CEMENT AND CONCRETE REFERENCE LABORATORY

PROFICIENCY SAMPLE PROGRAM

Final Report
Pozzolan Proficiency Samples
Number 37 and Number 38

November 2005

CCRL CEMENT AND CONCRETE REFERENCE LABORATORY

CEMENT AND CONCRETE REFERENCE LABORATORY
AT THE
NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY
GAITHERSBURG, MARYLAND 20899
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SPONSORED BY
COMMITTEE C-1 ON CEMENT
COMMITTEE C-9 ON CONCRETE AND
CONCRETE AGGREGATES
AMERICAN SOCIETY FOR TESTING AND MATERIALS

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December 1, 2005

TO: Participants in the CCRL Pozzolan Proficiency Sample Program

SUBJECT: Pozzolan Proficiency Samples No. 37 and No. 38

Enclosed is your copy of the final report on the test results for the CCRL **Pozzolan** Proficiency Samples which were distributed in August 2005. Both samples were a Class C fly ash.

This report consists of two parts and each part must be downloaded from our website located at: http://www.ccrl.us/. One part contains general information that consists of a statistical Summary of Results, a set of Scatter Diagrams, and other associated information. The second part is laboratory specific information that consists of the Table of Results containing test results and ratings for your laboratory

The CCRL Proficiency Sample Programs are intended for internal use by the laboratory as a tool to identify potential problems in laboratory procedures or test equipment and to initiate remedial actions. These programs are designed to complement the CCRL Laboratory Inspection Program as part of a total quality system. Care should be taken when using this program for any other purpose.

Additional samples of these two samples and other CCRL samples are available for purchase. These samples may be useful for equipment verification, technician training, and research. Contact CCRL for availability and price.

It is presently anticipated that the next Pozzolan Proficiency Samples will be distributed in August 2006.

Sincerely,

Robin K. Haupt

Robin K. Haupt
Supervisor, Proficiency Sample Programs
Cement and Concrete Reference Laboratory
Materials and Construction Research Division
Building and Fire Research Laboratory

Attachment

To: Participants in the CCRL Pozzolan Proficiency Sample Program

FROM: Robin K. Haupt, Supervisor, PSP

SUBJECT: Explanation of Final Report on Results of Tests on Pozzolan Proficiency Samples No. 37 and No. 38

This memo and the material included with it constitute the final report and summary of results for the current pair of Pozzolan Proficiency Samples, which were distributed in August 2005. This material includes a Table of Results for individual laboratory data, a statistical Summary of Results, and a set of Scatter Diagrams. Your unique laboratory number is displayed at the top of the individual Table of Results.

An explanation of the program is contained in the paper: "Statistical Evaluation of Interlaboratory Cement Tests" by J. R. Crandall and R. L. Blaine View document, and "Statistical Aspects of the Cement Testing Program" by W.J. Youden View document, which can be found in Volume 59, Proceedings of the 62nd Annual Meeting of the Society, June 25, 1959, American Society for Testing and Materials.

Table of Results - Laboratory Ratings

Each laboratory receives an individualized Table of Results. The Table of Results shows the test title and the reporting unit in the first two columns. After that it lists in order, the laboratory's results for the odd and even numbered samples, overall averages for the odd and even numbered samples, and the laboratory's ratings for the odd and even samples.

The ratings for the individual laboratory were determined in the manner described by Crandall and Blaine using a rating scale 1 to 5 instead of 0 to 4. The ratings have no valid standing beyond showing the difference between the individual laboratory result and the average for a particular test.

The following table details the relationship between the ratings and the averages.

Ratings	Range (Number of Standard Deviations)	Number (Per 100) of Laboratories achieving the rating [1]
5	Less than 1	69
4	1 to 1.5	18
3	1.5 to 2	9
2	2 to 2.5	3
1	Greater than 2.5	1

The sign of the rating merely shows whether the result reported was greater or less than the average obtained.

[1]Youden, W.J., "Statistical Aspects of the Cement Testing Program",Volume 59, *Proceedings of the 62nd Annual Meeting of the Society, June 25, 1959, American Society for Testing and Materials.*

Continued on Reverse Side

In cases where some laboratories' results are eliminated, averages, standard deviations, coefficients of variation and the ratings of the other laboratories' results, are recalculated using the data remaining after the elimination. Since the laboratory ratings given are the results from this one series of tests, you need not attach too much significance to a single low rating, or pair of ratings, from this one series. A continuing tendency to get low ratings on several pairs of samples should lead a laboratory to consider the types of error, systematic and random, which contribute to ratings that are low. Systematic error, which is indicated by low ratings with the same signs on each pair of samples, means a consistent error is occurring in equipment and/or test procedures. One indication of random error is low ratings on both samples with different signs. Since systematic error occurs with more regularity, its cause is generally easier to find than the cause of random error.

Summary of Results

Usually, averages, standard deviations, and coefficients of variation are given with all test results reported, and then with one or more outlying test results omitted. Sometimes, two or more recalculations with laboratories omitted, have been performed for the same test. In these cases, all of the laboratories omitted in previous recalculations are also omitted in subsequent ones. Results omitted are values that are more than three standard deviations from the mean of one or both samples. Often, elimination of these outlying results has little effect on the average, but may have a more pronounced effect on the standard deviation and coefficient of variation.

Scatter Diagrams

General scatter diagrams are supplied with this report. Crandall and Blaine describe the manner of preparing scatter diagrams, and their interpretation, in the paper published in the 1959 ASTM Proceedings. Each laboratory will receive a complete set of diagrams according to their participation in chemical and/or physical tests.

Using the results received from each laboratory, a scatter diagram is generated for each test method by plotting the value for the odd numbered samples on the *X*, or horizontal axis, against the value for the even numbered samples on the *Y*, or vertical axis. To find your point, just plot as you would when plotting any scatter diagram. Vertical and horizontal dashed lines, which divide the diagrams into four sections or quadrants, place the average values for the odd and even numbered samples, respectively. The first line of print under the diagram includes the test number, as given on the data sheet, the test title, and the number of data points on the diagrams. The number of plotted points may not agree with the total number of data pairs included in the analysis because a few points may be off the diagram, and some points may represent several data pairs, which are identical. Laboratories whose points are off the diagram will have a rating of ±1 for that particular test.

As described in Crandall and Blaine, a tight circular pattern of points around the intersection of the median lines is the ideal situation. Stretching out of the pattern into the first (upper right) and third (lower left) quadrants, suggests some kind of bias, or tendency for laboratories to get high or low results on both samples. Examination of the scatter diagrams may indicate strong evidence of bias in many cases.

CCRL PROFICIENCY SAMPLE PROGRAM
Pozzolan Proficiency Samples No. 37 and No. 38
Final Report - Chemical Results
November 28, 2005

SUMMARY OF RESULTS

Test			#Labs	Sample No. 37 Average	S.D.	C.V.	Sample No. 38 Average	S.D.	C.V.
Moisture Content	prcnt		58	0.17	0.186	111.9	0.11	0.085	74.2
Moisture Content	prcnt	*	53	0.14	0.050	35.9	0.09	0.038	41.4
Silicon Dioxide	prcnt		50	43.24	3.3	7.68	32.31	4.3	13.43
Silicon Dioxide	prcnt	*	43	43.15	1.2	2.92	31.90	1.2	3.70
Al_2O_3 w/minor[1]	prcnt		23	23.97	1.6	6.61	20.76	1.6	7.74
Al_2O_3 w/minor[1]	prcnt	*	22	23.77	1.3	5.36	20.53	1.2	5.74
Al_2O_3 wo/minor[2]	prcnt		44	21.90	1.6	7.12	18.39	2.5	13.56
Al_2O_3 wo/minor[2]	prcnt	*	40	21.80	1.11	5.08	18.29	0.98	5.39
Ferric Oxide	prcnt		49	6.30	0.70	11.2	6.20	0.94	15.2
Ferric Oxide	prcnt	*	47	6.25	0.54	8.62	6.25	0.55	8.81
Calcium Oxide	prcnt		51	16.90	1.2	7.20	25.89	3.2	12.46
Calcium Oxide	prcnt	*	49	16.79	0.72	4.29	26.48	1.14	4.29

[1] (P_2O_3 & TiO_2 included)

[2] (P_2O_3 & TiO_2 not included)

CONTINUED ON NEXT PAGE

* ELIMINATED LABS: Data over three S.D. from the mean

Moisture Content	43 176 20 1859 2522
Silicon Dioxide	20 23 29 176 205 1479 2295
Al_2O_3 w/minor	2295
Al_2O_3 wo/minor	25 176 23 2295
Ferric Oxide	158 2295
Calcium Oxide	23 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Pozzolan Proficiency Samples No. 37 and No. 38
Final Report - Chemical Results
November 28, 2005

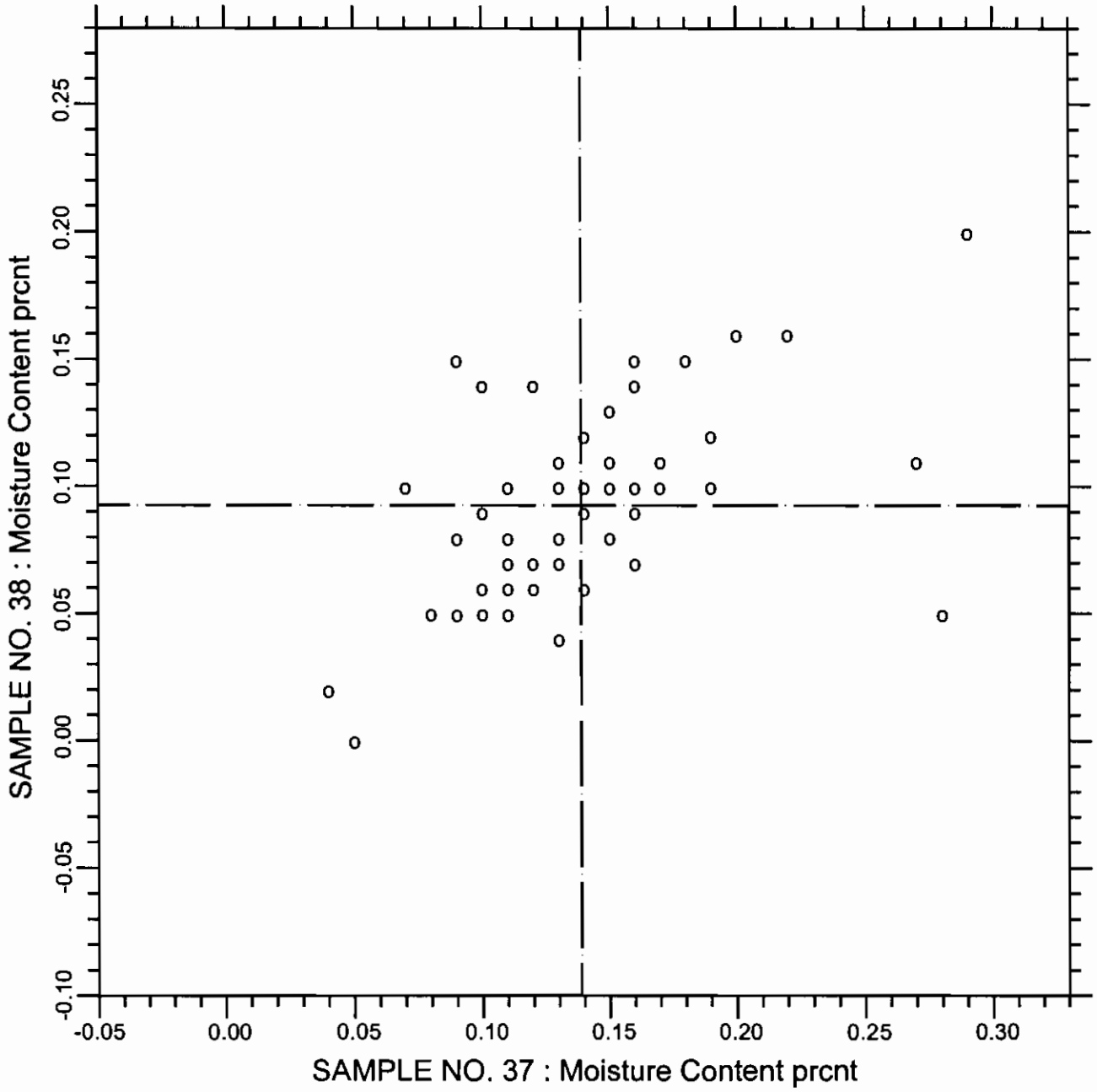
SUMMARY OF RESULTS

			Sample No. 37			Sample No. 38		
Test		#Labs	Average	S.D.	C.V.	Average	S.D.	C.V.
Magnesium Oxide	prcnt	52	3.73	0.63	16.9	5.51	1.05	19.1
Magnesium Oxide	prcnt	* 48	3.65	0.26	7.26	5.72	0.39	6.82
Sulfur Trioxide	prcnt	53	0.84	0.24	27.9	2.25	0.60	26.5
Sulfur Trioxide	prcnt	* 47	0.82	0.092	11.26	2.24	0.164	7.32
Loss on Ignition	prcnt	62	1.35	0.30	22.0	0.45	0.20	45.4
Loss on Ignition	prcnt	* 55	1.36	0.081	5.92	0.41	0.073	17.98
Sodium Oxide	prcnt	45	1.23	0.43	34.8	3.42	1.05	30.5
Sodium Oxide	prcnt	* 40	1.18	0.14	12.3	3.56	0.41	11.6
Potassium Oxide	prcnt	46	1.23	0.18	14.7	0.40	0.13	32.4
Potassium Oxide	prcnt	* 42	1.26	0.086	6.86	0.39	0.030	7.85
Available Na_2O	prcnt	27	0.58	0.20	34.7	2.40	0.74	30.8
Available Na_2O	prcnt	* 26	0.60	0.17	28.2	2.49	0.58	23.3
Available K_2O	prcnt	27	0.51	0.236	46.0	0.26	0.079	31.0
Available K_2O	prcnt	* 25	0.50	0.151	30.1	0.26	0.051	20.0
Available Alkali	prcnt	27	0.92	0.38	41.6	2.56	0.79	31.1
Available Alkali	prcnt	* 25	0.90	0.25	28.0	2.60	0.58	22.4

* ELIMINATED LABS: Data over three S.D. from the mean

Magnesium Oxide	20 205 23 2295
Sulfur Trioxide	23 1940 158 284 2116 2295
Loss on Ignition	23 148 205 284 2116 1 2295
Sodium Oxide	23 25 176 205 2295
Potassium Oxide	23 24 176 2295
Available Na_2O	23
Available K_2O	23 207
Available Alkali	23 38

CCRL PROFICIENCY SAMPLE PROGRAM
Moisture Content
POZZOLAN SAMPLES NO. 37 & NO. 38



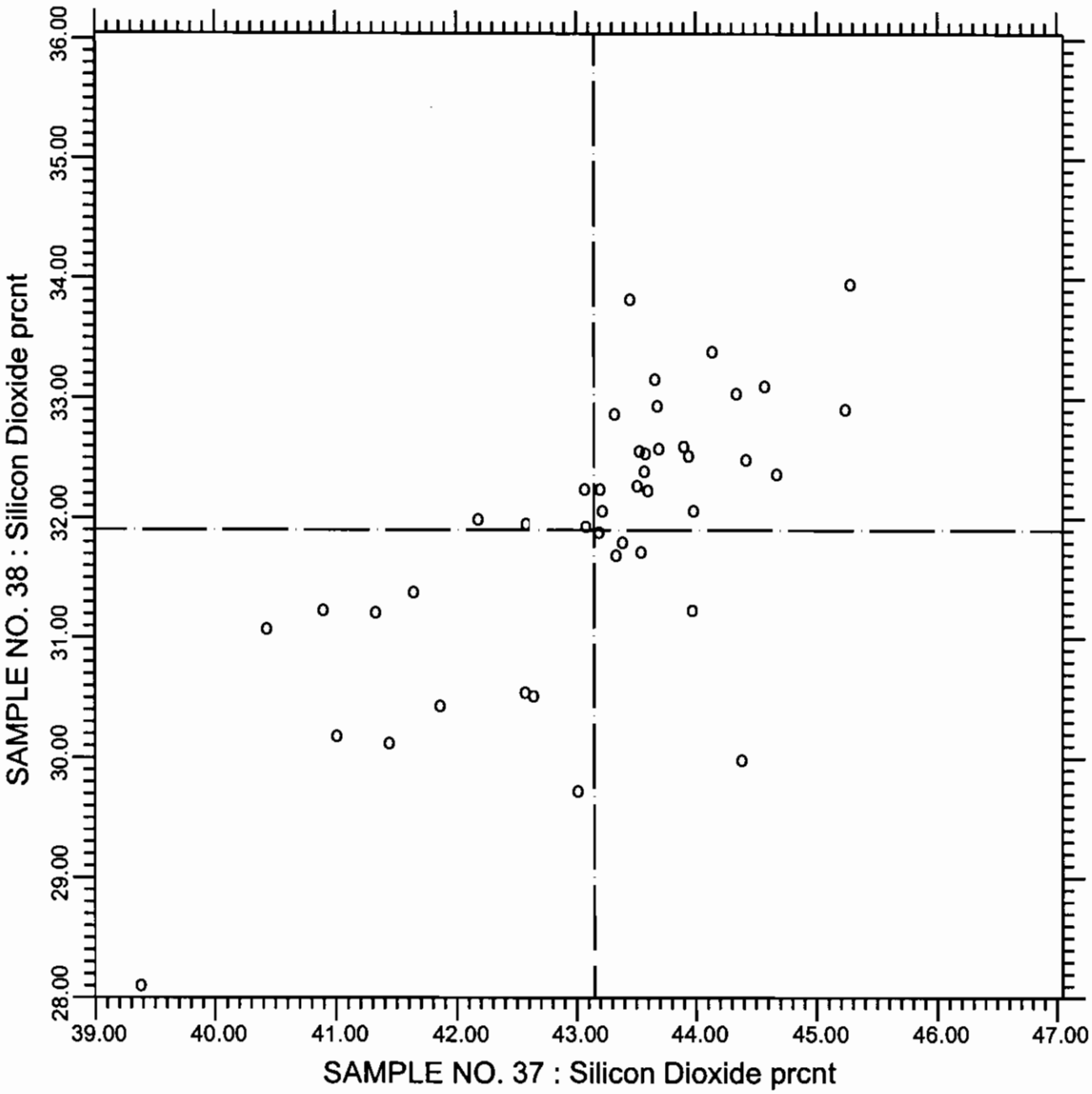
TEST NO.5 Moisture Content 53 POINTS

SAMPLE NO. 37 AVE 0.1389 S.D. 0.050 C.V. 35.9

SAMPLE NO. 38 AVE 0.0926 S.D. 0.038 C.V. 41.4

LABS ELIMINATED 43 176 20 1859 2522

CCRL PROFICIENCY SAMPLE PROGRAM
Silicon Dioxide
POZZOLAN SAMPLES NO. 37 & NO. 38



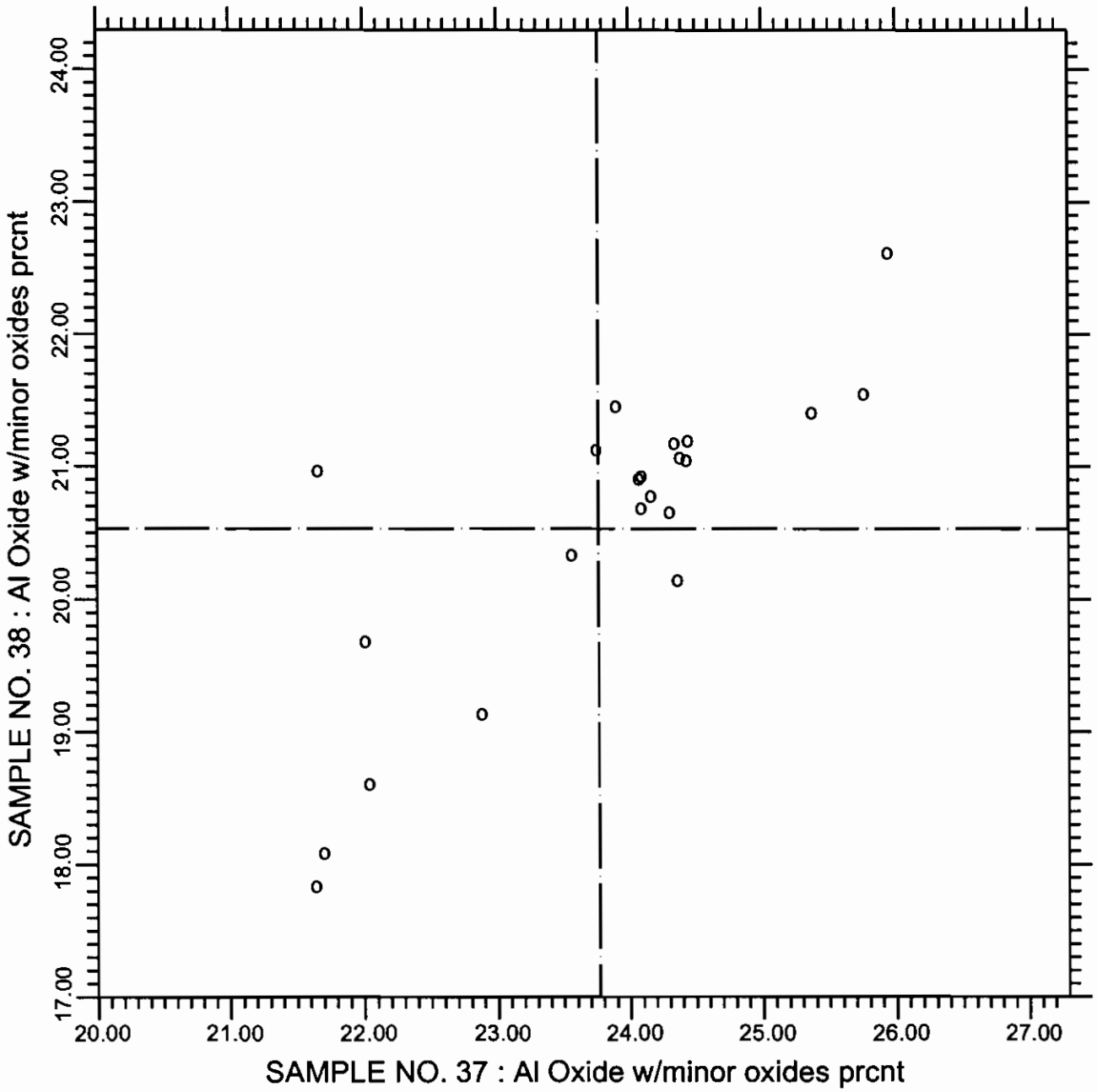
TEST NO.10 Silicon Dioxide 43 POINTS

SAMPLE NO. 37 AVE 43.15 S.D. 1.2 C.V. 2.92

SAMPLE NO. 38 AVE 31.90 S.D. 1.2 C.V. 3.70

LABS ELIMINATED 20 23 29 176 205 1479 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Aluminum Oxide (minor oxides included)
POZZOLAN SAMPLES NO. 37 & NO. 38



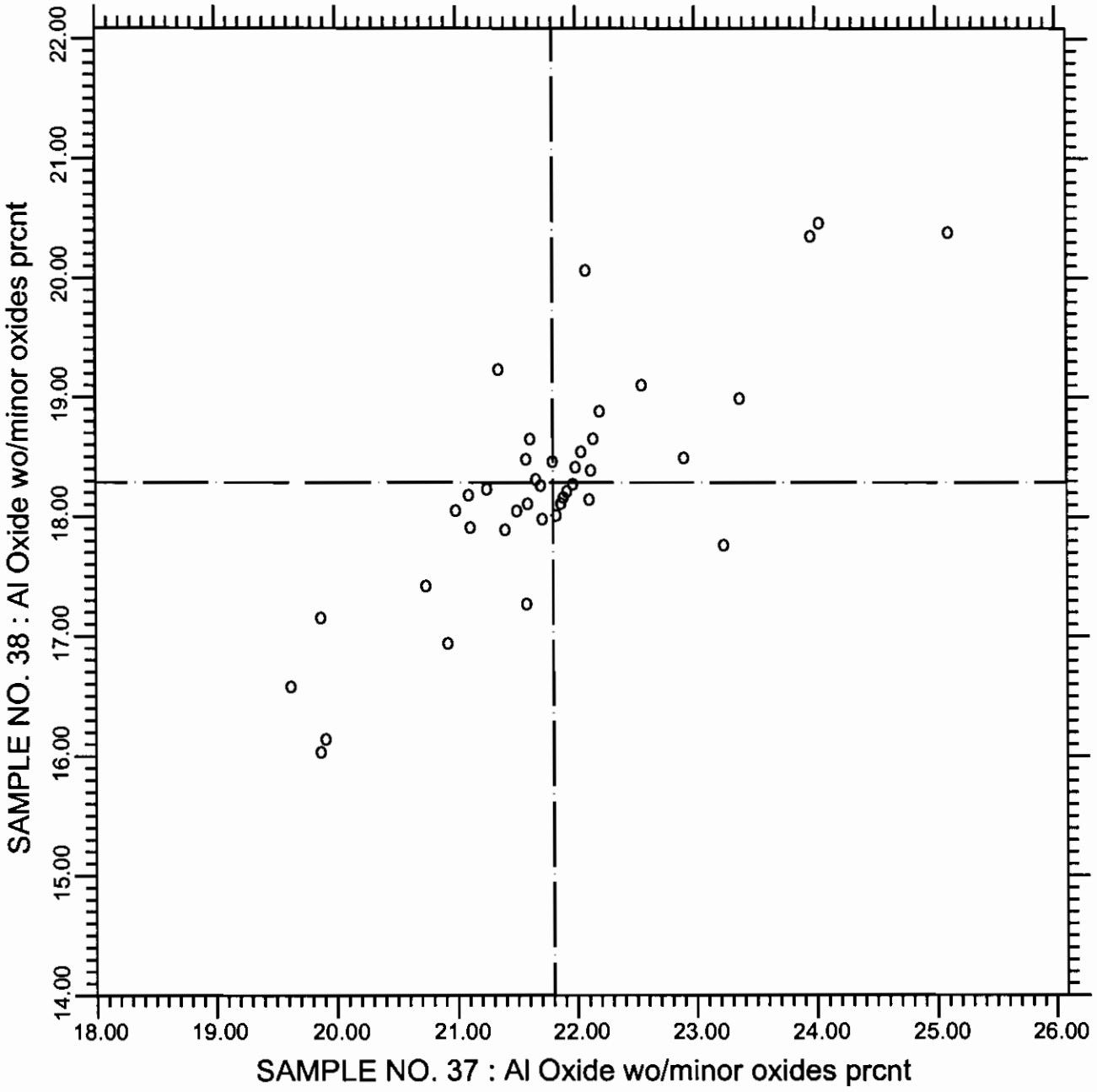
TEST NO.20 Al Oxide w/minor oxides 22 POINTS

SAMPLE NO. 37 AVE 23.77 S.D. 1.3 C.V. 5.36

SAMPLE NO. 38 AVE 20.53 S.D. 1.2 C.V. 5.74

LABS ELIMINATED 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Aluminum Oxide (minor oxides excluded)
POZZOLAN SAMPLES NO. 37 & NO. 38



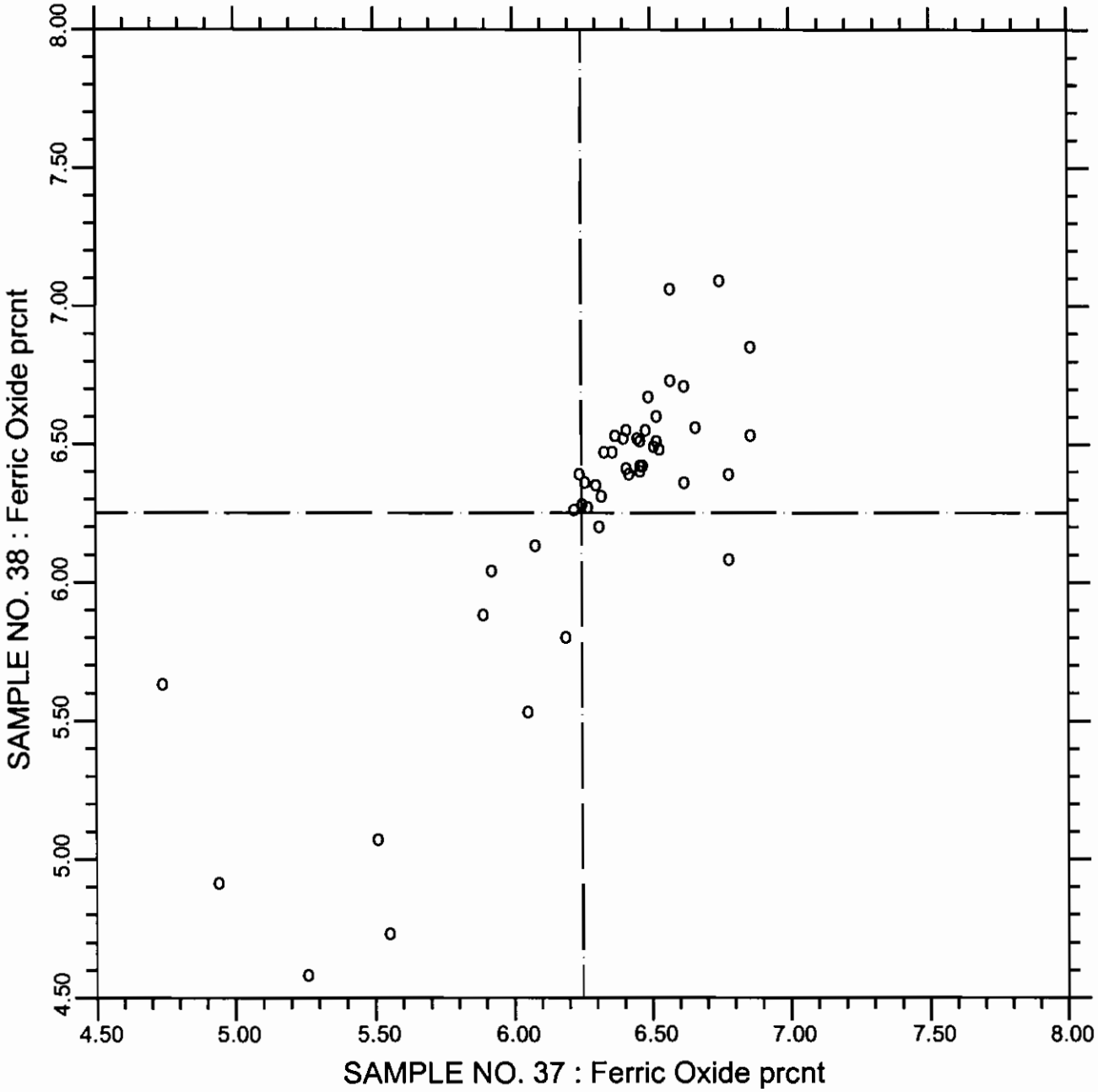
TEST NO.21 Al Oxide wo/minor oxides 40 POINTS

SAMPLE NO. 37 AVE 21.80 S.D. 1.11 C.V. 5.08

SAMPLE NO. 38 AVE 18.29 S.D. 0.98 C.V. 5.39

LABS ELIMINATED 25 176 23 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Ferric Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.30 Ferric Oxide 46 POINTS

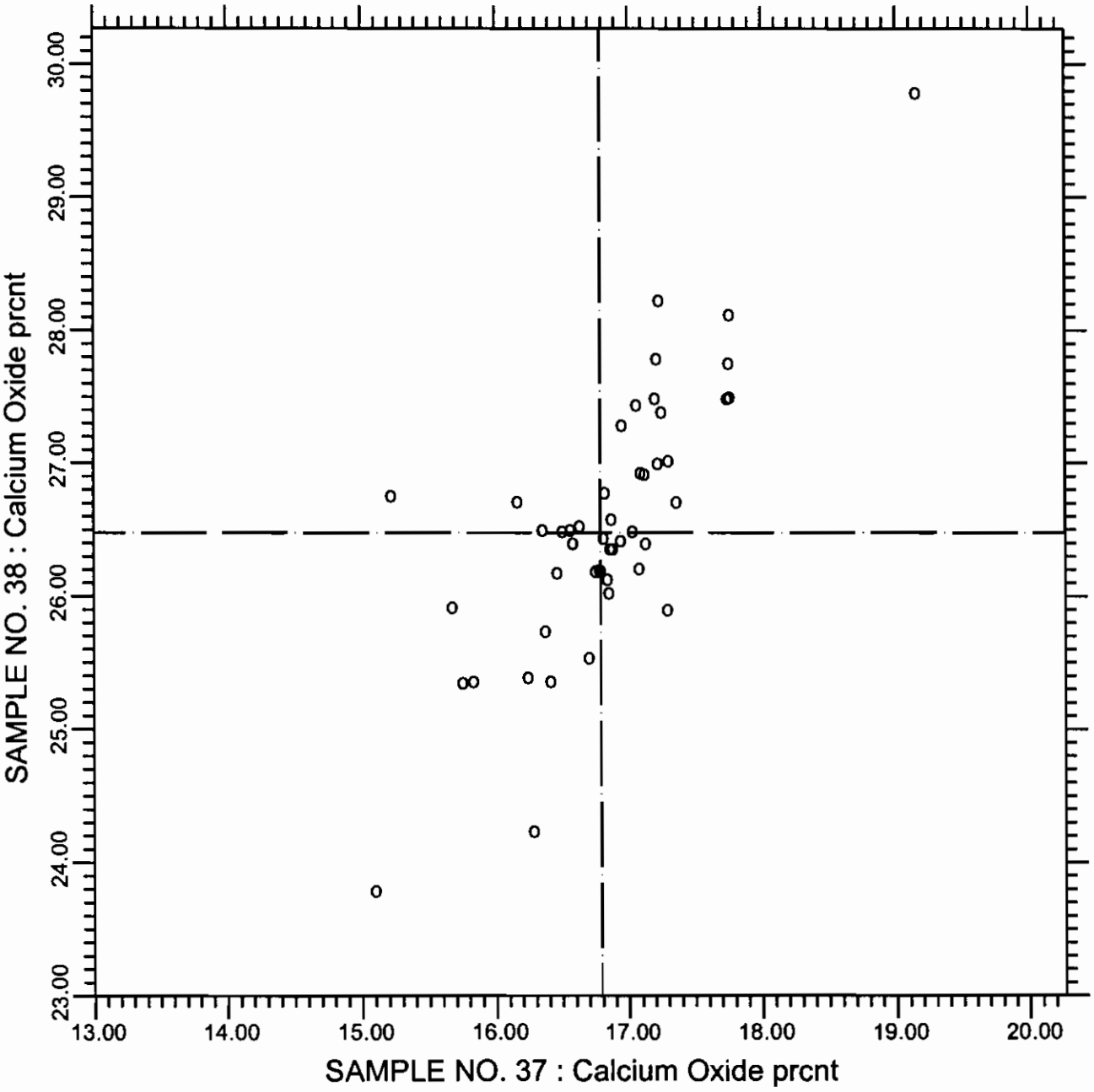
SAMPLE NO. 37 AVE 6.248 S.D. 0.54 C.V. 8.62

SAMPLE NO. 38 AVE 6.252 S.D. 0.55 C.V. 8.81

LABS ELIMINATED 158 2295

LABS OFF DIAGRAM 25

CCRL PROFICIENCY SAMPLE PROGRAM
Calcium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.40 Calcium Oxide 48 POINTS

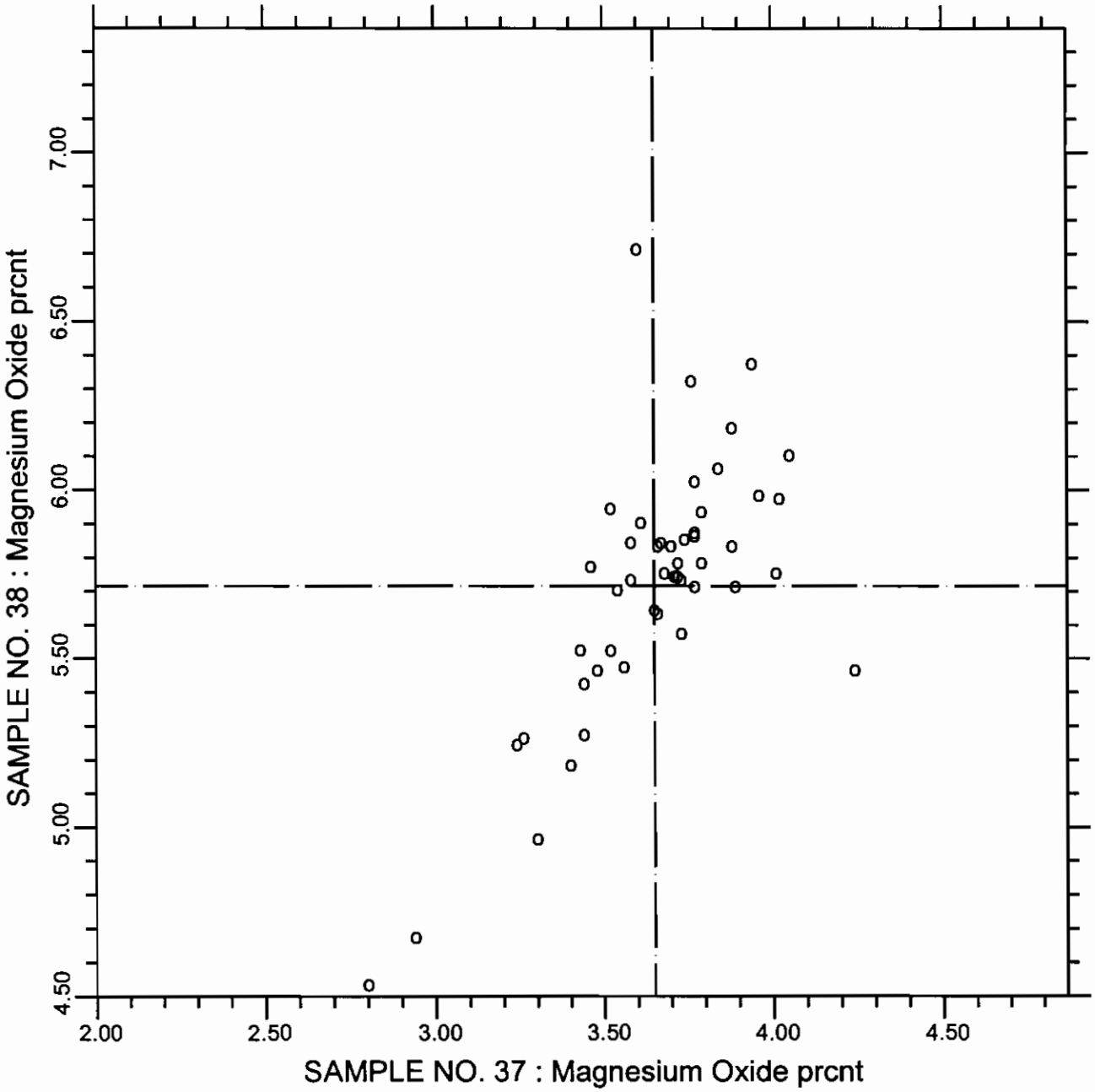
SAMPLE NO. 37 AVE 16.79 S.D. 0.72 C.V. 4.29

SAMPLE NO. 38 AVE 26.48 S.D. 1.14 C.V. 4.29

LABS ELIMINATED 23 2295

LABS OFF DIAGRAM 1940

CCRL PROFICIENCY SAMPLE PROGRAM
Magnesium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



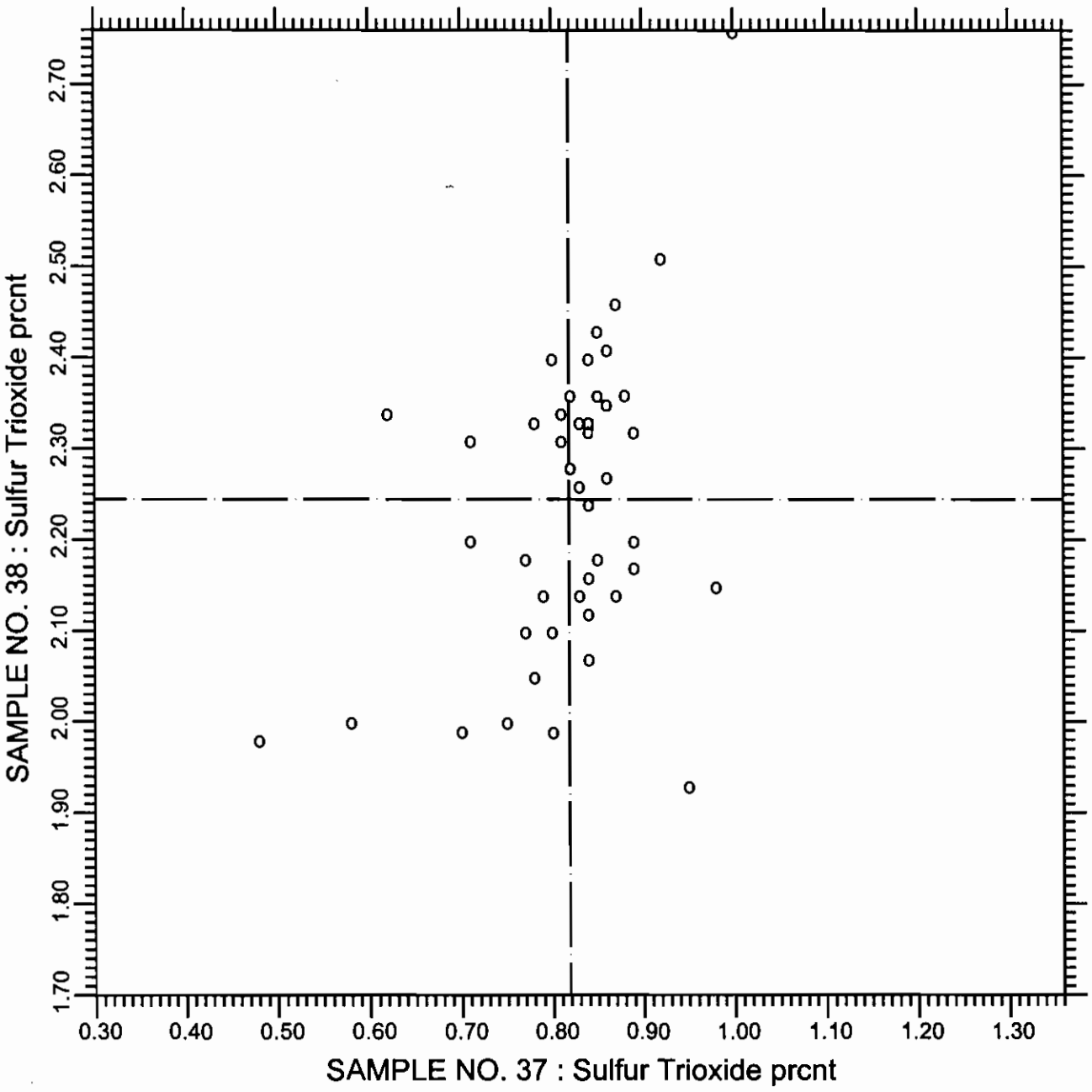
TEST NO.50 Magnesium Oxide 48 POINTS

SAMPLE NO. 37 AVE 3.650 S.D. 0.26 C.V. 7.26

SAMPLE NO. 38 AVE 5.717 S.D. 0.39 C.V. 6.82

LABS ELIMINATED 20 205 23 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Sulfur Trioxide
POZZOLAN SAMPLES NO. 37 & NO. 38



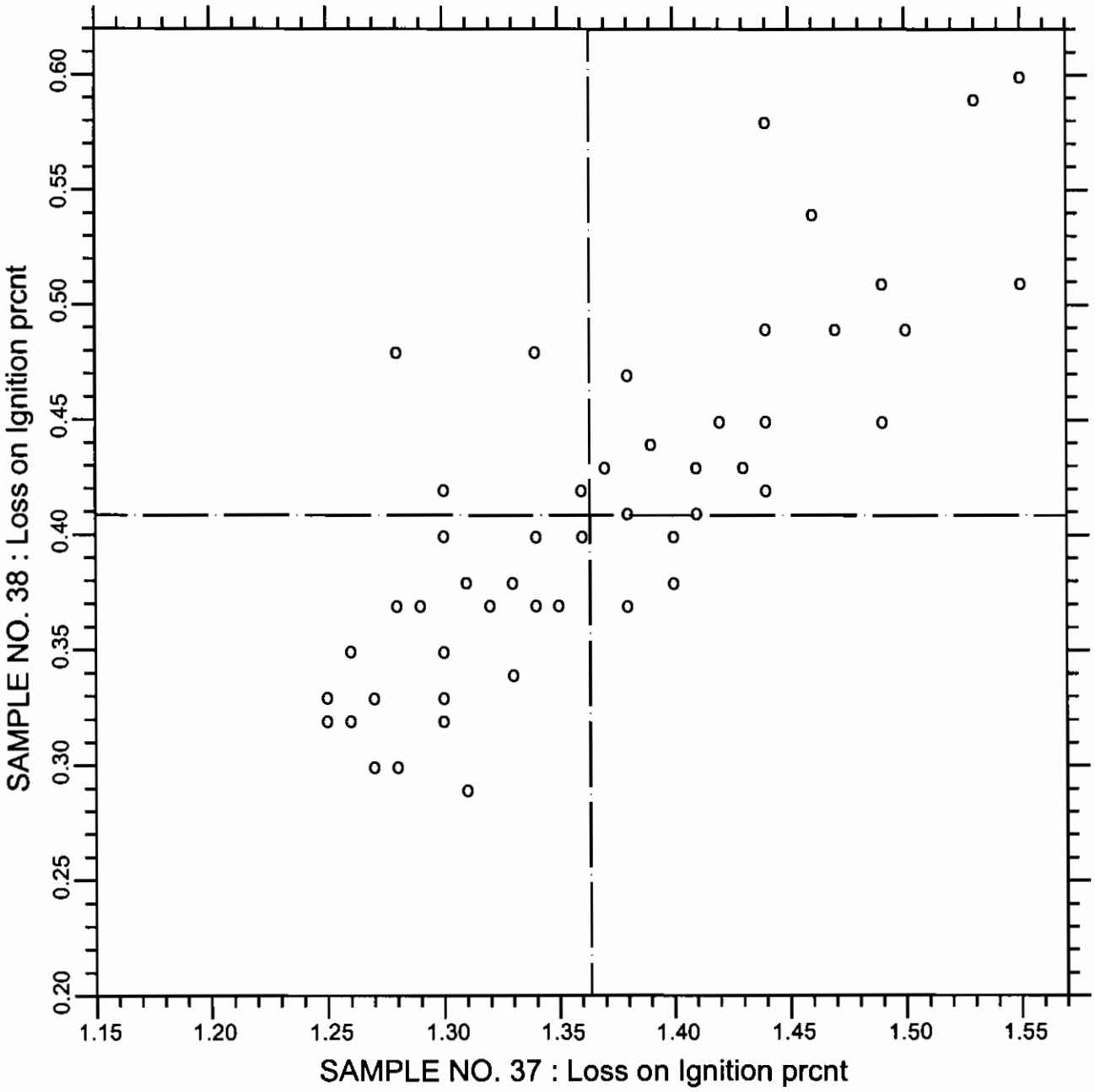
TEST NO.60 Sulfur Trioxide 47 POINTS

SAMPLE NO. 37 AVE 0.818 S.D. 0.092 C.V. 11.26

SAMPLE NO. 38 AVE 2.244 S.D. 0.164 C.V. 7.32

LABS ELIMINATED 23 1940 158 284 2116 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Loss on Ignition
POZZOLAN SAMPLES NO. 37 & NO. 38



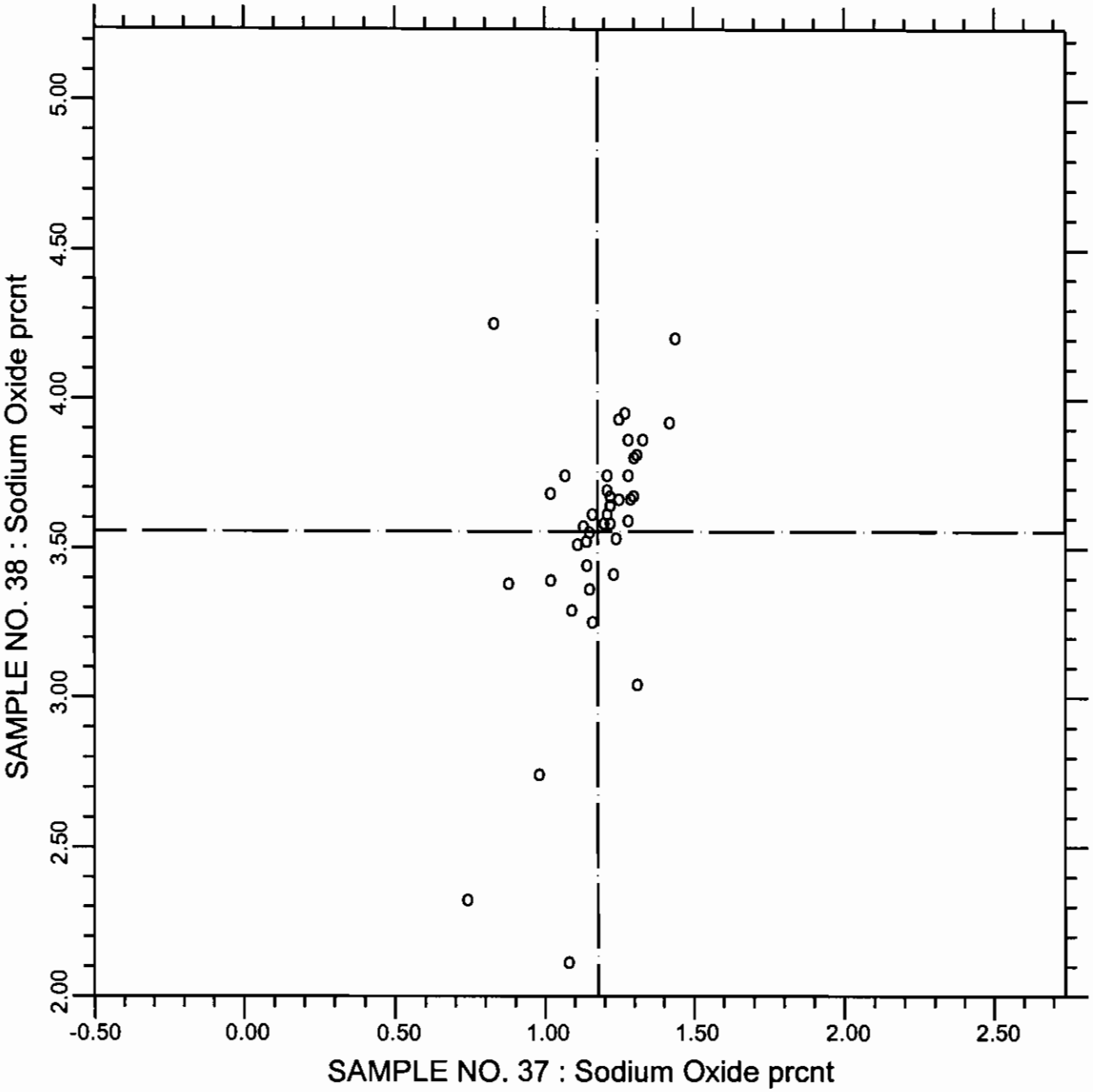
TEST NO.70 Loss on Ignition 55 POINTS

SAMPLE NO. 37 AVE 1.3636 S.D. 0.081 C.V. 5.92

SAMPLE NO. 38 AVE 0.4085 S.D. 0.073 C.V. 17.98

LABS ELIMINATED 23 148 205 284 2116 1 2295

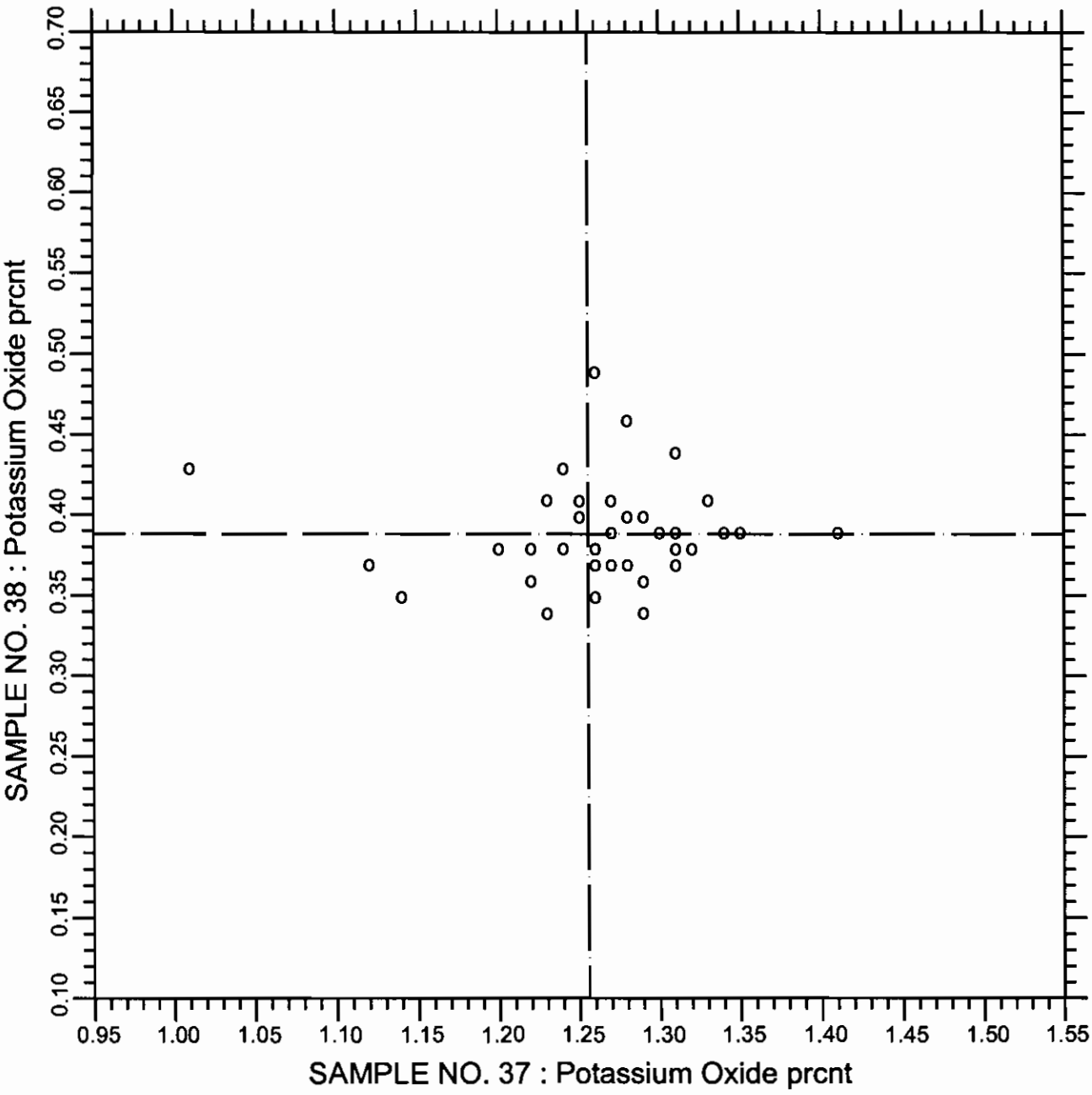
CCRL PROFICIENCY SAMPLE PROGRAM
Sodium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.90 Sodium Oxide 40 POINTS

SAMPLE NO. 37 AVE 1.178 S.D. 0.14 C.V. 12.3
SAMPLE NO. 38 AVE 3.556 S.D. 0.41 C.V. 11.6
LABS ELIMINATED 23 25 176 205 2295

CCRL PROFICIENCY SAMPLE PROGRAM
Potassium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.100 Potassium Oxide 41 POINTS

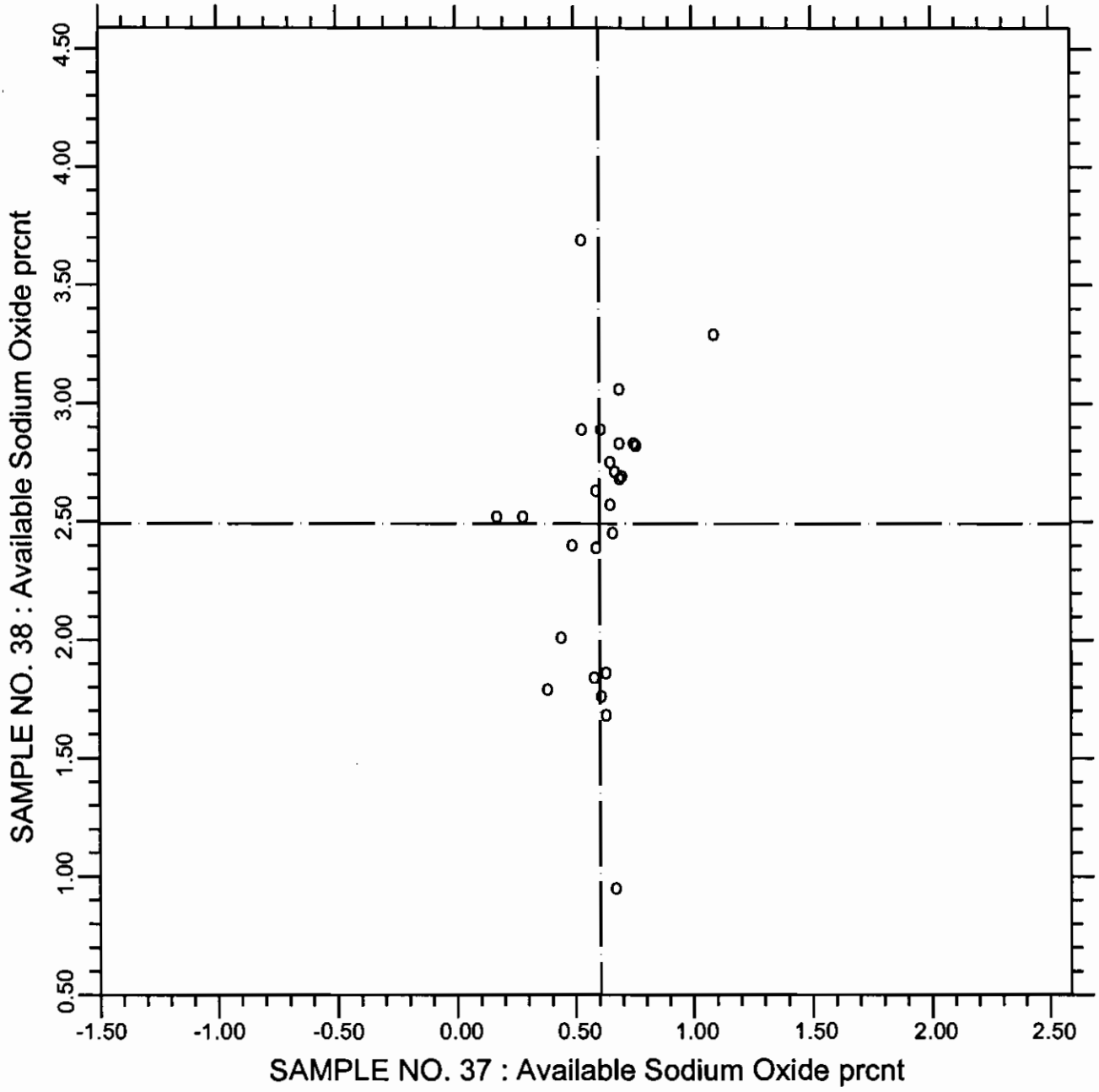
SAMPLE NO. 37 AVE 1.2555 S.D. 0.086 C.V. 6.86

SAMPLE NO. 38 AVE 0.3881 S.D. 0.030 C.V. 7.85

LABS ELIMINATED 23 24 176 2295

LABS OFF DIAGRAM 205

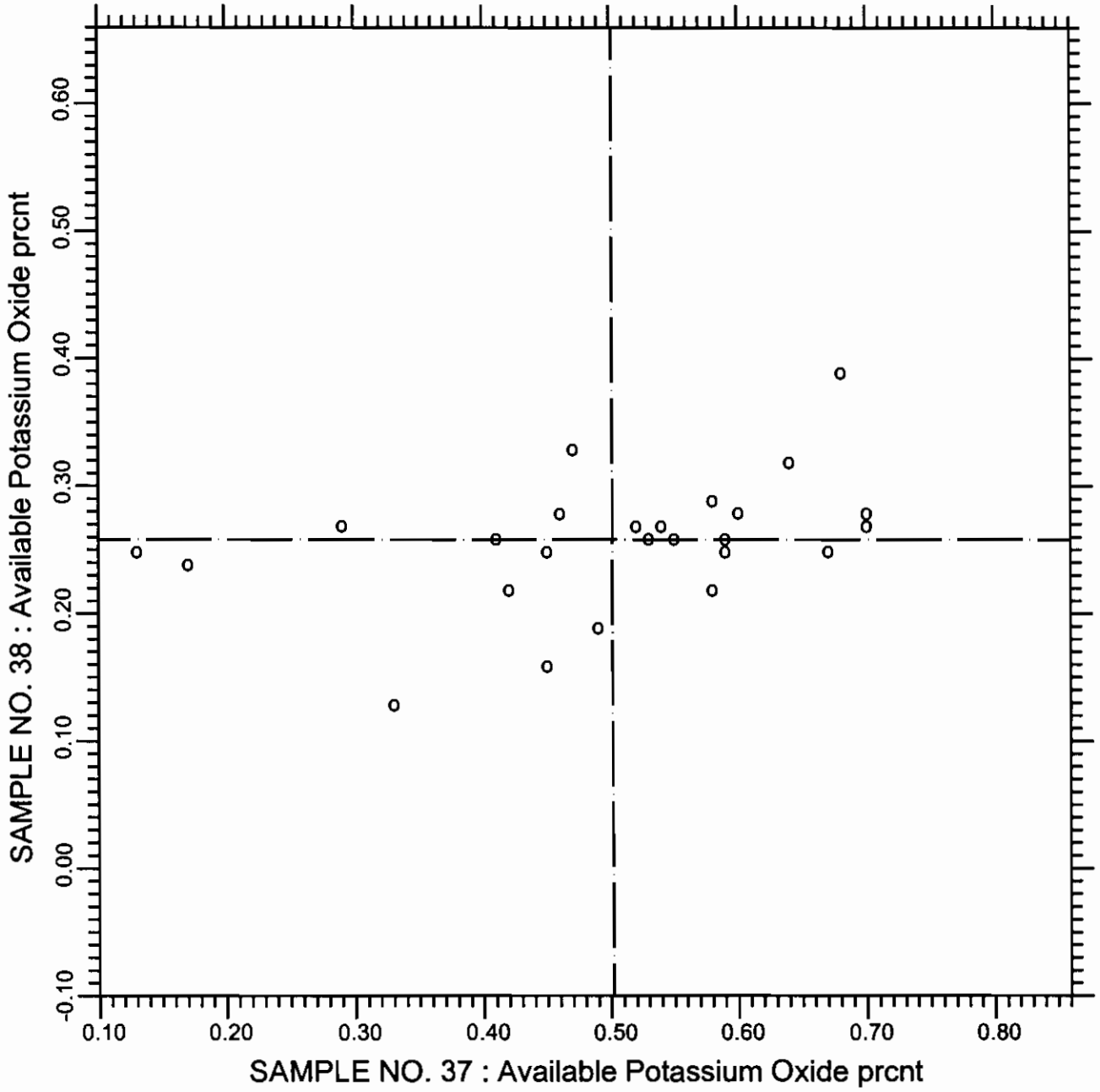
CCRL PROFICIENCY SAMPLE PROGRAM
Available Sodium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.91 Available Sodium Oxide 26 POINTS

SAMPLE NO. 37 AVE 0.605 S.D. 0.17 C.V. 28.2
SAMPLE NO. 38 AVE 2.491 S.D. 0.58 C.V. 23.3
LABS ELIMINATED 23

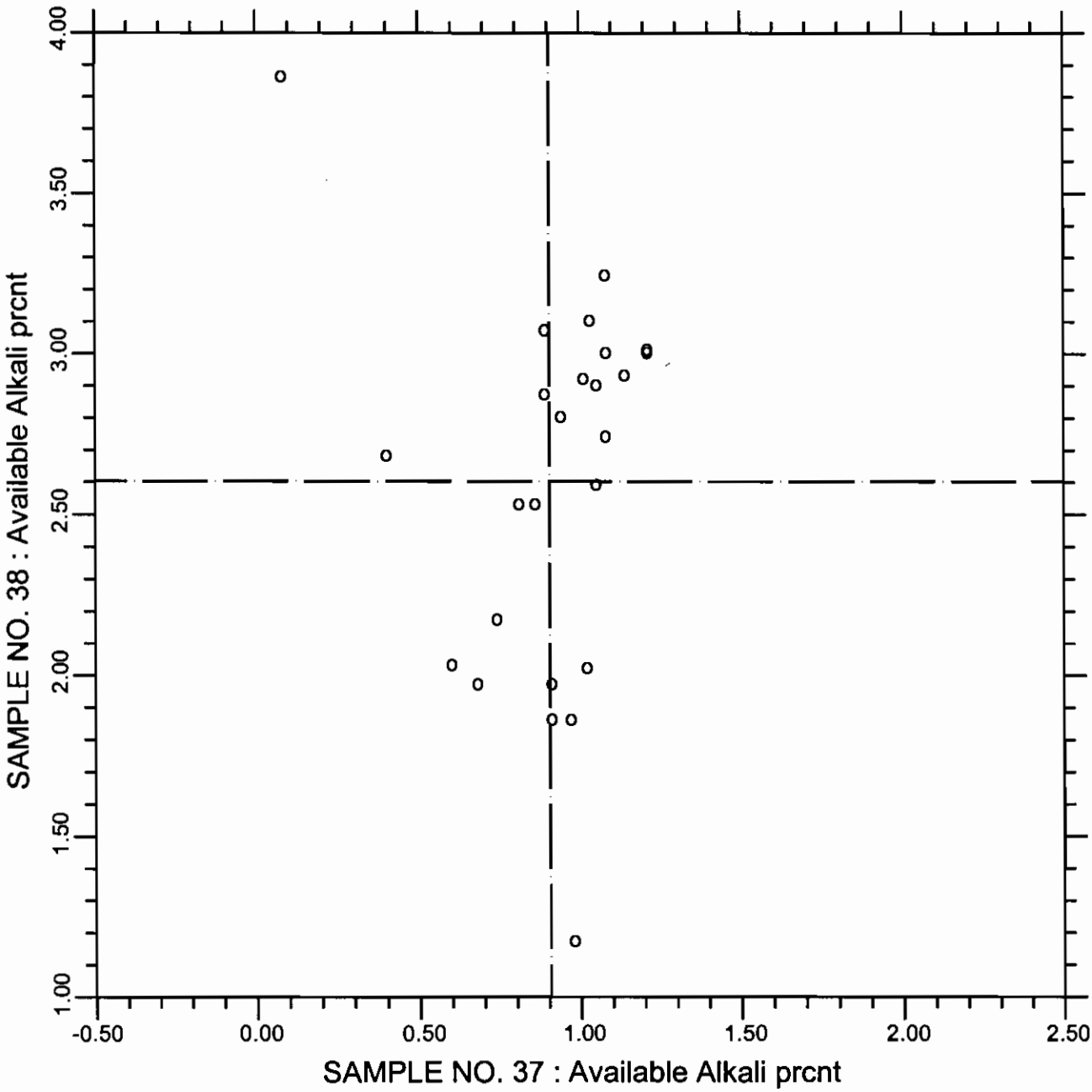
CCRL PROFICIENCY SAMPLE PROGRAM
Available Potassium Oxide
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.93 Available Potassium Oxide 25 POINTS

SAMPLE NO. 37 AVE 0.502 S.D. 0.151 C.V. 30.1
SAMPLE NO. 38 AVE 0.258 S.D. 0.051 C.V. 20.0
LABS ELIMINATED 23 207

CCRL PROFICIENCY SAMPLE PROGRAM
Available Alkali
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.95 Available Alkali 25 POINTS

SAMPLE NO. 37 AVE 0.905 S.D. 0.25 C.V. 28.0
SAMPLE NO. 38 AVE 2.603 S.D. 0.58 C.V. 22.4
LABS ELIMINATED 23 38

CCRL PROFICIENCY SAMPLE PROGRAM
Pozzolan Proficency Sample No. 37 and No. 38
Final Report - Physical Results
November 28, 2005

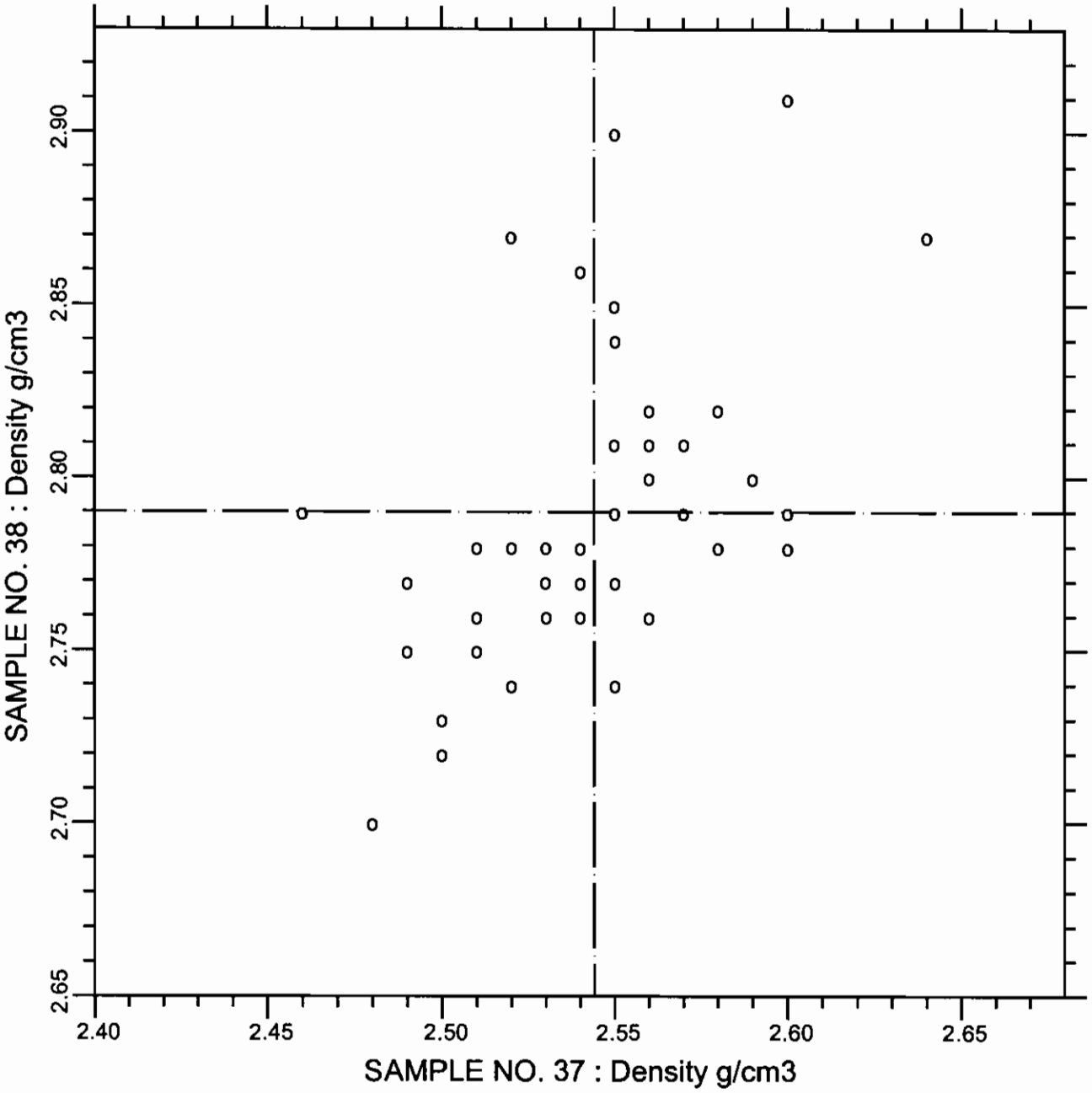
SUMMARY OF RESULTS

Test			#Labs	Sample No. 37 Average	S.D.	C.V.	Sample No. 38 Average	S.D.	C.V.
Density	g/cm^3		58	2.55	0.060	2.35	2.79	0.076	2.74
Density	g/cm^3	*	54	2.54	0.034	1.33	2.79	0.041	1.46
45 µm Sieve	prcnt		64	25.76	3.1	12.1	13.29	2.7	20.7
45 µm Sieve	prcnt	*	57	25.02	1.89	7.55	13.14	0.93	7.06
Drying Shrinkage	prcnt		13	0.010	0.022	235	0.017	0.022	130
Drying Shrinkage	prcnt	*	12	0.004	0.0078	213	0.012	0.0132	111
Autoclave Expan	prcnt		49	0.07	0.021	32.0	0.16	0.050	30.7
Autoclave Expan	prcnt	*	47	0.07	0.016	23.0	0.17	0.042	24.9
N.C. Water	prcnt		50	25.1	3.3	13.0	24.6	3.3	13.4
N.C. Water	prcnt	*	49	24.6	0.36	1.46	24.1	0.47	1.95
Air Entrainment	prcnt		7	0.044	0.034	77.0	0.029	0.022	77.9
STRENGTH ACTIVITY INDEX (SAI) WITH PORTLAND CEMENT									
SAI 7 day	prcnt		57	102	7.2	7.10	105	8.9	8.47
SAI 7 day	prcnt	*	55	101	6.7	6.58	105	7.6	7.18
SAI 28 day	prcnt		51	115	10.2	8.87	110	9.3	8.42
SAI 28 day	prcnt	*	49	114	8.2	7.17	110	8.5	7.74
SAI Water	prcnt		57	95	14.5	15.3	92	13.8	15.1
SAI Water	prcnt	*	54	98	2.1	2.12	95	2.3	2.44
EFFECTIVENESS OF MINERAL ADMIXTURES IN CONTROLLING ALKALI-SILICA REACTIONS (ASR)									
Reduction Expan	prcnt		8	71	15.2	21.48	-49	65.3	-134.23

* ELIMINATED LABS: Data over three S.D. from the mean

Density	26 37 840 1882
45 µm Sieve	29 37 480 25 284 1251 2295
Drying Shrinkage	205
Autoclave Expansion	605 2938
N.C. Water	2938
SAI 7 day	148 1251
SAI 28 day	34 36
SAI Water	26 34 158

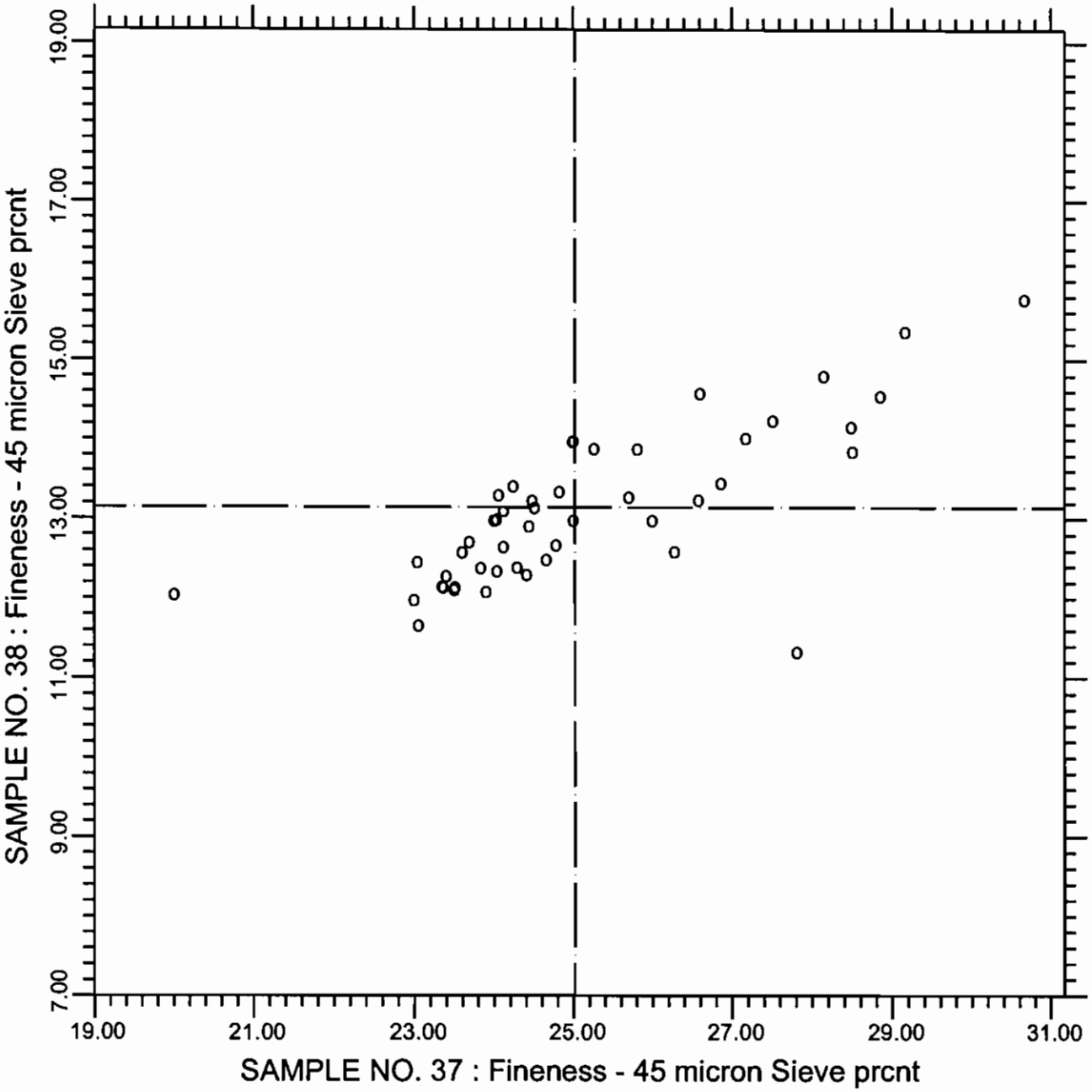
CCRL PROFICIENCY SAMPLE PROGRAM
Density
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.310 Density 54 POINTS

SAMPLE NO. 37 AVE 2.5441 S.D. 0.034 C.V. 1.33
SAMPLE NO. 38 AVE 2.7900 S.D. 0.041 C.V. 1.46
LABS ELIMINATED 26 37 840 1882

CCRL PROFICIENCY SAMPLE PROGRAM
Fineness - 45 micron Sieve Retained
POZZOLAN SAMPLES NO. 37 & NO. 38



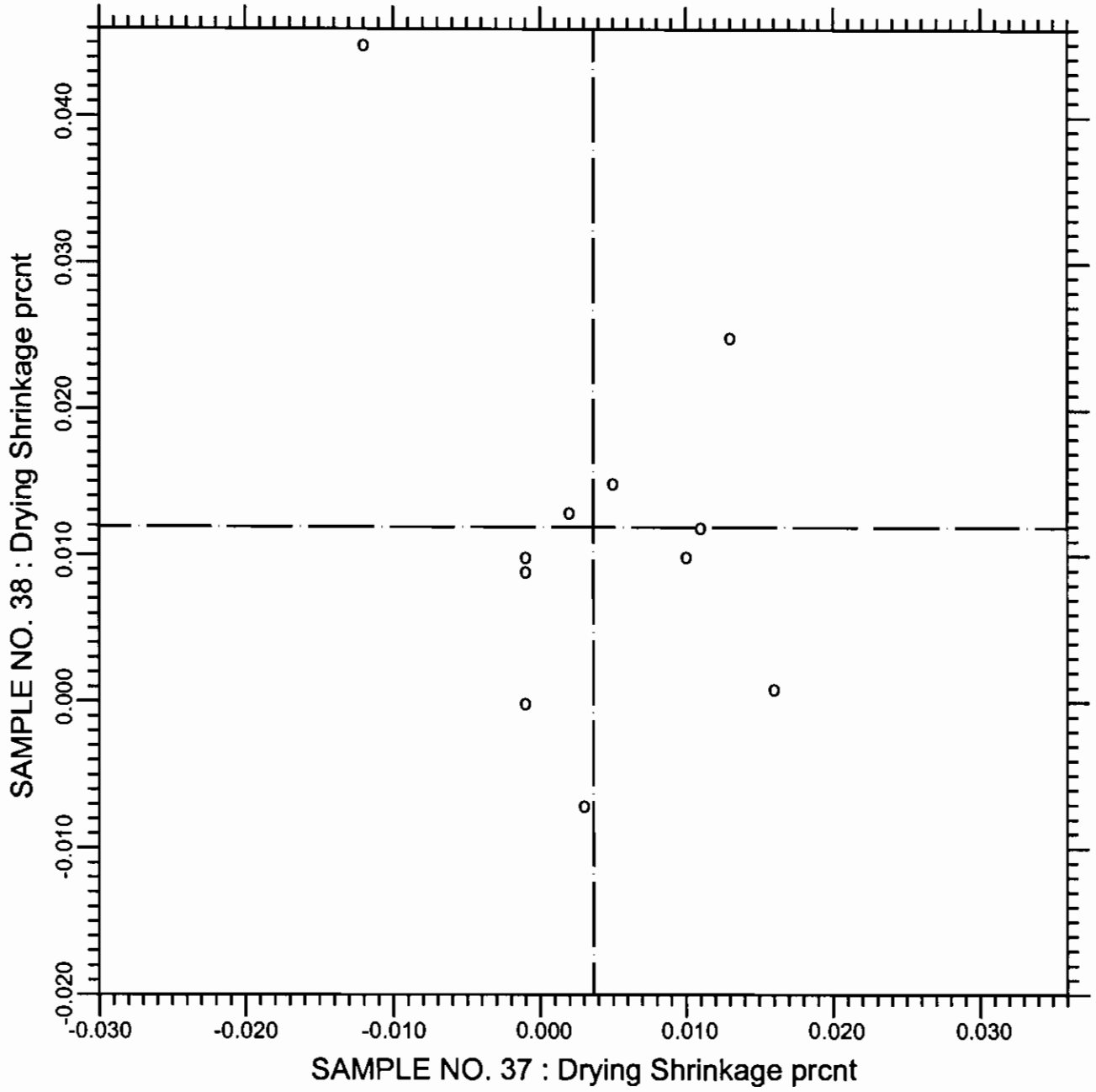
TEST NO.281 Fineness - 45 micron Sieve 57 POINTS

SAMPLE NO. 37 AVE 25.02 S.D. 1.89 C.V. 7.55

SAMPLE NO. 38 AVE 13.14 S.D. 0.93 C.V. 7.06

LABS ELIMINATED 29 37 480 25 284 1251 2295

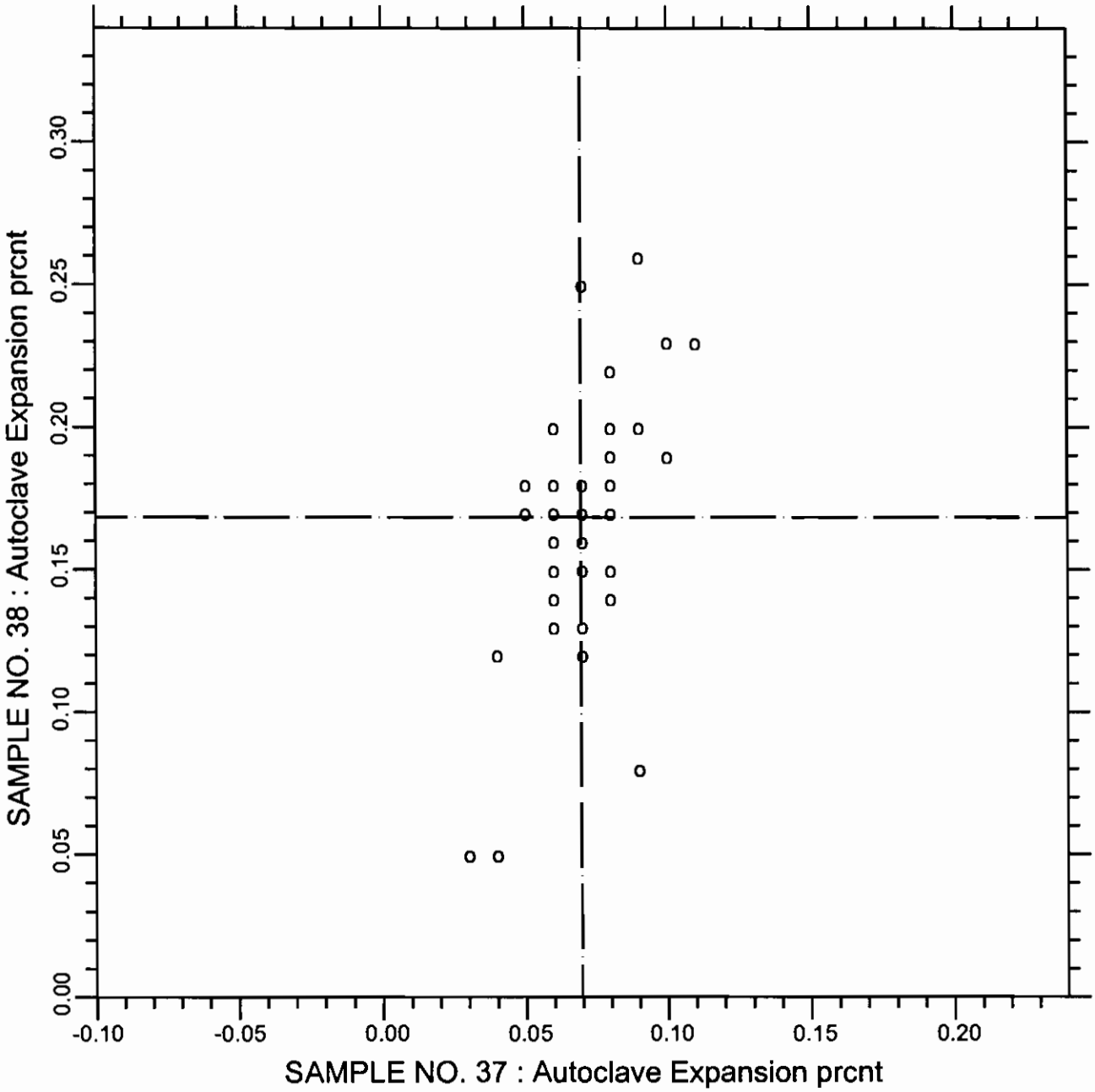
CCRL PROFICIENCY SAMPLE PROGRAM
Drying Shrinkage
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.340 Drying Shrinkage 12 POINTS

SAMPLE NO. 37 AVE 0.0037 S.D. 0.0078 C.V. 213
SAMPLE NO. 38 AVE 0.0119 S.D. 0.0132 C.V. 111
LABS ELIMINATED 205

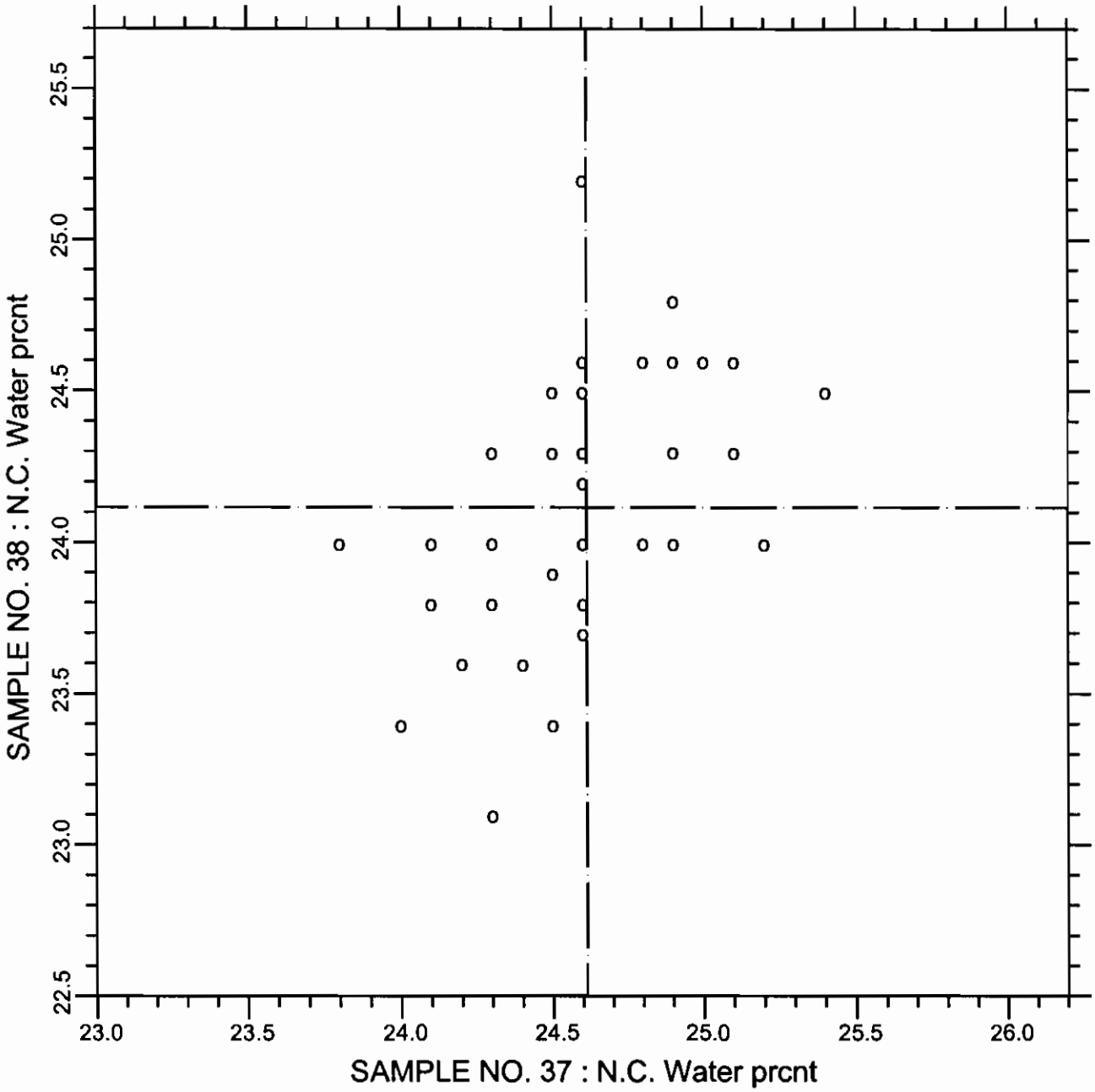
CCRL PROFICIENCY SAMPLE PROGRAM
Autoclave Expansion
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.160 Autoclave Expansion 47 POINTS

SAMPLE NO. 37 AVE 0.0696 S.D. 0.016 C.V. 23.0
SAMPLE NO. 38 AVE 0.1683 S.D. 0.042 C.V. 24.9
LABS ELIMINATED 605 2938

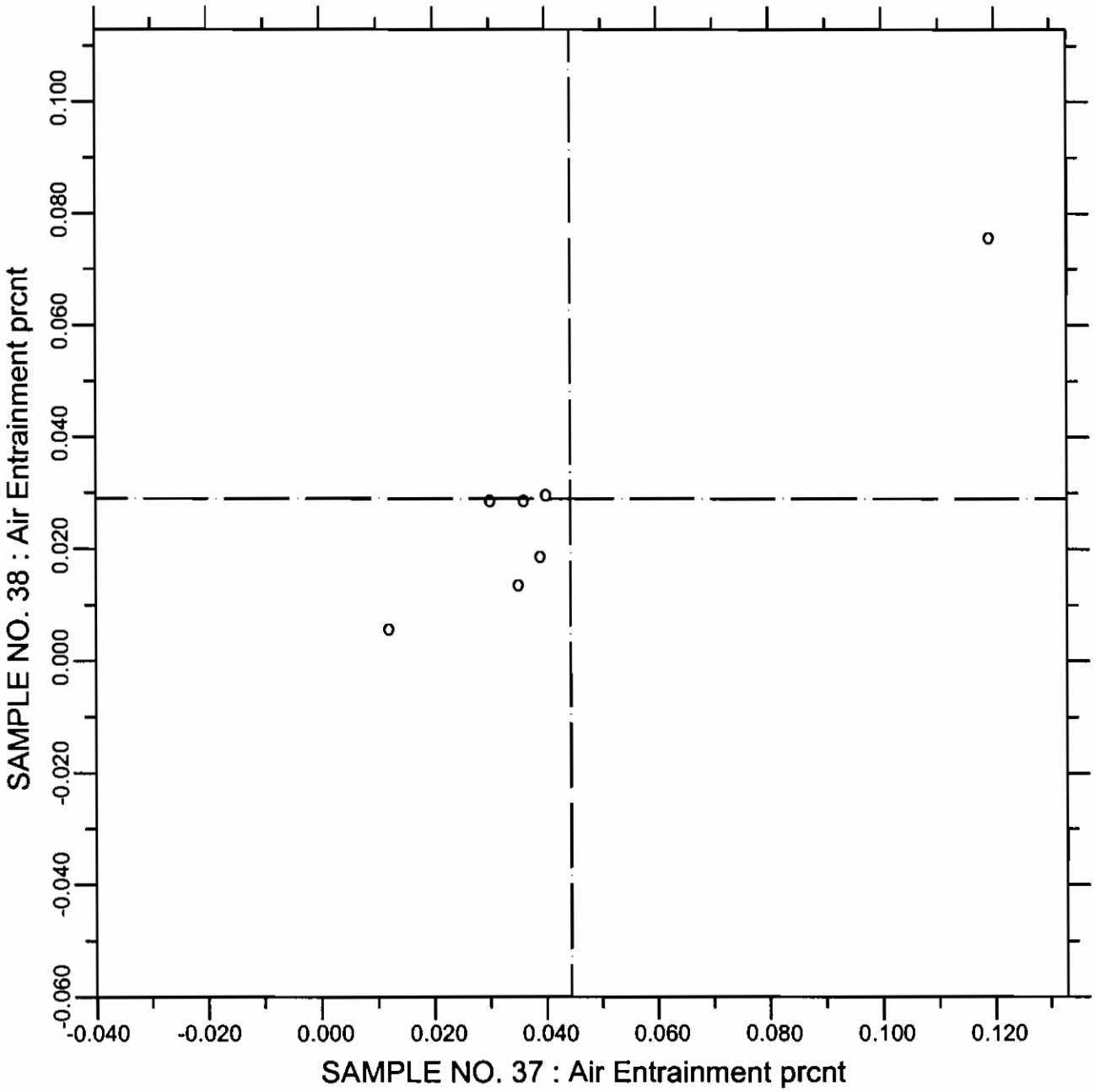
CCRL PROFICIENCY SAMPLE PROGRAM
Normal Consistency Water
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.110 N.C. Water 48 POINTS

SAMPLE NO. 37 AVE 24.614 S.D. 0.36 C.V. 1.46
SAMPLE NO. 38 AVE 24.116 S.D. 0.47 C.V. 1.95
LABS ELIMINATED 2938
LABS OFF DIAGRAM 2295

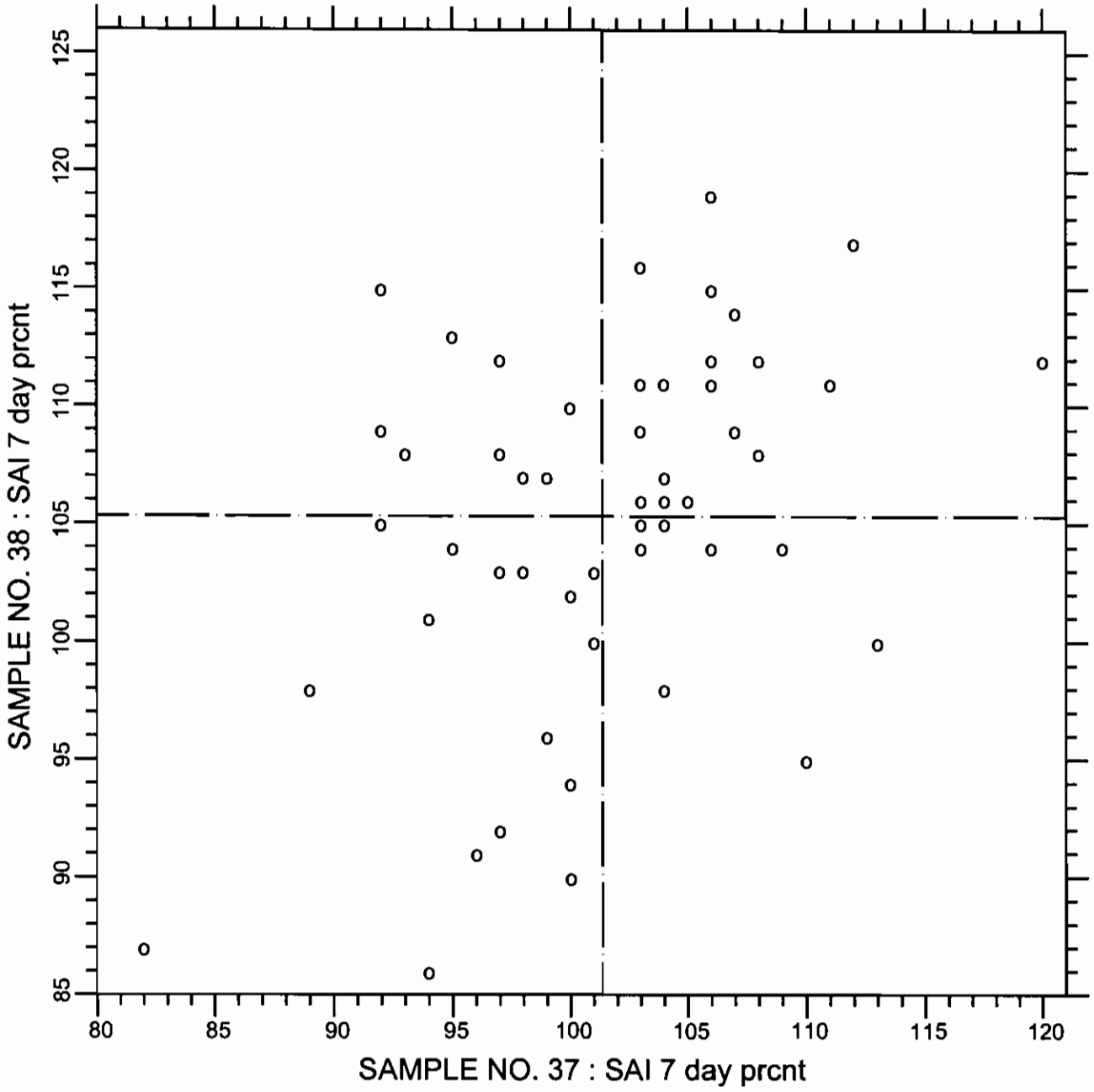
CCRL PROFICIENCY SAMPLE PROGRAM
Air Entrainment
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.350 Air Entrainment 7 POINTS

SAMPLE NO. 37	AVE	0.0444	S.D.	0.034	C.V.	77.0
SAMPLE NO. 38	AVE	0.0290	S.D.	0.022	C.V.	77.9

CCRL PROFICIENCY SAMPLE PROGRAM
Strength Activity Index - 7 day
POZZOLAN SAMPLES NO. 37 & NO. 38



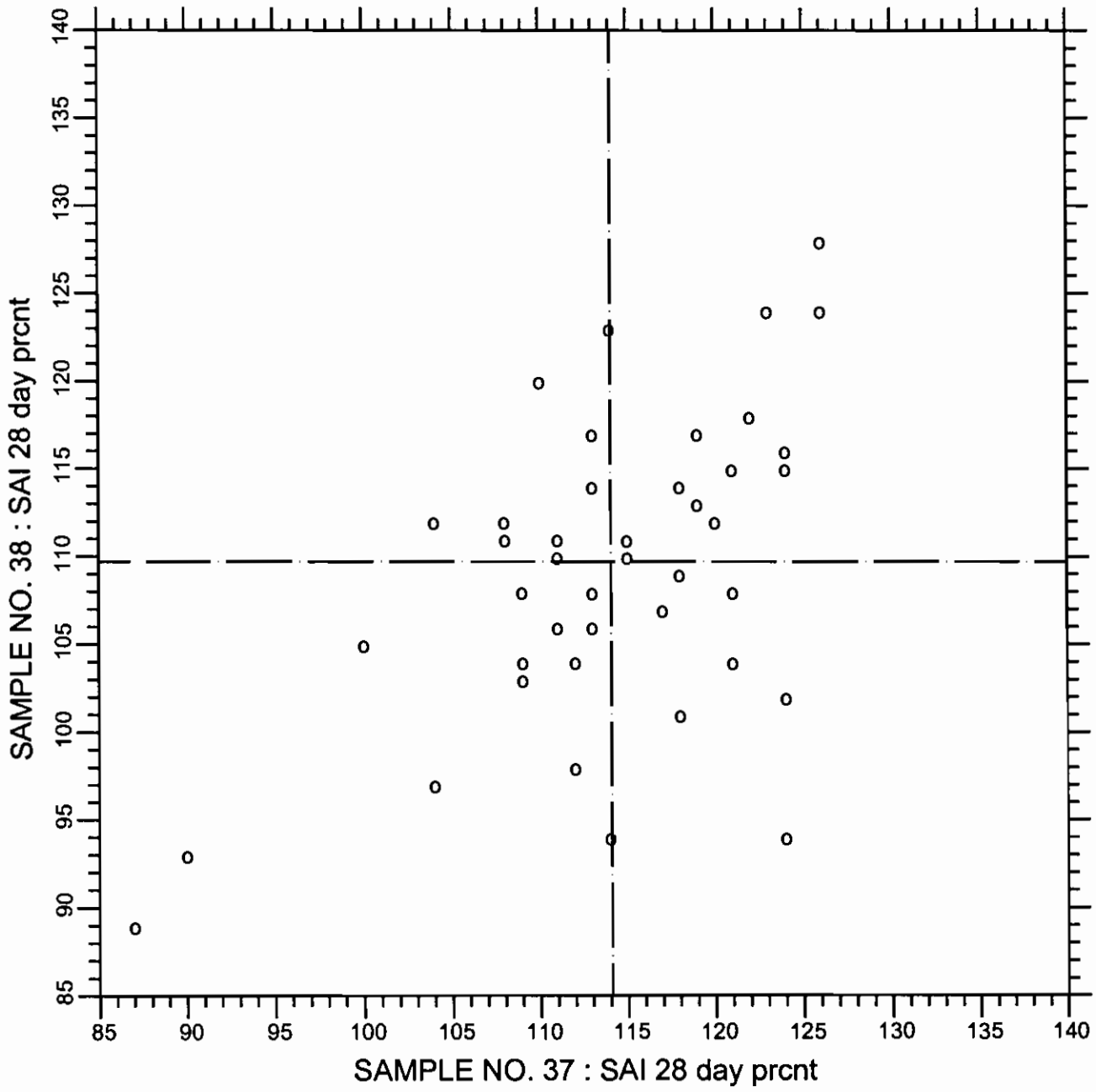
TEST NO.359 SAI 7 day 55 POINTS

SAMPLE NO. 37 AVE 101.38 S.D. 6.7 C.V. 6.58

SAMPLE NO. 38 AVE 105.31 S.D. 7.6 C.V. 7.18

LABS ELIMINATED 148 1251

CCRL PROFICIENCY SAMPLE PROGRAM
Strength Activity Index - 28 day
POZZOLAN SAMPLES NO. 37 & NO. 38



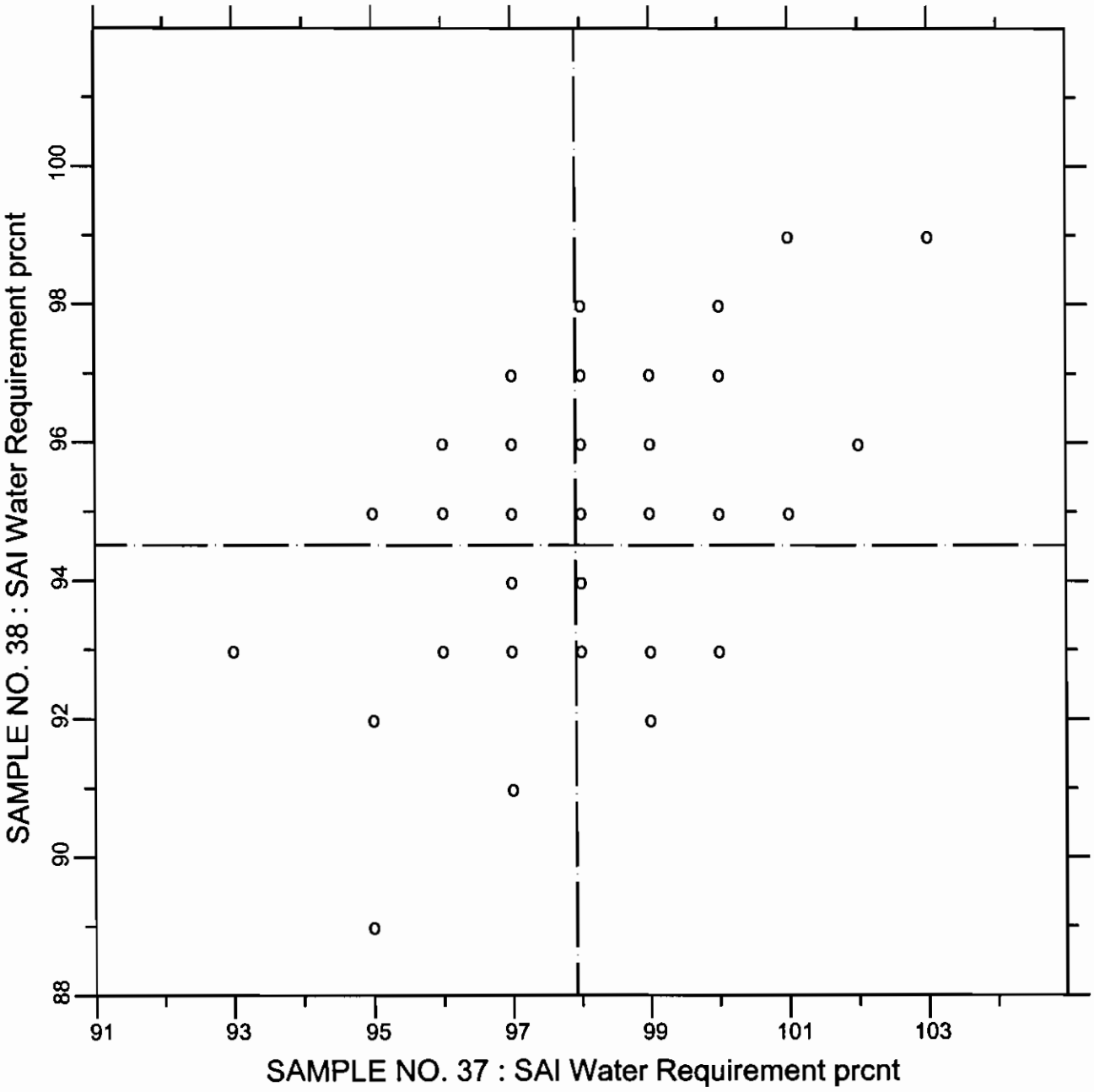
TEST NO.360 SAI 28 day 49 POINTS

SAMPLE NO. 37 AVE 114.1 S.D. 8.2 C.V. 7.17

SAMPLE NO. 38 AVE 109.7 S.D. 8.5 C.V. 7.74

LABS ELIMINATED 34 36

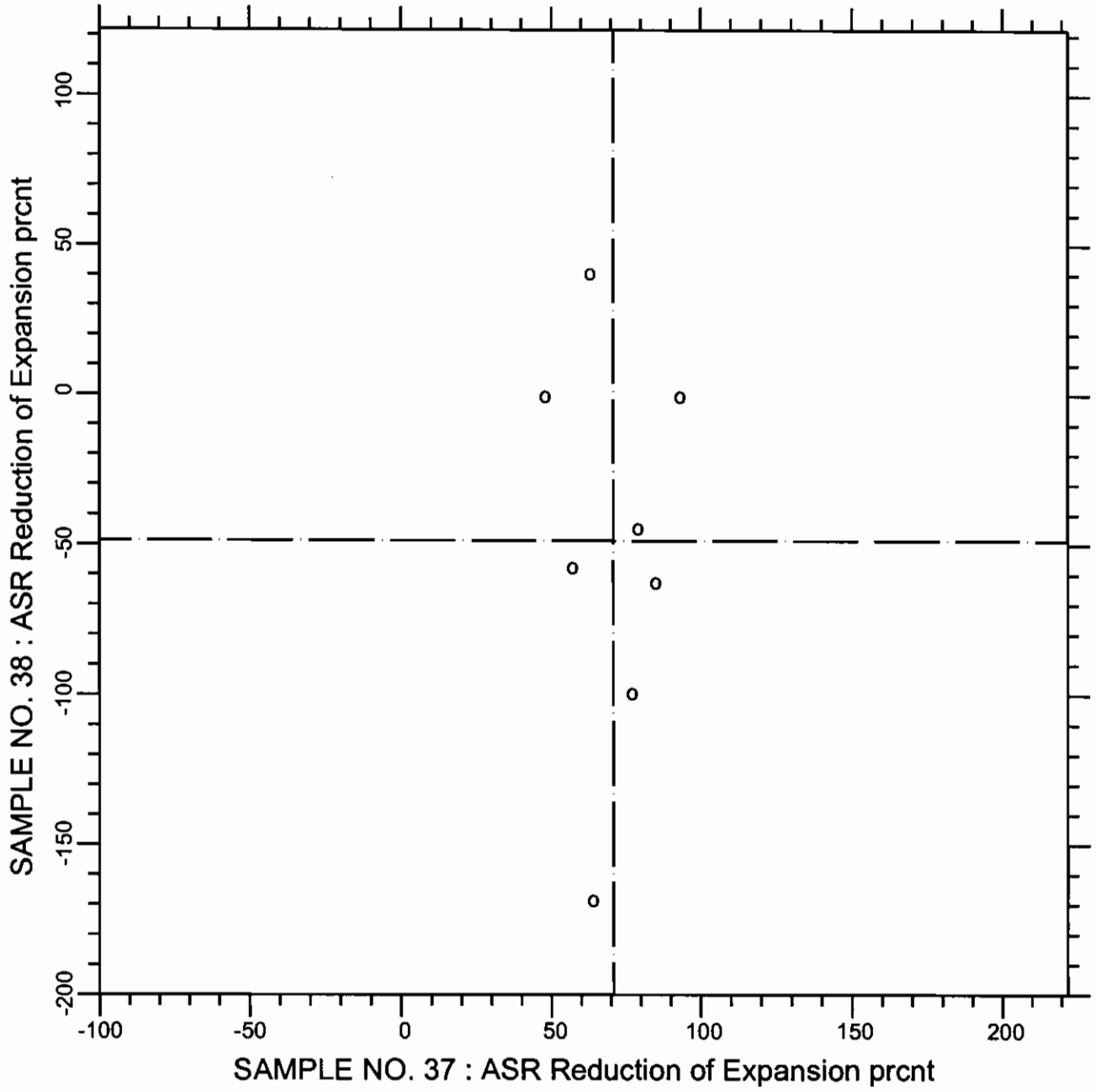
CCRL PROFICIENCY SAMPLE PROGRAM
SAI Water Requirement
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.370 SAI Water Requirement 53 POINTS

SAMPLE NO. 37 AVE 97.92 S.D. 2.1 C.V. 2.12
SAMPLE NO. 38 AVE 94.52 S.D. 2.3 C.V. 2.44
LABS ELIMINATED 26 34 158
LABS OFF DIAGRAM 2382

CCRL PROFICIENCY SAMPLE PROGRAM
Alkali-Silica Reaction - Reduction of Expansion
POZZOLAN SAMPLES NO. 37 & NO. 38



TEST NO.390 ASR Reduction of Expansion 8 POINTS

SAMPLE NO. 37	AVE 70.8	S.D. 15.2	C.V. 21.5
SAMPLE NO. 38	AVE -48.6	S.D. 65.3	C.V. -134.2