

Lab Code U****A

Here is a sample of an Individual Report sent to participants in the CTS Fasteners & Metals Interlaboratory Testing Program. You can view the Summary Reports of all participants' data on this Web site.

Lab Manager
Company Name
123 Main Street
Your town, Your state 12345

This is your Individual Report from Metals Program Cycle # 65 , 1st Q 2004

For guidance on interpreting this report, please refer to Report Guide, located in the Fasteners & Metals section of our website www.collaborativetesting.com If you need assistance with interpreting the statistics & terms used in the report, please reference the [Key to Individual Reports](#) that can be found on the reverse of this page. As always, you may contact the Metals Program Analyst for assistance with any aspect of the program.

On each "Performance Analysis Report" there is a WebCode printed in the first column. Use your WebCodes to locate your results in the Summary Report that is now available on our Web site. In order to maintain confidentiality, your WebCode will be unique for each analysis and will change with each report.

Collaborative Testing Services, Inc
21331 Gentry Drive
Sterling, VA 20166 USA
Voice: 571-434-1925
Fax: 571-434-1937
metals@cts-interlab.com

Key to Individual Reports in the Fasteners & Metals Program

- WebCode** - Assigned laboratory identification number (temporary) used to ensure lab confidentiality while permitting a lab to locate its data in the Fasteners & Metals Report published on the CTS web site.
- Lab Mean** - The mean of the test results obtained by the participant.
- Grand Mean** - The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.
- Between-Lab Standard Deviation** - An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).
- Comparative Performance Value (CPV)** - An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. $CPV = (LAB\ MEAN - GRAND\ MEAN) / BETWEEN-LAB\ STANDARD\ DEVIATION$. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa).

- Data Flag** - DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

<u>Data Flag</u>	<u>Statistically Included/Excluded</u>	<u>ACTION REQUIRED</u>
*	INCLUDED	CAUTION - review testing procedure and monitor future results. Results fall outside the drawn 95% ellipse but within a 99% ellipse that is calculated but not drawn. Labs flagged with an * do not typically receive a specific note regarding the flag. If this error is repeated in future rounds, however, a lab may need to stop and review its testing procedures. The initial data flag is not cause for alarm.
X	EXCLUDED	STOP - immediate review of data and/or testing procedure is required. Results fall outside the 99% ellipse. See the specific note following the data for more information on why the data is excluded.
M	EXCLUDED	PROCEED - lab was unable to report data for at least one sample. However, a lab receiving two or more M flags for a test may need to stop and review its testing procedures.

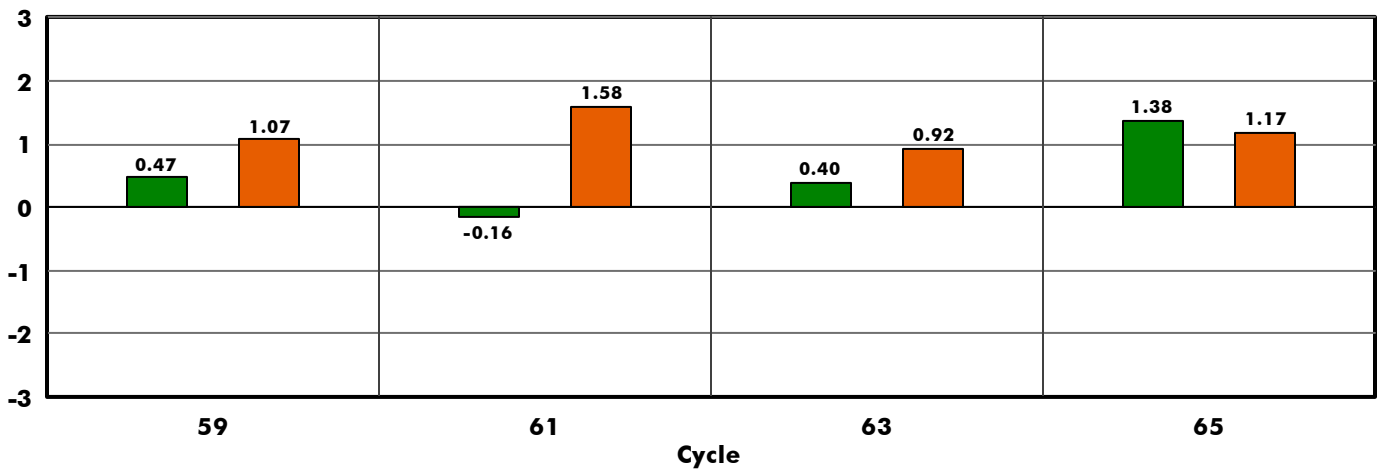
- Graph** - For each laboratory, the Lab Mean for the second sample (y-axis) is plotted against the Lab Mean for the first sample (x-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the Grand Means for each sample. When 20 or more laboratories are included in the statistics, an ellipse is also drawn so that 95% of the time a randomly selected laboratory will be included inside the ellipse. Plotted data flags are explained above. Labs not receiving a data flag appear as points on the plot. Your location on the plot is now highlighted, enabling you to quickly find your data.

Analysis #110: Tensile Strength (Pre-Machined Round Steel) - ksi

using Test Method: **ASTM E8**

CPV

Historical Chart of CPV Results



A maximum of 4 test cycles are printed on this page. If there are fewer than 4 sets of bar graphs on the chart and the laboratory was enrolled for all cycles, then one of the following situations occurred: this test was not conducted every cycle or lab did not submit data for a particular test/testing cycle or the data sheets were received late.

$$\text{WebCode} \quad \text{Test Cycle} \quad \text{Sample/Material} \quad \left(\begin{array}{cc} \text{Lab Mean} & - & \text{Grand Mean} \end{array} \right) \div \text{Between Lab Std Dev} = \text{CPV} \quad \text{Data Flag (if assigned)}$$

AAAAA1	59	A25	AISI 1018	72.10	71.715	0.819	0.47	58 of 60 labs included
		A26	AISI 1018	66.60	65.767	0.782	1.07	

BBBBB1	61	A29	AISI 4340	146.10	146.234	0.859	-0.16	47 of 49 labs included
		A30	AISI 4340	140.20	135.628	2.894	1.58	

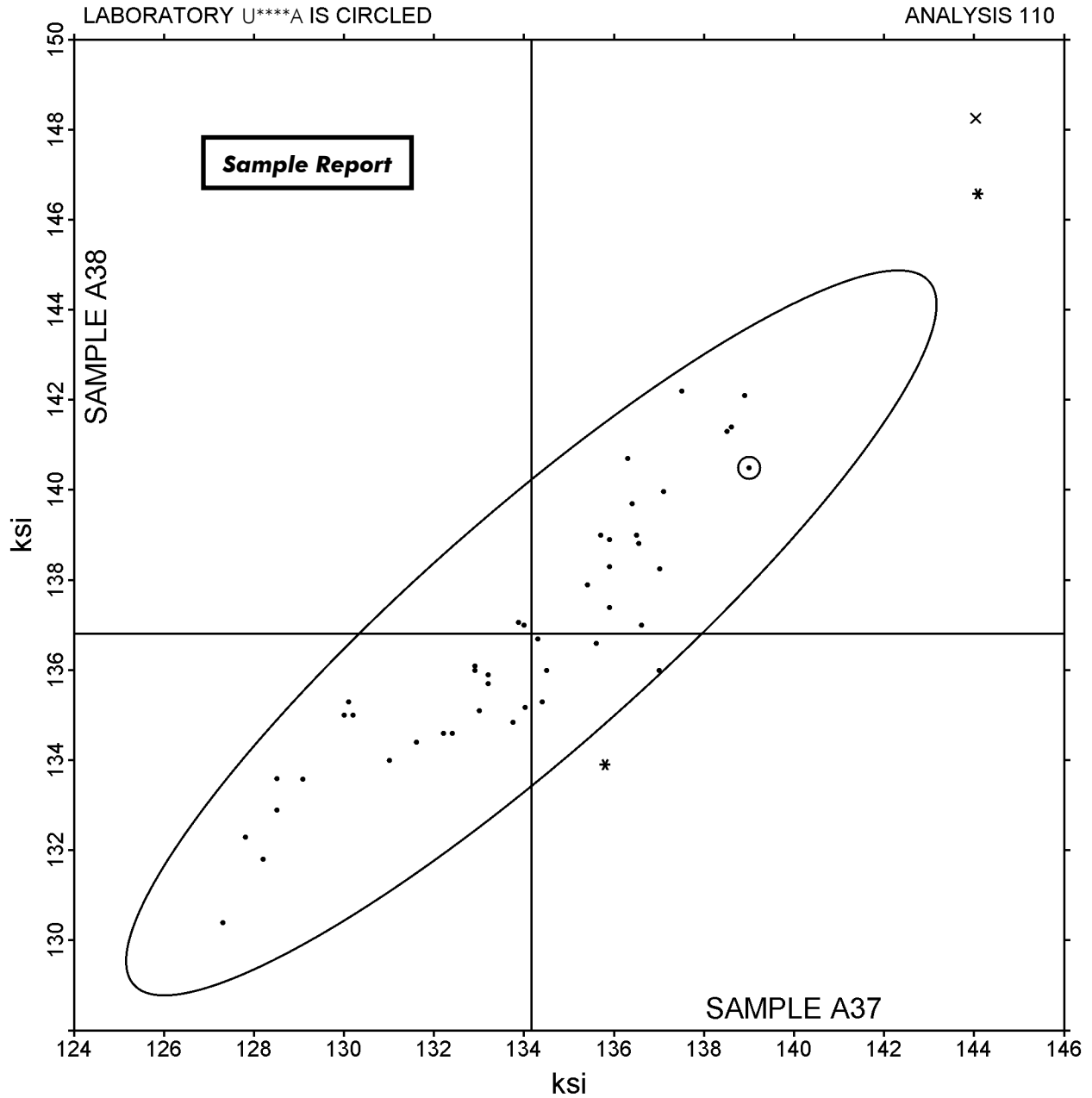
CCCCC1	63	A33	AISI 1045	112.40	111.941	1.156	0.40	54 of 57 labs included
		A34	AISI 1045	104.80	103.657	1.245	0.92	

DDDDD1	65	A37	AISI 4340	139.00	134.155	3.515	1.38	46 of 48 labs included
		A38	AISI 4340	140.50	136.823	3.142	1.17	

Overall Statement for this Cycle

Data Flag Assigned: None. Your data were consistent with the other laboratories.

Sample report



WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV

DDDDD1		139.00	4.84	1.38	140.50	3.68	1.17
--------	--	--------	------	------	--------	------	------

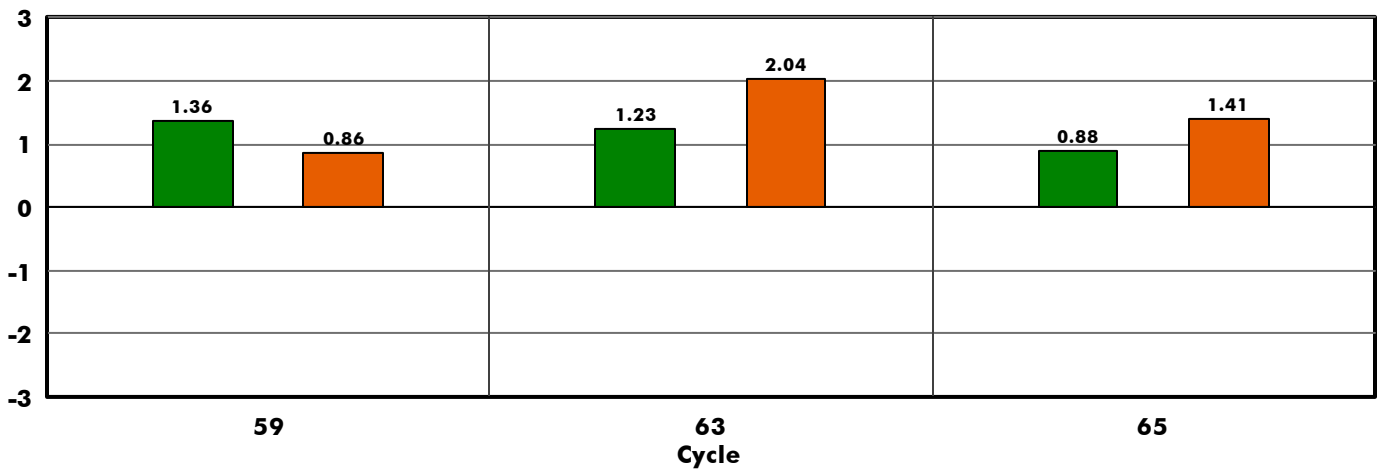
Consensus Results (all laboratories)			
Grand Means		134.155 ksi	136.823 ksi
Btwn Lab Standard Deviation		3.515 ksi	3.142 ksi
<i>Consensus statistics based on 46 of 48 reporting participants</i>			

Samples A37 , A38 : AISI 4340 steel

Analysis #123: Microhardness - Vickers Hardness Number (500 gf)

using Test Method: **ASTM E384**

CPV **Historical Chart of CPV Results**



A maximum of 4 test cycles are printed on this page. If there are fewer than 4 sets of bar graphs on the chart and the laboratory was enrolled for all cycles, then one of the following situations occurred: this test was not conducted every cycle or lab did not submit data for a particular test/testing cycle or the data sheets were received late.

$$\text{WebCode} \quad \text{Test Cycle} \quad \text{Sample/Material} \quad \left(\begin{array}{c} \text{Lab Mean} \\ - \\ \text{Grand Mean} \end{array} \right) \div \text{Between Lab Std Dev} = \text{CPV} \quad \text{Data Flag (if assigned)}$$

AAAAAA2	59	S25	steel	499.1	481.88	12.58	1.36	118 of 126 labs included
		S26	steel	555.6	544.43	12.98	0.86	

CCCCC2	63	S33	steel	391.4	378.10	10.76	1.23	130 of 136 labs included
		S34	steel	495.2	472.81	10.98	2.04	

DDDDD2	65	S37	steel	420.2	409.56	12.07	0.88	118 of 126 labs included
		S38	steel	480.4	464.02	11.66	1.41	

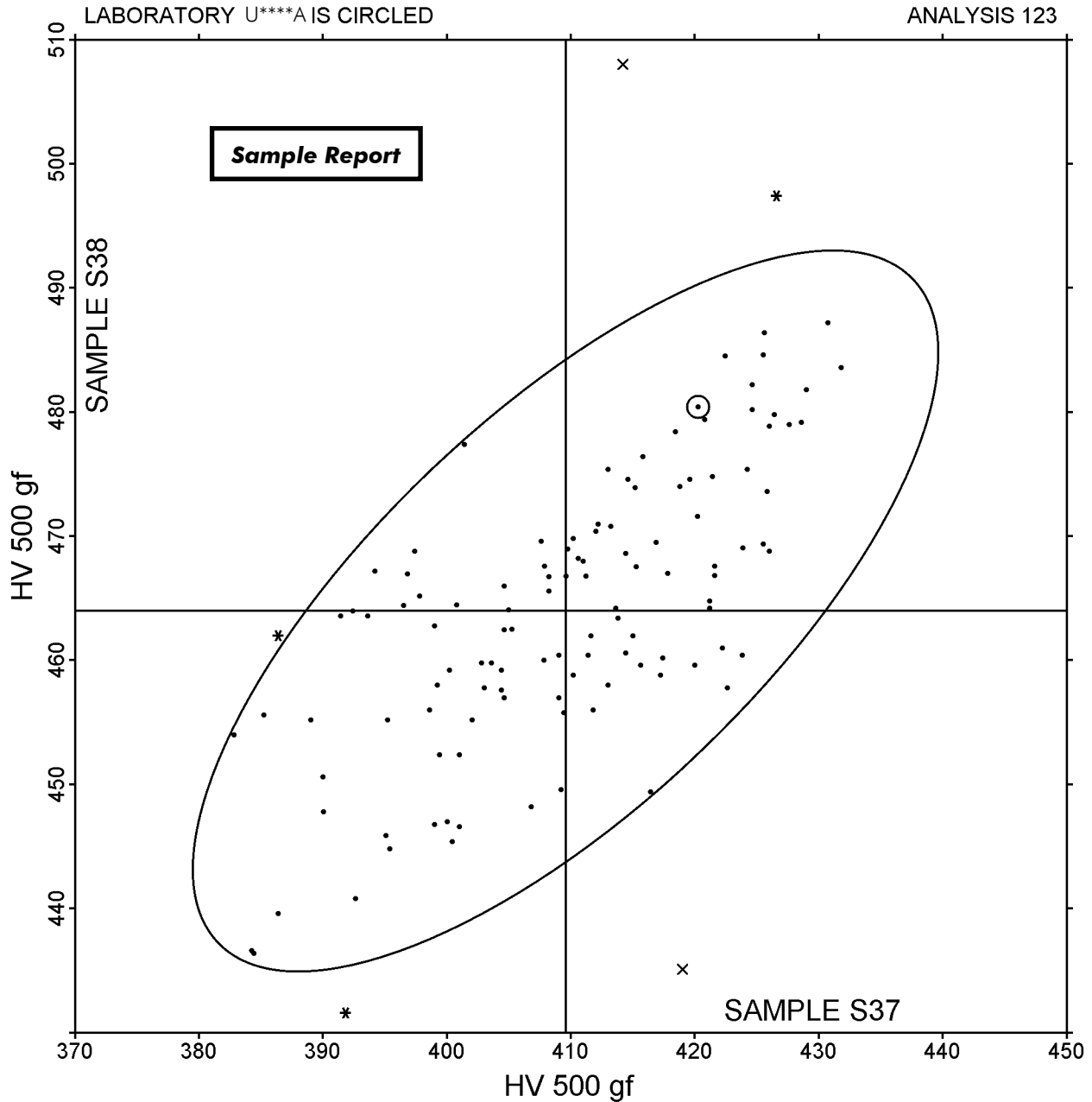
Overall Statement for this Cycle

Data Flag Assigned: None. Your data were consistent with the other laboratories.

Sample report

Analysis #123: Microhardness - Vickers Hardness Number (500 gf)

using Test Method: ASTM E384



WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV

DDDDD2		420.2	10.7	0.88	480.4	16.4	1.41
--------	--	-------	------	------	-------	------	------

Consensus Results (all laboratories)

Grand Means	409.56 HV 500 gf	464.02 HV 500 gf
Btwn Lab Standard Deviation	12.07 HV 500 gf	11.66 HV 500 gf

Consensus statistics based on 118 of 126 reporting participants

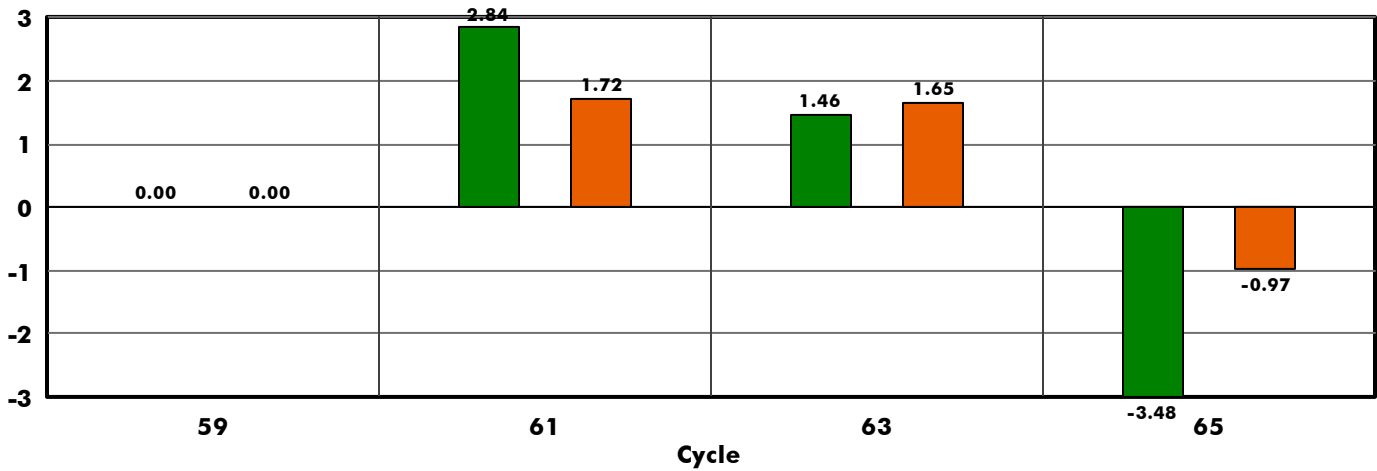
Samples S37 , S38 are hardness test blocks made from steel. The blocks are heat treated to hardness levels specified by CTS.

Analysis #171: Chemical Analysis Element #2 - Carbon & Low Alloy Steel - Percent

MANGANESE (Mn)

CPV

Historical Chart of CPV Results



A maximum of 4 test cycles are printed on this page. If there are fewer than 4 sets of bar graphs on the chart and the laboratory was enrolled for all cycles, then one of the following situations occurred: this test was not conducted every cycle or lab did not submit data for a particular test/testing cycle or the data sheets were received late.

$$\text{WebCode} \quad \text{Test Cycle} \quad \text{Sample/Material} \quad \left(\begin{array}{c} \text{Lab Mean} \\ - \\ \text{Grand Mean} \end{array} \right) \div \begin{array}{c} \text{Between} \\ \text{Lab Std Dev} \end{array} = \text{CPV} \quad \text{Data Flag (if assigned)}$$

AAAAA3	59	L25	AISI 4620	No data reported.				
		L26	AISI 4820	No data reported.				

BBBBB3	61	L29	AISI 8740	0.949	0.9173	0.0112	2.84	*	129 of 142 labs included
		L30	AISI 8740	0.927	0.9028	0.0139	1.72		

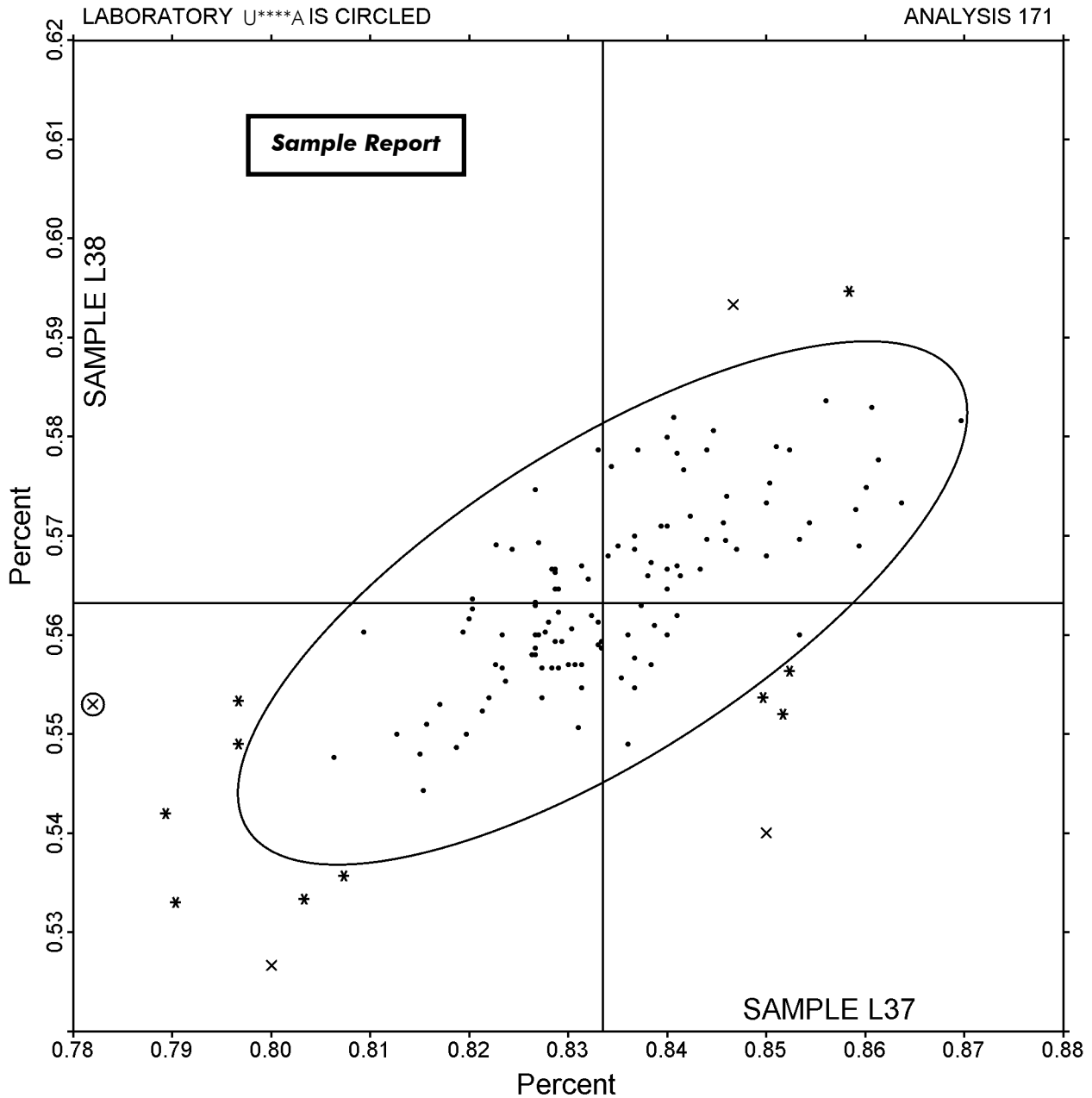
CCCCC3	63	L33	AISI 1018	0.684	0.6701	0.0093	1.46		134 of 152 labs included
		L34	AISI 1018	0.761	0.7437	0.0105	1.65		

DDDDD3	65	L37	AISI 4140	0.782	0.8334	0.0148	-3.48	X	122 of 126 labs included
		L38	AISI 4130	0.553	0.5633	0.0106	-0.97		

Overall Statement for this Cycle

Action Item ! Your performance for this cycle was assigned an X Data Flag. Analyst Comment: Low data for Sample L37

Sample report



WebCode	Data Flag	Sample L37			Sample L38		
		Lab Mean	Diff from Grand Mean	CPV	Lab Mean	Diff from Grand Mean	CPV
DDDDD3	X	0.782	-0.051	-3.48	0.553	-0.010	-0.97

Consensus Results (all laboratories)							
Grand Means	0.8334 Percent			0.5633 Percent			
Btwn Lab Standard Deviation	0.0148 Percent			0.0106 Percent			
<i>Consensus statistics based on 122 of 126 reporting participants</i>							

Samples L37 , L38 : AISI 4140, AISI 4130