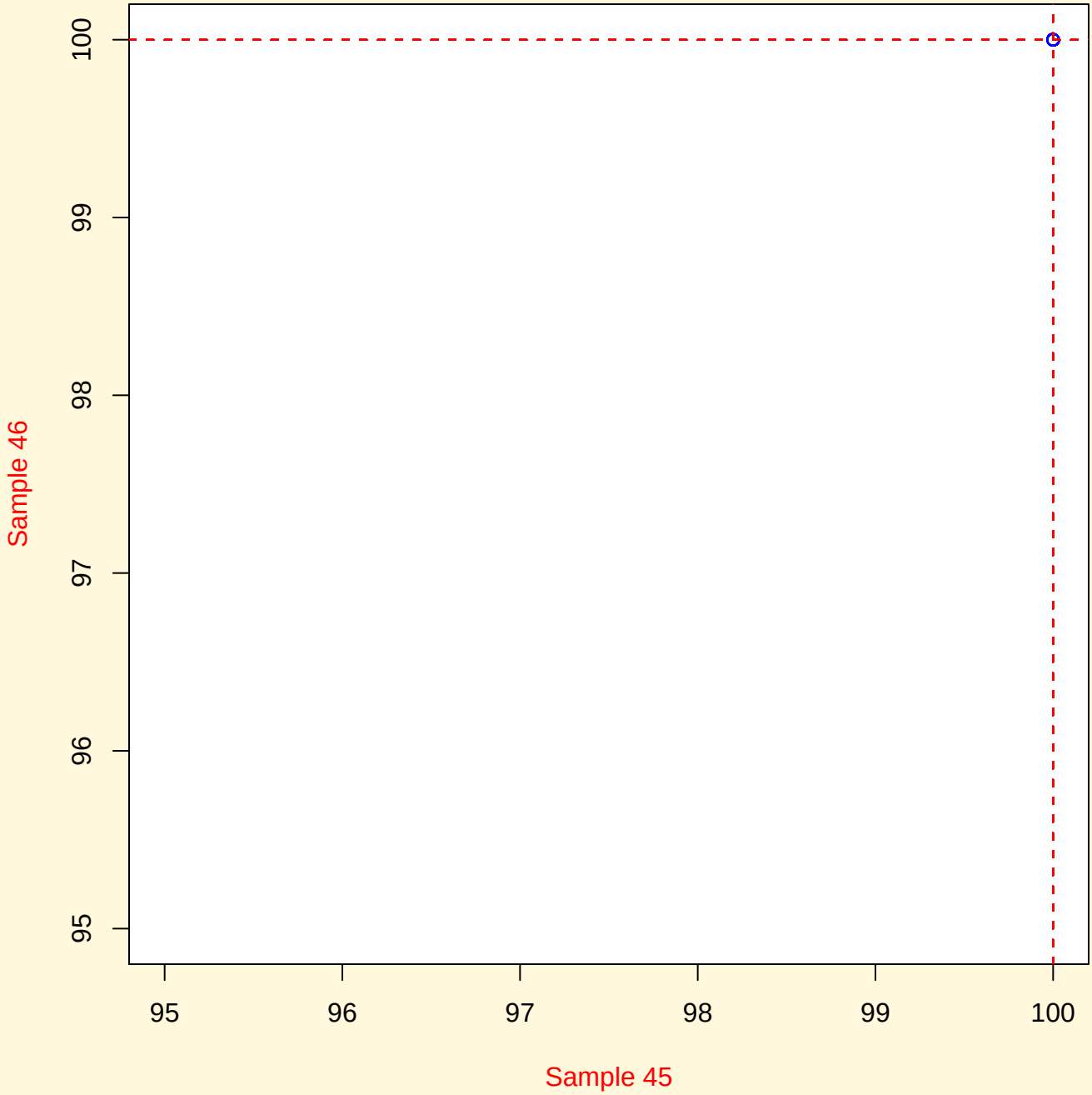
OMRL Asphalt Mix Proficiency Sample Program
Final Report - Summary Table

Asphalt Mix Proficiency Samples		Sample Number 45			Sample Number 46		
Test Description	**No. of Labs**	**AVG.**	**Standard Deviation**	**Coeff. of Variation**	**AVG.**	**Standard Deviation**	**Coeff. of Variation**
AASHTO T 30 - Analysis of Extracted Aggregate: (1) Total Percent Passing 3/4" Sieve (%)	82	100.0	0.0	0.0	100.0	0.0	0.0
	82	100.0	0.0	0.0	100.0	0.0	0.0
(2) Total Percent Passing 1/2" Sieve (%)	82	99.4	0.6	0.6	99.4	0.5	0.5
	79	99.5	0.5	0.5	99.5	0.5	0.5
(3) Total Percent Passing 3/8" (%)	82	85.4	2.1	2.4	84.9	2.7	3.2
	82	85.4	2.1	2.4	84.9	2.7	3.2
(4) Total Percent Passing No. 4 Sieve (%)	82	49.7	2.8	5.7	49.2	3.3	6.6
	81	49.7	2.8	5.6	49.1	3.0	6.0
(5) Total- Percent Passing No. 8 Sieve (%)	82	35.4	2.0	5.6	34.8	2.6	7.4
	82	35.4	2.0	5.6	34.8	2.6	7.4
(6) Total Percent Passing No. 16 Sieve (%)	82	32.2	29.1	90.5	28.5	2.0	6.9
	79	28.9	1.4	5.0	28.4	1.8	6.2
(7) Total Percent Passing No. 30 Sieve (%)	82	23.5	1.2	5.3	23.3	1.5	6.6
	80	23.4	1.1	4.6	23.2	1.3	5.7
(8) Total Percent Passing No. 50 Sieve (%)	82	14.3	0.9	6.1	14.7	0.9	6.0
	80	14.3	0.7	5.1	14.6	0.7	5.0
(9) Total Percent Passing No. 100 Sieve (%)	82	6.5	0.8	11.6	6.7	0.7	10.0
	80	6.4	0.5	7.2	6.6	0.5	7.7
(10) Total Percent Passing No. 200 Sieve (%)	82	2.83	0.63	22.13	2.96	0.63	21.26
	78	2.76	0.28	10.13	2.87	0.30	10.35
OHD L-26 - Asphalt Content (Method A): (11) Ignition Oven Loss (%AC)	82	4.43	0.16	3.62	4.40	0.21	4.81
	82	4.43	0.16	3.62	4.40	0.21	4.81
AASHTO T 209 - Theoretical Max. Specific Gravity: (12) Avg. Rices Gravity (G_{mm})	82	2.499	0.010	0.386	2.498	0.009	0.343
	82	2.499	0.010	0.386	2.498	0.009	0.343
OHD L-14 - Bulk Specific Gravity (Method B): (13) Avg. SGC Bulk Specific Gravity (G_{mb})	80	2.428	0.008	0.349	2.430	0.013	0.516
	77	2.428	0.008	0.344	2.431	0.008	0.344
OHD L-45 - CoreLok™ Bulk Specific Gravity: (14) Avg. SGC Bulk Specific Gravity (G_{mb})	70	2.429	0.118	4.857	2.414	0.023	0.967
	65	2.415	0.014	0.599	2.418	0.014	0.570
OHD L-14 - Percent Absorption: (15) Avg. SGC Absorption (%)	80	0.32	0.31	95.70	0.32	0.34	105.27
	78	0.29	0.14	49.96	0.28	0.15	52.49

NOTE: The shaded rows show results after removing outlying data.

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing 3/4 inch Sieve

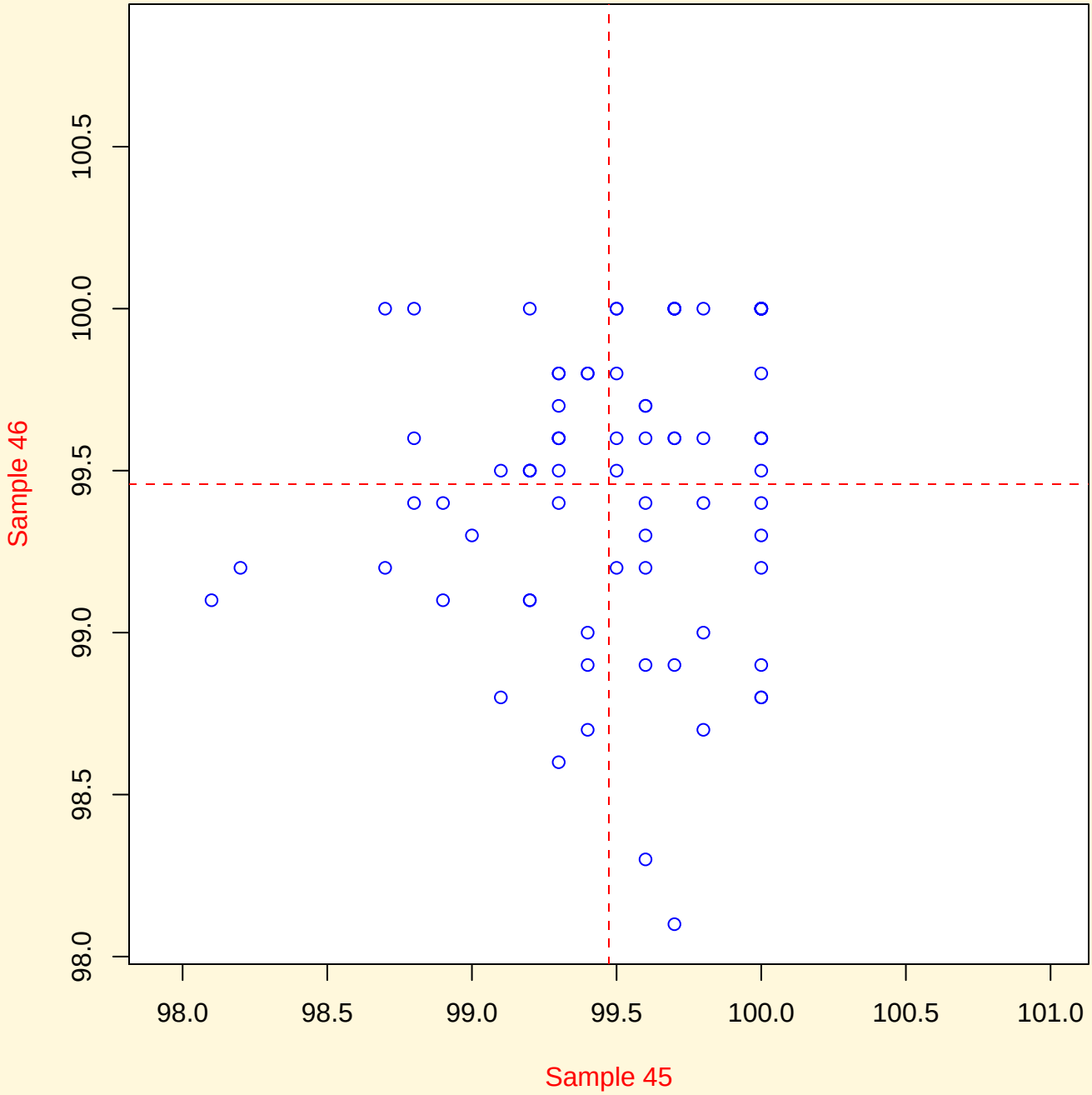


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	100.0	0.0	0.0
46	100.0	0.0	0.0

Outlier Lab Nos. –

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing 1/2 inch Sieve

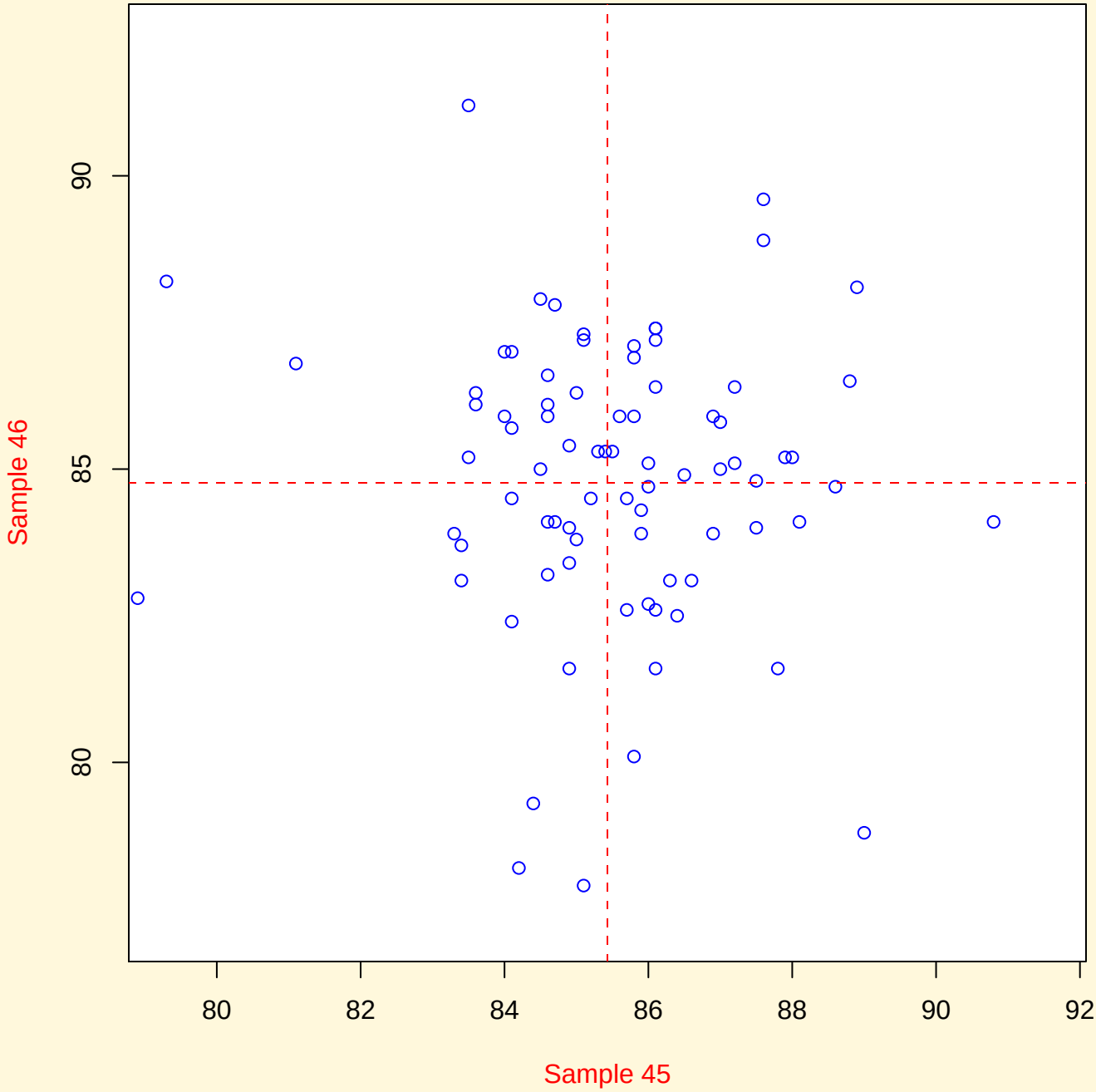


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	99.5	0.5	0.5
46	99.5	0.5	0.5

Outlier Lab Nos. – 8, 23, 114

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing 3/8 inch Sieve

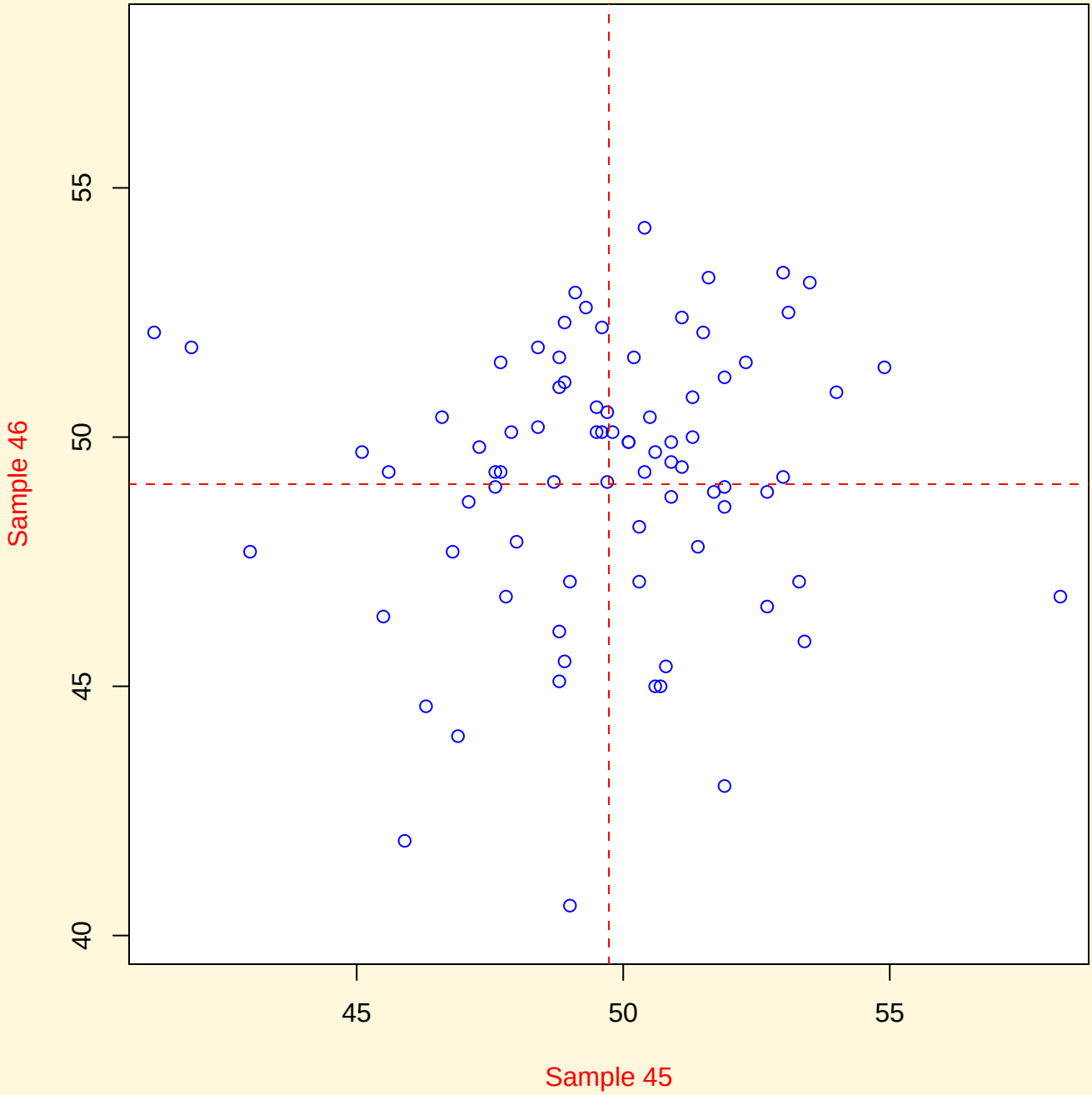


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	85.4	2.1	2.4
46	84.8	2.5	3.0

Outlier Lab Nos. –

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 4 Sieve

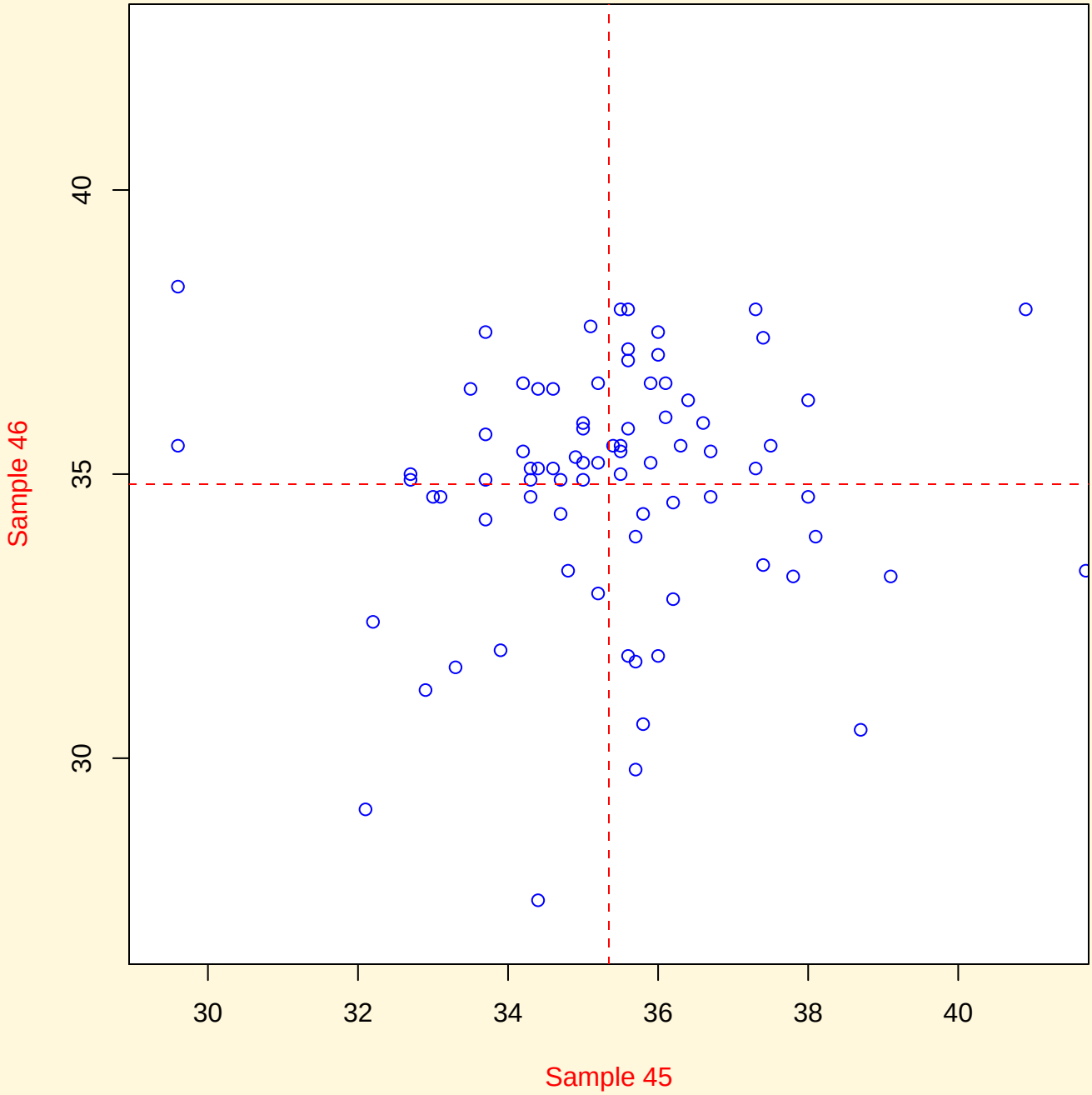


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	49.7	2.8	5.6
46	49.1	3.0	6.1

Outlier Lab Nos. – 109

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 8 Sieve

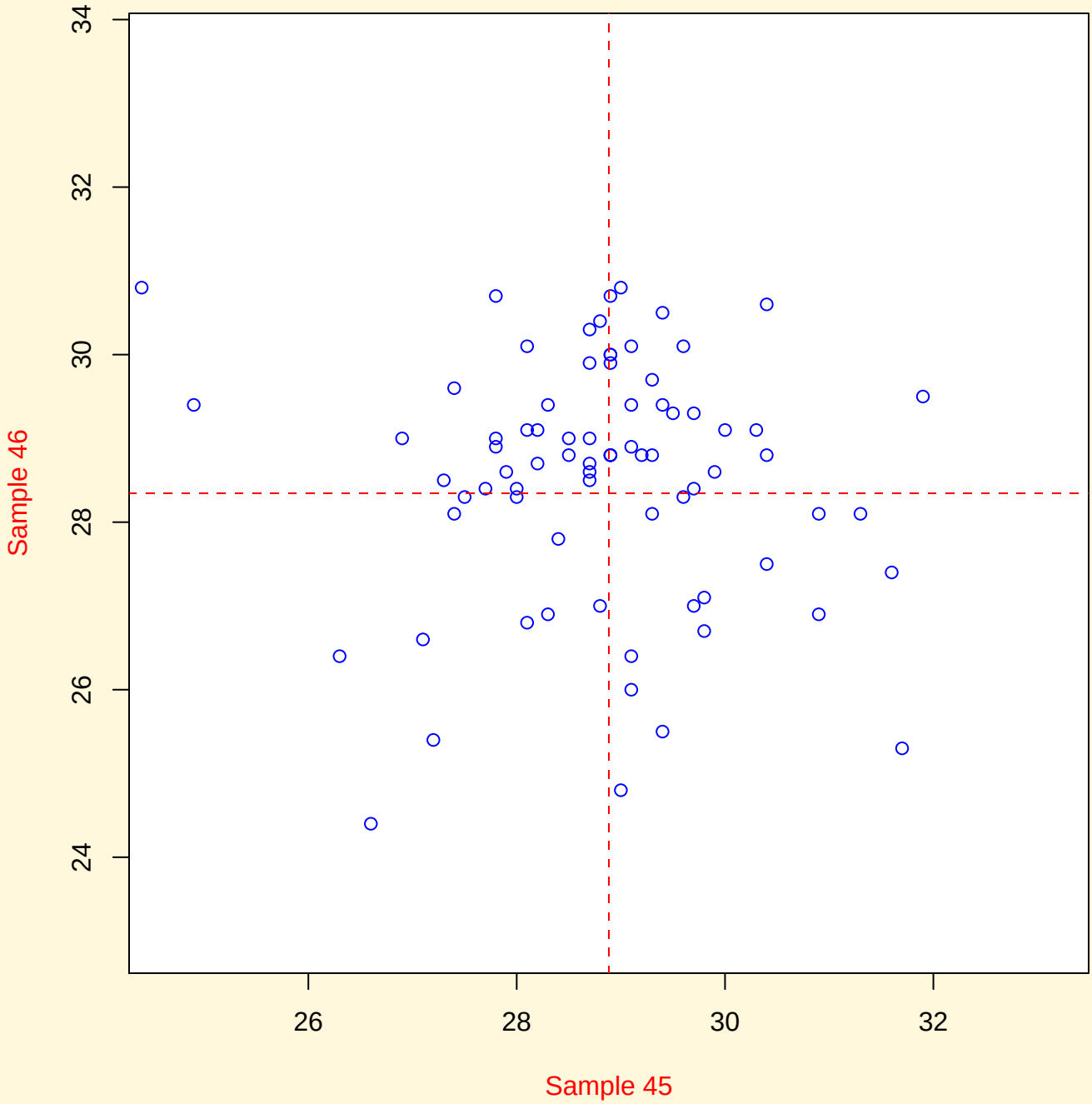


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	35.3	2.0	5.6
46	34.8	2.6	7.5

Outlier Lab Nos. –

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 16 Sieve

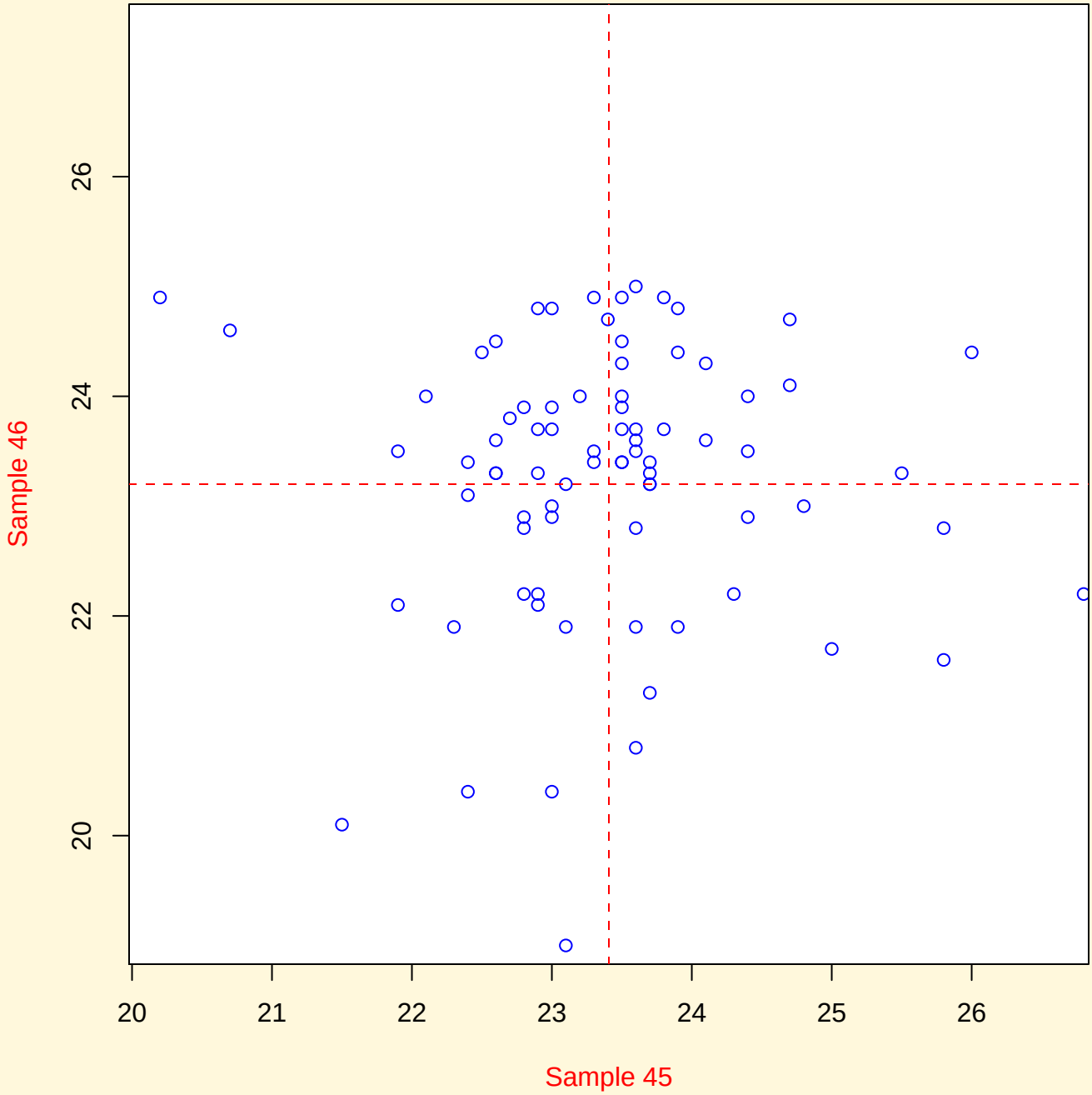


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	28.9	1.4	4.9
46	28.3	1.8	6.2

Outlier Lab Nos. – 89, 109

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 30 Sieve

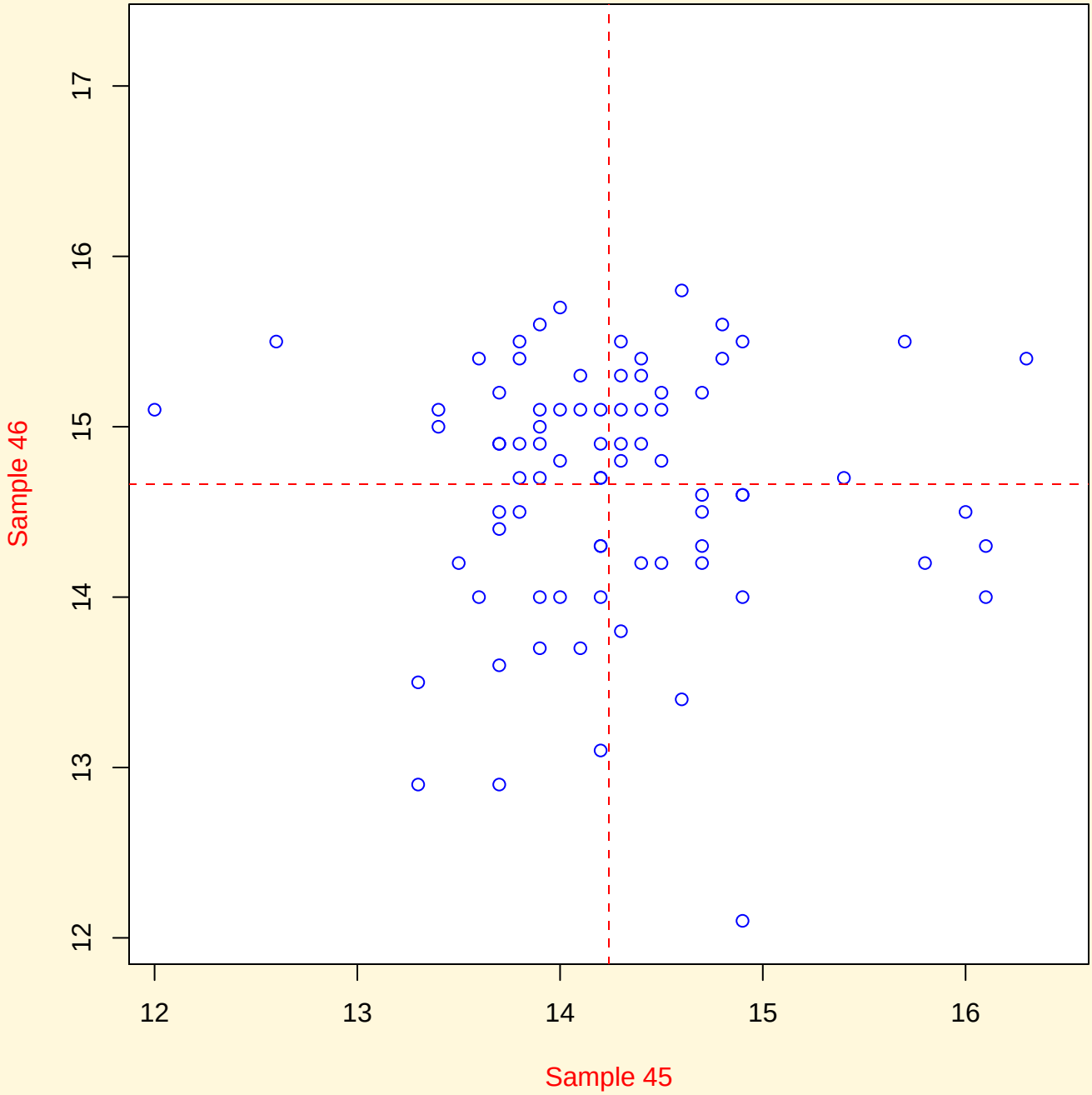


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	23.4	1.1	4.5
46	23.2	1.3	5.8

Outlier Lab Nos. – 89, 109

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 50 Sieve

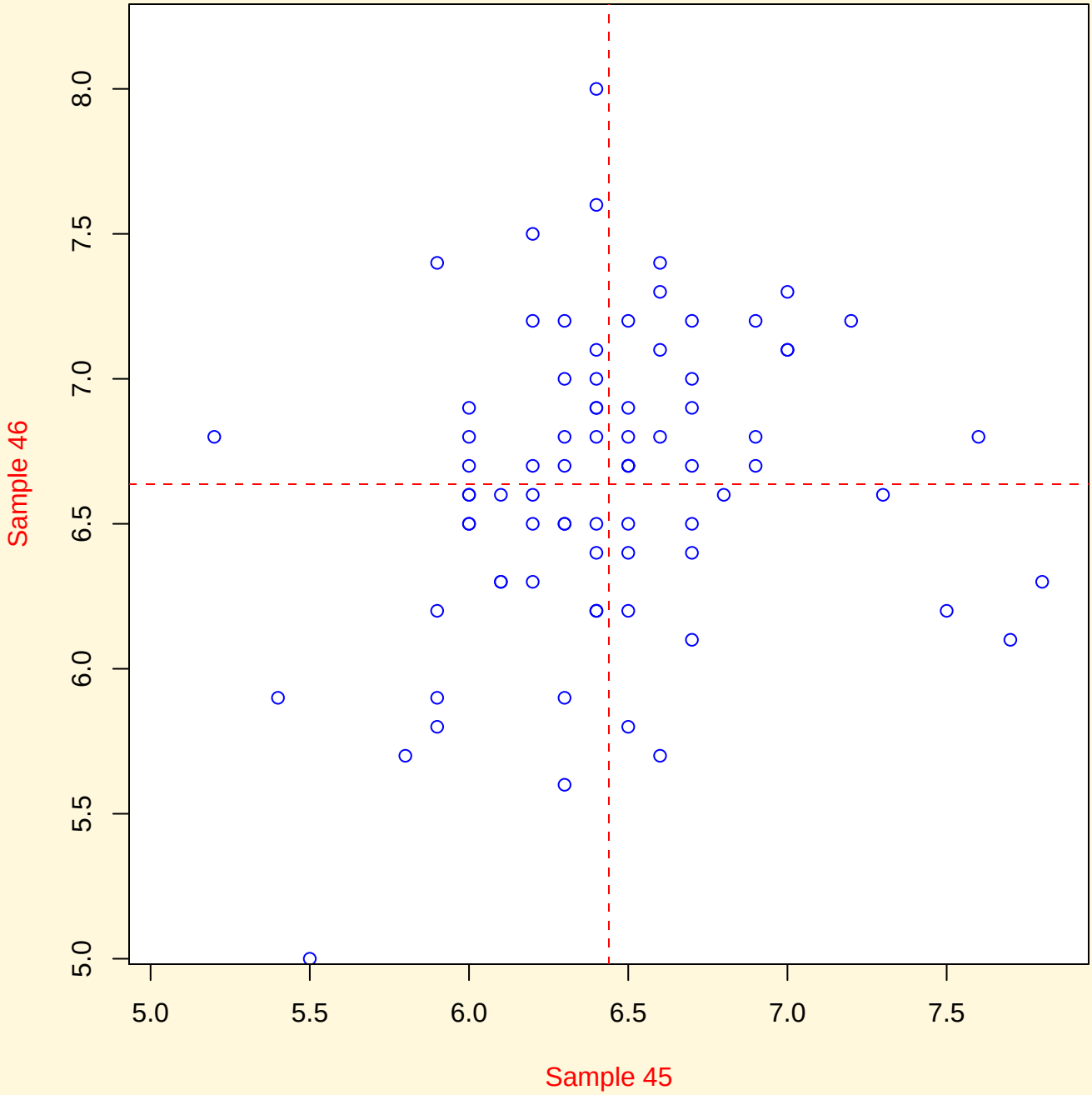


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	14.2	0.7	5.1
46	14.7	0.9	5.9

Outlier Lab Nos. – 89

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 100 Sieve

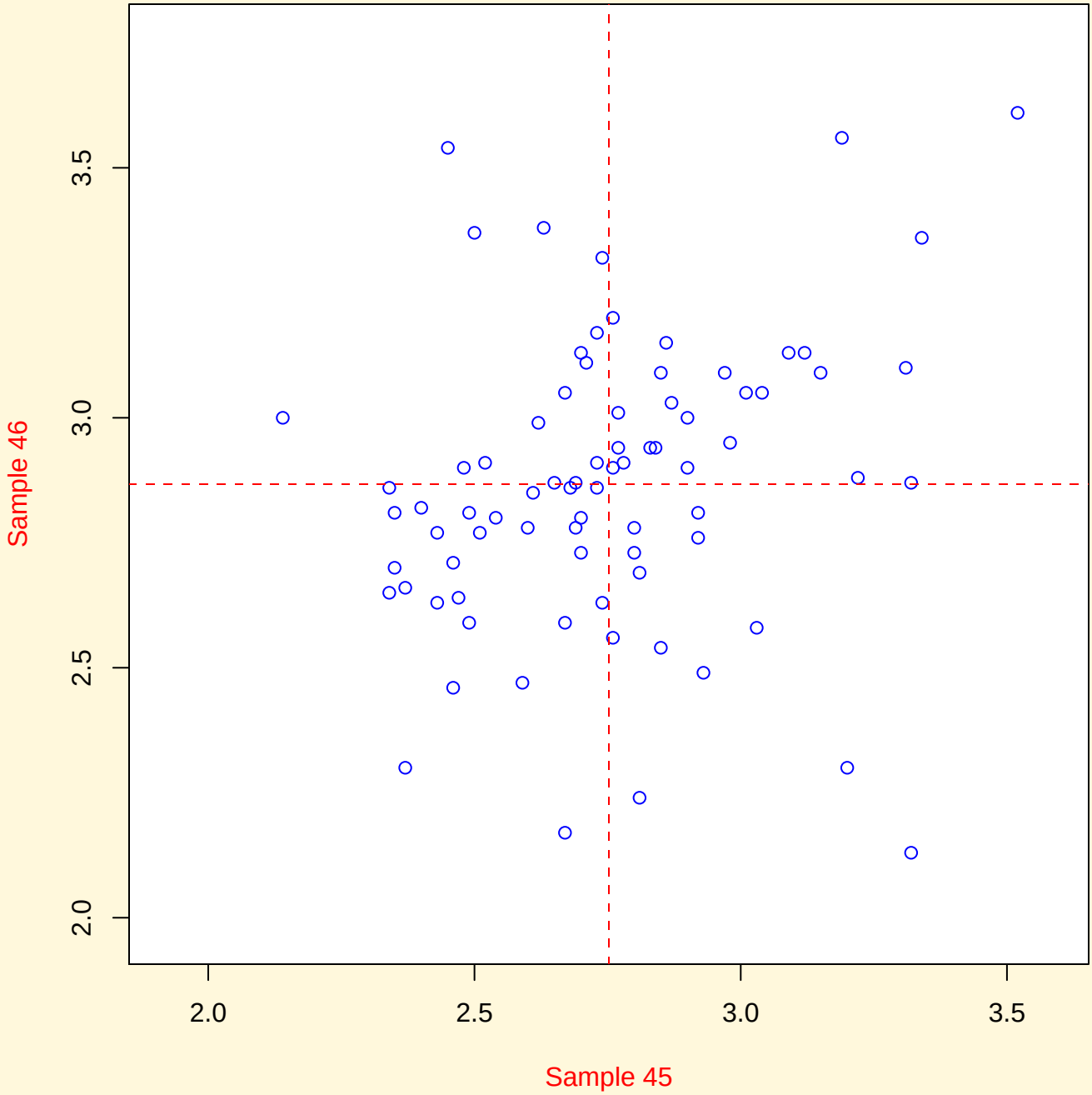


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	6.4	0.5	7.2
46	6.6	0.5	7.7

Outlier Lab Nos. – 89, 68, 25

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Passing No. 200 Sieve

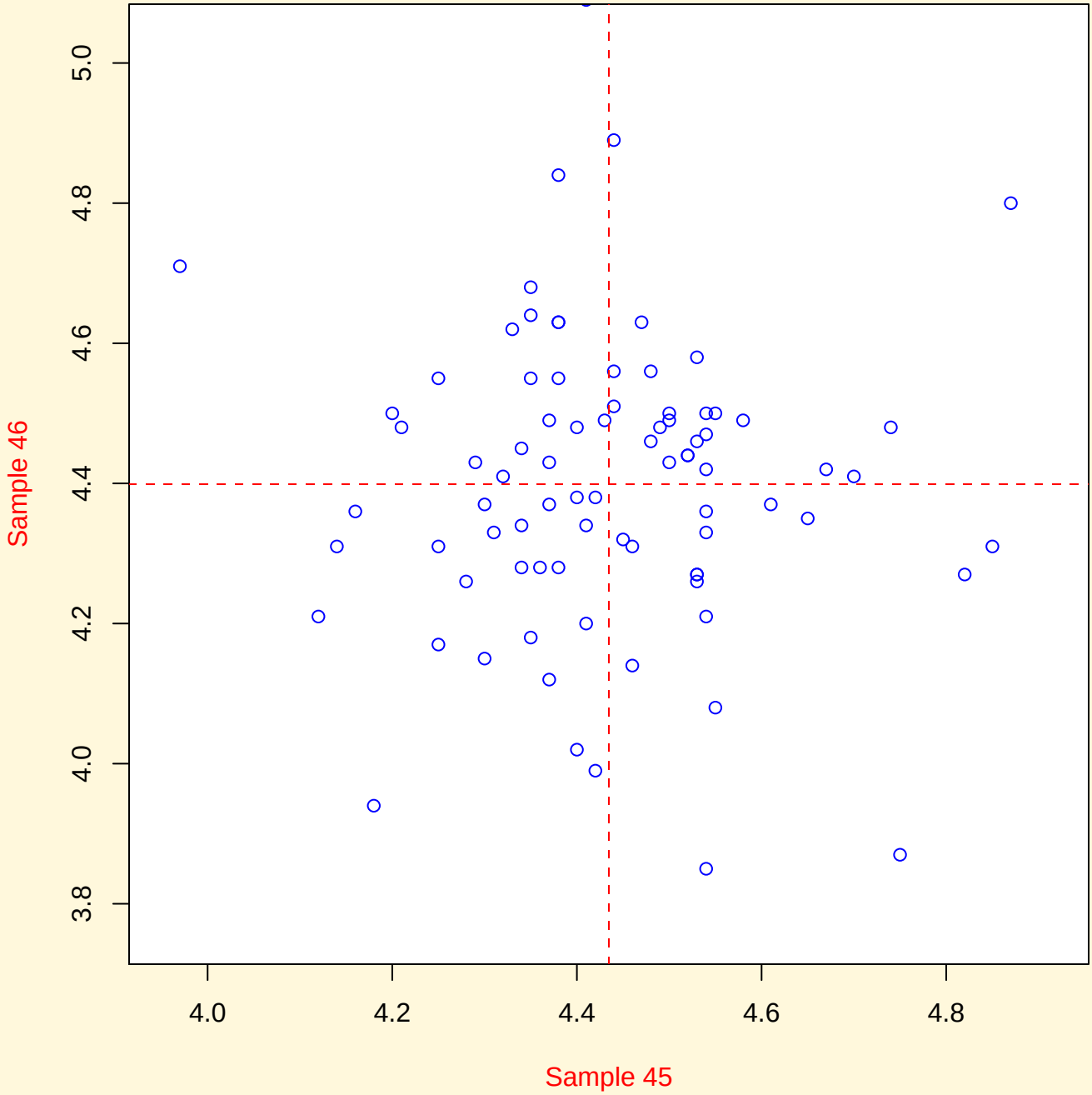


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	2.75	0.28	10.10
46	2.87	0.30	10.34

Outlier Lab Nos. – 45, 89, 114

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Asphalt Content (Ignition Oven)

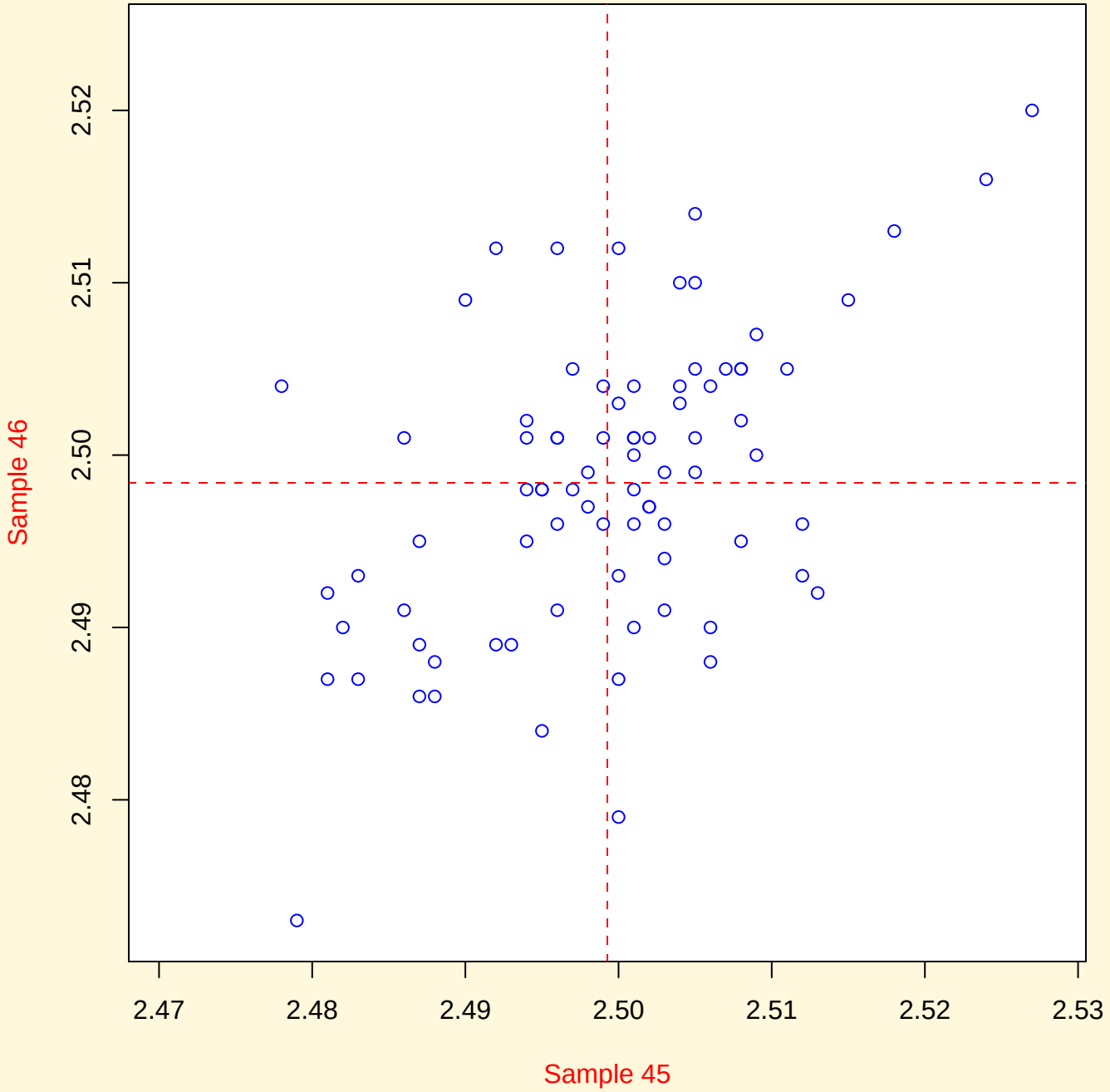


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	4.43	0.16	3.62
46	4.40	0.21	4.81

Outlier Lab Nos. –

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Rices Specific Gravity

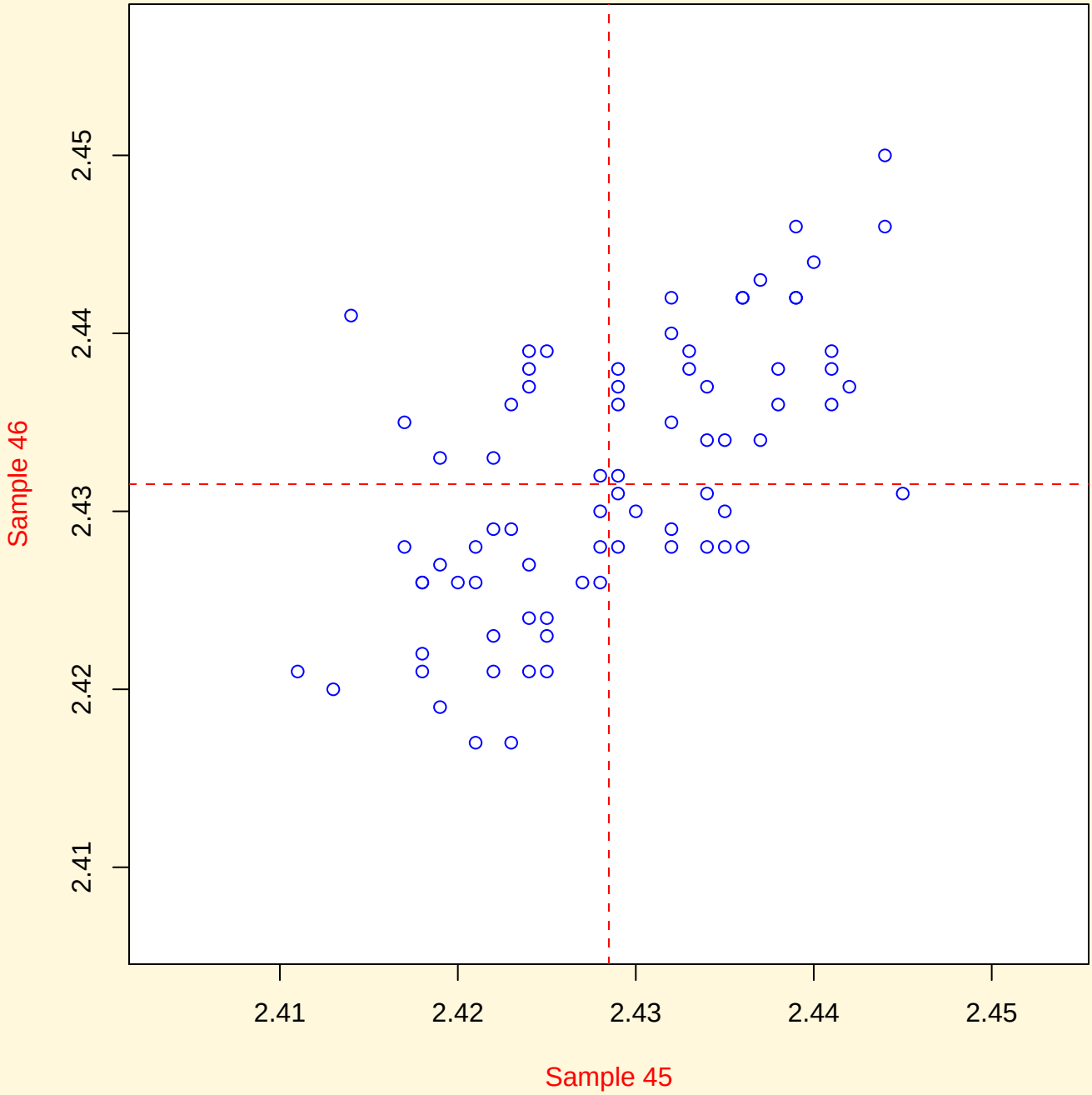


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	2.499	0.010	0.386
46	2.498	0.009	0.343

Outlier Lab Nos. –

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

SGC Specific Gravity

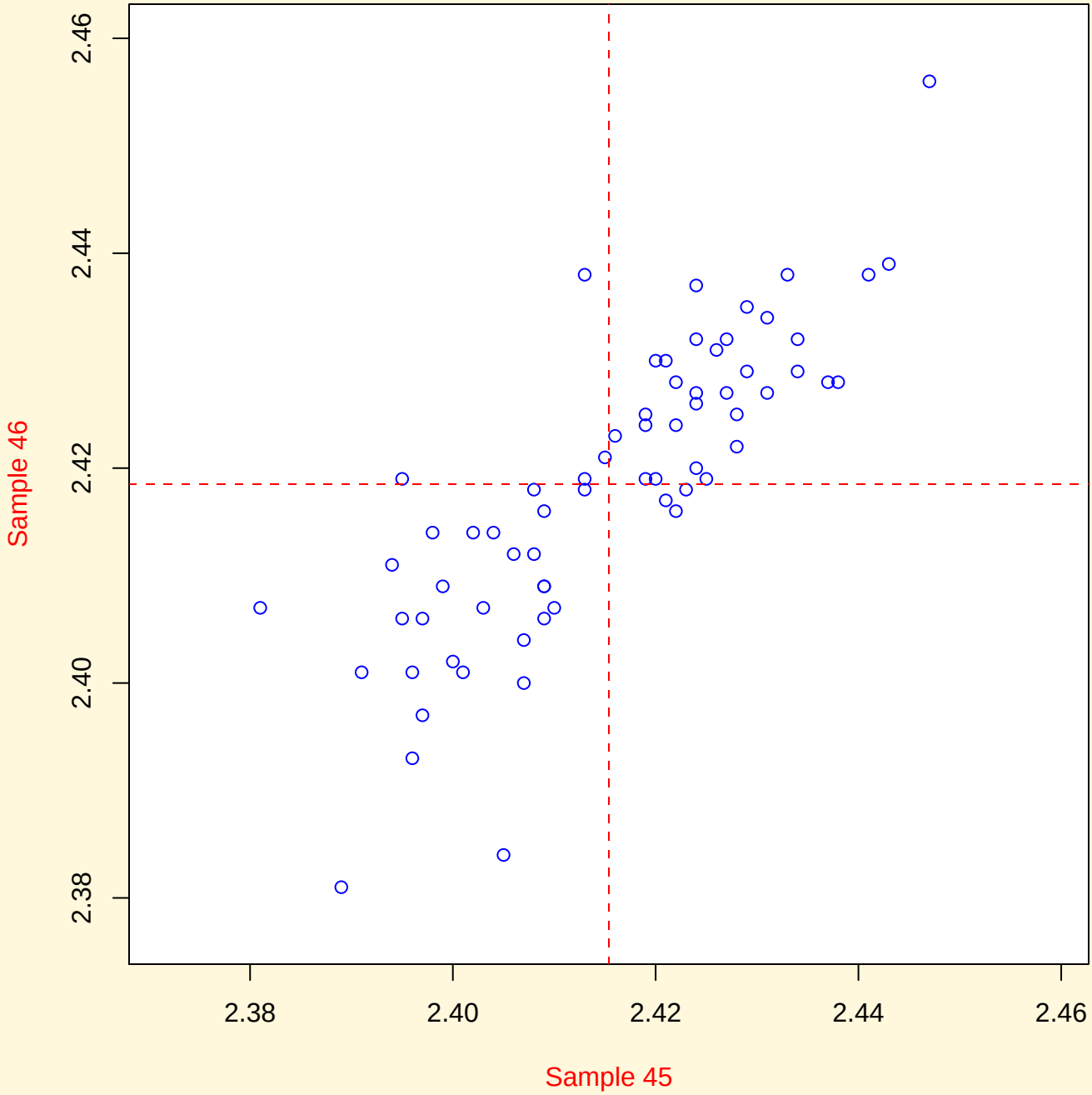


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	2.428	0.008	0.343
46	2.432	0.008	0.342

Outlier Lab Nos. – 5, 80, 89

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

SGC Specific Gravity−OHD L−45

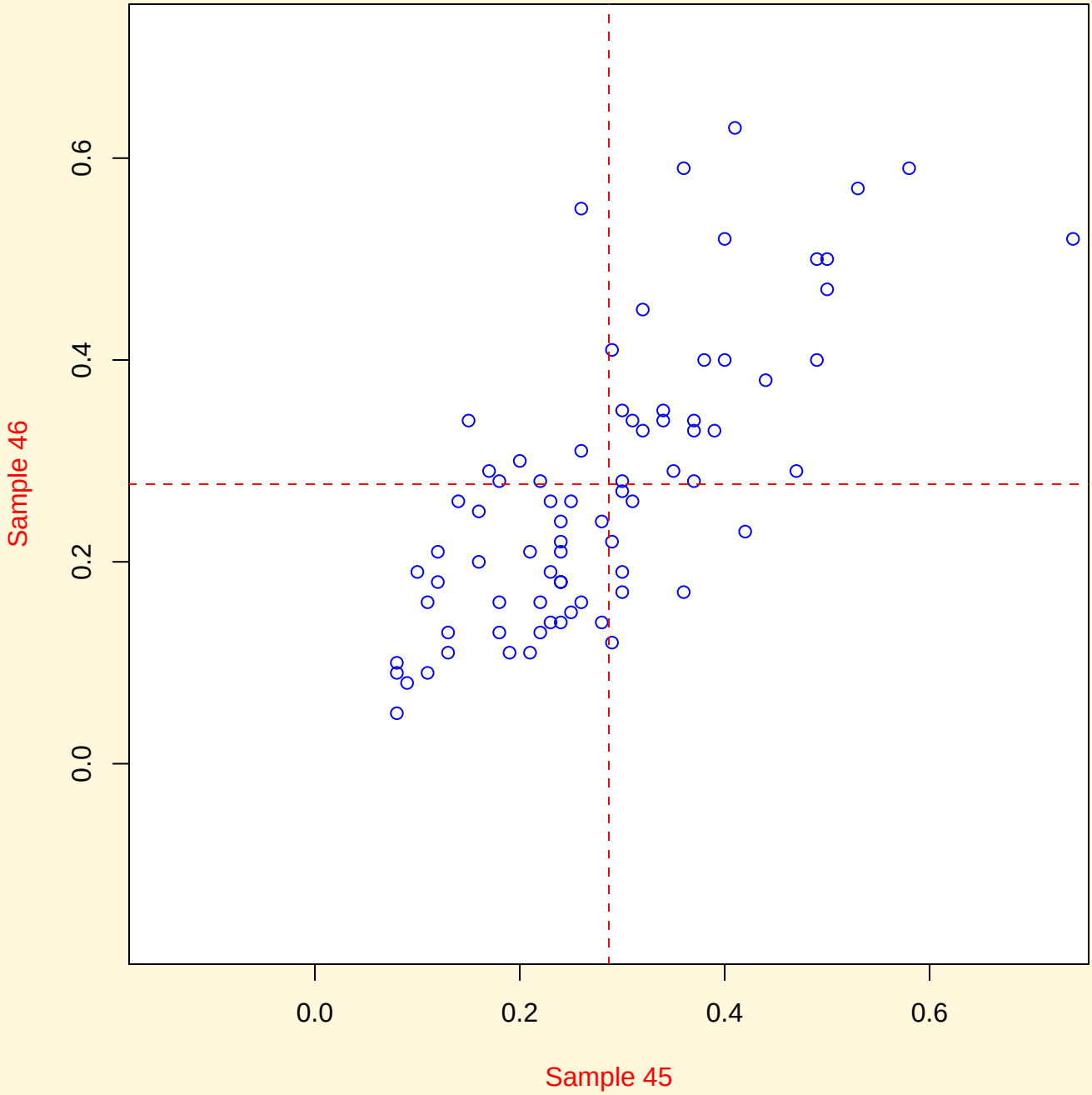


Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	2.415	0.015	0.605
46	2.419	0.014	0.570

Outlier Lab Nos. − 4, 6, 16, 80

OMRL Asphalt Mix Proficiency Sample Program
Asphalt Mix Analysis
Sample Numbers 45 & 46

Percent Water Absorption−OHD L−14



Sample No.	Mean	Std. Dev.	Coeff. of Var.
45	0.29	0.14	50.37
46	0.28	0.15	53.00

Outlier Lab Nos. − 4, 25

Appendix A - Outlier Criterion

Percent Passing 3/4 inch Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	83	83	83
Median	100.0000	100.0000	0.0000e+00
0.875 Percentile	100.0000	100.0000	0.000000
0.125 Percentile	100.00000	100.0000	0.000000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.00000	0.000000	0.000000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.000000	0.000000	0.000000
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	100.00000	100.0000	0.000000
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	100.00000	100.00000	0.000000

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	83	83	83
Median	100.000	100.0000	0.0000e+00
0.875 Percentile	100.0000	100.00000	0.00000
0.125 Percentile	100.00000	100.0000	0.00000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.00000	0.00000	0.00000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.000000	0.000000	0.000000
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	100.0000	100.00000	0.000000
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	100.000000	100.00000	0.000000

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing 1/2 inch Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	99.5000	99.5000	0.0000e+00
0.875 Percentile	100.0000	100.0000	0.500000
0.125 Percentile	98.81250	98.9000	-0.700000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	1.18750	1.100000	1.200000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	1.846562	1.710500	1.866000
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	101.84656	101.7105	2.366000
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	96.96594	97.18950	-2.566000

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	79	79	79
Median	99.600	99.5000	0.0000e+00
0.875 Percentile	100.0000	100.00000	0.50000
0.125 Percentile	98.97500	98.9000	-0.70000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	1.02500	1.10000	1.20000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.690850	0.741400	0.808800
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	100.6909	100.74140	1.308800
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	98.284150	98.15860	-1.508800

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing 3/8 inch Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	85.5500	85.1000	-1.0000e-01
0.875 Percentile	87.5875	87.2875	2.912500
0.125 Percentile	83.65000	82.5125	-3.400000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	3.93750	4.775000	6.312500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	6.122812	7.425125	9.815937
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	93.71031	94.7126	12.728437
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	77.52719	75.08737	-13.215937

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	85.550	85.1000	-1.0000e-01
0.875 Percentile	87.5875	87.28750	2.91250
0.125 Percentile	83.65000	82.5125	-3.40000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	3.93750	4.77500	6.31250
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	2.653875	3.218350	4.254625
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	90.2414	90.50585	7.167125
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	80.996125	79.29415	-7.654625

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 4 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	49.7500	49.6000	-1.5000e-01
0.875 Percentile	52.7000	52.1875	3.550000
0.125 Percentile	46.81250	45.9125	-3.825000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	5.88750	6.275000	7.375000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	9.155063	9.757625	11.468125
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	61.85506	61.9451	15.018125
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	37.65744	36.15487	-15.293125

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	81	81	81
Median	49.800	49.5000	-2.5000e-01
0.875 Percentile	52.7000	52.10000	3.55000
0.125 Percentile	46.90000	45.9000	-3.85000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	5.80000	6.20000	7.40000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	3.909200	4.178800	4.987600
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	56.6092	56.27880	8.537600
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	42.990800	41.72120	-8.837600

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 8 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	35.5000	35.1000	4.0000e-01
0.875 Percentile	37.4000	37.1875	2.587500
0.125 Percentile	33.41250	31.9625	-3.600000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	3.98750	5.225000	6.187500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	6.200563	8.124875	9.621562
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	43.60056	45.3124	12.209062
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	27.21194	23.83762	-13.221562

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	35.500	35.1000	4.0000e-01
0.875 Percentile	37.4000	37.18750	2.58750
0.125 Percentile	33.41250	31.9625	-3.60000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	3.98750	5.22500	6.18750
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	2.687575	3.521650	4.170375
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	40.0876	40.70915	6.757875
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	30.724925	28.44085	-7.770375

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 16 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	28.9000	28.8000	0.0000e+00
0.875 Percentile	30.4000	30.1000	1.650000
0.125 Percentile	27.51250	26.7125	-2.975000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	2.88750	3.387500	4.625000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	4.490062	5.267562	7.191875
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	34.89006	35.3676	8.841875
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	23.02244	21.44494	-10.166875

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	79	79	79
Median	28.900	28.8000	0.0000e+00
0.875 Percentile	30.3250	30.10000	1.40000
0.125 Percentile	27.47500	26.6750	-2.85000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	2.85000	3.42500	4.25000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	1.920900	2.308450	2.864500
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	32.2459	32.40845	4.264500
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	25.554100	24.36655	-5.714500

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 30 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	23.5000	23.4500	5.0000e-02
0.875 Percentile	24.6625	24.7000	1.450000
0.125 Percentile	22.51250	21.9000	-2.137500
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	2.15000	2.800000	3.587500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	3.343250	4.354000	5.578562
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	28.00575	29.0540	7.028562
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	19.16925	17.54600	-7.716062

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	80	80	80
Median	23.500	23.4000	5.0000e-02
0.875 Percentile	24.4375	24.61250	1.45000
0.125 Percentile	22.48750	21.9000	-2.06250
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	1.95000	2.71250	3.51250
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	1.314300	1.828225	2.367425
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	25.7518	26.44073	3.817425
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	21.173200	20.07177	-4.429925

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 50 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	14.2000	14.8000	-1.7764e-15
0.875 Percentile	14.9000	15.4875	0.862500
0.125 Percentile	13.70000	14.0000	-1.387500
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	1.20000	1.487500	2.250000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	1.866000	2.313063	3.498750
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	16.76600	17.8006	4.361250
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	11.83400	11.68694	-4.886250

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	80	80	80
Median	14.200	14.8000	-1.7764e-15
0.875 Percentile	14.9000	15.40000	0.63750
0.125 Percentile	13.70000	13.9750	-1.41250
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	1.20000	1.42500	2.05000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.808800	0.960450	1.381700
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	15.7088	16.36045	2.019200
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	12.891200	13.01455	-2.794200

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 100 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	6.4000	6.7000	-1.0000e-01
0.875 Percentile	6.9875	7.2000	0.400000
0.125 Percentile	6.00000	6.1000	-0.787500
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.98750	1.100000	1.187500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	1.535562	1.710500	1.846563
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	8.52306	8.9105	2.246563
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	4.46444	4.38950	-2.634063

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	80	80	80
Median	6.400	6.7000	-1.0000e-01
0.875 Percentile	6.9000	7.20000	0.41250
0.125 Percentile	6.00000	6.0875	-0.71250
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.90000	1.11250	1.12500
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.606600	0.749825	0.758250
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	7.5066	7.94983	1.170750
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	5.393400	5.33767	-1.470750

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Passing No. 200 Sieve

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	2.7400	2.8700	5.0000e-03
0.875 Percentile	3.1463	3.1963	0.308750
0.125 Percentile	2.45125	2.5625	-0.418750
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.69500	0.633750	0.727500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	1.080725	0.985481	1.131262
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	4.22697	4.1817	1.440012
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	1.37053	1.57702	-1.550012

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	78	78	78
Median	2.735	2.8700	5.0000e-03
0.875 Percentile	3.1012	3.13750	0.29375
0.125 Percentile	2.44250	2.5725	-0.33375
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.65875	0.56500	0.62750
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.443997	0.380810	0.422935
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	3.5452	3.51831	0.716685
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	1.998502	2.19169	-0.756685

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Asphalt Content (Ignition Oven)

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	4.4200	4.4150	-3.5000e-02
0.875 Percentile	4.5500	4.6150	0.255000
0.125 Percentile	4.28125	4.1825	-0.282500
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.26875	0.432500	0.537500
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.417906	0.672538	0.835813
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	4.96791	5.2875	1.090813
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	3.86334	3.50996	-1.118313

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	4.420	4.4150	-3.5000e-02
0.875 Percentile	4.5500	4.61500	0.25500
0.125 Percentile	4.28125	4.1825	-0.28250
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.26875	0.43250	0.53750
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.181137	0.291505	0.362275
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	4.7311	4.90651	0.617275
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	4.100112	3.89100	-0.644775

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Rices Specific Gravity

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	2.5000	2.4985	5.0000e-04
0.875 Percentile	2.5080	2.5088	0.009500
0.125 Percentile	2.48700	2.4890	-0.009250
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.02100	0.019750	0.018750
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.032655	0.030711	0.029156
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	2.54065	2.5395	0.038656
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	2.45435	2.45829	-0.038406

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	82	82	82
Median	2.500	2.4985	5.0000e-04
0.875 Percentile	2.5080	2.50875	0.00950
0.125 Percentile	2.48700	2.4890	-0.00925
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.02100	0.01975	0.01875
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.014154	0.013312	0.012637
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	2.5222	2.52206	0.022137
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	2.472846	2.47569	-0.021887

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

SGC Specific Gravity

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	80	80	80
Median	2.4285	2.4305	1.0000e-03
0.875 Percentile	2.4390	2.4411	0.008125
0.125 Percentile	2.41800	2.4210	-0.007000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.02100	0.020125	0.015125
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.032655	0.031294	0.023519
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	2.47165	2.4724	0.031644
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	2.38535	2.38971	-0.030519

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	77	77	77
Median	2.428	2.4310	1.0000e-03
0.875 Percentile	2.4390	2.44150	0.00850
0.125 Percentile	2.41850	2.4215	-0.00600
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.02050	0.02000	0.01450
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.013817	0.013480	0.009773
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	2.4528	2.45498	0.018273
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	2.404683	2.40802	-0.015773

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

SGC Specific Gravity-OHD L-45

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	70	70	70
Median	2.4175	2.4185	1.0000e-03
0.875 Percentile	2.4318	2.4320	0.009000
0.125 Percentile	2.39700	2.4006	-0.008375
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.03475	0.031375	0.017375
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.054036	0.048788	0.027018
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	2.48579	2.4808	0.036018
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	2.34296	2.35184	-0.035393

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	65	65	65
Median	2.419	2.4190	2.0000e-03
0.875 Percentile	2.4310	2.43200	0.00900
0.125 Percentile	2.39700	2.4020	-0.00600
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.03400	0.03000	0.01500
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.022916	0.020220	0.010110
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	2.4539	2.45222	0.019110
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	2.374084	2.38178	-0.016110

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.

Appendix A - Outlier Criterion

Percent Water Absorption-OHD L-14

Table A - Extreme Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	80	80	80
Median	0.2700	0.2600	-5.0000e-03
0.875 Percentile	0.4725	0.5025	0.130000
0.125 Percentile	0.13875	0.1300	-0.090000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.33375	0.372500	0.220000
(1.555) x (Range of Inner 75%) = Distance Beyond Inner 75% for 4.725 Std. Dev.	0.518981	0.579237	0.342100
Invalid Upper Limit = (87.5th Percentile) + (1.555) x (Range of Inner 75%)	0.99148	1.0817	0.472100
Invalid Lower Limit = (12.5th Percentile) - (1.555) x (Range of Inner 75%)	-0.38023	-0.44924	-0.432100

Table B - Outliers

Table of Statistics and Limits	Sample 45(X)	Sample 46(Y)	(Y-X)-(Ymed-Xmed)
Count = Number of Laboratories	78	78	78
Median	0.260	0.2600	-1.0000e-02
0.875 Percentile	0.4275	0.48125	0.11000
0.125 Percentile	0.13625	0.1300	-0.09000
Range of Inner 75% = (87.5th Percentile Value) - (12.5th Percentile Value)	0.29125	0.35125	0.20000
(0.674) x (Range of Inner 75%) = Distance Beyond Inner 75% for 2.7 Std. Dev.	0.196303	0.236742	0.134800
Outlier Upper Limit = (87.5th Percentile) + (0.674) x (Range of Inner 75%)	0.6238	0.71799	0.244800
Outlier Lower Limit = (12.5th Percentile) - (0.674) x (Range of Inner 75%)	-0.060053	-0.10674	-0.224800

NOTE: Limits are shown as shaded rows. If either pair of results are designated as "0" in ratings table, both results are removed prior to any analysis. Labs with outlier data exceeding these limits are listed in the paired plots.