



# Fasteners & Metals Interlaboratory Testing Program

Summary Report Cycle 115, 3rd Qtr 2016

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## ABOUT THE FASTENERS & METALS PROGRAM

Collaborative Testing Services operates and maintains the program for Fasteners and Metals as part of a series of Proficiency and Interlaboratory Testing Programs offered by CTS in cooperation with various associations for a wide range of industries. Personnel from the National Institute of Standards and Technology (formerly the National Bureau of Standards), Industrial Fasteners Institute (IFI), and the Naval Shipyard Laboratories provide technical guidance and advice to this program.

The purpose of the program is to give participating laboratories a means to compare periodically the level and uniformity of their testing with that of other laboratories in the industry. It also provides a realistic assessment of the state of fasteners and metals testing proficiency.

In each report, there is a summary of the statistics for the analysis and a graphical representation of the data for each test. Also shown are notes concerning specific laboratory results, as well as significant findings related to instrument types or other testing variations. Refer to the KEY TO TABLES AND GRAPHS for an explanation of terms and guidelines to interpreting the results.

## ABOUT CTS

Founded in 1971, CTS is a privately-owned company that specializes in interlaboratory tests for a wide variety of industries, including rubber, plastics, fasteners and metals, containerboard, paper, color, and wine as well as proficiency tests for forensic laboratories. All of the tests are designed to assist organizations in achieving and maintaining quality control objectives. Labs from the U.S., as well as more than 50 countries, currently participate in the CTS programs.

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## Key for Fasteners & Metals Program Web Summary Report

- WebCode** - Assigned laboratory identification number(temporary)used to ensure lab confidentiality while permitting a lab to locate its data in the report published on the CTS website.
  
- Lab Mean** - The average 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).
  
- Instr. Code** - A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).
  
- 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:

### Data Flags

Data Flag Type	Statistically Included/Excluded	ACTION REQUIRED
*	INCLUDED	<b>CAUTION</b> - 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	<b>STOP</b> - immediate review of data and/or testing procedure is required (all tests except Chemical Analyses). Results fall outside the 99% ellipse. See the specific note following the data for more information on why the data are excluded. For Chemical Analyses see an additional Memo.
M	EXCLUDED	<b>PROCEED</b> - 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.

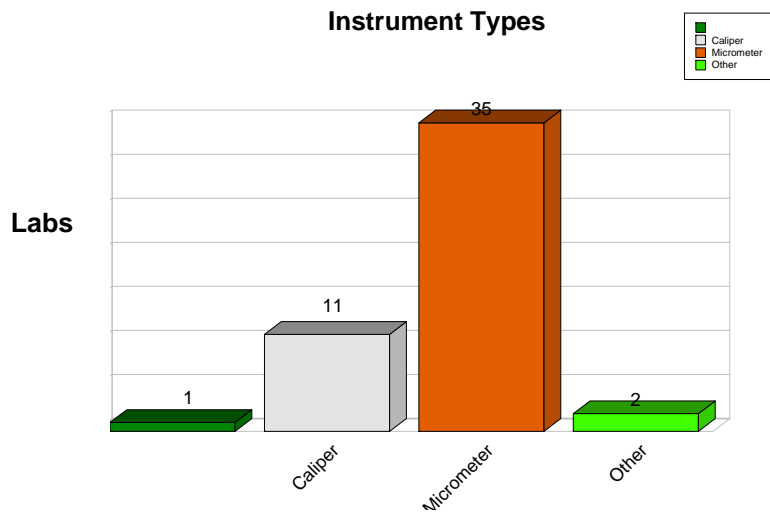
**Graph** - For each laboratory, the Lab Mean for the second sample (y-axis) is plotted against the Lab Mean for the first sample (x-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the Grand Means for each sample. When 20 or more laboratories are included 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.



Analysis 101

Dimensional: Outside Diameter of Plain Plug Gage  
ISO GUM

During Cycle 115, CTS conducted the Analysis #101 - Round Dimensional. For this test all participants received two samples I37 and I38 with nominal diameters; 0.2502 in. and 0.2500 in. Each sample is an English Class X gage pin with 0.00002 in roundness limit made from 52100 bearing steel, hardened to 60-62 Rockwell C. Laboratories were asked to determine the outside diameter of the pins. 49 laboratories that subscribed for this test reported testing results. The graph below shows a breakdown of the types of instruments used.



Analysis of the Results

The most convenient and common method of judging the quality of measurement results is by calculating the performance statistic,  $E_n$ , calculated as:

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

Where the assigned value,  $X_{ref}$ , is determined in a reference laboratory,  $U_{ref}$  is the expanded uncertainty of  $X_{ref}$ , and  $U_{lab}$  is the **Expanded Uncertainty** of a participant's result,  $X_{lab}$ .  $E_n$  is not calculated for Labs who did not report their Expanded Uncertainty.

Absolute values of  $E_n$  less than **1.00** should be obtained for the measurements to be acceptable.

The following graph and the table represent the results reported by participants. All tests were conducted at room temperature (20-23C or 68-77F).

$X_{ref}$  and  $U_{ref}$  were determined by the gage pin manufacturer. The manufacturer is ISO 9001:2000 Certified and an ISO 17025 Accredited company. All master gages used in checking the plug gages are calibrated with standards traceable to NIST.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 101

### Dimensional: Outside Diameter of Plain Plug Gage ISO GUM

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

Xref1 = 0.2502 in.

Xref2 = 0.2500 in.

**Sample I37**

**Sample I38**

WebCode	Data Flag (if assigned)	Reference Uncertainty (Uref)	Expanded Uncertainty (Ulab)	Lab Mean (Xlab)	Performance Statistic (En1)	Lab Mean (Xlab)	Performance Statistic (En2)	Instrument
37DPK9		0.00004	0.00100	0.25000	-0.20	0.24980	-0.20	Micrometer
3GRRXT		0.00004	0.00027	0.25016	-0.15	0.24995	-0.19	Micrometer
3KA2TC		0.00004	0.00050	0.25000	-0.40	0.24990	-0.20	Micrometer
3KEG8Y		0.00004	0.00020	0.25018	-0.09	0.24998	-0.12	Micrometer
3T8WQB	X	0.00004	0.00015	0.25000	-1.29	0.24990	-0.64	Micrometer
4ZFR72	X	0.00004	0.00008	0.25006	-1.55	0.24988	-1.34	Micrometer
64TW84		0.00004	Not Reported	0.25012		0.24994		Micrometer
6MVCYV		0.00004	0.00050	0.25070	1.00	0.25038	0.76	Other
7M7QMG		0.00004	0.00020	0.25008	-0.59	0.24994	-0.30	Micrometer
8PUD2P		0.00004	0.00030	0.25000	-0.66	0.24990	-0.33	Micrometer
AHLZRW		0.00004	0.00020	0.25016	-0.21	0.24996	-0.20	Micrometer
AP2GLR		0.00004	0.00019	0.25010	-0.52	0.24994	-0.31	Micrometer
AVTQRJ		0.00004	0.00150	0.24940	-0.53	0.24890	-0.73	Caliper
AYQCEF	X	0.00004	0.00005	0.25011	-1.46	0.24994	-1.03	Micrometer
BF9QC6		0.00004	0.00030	0.25011	-0.31	0.24992	-0.26	Other
BMRV66	X	0.00004	0.00006	0.25000	-2.84	0.24990	-1.42	Micrometer
BPDPXY		0.00004	0.00008	0.25016	-0.48	0.24997	-0.36	Micrometer
C27G7A		0.00004	0.00118	0.25000	-0.17	0.25000	0.00	Caliper
CMLYD7		0.00004	0.00015	0.25017	-0.22	0.24997	-0.20	Micrometer
CMNVHA		0.00004	Not Reported	0.24910		0.24930		Caliper
DAF6J9		0.00004	0.00260	0.25000	-0.08	0.25000	0.00	Caliper
E3TUMJ	X	0.00004	0.00004	0.24997	-4.12	0.24980	-3.50	Micrometer
EFW8XN		0.00004	0.00210	0.25020	0.00	0.24950	-0.24	Caliper
FMQU6E		0.00004	0.00110	0.25010	-0.09	0.24980	-0.18	Micrometer
FZHGEF		0.00004	0.00011	0.25015	-0.43	0.24996	-0.34	Micrometer
G4X4QZ		0.00004	0.00039	0.25002	-0.47	0.24983	-0.44	Micrometer
G8WK29		0.00004	0.00041	0.25002	-0.44	0.24998	-0.05	Micrometer
H9NZNP		0.00004	0.00100	0.25000	-0.20	0.25000	0.00	Caliper
JMYZZ7		0.00004	0.00040	0.25017	-0.07	0.24998	-0.05	Micrometer
KMYD6E		0.00004	0.00100	0.25000	-0.20	0.24900	-1.00	Caliper
KX3FL6		0.00004	0.00050	0.25000	-0.40	0.25000	0.00	Caliper
LBKJPE		0.00004	Not Reported	0.24998		0.24987		Micrometer
N4T32U		0.00004	0.00020	0.25030	0.49	0.25000	0.00	Micrometer



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3rd Qtr 2016

## Analysis 101

### Dimensional: Outside Diameter of Plain Plug Gage ISO GUM

$$E_n = \frac{(X_{lab} - X_{ref})}{\sqrt{U_{lab}^2 + U_{ref}^2}}$$

Xref1 = 0.2502 in.

Xref2 = 0.2500 in.

**Sample I37**

**Sample I38**

WebCode	Data Flag (if assigned)	Reference Uncertainty (Uref)	Expanded Uncertainty (Ulab)	Lab Mean (Xlab)	Performance Statistic (En1)	Lab Mean (Xlab)	Performance Statistic (En2)	Instrument
PF7GL8	X	0.00004	0.00050	0.24950	-1.40	0.24950	-1.00	Caliper
PKVC7C		0.00004	0.00016	0.25020	-0.02	0.25000	0.00	Micrometer
Q88AJD		0.00004	0.00047	0.25014	-0.13	0.24994	-0.13	Micrometer
RRP4N6		0.00004	0.00200	0.25012	-0.04	0.24994	-0.03	Micrometer
U9ADLQ		0.00004	0.00020	0.25014	-0.29	0.24992	-0.39	Micrometer
UJ6NTX		0.00004	0.00059	0.25027	0.12	0.25003	0.05	Micrometer
VX8FBW		0.00004	0.00083	0.24950	-0.84	0.24950	-0.60	Micrometer
W39B82		0.00004	0.00040	0.25007	-0.32	0.24983	-0.42	Micrometer
WEM7MZ		0.00004	0.00015	0.25010	-0.64	0.24990	-0.64	Micrometer
WQGH2Y	X	0.00004	0.00007	0.24999	-2.45	0.24987	-1.58	Micrometer
XD874B		0.00004	<u>Not Reported</u>	0.25010		0.24986		Micrometer
XE7AY8		0.00004	0.00100	0.25010	-0.10	0.24990	-0.10	Other
Y6PEUP		0.00004	0.00010	0.25010	-0.93	0.24990	-0.93	Micrometer
Z4WJ8F		0.00004	0.00100	0.25080	0.60	0.25040	0.40	Caliper
ZR43GU		0.00004	0.00023	0.25008	-0.52	0.24992	-0.34	Micrometer
ZZX6KQ		0.00004	0.00094	0.25006	-0.15	0.24980	-0.21	Caliper

#### Summary Statistics

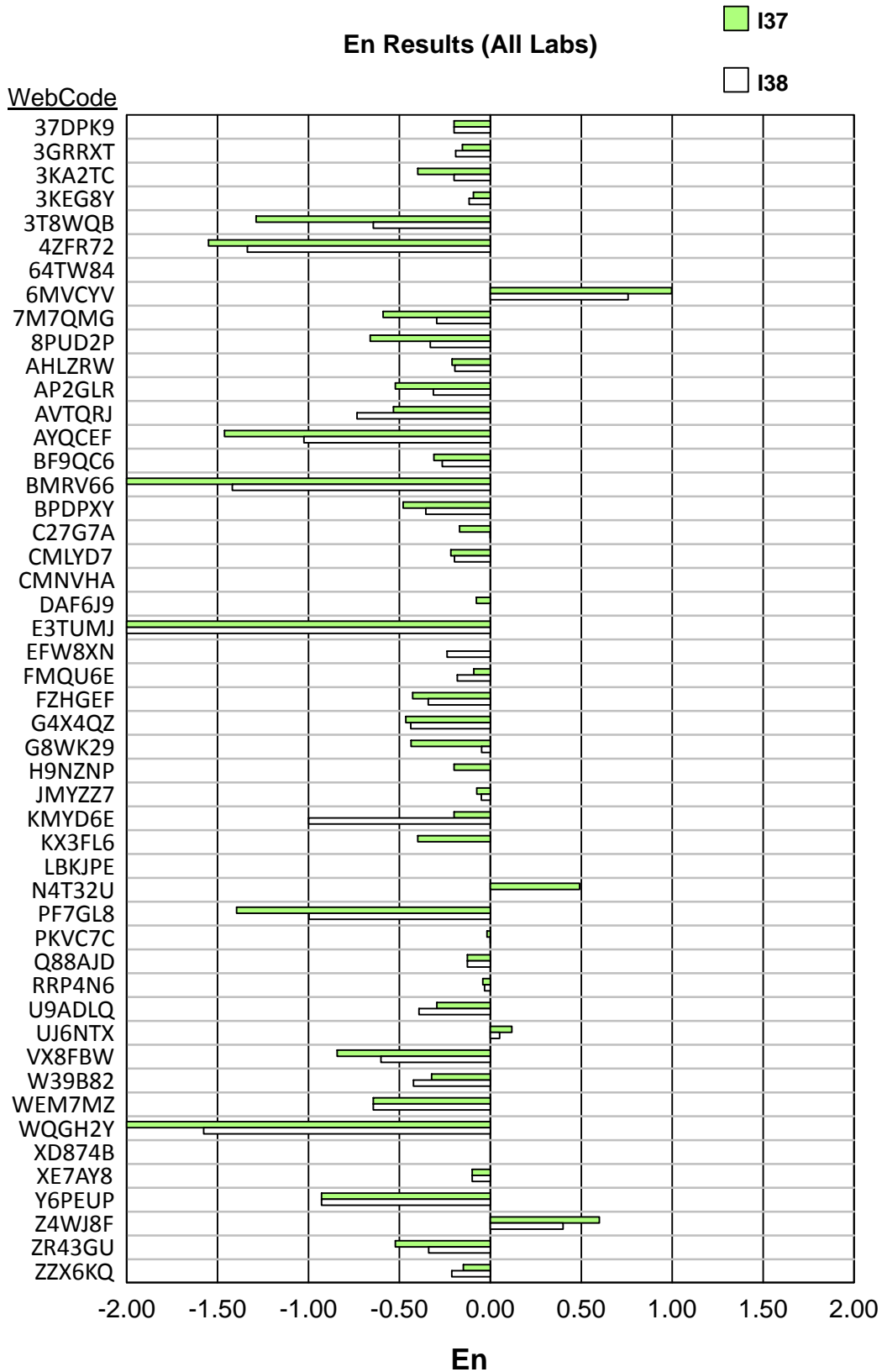
	<u>Sample I37</u>	<u>Sample I38</u>
Reference Uncertainty = 0.00004 in.	<u>Reference Diameters:</u> 0.2502 inch	0.2500 inch

Samples I37, I38 : 52100 steel



Analysis 101

Dimensional: Outside Diameter of Plain Plug Gage  
ISO GUM





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 105

Tensile Strength: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R37			Sample R38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GC6NR		45.00	-0.25	-0.66	47.90	-0.25	-0.74
349ZFE		45.51	0.26	0.69	48.27	0.12	0.37
37RBUA	X	42.72	-2.53	-6.67	47.13	-1.01	-3.05
3PLRE8	X	48.57	3.32	8.73	51.08	2.93	8.83
4KPPLQ		45.30	0.04	0.12	48.24	0.09	0.28
6Y3HPN		44.80	-0.45	-1.19	47.80	-0.35	-1.04
7YVVPL		45.00	-0.25	-0.66	48.00	-0.15	-0.44
822FCL		44.90	-0.35	-0.92	47.80	-0.35	-1.04
89YA4T		45.50	0.25	0.66	48.10	-0.05	-0.14
8QLNNC		45.40	0.15	0.39	48.10	-0.05	-0.14
8ZB6PY		45.30	0.05	0.13	48.20	0.05	0.16
99GBV2		45.60	0.35	0.93	48.38	0.23	0.69
9FJMQU	X	47.90	2.65	6.98	47.80	-0.35	-1.04
AHLZRW		45.30	0.04	0.12	48.21	0.06	0.19
B39PZ4		44.90	-0.35	-0.92	47.80	-0.35	-1.04
BF9QC6		44.40	-0.85	-2.24	47.40	-0.75	-2.25
CLEQ6L		45.32	0.07	0.19	48.34	0.19	0.59
DDH4U2		45.00	-0.25	-0.66	48.10	-0.05	-0.14
E8PLVF		45.70	0.45	1.18	48.40	0.25	0.76
ET7PPR	X	45.90	0.65	1.71	50.20	2.05	6.19
FZ4M3L		45.10	-0.15	-0.40	48.10	-0.05	-0.14
G7YG6D		45.50	0.25	0.66	48.60	0.45	1.37
GLXYH7		46.00	0.75	1.97	48.70	0.55	1.67
GM94VU	M	44.80	-0.45	-1.19	No Data Reported		
JE8PNQ	X	46.60	1.35	3.55	48.50	0.35	1.06
JYFTLV		45.00	-0.25	-0.66	47.80	-0.35	-1.04
KNDP4J		45.41	0.16	0.42	48.54	0.40	1.20
LF8JCL		44.90	-0.35	-0.92	47.80	-0.35	-1.04
M9UND7		45.00	-0.25	-0.66	48.00	-0.15	-0.44
NPU9C7	*	46.20	0.95	2.50	48.80	0.65	1.97
PMMETR		45.00	-0.25	-0.66	47.90	-0.25	-0.74
QUJAQP		45.00	-0.25	-0.66	48.00	-0.15	-0.44
RHKTGE		45.14	-0.11	-0.30	47.96	-0.18	-0.55
TUCW46	X	44.50	-0.75	-1.98	48.70	0.55	1.67
U9ADLQ		45.50	0.25	0.66	48.40	0.25	0.76
XNPXD7		45.80	0.55	1.45	48.80	0.65	1.97
Y97LCW		45.40	0.15	0.39	48.30	0.15	0.46
ZCRJM9		44.90	-0.35	-0.92	47.80	-0.35	-1.04

### Summary Statistics

	Sample R37		Sample R38	
<b>Grand Means</b>	45.25	ksi	48.15	ksi
<b>Std Dev Btwn Labs</b>	0.38	ksi	0.33	ksi

Samples R37, R38 : 6061-T6

Statistics based on 31 of 38 reporting participants





**Comments on Assigned Data Flags for Test #105**

- 37RBUA (X) - Data for both samples are low. Possible Systematic Error.
- 3PLRE8 (X) - Data for both samples are high. Possible Systematic Error.
- 9FJMQX (X) - Data for sample R37 are high.
- ET7PPR (X) - Data for sample R38 are high.
- GM94VU (M) - Participant did not submit data for sample R38.
- JE8PNQ (X) - Data for sample R37 are high.
- TUCW46 (X) - Inconsistent in testing between samples.





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 106

Yield Strength: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R37			Sample R38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GC6NR		37.20	-0.47	-0.79	41.60	-0.44	-1.12
349ZFE		38.00	0.33	0.56	42.13	0.10	0.25
37RBUA	X	34.70	-2.97	-5.02	40.06	-1.97	-5.04
3PLRE8	X	40.13	2.46	4.16	49.10	7.06	18.04
4KPPLQ		37.74	0.07	0.12	42.19	0.15	0.39
6Y3HPN		37.20	-0.47	-0.79	41.70	-0.34	-0.86
7YVVPL		37.30	-0.37	-0.62	41.90	-0.14	-0.35
822FCL		37.20	-0.47	-0.79	41.80	-0.24	-0.61
89YA4T		37.90	0.23	0.39	41.90	-0.14	-0.35
8QLNNC		37.60	-0.07	-0.12	41.70	-0.34	-0.86
8ZB6PY		37.40	-0.27	-0.45	42.00	-0.04	-0.10
99GBV2		37.60	-0.07	-0.11	41.90	-0.14	-0.36
9FJMQU	X	41.70	4.03	6.81	40.70	-1.34	-3.42
AHLZRW		37.46	-0.21	-0.35	42.00	-0.03	-0.09
B39PZ4		36.60	-1.07	-1.81	42.00	-0.04	-0.10
BF9QC6		36.60	-1.07	-1.81	41.40	-0.64	-1.63
CLEQ6L		37.94	0.27	0.46	42.21	0.17	0.43
DDH4U2		37.30	-0.37	-0.62	42.20	0.16	0.41
E8PLVF		38.10	0.43	0.73	42.20	0.16	0.41
ET7PPR	X	38.80	1.13	1.91	44.20	2.16	5.52
FZ4M3L		37.80	0.13	0.22	42.00	-0.04	-0.10
G7YG6D		38.10	0.43	0.73	42.70	0.66	1.69
GLXYH7		38.30	0.63	1.07	42.80	0.76	1.95
GM94VU	M	35.90	-1.77	-2.99	No Data Reported		
JE8PNQ		39.00	1.33	2.25	42.20	0.16	0.41
JYFTLV		37.60	-0.07	-0.12	41.70	-0.34	-0.86
KNDP4J		37.77	0.10	0.17	42.44	0.40	1.02
LF8JCL		37.50	-0.17	-0.29	41.90	-0.14	-0.35
M9UND7		37.50	-0.17	-0.29	41.80	-0.24	-0.61
NPU9C7	*	39.20	1.53	2.59	42.90	0.86	2.20
PMMETR		36.90	-0.77	-1.30	41.20	-0.84	-2.14
QUJAQP		37.10	-0.57	-0.96	42.00	-0.04	-0.10
RHKTGE		37.83	0.16	0.27	42.18	0.14	0.36
TUCW46	*	36.80	-0.87	-1.47	42.60	0.56	1.44
U9ADLQ		38.00	0.33	0.56	42.20	0.16	0.41
XNPXD7		38.10	0.43	0.73	42.30	0.26	0.67
Y97LCW		38.04	0.37	0.63	42.20	0.16	0.41
ZCRJM9	*	38.40	0.73	1.23	41.30	-0.74	-1.88

### Summary Statistics

	Sample R37		Sample R38	
<b>Grand Means</b>	37.67	ksi	42.04	ksi
<b>Std Dev Btwn Labs</b>	0.59	ksi	0.39	ksi

Samples R37, R38 : 6061-T6

Statistics based on 33 of 38 reporting participants



**Comments on Assigned Data Flags for Test #106**

37RBUA (X) - Data for both samples are low.

3PLRE8 (X) - Data for both samples are high.

9FJMQX (X) - Data for sample R37 are high and data for sample R38 are low.

ET7PPR (X) - Data for sample R38 are high.

GM94VU (M) - Participant did not submit data for sample R38.



Analysis 106

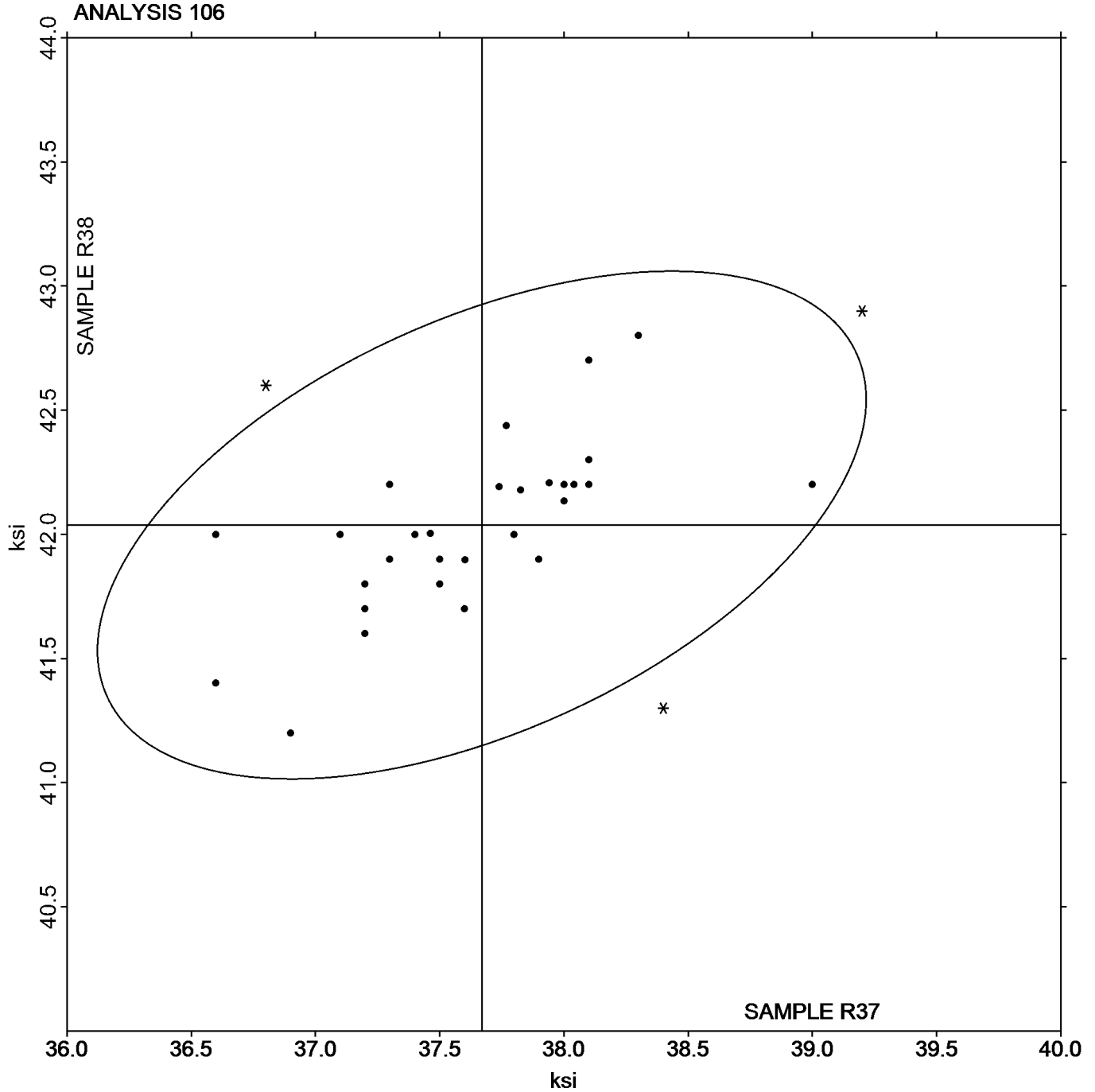
Yield Strength: Lab-Machined Flat Aluminum  
ASTM B557

SAMPLE R37

37.67 ksi

SAMPLE R38

42.04 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 107

Elongation: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R37			Sample R38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GC6NR		14.00	-0.18	-0.21	13.10	-0.23	-0.24
349ZFE		15.00	0.82	0.92	15.00	1.67	1.73
37RBUA		14.50	0.32	0.36	12.20	-1.13	-1.18
3PLRE8		14.90	0.72	0.81	14.60	1.27	1.32
4KPPLQ		15.60	1.42	1.60	14.10	0.77	0.80
6Y3HPN		13.90	-0.28	-0.32	12.90	-0.43	-0.45
7YVVPL		14.40	0.22	0.25	13.00	-0.33	-0.35
822FCL		14.00	-0.18	-0.21	12.80	-0.53	-0.56
89YA4T		15.30	1.12	1.26	14.50	1.17	1.21
8QLNNC		13.90	-0.28	-0.32	12.90	-0.43	-0.45
8ZB6PY		14.60	0.42	0.47	12.80	-0.53	-0.56
99GBV2		15.00	0.82	0.92	15.20	1.87	1.94
9FJMQU		14.40	0.22	0.25	15.20	1.87	1.94
AHLZRW		15.50	1.32	1.49	14.60	1.27	1.32
B39PZ4		13.50	-0.68	-0.77	11.50	-1.83	-1.91
BF9QC6		14.00	-0.18	-0.21	12.50	-0.83	-0.87
CLEQ6L		12.70	-1.48	-1.68	12.00	-1.33	-1.39
DDH4U2		15.30	1.12	1.26	13.80	0.47	0.49
E8PLVF		13.50	-0.68	-0.77	13.00	-0.33	-0.35
ET7PPR		13.20	-0.98	-1.11	12.40	-0.93	-0.97
FZ4M3L		13.50	-0.68	-0.77	13.50	0.17	0.17
G7YG6D		15.00	0.82	0.92	13.70	0.37	0.38
GLXYH7		15.00	0.82	0.92	14.00	0.67	0.69
GM94VU	M	15.80	1.62	1.83	No Data Reported		
JE8PNQ		12.10	-2.08	-2.36	12.20	-1.13	-1.18
JYFTLV		14.60	0.42	0.47	13.70	0.37	0.38
KNDP4J		13.30	-0.88	-1.00	12.10	-1.23	-1.28
LF8JCL		15.10	0.92	1.04	14.20	0.87	0.90
M9UND7		14.10	-0.08	-0.09	13.20	-0.13	-0.14
NPU9C7		13.00	-1.18	-1.34	13.00	-0.33	-0.35
PMMETR		13.00	-1.18	-1.34	12.40	-0.93	-0.97
QUJAQP		13.50	-0.68	-0.77	13.00	-0.33	-0.35
RHKTGE		13.56	-0.62	-0.70	12.75	-0.58	-0.61
TUCW46		15.70	1.52	1.72	14.80	1.47	1.53
U9ADLQ		13.80	-0.38	-0.43	12.80	-0.53	-0.56
XNPXD7		13.50	-0.68	-0.77	14.00	0.67	0.69
Y97LCW		13.80	-0.38	-0.43	12.90	-0.43	-0.45
ZCRJM9		15.00	0.82	0.92	13.00	-0.33	-0.35

### Summary Statistics

	Sample R37		Sample R38	
<b>Grand Means</b>	14.18	Percent	13.33	Percent
<b>Stnd Dev Btwn Labs</b>	0.88	Percent	0.96	Percent

Samples R37, R38 : 6061-T6

Statistics based on 37 of 38 reporting participants



**Comments on Assigned Data Flags for Test #107**

GM94VU (M) - Participant did not submit data for sample R38.



Analysis 107

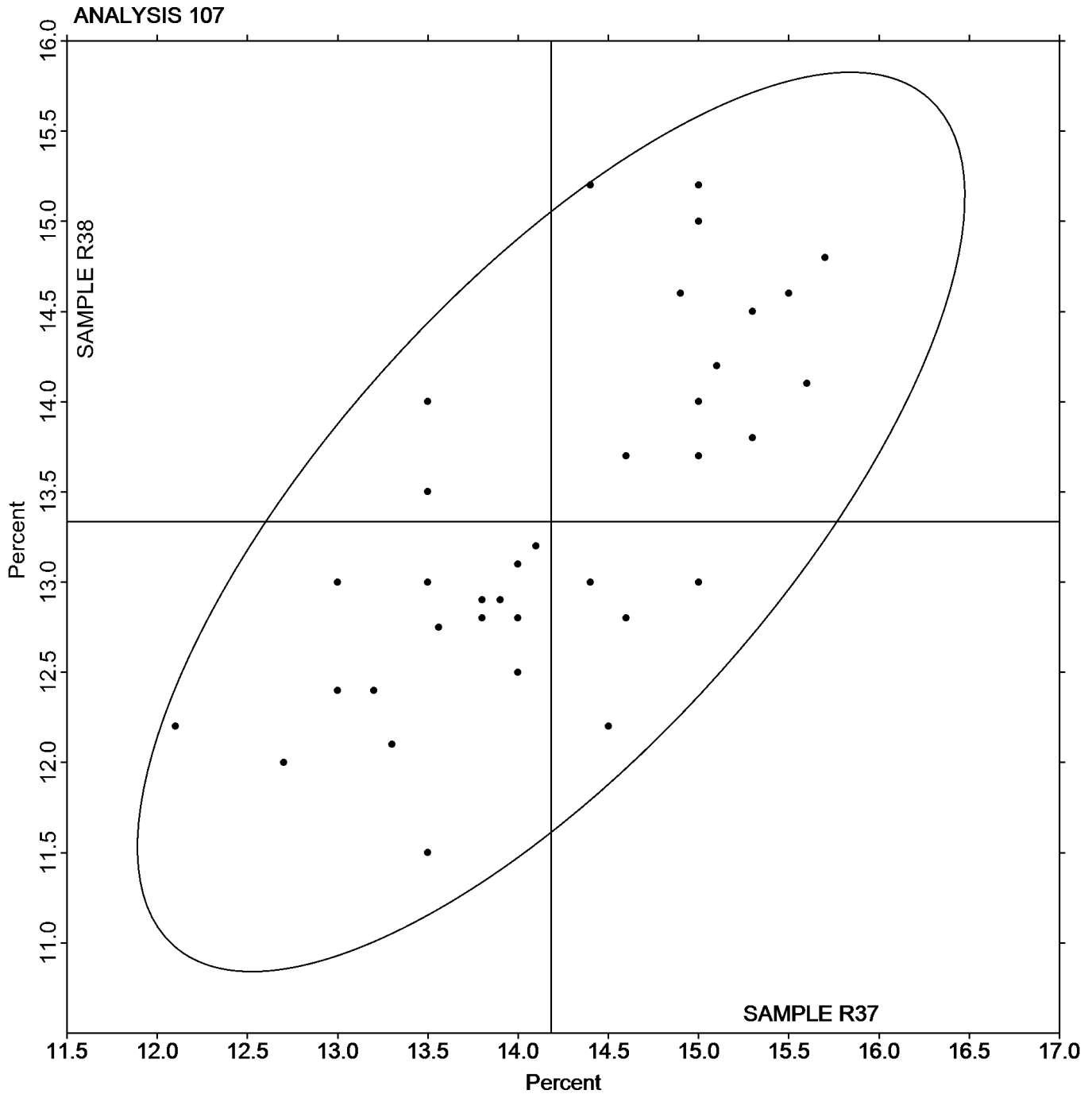
Elongation: Lab-Machined Flat Aluminum  
ASTM B557

SAMPLE R37

14.18 Percent

SAMPLE R38

13.33 Percent







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 110

Tensile Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2BR244		160.70	1.20	0.75	139.60	-0.56	-0.41
2UH4Q7		156.62	-2.88	-1.79	137.86	-2.30	-1.70
39EXHQ		158.82	-0.68	-0.42	140.98	0.82	0.61
47BDHX		158.04	-1.46	-0.91	138.40	-1.76	-1.31
4ATELW		160.56	1.06	0.66	139.82	-0.34	-0.25
6K77EY		160.85	1.35	0.84	141.70	1.54	1.15
6R7FT4		159.69	0.19	0.12	139.67	-0.49	-0.36
7D49AT		158.68	-0.82	-0.51	140.31	0.15	0.11
7PYDMY		161.50	2.00	1.25	140.80	0.64	0.48
8KXVGJ		159.00	-0.50	-0.31	138.40	-1.76	-1.31
93P9MV		157.37	-2.13	-1.33	139.53	-0.63	-0.47
9ELCTA		158.34	-1.16	-0.72	140.85	0.69	0.51
A7KLGX		161.89	2.39	1.49	142.47	2.31	1.72
ACCT2R		157.74	-1.75	-1.09	139.02	-1.14	-0.85
AQTK7L		157.02	-2.48	-1.54	138.11	-2.05	-1.52
B2CE2F		161.90	2.40	1.50	140.90	0.74	0.55
B79TVW		160.60	1.10	0.69	139.60	-0.56	-0.41
CMLYD7		161.15	1.66	1.03	139.98	-0.18	-0.14
CN4XPH	X	150.12	-9.38	-5.84	140.40	0.24	0.18
DYVUAG		159.00	-0.50	-0.31	140.00	-0.16	-0.12
EHNE7R	X	164.80	5.30	3.30	140.00	-0.16	-0.12
FNU6BJ		159.80	0.30	0.19	139.30	-0.86	-0.64
FRCCQ7		159.60	0.10	0.06	139.80	-0.36	-0.27
GEC64K		158.69	-0.81	-0.50	140.87	0.71	0.53
HQ9JRN		160.40	0.90	0.56	141.00	0.84	0.62
KLMJL		159.98	0.48	0.30	140.69	0.53	0.39
KZ7DQ7		159.00	-0.50	-0.31	139.00	-1.16	-0.86
LBKJPE		159.60	0.10	0.06	139.10	-1.06	-0.79
LE4MBQ	X	12.17	-147.32	-91.76	11.04	-129.12	-95.83
LPKHDC		159.90	0.40	0.25	139.80	-0.36	-0.27
LUTRGY		158.70	-0.80	-0.50	140.40	0.24	0.18
MC9G96		160.22	0.72	0.45	140.10	-0.06	-0.05
MM9AGW		162.29	2.79	1.74	141.88	1.72	1.28
N24WZA	*	157.51	-1.98	-1.24	141.41	1.25	0.93
N96ZE9	X	139.53	-19.97	-12.44	160.25	20.09	14.91
NDWC8J		158.31	-1.19	-0.74	139.75	-0.41	-0.31
NJNN3F		157.80	-1.69	-1.05	137.93	-2.23	-1.65
NRGY94		157.40	-2.10	-1.31	138.90	-1.26	-0.93
PQMLC4		162.00	2.50	1.56	142.30	2.14	1.59
TMTVH2		161.81	2.31	1.44	143.50	3.34	2.48
UBWYA8		159.10	-0.40	-0.25	139.10	-1.06	-0.79
V8TJFB		159.11	-0.39	-0.24	141.12	0.96	0.72
VABZ8U		159.10	-0.40	-0.25	139.30	-0.86	-0.64
VC3YLR		155.82	-3.68	-2.29	137.66	-2.50	-1.85
WL7D66		158.90	-0.60	-0.37	141.20	1.04	0.77
X2DPEA		160.50	1.00	0.63	141.80	1.64	1.22
XG7KQ2		162.33	2.83	1.76	142.30	2.14	1.59



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 110

Tensile Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Z4WJ8F		160.50	1.00	0.63	140.80	0.64	0.48

### Summary Statistics

	Sample A37		Sample A38	
<b>Grand Means</b>	159.50	ksi	140.16	ksi
<b>Stnd Dev Btrwn Labs</b>	1.61	ksi	1.35	ksi

Samples A37, A38 : AISI 4340

Statistics based on 44 of 48 reporting participants

### Comments on Assigned Data Flags for Test #110

CN4XPH (X) - Data for sample A37 are low.

EHNE7R (X) - Data for sample A37 are high.

LE4MBQ (X) - Extreme data.

N96ZE9 (X) - Data for sample A37 are low and data for sample A38 are high. Data appear to be transposed between the samples.



Analysis 110

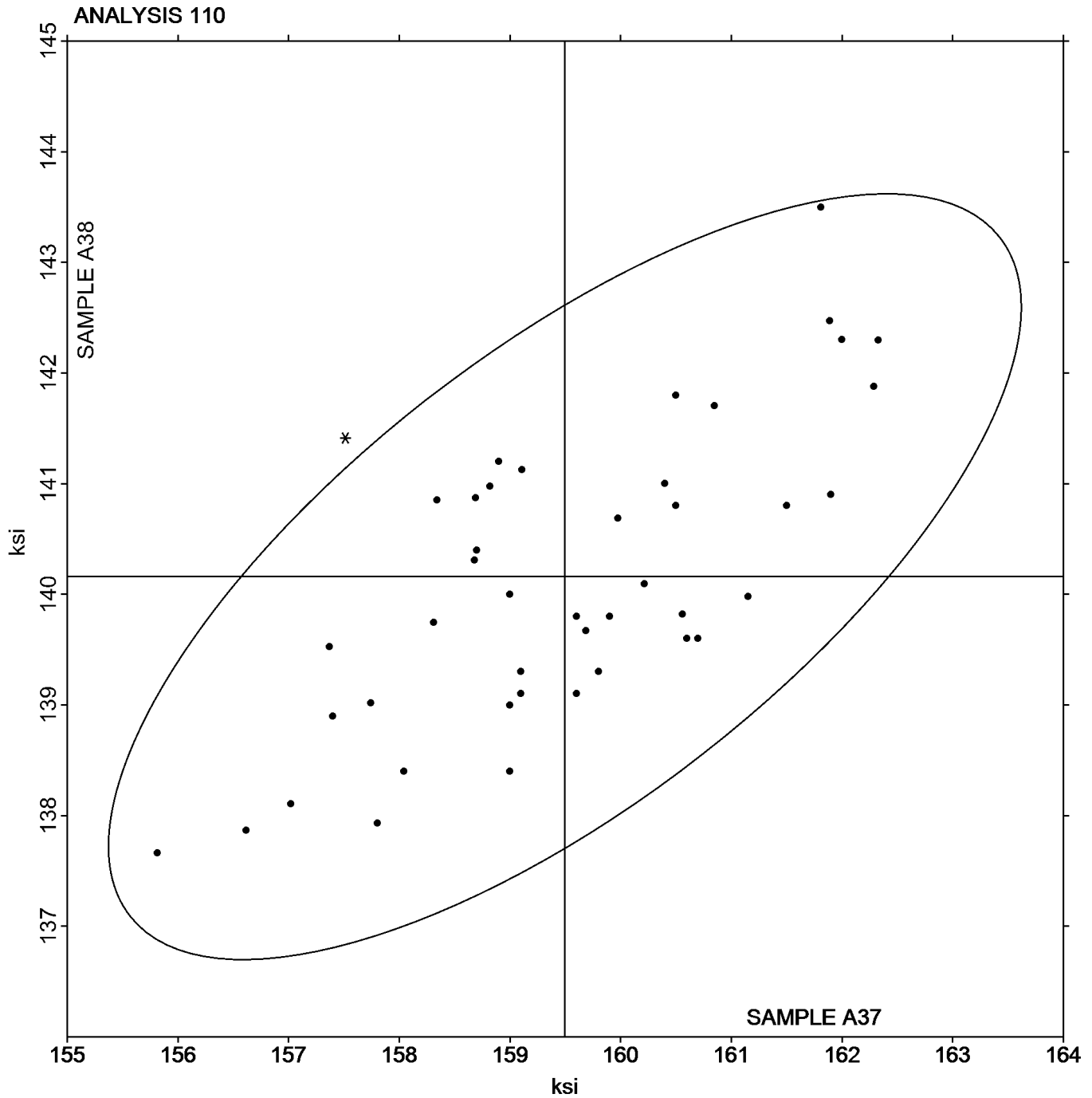
Tensile Strength: Pre-Machined Round Steel  
ASTM E8

SAMPLE A37

159.50 ksi

SAMPLE A38

140.16 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 111

Yield Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2BR244		137.80	1.21	0.55	111.70	-0.28	-0.18
2UH4Q7		136.73	0.13	0.06	109.20	-2.78	-1.78
39EXHQ		134.16	-2.43	-1.11	111.97	-0.01	0.00
47BDHX	X	135.18	-1.41	-0.64	138.40	26.42	16.96
4ATELW	*	136.48	-0.11	-0.05	116.03	4.05	2.60
6K77EY		138.66	2.06	0.94	113.57	1.59	1.02
6R7FT4		134.60	-2.00	-0.91	111.53	-0.44	-0.28
7D49AT		138.34	1.75	0.79	112.38	0.40	0.26
7PYDMY		138.70	2.11	0.96	112.40	0.42	0.27
8KXVGJ		135.70	-0.89	-0.41	111.40	-0.58	-0.37
93P9MV		136.48	-0.11	-0.05	111.83	-0.15	-0.10
9ELCTA		137.38	0.79	0.36	111.99	0.01	0.01
A7KLGX	X	138.16	1.56	0.71	107.42	-4.56	-2.93
ACCT2R		139.25	2.66	1.21	112.09	0.11	0.07
AQTK7L		134.10	-2.49	-1.13	110.37	-1.60	-1.03
B2CE2F		137.80	1.21	0.55	112.10	0.12	0.08
B79TVW		137.80	1.21	0.55	112.00	0.02	0.01
CMLYD7	X	143.70	7.11	3.23	117.87	5.90	3.79
CN4XPH		135.32	-1.27	-0.58	108.49	-3.49	-2.24
DYVUAG		135.00	-1.59	-0.73	112.00	0.02	0.01
EHNE7R		135.60	-0.99	-0.45	112.70	0.72	0.46
FNU6BJ		135.90	-0.69	-0.32	110.30	-1.68	-1.08
FRCCQ7		136.60	0.01	0.00	110.80	-1.18	-0.76
GEC64K		135.55	-1.04	-0.48	111.98	0.00	0.00
HQ9JRN		137.30	0.71	0.32	112.90	0.92	0.59
KLMJL		136.77	0.18	0.08	113.42	1.44	0.93
KZ7DQ7	*	131.00	-5.59	-2.55	108.00	-3.98	-2.55
LBKJPE		133.70	-2.89	-1.32	113.50	1.52	0.98
LPKHDC		135.30	-1.29	-0.59	112.80	0.82	0.53
LUTRGY		135.20	-1.39	-0.63	112.10	0.12	0.08
MC9G96		136.35	-0.25	-0.11	111.90	-0.08	-0.05
MM9AGW		137.55	0.96	0.43	113.19	1.21	0.78
N24WZA		136.05	-0.55	-0.25	113.13	1.15	0.74
N96ZE9	X	118.63	-17.97	-8.17	137.99	26.01	16.70
NDWC8J		137.93	1.34	0.61	111.40	-0.57	-0.37
NJNN3F		133.87	-2.72	-1.24	109.36	-2.62	-1.68
NRGY94		137.40	0.81	0.37	111.70	-0.28	-0.18
PQMLC4		139.00	2.41	1.09	113.60	1.62	1.04
TMTVH2	*	143.72	7.12	3.24	114.50	2.52	1.62
UBWYA8		134.30	-2.29	-1.04	110.80	-1.18	-0.76
V8TJFB		135.47	-1.13	-0.51	112.26	0.28	0.18
VABZ8U		134.90	-1.69	-0.77	111.40	-0.58	-0.37
WL7D66	X	143.10	6.51	2.96	123.70	11.72	7.53
X2DPEA		140.10	3.51	1.59	114.10	2.12	1.36
XG7KQ2		140.14	3.54	1.61	113.26	1.28	0.82
Z4WJ8F		136.40	-0.19	-0.09	110.90	-1.08	-0.69



Analysis 111

Yield Strength: Pre-Machined Round Steel  
ASTM E8

Summary Statistics

	<u>Sample A37</u>		<u>Sample A38</u>	
<b>Grand Means</b>	136.59	ksi	111.98	ksi
<b>Stnd Dev Btwn Labs</b>	2.20	ksi	1.56	ksi

Samples A37, A38 : AISI 4340

Statistics based on 41 of 46 reporting participants

**Comments on Assigned Data Flags for Test #111**

- 47BDHX (X) - Data for sample A38 are high.
- A7KLGX (X) - Data for sample A38 are low.
- CMLYD7 (X) - Data for both samples are high.
- N96ZE9 (X) - Data for sample A37 are low and data for sample A38 are high. Data appear to be transposed between the samples.
- WL7D66 (X) - Data for both samples are high.



Analysis 111

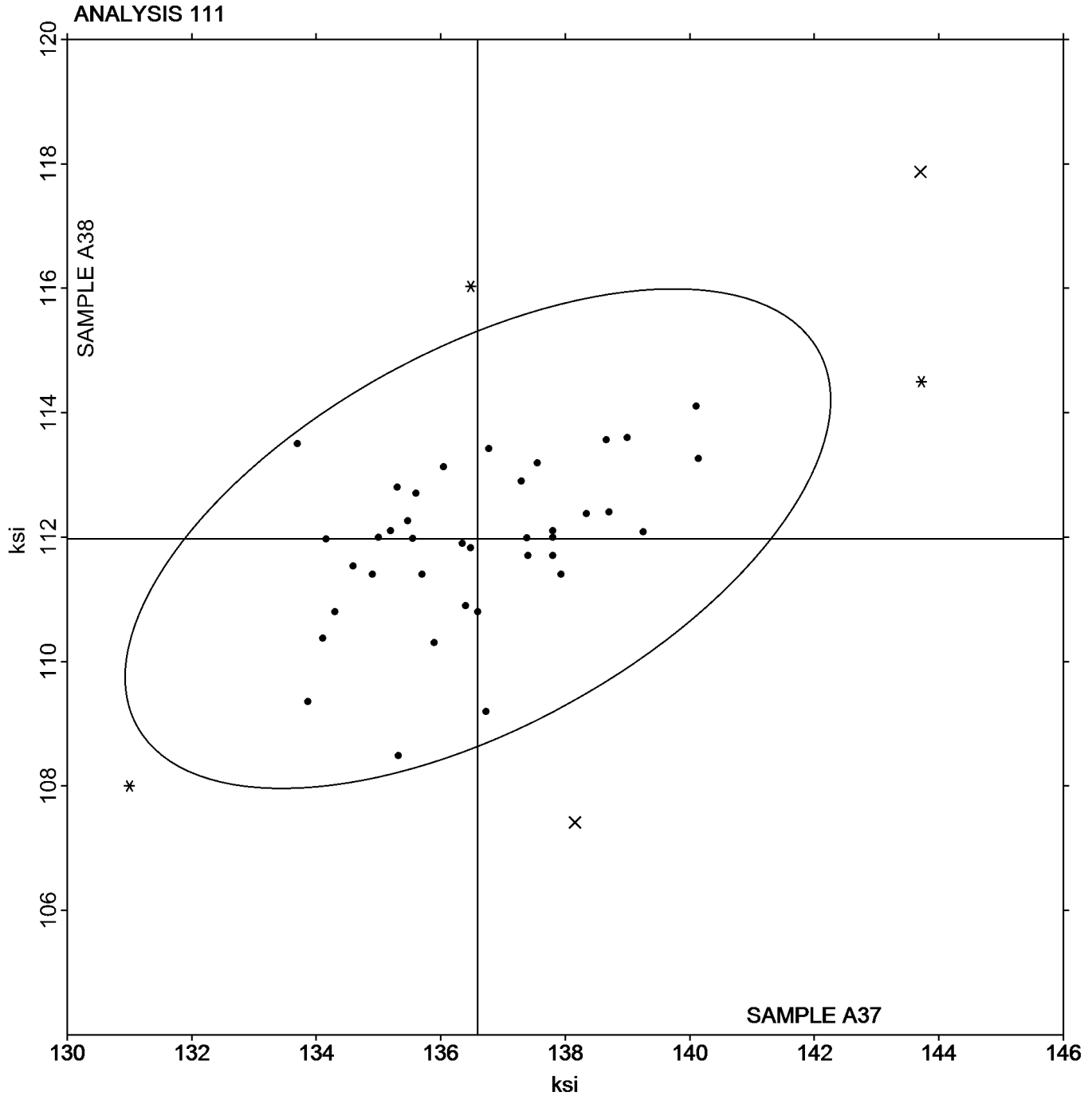
Yield Strength: Pre-Machined Round Steel  
ASTM E8

SAMPLE A37

136.59 ksi

SAMPLE A38

111.98 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 112

Elongation: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2BR244		16.80	0.18	0.19	16.90	-0.38	-0.71
2UH4Q7	X	16.98	0.36	0.38	19.84	2.56	4.83
39EXHQ		16.00	-0.62	-0.67	17.00	-0.28	-0.53
47BDHX		17.00	0.38	0.40	18.50	1.22	2.30
4ATELW		15.80	-0.82	-0.88	16.30	-0.98	-1.85
6K77EY		16.80	0.18	0.19	17.60	0.32	0.61
6R7FT4		15.20	-1.42	-1.52	17.10	-0.18	-0.34
7D49AT		17.20	0.58	0.62	17.70	0.42	0.79
7PYDMY		18.00	1.38	1.47	17.00	-0.28	-0.53
8KXVGJ		15.70	-0.92	-0.99	17.00	-0.28	-0.53
93P9MV		16.60	-0.02	-0.03	17.00	-0.28	-0.53
9ELCTA		18.45	1.83	1.96	17.65	0.37	0.70
A7KLGX		14.84	-1.78	-1.91	17.04	-0.24	-0.45
ACCT2R		16.50	-0.12	-0.13	17.70	0.42	0.79
AQTK7L		17.00	0.38	0.40	16.70	-0.58	-1.09
B2CE2F		16.30	-0.32	-0.35	16.70	-0.58	-1.09
B79TVW		15.70	-0.92	-0.99	17.00	-0.28	-0.53
CMLYD7		17.50	0.88	0.94	17.30	0.02	0.04
CN4XPH		16.00	-0.62	-0.67	17.00	-0.28	-0.53
DYVUAG		16.20	-0.42	-0.45	17.10	-0.18	-0.34
EHNE7R		16.50	-0.12	-0.13	17.50	0.22	0.42
FNU6BJ		17.00	0.38	0.40	17.00	-0.28	-0.53
FRCCQ7		17.50	0.88	0.94	17.90	0.62	1.17
GEC64K		17.50	0.88	0.94	17.50	0.22	0.42
HQ9JRN		17.50	0.88	0.94	17.50	0.22	0.42
KLMJL		17.00	0.38	0.40	17.50	0.22	0.42
KZ7DQ7		18.00	1.38	1.47	18.00	0.72	1.36
LBKJPE	*	14.80	-1.82	-1.95	17.70	0.42	0.79
LPKHDC		15.10	-1.52	-1.63	17.50	0.22	0.42
LUTRGY		16.60	-0.02	-0.03	16.80	-0.48	-0.90
MC9G96		15.50	-1.12	-1.20	17.05	-0.23	-0.43
MM9AGW		17.00	0.38	0.40	17.50	0.22	0.42
N24WZA	X	16.50	-0.12	-0.13	15.50	-1.78	-3.35
N96ZE9	*	15.40	-1.22	-1.31	15.60	-1.68	-3.17
NDWC8J		17.74	1.12	1.20	17.67	0.39	0.74
NJNN3F		17.30	0.68	0.72	17.60	0.32	0.61
NRGY94		15.70	-0.92	-0.99	17.30	0.02	0.04
PQMLC4		15.70	-0.92	-0.99	16.90	-0.38	-0.71
TMTVH2		16.10	-0.52	-0.56	17.35	0.07	0.13
UBWYA8		18.00	1.38	1.47	18.00	0.72	1.36
V8TJFB		15.80	-0.82	-0.88	16.90	-0.38	-0.71
VABZ8U		16.80	0.18	0.19	17.40	0.12	0.23
WL7D66		18.00	1.38	1.47	18.50	1.22	2.30
X2DPEA		17.00	0.38	0.40	17.00	-0.28	-0.53
XG7KQ2		16.80	0.18	0.19	16.70	-0.58	-1.09
Z4WJ8F		17.50	0.88	0.94	17.60	0.32	0.61



Analysis 112

Elongation: Pre-Machined Round Steel  
ASTM E8

Summary Statistics

	<u>Sample A37</u>		<u>Sample A38</u>	
<b>Grand Means</b>	16.62	Percent	17.28	Percent
<b>Std Dev Btwn Labs</b>	0.93	Percent	0.53	Percent

Samples A37, A38 : AISI 4340

Statistics based on 44 of 46 reporting participants

**Comments on Assigned Data Flags for Test #112**

2UH4Q7 (X) - Data for sample A38 are high.

N24WZA (X) - Data for sample A38 are low.





Analysis 112

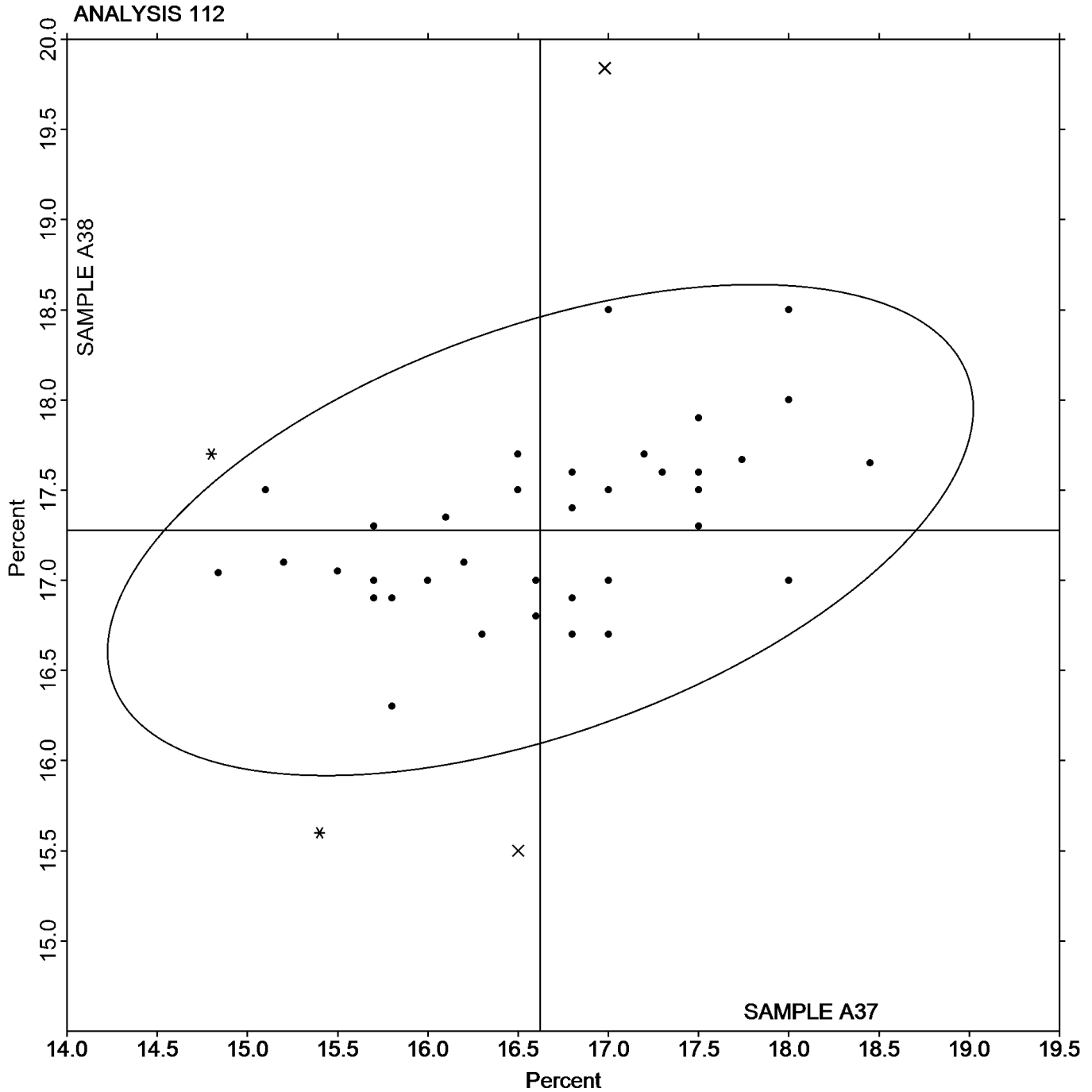
Elongation: Pre-Machined Round Steel  
ASTM E8

SAMPLE A37

16.62 Percent

SAMPLE A38

17.28 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 113

Reduction of Area: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A37			Sample A38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2BR244		57.70	2.84	0.88	53.30	-0.40	-0.36
2UH4Q7	X	52.24	-2.62	-0.81	46.72	-6.98	-6.22
47BDHX		52.77	-2.09	-0.65	55.47	1.77	1.57
4ATELW		56.00	1.14	0.35	54.00	0.30	0.26
6K77EY		57.00	2.14	0.66	52.00	-1.70	-1.52
6R7FT4		48.00	-6.86	-2.13	53.00	-0.70	-0.63
7D49AT		57.10	2.24	0.69	53.70	0.00	0.00
7PYDMY		58.00	3.14	0.97	53.00	-0.70	-0.63
8KXVGJ		51.20	-3.66	-1.14	54.00	0.30	0.26
93P9MV		54.50	-0.36	-0.11	55.10	1.40	1.24
9ELCTA		54.75	-0.11	-0.03	53.14	-0.56	-0.50
A7KLGX		52.52	-2.34	-0.73	54.13	0.43	0.38
ACCT2R		56.50	1.64	0.51	54.10	0.40	0.35
AQTK7L		56.90	2.04	0.63	55.00	1.30	1.15
B2CE2F		55.60	0.74	0.23	54.10	0.40	0.35
B79TVW		51.90	-2.96	-0.92	54.30	0.60	0.53
CMLYD7		57.31	2.45	0.76	54.20	0.50	0.44
DYVUAG		53.00	-1.86	-0.58	55.00	1.30	1.15
EHNE7R		55.00	0.14	0.04	52.00	-1.70	-1.52
FNU6BJ		58.00	3.14	0.97	54.30	0.60	0.53
FRCCQ7		59.40	4.54	1.41	54.70	1.00	0.89
GEC64K		57.00	2.14	0.66	54.00	0.30	0.26
HQ9JRN		57.00	2.14	0.66	52.70	-1.00	-0.89
KLMJL		54.50	-0.36	-0.11	53.50	-0.20	-0.18
KZ7DQ7		56.00	1.14	0.35	54.00	0.30	0.26
LBKJPE	*	45.50	-9.36	-2.90	55.30	1.60	1.42
LPKHDC		49.00	-5.86	-1.82	52.60	-1.10	-0.98
LUTRGY		56.80	1.94	0.60	53.70	0.00	0.00
MC9G96		47.36	-7.50	-2.33	53.50	-0.20	-0.18
MM9AGW		55.20	0.34	0.11	53.40	-0.30	-0.27
N24WZA	X	55.00	0.14	0.04	49.00	-4.70	-4.19
N96ZE9	X	53.80	-1.06	-0.33	48.40	-5.30	-4.72
NDWC8J		58.60	3.74	1.16	53.00	-0.70	-0.63
NJNN3F		55.00	0.14	0.04	55.00	1.30	1.15
NRGY94		54.32	-0.55	-0.17	54.42	0.72	0.64
PQMLC4		50.00	-4.86	-1.51	53.20	-0.50	-0.45
TMTVH2	*	54.90	0.04	0.01	50.80	-2.90	-2.59
UBWYA8		58.00	3.14	0.97	53.50	-0.20	-0.18
V8TJFB		53.50	-1.36	-0.42	51.00	-2.70	-2.41
VABZ8U		56.20	1.34	0.42	52.00	-1.70	-1.52
WL7D66		57.00	2.14	0.66	55.90	2.20	1.96
X2DPEA		56.60	1.74	0.54	53.60	-0.10	-0.09
XG7KQ2		56.40	1.54	0.48	53.80	0.10	0.09
Z4WJ8F		57.30	2.44	0.76	54.40	0.70	0.62



Summary Statistics

	<u>Sample A37</u>		<u>Sample A38</u>	
<b>Grand Means</b>	54.86	Percent	53.70	Percent
<b>Std Dev Btwn Labs</b>	3.22	Percent	1.12	Percent

Samples A37, A38 : AISI 4340

Statistics based on 41 of 44 reporting participants

**Comments on Assigned Data Flags for Test #113**

2UH4Q7 (X) - Data for sample A38 are low.

N24WZA (X) - Data for sample A38 are low.

N96ZE9 (X) - Data for sample A38 are low.



Analysis 113

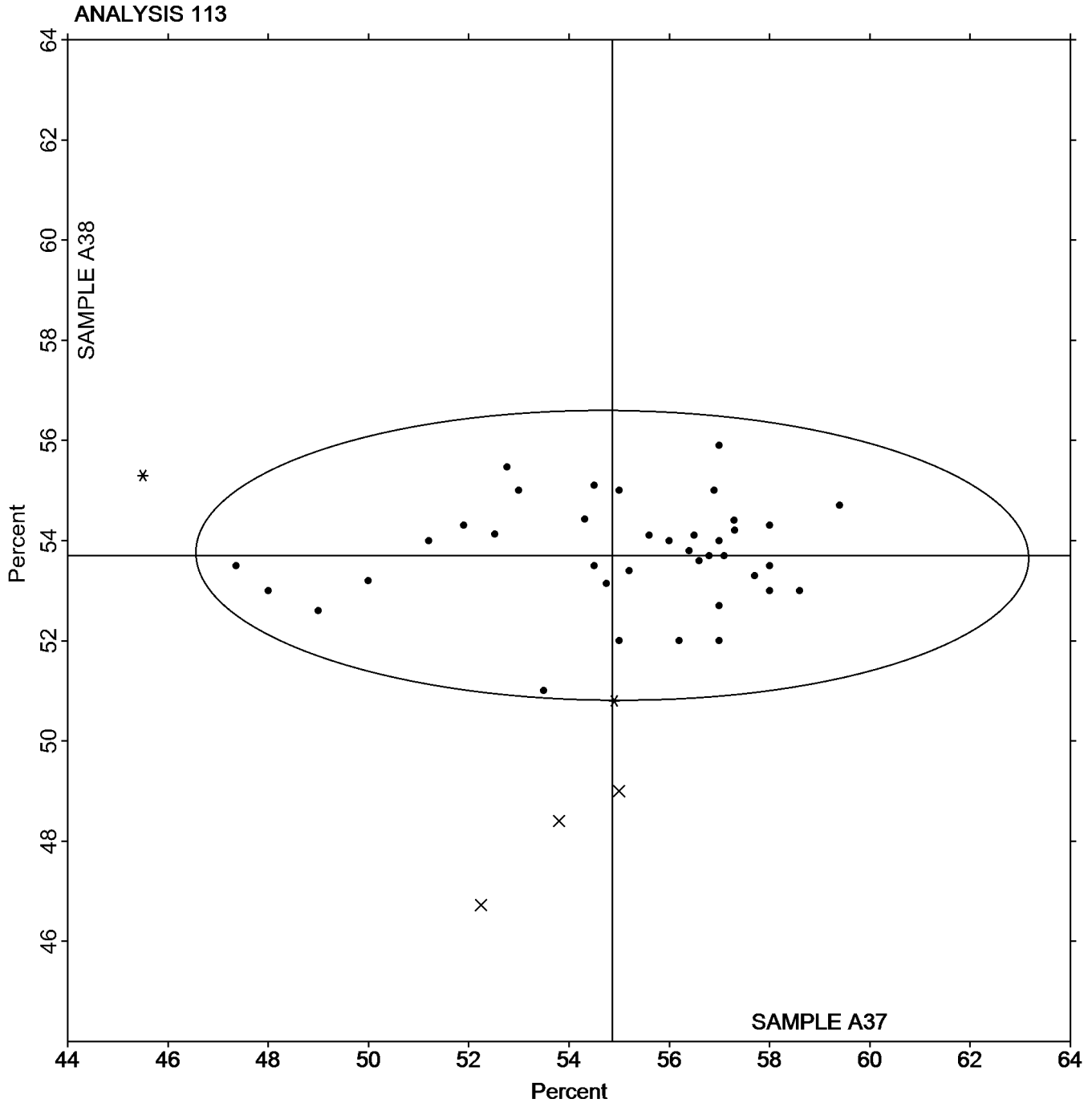
Reduction of Area: Pre-Machined Round Steel  
ASTM E8

SAMPLE A37

54.86 Percent

SAMPLE A38

53.70 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 118

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N37			Sample N38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		93.56	0.18	0.35	93.18	0.17	0.35
2BR244		93.04	-0.34	-0.67	92.86	-0.15	-0.29
2ZRBHW		93.49	0.11	0.21	93.62	0.61	1.23
349ZFE		93.00	-0.38	-0.75	93.00	-0.01	-0.01
3GRRXT		93.14	-0.24	-0.48	92.90	-0.11	-0.21
3J2R3Z		93.24	-0.14	-0.28	92.64	-0.37	-0.73
3MH4TP		93.46	0.08	0.15	93.22	0.21	0.43
3PJA8V		94.50	1.12	2.19	93.80	0.79	1.59
3QYJ9A	*	94.18	0.80	1.56	93.14	0.13	0.27
3T8WQB		92.52	-0.86	-1.69	92.02	-0.99	-1.97
3TLZK3	X	93.28	-0.10	-0.20	92.10	-0.91	-1.81
3XKCMU		94.32	0.94	1.83	93.82	0.81	1.63
49ATME		92.84	-0.54	-1.06	92.12	-0.89	-1.77
49DHPQ		92.70	-0.68	-1.34	92.44	-0.57	-1.13
4AMCJ6		93.44	0.06	0.11	92.96	-0.05	-0.09
4CTW9Q	*	94.40	1.02	1.99	94.40	1.39	2.79
6HHMJT		93.02	-0.36	-0.71	92.40	-0.61	-1.21
7C8XC6		93.80	0.42	0.82	93.32	0.31	0.63
7D49AT		93.10	-0.28	-0.56	92.88	-0.13	-0.25
7KXQE4	X	92.40	-0.98	-1.93	93.40	0.39	0.79
7PPVAT		93.59	0.21	0.41	93.47	0.47	0.93
7PYDMY		92.98	-0.40	-0.79	92.38	-0.63	-1.25
8E9JHF		93.28	-0.10	-0.20	92.56	-0.45	-0.89
8G23RU		92.80	-0.58	-1.14	92.76	-0.25	-0.49
92HV2M	X	91.80	-1.58	-3.10	92.00	-1.01	-2.01
99GBV2		92.70	-0.68	-1.34	92.10	-0.91	-1.81
9ELCTA		92.98	-0.40	-0.79	92.62	-0.39	-0.77
9XXWUK		93.86	0.48	0.93	93.46	0.45	0.91
9YP32X		93.78	0.40	0.78	93.32	0.31	0.63
AHLZRW	X	93.24	-0.14	-0.28	93.72	0.71	1.43
AP2GLR		93.20	-0.18	-0.36	92.92	-0.09	-0.17
AW26UJ		93.02	-0.36	-0.71	92.90	-0.11	-0.21
BEE3VU		93.34	-0.04	-0.09	92.50	-0.51	-1.01
BF9QC6		93.04	-0.34	-0.67	92.58	-0.43	-0.85
BFT8R8		93.14	-0.24	-0.48	92.76	-0.25	-0.49
BMRV66		93.38	0.00	-0.01	93.22	0.21	0.43
BUNVFQ		93.56	0.18	0.35	92.88	-0.13	-0.25
C3YGYE		93.92	0.54	1.05	93.28	0.27	0.55
CBD6XM		93.56	0.18	0.35	93.16	0.15	0.31
CEVDAT		93.36	-0.02	-0.05	93.12	0.11	0.23
CMNVHA		92.54	-0.84	-1.65	92.02	-0.99	-1.97
CQ63ZH		93.44	0.06	0.11	93.51	0.50	1.01
CUBE7J		93.48	0.10	0.19	92.96	-0.05	-0.09
D4CGNL		92.88	-0.50	-0.99	92.88	-0.13	-0.25
D7JG6M		93.28	-0.10	-0.20	92.86	-0.15	-0.29
DAF6J9		92.82	-0.56	-1.10	92.68	-0.33	-0.65
DCYA7K		93.14	-0.24	-0.48	93.32	0.31	0.63



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 118

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N37			Sample N38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
DP3WVT		93.92	0.54	1.05	93.44	0.43	0.87
E3TUMJ		93.57	0.18	0.36	93.26	0.25	0.50
EACZKQ		93.64	0.26	0.50	93.24	0.23	0.47
EFW8XN		93.88	0.50	0.97	93.34	0.33	0.67
EHLEHL	X	91.48	-1.90	-3.73	91.86	-1.15	-2.29
ET7PPR		93.74	0.36	0.70	93.46	0.45	0.91
FNU6BJ		92.70	-0.68	-1.34	92.06	-0.95	-1.89
FRCCQ7		93.32	-0.06	-0.12	93.02	0.01	0.03
FZ4M3L		93.26	-0.12	-0.24	92.72	-0.29	-0.57
G9MTZC		94.30	0.92	1.79	94.00	0.99	1.99
GF9N2F		93.14	-0.24	-0.48	92.66	-0.35	-0.69
GQVKA9		92.16	-1.22	-2.40	91.84	-1.17	-2.33
HM2FME		94.36	0.98	1.91	93.72	0.71	1.43
HQ9JRN		93.16	-0.22	-0.44	92.90	-0.11	-0.21
HXH3WF		92.68	-0.70	-1.38	92.58	-0.43	-0.85
JMYZZ7		93.78	0.40	0.78	93.26	0.25	0.51
JWA8XV		93.80	0.42	0.82	93.14	0.13	0.27
JYU2QP		93.20	-0.18	-0.36	92.90	-0.11	-0.21
K6U37A		93.36	-0.02	-0.05	92.82	-0.19	-0.37
K8MRVW		93.20	-0.18	-0.36	93.00	-0.01	-0.01
KE2Q8M		93.38	0.00	-0.01	92.96	-0.05	-0.09
KX3FL6		93.00	-0.38	-0.75	92.60	-0.41	-0.81
L6FNM7		92.94	-0.44	-0.87	92.60	-0.41	-0.81
LCBTC2		94.40	1.02	1.99	93.66	0.65	1.31
LLZCW2		92.62	-0.76	-1.50	92.58	-0.43	-0.85
LPKHDC		93.30	-0.08	-0.16	92.42	-0.59	-1.17
LXBRWE		93.28	-0.10	-0.20	93.02	0.01	0.03
LY8AUA		92.40	-0.98	-1.93	92.10	-0.91	-1.81
LZXN66		93.16	-0.22	-0.44	92.72	-0.29	-0.57
MC9G96		93.74	0.36	0.70	93.66	0.65	1.31
MFPVR6		93.86	0.48	0.93	93.54	0.53	1.07
MKLEU4	X	95.38	2.00	3.91	94.52	1.51	3.03
MLCHMB		93.10	-0.28	-0.56	92.58	-0.43	-0.85
MLF8PM		93.32	-0.06	-0.12	92.82	-0.19	-0.37
MMQVFE		93.80	0.42	0.82	93.50	0.49	0.99
MYZMTL	X	95.56	2.18	4.26	93.50	0.49	0.99
MZCJZC		93.04	-0.34	-0.67	92.66	-0.35	-0.69
N24WZA		92.74	-0.64	-1.26	92.72	-0.29	-0.57
NBXW2G		93.66	0.28	0.54	93.32	0.31	0.63
NCNZUN		93.70	0.32	0.62	93.50	0.49	0.99
NPU9C7		93.68	0.30	0.58	93.38	0.37	0.75
NRGY94		93.90	0.52	1.01	93.62	0.61	1.23
NWVCH4		92.86	-0.52	-1.03	92.86	-0.15	-0.29
P4P288		94.30	0.92	1.79	93.84	0.83	1.67
P97CFA		94.14	0.76	1.48	93.78	0.77	1.55
PF7GL8		92.84	-0.54	-1.06	92.84	-0.17	-0.33
Q88AJD		93.48	0.10	0.19	93.06	0.05	0.11



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 118

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N37			Sample N38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QCDC2Y		93.96	0.58	1.13	93.12	0.11	0.23
QF2G3J		93.12	-0.26	-0.52	92.68	-0.33	-0.65
QMXN96	X	94.60	1.22	2.38	95.00	1.99	3.99
QW3DD2	X	92.40	-0.98	-1.93	91.20	-1.81	-3.62
QZ8Y69		92.67	-0.72	-1.40	92.68	-0.33	-0.66
QZMDGN		93.36	-0.02	-0.05	92.70	-0.31	-0.61
RCE973		92.80	-0.58	-1.14	92.10	-0.91	-1.81
RG8DY8		92.72	-0.66	-1.30	92.66	-0.35	-0.69
RRP4N6		93.28	-0.10	-0.20	93.08	0.07	0.15
RUR4JV		93.58	0.20	0.38	93.06	0.05	0.11
RW6DYM		93.68	0.30	0.58	92.94	-0.07	-0.13
RWGA4R		93.20	-0.18	-0.36	92.60	-0.41	-0.81
RXB878		93.72	0.34	0.66	93.30	0.29	0.59
T72Z24		92.70	-0.68	-1.34	92.00	-1.01	-2.01
TGL83E		92.96	-0.42	-0.83	92.64	-0.37	-0.73
THWCEG		93.12	-0.26	-0.52	92.72	-0.29	-0.57
TLDJVP		94.40	1.02	1.99	93.80	0.79	1.59
TWCC4F		93.36	-0.02	-0.05	93.44	0.43	0.87
U9ADLQ		93.14	-0.24	-0.48	92.86	-0.15	-0.29
UAXVEC	*	94.82	1.44	2.81	94.08	1.07	2.15
UBTG83	X	94.60	1.22	2.38	95.00	1.99	3.99
UGZ4Y7		93.72	0.34	0.66	93.47	0.46	0.93
UJ6NTX		92.92	-0.46	-0.91	92.64	-0.37	-0.73
V3XWGU		93.96	0.58	1.13	93.40	0.39	0.79
V8TJFB		93.70	0.32	0.62	93.44	0.43	0.87
VABZ8U		93.16	-0.22	-0.44	92.72	-0.29	-0.57
W6XLXU	X	93.40	0.02	0.03	93.90	0.89	1.79
WL6GZ2		93.22	-0.16	-0.32	93.16	0.15	0.31
WQGH2Y		93.22	-0.16	-0.32	92.94	-0.07	-0.13
XBJRE2		94.08	0.70	1.36	93.54	0.53	1.07
XK6XAK		93.72	0.34	0.66	93.06	0.05	0.11
Z4WJ8F		92.92	-0.46	-0.91	92.52	-0.49	-0.97
Z7FMUR		94.04	0.66	1.29	93.68	0.67	1.35
ZCRJM9		94.00	0.62	1.21	94.00	0.99	1.99

### Summary Statistics

	Sample N37		Sample N38	
<b>Grand Means</b>	93.38	HRB	93.01	HRB
<b>Std Dev Btwn Labs</b>	0.51	HRB	0.50	HRB

Samples N37, N38 : Steel

Statistics based on 117 of 128 reporting participants



**Analysis 118**

**Rockwell Hardness: C & B Scales**  
**ASTM E18**

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**Comments on Assigned Data Flags for Test #118**

- 3TLZK3 (X) - Inconsistent in testing between samples.
- 7KXQE4 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- 92HV2M (X) - Data for sample N37 are low.
- AHLZRW (X) - Inconsistent in testing between samples.
- EHLEHL (X) - Data for sample N37 are low. Inconsistent within the determinations of sample N37.
- MKLEU4 (X) - Data for both samples are high. Possible Systematic Error.
- MYZMTL (X) - Data for sample N37 are high.
- QMXN96 (X) - Data for sample N38 are high. Inconsistent within the determinations of sample N37.
- QW3DD2 (X) - Data for sample N38 are low.
- UBTG83 (X) - Data for sample N38 are high.
- W6XLXU (X) - Inconsistent in testing between samples.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 119

Rockwell Hardness: B Scale  
ASTM E18

WebCode	Data Flag	Sample N37			Sample N38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
3M4NRV		93.78	-1.10	-1.36	93.34	-1.04	-1.21
3P4Z32		95.34	0.46	0.57	94.86	0.48	0.55
4E2XKP		94.80	-0.08	-0.10	94.40	0.02	0.02
6MAWPK		94.72	-0.16	-0.20	93.70	-0.68	-0.79
76QBNU		94.12	-0.76	-0.94	93.62	-0.76	-0.89
7EX37C		96.40	1.52	1.88	95.92	1.54	1.79
7FLTW9		93.84	-1.04	-1.28	93.46	-0.92	-1.07
7VLB8F		93.86	-1.02	-1.26	92.86	-1.52	-1.77
89YA4T		95.50	0.62	0.77	95.38	1.00	1.16
8AFEQX		95.64	0.76	0.94	95.34	0.96	1.11
8KXVGJ		94.68	-0.20	-0.25	93.74	-0.64	-0.75
8MM36L		95.18	0.30	0.37	94.68	0.30	0.34
94MJKJ		95.88	1.00	1.24	95.56	1.18	1.37
9GBJD8		94.92	0.04	0.05	94.72	0.34	0.39
A7KLGX		96.01	1.13	1.39	95.67	1.28	1.49
AA68UE		95.32	0.44	0.54	94.88	0.50	0.58
APKEPQ		96.20	1.32	1.63	95.70	1.32	1.53
B79TVW		95.28	0.40	0.49	95.00	0.62	0.72
BXC39Z		95.32	0.44	0.54	94.46	0.08	0.09
C27G7A		93.32	-1.56	-1.93	92.44	-1.94	-2.26
C7WXFE		96.10	1.22	1.51	95.30	0.92	1.07
C7ZFHK		94.88	0.00	0.00	93.74	-0.64	-0.75
CQM6UX		95.18	0.30	0.37	94.14	-0.24	-0.28
D9JULK		95.20	0.32	0.40	94.26	-0.12	-0.14
DDH4U2		94.14	-0.74	-0.91	93.44	-0.94	-1.10
DEQHXZ		95.48	0.60	0.74	95.26	0.88	1.02
DYVUAG		94.42	-0.46	-0.57	93.44	-0.94	-1.10
DYXQEK		94.90	0.02	0.03	94.74	0.36	0.41
EHNE7R		94.06	-0.82	-1.01	93.50	-0.88	-1.03
FQTN66		93.78	-1.10	-1.36	93.38	-1.00	-1.17
G6QXQP		94.86	-0.02	-0.02	94.08	-0.30	-0.35
GCPJF4		93.56	-1.32	-1.63	92.70	-1.68	-1.96
GJAP7J		94.60	-0.28	-0.35	94.04	-0.34	-0.40
GKPYAH		94.46	-0.42	-0.52	93.74	-0.64	-0.75
GLXYH7		94.00	-0.88	-1.09	94.00	-0.38	-0.45
H6RCEA		94.64	-0.24	-0.30	93.98	-0.40	-0.47
HC63Z2		94.58	-0.30	-0.37	93.80	-0.58	-0.68
HRYUHG		95.14	0.26	0.32	95.22	0.84	0.97
HYZ6TF		95.08	0.20	0.25	94.38	0.00	0.00
JCNL2E		93.76	-1.12	-1.38	93.00	-1.38	-1.61
JM2Q9A		95.46	0.58	0.72	94.80	0.42	0.48
JX8BUQ		95.17	0.29	0.36	94.87	0.48	0.56
KM2X6B		94.84	-0.04	-0.05	94.76	0.38	0.44
KMYD6E		93.64	-1.24	-1.53	93.56	-0.82	-0.96
KZ7DQ7		94.32	-0.56	-0.69	94.04	-0.34	-0.40
LUELZN		96.02	1.14	1.41	95.46	1.08	1.25
LUTRGY		94.74	-0.14	-0.17	94.58	0.20	0.23



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 119

Rockwell Hardness: B Scale  
ASTM E18

WebCode	Data Flag	Sample N37			Sample N38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
LVP79X		93.82	-1.06	-1.31	93.14	-1.24	-1.45
M4CNV6		96.09	1.21	1.50	95.63	1.25	1.45
M4EFRR		95.30	0.42	0.52	95.42	1.03	1.20
MM9AGW		93.64	-1.24	-1.53	93.82	-0.56	-0.66
NHBRXB		94.88	0.00	0.00	94.98	0.60	0.69
NHDH7E		95.10	0.22	0.27	94.62	0.24	0.27
NQ6ZJ2		94.68	-0.20	-0.25	94.34	-0.04	-0.05
PGWRCZ		96.02	1.14	1.41	95.60	1.22	1.41
QJEMJU		93.72	-1.16	-1.43	93.22	-1.16	-1.35
QNY6ZB		93.40	-1.48	-1.83	93.24	-1.14	-1.33
QYRRMX		95.64	0.76	0.94	94.48	0.10	0.11
RA7AVU		94.12	-0.76	-0.94	93.96	-0.42	-0.49
RDP29H		96.10	1.22	1.51	95.48	1.10	1.27
RZQE4	X	93.72	-1.16	-1.43	95.18	0.80	0.93
TZFUJB		95.24	0.36	0.45	94.64	0.26	0.30
UBWYA8		94.12	-0.76	-0.94	94.28	-0.10	-0.12
ULUVDU		96.30	1.42	1.75	95.24	0.86	1.00
UMMTFA		94.50	-0.38	-0.47	94.30	-0.08	-0.10
V3VYCQ		95.08	0.20	0.25	94.70	0.32	0.37
VC3YLR		94.03	-0.85	-1.05	93.53	-0.86	-0.99
VJMUTN		94.60	-0.28	-0.35	93.94	-0.44	-0.52
W39B82	*	95.00	0.12	0.15	93.50	-0.88	-1.03
WEM7MZ		93.30	-1.58	-1.95	93.32	-1.06	-1.24
WGMLPW		95.56	0.68	0.84	94.98	0.60	0.69
WPMXRK	*	96.46	1.58	1.95	96.56	2.18	2.53
X2DPEA		95.12	0.24	0.30	94.62	0.24	0.27
XG7KQ2		95.80	0.92	1.14	95.34	0.96	1.11
XTLE2U		95.78	0.90	1.11	95.72	1.34	1.55
YFRGD2		96.00	1.12	1.38	95.50	1.12	1.30
YKPW8H		95.10	0.22	0.27	94.26	-0.12	-0.14
YTG8JY		94.92	0.04	0.05	94.12	-0.26	-0.31
YTXNAK		94.12	-0.76	-0.94	93.76	-0.62	-0.73
ZEE6BP		94.90	0.02	0.03	94.26	-0.12	-0.14
ZHR8VZ		94.80	-0.08	-0.10	94.26	-0.12	-0.14

### Summary Statistics

	Sample N37		Sample N38	
<b>Grand Means</b>	94.88	HRB	94.38	HRB
<b>Std Dev Btwn Labs</b>	0.81	HRB	0.86	HRB

Samples N37, N38 : Steel

Statistics based on 80 of 81 reporting participants

### Comments on Assigned Data Flags for Test #119

RZQE4 (X) - Inconsistent in testing between samples.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 119

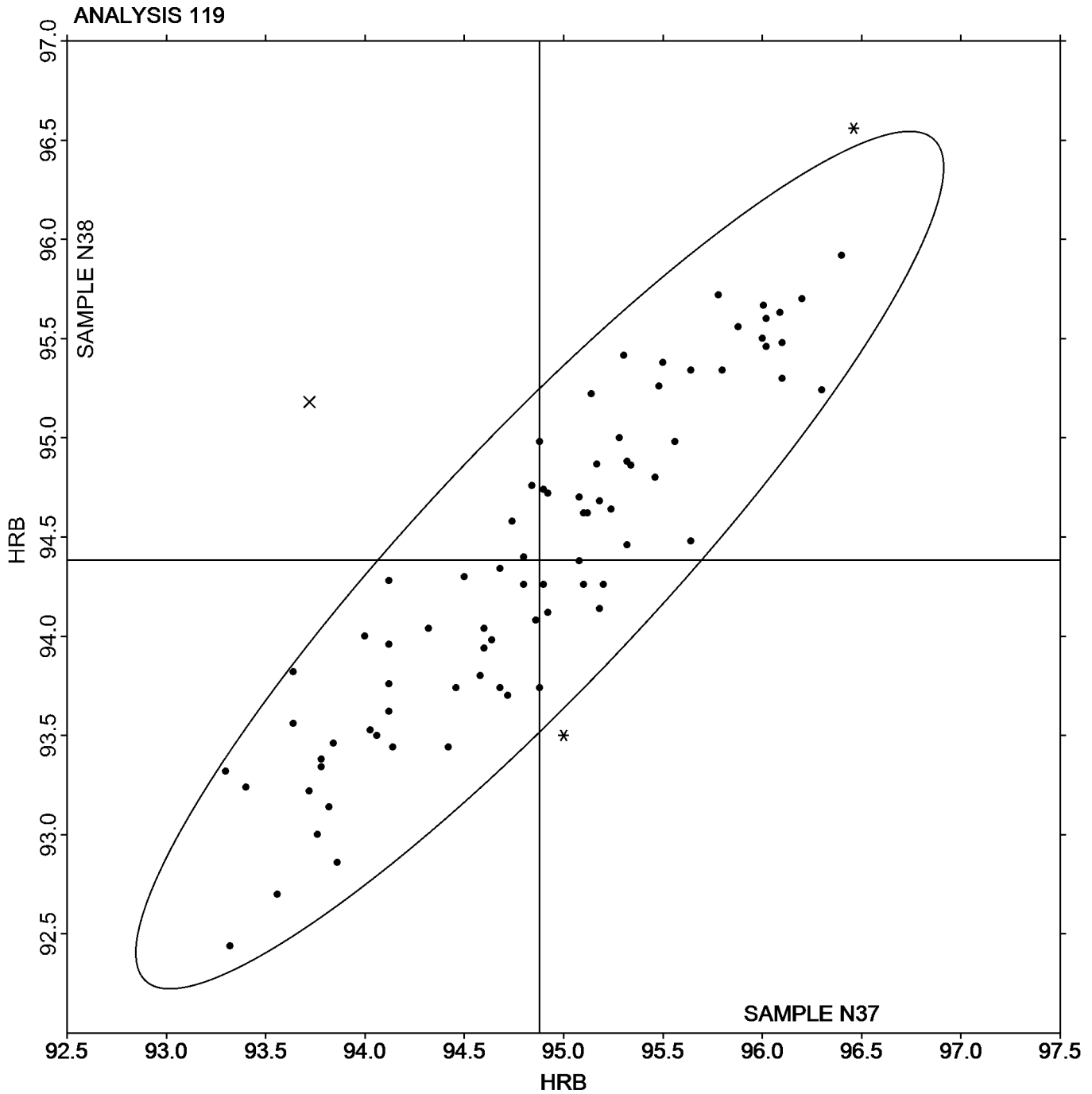
Rockwell Hardness: B Scale  
ASTM E18

SAMPLE N37

94.88 HRB

SAMPLE N38

94.38 HRB





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 121

Microhardness: Knoop Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
29JVH3		444.72	7.39	0.52	464.04	4.81	0.34
2BR244		432.40	-4.93	-0.35	444.20	-15.03	-1.06
2MHYK9		436.80	-0.53	-0.04	460.20	0.97	0.07
2ZRBHW		446.58	9.25	0.65	471.60	12.37	0.87
349ZFE		430.40	-6.93	-0.49	454.40	-4.83	-0.34
34PBVY		429.86	-7.47	-0.53	450.44	-8.79	-0.62
3B9GT6		454.68	17.35	1.23	483.60	24.37	1.72
3KYVXW		449.80	12.47	0.88	474.80	15.57	1.10
3MLLY2		456.54	19.21	1.36	482.92	23.69	1.67
3P4Z32		419.12	-18.21	-1.29	437.56	-21.67	-1.53
3QYJ9A		414.60	-22.73	-1.61	448.80	-10.43	-0.74
49DHPQ		428.60	-8.73	-0.62	451.60	-7.63	-0.54
4E2XKP		438.60	1.27	0.09	463.00	3.77	0.27
6BKRLU		420.00	-17.33	-1.23	444.00	-15.23	-1.07
6EWUHX		449.00	11.67	0.83	471.40	12.17	0.86
6VNTDR		431.60	-5.73	-0.41	453.20	-6.03	-0.42
7M7QMG		419.38	-17.95	-1.27	438.68	-20.55	-1.45
8AFEQX		439.00	1.67	0.12	478.00	18.77	1.32
8DB7W9		443.86	6.53	0.46	471.06	11.83	0.83
8G23RU		426.60	-10.73	-0.76	451.80	-7.43	-0.52
8HTDEG		421.60	-15.73	-1.11	444.80	-14.43	-1.02
8UYBGV		438.80	1.47	0.10	469.40	10.17	0.72
8WT69Y		414.80	-22.53	-1.59	441.00	-18.23	-1.28
8YFLKR		437.22	-0.11	-0.01	464.52	5.29	0.37
8ZB6PY		412.60	-24.73	-1.75	439.20	-20.03	-1.41
8ZPKQU	X	459.10	21.77	1.54	515.04	55.81	3.93
97Y89P		427.38	-9.95	-0.70	453.08	-6.15	-0.43
99GBV2		433.80	-3.53	-0.25	444.80	-14.43	-1.02
9ELCTA		445.02	7.69	0.54	470.44	11.21	0.79
A7KLGX		463.72	26.39	1.87	492.92	33.69	2.37
AQVGBP		453.32	15.98	1.13	475.76	16.53	1.16
AW26UJ		437.80	0.47	0.03	469.40	10.17	0.72
B39PZ4		429.00	-8.33	-0.59	440.60	-18.63	-1.31
BF9QC6		417.40	-19.93	-1.41	443.80	-15.43	-1.09
C93KRX		452.50	15.17	1.07	476.44	17.21	1.21
CMNVHA		441.60	4.27	0.30	464.00	4.77	0.34
CTD49V		442.52	5.19	0.37	449.20	-10.03	-0.71
CV3BTR		433.00	-4.33	-0.31	453.00	-6.23	-0.44
CWEAN2		444.70	7.37	0.52	469.48	10.25	0.72
DEPLTW		425.00	-12.33	-0.87	463.60	4.37	0.31
DYVUAG		432.44	-4.89	-0.35	456.38	-2.85	-0.20
E7UZ3P		453.20	15.87	1.12	464.60	5.37	0.38
EFW8XN		467.80	30.47	2.16	479.40	20.17	1.42
EHLEHL		429.20	-8.13	-0.58	433.20	-26.03	-1.83
EK7HT4		429.20	-8.13	-0.58	451.60	-7.63	-0.54
EP33ZU		447.52	10.18	0.72	456.69	-2.54	-0.18
ET7PPR		439.20	1.87	0.13	469.20	9.97	0.70



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 121

Microhardness: Knoop Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
FZHGEF		420.60	-16.73	-1.18	447.60	-11.63	-0.82
H8DX3Q		462.96	25.63	1.81	487.26	28.03	1.98
HD2LXW		463.40	26.07	1.84	470.40	11.17	0.79
HVX94L	*	423.40	-13.93	-0.99	466.60	7.37	0.52
JHPP7Q		438.40	1.07	0.08	472.20	12.97	0.91
KE2Q8M	*	468.60	31.27	2.21	472.80	13.57	0.96
KYUEXH	*	475.94	38.61	2.73	487.45	28.22	1.99
KZ7DQ7		419.20	-18.13	-1.28	438.80	-20.43	-1.44
L4GTRG	*	470.20	32.87	2.33	495.00	35.77	2.52
L6FNM7		438.20	0.87	0.06	463.00	3.77	0.27
LL6R8G		428.40	-8.93	-0.63	457.80	-1.43	-0.10
LNPVPL		459.80	22.47	1.59	471.60	12.37	0.87
LPKHDC		418.80	-18.53	-1.31	445.20	-14.03	-0.99
MC9G96		450.40	13.07	0.92	472.00	12.77	0.90
MMQVFE		439.40	2.07	0.15	469.80	10.57	0.74
MXTFDZ		427.40	-9.93	-0.70	450.40	-8.83	-0.62
MZE37M		433.80	-3.53	-0.25	461.20	1.97	0.14
NGDN3E		450.78	13.45	0.95	477.90	18.67	1.32
NHDH7E		443.40	6.07	0.43	459.60	0.37	0.03
NPU9C7		448.80	11.47	0.81	467.20	7.97	0.56
NRGY94		426.30	-11.03	-0.78	448.76	-10.47	-0.74
NWVCH4		443.20	5.87	0.42	460.60	1.37	0.10
NZDPZ7		429.00	-8.33	-0.59	448.00	-11.23	-0.79
PF7GL8		433.50	-3.83	-0.27	466.34	7.11	0.50
PKVC7C		435.98	-1.35	-0.10	466.58	7.35	0.52
PNW6GA		438.60	1.27	0.09	458.00	-1.23	-0.09
Q7U2WB		433.40	-3.93	-0.28	447.60	-11.63	-0.82
QDTE98	*	406.44	-30.89	-2.19	419.22	-40.01	-2.82
QNY6ZB		433.80	-3.53	-0.25	447.10	-12.13	-0.85
R6BK7A		422.60	-14.73	-1.04	442.00	-17.23	-1.21
RGBV2C		460.00	22.67	1.60	466.00	6.77	0.48
RT3LHA		444.40	7.07	0.50	473.00	13.77	0.97
T4HQBR		433.10	-4.23	-0.30	471.30	12.07	0.85
TD6ZK7		446.84	9.51	0.67	462.14	2.91	0.21
TGL83E		411.38	-25.95	-1.84	441.56	-17.67	-1.25
THWCEG		438.60	1.27	0.09	455.40	-3.83	-0.27
TJQX89	X	411.60	-25.73	-1.82	414.60	-44.63	-3.15
TUCW46		431.20	-6.13	-0.43	452.40	-6.83	-0.48
TZXUQ8		452.20	14.87	1.05	470.60	11.37	0.80
U9ADLQ		436.20	-1.13	-0.08	462.20	2.97	0.21
UBWYA8		420.60	-16.73	-1.18	433.40	-25.83	-1.82
V3VYCQ		424.60	-12.73	-0.90	452.60	-6.63	-0.47
VABZ8U		437.78	0.45	0.03	469.10	9.87	0.70
VE7RGC		423.80	-13.53	-0.96	456.20	-3.03	-0.21
VJNPFZ	*	444.80	7.47	0.53	440.60	-18.63	-1.31
WBPkZ4		442.60	5.27	0.37	454.20	-5.03	-0.35
WGMLPW		448.08	10.75	0.76	466.50	7.27	0.51



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 121**

**Microhardness: Knoop Indenters (500 gf)**  
**ASTM E384**

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
XBJRE2		438.00	0.67	0.05	451.00	-8.23	-0.58
Y3JWP2		424.60	-12.73	-0.90	450.60	-8.63	-0.61
Y3YZH9		440.60	3.27	0.23	451.40	-7.83	-0.55
YGPK9W		424.54	-12.79	-0.91	457.14	-2.09	-0.15
ZHR8VZ		435.80	-1.53	-0.11	450.40	-8.83	-0.62
ZZA764		431.66	-5.67	-0.40	447.00	-12.23	-0.86

Summary Statistics						
	Sample S37			Sample S38		
<b>Grand Means</b>	437.33	HK 500 gf		459.23	HK 500 gf	
<b>Std Dev Btwn Labs</b>	14.13	HK 500 gf		14.19	HK 500 gf	

Samples S37, S38 : Steel

Statistics based on 98 of 100 reporting participants

**Comments on Assigned Data Flags for Test #121**

- 8ZPKQU (X) - Data for sample S38 are high. Inconsistent within the determinations of both samples.
- TJQX89 (X) - Data for sample S38 are low.

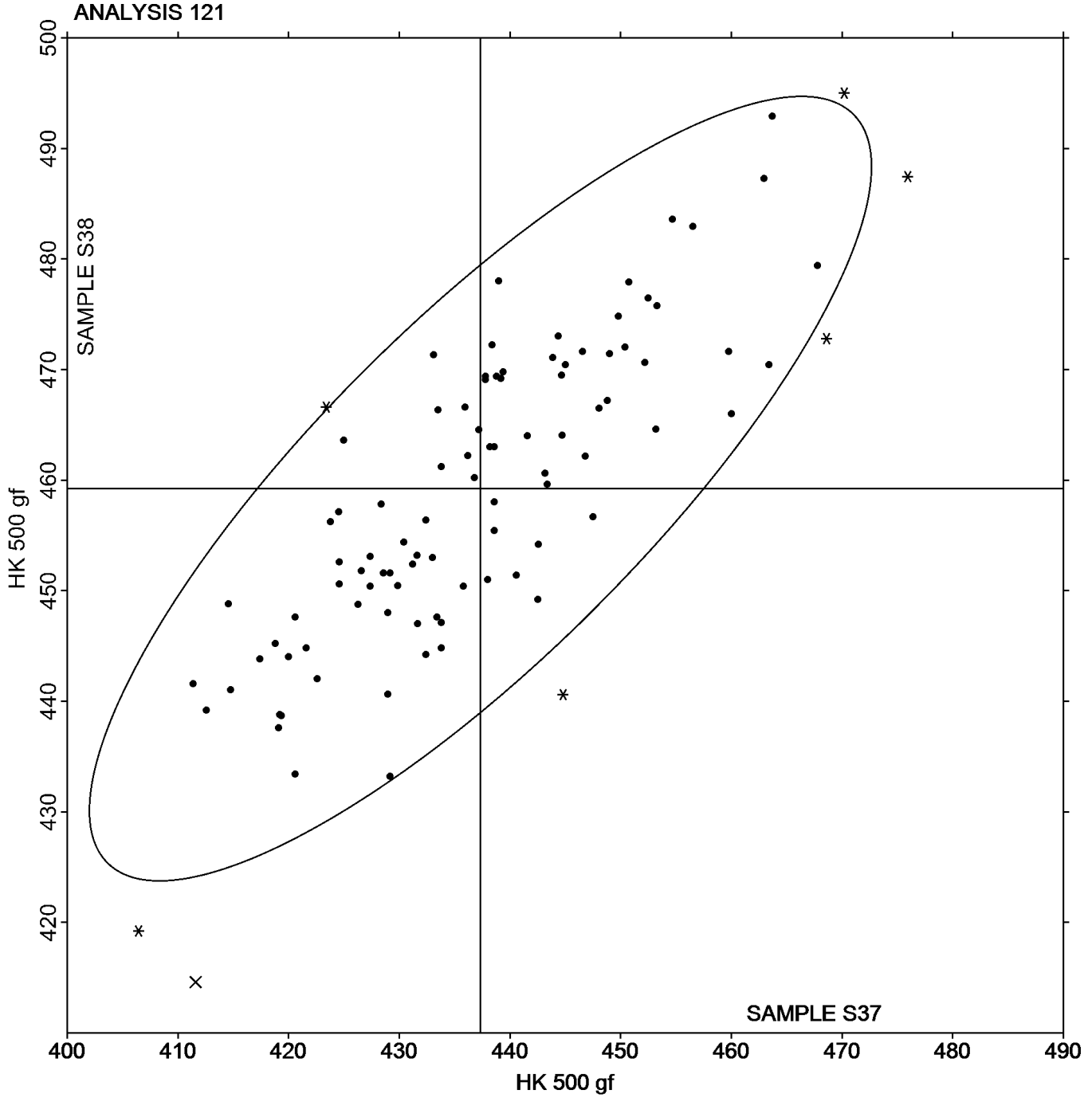


Analysis 121

Microhardness: Knoop Indenters (500 gf)  
ASTM E384

SAMPLE S37  
437.33 HK 500 gf

SAMPLE S38  
459.23 HK 500 gf







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 122

Microhardness: Knoop Indenters (200 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
29JVH3		453.48	6.02	0.41	473.52	3.23	0.22
2BR244		442.20	-5.26	-0.36	447.20	-23.09	-1.55
2MHYK9		434.00	-13.46	-0.91	461.40	-8.89	-0.60
2ZRBHW		462.28	14.82	1.01	483.42	13.13	0.88
349ZFE		445.60	-1.86	-0.13	478.00	7.71	0.52
34PBVY		432.38	-15.08	-1.02	455.34	-14.95	-1.00
3MLLY2		475.78	28.32	1.92	499.38	29.09	1.96
3P4Z32		440.48	-6.98	-0.47	468.96	-1.33	-0.09
4E2XKP		457.00	9.54	0.65	487.80	17.51	1.18
6BKRLU		427.80	-19.66	-1.34	454.80	-15.49	-1.04
6EWUHX		457.00	9.54	0.65	479.40	9.11	0.61
6VNTDR		451.40	3.94	0.27	469.60	-0.69	-0.05
7M7QMG		429.60	-17.86	-1.21	452.20	-18.09	-1.22
8AFEQX		468.60	21.14	1.44	495.40	25.11	1.69
8G23RU		437.60	-9.86	-0.67	453.60	-16.69	-1.12
8UYBGV		457.40	9.94	0.67	484.00	13.71	0.92
8WT69Y		427.40	-20.06	-1.36	452.00	-18.29	-1.23
8YFLKR		442.38	-5.08	-0.35	474.08	3.79	0.25
8ZPKQU	X	459.22	11.76	0.80	582.72	112.43	7.56
9ELCTA		450.36	2.90	0.20	469.48	-0.81	-0.05
A7KLGX	*	475.76	28.30	1.92	508.62	38.33	2.58
AQVGBP		452.52	5.05	0.34	475.92	5.63	0.38
AW26UJ		474.00	26.54	1.80	501.60	31.31	2.10
B39PZ4		428.20	-19.26	-1.31	448.20	-22.09	-1.48
BF9QC6		434.20	-13.26	-0.90	451.80	-18.49	-1.24
C93KRX		451.88	4.42	0.30	478.40	8.11	0.55
CMNVHA		451.60	4.14	0.28	467.20	-3.09	-0.21
CV3BTR		444.00	-3.46	-0.24	460.80	-9.49	-0.64
DEPLTW		426.80	-20.66	-1.40	464.40	-5.89	-0.40
DYVUAG		433.72	-13.74	-0.93	470.40	0.11	0.01
E7UZ3P		466.60	19.14	1.30	479.00	8.71	0.59
EFW8XN	X	516.60	69.14	4.69	513.80	43.51	2.92
EHLEHL		432.80	-14.66	-1.00	447.40	-22.89	-1.54
EK7HT4		443.60	-3.86	-0.26	476.00	5.71	0.38
EP33ZU		462.83	15.37	1.04	473.19	2.90	0.19
ET7PPR		443.80	-3.66	-0.25	484.80	14.51	0.98
FZHGEF		425.40	-22.06	-1.50	448.00	-22.29	-1.50
HVX94L	*	430.60	-16.86	-1.15	478.80	8.51	0.57
JHPP7Q		435.20	-12.26	-0.83	465.60	-4.69	-0.32
KYUEXH		480.02	32.55	2.21	493.39	23.10	1.55
KZ7DQ7		420.00	-27.46	-1.86	454.60	-15.69	-1.05
L4GTRG		481.40	33.94	2.30	491.60	21.31	1.43
L6FNM7		448.80	1.34	0.09	475.80	5.51	0.37
LNPVPL		475.20	27.74	1.88	482.80	12.51	0.84
LPKHDC		429.60	-17.86	-1.21	454.60	-15.69	-1.05
MC9G96		459.40	11.94	0.81	487.20	16.91	1.14
MMQVFE		451.60	4.14	0.28	478.80	8.51	0.57



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 122

Microhardness: Knoop Indenters (200 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MXTFDZ		433.20	-14.26	-0.97	459.60	-10.69	-0.72
MZE37M		435.00	-12.46	-0.85	467.00	-3.29	-0.22
NGDN3E		451.24	3.78	0.26	482.32	12.03	0.81
NHDH7E		445.40	-2.06	-0.14	457.20	-13.09	-0.88
NPU9C7		449.60	2.14	0.15	480.60	10.31	0.69
NRGY94		437.04	-10.42	-0.71	454.38	-15.91	-1.07
NWVCH4		450.80	3.34	0.23	471.80	1.51	0.10
NZDPZ7		449.00	1.54	0.10	473.40	3.11	0.21
PF7GL8		446.16	-1.30	-0.09	467.64	-2.65	-0.18
PKVC7C		460.80	13.34	0.91	469.08	-1.21	-0.08
PNW6GA		464.80	17.34	1.18	477.00	6.71	0.45
Q7U2WB		442.00	-5.46	-0.37	460.00	-10.29	-0.69
R6BK7A		433.60	-13.86	-0.94	454.60	-15.69	-1.05
RGBV2C		468.00	20.54	1.39	494.00	23.71	1.59
RT3LHA		463.80	16.34	1.11	481.60	11.31	0.76
TD6ZK7		450.96	3.50	0.24	469.42	-0.87	-0.06
THWCEG		444.00	-3.46	-0.24	464.60	-5.69	-0.38
TJQX89		434.40	-13.06	-0.89	466.60	-3.69	-0.25
TUCW46		441.60	-5.86	-0.40	460.60	-9.69	-0.65
TZXUQ8		458.20	10.74	0.73	487.40	17.11	1.15
U9ADLQ		455.60	8.14	0.55	486.00	15.71	1.06
V3VYCQ		439.20	-8.26	-0.56	462.40	-7.89	-0.53
VABZ8U		445.88	-1.58	-0.11	462.54	-7.75	-0.52
WBPkZ4		447.20	-0.26	-0.02	459.60	-10.69	-0.72
WGMLPW		460.36	12.90	0.88	462.96	-7.33	-0.49
XBJRE2		450.20	2.74	0.19	475.80	5.51	0.37
Y3YZH9	*	427.40	-20.06	-1.36	433.60	-36.69	-2.47
ZZA764		427.18	-20.28	-1.38	451.00	-19.29	-1.30

### Summary Statistics

	Sample S37		Sample S38	
<b>Grand Means</b>	447.46	HK 200 gf	470.29	HK 200 gf
<b>Std Dev Btwn Labs</b>	14.73	HK 200 gf	14.88	HK 200 gf

Samples S37, S38 : Steel

Statistics based on 73 of 75 reporting participants

### Comments on Assigned Data Flags for Test #122

8ZPKQU (X) - Data for sample S38 are high. Inconsistent within the determinations of sample S37.

EFW8XN (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample S38.

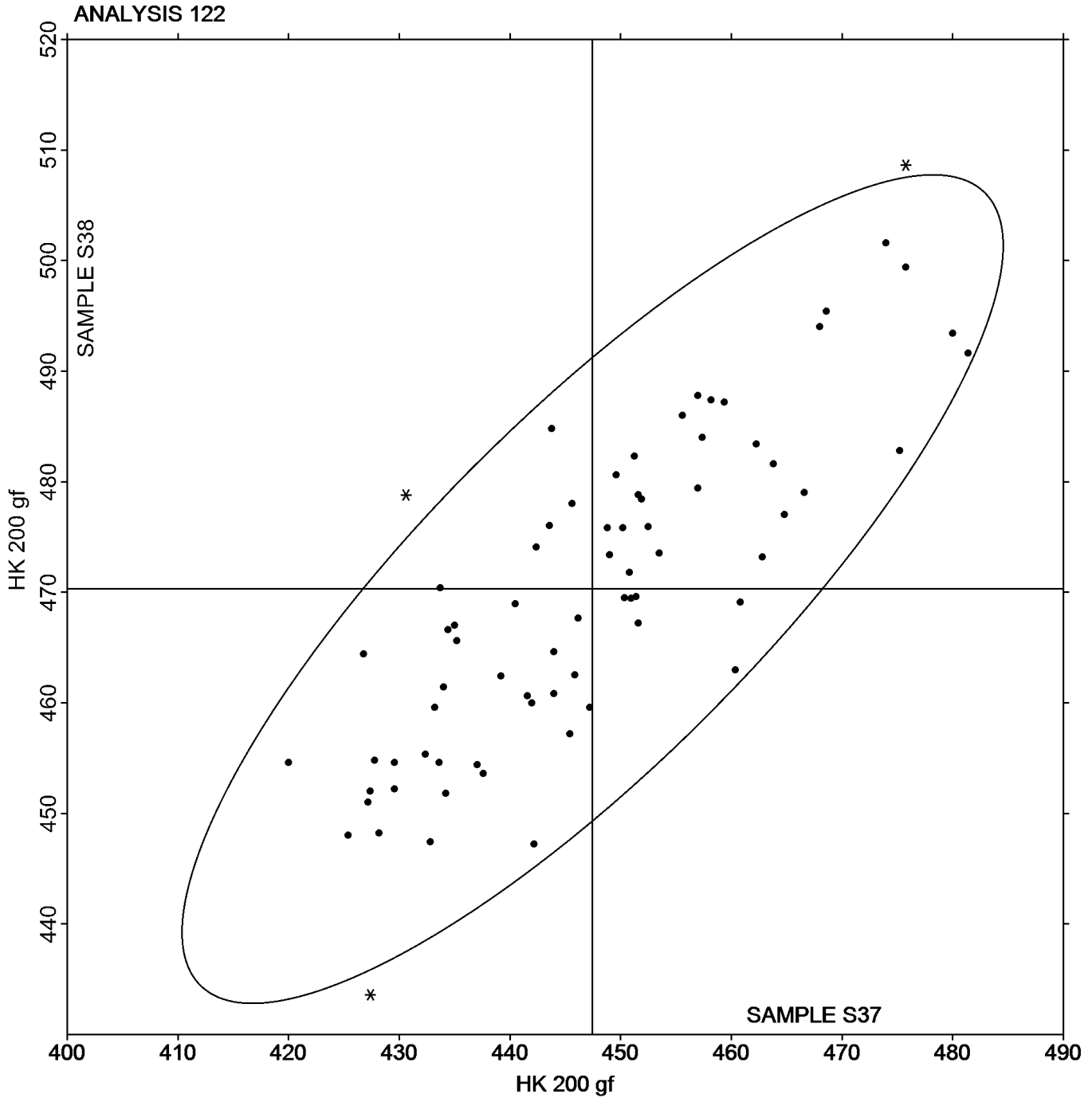


Analysis 122

Microhardness: Knoop Indenters (200 gf)  
ASTM E384

SAMPLE S37  
447.46 HK 200 gf

SAMPLE S38  
470.29 HK 200 gf





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 123

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
29JVH3		423.52	5.58	0.39	443.04	2.52	0.18
2BR244		419.20	1.26	0.09	427.80	-12.72	-0.92
2EBZDR		417.88	-0.06	0.00	441.90	1.38	0.10
2MHYK9		435.20	17.26	1.20	463.20	22.68	1.64
2ZRBHW		420.22	2.28	0.16	441.18	0.66	0.05
349ZFE		409.80	-8.14	-0.57	444.20	3.68	0.27
34PBVY		401.84	-16.10	-1.12	429.64	-10.88	-0.79
3KEG8Y		429.40	11.46	0.80	453.80	13.28	0.96
3KYVXW		421.40	3.46	0.24	450.20	9.68	0.70
3M4NRV		409.00	-8.94	-0.62	435.40	-5.12	-0.37
3MLLY2		434.92	16.98	1.18	463.66	23.14	1.67
3QYJ9A		397.40	-20.54	-1.43	435.20	-5.32	-0.38
3T8WQB	*	434.20	16.26	1.13	436.00	-4.52	-0.33
49DHPQ		405.80	-12.14	-0.85	429.40	-11.12	-0.80
4E2XKP		420.40	2.46	0.17	455.20	14.68	1.06
4KPPLQ		422.38	4.44	0.31	454.36	13.84	1.00
4ZFR72		425.32	7.38	0.51	442.00	1.48	0.11
6EWUHX		431.20	13.26	0.92	459.40	18.88	1.36
6MBMXN		423.40	5.46	0.38	444.20	3.68	0.27
73K2AH		432.00	14.06	0.98	450.40	9.88	0.71
7EF7J4		426.40	8.46	0.59	446.00	5.48	0.40
7VLB8F		446.60	28.66	1.99	472.00	31.48	2.27
8AFEQX		421.20	3.26	0.23	450.60	10.08	0.73
8G23RU		409.20	-8.74	-0.61	429.80	-10.72	-0.77
8RXDUA		393.20	-24.74	-1.72	416.20	-24.32	-1.76
8UYBGV		409.40	-8.54	-0.59	441.80	1.28	0.09
8WT69Y	*	384.00	-33.94	-2.36	399.80	-40.72	-2.94
8ZB6PY		388.20	-29.74	-2.07	410.80	-29.72	-2.15
8ZPKQU	*	455.94	38.00	2.64	480.94	40.42	2.92
92HV2M		441.40	23.46	1.63	471.20	30.68	2.22
97Y89P		416.00	-1.94	-0.14	435.00	-5.52	-0.40
99GBV2		406.60	-11.34	-0.79	422.00	-18.52	-1.34
9CW79D		418.10	0.16	0.01	438.50	-2.02	-0.15
9HMH9F		396.60	-21.34	-1.49	422.20	-18.32	-1.32
A7KLGX		446.08	28.14	1.96	473.54	33.02	2.38
A9RWG9		417.54	-0.40	-0.03	452.80	12.28	0.89
AN9NM3		432.00	14.06	0.98	457.00	16.48	1.19
AQVGBP		435.15	17.21	1.20	454.36	13.84	1.00
B39PZ4		397.00	-20.94	-1.46	419.00	-21.52	-1.55
BF9QC6		402.20	-15.74	-1.10	425.00	-15.52	-1.12
C27G7A		427.40	9.46	0.66	448.40	7.88	0.57
C4VPEP	*	448.60	30.66	2.13	455.60	15.08	1.09
C93KRX		429.60	11.66	0.81	455.18	14.66	1.06
CDXAEW		412.20	-5.74	-0.40	427.00	-13.52	-0.98
CMNVHA	X	247.20	-170.74	-11.89	243.40	-197.12	-14.23
D4CGNL		424.00	6.06	0.42	442.20	1.68	0.12
DATWA4		414.60	-3.34	-0.23	427.00	-13.52	-0.98



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 123

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
DEPLTW		411.20	-6.74	-0.47	444.60	4.08	0.29
DYVUAG		409.36	-8.58	-0.60	433.96	-6.56	-0.47
E7UZ3P	X	389.80	-28.14	-1.96	388.40	-52.12	-3.76
EFW8XN		435.20	17.26	1.20	458.00	17.48	1.26
EHLEHL		401.80	-16.14	-1.12	424.40	-16.12	-1.16
EP33ZU		417.30	-0.65	-0.04	430.93	-9.59	-0.69
ET7PPR		409.80	-8.14	-0.57	443.80	3.28	0.24
EZN9VC		406.00	-11.94	-0.83	428.20	-12.32	-0.89
FGPBBW	*	408.40	-9.54	-0.66	451.80	11.28	0.81
FNU6BJ		420.00	2.06	0.14	438.00	-2.52	-0.18
FZ4M3L		425.40	7.46	0.52	444.20	3.68	0.27
FZHGEF		402.20	-15.74	-1.10	429.00	-11.52	-0.83
HD2LXW		438.60	20.66	1.44	447.80	7.28	0.53
HVX94L	*	393.60	-24.34	-1.69	433.20	-7.32	-0.53
HWVCYH		409.80	-8.14	-0.57	441.60	1.08	0.08
JCNL2E		402.80	-15.14	-1.05	424.40	-16.12	-1.16
JX8BUQ		407.40	-10.54	-0.73	437.00	-3.52	-0.25
KE2Q8M		439.40	21.46	1.49	449.00	8.48	0.61
KNA8W8		403.20	-14.74	-1.03	421.40	-19.12	-1.38
KNDP4J		395.52	-22.42	-1.56	423.74	-16.78	-1.21
KUHGCG		400.42	-17.52	-1.22	418.22	-22.30	-1.61
KYUEXH	*	450.49	32.55	2.27	453.64	13.12	0.95
KZ7DQ7		386.20	-31.74	-2.21	411.80	-28.72	-2.07
L4GTRG		438.20	20.26	1.41	462.00	21.48	1.55
L6FNM7		414.00	-3.94	-0.27	440.20	-0.32	-0.02
LCBTC2		426.80	8.86	0.62	448.00	7.48	0.54
LNPVPL		439.20	21.26	1.48	459.80	19.28	1.39
LPKHDC		389.60	-28.34	-1.97	414.80	-25.72	-1.86
LUTRGY		422.20	4.26	0.30	445.20	4.68	0.34
MC9G96		424.40	6.46	0.45	445.40	4.88	0.35
MMQVFE		414.80	-3.14	-0.22	438.80	-1.72	-0.12
MWGJ7A		415.98	-1.96	-0.14	434.54	-5.98	-0.43
MXTFDZ		406.80	-11.14	-0.78	431.80	-8.72	-0.63
MZE37M		434.00	16.06	1.12	462.60	22.08	1.59
NGDN3E		434.82	16.88	1.17	456.06	15.54	1.12
NHDH7E		439.00	21.06	1.47	454.40	13.88	1.00
NPU9C7		429.60	11.66	0.81	453.20	12.68	0.92
NRGY94		414.92	-3.02	-0.21	434.62	-5.90	-0.43
NWVCH4		418.00	0.06	0.00	446.80	6.28	0.45
NXLTDX		386.40	-31.54	-2.20	410.40	-30.12	-2.18
NZDPZ7		405.80	-12.14	-0.85	425.00	-15.52	-1.12
P97CFA		424.58	6.64	0.46	434.72	-5.80	-0.42
PAECQH		420.80	2.86	0.20	436.20	-4.32	-0.31
PGBFB7	X	445.00	27.06	1.88	440.20	-0.32	-0.02
PKVC7C		410.48	-7.46	-0.52	429.32	-11.20	-0.81
PNW6GA		421.60	3.66	0.25	440.00	-0.52	-0.04
Q7U2WB		414.40	-3.54	-0.25	434.20	-6.32	-0.46



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 123

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S37			Sample S38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QBM4XP		417.20	-0.74	-0.05	440.00	-0.52	-0.04
QDCBHL		416.42	-1.52	-0.11	440.24	-0.28	-0.02
QDTE98	X	326.44	-91.50	-6.37	332.26	-108.26	-7.82
QNY6ZB		415.78	-2.16	-0.15	434.02	-6.50	-0.47
QZMDGN	*	415.00	-2.94	-0.20	418.80	-21.72	-1.57
R6BK7A		414.60	-3.34	-0.23	439.00	-1.52	-0.11
RGBV2C		429.80	11.86	0.83	439.80	-0.72	-0.05
RT3LHA		423.00	5.06	0.35	447.00	6.48	0.47
TD6ZK7		414.88	-3.06	-0.21	441.00	0.48	0.03
THWCEG		417.60	-0.34	-0.02	441.60	1.08	0.08
TUCW46		414.40	-3.54	-0.25	443.00	2.48	0.18
TV38QR		406.70	-11.24	-0.78	446.70	6.18	0.45
TZXUQ8		409.20	-8.74	-0.61	438.60	-1.92	-0.14
U9ADLQ		428.20	10.26	0.71	450.00	9.48	0.68
UBWYA8		403.00	-14.94	-1.04	430.40	-10.12	-0.73
UGZ4Y7		421.60	3.66	0.25	442.60	2.08	0.15
UU3MGX		415.26	-2.68	-0.19	440.62	0.10	0.01
UVKGH8		406.40	-11.54	-0.80	435.00	-5.52	-0.40
V22DJZ		409.00	-8.94	-0.62	441.50	0.98	0.07
V3VYCQ		417.60	-0.34	-0.02	438.20	-2.32	-0.17
VABZ8U		418.06	0.12	0.01	436.58	-3.94	-0.28
VJNPFZ	X	429.40	11.46	0.80	422.00	-18.52	-1.34
VX8FBW		410.64	-7.30	-0.51	438.08	-2.44	-0.18
W39B82		424.20	6.26	0.44	449.40	8.88	0.64
WBPkZ4		418.20	0.26	0.02	434.20	-6.32	-0.46
WGMLPW		424.60	6.66	0.46	440.60	0.08	0.01
X2WTQG		423.20	5.26	0.37	445.00	4.48	0.32
XAAREZ		447.60	29.66	2.06	465.80	25.28	1.83
XBjRE2		418.40	0.46	0.03	434.40	-6.12	-0.44
XE7AY8	X	455.06	37.12	2.58	405.08	-35.44	-2.56
XK6XAK		411.04	-6.90	-0.48	430.26	-10.26	-0.74
XZXPuK	X	465.76	47.82	3.33	480.84	40.32	2.91
Y3YZH9		432.20	14.26	0.99	438.60	-1.92	-0.14
YHZMvV		423.00	5.06	0.35	445.20	4.68	0.34
YYF3RW		399.60	-18.34	-1.28	434.40	-6.12	-0.44
ZR43GU		428.80	10.86	0.76	449.20	8.68	0.63
ZZA764		415.64	-2.30	-0.16	434.20	-6.32	-0.46

### Summary Statistics

	Sample S37		Sample S38	
<b>Grand Means</b>	417.94	HV 500 gf	440.52	HV 500 gf
<b>Std Dev Btwn Labs</b>	14.37	HV 500 gf	13.85	HV 500 gf

Samples S37, S38 : Steel

Statistics based on 124 of 131 reporting participants



**Analysis 123**

**Microhardness: Vickers Indenters (500 gf)**  
**ASTM E384**

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**Comments on Assigned Data Flags for Test #123**

- CMNVHA (X) - Data for both samples are low. Possible Systematic Error.
- E7UZ3P (X) - Data for sample S38 are low.
- PGBFB7 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample S37.
- QDTE98 (X) - Data for both samples are low. Possible Systematic Error.
- VJNPFZ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample S38.
- XE7AY8 (X) - Inconsistent in testing between samples.
- XZXPUK (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample S37.

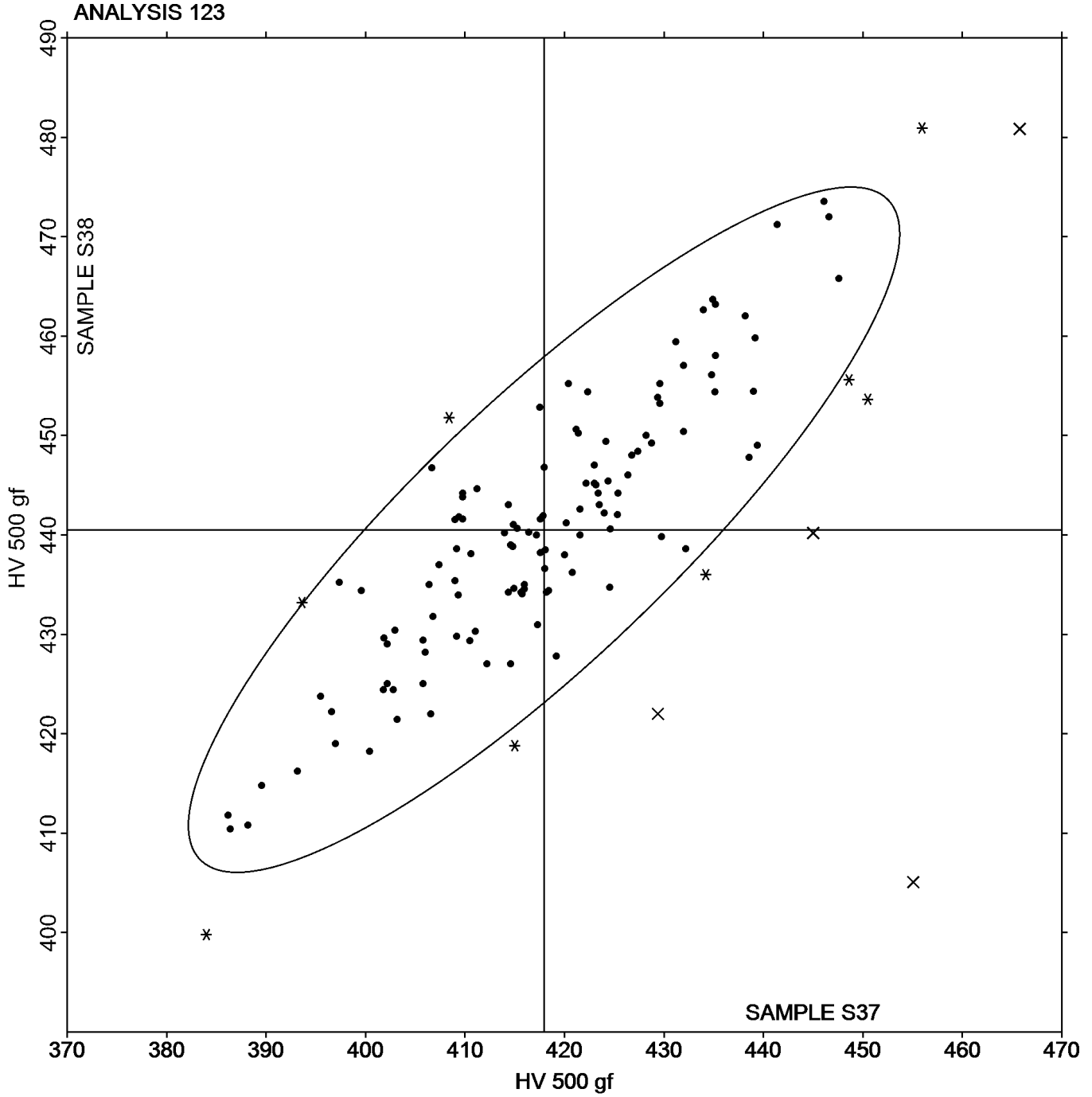


Analysis 123

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

SAMPLE S37  
417.94 HV 500 gf

SAMPLE S38  
440.52 HV 500 gf







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 135 Brinell Hardness ASTM E10

WebCode	Data Flag	Sample D37			Sample D38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		308.40	9.22	1.64	333.60	-2.42	-0.38
2BR244		308.40	9.22	1.64	341.00	4.98	0.78
2YXPP6		302.00	2.82	0.50	331.00	-5.02	-0.79
2ZRBHW		299.84	0.66	0.12	339.64	3.62	0.57
349ZFE		302.00	2.82	0.50	330.00	-6.02	-0.95
3J2R3Z		300.80	1.62	0.29	324.20	-11.82	-1.86
3KEG8Y		304.00	4.82	0.86	343.20	7.18	1.13
3M4NRV		304.00	4.82	0.86	335.00	-1.02	-0.16
3QYJ9A	*	286.40	-12.78	-2.28	339.00	2.98	0.47
3TLZK3		294.80	-4.38	-0.78	339.00	2.98	0.47
47BDHX	*	303.80	4.62	0.82	352.00	15.98	2.51
49ATME		307.76	8.58	1.53	347.60	11.58	1.82
4E2XKP		296.60	-2.58	-0.46	339.00	2.98	0.47
62CHUV		299.20	0.02	0.00	331.20	-4.82	-0.76
6EWUHX		288.00	-11.18	-1.99	340.60	4.58	0.72
7D49AT		298.00	-1.18	-0.21	334.80	-1.22	-0.19
7RHG9B		293.40	-5.78	-1.03	340.40	4.38	0.69
8CKP2F		296.60	-2.58	-0.46	329.00	-7.02	-1.11
8FMP2C	*	315.00	15.82	2.82	339.00	2.98	0.47
8G23RU		294.80	-4.38	-0.78	331.00	-5.02	-0.79
8RE8YQ	*	285.00	-14.18	-2.53	321.00	-15.02	-2.36
99GBV2		295.00	-4.18	-0.75	339.00	2.98	0.47
9YP32X		302.00	2.82	0.50	341.00	4.98	0.78
AA68UE		304.00	4.82	0.86	339.00	2.98	0.47
AHLZRW		300.00	0.82	0.15	337.00	0.98	0.15
B39PZ4		302.20	3.02	0.54	347.40	11.38	1.79
BF9QC6		306.60	7.42	1.32	339.40	3.38	0.53
BMRV66		306.80	7.62	1.36	340.20	4.18	0.66
BXC39Z		299.20	0.02	0.00	339.80	3.78	0.59
BXETEJ		296.80	-2.38	-0.43	333.60	-2.42	-0.38
C27G7A		300.40	1.22	0.22	339.40	3.38	0.53
CEVDAT		302.00	2.82	0.50	331.00	-5.02	-0.79
CLEQ6L		295.00	-4.18	-0.75	331.00	-5.02	-0.79
CQ63ZH		292.20	-6.98	-1.25	331.80	-4.22	-0.66
EFW8XN		302.00	2.82	0.50	339.40	3.38	0.53
EHLEHL		302.00	2.82	0.50	329.00	-7.02	-1.11
FZ4M3L		295.80	-3.38	-0.60	331.00	-5.02	-0.79
G9MTZC		297.00	-2.18	-0.39	341.00	4.98	0.78
GQVKA9		300.80	1.62	0.29	336.60	0.58	0.09
H8DX3Q	X	3.566	-295.62	-52.71	3.324	-332.70	-52.36
HQ9JRN		308.00	8.82	1.57	333.00	-3.02	-0.48
HVX94L		295.98	-3.20	-0.57	333.28	-2.74	-0.43
HYZ6TF		297.20	-1.98	-0.35	334.60	-1.42	-0.22
JCH7YL		290.40	-8.78	-1.57	338.20	2.18	0.34
JX8BUQ		300.20	1.02	0.18	337.60	1.58	0.25
JYU2QP		296.40	-2.78	-0.50	334.40	-1.62	-0.26
KE2Q8M		297.60	-1.58	-0.28	336.00	-0.02	0.00



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 135 Brinell Hardness ASTM E10

WebCode	Data Flag	Sample D37			Sample D38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
KX3FL6		300.40	1.22	0.22	332.00	-4.02	-0.63
KZ7DQ7	X	285.00	-14.18	-2.53	315.80	-20.22	-3.18
LNPVPL	*	294.80	-4.38	-0.78	319.40	-16.62	-2.62
M4EFRR	X	288.20	-10.99	-1.96	241.19	-94.83	-14.92
MC9G96		302.00	2.82	0.50	331.00	-5.02	-0.79
MFPVR6		293.00	-6.18	-1.10	345.00	8.98	1.41
MM9AGW		309.00	9.82	1.75	338.00	1.98	0.31
NPU9C7		302.20	3.02	0.54	342.20	6.18	0.97
NQ6ZJ2		307.00	7.82	1.39	338.20	2.18	0.34
NWVCH4		294.60	-4.58	-0.82	322.20	-13.82	-2.18
PBPG2L		292.80	-6.38	-1.14	327.80	-8.22	-1.29
PQMLC4		301.00	1.82	0.32	335.00	-1.02	-0.16
QF2G3J		299.40	0.22	0.04	339.80	3.78	0.59
QNY6ZB		310.60	11.42	2.04	332.20	-3.82	-0.60
QUJAQP		306.00	6.82	1.22	337.00	0.98	0.15
QYNHKY	*	285.00	-14.18	-2.53	341.00	4.98	0.78
QYRRMX		294.80	-4.38	-0.78	321.00	-15.02	-2.36
RA7AVU		302.00	2.82	0.50	341.00	4.98	0.78
RDP29H		298.68	-0.50	-0.09	337.40	1.38	0.22
RUR4JV	X	151.00	-148.18	-26.42	160.00	-176.02	-27.70
T74VKA		292.00	-7.18	-1.28	329.60	-6.42	-1.01
THWCEG		300.80	1.62	0.29	341.00	4.98	0.78
TZFUJB	X	341.36	42.18	7.52	301.98	-34.04	-5.36
U9ADLQ		302.60	3.42	0.61	333.60	-2.42	-0.38
UBWYA8		296.40	-2.78	-0.50	343.00	6.98	1.10
UEDJX9		298.40	-0.78	-0.14	337.00	0.98	0.15
UGZ4Y7		293.84	-5.34	-0.95	328.26	-7.76	-1.22
UMMTFA		300.20	1.02	0.18	347.60	11.58	1.82
UUM7JJ		302.00	2.82	0.50	341.00	4.98	0.78
UZPENQ		298.80	-0.38	-0.07	332.20	-3.82	-0.60
V8TJFB		293.60	-5.58	-1.00	334.60	-1.42	-0.22
VABZ8U		302.00	2.82	0.50	331.00	-5.02	-0.79
WUXPJ8		295.60	-3.58	-0.64	335.80	-0.22	-0.03
XBJRE2		301.00	1.82	0.32	351.20	15.18	2.39
XD874B		300.00	0.82	0.15	341.00	4.98	0.78
XE2RW3		299.00	-0.18	-0.03	327.40	-8.62	-1.36
XGRBHZ		296.00	-3.18	-0.57	335.00	-1.02	-0.16
XLYJ3B		297.60	-1.58	-0.28	339.00	2.98	0.47
XNPXD7		302.00	2.82	0.50	337.00	0.98	0.15
ZCRJM9		293.60	-5.58	-1.00	333.40	-2.62	-0.41



Analysis 135  
Brinell Hardness  
ASTM E10

Summary Statistics

	<u>Sample D37</u>		<u>Sample D38</u>	
<b>Grand Means</b>	299.18	HBW	336.02	HBW
<b>Std Dev Btwn Labs</b>	5.61	HBW	6.35	HBW

Samples D37, D38 : Steel

Statistics based on 82 of 87 reporting participants

Samples D37, D38 are hardness test blocks made from steel. The blocks are heat treated to hardness levels specified by CTS.

**Comments on Assigned Data Flags for Test #135**

H8DX3Q (X) - Extreme data. Data appear to be reported in the wrong unit.

KZ7DQ7 (X) - Data for sample D38 are low. Inconsistent within the determinations of sample D38.

M4EFRR (X) - Data for sample D38 are low. Inconsistent within the determinations of sample D37.

RUR4JV (X) - Data for both samples are low.

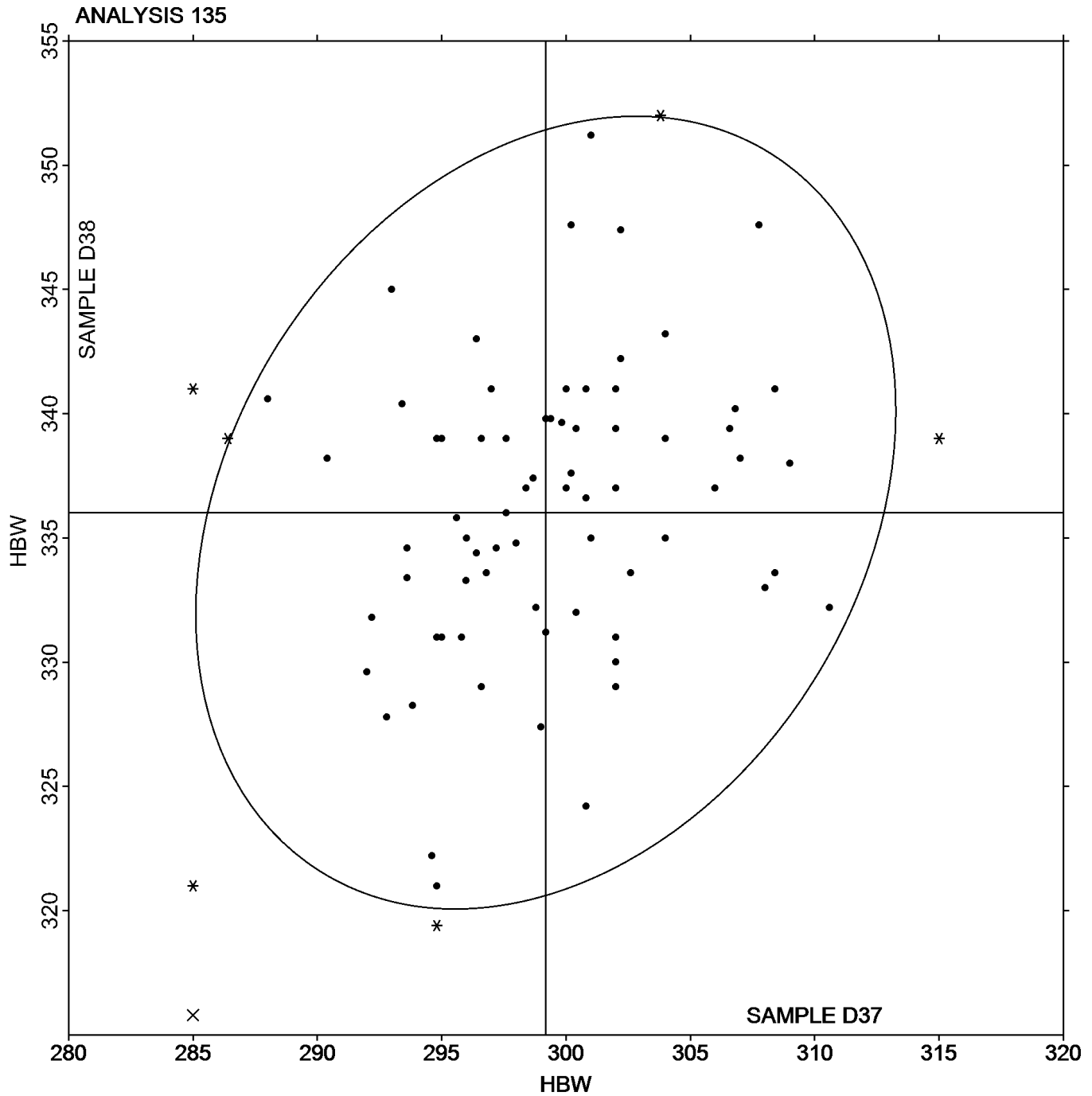
TZFUJB (X) - Data for sample D37 are high and data for sample D38 are low.



Analysis 135  
Brinell Hardness  
ASTM E10

SAMPLE D37  
299.18 HBW

SAMPLE D38  
336.02 HBW





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 140

### Tensile Strength: Lab-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		155.76	-2.05	-0.90	139.99	0.26	0.20
2RZY4U		160.62	2.81	1.23	139.19	-0.53	-0.41
2VZ7M8		157.80	-0.01	0.00	139.00	-0.73	-0.55
2XKZK8		158.80	0.99	0.43	140.00	0.27	0.21
349ZFE		155.24	-2.57	-1.13	137.86	-1.87	-1.42
3J2R3Z		157.60	-0.21	-0.09	140.00	0.27	0.21
3KYVXW		154.00	-3.81	-1.67	140.00	0.27	0.21
3QYJ9A		156.50	-1.31	-0.57	141.27	1.54	1.17
44JBKW		156.40	-1.41	-0.62	140.48	0.75	0.57
49UCP2		158.90	1.09	0.48	140.00	0.27	0.21
4RNAP8		158.47	0.66	0.29	140.02	0.29	0.22
4ZFR2V		156.02	-1.79	-0.78	137.81	-1.92	-1.46
62CHUV		160.85	3.04	1.33	140.54	0.82	0.62
6BKRLU		158.90	1.09	0.48	137.90	-1.83	-1.39
6EWUHX		156.10	-1.71	-0.75	140.90	1.17	0.89
6MBMXN		159.25	1.44	0.63	139.96	0.24	0.18
78AEB7		158.96	1.15	0.51	141.56	1.83	1.39
7D49AT		158.00	0.19	0.08	139.12	-0.61	-0.46
7PYDMY		153.80	-4.01	-1.75	139.90	0.17	0.13
8CKP2F		160.00	2.19	0.96	141.00	1.27	0.97
8FMP2C		160.40	2.59	1.13	141.49	1.77	1.34
8G23RU		156.15	-1.66	-0.73	141.54	1.81	1.38
8KXVGJ		159.20	1.39	0.61	138.20	-1.53	-1.16
9YP32X		156.00	-1.81	-0.79	141.00	1.27	0.97
A2VZWQ	X	154.40	-3.41	-1.49	132.70	-7.03	-5.35
AA68UE		156.50	-1.30	-0.57	141.31	1.58	1.21
AHLZRW	X	147.30	-10.51	-4.60	128.36	-11.37	-8.65
APKEPQ		155.27	-2.54	-1.11	140.74	1.01	0.77
AUUMWM		159.00	1.19	0.52	140.60	0.87	0.66
B79TVW		152.20	-5.61	-2.45	139.20	-0.53	-0.40
BEE3VU		156.90	-0.91	-0.40	140.10	0.37	0.28
BEV4WB	X	145.00	-12.81	-5.61	130.20	-9.53	-7.25
BF9QC6		155.80	-2.01	-0.88	139.10	-0.63	-0.48
BQT2LW	X	138.51	-19.30	-8.45	159.54	19.82	15.07
BVZFKU	*	152.80	-5.01	-2.19	137.22	-2.51	-1.91
BXC39Z		157.51	-0.30	-0.13	139.09	-0.63	-0.48
C27G7A		155.48	-2.33	-1.02	139.67	-0.05	-0.04
C4UVVK		161.37	3.56	1.56	139.14	-0.59	-0.45
CEVDAT		155.80	-2.01	-0.88	138.00	-1.73	-1.31
DBK2HH		157.70	-0.11	-0.05	141.53	1.80	1.37
DYVUAG		161.00	3.19	1.40	141.00	1.27	0.97
E7QHZJ		158.00	0.19	0.08	137.00	-2.73	-2.07
E8PLVF		160.10	2.29	1.00	141.20	1.47	1.12
EFW8XN	X	153.30	-4.51	-1.97	133.30	-6.43	-4.89
EHLEHL		161.52	3.71	1.62	142.47	2.74	2.09
EHNE7R		155.00	-2.81	-1.23	140.10	0.37	0.28
F82L8G		158.40	0.59	0.26	140.50	0.77	0.59



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 140

### Tensile Strength: Lab-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
FA868X		157.80	-0.01	0.00	139.38	-0.34	-0.26
FKNPVZ		161.80	3.99	1.75	141.60	1.87	1.42
FNU6BJ		154.90	-2.91	-1.27	138.60	-1.13	-0.86
FU982R		156.16	-1.65	-0.72	140.22	0.50	0.38
FZ4M3L		159.30	1.49	0.65	139.10	-0.63	-0.48
G9MTZC		159.47	1.66	0.73	140.31	0.58	0.44
GJQWDM	M	No Data Reported			141.20	1.48	1.12
GQVKA9		158.50	0.69	0.30	141.70	1.97	1.50
HHB23E		158.40	0.59	0.26	140.10	0.37	0.28
HQ9JRN		154.30	-3.51	-1.54	140.00	0.27	0.21
HQNX8K		155.73	-2.08	-0.91	139.86	0.13	0.10
HYZ6TF		158.60	0.79	0.35	137.10	-2.63	-2.00
JH9TFC		160.59	2.78	1.22	139.01	-0.72	-0.55
JX8BUQ		159.70	1.89	0.83	141.17	1.44	1.10
JYU2QP		158.48	0.67	0.29	140.05	0.32	0.25
K6U37A		155.00	-2.81	-1.23	138.00	-1.73	-1.31
KUHGCG		156.00	-1.81	-0.79	140.20	0.47	0.36
KX3FL6		159.60	1.79	0.78	138.00	-1.73	-1.31
LCBTC2		159.70	1.89	0.83	140.20	0.47	0.36
MDMT7A		157.40	-0.41	-0.18	140.20	0.47	0.36
MM9AGW		157.00	-0.81	-0.35	141.68	1.95	1.49
MVMZZ3	X	162.63	4.82	2.11	147.46	7.73	5.88
NPU9C7		159.40	1.59	0.70	140.20	0.47	0.36
NQ6ZJ2	M	No Data Reported			142.34	2.61	1.99
PAWKEC		161.00	3.19	1.40	138.00	-1.73	-1.31
PNW6GA		158.70	0.89	0.39	137.80	-1.93	-1.47
QABEQ7		158.30	0.49	0.22	140.40	0.67	0.51
QCDC2Y		156.35	-1.46	-0.64	140.05	0.32	0.25
QYNHXY		154.46	-3.35	-1.47	139.38	-0.35	-0.26
RA7AVU		153.80	-4.01	-1.75	137.70	-2.03	-1.54
RUR4JV		155.86	-1.95	-0.85	140.01	0.28	0.22
T4HQBR		156.00	-1.81	-0.79	140.00	0.27	0.21
T74VKA		159.00	1.19	0.52	140.00	0.27	0.21
TN8474		159.00	1.19	0.52	138.70	-1.03	-0.78
UEDJX9		159.00	1.19	0.52	139.10	-0.63	-0.48
ULUVDU		163.10	5.29	2.32	141.10	1.37	1.04
UZPENQ		160.79	2.98	1.30	141.08	1.35	1.03
VE7RGC		158.00	0.19	0.08	139.00	-0.73	-0.55
VU6JL2		157.40	-0.41	-0.18	139.80	0.07	0.06
XBJRE2		157.00	-0.81	-0.35	137.70	-2.03	-1.54
XE2RW3		157.51	-0.30	-0.13	138.51	-1.21	-0.92
XGRBHZ		157.20	-0.61	-0.27	137.10	-2.63	-2.00
XNPXD7		153.40	-4.41	-1.93	139.40	-0.33	-0.25
XQ92YH		158.81	1.00	0.44	137.64	-2.09	-1.59
YBDZZQ		160.10	2.29	1.00	137.80	-1.93	-1.47
YHZMVV	*	161.50	3.69	1.62	142.90	3.17	2.41
YKPW8H		157.90	0.09	0.04	140.70	0.97	0.74



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 140**

**Tensile Strength: Lab-Machined Round Steel**  
**ASTM E8**

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Z8VZHP		161.10	3.29	1.44	139.70	-0.03	-0.02
ZCRJM9		160.00	2.19	0.96	139.00	-0.73	-0.55

**Summary Statistics**

	Sample P37		Sample P38	
<b>Grand Means</b>	157.81	ksi	139.73	ksi
<b>Stnd Dev Btwn Labs</b>	2.28	ksi	1.31	ksi

Samples P37, P38 : AISI 4340

Statistics based on 88 of 96 reporting participants

**Comments on Assigned Data Flags for Test #140**

- A2VZWQ (X) - Data for sample P38 are low.
- AHLZRW (X) - Data for both samples are low.
- BEV4WB (X) - Data for both samples are low.
- BQT2LW (X) - Data for sample P37 are low and data for sample P38 are high. Data appear to be transposed between the samples.
- EFW8XN (X) - Data for sample P38 are low.
- GJQWDM (M) - Participant did not submit data for sample P37.
- MVMZZ3 (X) - Data for sample P38 are high.
- NQ6ZJ2 (M) - Participant did not submit data for sample P37.



Analysis 140

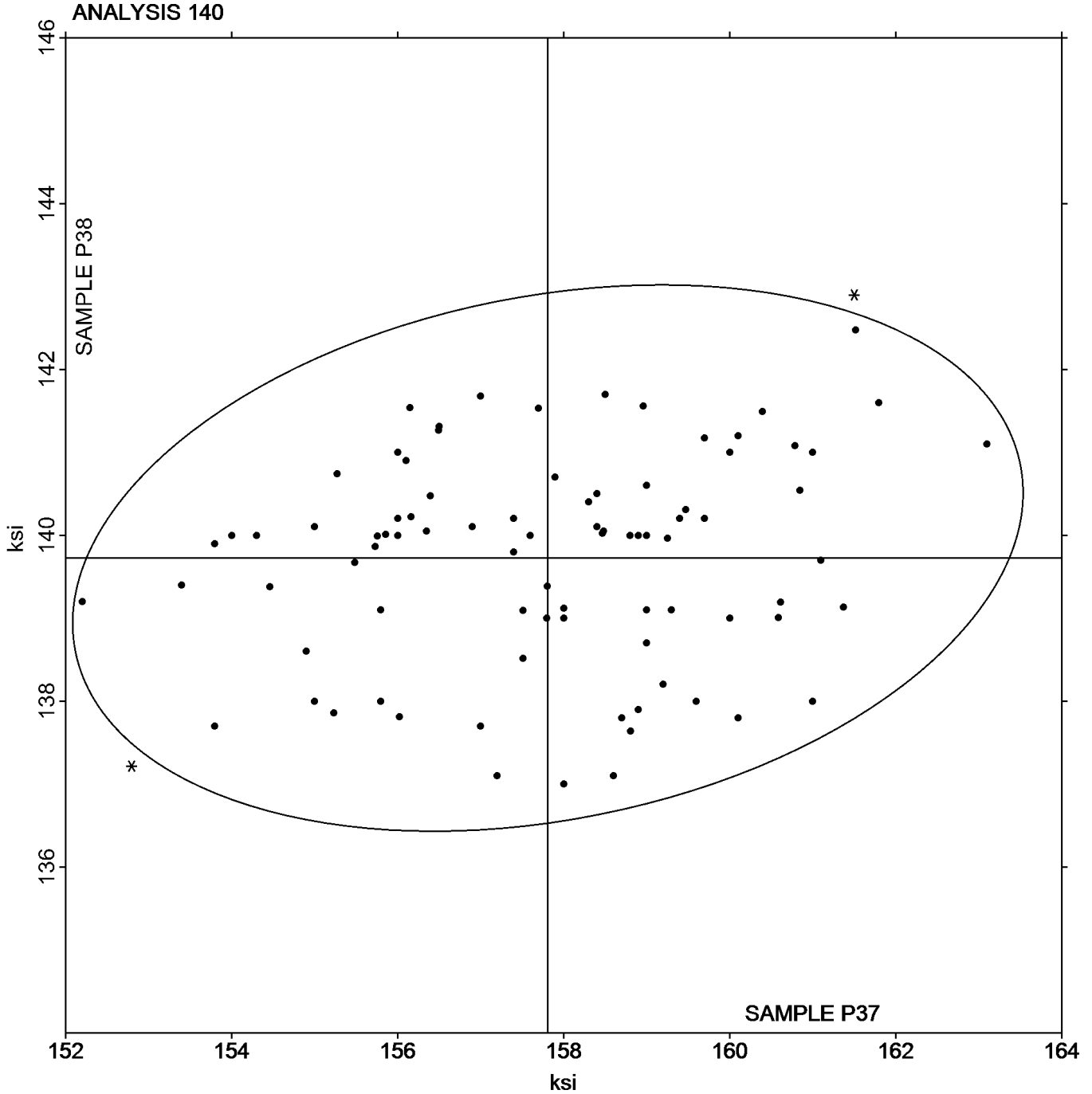
Tensile Strength: Lab-Machined Round Steel  
ASTM E8

SAMPLE P37

157.81 ksi

SAMPLE P38

139.73 ksi







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 141

Yield Strength: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		131.72	-2.90	-0.78	111.87	0.76	0.54
2RZY4U		140.70	6.07	1.63	110.85	-0.25	-0.18
2VZ7M8		135.00	0.37	0.10	110.98	-0.12	-0.09
2XKZK8		137.40	2.77	0.74	110.50	-0.60	-0.43
349ZFE		131.78	-2.85	-0.76	109.98	-1.12	-0.80
3J2R3Z		133.10	-1.53	-0.41	113.70	2.60	1.84
3KYVXW		129.00	-5.63	-1.51	112.00	0.90	0.64
3QYJ9A		134.16	-0.47	-0.13	113.57	2.46	1.75
44JBKW		129.28	-5.35	-1.43	111.46	0.35	0.25
49UCP2		136.70	2.07	0.55	111.00	-0.10	-0.07
4RNAP8		135.44	0.81	0.22	112.23	1.12	0.80
4ZFR2V		134.62	-0.01	0.00	110.89	-0.21	-0.15
62CHUV		140.25	5.62	1.51	112.84	1.74	1.23
6BKRLU		138.00	3.37	0.90	109.80	-1.30	-0.93
6EWUHX		130.30	-4.33	-1.16	112.70	1.60	1.13
6MBMXN		136.74	2.11	0.57	110.88	-0.22	-0.16
78AEB7	X	143.15	8.52	2.28	131.55	20.45	14.52
7D49AT		137.02	2.39	0.64	110.46	-0.64	-0.46
7PYDMY		128.60	-6.03	-1.61	111.60	0.50	0.35
8CKP2F		137.00	2.37	0.63	111.00	-0.10	-0.07
8FMP2C		138.00	3.37	0.90	112.00	0.90	0.64
8G23RU		130.55	-4.08	-1.09	111.96	0.86	0.61
8KXVGJ		138.70	4.07	1.09	110.60	-0.50	-0.36
9YP32X		130.00	-4.63	-1.24	112.00	0.90	0.64
A2VZWQ	X	129.90	-4.73	-1.27	103.80	-7.30	-5.19
AA68UE		131.82	-2.81	-0.75	111.91	0.81	0.57
AHLZRW	X	145.82	11.19	3.00	103.72	-7.39	-5.25
APKEPQ		128.83	-5.80	-1.55	111.74	0.64	0.45
AUUMWM		137.20	2.57	0.69	112.50	1.40	0.99
B79TVW		127.00	-7.63	-2.04	110.80	-0.30	-0.22
BEE3VU		135.00	0.37	0.10	110.80	-0.30	-0.22
BEV4WB	X	125.50	-9.13	-2.44	104.10	-7.00	-4.97
BF9QC6		132.20	-2.43	-0.65	111.00	-0.10	-0.07
BQT2LW	X	116.76	-17.87	-4.78	139.24	28.13	19.98
BVZFKU		130.47	-4.16	-1.11	110.53	-0.57	-0.41
BXC39Z		134.02	-0.61	-0.16	110.23	-0.88	-0.62
C27G7A		133.00	-1.63	-0.44	114.15	3.04	2.16
C4UVVK		140.80	6.18	1.65	110.82	-0.28	-0.20
CEVDAT		132.50	-2.13	-0.57	110.40	-0.70	-0.50
DBK2HH		132.65	-1.97	-0.53	110.47	-0.64	-0.45
DYVUAG		138.00	3.37	0.90	113.00	1.90	1.35
E7QHJZ		137.00	2.37	0.63	110.00	-1.10	-0.78
E8PLVF		139.70	5.07	1.36	113.50	2.40	1.70
EFW8XN	X	128.90	-5.73	-1.53	103.80	-7.30	-5.19
EHLEHL	X	140.98	6.35	1.70	118.93	7.83	5.56
EHNE7R		131.10	-3.53	-0.94	111.90	0.80	0.56
F82L8G		135.60	0.97	0.26	112.30	1.20	0.85



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 141

### Yield Strength: Lab-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
FA868X		136.19	1.56	0.42	110.08	-1.02	-0.72
FKNPVZ		139.90	5.27	1.41	110.60	-0.50	-0.36
FNU6BJ		127.30	-7.33	-1.96	109.40	-1.70	-1.21
FU982R		129.95	-4.68	-1.25	111.12	0.01	0.01
FZ4M3L		137.50	2.87	0.77	111.60	0.50	0.35
G9MTZC	X	119.79	-14.84	-3.97	112.42	1.32	0.93
GJQWDM		131.88	-2.75	-0.74	112.99	1.88	1.34
HHB23E		136.60	1.97	0.53	112.00	0.90	0.64
HQ9JRN		128.20	-6.43	-1.72	109.60	-1.50	-1.07
HQNX8K	X	73.24	-61.38	-16.43	72.66	-38.44	-27.29
HYZ6TF		137.80	3.17	0.85	111.20	0.10	0.07
JH9TFC		140.02	5.39	1.44	109.46	-1.64	-1.17
JX8BUQ		135.79	1.17	0.31	112.70	1.59	1.13
JYU2QP		133.20	-1.43	-0.38	112.08	0.98	0.69
K6U37A		130.00	-4.63	-1.24	109.00	-2.10	-1.49
KUHGCG		130.80	-3.83	-1.03	111.20	0.10	0.07
KX3FL6		139.90	5.27	1.41	110.40	-0.70	-0.50
LCBTC2		137.40	2.77	0.74	110.90	-0.20	-0.15
MDMT7A		135.00	0.37	0.10	112.30	1.20	0.85
MFPVR6		130.14	-4.49	-1.20	109.43	-1.68	-1.19
MM9AGW		133.93	-0.70	-0.19	113.62	2.52	1.79
MVMZZ3	X	141.95	7.32	1.96	126.00	14.90	10.58
NPU9C7		137.90	3.27	0.88	111.80	0.70	0.49
NQ6ZJ2		133.97	-0.66	-0.18	113.88	2.78	1.97
PAWKEC	X	139.00	4.37	1.17	118.00	6.90	4.90
PNW6GA		137.00	2.37	0.63	109.00	-2.10	-1.49
QABEQ7		136.20	1.57	0.42	112.60	1.50	1.06
QCDC2Y	*	129.31	-5.32	-1.42	107.58	-3.52	-2.50
QYNHXY		130.33	-4.30	-1.15	111.22	0.12	0.08
RA7AVU		129.70	-4.93	-1.32	109.50	-1.60	-1.14
RUR4JV		131.44	-3.19	-0.85	110.86	-0.24	-0.17
T4HQBR		134.00	-0.63	-0.17	111.00	-0.10	-0.07
T74VKA		136.00	1.37	0.37	110.00	-1.10	-0.78
TN8474		136.70	2.07	0.55	111.10	0.00	0.00
UEDJX9		136.30	1.67	0.45	109.90	-1.20	-0.86
ULUVDU		139.00	4.37	1.17	109.90	-1.20	-0.86
UZPENQ		140.71	6.08	1.63	112.44	1.34	0.95
VE7RGC		136.00	1.37	0.37	113.00	1.90	1.35
VU6JL2		135.00	0.37	0.10	111.90	0.80	0.56
XBJRE2		135.30	0.67	0.18	109.70	-1.40	-1.00
XE2RW3		135.79	1.16	0.31	109.38	-1.73	-1.23
XGRBHZ	*	136.30	1.67	0.45	107.30	-3.80	-2.70
XNPXD7		127.50	-7.13	-1.91	111.00	-0.10	-0.07
XQ92YH		136.63	2.00	0.53	108.54	-2.57	-1.82
YBDZZQ		140.70	6.07	1.63	111.10	0.00	0.00
YHZMVV		137.70	3.07	0.82	109.90	-1.20	-0.86
YKPW8H		133.30	-1.33	-0.36	111.30	0.20	0.14



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 141**

**Yield Strength: Lab-Machined Round Steel**  
**ASTM E8**

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Z8VZHP	*	141.40	6.77	1.81	107.80	-3.30	-2.35
ZCRJM9		136.80	2.17	0.58	111.60	0.50	0.35

**Summary Statistics**

	Sample P37		Sample P38	
<b>Grand Means</b>	134.63	ksi	111.10	ksi
<b>Stnd Dev Btwn Labs</b>	3.74	ksi	1.41	ksi

Samples P37, P38 : AISI 4340

Statistics based on 85 of 96 reporting participants

**Comments on Assigned Data Flags for Test #141**

- 78AEB7 (X) - Data for sample P38 are high.
- A2VZWQ (X) - Data for sample P38 are low.
- AHLZRW (X) - Data for sample P37 are high and data for sample P38 are low.
- BEV4WB (X) - Data for sample P38 are low.
- BQT2LW (X) - Data for sample P37 are low and data for sample P38 are high.
- EFW8XN (X) - Data for sample P38 are low.
- EHLEHL (X) - Data for sample P38 are high.
- G9MTZC (X) - Data for sample P37 are low.
- HQNX8K (X) - Data for both samples are low.
- MVMZZ3 (X) - Data for sample P38 are high.
- PAWKEC (X) - Data for sample P38 are high.



Analysis 141

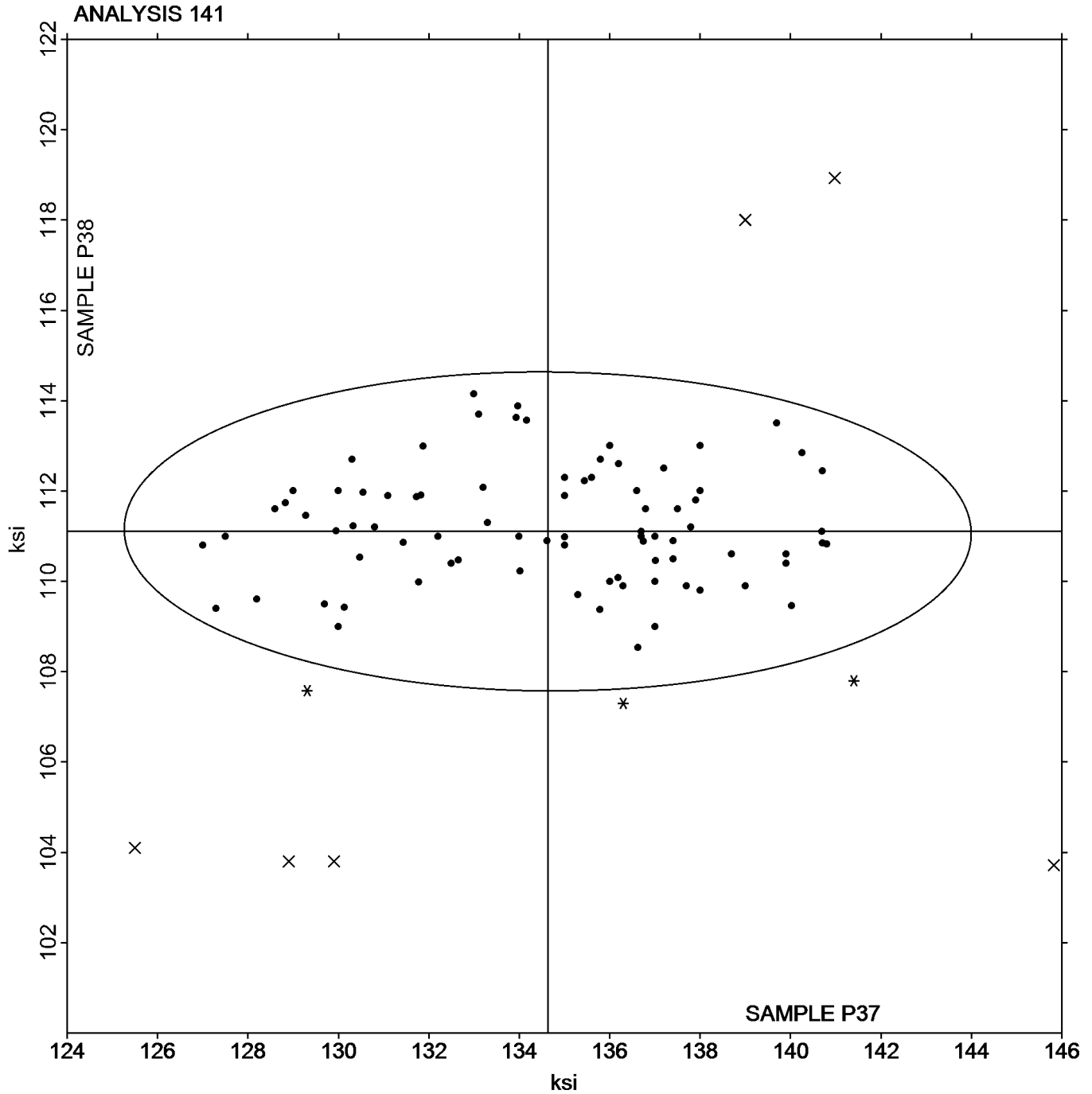
Yield Strength: Lab-Machined Round Steel  
ASTM E8

SAMPLE P37

134.63 ksi

SAMPLE P38

111.10 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 142

Elongation: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		17.80	0.29	0.23	17.70	-0.13	-0.12
2RZY4U		17.90	0.39	0.31	19.30	1.47	1.37
2VZ7M8		18.00	0.49	0.39	18.00	0.17	0.16
2XKZK8		18.15	0.64	0.51	18.70	0.87	0.81
349ZFE		17.00	-0.51	-0.41	17.10	-0.73	-0.68
3J2R3Z		19.20	1.69	1.36	19.20	1.37	1.27
3KYVXW		18.00	0.49	0.39	18.00	0.17	0.16
3QYJ9A		19.30	1.79	1.44	19.80	1.97	1.83
44JBKW		18.91	1.40	1.13	19.03	1.20	1.11
49UCP2		18.00	0.49	0.39	18.00	0.17	0.16
4RNAP8		16.50	-1.01	-0.82	16.00	-1.83	-1.70
4ZFR2V		17.56	0.05	0.04	18.25	0.41	0.38
62CHUV		15.60	-1.91	-1.54	17.20	-0.63	-0.59
6BKRLU		17.60	0.09	0.07	18.30	0.47	0.44
6EWUHX		17.00	-0.51	-0.41	16.00	-1.83	-1.70
6MBMXN		18.40	0.89	0.71	17.60	-0.23	-0.22
78AEB7		18.00	0.49	0.39	19.00	1.17	1.09
7D49AT		19.60	2.09	1.68	18.80	0.97	0.90
7PYDMY		18.00	0.49	0.39	18.00	0.17	0.16
8CKP2F		18.00	0.49	0.39	19.28	1.45	1.35
8FMP2C		16.00	-1.51	-1.22	16.00	-1.83	-1.70
8G23RU		16.90	-0.61	-0.50	17.00	-0.83	-0.77
8KXVGJ		15.60	-1.91	-1.54	17.20	-0.63	-0.59
9YP32X		16.50	-1.01	-0.82	17.00	-0.83	-0.77
A2VZWQ	*	14.90	-2.61	-2.11	17.70	-0.13	-0.12
AA68UE		18.50	0.99	0.80	18.50	0.67	0.62
AHLZRW		17.50	-0.01	-0.01	17.00	-0.83	-0.77
APKEPQ	X	17.10	-0.41	-0.33	21.20	3.37	3.13
AUUMWM		16.50	-1.01	-0.82	17.00	-0.83	-0.77
B79TVW		18.20	0.69	0.55	18.80	0.97	0.90
BEE3VU		19.40	1.89	1.52	19.00	1.17	1.09
BEV4WB	*	14.90	-2.61	-2.11	15.20	-2.63	-2.45
BF9QC6		17.00	-0.51	-0.41	17.00	-0.83	-0.77
BQT2LW		19.00	1.49	1.20	17.00	-0.83	-0.77
BVZFKU		17.70	0.19	0.15	17.60	-0.23	-0.22
BXC39Z		19.00	1.49	1.20	18.00	0.17	0.16
C27G7A		20.00	2.49	2.01	18.00	0.17	0.16
C4UVVK		17.70	0.19	0.15	18.70	0.87	0.81
CEVDAT		17.60	0.09	0.07	18.60	0.77	0.71
DBK2HH		17.40	-0.11	-0.09	17.60	-0.23	-0.22
DYVUAG		15.80	-1.71	-1.38	17.50	-0.33	-0.31
E7QHJZ		17.70	0.19	0.15	16.70	-1.13	-1.05
E8PLVF		16.00	-1.51	-1.22	16.00	-1.83	-1.70
EFW8XN		16.00	-1.51	-1.22	17.00	-0.83	-0.77
EHLEHL		18.70	1.19	0.96	19.50	1.67	1.55
EHNE7R		16.50	-1.01	-0.82	16.00	-1.83	-1.70
F82L8G		16.50	-1.01	-0.82	17.50	-0.33	-0.31



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 142

Elongation: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
FA868X		15.70	-1.81	-1.46	17.00	-0.83	-0.77
FKNPVZ		17.00	-0.51	-0.41	17.00	-0.83	-0.77
FNU6BJ		19.00	1.49	1.20	19.00	1.17	1.09
FU982R	X	17.40	-0.11	-0.09	20.80	2.97	2.76
FZ4M3L		17.30	-0.21	-0.17	17.30	-0.53	-0.49
G9MTZC		18.20	0.69	0.55	18.22	0.39	0.36
GJQWDM	M	No Data Reported			16.40	-1.43	-1.33
HHB23E		16.50	-1.01	-0.82	17.00	-0.83	-0.77
HQ9JRN		17.00	-0.51	-0.41	17.00	-0.83	-0.77
HQNX8K	X	21.80	4.29	3.46	20.70	2.87	2.67
HYZ6TF		17.50	-0.01	-0.01	17.10	-0.73	-0.68
JH9TFC		18.10	0.59	0.47	19.10	1.27	1.18
JX8BUQ	*	14.60	-2.91	-2.35	17.70	-0.13	-0.12
JYU2QP		17.50	-0.01	-0.01	18.00	0.17	0.16
K6U37A		18.00	0.49	0.39	18.00	0.17	0.16
KUHGCG		17.50	-0.01	-0.01	18.00	0.17	0.16
KX3FL6	*	18.30	0.79	0.63	20.50	2.67	2.48
LCBTC2		15.50	-2.01	-1.62	16.60	-1.23	-1.15
MDMT7A		16.50	-1.01	-0.82	17.00	-0.83	-0.77
MFPVR6		15.80	-1.71	-1.38	16.50	-1.33	-1.24
MM9AGW		17.50	-0.01	-0.01	16.50	-1.33	-1.24
MVMZZ3		19.50	1.99	1.60	19.50	1.67	1.55
NPU9C7		16.00	-1.51	-1.22	17.00	-0.83	-0.77
NQ6ZJ2	M	No Data Reported			17.46	-0.37	-0.35
PAWKEC		18.80	1.29	1.04	16.80	-1.03	-0.96
PNW6GA		18.49	0.98	0.79	19.49	1.66	1.54
QABEQ7		16.50	-1.01	-0.82	17.00	-0.83	-0.77
QCDC2Y	*	17.17	-0.34	-0.28	20.07	2.24	2.08
QYNHKY	*	21.00	3.49	2.81	19.00	1.17	1.09
RA7AVU		17.75	0.24	0.19	18.78	0.95	0.88
RUR4JV		16.60	-0.91	-0.74	16.85	-0.98	-0.91
T4HQBR		17.70	0.19	0.15	17.50	-0.33	-0.31
T74VKA		19.00	1.49	1.20	19.00	1.17	1.09
TN8474		18.20	0.69	0.55	19.70	1.87	1.74
UEDJX9		19.30	1.79	1.44	17.90	0.07	0.06
ULUVDU		17.30	-0.21	-0.17	18.80	0.97	0.90
UZPENQ		17.70	0.19	0.15	18.20	0.37	0.34
VE7RGC		17.90	0.39	0.31	17.10	-0.73	-0.68
VU6JL2		16.50	-1.01	-0.82	16.50	-1.33	-1.24
XBJRE2		17.98	0.47	0.38	17.94	0.11	0.10
XE2RW3		18.21	0.70	0.56	18.47	0.64	0.59
XGRBHZ		17.35	-0.16	-0.13	18.00	0.17	0.16
XNPXD7		17.50	-0.01	-0.01	19.00	1.17	1.09
XQ92YH		19.00	1.49	1.20	18.00	0.17	0.16
YBDZZQ		18.30	0.79	0.63	18.20	0.37	0.34
YHZMVV		18.30	0.79	0.63	18.30	0.47	0.44
YKPW8H		16.50	-1.01	-0.82	17.90	0.07	0.06



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 142**

**Elongation: Lab-Machined Round Steel**  
**ASTM E8**

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Z8VZHP		14.70	-2.81	-2.27	15.80	-2.03	-1.89
ZCRJM9		17.00	-0.51	-0.41	18.00	0.17	0.16

**Summary Statistics**

	Sample P37		Sample P38	
<b>Grand Means</b>	17.51	Percent	17.83	Percent
<b>Stnd Dev Btwn Labs</b>	1.24	Percent	1.08	Percent

Samples P37, P38 : AISI 4340

Statistics based on 91 of 96 reporting participants

**Comments on Assigned Data Flags for Test #142**

- APKEPQ (X) - Data for sample P38 are high.
- FU982R (X) - Data for sample P38 are high.
- GJQWDM (M) - Participant did not submit data for sample P37.
- HQNX8K (X) - Data for sample P37 are high.
- NQ6ZJ2 (M) - Participant did not submit data for sample P37.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 143

Reduction of Area: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
26ZTE4		58.00	2.49	1.14	54.60	1.47	0.90
2RZY4U		55.10	-0.41	-0.19	55.20	2.07	1.27
2VZ7M8		57.00	1.49	0.69	51.50	-1.63	-1.00
2XKZK8		56.30	0.79	0.36	51.60	-1.53	-0.94
349ZFE	*	60.10	4.59	2.11	56.40	3.27	2.00
3J2R3Z		58.00	2.49	1.14	54.20	1.07	0.65
3KYVXW		57.00	1.49	0.69	53.00	-0.13	-0.08
3QYJ9A		58.20	2.69	1.24	52.90	-0.23	-0.14
44JBKW		59.25	3.74	1.72	54.87	1.74	1.07
49UCP2		56.00	0.49	0.23	54.00	0.87	0.53
4RNAP8	*	55.60	0.09	0.04	48.80	-4.33	-2.66
4ZFR2V		52.22	-3.29	-1.51	50.00	-3.13	-1.92
62CHUV		50.40	-5.11	-2.34	53.80	0.67	0.41
6BKRLU		55.10	-0.41	-0.19	52.60	-0.53	-0.33
6EWUHX		56.00	0.49	0.23	50.00	-3.13	-1.92
6MBMXN		55.20	-0.31	-0.14	53.00	-0.13	-0.08
78AEB7		55.00	-0.51	-0.23	53.00	-0.13	-0.08
7D49AT		57.60	2.09	0.96	54.50	1.37	0.84
7PYDMY		57.00	1.49	0.69	51.00	-2.13	-1.31
8CKP2F		54.00	-1.51	-0.69	52.00	-1.13	-0.70
8FMP2C		56.00	0.49	0.23	52.00	-1.13	-0.70
8G23RU		55.70	0.19	0.09	51.30	-1.83	-1.12
8KXVGJ		54.30	-1.21	-0.55	54.20	1.07	0.65
9YP32X		53.40	-2.11	-0.97	50.70	-2.43	-1.49
A2VZWQ	*	50.10	-5.41	-2.48	55.20	2.07	1.27
AA68UE		58.00	2.49	1.14	52.00	-1.13	-0.70
AHLZRW		57.40	1.89	0.87	54.20	1.07	0.65
APKEPQ		51.90	-3.61	-1.65	54.10	0.97	0.59
AUUMWM		55.90	0.39	0.18	53.80	0.67	0.41
B79TVW		57.30	1.79	0.82	53.20	0.07	0.04
BEE3VU		55.70	0.19	0.09	50.20	-2.93	-1.80
BEV4WB		53.30	-2.21	-1.01	51.60	-1.53	-0.94
BF9QC6		59.80	4.29	1.97	54.10	0.97	0.59
BQT2LW		54.00	-1.51	-0.69	55.00	1.87	1.14
BVZFKU		55.73	0.22	0.10	54.41	1.28	0.78
BXC39Z		57.00	1.49	0.69	54.00	0.87	0.53
C27G7A		58.00	2.49	1.14	54.00	0.87	0.53
C4UVVK		52.60	-2.91	-1.33	54.10	0.97	0.59
CEVDAT		56.70	1.19	0.55	54.60	1.47	0.90
DBK2HH		54.30	-1.21	-0.55	53.50	0.37	0.22
DYVUAG	*	51.00	-4.51	-2.07	55.00	1.87	1.14
E7QHJZ	X	51.60	-3.91	-1.79	47.50	-5.63	-3.46
E8PLVF		54.60	-0.91	-0.42	49.20	-3.93	-2.41
EFW8XN		55.30	-0.21	-0.09	55.90	2.77	1.70
EHLEHL		54.90	-0.61	-0.28	53.50	0.37	0.22
EHNE7R		53.80	-1.71	-0.78	52.20	-0.93	-0.57
F82L8G		56.80	1.29	0.59	54.20	1.07	0.65



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 143

Reduction of Area: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P37			Sample P38		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
FA868X		53.80	-1.71	-0.78	51.00	-2.13	-1.31
FKNPVZ		52.50	-3.01	-1.38	53.00	-0.13	-0.08
FNU6BJ		57.10	1.59	0.73	54.30	1.17	0.72
FU982R		52.85	-2.66	-1.22	53.40	0.27	0.16
FZ4M3L		55.30	-0.21	-0.09	54.50	1.37	0.84
G9MTZC		52.13	-3.38	-1.55	54.19	1.06	0.65
GJQWDM	M	No Data Reported			53.00	-0.13	-0.08
HHB23E		56.20	0.69	0.32	53.80	0.67	0.41
HQ9JRN		55.60	0.09	0.04	51.00	-2.13	-1.31
HQNX8K		55.00	-0.51	-0.23	51.00	-2.13	-1.31
HYZ6TF		55.70	0.19	0.09	52.90	-0.23	-0.14
JH9TFC		56.10	0.59	0.27	54.50	1.37	0.84
JX8BUQ		55.90	0.39	0.18	53.50	0.37	0.22
JYU2QP	*	53.50	-2.01	-0.92	49.00	-4.13	-2.54
K6U37A		53.00	-2.51	-1.15	52.00	-1.13	-0.70
KUHGCG		55.90	0.39	0.18	53.40	0.27	0.16
KX3FL6		55.80	0.29	0.13	55.30	2.17	1.33
LCBTC2		52.50	-3.01	-1.38	51.90	-1.23	-0.76
MDMT7A		55.10	-0.41	-0.19	54.30	1.17	0.72
MFPVR6		55.00	-0.51	-0.23	51.30	-1.83	-1.12
MM9AGW		57.60	2.09	0.96	53.20	0.07	0.04
MVMZZ3		51.06	-4.45	-2.04	53.78	0.65	0.40
NPU9C7		52.90	-2.61	-1.20	53.20	0.07	0.04
NQ6ZJ2	M	No Data Reported			53.80	0.67	0.41
PAWKEC	X	51.50	-4.01	-1.84	44.10	-9.03	-5.54
PNW6GA		58.00	2.49	1.14	55.00	1.87	1.14
QABEQ7		56.40	0.89	0.41	53.80	0.67	0.41
QCDC2Y		56.18	0.67	0.31	56.09	2.96	1.81
RA7AVU		58.39	2.88	1.32	55.33	2.20	1.35
RUR4JV		55.91	0.40	0.19	53.41	0.28	0.17
T4HQBR		59.60	4.09	1.88	53.30	0.17	0.10
T74VKA		57.00	1.49	0.69	52.00	-1.13	-0.70
TN8474	X	61.70	6.19	2.84	60.10	6.97	4.27
ULUVDU		53.40	-2.11	-0.97	53.90	0.77	0.47
UZPENQ		56.50	0.99	0.46	52.60	-0.53	-0.33
VE7RGC		57.60	2.09	0.96	52.50	-0.63	-0.39
VU6JL2		56.40	0.89	0.41	52.50	-0.63	-0.39
XBJRE2		57.00	1.49	0.69	54.00	0.87	0.53
XE2RW3		56.44	0.93	0.43	54.31	1.18	0.72
XGRBHZ		55.50	-0.01	0.00	52.40	-0.73	-0.45
XNPXD7		56.10	0.59	0.27	52.30	-0.83	-0.51
XQ92YH		60.00	4.49	2.06	55.00	1.87	1.14
YBDZZQ		51.30	-4.21	-1.93	54.10	0.97	0.59
YHZMVV		56.70	1.19	0.55	53.30	0.17	0.10
YKPW8H		55.00	-0.51	-0.23	52.10	-1.03	-0.63
Z8VZHP		53.50	-2.01	-0.92	53.30	0.17	0.10
ZCRJM9		56.00	0.49	0.23	50.00	-3.13	-1.92



Summary Statistics

	<u>Sample P37</u>		<u>Sample P38</u>	
<b>Grand Means</b>	55.51	Percent	53.13	Percent
<b>Stnd Dev Btwn Labs</b>	2.18	Percent	1.63	Percent

Samples P37, P38 : AISI 4340

Statistics based on 89 of 94 reporting participants

**Comments on Assigned Data Flags for Test #143**

E7QHJZ (X) - Data for sample P38 are low.

GJQWDM (M) - Participant did not submit data for sample P37.

NQ6ZJ2 (M) - Participant did not submit data for sample P37.

PAWKEC (X) - Data for sample P38 are low.

TN8474 (X) - Data for both samples are high.



Analysis 143

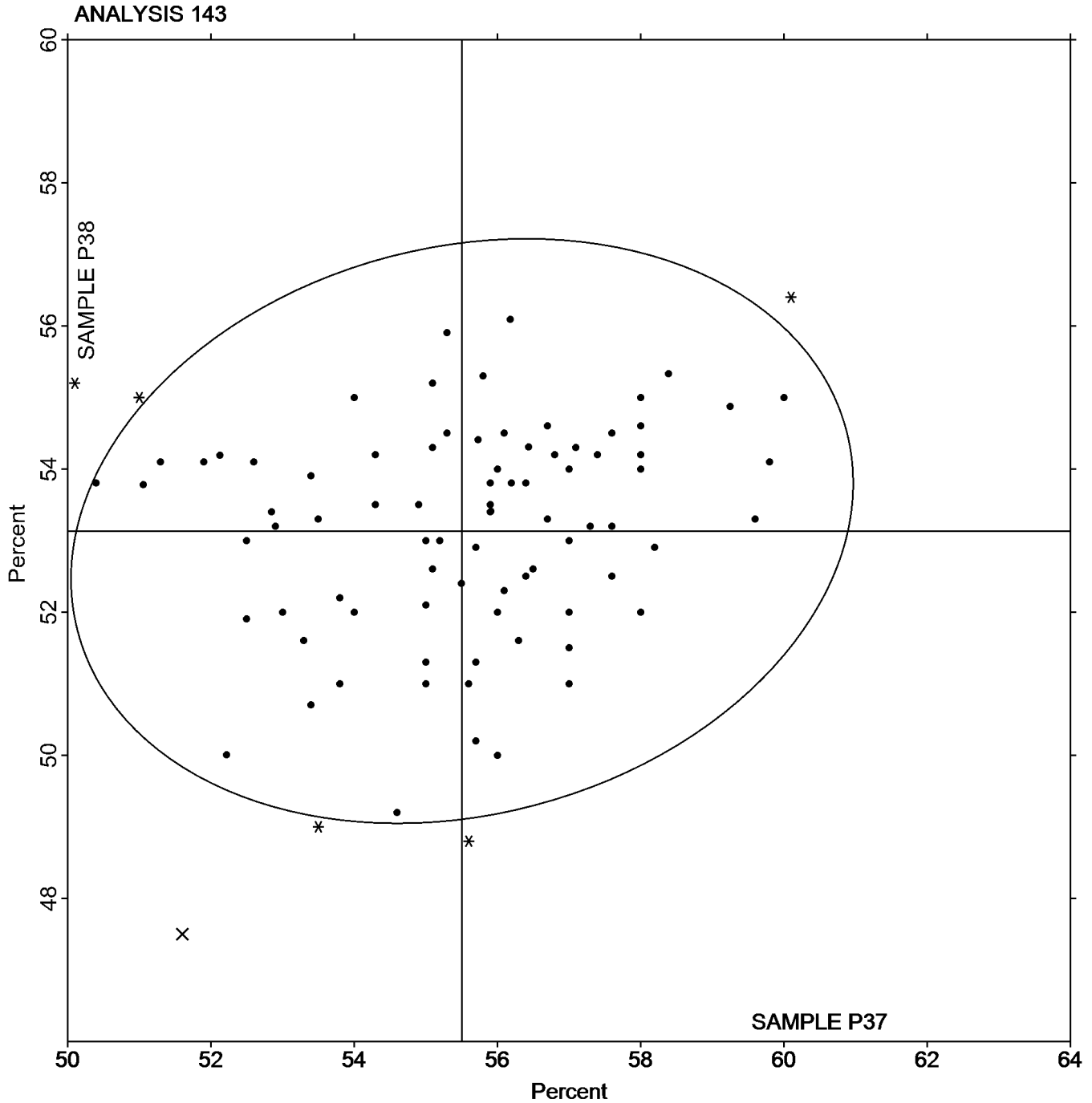
Reduction of Area: Lab-Machined Round Steel  
ASTM E8

SAMPLE P37

55.51 Percent

SAMPLE P38

53.13 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 170

Carbon & Low Alloy Steel, Element #1  
CARBON (C)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.3020	-0.0155	-1.78	0.3957	-0.0161	-1.88	OE
29J3D4		0.3380	0.0205	2.36	0.4261	0.0143	1.67	CI
2BR244		0.3267	0.0092	1.06	0.4217	0.0099	1.16	OE
2NYNC2		0.3253	0.0078	0.90	0.4114	-0.0003	-0.04	OE
349ZFE		0.3300	0.0125	1.44	0.4147	0.0029	0.34	OE
39EXHQ		0.3200	0.0025	0.29	0.4197	0.0079	0.92	OE
3KEG8Y	X	0.3369	0.0194	2.23	0.4419	0.0301	3.52	OE
3M4NRV		0.3043	-0.0131	-1.51	0.3960	-0.0158	-1.84	OE
3MLLY2		0.3203	0.0029	0.33	0.4203	0.0086	1.00	DR
3MWKUA		0.3237	0.0063	0.72	0.4093	-0.0025	-0.29	OE
3PJA8V		0.3192	0.0017	0.19	0.4028	-0.0089	-1.04	OE
3QYJ9A		0.3140	-0.0035	-0.40	0.4100	-0.0018	-0.20	OE
3T8WQB	*	0.3010	-0.0165	-1.89	0.4150	0.0032	0.38	OE
3TLZK3		0.3240	0.0065	0.75	0.4293	0.0176	2.05	OE
3UGJQA	X	0.3500	0.0325	3.74	0.4403	0.0286	3.34	DR
43LXZP		0.3091	-0.0084	-0.97	0.4014	-0.0103	-1.21	OE
49DHPQ		0.3090	-0.0085	-0.97	0.4070	-0.0048	-0.56	GD
49UCP2		0.3223	0.0049	0.56	0.4267	0.0149	1.74	OE
4AMCJ6		0.3187	0.0012	0.14	0.4107	-0.0011	-0.13	OE
4CCQZT		0.3200	0.0025	0.29	0.4233	0.0116	1.35	OE
4CTW9Q		0.3213	0.0039	0.44	0.4083	-0.0034	-0.40	OE
62CHUV		0.3220	0.0045	0.52	0.4077	-0.0041	-0.48	OE
6CRET8		0.3272	0.0098	1.12	0.4098	-0.0020	-0.23	OE
6EWUHX		0.3147	-0.0028	-0.32	0.4097	-0.0021	-0.24	CI
6K77EY		0.3163	-0.0011	-0.13	0.4120	0.0002	0.03	OE
6MAWPK	X	0.3867	0.0692	7.96	0.4933	0.0816	9.53	GD
6MBTTN		0.3243	0.0069	0.79	0.4167	0.0049	0.57	OE
6PVMQP		0.3077	-0.0098	-1.13	0.4040	-0.0078	-0.91	CI
6Y7ZVZ		0.3222	0.0047	0.54	0.4178	0.0061	0.71	OE
72MQBU		0.3133	-0.0041	-0.48	0.4067	-0.0051	-0.59	CO
7BEXJZ		0.3327	0.0152	1.75	0.4257	0.0139	1.63	GD
7ECGGR		0.3237	0.0062	0.71	0.4007	-0.0111	-1.30	OE
7FLTW9		0.3153	-0.0021	-0.25	0.4010	-0.0108	-1.26	OE
7PPVAT		0.3241	0.0067	0.77	0.4202	0.0084	0.98	OE
7PYDMY		0.3200	0.0025	0.29	0.4130	0.0012	0.15	OE
7ZF8W8	*	0.2968	-0.0207	-2.38	0.3869	-0.0248	-2.90	OE
8G23RU		0.3073	-0.0101	-1.17	0.4017	-0.0101	-1.18	CI
8ZM4EG		0.3100	-0.0075	-0.86	0.4100	-0.0018	-0.20	XX
93P9MV		0.3247	0.0072	0.83	0.4117	-0.0001	-0.01	OE
99GBV2		0.3347	0.0172	1.98	0.4303	0.0186	2.17	GD
9B4AQB	*	0.3277	0.0102	1.17	0.4010	-0.0108	-1.26	GD
9ELCTA		0.3200	0.0025	0.29	0.4167	0.0049	0.57	OE
9HMH9F	X	0.3406	0.0232	2.66	0.4379	0.0262	3.06	OE
AAP8EW	*	0.3040	-0.0135	-1.55	0.3903	-0.0214	-2.50	OE
AN9NM3		0.3147	-0.0028	-0.32	0.4143	0.0026	0.30	XX
AQTK7L	*	0.3010	-0.0165	-1.89	0.4137	0.0019	0.22	OE
AYQCEF		0.3197	0.0022	0.25	0.4157	0.0039	0.46	DR



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 170

Carbon & Low Alloy Steel, Element #1  
CARBON (C)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
B39PZ4		0.3143	-0.0031	-0.36	0.4083	-0.0034	-0.40	CI
B8B3CR		0.3144	-0.0030	-0.35	0.4103	-0.0015	-0.17	OE
BQT2LW		0.3060	-0.0115	-1.32	0.4060	-0.0058	-0.67	CI
BXC39Z		0.3187	0.0012	0.14	0.4123	0.0006	0.07	CI
C27G7A		0.3200	0.0025	0.29	0.4120	0.0002	0.03	OE
C4UVVK		0.3203	0.0029	0.33	0.4167	0.0049	0.57	CI
CBD6XM	*	0.2943	-0.0231	-2.66	0.3887	-0.0231	-2.70	OE
CMLYD7		0.3267	0.0092	1.06	0.4233	0.0116	1.35	DR
CN4XPH		0.3180	0.0005	0.06	0.4150	0.0032	0.38	CO
D4CGNL		0.3253	0.0079	0.90	0.4160	0.0042	0.50	OE
D6KDAQ		0.3283	0.0108	1.25	0.4086	-0.0032	-0.37	CI
DATWA4		0.3283	0.0109	1.25	0.4283	0.0166	1.94	OE
DCYA7K		0.3211	0.0036	0.42	0.4201	0.0083	0.98	OE
DDH4U2		0.3147	-0.0028	-0.32	0.4180	0.0062	0.73	OE
DGCCQV		0.3057	-0.0118	-1.36	0.4087	-0.0031	-0.36	OE
E3TUMJ		0.3267	0.0092	1.06	0.4287	0.0169	1.98	GD
EACZKQ		0.3073	-0.0101	-1.17	0.4103	-0.0014	-0.17	OE
EH7E2G		0.3246	0.0072	0.82	0.4304	0.0186	2.17	CI
EHNE7R		0.3203	0.0029	0.33	0.4170	0.0052	0.61	OE
EZN9VC		0.3207	0.0032	0.37	0.4123	0.0006	0.07	OE
FKNPVZ		0.3127	-0.0048	-0.55	0.4033	-0.0084	-0.98	OE
FNAG2B		0.3225	0.0050	0.58	0.4109	-0.0008	-0.10	OE
FTY3PP	X	0.2693	-0.0481	-5.54	0.3657	-0.0461	-5.38	OE
GCCX2W		0.3170	-0.0005	-0.05	0.4103	-0.0014	-0.17	AE
GF9N2F		0.3109	-0.0066	-0.76	0.4100	-0.0017	-0.20	OE
GJQWDM		0.3114	-0.0060	-0.69	0.4135	0.0018	0.21	OE
GQA3CE	X	0.2980	-0.0195	-2.24	0.3740	-0.0378	-4.41	CI
HQ9JRN		0.3250	0.0075	0.87	0.4057	-0.0061	-0.71	OE
HXH3WF		0.3110	-0.0065	-0.74	0.4093	-0.0024	-0.28	OE
JRJQQB		0.3097	-0.0078	-0.90	0.4013	-0.0104	-1.22	CI
JW4XXH	X	0.3037	-0.0138	-1.59	0.3793	-0.0324	-3.79	OE
JWBX9J		0.3153	-0.0021	-0.25	0.4093	-0.0024	-0.28	AE
JX8BUQ		0.3130	-0.0044	-0.51	0.4134	0.0016	0.19	CI
KB3GWK		0.3113	-0.0061	-0.71	0.4083	-0.0034	-0.40	OE
KE2Q8M	*	0.3170	-0.0005	-0.05	0.4310	0.0192	2.25	CI
KNA8W8		0.3113	-0.0061	-0.71	0.4023	-0.0094	-1.10	CI
KUHGCG		0.3237	0.0062	0.71	0.4150	0.0032	0.38	CO
LNPVPL	*	0.2923	-0.0251	-2.89	0.4027	-0.0091	-1.06	GD
LPKHDC	*	0.3353	0.0179	2.05	0.4090	-0.0028	-0.32	OE
LUTRGY		0.3160	-0.0015	-0.17	0.4133	0.0016	0.18	CI
LY8AUA	X	0.3347	0.0172	1.98	0.4530	0.0412	4.82	OE
MCUUWH		0.3220	0.0045	0.52	0.4170	0.0052	0.61	OE
MKLBN8		0.3193	0.0019	0.21	0.4143	0.0026	0.30	CI
MKLEU4		0.3081	-0.0093	-1.07	0.4062	-0.0056	-0.65	OE
MLCHMB		0.3053	-0.0121	-1.40	0.4083	-0.0034	-0.40	XX
MQBRZX		0.3164	-0.0011	-0.12	0.4121	0.0004	0.04	OE
MYZMTL	X	0.3196	0.0022	0.25	0.3820	-0.0297	-3.47	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 170

Carbon & Low Alloy Steel, Element #1  
CARBON (C)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MZCJZC		0.3107	-0.0067	-0.78	0.4102	-0.0016	-0.18	OE
N24WZA		0.3090	-0.0085	-0.97	0.4120	0.0002	0.03	CI
NCNZUN		0.3354	0.0179	2.06	0.4212	0.0094	1.10	OE
NDWC8J		0.3285	0.0110	1.27	0.4125	0.0008	0.09	OE
NHDH7E		0.3087	-0.0088	-1.01	0.3980	-0.0138	-1.61	CI
NJNN3F		0.3233	0.0059	0.67	0.4177	0.0059	0.69	OE
P4P288		0.3230	0.0055	0.64	0.4230	0.0112	1.31	OE
P97CFA		0.3033	-0.0141	-1.63	0.4067	-0.0051	-0.59	OE
P9MDE6		0.3324	0.0149	1.72	0.4203	0.0086	1.00	OE
PAECQH		0.3135	-0.0040	-0.46	0.3974	-0.0144	-1.68	OE
PBPG2L		0.3287	0.0112	1.29	0.4047	-0.0071	-0.83	IR
PGBFB7		0.3063	-0.0111	-1.28	0.4053	-0.0064	-0.75	OE
PMMETR		0.3193	0.0019	0.21	0.4142	0.0024	0.28	CI
PPP6AE		0.3080	-0.0094	-1.09	0.4072	-0.0046	-0.54	OE
Q46DW4		0.3170	-0.0005	-0.05	0.4157	0.0039	0.46	OE
QMXN96		0.3227	0.0052	0.60	0.4013	-0.0104	-1.22	OE
QNY6ZB		0.3200	0.0025	0.29	0.4037	-0.0081	-0.94	OE
QR9MTB		0.3063	-0.0112	-1.29	0.3964	-0.0153	-1.79	OE
QW3DD2	X	0.3500	0.0325	3.74	0.4733	0.0616	7.20	OE
QYRRMX		0.3169	-0.0006	-0.07	0.4121	0.0004	0.04	OE
R9V6JR		0.3071	-0.0104	-1.20	0.4035	-0.0083	-0.97	OE
RCE973		0.3133	-0.0041	-0.48	0.4033	-0.0084	-0.98	OE
RG8DY8		0.3214	0.0040	0.46	0.4216	0.0098	1.15	AE
RPHPXQ		0.3057	-0.0118	-1.36	0.4107	-0.0011	-0.13	OE
RRP4N6		0.3201	0.0027	0.31	0.4135	0.0017	0.20	OE
RWGA4R		0.3260	0.0085	0.98	0.4243	0.0126	1.47	OE
RXB878		0.3203	0.0029	0.33	0.4163	0.0046	0.54	CI
TFN68H		0.3217	0.0042	0.48	0.4240	0.0122	1.43	OE
TMTVH2		0.3157	-0.0018	-0.21	0.4117	-0.0001	-0.01	OE
TUCW46		0.3137	-0.0038	-0.44	0.4137	0.0019	0.22	OE
U64X78		0.3140	-0.0035	-0.40	0.4107	-0.0011	-0.13	CI
UBTG83		0.3230	0.0055	0.64	0.4043	-0.0074	-0.87	OE
UBWYA8		0.3103	-0.0071	-0.82	0.4163	0.0046	0.54	OE
UGZ4Y7		0.3115	-0.0060	-0.69	0.4171	0.0053	0.62	OE
UTW87K		0.3170	-0.0005	-0.05	0.4147	0.0029	0.34	CI
UUM7JJ		0.3230	0.0055	0.64	0.4053	-0.0064	-0.75	OE
V8TJFB		0.3213	0.0039	0.44	0.4110	-0.0008	-0.09	CI
VABZ8U		0.3290	0.0115	1.33	0.4070	-0.0048	-0.56	GD
VDWKKB		0.3277	0.0102	1.17	0.4197	0.0079	0.92	CI
VJMUTN		0.3170	-0.0005	-0.05	0.4167	0.0049	0.57	CI
WGCC8X		0.3230	0.0055	0.64	0.4223	0.0106	1.24	CO
X2DPEA		0.3282	0.0107	1.23	0.4222	0.0105	1.22	OE
X3A8C6		0.3234	0.0060	0.69	0.4161	0.0044	0.51	CI
X7C7Q4		0.3243	0.0069	0.79	0.4157	0.0039	0.46	OE
XE2RW3		0.3107	-0.0068	-0.78	0.4333	0.0216	2.52	DR
XR86VE		0.3227	0.0052	0.60	0.4153	0.0036	0.42	CO
YKPW8H		0.3037	-0.0138	-1.59	0.4070	-0.0048	-0.56	OE



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 170**

**Carbon & Low Alloy Steel, Element #1**  
**CARBON (C)**

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
ZCRJM9		0.3150	-0.0025	-0.28	0.3983	-0.0134	-1.57	GD
ZR43GU		0.3188	0.0013	0.15	0.4052	-0.0065	-0.76	XX

**Summary Statistics**

	Sample L37		Sample L38	
<b>Grand Means</b>	0.3175	Percent	0.4118	Percent
<b>Std Dev Btwn Labs</b>	0.0087	Percent	0.0086	Percent

Samples L37, L38 : AISI 8740

Statistics based on 132 of 143 reporting participants

**Key to Method Codes Reported by Participants**

- |  |  |
|--|--|
| AE Spectrometry - Atomic Emission (AES)  | CI Combustion / IR                                 |
| CO Combustion                            | DR Spectrometry - Direct Reading OE (DROES)        |
| GD Spectrometry - Glow Discharge (GDS)   | IR IR (Absorption / Detection)                     |
| OE Spectrometry - Optical Emission (OES) | XX Please Indicate Method Used for Current Element |

**Comments on Assigned Data Flags for Test #170**

- 3KEG8Y (X) - Data for sample L38 are high.
- 3UGJQA (X) - Data for both samples are high. Inconsistent within the determinations of sample L38.
- 6MAWPK (X) - Data for both samples are high.
- 9HMH9F (X) - Data for sample L38 are high.
- FTY3PP (X) - Data for both samples are low.
- GQA3CE (X) - Data for sample L38 are low.
- JW4XXH (X) - Data for sample L38 are low.
- LY8AUA (X) - Data for sample L38 are high.
- MYZMTL (X) - Data for sample L38 are low. Inconsistent within the determinations of both samples.
- QW3DD2 (X) - Data for both samples are high.



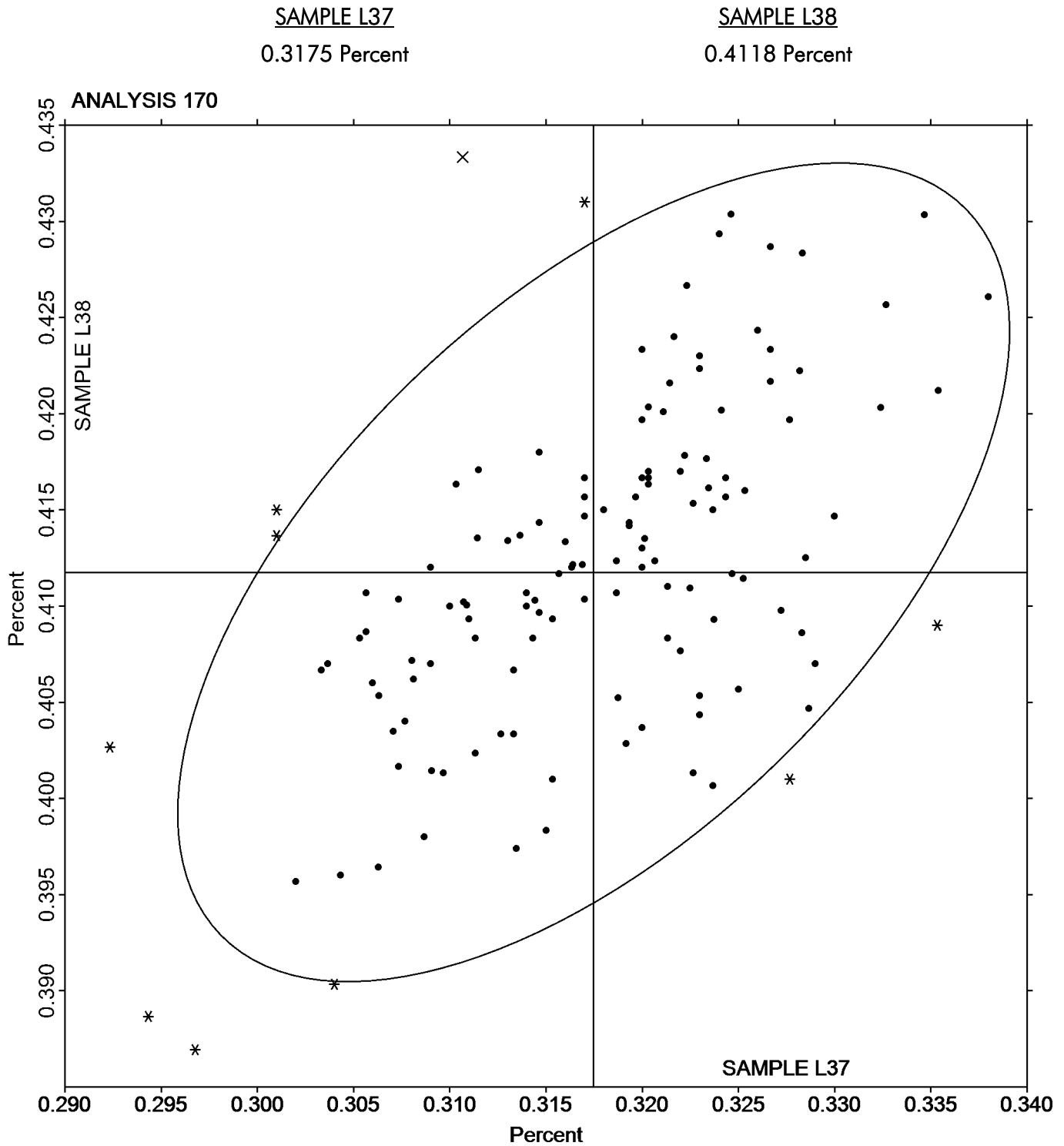


# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 170

Carbon & Low Alloy Steel, Element #1  
CARBON (C)





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 171

Carbon & Low Alloy Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.5717	-0.0023	-0.35	0.8793	-0.0073	-0.74	OE
29J3D4		0.5757	0.0017	0.26	0.8780	-0.0086	-0.88	ED
2BR244		0.5757	0.0017	0.26	0.8927	0.0060	0.61	OE
2NYNC2		0.5757	0.0017	0.26	0.8894	0.0027	0.28	OE
349ZFE		0.5750	0.0010	0.15	0.8823	-0.0043	-0.44	OE
39EXHQ		0.5727	-0.0013	-0.20	0.8927	0.0060	0.61	OE
3KEG8Y		0.5702	-0.0038	-0.58	0.8860	-0.0006	-0.07	OE
3M4NRV		0.5720	-0.0020	-0.30	0.8813	-0.0053	-0.54	OE
3MLLY2		0.5767	0.0027	0.41	0.8883	0.0017	0.17	DR
3MWKUA		0.5778	0.0038	0.58	0.8935	0.0069	0.70	OE
3PJA8V	*	0.5890	0.0150	2.28	0.9149	0.0282	2.87	OE
3QYJ9A		0.5673	-0.0067	-1.01	0.8937	0.0070	0.71	OE
3T8WQB		0.5700	-0.0040	-0.61	0.9000	0.0134	1.36	OE
3TLZK3		0.5673	-0.0067	-1.01	0.8743	-0.0123	-1.25	OE
3UGJQA		0.5683	-0.0057	-0.86	0.8847	-0.0020	-0.20	DR
43LXZP		0.5713	-0.0027	-0.41	0.8773	-0.0094	-0.95	OE
49DHPQ		0.5640	-0.0100	-1.52	0.8903	0.0037	0.38	GD
49UCP2	X	0.6060	0.0320	4.87	0.9197	0.0330	3.36	OE
4AMCJ6		0.5760	0.0020	0.31	0.8850	-0.0016	-0.17	OE
4CCQZT		0.5650	-0.0090	-1.37	0.8833	-0.0033	-0.34	OE
4CTW9Q	X	0.5733	-0.0007	-0.10	0.9353	0.0487	4.95	OE
62CHUV		0.5857	0.0117	1.78	0.8940	0.0074	0.75	OE
6CRET8		0.5687	-0.0053	-0.80	0.8934	0.0067	0.68	OE
6EWUHX	*	0.5757	0.0017	0.26	0.8670	-0.0196	-2.00	IC
6K77EY		0.5727	-0.0013	-0.20	0.8867	0.0000	0.00	OE
6MAWPK		0.5833	0.0093	1.42	0.9067	0.0200	2.04	GD
6MBTTN		0.5683	-0.0057	-0.86	0.8763	-0.0103	-1.05	OE
6PVMQP		0.5725	-0.0015	-0.23	0.8819	-0.0047	-0.48	IC
6Y7ZVZ		0.5752	0.0012	0.19	0.8866	-0.0001	-0.01	OE
72MQBU		0.5747	0.0007	0.10	0.8807	-0.0060	-0.61	IC
768ECU	*	0.5757	0.0017	0.26	0.9107	0.0240	2.44	XX
7BEXJZ		0.5750	0.0010	0.15	0.8717	-0.0150	-1.52	GD
7ECGGR		0.5733	-0.0007	-0.10	0.8933	0.0067	0.68	OE
7FLTW9		0.5690	-0.0050	-0.76	0.8780	-0.0086	-0.88	OE
7PPVAT		0.5694	-0.0046	-0.69	0.8921	0.0055	0.55	OE
7PYDMY		0.5660	-0.0080	-1.21	0.8770	-0.0096	-0.98	OE
7ZF8W8		0.5673	-0.0067	-1.02	0.8754	-0.0112	-1.14	OE
8G23RU		0.5680	-0.0060	-0.91	0.8887	0.0020	0.21	IC
8ZM4EG		0.5730	-0.0010	-0.15	0.8930	0.0064	0.65	XX
93P9MV		0.5740	0.0000	0.00	0.8817	-0.0050	-0.51	OE
99GBV2		0.5803	0.0063	0.96	0.8773	-0.0093	-0.95	GD
9B4AQB		0.5680	-0.0060	-0.91	0.8763	-0.0103	-1.05	GD
9ELCTA		0.5700	-0.0040	-0.61	0.8967	0.0100	1.02	OE
9HMH9F		0.5740	0.0000	0.00	0.8858	-0.0008	-0.08	OE
AAP8EW		0.5713	-0.0027	-0.40	0.8823	-0.0043	-0.44	OE
AN9NM3		0.5747	0.0007	0.10	0.8903	0.0037	0.38	XX
AQTK7L		0.5823	0.0083	1.27	0.8857	-0.0010	-0.10	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 171

Carbon & Low Alloy Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
AYQCEF		0.5723	-0.0017	-0.25	0.8860	-0.0006	-0.07	DR
B39PZ4		0.5737	-0.0003	-0.05	0.8847	-0.0020	-0.20	IC
B8B3CR		0.5656	-0.0084	-1.27	0.8827	-0.0040	-0.40	OE
BQT2LW	*	0.5683	-0.0057	-0.86	0.8620	-0.0246	-2.51	OE
BXC39Z		0.5643	-0.0097	-1.47	0.8783	-0.0083	-0.85	DR
C27G7A		0.5703	-0.0037	-0.56	0.8830	-0.0036	-0.37	OE
C4UVVK		0.5737	-0.0003	-0.05	0.8830	-0.0036	-0.37	OE
CBD6XM		0.5633	-0.0107	-1.62	0.8803	-0.0063	-0.64	OE
CMLYD7		0.5767	0.0027	0.41	0.8900	0.0034	0.34	DR
CN4XPH		0.5703	-0.0037	-0.56	0.8783	-0.0083	-0.85	IC
D4CGNL		0.5680	-0.0060	-0.91	0.8800	-0.0066	-0.68	OE
D6KDAQ	X	0.5973	0.0233	3.55	0.9058	0.0192	1.95	IC
DATWA4		0.5743	0.0003	0.05	0.8933	0.0067	0.68	OE
DCYA7K		0.5710	-0.0030	-0.46	0.8796	-0.0070	-0.72	OE
DDH4U2		0.5810	0.0070	1.07	0.9070	0.0204	2.07	OE
DGCCQV		0.5750	0.0010	0.15	0.8920	0.0054	0.54	OE
E3TUMJ		0.5730	-0.0010	-0.15	0.8880	0.0014	0.14	GD
EACZKQ		0.5647	-0.0093	-1.42	0.8627	-0.0240	-2.44	OE
EH7E2G		0.5760	0.0020	0.31	0.8963	0.0097	0.99	AE
EHNE7R		0.5723	-0.0017	-0.25	0.8953	0.0087	0.88	OE
EZN9VC	*	0.5600	-0.0140	-2.13	0.8603	-0.0263	-2.68	OE
FKNPVZ		0.5723	-0.0017	-0.25	0.8797	-0.0070	-0.71	OE
FNAG2B		0.5773	0.0033	0.51	0.8840	-0.0026	-0.27	OE
FTY3PP		0.5860	0.0120	1.83	0.8970	0.0104	1.05	OE
FZ4M3L		0.5771	0.0031	0.47	0.8919	0.0052	0.53	WD
GCCX2W		0.5743	0.0003	0.05	0.8870	0.0004	0.04	AE
GF9N2F		0.5840	0.0100	1.52	0.8842	-0.0024	-0.25	OE
GJQWDM		0.5673	-0.0067	-1.01	0.8884	0.0018	0.18	OE
GQA3CE		0.5781	0.0041	0.63	0.8957	0.0091	0.92	OE
HQ9JRN		0.5853	0.0113	1.72	0.8963	0.0097	0.99	OE
HXH3WF		0.5803	0.0063	0.96	0.8843	-0.0023	-0.23	OE
JRJQQB		0.5757	0.0017	0.26	0.8757	-0.0110	-1.12	OE
JW4XXH	X	0.5417	-0.0323	-4.91	0.8137	-0.0730	-7.42	OE
JWBX9J		0.5753	0.0013	0.20	0.8850	-0.0016	-0.17	AE
JX8BUQ		0.5801	0.0061	0.92	0.8887	0.0021	0.21	OE
KB3GWK		0.5757	0.0017	0.26	0.8750	-0.0116	-1.18	OE
KNA8W8		0.5767	0.0027	0.41	0.8913	0.0047	0.48	IC
KUHGCG		0.5730	-0.0010	-0.15	0.9020	0.0154	1.56	GD
LNPVPL	*	0.5900	0.0160	2.43	0.8950	0.0084	0.85	GD
LPKHDC	*	0.5900	0.0160	2.43	0.9073	0.0207	2.10	OE
LUTRGY		0.5687	-0.0053	-0.81	0.8753	-0.0113	-1.15	WD
LY8AUA	X	0.6197	0.0457	6.94	0.9017	0.0150	1.53	OE
MCUUWH		0.5767	0.0027	0.41	0.8847	-0.0020	-0.20	OE
MD8J2F		0.5733	-0.0007	-0.10	0.8967	0.0100	1.02	XX
MKLBN8		0.5797	0.0057	0.86	0.8940	0.0074	0.75	IC
MKLEU4		0.5818	0.0078	1.18	0.8831	-0.0036	-0.36	OE
MLCHMB		0.5763	0.0023	0.36	0.8823	-0.0043	-0.44	XX



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 171

Carbon & Low Alloy Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MQBRZX		0.5738	-0.0002	-0.03	0.8875	0.0009	0.09	OE
MYZMTL	X	0.5854	0.0114	1.73	0.8718	-0.0149	-1.51	OE
MZCJZC		0.5795	0.0055	0.84	0.8852	-0.0014	-0.15	OE
N24WZA		0.5720	-0.0020	-0.30	0.8860	-0.0006	-0.07	OE
NCNZUN		0.5731	-0.0009	-0.13	0.8831	-0.0035	-0.36	OE
NDWC8J		0.5726	-0.0014	-0.21	0.8847	-0.0020	-0.20	OE
NHDH7E		0.5860	0.0120	1.83	0.8937	0.0070	0.71	IC
NJNN3F		0.5707	-0.0033	-0.50	0.8810	-0.0056	-0.57	OE
P4P288		0.5700	-0.0040	-0.61	0.8967	0.0100	1.02	OE
P97CFA		0.5733	-0.0007	-0.10	0.9033	0.0167	1.70	OE
P9MDE6		0.5735	-0.0005	-0.08	0.8952	0.0085	0.87	OE
PAECQH		0.5813	0.0073	1.12	0.8830	-0.0036	-0.37	IC
PBPG2L		0.5873	0.0133	2.03	0.8917	0.0050	0.51	IC
PGBFB7		0.5813	0.0073	1.12	0.8913	0.0047	0.48	OE
PMMETR		0.5767	0.0027	0.41	0.8893	0.0027	0.27	OE
PPP6AE		0.5737	-0.0003	-0.05	0.8939	0.0073	0.74	OE
Q46DW4		0.5650	-0.0090	-1.37	0.8770	-0.0096	-0.98	OE
QMXN96	X	0.5717	-0.0023	-0.35	0.9330	0.0464	4.71	OE
QNY6ZB		0.5753	0.0013	0.20	0.8907	0.0040	0.41	OE
QR9MTB		0.5627	-0.0113	-1.72	0.8677	-0.0190	-1.93	OE
QW3DD2	X	0.5600	-0.0140	-2.13	0.8433	-0.0433	-4.40	OE
QYNHKY	X	0.5503	-0.0237	-3.60	0.8617	-0.0250	-2.54	OE
QYRRMX		0.5763	0.0023	0.35	0.8867	0.0000	0.00	OE
R9V6JR		0.5696	-0.0044	-0.67	0.8684	-0.0182	-1.85	OE
RCE973	*	0.5833	0.0093	1.42	0.8767	-0.0100	-1.01	OE
RG8DY8		0.5728	-0.0012	-0.18	0.8982	0.0116	1.18	AE
RPHPXQ		0.5757	0.0017	0.26	0.8990	0.0124	1.26	OE
RRP4N6		0.5772	0.0032	0.48	0.8897	0.0030	0.31	OE
RWGA4R		0.5767	0.0027	0.41	0.8767	-0.0100	-1.01	OE
RXB878		0.5733	-0.0007	-0.10	0.8910	0.0044	0.44	OE
TCNQLD	X	0.6017	0.0277	4.21	0.9367	0.0500	5.09	XX
TFN68H		0.5703	-0.0037	-0.56	0.8913	0.0047	0.48	OE
TGJPRW		0.5823	0.0083	1.27	0.9033	0.0167	1.70	XX
TMTVH2		0.5600	-0.0140	-2.13	0.8800	-0.0066	-0.68	OE
TUCW46		0.5800	0.0060	0.91	0.8997	0.0130	1.32	OE
UBTG83	X	0.5733	-0.0007	-0.10	0.9327	0.0460	4.68	XX
UBWYA8		0.5730	-0.0010	-0.15	0.8810	-0.0056	-0.57	OE
UGZ4Y7		0.5649	-0.0091	-1.39	0.8757	-0.0109	-1.11	OE
UTW87K		0.5643	-0.0097	-1.47	0.8810	-0.0056	-0.57	OE
UUM7JJ		0.5767	0.0027	0.41	0.8800	-0.0066	-0.68	OE
V8TJFB		0.5750	0.0010	0.15	0.8853	-0.0013	-0.13	OE
VABZ8U		0.5590	-0.0150	-2.28	0.8730	-0.0136	-1.39	GD
VDWKKB		0.5753	0.0013	0.20	0.8867	0.0000	0.00	OE
VJMUTN		0.5785	0.0045	0.69	0.9059	0.0192	1.96	OE
WGCC8X	X	0.5970	0.0230	3.50	0.8877	0.0010	0.10	OE
X2DPEA		0.5673	-0.0067	-1.02	0.8717	-0.0149	-1.52	OE
X3A8C6		0.5836	0.0096	1.46	0.8844	-0.0023	-0.23	IC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 171

Carbon & Low Alloy Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
X7C7Q4		0.5813	0.0073	1.11	0.9042	0.0176	1.79	OE
XE2RW3	*	0.5580	-0.0160	-2.43	0.8787	-0.0080	-0.81	DR
XR86VE		0.5890	0.0150	2.28	0.8927	0.0060	0.61	OE
YKPW8H		0.5693	-0.0047	-0.71	0.8927	0.0060	0.61	OE
ZCRJM9		0.5620	-0.0120	-1.82	0.8797	-0.0070	-0.71	GD
ZR43GU		0.5871	0.0131	2.00	0.8988	0.0121	1.24	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.5740	Percent	0.8866	Percent
<b>Std Dev Btwn Labs</b>	0.0066	Percent	0.0098	Percent

Samples L37, L38 : AISI 8740

Statistics based on 135 of 147 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	DR	Spectrometry - Direct Reading OE (DROES)
ED	X-Ray Fluorescence - Energy Dispersive (EDX)	GD	Spectrometry - Glow Discharge (GDS)
IC	Spectrometry - Inductively Coupled Plasma (ICP)	OE	Spectrometry - Optical Emission (OES)
WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)	XX	Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #171

- 49UCP2 (X) - Data for both samples are high.
- 4CTW9Q (X) - Data for sample L38 are high.
- D6KDAQ (X) - Data for sample L37 are high.
- JW4XXH (X) - Data for both samples are low.
- LY8AUA (X) - Data for sample L37 are high.
- MYZMTL (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- QMXN96 (X) - Data for sample L38 are high.
- QW3DD2 (X) - Data for sample L38 are low. Inconsistent within the determinations of sample L37.
- QYNHXY (X) - Data for sample L37 are low.
- TCNQLD (X) - Data for both samples are high.
- UBTG83 (X) - Data for sample L38 are high.
- WGCC8X (X) - Data for sample L37 are high.

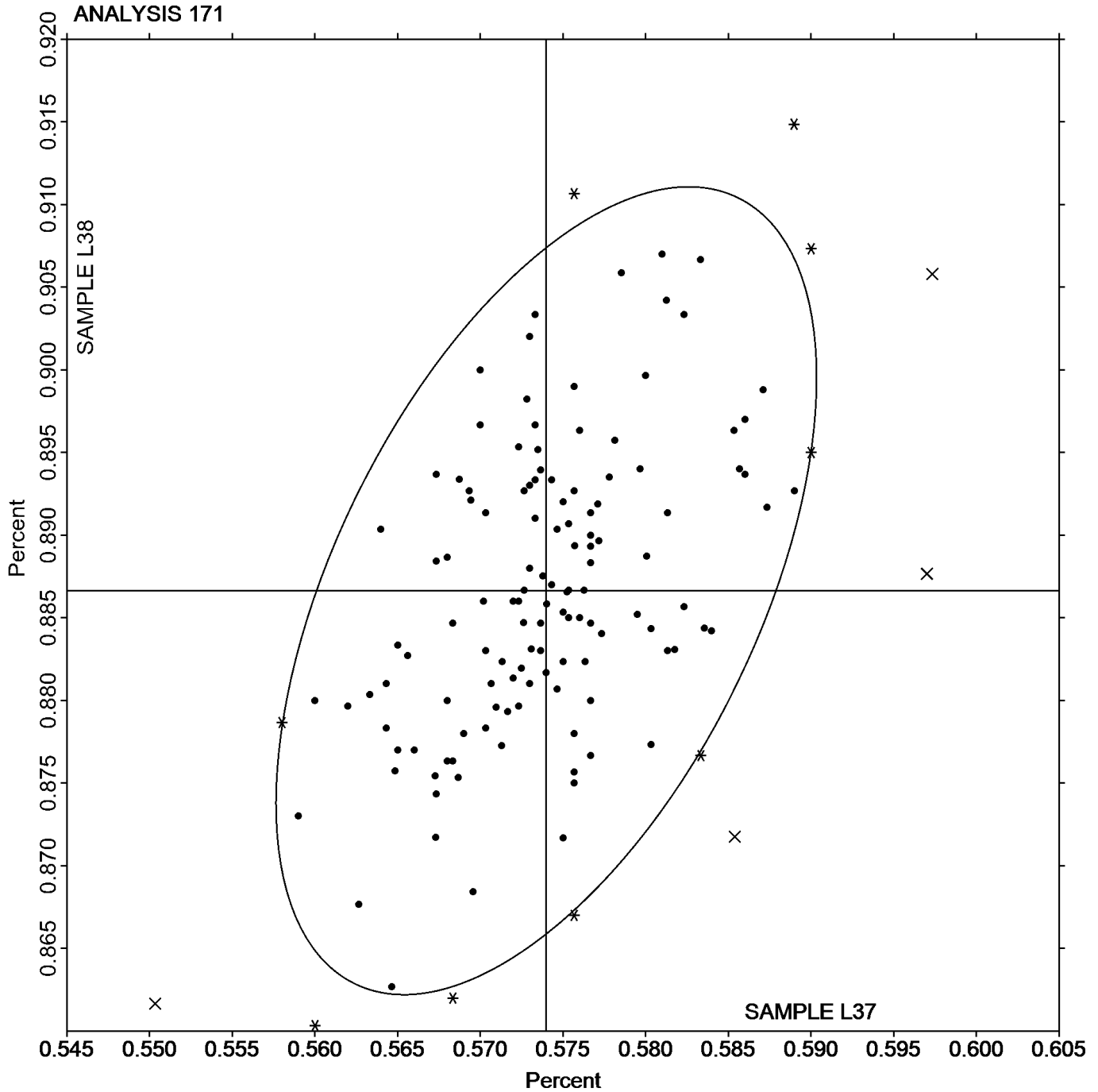


Analysis 171

Carbon & Low Alloy Steel, Element #2  
MANGANESE (Mn)

SAMPLE L37  
0.5740 Percent

SAMPLE L38  
0.8866 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 172

Carbon & Low Alloy Steel, Element #3  
TIN (Sn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.0117	0.0007	0.82	0.0103	-0.0013	-1.58	OE
29J3D4	X	0.00700	-0.0040	-4.97	0.00867	-0.0030	-3.60	ED
2BR244		0.0100	-0.0010	-1.21	0.0108	-0.0008	-0.97	OE
349ZFE		0.0117	0.0007	0.90	0.0117	0.0001	0.12	OE
39EXHQ		0.0110	0.0000	-0.01	0.0117	0.0000	0.04	OE
3KEG8Y		0.0110	0.0000	-0.05	0.0116	0.0000	0.00	OE
3M4NRV		0.0113	0.0003	0.36	0.0121	0.0004	0.52	OE
3MLLY2		0.0103	-0.0007	-0.84	0.0107	-0.0010	-1.17	DR
3MWKUA		0.0115	0.0005	0.61	0.0117	0.0001	0.12	OE
3PJA8V		0.0113	0.0003	0.36	0.0118	0.0002	0.20	OE
3QYJ9A		0.0106	-0.0004	-0.51	0.0116	0.0000	-0.04	OE
3TLZK3		0.0110	0.0000	-0.01	0.0113	-0.0003	-0.37	OE
3UGJQA		0.0120	0.0010	1.23	0.0120	0.0004	0.44	DR
43LXZP		0.0104	-0.0006	-0.75	0.0111	-0.0006	-0.69	OE
49UCP2		0.0115	0.0005	0.61	0.0123	0.0007	0.85	OE
4AMCJ6		0.0117	0.0007	0.86	0.0122	0.0006	0.69	OE
4CCQZT		0.0100	-0.0010	-1.25	0.0110	-0.0006	-0.77	OE
4CTW9Q		0.00990	-0.0011	-1.37	0.0108	-0.0008	-0.97	OE
62CHUV		0.0124	0.0014	1.77	0.0124	0.0008	0.97	OE
6CRET8		0.0113	0.0003	0.40	0.0122	0.0006	0.69	OE
6K77EY		0.00923	-0.0018	-2.20	0.00993	-0.0017	-2.06	OE
6MBTTN		0.0110	0.0000	-0.01	0.0117	0.0000	0.04	OE
6PVMQP		0.0101	-0.0009	-1.13	0.0101	-0.0016	-1.90	AA
6Y7ZVZ		0.00980	-0.0012	-1.50	0.0110	-0.0006	-0.73	OE
72MQBU		0.0111	0.0001	0.07	0.0120	0.0003	0.40	IC
7FLTW9	*	0.0133	0.0023	2.89	0.0140	0.0024	2.87	OE
7PPVAT		0.0113	0.0003	0.36	0.0114	-0.0002	-0.24	OE
7PYDMY		0.0120	0.0010	1.23	0.0130	0.0014	1.65	OE
7ZF8W8		0.0104	-0.0006	-0.75	0.0111	-0.0006	-0.69	OE
8ZM4EG		0.0110	0.0000	-0.01	0.0120	0.0004	0.44	XX
93P9MV		0.00997	-0.0010	-1.29	0.0105	-0.0011	-1.33	OE
9ELCTA		0.0120	0.0010	1.23	0.0120	0.0004	0.44	OE
9HMH9F		0.0117	0.0006	0.81	0.0124	0.0008	0.95	OE
AAP8EW		0.0111	0.0001	0.16	0.0121	0.0004	0.52	OE
AN9NM3		0.0117	0.0007	0.82	0.0131	0.0014	1.74	XX
AQTK7L		0.0121	0.0011	1.36	0.0128	0.0012	1.45	OE
B39PZ4		0.0109	-0.0001	-0.09	0.0116	0.0000	0.00	IC
B8B3CR		0.0113	0.0003	0.38	0.0118	0.0002	0.25	OE
BXC39Z		0.0120	0.0010	1.23	0.0120	0.0004	0.44	DR
C27G7A		0.0107	-0.0003	-0.38	0.0112	-0.0004	-0.53	OE
C4UVVK		0.0110	0.0000	-0.05	0.0124	0.0008	0.97	OE
CN4XPH		0.0113	0.0003	0.40	0.0120	0.0004	0.44	IC
D4CGNL	X	0.00480	-0.0062	-7.70	0.00513	-0.0065	-7.88	OE
D6KDAQ	*	0.0123	0.0013	1.60	0.0139	0.0022	2.71	OE
DGCCQV		0.0110	0.0000	0.03	0.0123	0.0007	0.85	OE
EACZKQ		0.00977	-0.0012	-1.54	0.0113	-0.0003	-0.37	OE
EH7E2G		0.0106	-0.0004	-0.55	0.0116	0.0000	0.00	AE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 172

Carbon & Low Alloy Steel, Element #3  
TIN (Sn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
FKNPVZ		0.0116	0.0006	0.74	0.0119	0.0002	0.28	IC
FNAG2B		0.0107	-0.0003	-0.42	0.0113	-0.0004	-0.45	OE
FTY3PP	X	0.0107	-0.0003	-0.42	0.00400	-0.0076	-9.25	OE
GCCX2W		0.0107	-0.0003	-0.42	0.0110	-0.0006	-0.77	AE
GF9N2F		0.0107	-0.0003	-0.42	0.0114	-0.0002	-0.24	OE
GJQWDM		0.0105	-0.0005	-0.59	0.0116	0.0000	-0.04	OE
GQA3CE		0.0104	-0.0006	-0.79	0.0113	-0.0003	-0.37	OE
HQ9JRN		0.0102	-0.0008	-1.04	0.0108	-0.0009	-1.05	OE
HXH3WF	*	0.0112	0.0002	0.28	0.0131	0.0015	1.82	OE
JRJQQB		0.0112	0.0002	0.24	0.0115	-0.0001	-0.16	OE
JW4XXH	X	0.0140	0.0030	3.71	0.0137	0.0021	2.50	OE
JWBX9J		0.0107	-0.0003	-0.42	0.0110	-0.0006	-0.77	AE
JX8BUQ		0.0108	-0.0002	-0.26	0.0112	-0.0005	-0.57	OE
KNA8W8		0.0110	0.0000	-0.01	0.0117	0.0000	0.04	IC
LUTRGY		0.00933	-0.0017	-2.08	0.00993	-0.0017	-2.06	WD
MCUUWH		0.0107	-0.0003	-0.42	0.0107	-0.0010	-1.17	OE
MKLBN8		0.0117	0.0007	0.82	0.0122	0.0005	0.64	IC
MLCHMB		0.00957	-0.0014	-1.79	0.0103	-0.0013	-1.62	XX
MQBRZX		0.0107	-0.0003	-0.42	0.0114	-0.0003	-0.32	OE
MYZMTL		0.0104	-0.0006	-0.76	0.0126	0.0009	1.13	OE
MZCJZC		0.0110	0.0000	0.03	0.0112	-0.0004	-0.53	OE
N24WZA		0.0107	-0.0003	-0.38	0.0106	-0.0010	-1.25	OE
NHDH7E	X	0.0107	-0.0003	-0.38	0.00963	-0.0020	-2.43	IC
NJNN3F		0.00993	-0.0011	-1.33	0.0102	-0.0014	-1.70	OE
P4P288	X	0.0213	0.0103	12.81	0.0210	0.0094	11.35	OE
P9MDE6		0.0104	-0.0006	-0.76	0.0107	-0.0009	-1.11	OE
PAECQH		0.0108	-0.0002	-0.22	0.0115	-0.0002	-0.20	XX
PMMETR		0.0115	0.0005	0.61	0.0126	0.0010	1.17	OE
PPP6AE		0.0103	-0.0007	-0.84	0.0112	-0.0004	-0.49	OE
QMXN96		0.00997	-0.0010	-1.29	0.0108	-0.0008	-0.97	OE
QNY6ZB		0.0109	-0.0001	-0.09	0.0112	-0.0004	-0.49	OE
QR9MTB		0.0116	0.0006	0.69	0.0123	0.0007	0.81	OE
QW3DD2	X	0.00200	-0.0090	-11.17	0.00200	-0.0096	-11.68	XX
QYNHKY		0.0111	0.0001	0.16	0.0117	0.0001	0.12	OE
R9V6JR		0.0111	0.0001	0.07	0.0116	0.0000	0.00	OE
RCE973		0.0113	0.0003	0.40	0.0110	-0.0006	-0.77	OE
RPHPXQ		0.0100	-0.0010	-1.25	0.0107	-0.0010	-1.17	OE
RWGA4R		0.0107	-0.0003	-0.42	0.0110	-0.0006	-0.77	OE
RXB878		0.0115	0.0005	0.61	0.0125	0.0008	1.01	OE
TMTVH2	X	0.0150	0.0040	4.95	0.0160	0.0044	5.29	OE
UBTG83		0.0100	-0.0010	-1.21	0.0109	-0.0008	-0.93	OE
UBWYA8		0.0111	0.0001	0.07	0.0119	0.0003	0.36	OE
UGZ4Y7		0.0104	-0.0006	-0.79	0.0117	0.0000	0.04	OE
UTW87K		0.0113	0.0003	0.40	0.0113	-0.0003	-0.37	OE
UUM7JJ	X	0.0140	0.0030	3.71	0.0150	0.0034	4.08	OE
VDWKKB		0.0105	-0.0005	-0.63	0.0115	-0.0001	-0.12	OE
VJMUTN		0.0112	0.0002	0.22	0.0122	0.0005	0.64	OE





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 172

Carbon & Low Alloy Steel, Element #3  
TIN (Sn)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
WGCC8X		0.0110	0.0000	-0.01	0.0110	-0.0006	-0.77	OE
X2DPEA	*	0.0131	0.0021	2.64	0.0138	0.0021	2.58	OE
X7C7Q4	*	0.0130	0.0020	2.47	0.0130	0.0014	1.65	OE
XE2RW3		0.0113	0.0003	0.40	0.0117	0.0000	0.04	DR
XR86VE		0.0127	0.0017	2.06	0.0127	0.0010	1.25	OE
YKPW8H		0.0112	0.0002	0.24	0.0135	0.0019	2.30	OE
ZR43GU		0.0120	0.0010	1.19	0.0123	0.0007	0.83	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.0110	Percent	0.0116	Percent
<b>Stnd Dev Btwn Labs</b>	0.0008	Percent	0.0008	Percent

Samples L37, L38 : AISI 8740

Statistics based on 89 of 101 reporting participants

### Key to Method Codes Reported by Participants

<b>AA</b> Spectrometry - Atomic Absorption (AAS)	<b>AE</b> Spectrometry - Atomic Emission (AES)
<b>DR</b> Spectrometry - Direct Reading OE (DROES)	<b>ED</b> X-Ray Fluorescence - Energy Dispersive (EDX)
<b>IC</b> Spectrometry - Inductively Coupled Plasma (ICP)	<b>OE</b> Spectrometry - Optical Emission (OES)
<b>WD</b> X-Ray Fluorescence - Wavelength Dispersive (WDX)	<b>XX</b> Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #172

- 29J3D4 (X) - Data for both samples are low. Possible Systematic Error.
- D4CGNL (X) - Data for both samples are low. Possible Systematic Error.
- FTY3PP (X) - Data for sample L38 are low. Inconsistent within the determinations of both samples.
- JW4XXH (X) - Data for sample L37 are high.
- NHDH7E (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L37.
- P4P288 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L38.
- QW3DD2 (X) - Data for both samples are low. Possible Systematic Error.
- TMTVH2 (X) - Data for both samples are high. Possible Systematic Error.
- UUM7JJ (X) - Data for both samples are high. Possible Systematic Error.

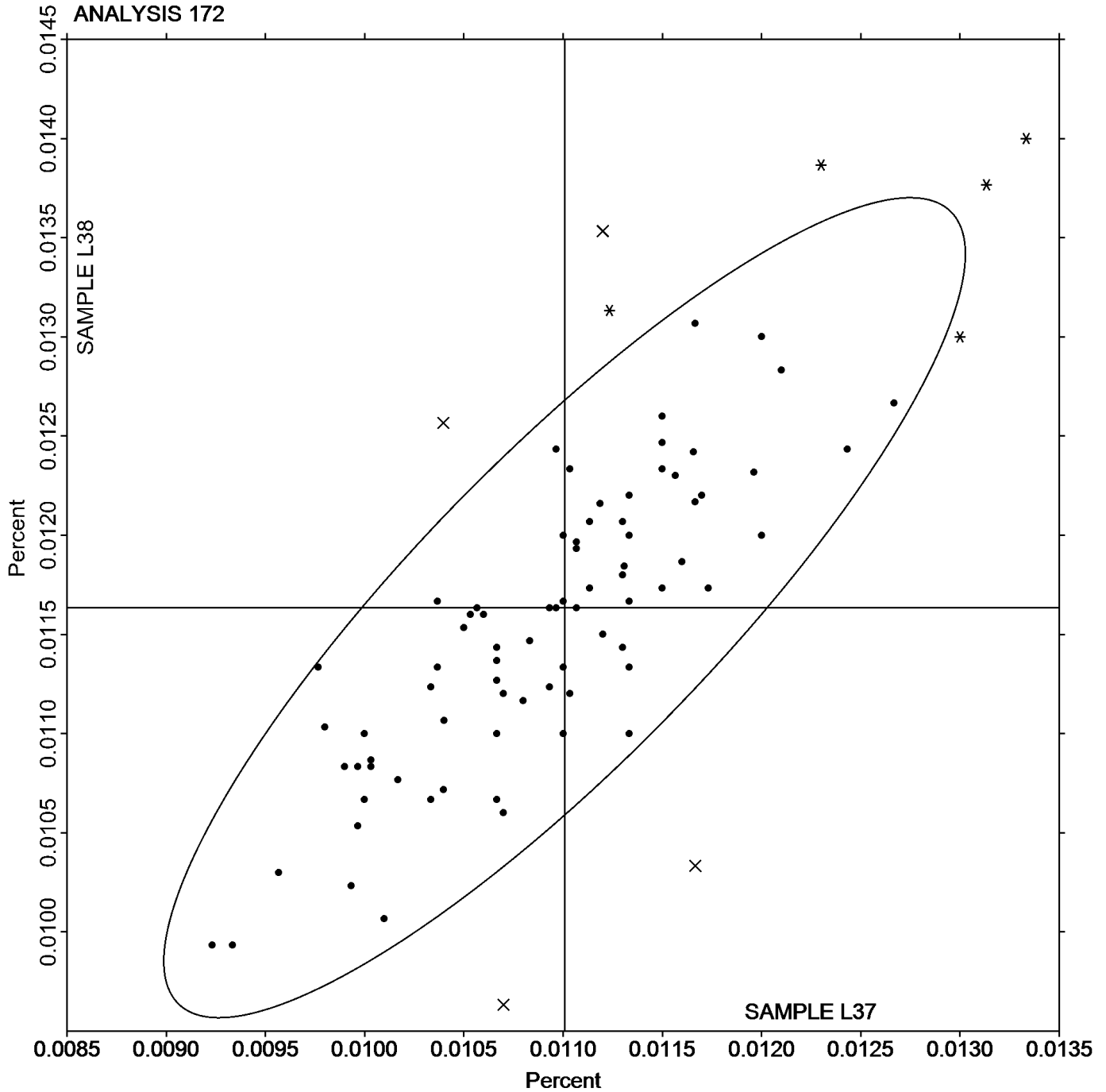


Analysis 172

Carbon & Low Alloy Steel, Element #3  
TIN (Sn)

SAMPLE L37  
0.0110 Percent

SAMPLE L38  
0.0116 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 173

Carbon & Low Alloy Steel, Element #4  
SULFUR (S)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.0190	0.0004	0.27	0.0373	0.0009	0.41	OE
29J3D4		0.0178	-0.0009	-0.61	0.0352	-0.0012	-0.57	CI
2BR244		0.0195	0.0009	0.62	0.0388	0.0024	1.11	OE
2NYNC2		0.0191	0.0004	0.31	0.0361	-0.0004	-0.17	OE
349ZFE		0.0208	0.0022	1.54	0.0387	0.0022	1.03	OE
39EXHQ		0.0178	-0.0008	-0.56	0.0373	0.0008	0.39	OE
3KEG8Y		0.0192	0.0005	0.39	0.0369	0.0004	0.21	OE
3M4NRV		0.0188	0.0002	0.12	0.0386	0.0021	0.98	OE
3MLLY2		0.0175	-0.0011	-0.77	0.0326	-0.0039	-1.80	DR
3MWKUA		0.0197	0.0011	0.79	0.0378	0.0014	0.64	OE
3PJA8V		0.0196	0.0010	0.72	0.0360	-0.0004	-0.20	OE
3QYJ9A		0.0171	-0.0015	-1.08	0.0354	-0.0011	-0.49	OE
3T8WQB	X	0.0150	-0.0036	-2.57	0.0263	-0.0101	-4.72	OE
3TLZK3		0.0193	0.0007	0.50	0.0393	0.0029	1.34	OE
3UGJQA	*	0.0213	0.0027	1.92	0.0423	0.0059	2.74	DR
43LXZP		0.0186	-0.0001	-0.04	0.0358	-0.0007	-0.32	OE
49DHPQ		0.0170	-0.0016	-1.15	0.0353	-0.0011	-0.53	GD
49UCP2		0.0169	-0.0018	-1.25	0.0365	0.0001	0.03	OE
4AMCJ6		0.0187	0.0001	0.05	0.0372	0.0007	0.35	OE
4CCQZT		0.0170	-0.0016	-1.15	0.0363	-0.0001	-0.06	OE
4CTW9Q	*	0.0149	-0.0037	-2.62	0.0353	-0.0012	-0.54	OE
62CHUV		0.0201	0.0015	1.05	0.0359	-0.0006	-0.26	OE
6CRET8		0.0200	0.0014	1.00	0.0404	0.0039	1.84	OE
6EWUHX		0.0198	0.0012	0.83	0.0338	-0.0026	-1.22	CI
6K77EY		0.0195	0.0009	0.65	0.0369	0.0004	0.19	OE
6MAWPK	X	0.0137	-0.0050	-3.52	0.0267	-0.0098	-4.57	GD
6MBTTN		0.0177	-0.0010	-0.68	0.0350	-0.0015	-0.68	OE
6PVMQP		0.0163	-0.0023	-1.63	0.0327	-0.0038	-1.77	CI
6Y7ZVZ	*	0.0219	0.0033	2.32	0.0364	-0.0001	-0.04	OE
72MQBU		0.0178	-0.0008	-0.58	0.0365	0.0000	0.00	CO
768ECU	*	0.0223	0.0037	2.63	0.0417	0.0052	2.43	XX
7BEXJZ		0.0184	-0.0002	-0.16	0.0366	0.0002	0.08	GD
7ECGGR		0.0213	0.0027	1.92	0.0327	-0.0038	-1.77	OE
7FLTW9	X	0.0210	0.0024	1.69	0.0443	0.0079	3.67	OE
7PPVAT		0.0204	0.0018	1.26	0.0391	0.0026	1.22	OE
7PYDMY		0.0210	0.0024	1.69	0.0357	-0.0008	-0.37	OE
7ZF8W8		0.0152	-0.0034	-2.43	0.0331	-0.0033	-1.55	OE
8G23RU		0.0170	-0.0016	-1.15	0.0360	-0.0005	-0.21	CI
8ZM4EG		0.0190	0.0004	0.27	0.0380	0.0015	0.72	XX
93P9MV		0.0190	0.0004	0.27	0.0378	0.0014	0.64	OE
99GBV2		0.0190	0.0004	0.27	0.0363	-0.0001	-0.06	GD
9B4AQB		0.0187	0.0000	0.03	0.0343	-0.0021	-0.99	GD
9ELCTA		0.0200	0.0014	0.98	0.0393	0.0029	1.34	OE
9HMH9F		0.0192	0.0005	0.38	0.0363	-0.0002	-0.10	OE
AAP8EW		0.0177	-0.0009	-0.66	0.0324	-0.0041	-1.91	OE
AN9NM3		0.0187	0.0000	0.03	0.0363	-0.0001	-0.06	XX
AQTK7L		0.0212	0.0025	1.80	0.0342	-0.0023	-1.07	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 173

Carbon & Low Alloy Steel, Element #4  
SULFUR (S)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
AYQCEF		0.0172	-0.0015	-1.03	0.0313	-0.0051	-2.39	DR
B39PZ4		0.0187	0.0001	0.08	0.0379	0.0015	0.69	CI
B8B3CR		0.0177	-0.0009	-0.66	0.0342	-0.0022	-1.05	OE
BQT2LW		0.0169	-0.0017	-1.22	0.0352	-0.0013	-0.60	OE
BXC39Z	*	0.0217	0.0030	2.16	0.0360	-0.0005	-0.21	CI
C27G7A		0.0171	-0.0016	-1.11	0.0354	-0.0011	-0.51	OE
C4UVVK		0.0182	-0.0004	-0.28	0.0359	-0.0006	-0.26	CI
CBD6XM		0.0192	0.0006	0.41	0.0383	0.0018	0.86	XX
CN4XPH		0.0187	0.0000	0.03	0.0377	0.0012	0.56	CO
D4CGNL	X	0.0187	0.0001	0.08	0.0301	-0.0063	-2.95	OE
D6KDAQ		0.0181	-0.0005	-0.36	0.0365	0.0000	0.00	CI
DATWA4	X	0.0208	0.0022	1.54	0.0437	0.0072	3.38	OE
DCYA7K		0.0194	0.0008	0.55	0.0390	0.0025	1.19	OE
DDH4U2	*	0.0200	0.0014	0.98	0.0417	0.0052	2.43	OE
DGCCQV	*	0.0153	-0.0033	-2.34	0.0315	-0.0050	-2.31	OE
E3TUMJ		0.0177	-0.0010	-0.68	0.0320	-0.0045	-2.08	GD
EACZKQ		0.0187	0.0000	0.03	0.0370	0.0005	0.25	OE
EH7E2G		0.0187	0.0000	0.03	0.0378	0.0013	0.62	CI
EHNE7R		0.0187	0.0000	0.03	0.0358	-0.0006	-0.29	OE
EZN9VC		0.0177	-0.0010	-0.68	0.0330	-0.0035	-1.61	OE
FKNPVZ		0.0187	0.0000	0.03	0.0359	-0.0005	-0.25	OE
FNAG2B		0.0182	-0.0005	-0.32	0.0374	0.0009	0.44	OE
FTY3PP	X	0.0147	-0.0040	-2.81	0.0300	-0.0065	-3.01	OE
GCCX2W		0.0187	0.0000	0.03	0.0357	-0.0008	-0.37	AE
GF9N2F		0.0189	0.0003	0.20	0.0376	0.0012	0.55	OE
GJQWDM		0.0190	0.0004	0.29	0.0369	0.0004	0.21	OE
GQA3CE		0.0171	-0.0015	-1.08	0.0349	-0.0015	-0.71	CI
HQ9JRN	X	0.0239	0.0053	3.77	0.0391	0.0026	1.23	OE
HXH3WF		0.0194	0.0007	0.53	0.0367	0.0002	0.11	OE
JRJQQB		0.0163	-0.0023	-1.63	0.0331	-0.0034	-1.58	CI
JW4XXH		0.0199	0.0012	0.88	0.0342	-0.0023	-1.07	OE
JWBX9J		0.0183	-0.0003	-0.21	0.0347	-0.0018	-0.84	AE
JX8BUQ		0.0182	-0.0004	-0.30	0.0357	-0.0008	-0.37	CI
KB3GWK		0.0165	-0.0021	-1.48	0.0364	-0.0001	-0.03	OE
KE2Q8M		0.0181	-0.0005	-0.35	0.0380	0.0015	0.70	CI
KNA8W8		0.0182	-0.0004	-0.28	0.0374	0.0010	0.45	CI
KUHGCG		0.0179	-0.0007	-0.51	0.0393	0.0028	1.31	CO
LNPVPL		0.0187	0.0000	0.03	0.0367	0.0002	0.10	GD
LPKHDC		0.0210	0.0024	1.69	0.0332	-0.0032	-1.50	OE
LUTRGY		0.0189	0.0003	0.20	0.0382	0.0018	0.83	CI
LY8AUA		0.0210	0.0024	1.69	0.0380	0.0015	0.72	OE
MCUUWH		0.0193	0.0007	0.50	0.0373	0.0009	0.41	OE
MD8J2F		0.0170	-0.0016	-1.15	0.0363	-0.0001	-0.06	XX
MKLBN8		0.0187	0.0001	0.08	0.0375	0.0011	0.50	CI
MKLEU4		0.0195	0.0009	0.65	0.0377	0.0012	0.58	OE
MLCHMB		0.0176	-0.0010	-0.70	0.0365	0.0000	0.02	XX
MQBRZX		0.0188	0.0002	0.12	0.0362	-0.0002	-0.11	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 173

Carbon & Low Alloy Steel, Element #4  
SULFUR (S)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MYZMTL	X	0.0220	0.0034	2.41	0.0297	-0.0068	-3.17	OE
MZCJZC		0.0191	0.0005	0.36	0.0372	0.0008	0.36	OE
N24WZA		0.0187	0.0000	0.03	0.0365	0.0000	0.02	CI
NCNZUN		0.0154	-0.0033	-2.32	0.0326	-0.0039	-1.82	OE
NDWC8J		0.0166	-0.0020	-1.42	0.0350	-0.0014	-0.67	OE
NHDH7E		0.0169	-0.0017	-1.20	0.0335	-0.0030	-1.38	CI
NJNN3F		0.0192	0.0006	0.43	0.0385	0.0020	0.94	OE
P4P288	X	0.0137	-0.0050	-3.52	0.0280	-0.0085	-3.95	OE
P97CFA	X	0.0149	-0.0038	-2.67	0.0271	-0.0093	-4.35	OE
P9MDE6		0.0187	0.0001	0.06	0.0346	-0.0019	-0.86	OE
PAECQH		0.0176	-0.0010	-0.70	0.0376	0.0011	0.53	OE
PBPG2L		0.0197	0.0011	0.76	0.0350	-0.0015	-0.70	IR
PGBFB7	X	0.0165	-0.0021	-1.48	0.0294	-0.0071	-3.29	OE
PMMETR		0.0175	-0.0012	-0.83	0.0358	-0.0007	-0.32	CI
PPP6AE		0.0177	-0.0010	-0.68	0.0352	-0.0013	-0.59	OE
Q46DW4		0.0164	-0.0022	-1.55	0.0354	-0.0011	-0.51	OE
QMXN96	X	0.0145	-0.0041	-2.93	0.0356	-0.0008	-0.39	OE
QNY6ZB		0.0171	-0.0015	-1.08	0.0329	-0.0035	-1.64	OE
QR9MTB		0.0213	0.0026	1.88	0.0409	0.0044	2.06	OE
QW3DD2	X	0.00617	-0.0125	-8.84	0.0223	-0.0141	-6.59	OE
QYNHKY	*	0.0214	0.0028	1.99	0.0420	0.0055	2.57	OE
QYRRMX		0.0189	0.0002	0.17	0.0366	0.0002	0.08	OE
R9V6JR		0.0190	0.0003	0.24	0.0352	-0.0013	-0.60	OE
RCE973		0.0197	0.0010	0.74	0.0337	-0.0028	-1.30	OE
RG8DY8		0.0199	0.0013	0.93	0.0380	0.0015	0.70	AE
RPHPXQ		0.0180	-0.0006	-0.44	0.0373	0.0009	0.41	OE
RRP4N6		0.0190	0.0004	0.29	0.0360	-0.0005	-0.23	OE
RWGA4R		0.0190	0.0004	0.27	0.0340	-0.0025	-1.15	OE
RXB878		0.0185	-0.0002	-0.11	0.0372	0.0007	0.35	CI
TCNQLD		0.0170	-0.0016	-1.15	0.0383	0.0019	0.87	XX
TFN68H		0.0183	-0.0004	-0.25	0.0334	-0.0031	-1.43	OE
TGJPRW		0.0212	0.0026	1.85	0.0409	0.0044	2.06	XX
TMTVH2	X	0.0160	-0.0026	-1.86	0.0180	-0.0185	-8.61	OE
TUCW46		0.0203	0.0016	1.17	0.0397	0.0033	1.53	OE
U64X78		0.0209	0.0022	1.59	0.0381	0.0016	0.77	CI
UBTG83	X	0.0143	-0.0043	-3.04	0.0358	-0.0007	-0.31	OE
UBWYA8		0.0178	-0.0008	-0.58	0.0370	0.0005	0.24	OE
UGZ4Y7		0.0190	0.0004	0.29	0.0380	0.0016	0.73	OE
UTW87K		0.0174	-0.0012	-0.87	0.0364	-0.0001	-0.04	CI
UUM7JJ		0.0210	0.0024	1.69	0.0383	0.0019	0.87	OE
V8TJFB		0.0193	0.0007	0.50	0.0373	0.0009	0.41	CI
VABZ8U		0.0200	0.0014	0.98	0.0380	0.0015	0.72	XX
VDWKKB		0.0183	-0.0003	-0.21	0.0359	-0.0006	-0.28	CI
VJMUTN		0.0184	-0.0002	-0.14	0.0356	-0.0009	-0.42	CI
WGCC8X		0.0180	-0.0006	-0.44	0.0347	-0.0018	-0.84	CO
X2DPEA		0.0189	0.0003	0.22	0.0358	-0.0006	-0.29	OE
X3A8C6		0.0177	-0.0009	-0.67	0.0376	0.0011	0.51	CI



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 173

Carbon & Low Alloy Steel, Element #4  
SULFUR (S)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
X7C7Q4		0.0187	0.0001	0.05	0.0365	0.0001	0.03	OE
XE2RW3		0.0180	-0.0006	-0.44	0.0363	-0.0001	-0.06	DR
XR86VE		0.0187	0.0000	0.03	0.0347	-0.0018	-0.84	CO
YKPW8H		0.0176	-0.0010	-0.70	0.0349	-0.0016	-0.74	OE
ZCRJM9		0.0183	-0.0003	-0.21	0.0330	-0.0035	-1.61	GD
ZR43GU		0.0214	0.0028	1.97	0.0385	0.0021	0.97	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.0186	Percent	0.0365	Percent
<b>Std Dev Btwn Labs</b>	0.0014	Percent	0.0021	Percent

Samples L37, L38 : AISI 8740

Statistics based on 129 of 147 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	CI	Combustion / IR
CO	Combustion	DR	Spectrometry - Direct Reading OE (DROES)
GD	Spectrometry - Glow Discharge (GDS)	IR	IR (Absorption / Detection)
OE	Spectrometry - Optical Emission (OES)	XX	Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #173

- 3T8WQB (X) - Data for sample L38 are low.
- 6MAWPK (X) - Data for both samples are low.
- 7FLTW9 (X) - Data for sample L38 are high.
- D4CGNL (X) - Data for sample L38 are low.
- DATWA4 (X) - Data for sample L38 are high.
- FTY3PP (X) - Data for both samples are low.
- HQ9JRN (X) - Data for sample L37 are high.
- MYZMTL (X) - Data for sample L38 are low.
- P4P288 (X) - Data for both samples are low.
- P97CFA (X) - Data for sample L38 are low.
- PGBFB7 (X) - Data for sample L38 are low.
- QMXN96 (X) - Data for sample L37 are low.
- QW3DD2 (X) - Data for both samples are low.
- TMTVH2 (X) - Data for sample L38 are low.
- UBTG83 (X) - Data for sample L37 are low.



Fasteners and Metals Interlaboratory Testing Program

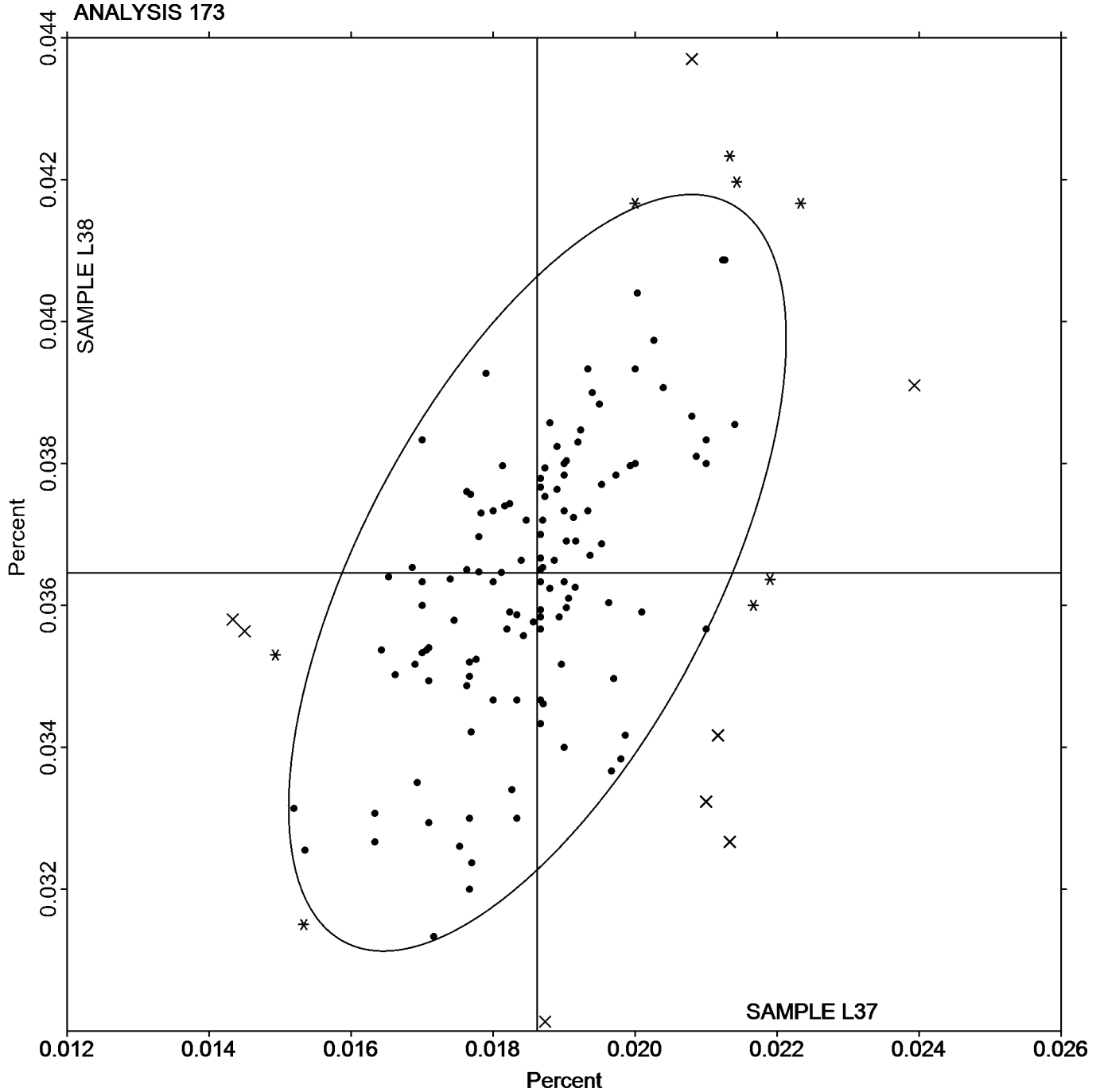
Cycle 115  
3rd Qtr 2016

Analysis 173

Carbon & Low Alloy Steel, Element #4  
SULFUR (S)

SAMPLE L37  
0.0186 Percent

SAMPLE L38  
0.0365 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 174

Carbon & Low Alloy Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.2330	0.0029	0.72	0.2593	0.0022	0.47	OE
29J3D4	X	0.2460	0.0159	3.96	0.2500	-0.0071	-1.55	ED
2BR244		0.2260	-0.0041	-1.03	0.2523	-0.0048	-1.04	OE
2NYNC2		0.2300	-0.0002	-0.04	0.2586	0.0014	0.31	OE
349ZFE	X	0.2143	-0.0158	-3.94	0.2410	-0.0161	-3.50	OE
39EXHQ		0.2303	0.0002	0.05	0.2580	0.0009	0.18	OE
3KEG8Y		0.2305	0.0004	0.10	0.2575	0.0004	0.08	OE
3M4NRV		0.2297	-0.0005	-0.12	0.2583	0.0012	0.26	OE
3MLLY2		0.2303	0.0002	0.05	0.2570	-0.0001	-0.03	DR
3MWKUA		0.2322	0.0021	0.53	0.2576	0.0004	0.09	OE
3PJA8V	*	0.2392	0.0091	2.26	0.2615	0.0043	0.94	OE
3QYJ9A		0.2270	-0.0031	-0.78	0.2597	0.0025	0.55	OE
3T8WQB		0.2290	-0.0011	-0.28	0.2513	-0.0058	-1.26	OE
3TLZK3	*	0.2200	-0.0101	-2.53	0.2480	-0.0091	-1.98	OE
3UGJQA		0.2307	0.0005	0.13	0.2577	0.0005	0.11	DR
43LXZP		0.2329	0.0028	0.70	0.2592	0.0021	0.45	OE
49DHPQ		0.2283	-0.0018	-0.45	0.2543	-0.0028	-0.61	GD
49UCP2		0.2293	-0.0008	-0.20	0.2537	-0.0035	-0.75	OE
4AMCJ6		0.2307	0.0005	0.13	0.2623	0.0052	1.12	OE
4CCQZT		0.2237	-0.0065	-1.61	0.2533	-0.0038	-0.83	OE
62CHUV		0.2340	0.0039	0.97	0.2613	0.0042	0.91	OE
6CRET8		0.2297	-0.0005	-0.12	0.2590	0.0018	0.39	OE
6EWUHX		0.2340	0.0039	0.97	0.2560	-0.0011	-0.25	IC
6K77EY		0.2277	-0.0025	-0.61	0.2530	-0.0041	-0.90	OE
6MAWPK	*	0.2400	0.0099	2.46	0.2700	0.0129	2.78	GD
6MBTTN		0.2260	-0.0041	-1.03	0.2537	-0.0035	-0.75	OE
6PVMQP		0.2316	0.0015	0.37	0.2549	-0.0022	-0.49	IC
6Y7ZVZ		0.2315	0.0014	0.35	0.2539	-0.0032	-0.70	OE
72MQBU		0.2263	-0.0038	-0.95	0.2537	-0.0035	-0.75	IC
768ECU		0.2333	0.0032	0.80	0.2643	0.0072	1.56	XX
7BEXJZ		0.2287	-0.0015	-0.36	0.2567	-0.0005	-0.10	GD
7ECGGR		0.2310	0.0009	0.22	0.2620	0.0049	1.05	OE
7FLTW9		0.2377	0.0075	1.88	0.2653	0.0082	1.77	OE
7PPVAT		0.2309	0.0007	0.18	0.2597	0.0026	0.56	OE
7PYDMY		0.2263	-0.0038	-0.95	0.2540	-0.0031	-0.68	OE
7ZF8W8		0.2299	-0.0002	-0.06	0.2576	0.0004	0.09	OE
8G23RU		0.2260	-0.0041	-1.03	0.2527	-0.0045	-0.97	IC
8ZM4EG		0.2260	-0.0041	-1.03	0.2520	-0.0051	-1.12	XX
93P9MV		0.2303	0.0002	0.05	0.2560	-0.0011	-0.25	OE
99GBV2		0.2227	-0.0075	-1.86	0.2477	-0.0095	-2.05	GD
9B4AQB		0.2303	0.0002	0.05	0.2517	-0.0055	-1.19	GD
9ELCTA	*	0.2300	-0.0001	-0.03	0.2500	-0.0071	-1.55	OE
9HMH9F		0.2320	0.0019	0.47	0.2580	0.0008	0.18	OE
AAP8EW		0.2370	0.0069	1.71	0.2610	0.0039	0.83	OE
AN9NM3		0.2310	0.0009	0.22	0.2587	0.0015	0.33	XX
AQTK7L		0.2230	-0.0071	-1.78	0.2530	-0.0041	-0.90	OE
AYQCEF		0.2303	0.0002	0.05	0.2573	0.0002	0.04	DR





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 174

Carbon & Low Alloy Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
B39PZ4		0.2287	-0.0015	-0.36	0.2563	-0.0008	-0.18	IC
B8B3CR		0.2298	-0.0004	-0.09	0.2553	-0.0018	-0.39	OE
BQT2LW		0.2390	0.0089	2.21	0.2593	0.0022	0.47	OE
BXC39Z		0.2320	0.0019	0.47	0.2610	0.0039	0.83	DR
C27G7A		0.2263	-0.0038	-0.95	0.2517	-0.0055	-1.19	OE
C4UVVK		0.2297	-0.0005	-0.12	0.2577	0.0005	0.11	OE
CBD6XM		0.2260	-0.0041	-1.03	0.2533	-0.0038	-0.83	XX
CMLYD7	*	0.2400	0.0099	2.46	0.2633	0.0062	1.34	DR
CN4XPH		0.2283	-0.0018	-0.45	0.2523	-0.0048	-1.04	IC
D4CGNL		0.2380	0.0079	1.96	0.2673	0.0102	2.21	OE
D6KDAQ		0.2230	-0.0071	-1.78	0.2506	-0.0065	-1.42	OE
DATWA4	*	0.2310	0.0009	0.22	0.2660	0.0089	1.92	OE
DCYA7K		0.2304	0.0003	0.08	0.2586	0.0014	0.31	OE
DDH4U2		0.2300	-0.0001	-0.03	0.2577	0.0005	0.11	OE
DGCCQV		0.2287	-0.0015	-0.36	0.2543	-0.0028	-0.61	OE
E3TUMJ		0.2260	-0.0041	-1.03	0.2547	-0.0025	-0.54	GD
EACZKQ		0.2267	-0.0035	-0.86	0.2523	-0.0048	-1.04	OE
EH7E2G	*	0.2243	-0.0058	-1.45	0.2583	0.0012	0.26	AE
EHNE7R		0.2293	-0.0008	-0.20	0.2560	-0.0011	-0.25	OE
EZN9VC		0.2353	0.0052	1.30	0.2610	0.0039	0.83	OE
FKNPVZ		0.2287	-0.0015	-0.36	0.2547	-0.0025	-0.54	OE
FNAG2B		0.2350	0.0048	1.21	0.2637	0.0066	1.42	OE
FTY3PP		0.2310	0.0009	0.22	0.2583	0.0012	0.26	OE
FZ4M3L		0.2361	0.0060	1.50	0.2634	0.0063	1.36	WD
GCCX2W		0.2313	0.0012	0.30	0.2587	0.0015	0.33	AE
GF9N2F		0.2343	0.0041	1.03	0.2575	0.0004	0.08	OE
GJQWDM	*	0.2208	-0.0093	-2.32	0.2516	-0.0055	-1.19	OE
GQA3CE		0.2346	0.0045	1.12	0.2624	0.0053	1.14	OE
HQ9JRN		0.2317	0.0015	0.38	0.2580	0.0009	0.18	OE
HXH3WF		0.2290	-0.0011	-0.28	0.2547	-0.0025	-0.54	OE
JRJQQB		0.2250	-0.0051	-1.28	0.2540	-0.0031	-0.68	OE
JW4XXH	X	0.2453	0.0152	3.79	0.2677	0.0105	2.28	OE
JWBX9J		0.2333	0.0032	0.80	0.2583	0.0012	0.26	AE
JX8BUQ		0.2240	-0.0061	-1.52	0.2518	-0.0053	-1.15	OE
KB3GWK		0.2330	0.0029	0.72	0.2587	0.0015	0.33	OE
KNA8W8		0.2297	-0.0005	-0.12	0.2570	-0.0001	-0.03	GR
KUHGCG		0.2283	-0.0018	-0.45	0.2593	0.0022	0.47	GD
LNPVPL		0.2250	-0.0051	-1.28	0.2500	-0.0071	-1.55	GD
LPKHDC		0.2363	0.0062	1.55	0.2640	0.0069	1.48	OE
LUTRGY		0.2267	-0.0035	-0.86	0.2507	-0.0065	-1.40	WD
LY8AUA		0.2303	0.0002	0.05	0.2560	-0.0011	-0.25	OE
MCUUWH		0.2297	-0.0005	-0.12	0.2567	-0.0005	-0.10	OE
MD8J2F	X	0.2300	-0.0001	-0.03	0.9700	0.7129	154.43	XX
MKLBN8		0.2287	-0.0015	-0.36	0.2560	-0.0011	-0.25	IC
MKLEU4		0.2273	-0.0029	-0.71	0.2484	-0.0087	-1.89	OE
MLCHMB		0.2280	-0.0021	-0.53	0.2583	0.0012	0.26	XX
MQBRZX		0.2304	0.0002	0.06	0.2583	0.0012	0.25	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 174

Carbon & Low Alloy Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MYZMTL	X	0.2501	0.0199	4.97	0.2705	0.0133	2.89	OE
MZCJZC		0.2297	-0.0004	-0.10	0.2571	-0.0001	-0.02	OE
N24WZA		0.2320	0.0019	0.47	0.2610	0.0039	0.83	OE
NCNZUN		0.2204	-0.0097	-2.43	0.2484	-0.0087	-1.89	OE
NDWC8J	X	0.2440	0.0139	3.47	0.2684	0.0113	2.44	OE
NHDH7E		0.2377	0.0075	1.88	0.2640	0.0069	1.48	IC
NJNN3F		0.2277	-0.0025	-0.61	0.2533	-0.0038	-0.83	OE
P4P288		0.2290	-0.0011	-0.28	0.2557	-0.0015	-0.32	OE
P97CFA		0.2300	-0.0001	-0.03	0.2600	0.0029	0.62	OE
P9MDE6		0.2325	0.0024	0.60	0.2589	0.0018	0.39	OE
PAECQH		0.2345	0.0044	1.10	0.2599	0.0027	0.59	IC
PBPG2L		0.2377	0.0075	1.88	0.2633	0.0062	1.34	IC
PGBFB7		0.2310	0.0009	0.22	0.2577	0.0005	0.11	OE
PMMETR		0.2307	0.0005	0.13	0.2570	-0.0001	-0.03	OE
PPP6AE		0.2290	-0.0012	-0.29	0.2551	-0.0020	-0.44	OE
Q46DW4		0.2300	-0.0001	-0.03	0.2623	0.0052	1.12	OE
QMXN96		0.2317	0.0015	0.38	0.2617	0.0045	0.98	OE
QNY6ZB		0.2267	-0.0035	-0.86	0.2523	-0.0048	-1.04	OE
QR9MTB		0.2201	-0.0100	-2.49	0.2552	-0.0019	-0.42	OE
QW3DD2		0.2333	0.0032	0.80	0.2633	0.0062	1.34	OE
QYNHKY	X	0.2137	-0.0165	-4.11	0.2373	-0.0198	-4.29	OE
QYRRMX		0.2283	-0.0018	-0.45	0.2573	0.0002	0.04	OE
R9V6JR	X	0.2187	-0.0114	-2.85	0.2418	-0.0154	-3.33	OE
RCE973	*	0.2300	-0.0001	-0.03	0.2500	-0.0071	-1.55	OE
RG8DY8		0.2318	0.0017	0.43	0.2588	0.0016	0.35	AE
RPHPXQ		0.2250	-0.0051	-1.28	0.2547	-0.0025	-0.54	OE
RRP4N6		0.2300	-0.0002	-0.04	0.2559	-0.0013	-0.28	OE
RWGA4R		0.2400	0.0099	2.46	0.2600	0.0029	0.62	OE
RXB878		0.2277	-0.0025	-0.61	0.2550	-0.0021	-0.47	OE
TCNQLD	X	0.2533	0.0232	5.79	0.2917	0.0345	7.48	XX
TFN68H		0.2287	-0.0015	-0.36	0.2507	-0.0065	-1.40	OE
TGJPRW	*	0.2407	0.0105	2.63	0.2680	0.0109	2.35	XX
TMTVH2		0.2350	0.0049	1.22	0.2620	0.0049	1.05	OE
TUCW46		0.2270	-0.0031	-0.78	0.2547	-0.0025	-0.54	OE
UBTG83		0.2313	0.0012	0.30	0.2620	0.0049	1.05	OE
UBWYA8		0.2253	-0.0048	-1.20	0.2497	-0.0075	-1.62	OE
UGZ4Y7		0.2302	0.0001	0.02	0.2567	-0.0004	-0.09	OE
UTW87K		0.2250	-0.0051	-1.28	0.2513	-0.0058	-1.26	OE
UUM7JJ		0.2287	-0.0015	-0.36	0.2520	-0.0051	-1.12	OE
V8TJFB		0.2317	0.0015	0.38	0.2587	0.0015	0.33	OE
VABZ8U		0.2360	0.0059	1.47	0.2670	0.0099	2.13	GD
VDWKKB		0.2303	0.0002	0.05	0.2577	0.0005	0.11	OE
VJMUTN		0.2331	0.0030	0.74	0.2656	0.0085	1.84	OE
WGCC8X		0.2277	-0.0025	-0.61	0.2537	-0.0035	-0.75	OE
X2DPEA		0.2256	-0.0045	-1.13	0.2530	-0.0042	-0.91	OE
X3A8C6		0.2335	0.0033	0.83	0.2588	0.0017	0.36	IC
X7C7Q4		0.2323	0.0022	0.55	0.2640	0.0069	1.48	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 174

Carbon & Low Alloy Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
XE2RW3		0.2283	-0.0018	-0.45	0.2550	-0.0021	-0.47	DR
XR86VE		0.2267	-0.0035	-0.86	0.2510	-0.0061	-1.33	OE
YKPW8H		0.2363	0.0062	1.55	0.2643	0.0072	1.56	OE
ZCRJM9	X	0.2433	0.0132	3.30	0.2637	0.0065	1.41	GD
ZR43GU		0.2355	0.0053	1.33	0.2610	0.0039	0.84	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.2301	Percent	0.2571	Percent
<b>Std Dev Btwn Labs</b>	0.0040	Percent	0.0046	Percent

Samples L37, L38 : AISI 8740

Statistics based on 133 of 146 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	DR	Spectrometry - Direct Reading OE (DROES)
ED	X-Ray Fluorescence - Energy Dispersive (EDX)	GD	Spectrometry - Glow Discharge (GDS)
GR	Gravimetry	IC	Spectrometry - Inductively Coupled Plasma (ICP)
OE	Spectrometry - Optical Emission (OES)	WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)
XX	Please Indicate Method Used for Current Element		

### Comments on Assigned Data Flags for Test #174

- 29J3D4 (X) - Data for sample L37 are high. Inconsistent within the determinations of both samples.
- 349ZFE (X) - Data for both samples are low. Possible Systematic Error.
- JW4XXH (X) - Data for sample L37 are high.
- MD8J2F (X) - Data for sample L38 are high. Inconsistent within the determinations of sample L38.
- MYZMTL (X) - Data for both samples are high. Possible Systematic Error.
- NDWC8J (X) - Data for sample L37 are high.
- QYNHXY (X) - Data for both samples are low. Possible Systematic Error.
- R9V6JR (X) - Data for both samples are low. Possible Systematic Error.
- TCNQLD (X) - Data for both samples are high. Possible Systematic Error.
- ZCRJM9 (X) - Data for sample L37 are high.

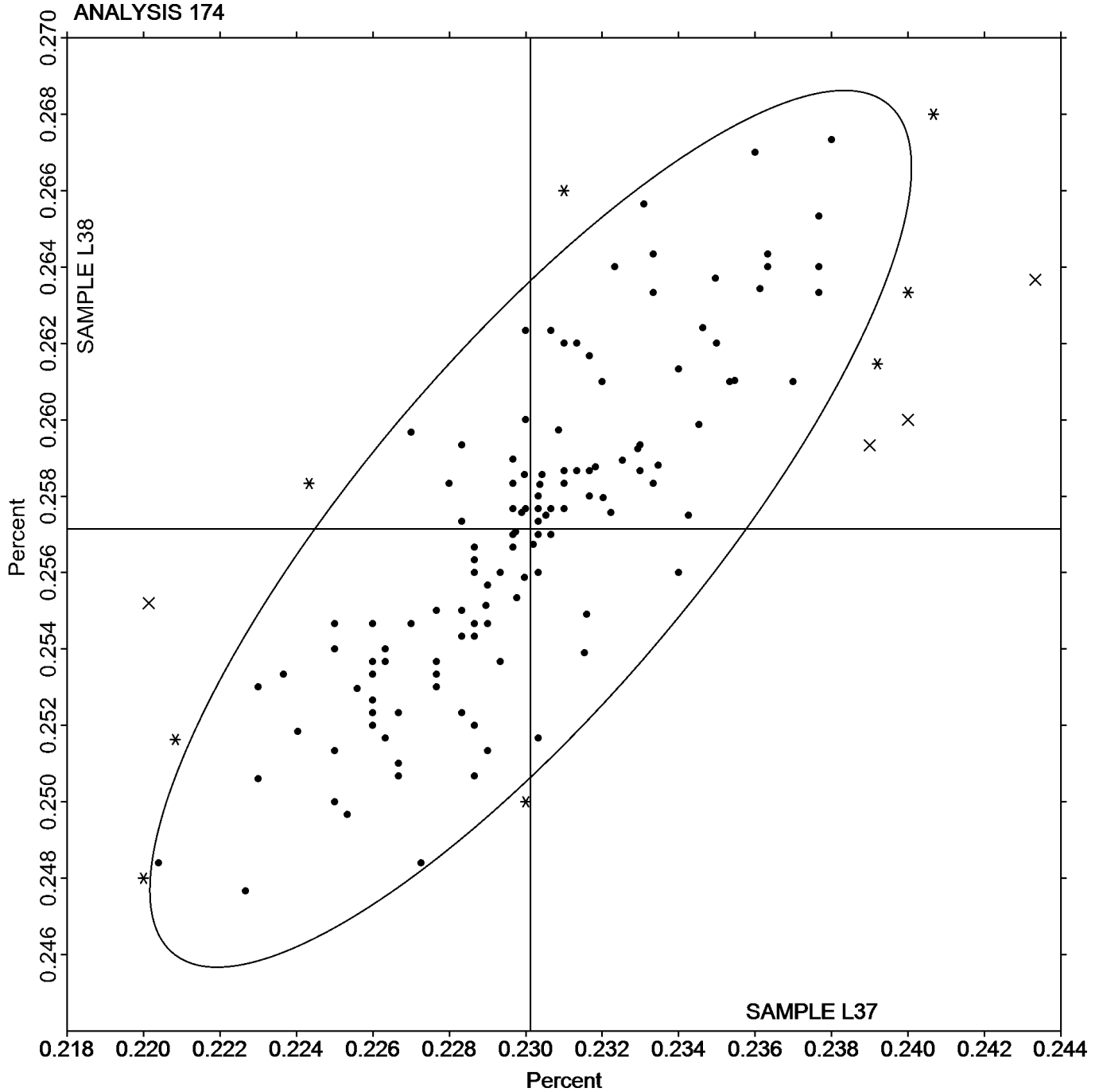


Analysis 174

Carbon & Low Alloy Steel, Element #5  
SILICON (Si)

SAMPLE L37  
0.2301 Percent

SAMPLE L38  
0.2571 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 175

Carbon & Low Alloy Steel, Element #6  
COPPER (Cu)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.2133	-0.0113	-2.21	0.1670	-0.0069	-1.95	OE
29J3D4		0.2257	0.0010	0.20	0.1737	-0.0002	-0.07	ED
2BR244		0.2307	0.0060	1.17	0.1763	0.0024	0.69	OE
2NYNC2		0.2270	0.0024	0.46	0.1740	0.0001	0.03	OE
349ZFE		0.2287	0.0040	0.78	0.1733	-0.0006	-0.16	OE
39EXHQ		0.2280	0.0033	0.65	0.1753	0.0014	0.40	OE
3KEG8Y		0.2330	0.0083	1.62	0.1783	0.0044	1.25	OE
3M4NRV		0.2263	0.0017	0.33	0.1787	0.0048	1.35	OE
3MLLY2	X	0.2057	-0.0190	-3.70	0.1587	-0.0152	-4.31	DR
3MWKUA		0.2249	0.0002	0.05	0.1710	-0.0029	-0.81	OE
3PJA8V		0.2121	-0.0126	-2.45	0.1786	0.0047	1.32	OE
3QYJ9A		0.2273	0.0027	0.52	0.1763	0.0024	0.69	OE
3TLZK3		0.2307	0.0060	1.17	0.1777	0.0038	1.06	OE
3UGJQA		0.2233	-0.0013	-0.26	0.1723	-0.0016	-0.44	DR
43LXZP		0.2263	0.0016	0.32	0.1737	-0.0002	-0.07	OE
49DHPQ		0.2197	-0.0050	-0.97	0.1670	-0.0069	-1.95	GD
49UCP2	X	0.2223	-0.0023	-0.45	0.1640	-0.0099	-2.80	OE
4AMCJ6		0.2303	0.0057	1.11	0.1753	0.0014	0.40	OE
4CCQZT		0.2280	0.0033	0.65	0.1743	0.0004	0.12	OE
4CTW9Q	*	0.2137	-0.0110	-2.14	0.1723	-0.0016	-0.44	OE
62CHUV		0.2270	0.0023	0.46	0.1743	0.0004	0.12	OE
6CRET8		0.2212	-0.0035	-0.68	0.1696	-0.0043	-1.22	OE
6EWUHX		0.2283	0.0037	0.72	0.1760	0.0021	0.59	IC
6K77EY		0.2217	-0.0030	-0.58	0.1747	0.0008	0.21	OE
6MAWPK	X	0.2600	0.0353	6.89	0.2000	0.0261	7.37	GD
6MBTTN		0.2273	0.0027	0.52	0.1730	-0.0009	-0.26	OE
6PVMQP		0.2214	-0.0033	-0.64	0.1703	-0.0036	-1.01	IC
6Y7ZVZ		0.2197	-0.0049	-0.96	0.1716	-0.0023	-0.64	OE
72MQBU		0.2233	-0.0013	-0.26	0.1723	-0.0016	-0.44	IC
768ECU		0.2260	0.0013	0.26	0.1760	0.0021	0.59	XX
7BEXJZ		0.2240	-0.0007	-0.13	0.1753	0.0014	0.40	GD
7ECGGR	*	0.2237	-0.0010	-0.19	0.1667	-0.0072	-2.05	OE
7FLTW9		0.2313	0.0067	1.30	0.1773	0.0034	0.97	OE
7PPVAT		0.2284	0.0038	0.74	0.1742	0.0003	0.08	OE
7PYDMY		0.2223	-0.0023	-0.45	0.1723	-0.0016	-0.44	OE
7ZF8W8		0.2312	0.0066	1.28	0.1816	0.0077	2.17	OE
8G23RU		0.2170	-0.0077	-1.49	0.1713	-0.0026	-0.73	IC
8ZM4EG		0.2280	0.0033	0.65	0.1780	0.0041	1.16	XX
93P9MV		0.2273	0.0027	0.52	0.1783	0.0044	1.25	OE
99GBV2		0.2150	-0.0097	-1.88	0.1683	-0.0056	-1.57	GD
9B4AQB		0.2283	0.0037	0.72	0.1717	-0.0022	-0.63	GD
9ELCTA		0.2200	-0.0047	-0.91	0.1700	-0.0039	-1.10	OE
9HMH9F		0.2239	-0.0007	-0.15	0.1731	-0.0008	-0.24	OE
AAP8EW		0.2277	0.0030	0.59	0.1763	0.0024	0.69	OE
AN9NM3		0.2253	0.0007	0.13	0.1770	0.0031	0.87	XX
AQTK7L	X	0.2067	-0.0180	-3.51	0.1790	0.0051	1.44	OE
AYQCEF		0.2240	-0.0007	-0.13	0.1750	0.0011	0.31	DR



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 175

Carbon & Low Alloy Steel, Element #6  
COPPER (Cu)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
B39PZ4		0.2230	-0.0017	-0.32	0.1737	-0.0002	-0.07	XX
B8B3CR		0.2294	0.0047	0.92	0.1764	0.0025	0.69	OE
BQT2LW		0.2233	-0.0013	-0.26	0.1763	0.0024	0.69	OE
BXC39Z		0.2267	0.0020	0.39	0.1740	0.0001	0.03	DR
C27G7A		0.2260	0.0013	0.26	0.1727	-0.0012	-0.35	OE
C4UVVK		0.2213	-0.0033	-0.65	0.1750	0.0011	0.31	OE
CBD6XM		0.2277	0.0031	0.60	0.1715	-0.0024	-0.67	XX
CMLYD7		0.2267	0.0020	0.39	0.1767	0.0028	0.78	DR
CN4XPH		0.2273	0.0027	0.52	0.1740	0.0001	0.03	IC
D4CGNL	X	0.2460	0.0213	4.16	0.1883	0.0144	4.08	OE
D6KDAQ		0.2256	0.0009	0.18	0.1726	-0.0013	-0.38	IC
DATWA4	*	0.2357	0.0110	2.15	0.1840	0.0101	2.85	OE
DCYA7K		0.2268	0.0021	0.41	0.1741	0.0002	0.05	OE
DDH4U2		0.2270	0.0023	0.46	0.1780	0.0041	1.16	OE
DGCCQV		0.2140	-0.0107	-2.08	0.1720	-0.0019	-0.54	OE
E3TUMJ		0.2343	0.0097	1.89	0.1777	0.0038	1.06	GD
EACZKQ		0.2143	-0.0103	-2.01	0.1670	-0.0069	-1.95	OE
EH7E2G	*	0.2167	-0.0080	-1.56	0.1647	-0.0092	-2.61	AE
EHNE7R		0.2253	0.0007	0.13	0.1740	0.0001	0.03	OE
EZN9VC		0.2307	0.0060	1.17	0.1793	0.0054	1.53	OE
FKNPVZ		0.2233	-0.0013	-0.26	0.1733	-0.0006	-0.16	OE
FNAG2B		0.2250	0.0003	0.06	0.1721	-0.0018	-0.50	OE
FTY3PP	X	0.2513	0.0267	5.20	0.1940	0.0201	5.68	OE
FZ4M3L		0.2149	-0.0097	-1.89	0.1667	-0.0072	-2.03	WD
GCCX2W		0.2257	0.0010	0.20	0.1753	0.0014	0.40	AE
GF9N2F		0.2266	0.0020	0.39	0.1717	-0.0022	-0.61	OE
GJQWDM		0.2243	-0.0004	-0.07	0.1764	0.0025	0.70	OE
GQA3CE		0.2246	-0.0001	-0.01	0.1754	0.0015	0.41	OE
HQ9JRN		0.2300	0.0053	1.04	0.1820	0.0081	2.29	OE
HXH3WF	*	0.2273	0.0027	0.52	0.1690	-0.0049	-1.39	OE
JRJQQB		0.2270	0.0023	0.46	0.1743	0.0004	0.12	OE
JW4XXH		0.2220	-0.0027	-0.52	0.1690	-0.0049	-1.39	OE
JWBX9J		0.2243	-0.0003	-0.06	0.1750	0.0011	0.31	AE
JX8BUQ		0.2266	0.0019	0.38	0.1733	-0.0006	-0.16	OE
KB3GWK		0.2207	-0.0040	-0.78	0.1733	-0.0006	-0.16	OE
KNA8W8		0.2233	-0.0013	-0.26	0.1747	0.0008	0.21	IC
KUHGCG		0.2203	-0.0043	-0.84	0.1700	-0.0039	-1.10	GD
LNPVPL		0.2220	-0.0027	-0.52	0.1713	-0.0026	-0.73	GD
LUTRGY		0.2227	-0.0020	-0.39	0.1707	-0.0032	-0.92	WD
LY8AUA		0.2240	-0.0007	-0.13	0.1653	-0.0086	-2.42	OE
MCUUWH		0.2273	0.0027	0.52	0.1750	0.0011	0.31	OE
MD8J2F		0.2200	-0.0047	-0.91	0.1700	-0.0039	-1.10	XX
MKLBN8		0.2257	0.0010	0.20	0.1743	0.0004	0.12	IC
MKLEU4		0.2237	-0.0010	-0.19	0.1745	0.0006	0.17	OE
MLCHMB		0.2240	-0.0007	-0.13	0.1747	0.0008	0.21	XX
MQBRZX		0.2254	0.0007	0.14	0.1739	0.0000	0.01	OE
MYZMTL	X	0.2236	-0.0010	-0.20	0.1988	0.0249	7.03	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 175

Carbon & Low Alloy Steel, Element #6  
COPPER (Cu)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MZCJZC		0.2268	0.0022	0.42	0.1751	0.0012	0.34	OE
N24WZA		0.2240	-0.0007	-0.13	0.1740	0.0001	0.03	OE
NCNZUN	X	0.1905	-0.0342	-6.66	0.1505	-0.0234	-6.61	OE
NDWC8J		0.2225	-0.0022	-0.43	0.1771	0.0032	0.91	OE
NHDH7E		0.2287	0.0040	0.78	0.1757	0.0018	0.50	IC
NJNN3F		0.2320	0.0073	1.43	0.1820	0.0081	2.29	OE
P4P288	*	0.2147	-0.0100	-1.95	0.1750	0.0011	0.31	OE
P9MDE6		0.2277	0.0030	0.58	0.1739	0.0000	-0.01	OE
PAECQH		0.2253	0.0007	0.13	0.1747	0.0008	0.21	IC
PBPG2L		0.2247	0.0000	0.00	0.1740	0.0001	0.03	IC
PGBFB7	X	0.2197	-0.0050	-0.97	0.1553	-0.0186	-5.25	OE
PMMETR		0.2283	0.0037	0.72	0.1737	-0.0002	-0.07	OE
PPP6AE		0.2245	-0.0001	-0.02	0.1756	0.0017	0.48	OE
Q46DW4		0.2240	-0.0007	-0.13	0.1730	-0.0009	-0.26	OE
QMXN96	*	0.2123	-0.0123	-2.40	0.1713	-0.0026	-0.73	OE
QNY6ZB		0.2361	0.0114	2.23	0.1774	0.0035	1.00	OE
QR9MTB		0.2232	-0.0015	-0.28	0.1775	0.0036	1.03	OE
QW3DD2		0.2267	0.0020	0.39	0.1700	-0.0039	-1.10	OE
QYNHKY	*	0.2103	-0.0143	-2.79	0.1650	-0.0089	-2.52	OE
QYRRMX		0.2252	0.0005	0.11	0.1741	0.0002	0.06	OE
R9V6JR		0.2213	-0.0034	-0.66	0.1687	-0.0052	-1.47	OE
RCE973		0.2267	0.0020	0.39	0.1700	-0.0039	-1.10	OE
RG8DY8		0.2259	0.0013	0.25	0.1742	0.0003	0.08	AE
RPHPXQ		0.2267	0.0020	0.39	0.1787	0.0048	1.35	OE
RRP4N6		0.2266	0.0019	0.38	0.1730	-0.0009	-0.26	OE
RWGA4R	*	0.2400	0.0153	2.99	0.1800	0.0061	1.72	OE
RXB878		0.2230	-0.0017	-0.32	0.1740	0.0001	0.03	OE
TCNQLD		0.2187	-0.0060	-1.17	0.1683	-0.0056	-1.57	XX
TFN68H		0.2213	-0.0033	-0.65	0.1710	-0.0029	-0.82	OE
TGJPRW		0.2180	-0.0067	-1.30	0.1757	0.0018	0.50	XX
TMTVH2		0.2203	-0.0043	-0.84	0.1827	0.0088	2.48	OE
TUCW46		0.2213	-0.0033	-0.65	0.1690	-0.0049	-1.39	OE
UBTG83	*	0.2130	-0.0117	-2.27	0.1713	-0.0026	-0.73	OE
UBWYA8		0.2237	-0.0010	-0.19	0.1717	-0.0022	-0.63	OE
UGZ4Y7		0.2216	-0.0031	-0.60	0.1708	-0.0031	-0.89	OE
UTW87K		0.2323	0.0077	1.50	0.1763	0.0024	0.69	OE
UUM7JJ		0.2297	0.0050	0.98	0.1793	0.0054	1.53	OE
V8TJFB		0.2283	0.0037	0.72	0.1750	0.0011	0.31	OE
VABZ8U		0.2330	0.0083	1.63	0.1800	0.0061	1.72	GD
VDWKKB		0.2267	0.0020	0.39	0.1740	0.0001	0.03	OE
VJMUTN		0.2184	-0.0062	-1.22	0.1700	-0.0039	-1.11	OE
WGCC8X		0.2280	0.0033	0.65	0.1757	0.0018	0.50	OE
X2DPEA		0.2242	-0.0004	-0.08	0.1748	0.0009	0.25	OE
X3A8C6		0.2305	0.0058	1.13	0.1758	0.0019	0.53	IC
X7C7Q4		0.2240	-0.0006	-0.12	0.1728	-0.0011	-0.31	OE
XE2RW3		0.2160	-0.0087	-1.69	0.1700	-0.0039	-1.10	DR
XR86VE		0.2210	-0.0037	-0.71	0.1727	-0.0012	-0.35	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 175

Carbon & Low Alloy Steel, Element #6  
COPPER (Cu)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YKPW8H	*	0.2317	0.0070	1.37	0.1827	0.0088	2.48	OE
ZCRJM9		0.2160	-0.0087	-1.69	0.1733	-0.0006	-0.16	GD
ZR43GU		0.2213	-0.0034	-0.66	0.1770	0.0031	0.88	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.2247	Percent	0.1739	Percent
<b>Stnd Dev Btwn Labs</b>	0.0051	Percent	0.0035	Percent

Samples L37, L38 : AISI 8740

Statistics based on 132 of 144 reporting participants

### Key to Method Codes Reported by Participants

<b>AE</b> Spectrometry - Atomic Emission (AES)	<b>DR</b> Spectrometry - Direct Reading OE (DROES)
<b>ED</b> X-Ray Fluorescence - Energy Dispersive (EDX)	<b>GD</b> Spectrometry - Glow Discharge (GDS)
<b>IC</b> Spectrometry - Inductively Coupled Plasma (ICP)	<b>OE</b> Spectrometry - Optical Emission (OES)
<b>WD</b> X-Ray Fluorescence - Wavelength Dispersive (WDX)	<b>XX</b> Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #175

- 3MLLY2 (X) - Data for both samples are low.
- 49UCP2 (X) - Data for sample L38 are low.
- 6MAWPK (X) - Data for both samples are high.
- AQTK7L (X) - Data for sample L37 are low.
- D4CGNL (X) - Data for both samples are high. Inconsistent within the determinations of sample L38.
- FTY3PP (X) - Data for both samples are high.
- MYZMTL (X) - Data for sample L38 are high.
- NCNZUN (X) - Data for both samples are low.
- PGBFB7 (X) - Data for sample L38 are low. Inconsistent within the determinations of sample L38.



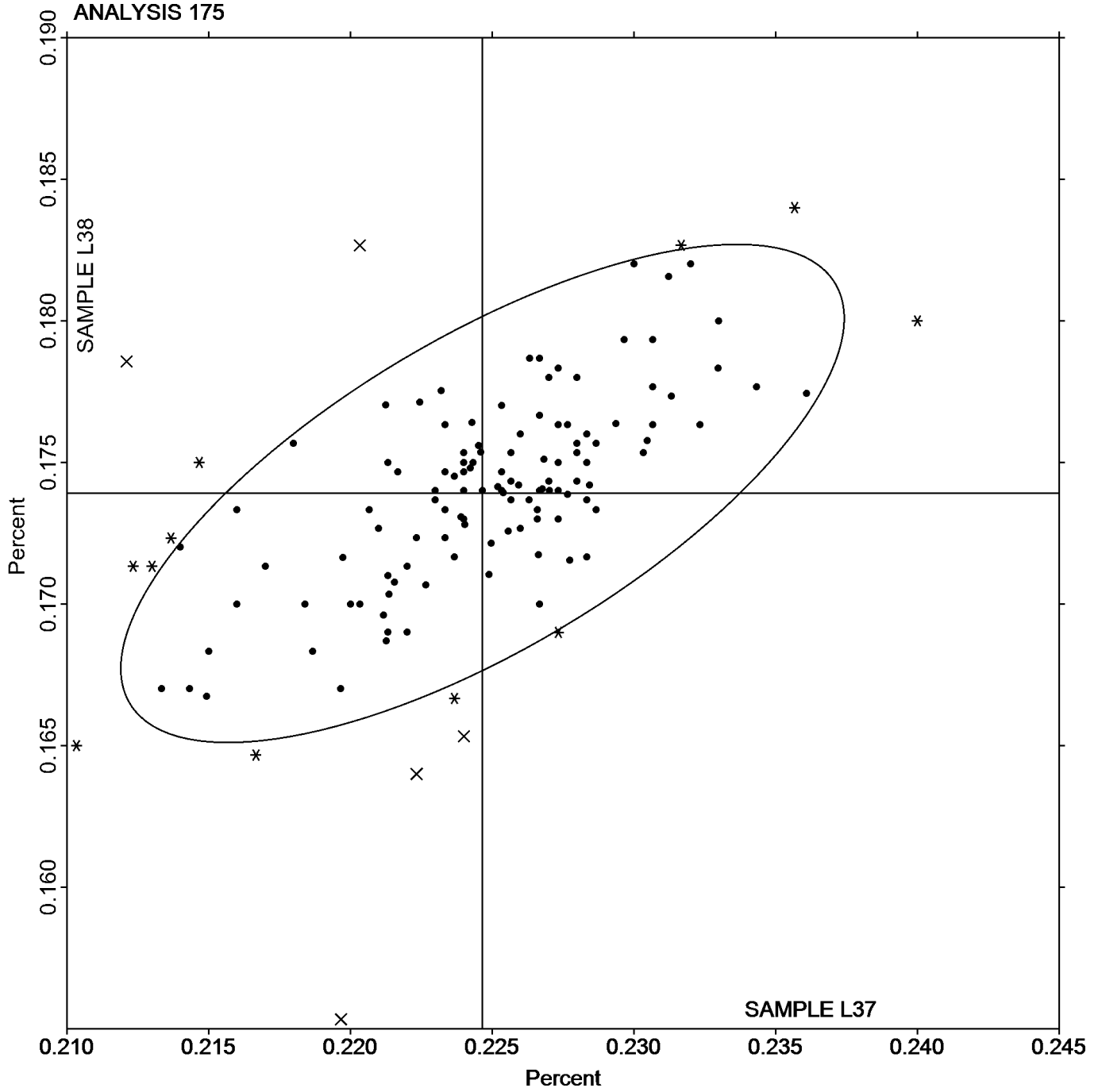


Analysis 175

Carbon & Low Alloy Steel, Element #6  
COPPER (Cu)

SAMPLE L37  
0.2247 Percent

SAMPLE L38  
0.1739 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 176

Carbon & Low Alloy Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7	X	0.0947	0.0070	2.93	0.1870	-0.0014	-0.35	OE
29J3D4		0.0860	-0.0017	-0.70	0.1847	-0.0038	-0.91	ED
2BR244		0.0850	-0.0027	-1.12	0.1843	-0.0041	-0.99	OE
2NYNC2		0.0873	-0.0003	-0.14	0.1898	0.0014	0.34	OE
349ZFE		0.0883	0.0007	0.28	0.1887	0.0002	0.06	OE
39EXHQ		0.0900	0.0023	0.98	0.1903	0.0019	0.46	OE
3KEG8Y		0.0921	0.0045	1.87	0.1957	0.0073	1.77	OE
3M4NRV		0.0890	0.0013	0.56	0.1923	0.0039	0.95	OE
3MLLY2	X	0.0887	0.0010	0.42	0.1747	-0.0138	-3.35	DR
3MWKUA		0.0893	0.0016	0.67	0.1884	0.0000	0.00	OE
3PJA8V		0.0893	0.0017	0.70	0.1848	-0.0037	-0.89	OE
3QYJ9A		0.0883	0.0007	0.28	0.1900	0.0016	0.38	OE
3T8WQB	X	0.0967	0.0090	3.77	0.1890	0.0006	0.14	OE
3TLZK3		0.0917	0.0040	1.68	0.1957	0.0072	1.76	OE
3UGJQA		0.0900	0.0023	0.98	0.1910	0.0026	0.63	DR
43LXZP		0.0888	0.0011	0.47	0.1907	0.0022	0.55	OE
49DHPQ		0.0867	-0.0010	-0.42	0.1890	0.0006	0.14	GD
49UCP2	X	0.0966	0.0089	3.75	0.1870	-0.0014	-0.35	OE
4AMCJ6		0.0893	0.0017	0.70	0.1867	-0.0018	-0.43	OE
4CCQZT	X	0.0930	0.0053	2.24	0.2027	0.0142	3.47	OE
4CTW9Q		0.0903	0.0027	1.12	0.1943	0.0059	1.44	OE
62CHUV		0.0880	0.0003	0.14	0.1863	-0.0021	-0.51	OE
6CRET8	X	0.0995	0.0118	4.96	0.1920	0.0036	0.87	OE
6EWUHX	X	0.0737	-0.0140	-5.88	0.1793	-0.0091	-2.21	IC
6K77EY		0.0853	-0.0023	-0.98	0.1820	-0.0064	-1.56	OE
6MAWPK	X	0.1100	0.0223	9.37	0.2300	0.0416	10.11	GD
6MBTTN		0.0900	0.0023	0.98	0.1907	0.0022	0.55	OE
6PVMQP		0.0885	0.0008	0.33	0.1904	0.0020	0.48	IC
6Y7ZVZ		0.0862	-0.0014	-0.60	0.1860	-0.0024	-0.59	OE
72MQBU		0.0873	-0.0003	-0.14	0.1877	-0.0008	-0.18	IC
768ECU		0.0867	-0.0010	-0.42	0.1917	0.0032	0.79	XX
7BEXJZ		0.0880	0.0003	0.14	0.1907	0.0022	0.55	GD
7ECGGR		0.0910	0.0033	1.40	0.1957	0.0072	1.76	OE
7FLTW9		0.0830	-0.0047	-1.96	0.1833	-0.0051	-1.24	OE
7PPVAT		0.0855	-0.0022	-0.93	0.1846	-0.0039	-0.94	OE
7PYDMY	*	0.0860	-0.0017	-0.70	0.1780	-0.0104	-2.54	OE
7ZF8W8		0.0872	-0.0005	-0.21	0.1869	-0.0016	-0.38	OE
8G23RU		0.0870	-0.0007	-0.28	0.1853	-0.0031	-0.75	IC
8ZM4EG		0.0885	0.0008	0.35	0.1930	0.0046	1.11	XX
93P9MV		0.0890	0.0013	0.56	0.1890	0.0006	0.14	OE
99GBV2		0.0863	-0.0013	-0.56	0.1850	-0.0034	-0.83	GD
9B4AQB		0.0880	0.0003	0.14	0.1913	0.0029	0.71	GD
9ELCTA	X	0.0800	-0.0077	-3.22	0.1900	0.0016	0.38	OE
9HMH9F		0.0888	0.0012	0.49	0.1886	0.0002	0.05	OE
AAP8EW		0.0827	-0.0050	-2.09	0.1793	-0.0091	-2.21	OE
AN9NM3	*	0.0847	-0.0030	-1.26	0.1917	0.0032	0.79	XX
AQTK7L	*	0.0880	0.0003	0.14	0.1980	0.0096	2.33	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 176

Carbon & Low Alloy Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
B39PZ4		0.0867	-0.0010	-0.42	0.1880	-0.0004	-0.10	IC
B8B3CR		0.0870	-0.0006	-0.27	0.1864	-0.0020	-0.48	OE
BQT2LW		0.0900	0.0023	0.98	0.1857	-0.0028	-0.67	OE
BXC39Z		0.0890	0.0013	0.56	0.1900	0.0016	0.38	DR
C27G7A		0.0863	-0.0014	-0.59	0.1842	-0.0042	-1.02	OE
C4UVVK		0.0850	-0.0027	-1.12	0.1877	-0.0008	-0.18	OE
CBD6XM		0.0850	-0.0027	-1.12	0.1823	-0.0061	-1.48	XX
CMLYD7	X	0.0813	-0.0063	-2.66	0.1733	-0.0151	-3.67	DR
CN4XPH		0.0893	0.0017	0.70	0.1897	0.0012	0.30	IC
D4CGNL	X	0.0812	-0.0064	-2.70	0.1710	-0.0174	-4.24	OE
D6KDAQ	*	0.0868	-0.0009	-0.37	0.1955	0.0070	1.71	IC
DATWA4	X	0.0940	0.0063	2.65	0.2087	0.0202	4.92	OE
DCYA7K		0.0863	-0.0014	-0.59	0.1840	-0.0045	-1.08	OE
DDH4U2		0.0860	-0.0017	-0.70	0.1920	0.0036	0.87	OE
DGCCQV	X	0.0794	-0.0083	-3.49	0.1853	-0.0031	-0.75	OE
E3TUMJ		0.0880	0.0003	0.14	0.1953	0.0069	1.68	GD
EACZKQ		0.0857	-0.0020	-0.84	0.1837	-0.0048	-1.16	OE
EH7E2G		0.0893	0.0017	0.70	0.1917	0.0032	0.79	AE
EHNE7R		0.0870	-0.0007	-0.28	0.1880	-0.0004	-0.10	OE
EZN9VC		0.0893	0.0017	0.70	0.1860	-0.0024	-0.59	OE
FKNPVZ		0.0872	-0.0005	-0.20	0.1860	-0.0024	-0.59	OE
FNAG2B		0.0885	0.0008	0.33	0.1887	0.0002	0.06	OE
FTY3PP	*	0.0910	0.0033	1.40	0.1843	-0.0041	-0.99	OE
FZ4M3L		0.0875	-0.0002	-0.09	0.1870	-0.0014	-0.35	WD
GCCX2W		0.0867	-0.0010	-0.42	0.1880	-0.0004	-0.10	AE
GF9N2F		0.0871	-0.0005	-0.23	0.1869	-0.0016	-0.38	OE
GJQWDM		0.0859	-0.0018	-0.74	0.1856	-0.0028	-0.69	OE
GQA3CE		0.0865	-0.0012	-0.51	0.1883	-0.0001	-0.02	OE
HQ9JRN		0.0877	0.0000	0.00	0.1893	0.0009	0.22	OE
HXH3WF		0.0855	-0.0022	-0.91	0.1863	-0.0021	-0.51	OE
JRJQQB		0.0899	0.0022	0.93	0.1897	0.0012	0.30	OE
JW4XXH	*	0.0807	-0.0070	-2.94	0.1783	-0.0101	-2.45	OE
JWBX9J		0.0880	0.0003	0.14	0.1883	-0.0001	-0.02	AE
JX8BUQ		0.0889	0.0012	0.51	0.1892	0.0008	0.19	OE
KB3GWK		0.0870	-0.0007	-0.28	0.1807	-0.0078	-1.89	OE
KNA8W8		0.0857	-0.0020	-0.84	0.1893	0.0009	0.22	IC
KUHGCG		0.0913	0.0037	1.54	0.1930	0.0046	1.11	GD
LNPVPL		0.0857	-0.0020	-0.84	0.1897	0.0012	0.30	GD
LPKHDC	X	0.1060	0.0183	7.69	0.1950	0.0066	1.60	OE
LUTRGY		0.0893	0.0017	0.70	0.1883	-0.0001	-0.02	WD
LY8AUA		0.0917	0.0040	1.68	0.1947	0.0062	1.52	OE
MCUUWH		0.0887	0.0010	0.42	0.1900	0.0016	0.38	OE
MD8J2F		0.0867	-0.0010	-0.42	0.1900	0.0016	0.38	XX
MKLBN8		0.0890	0.0013	0.56	0.1903	0.0019	0.46	IC
MKLEU4	X	0.0933	0.0057	2.38	0.1769	-0.0115	-2.80	OE
MLCHMB		0.0867	-0.0010	-0.42	0.1870	-0.0014	-0.35	XX
MQBRZX		0.0878	0.0001	0.04	0.1888	0.0003	0.08	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 176

Carbon & Low Alloy Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MYZMTL	*	0.0937	0.0060	2.53	0.1942	0.0058	1.41	OE
MZCJZC		0.0856	-0.0020	-0.86	0.1867	-0.0017	-0.41	OE
N24WZA		0.0890	0.0013	0.56	0.1870	-0.0014	-0.35	OE
NCNZUN	*	0.0947	0.0070	2.95	0.1958	0.0074	1.79	OE
NDWC8J		0.0820	-0.0057	-2.40	0.1804	-0.0080	-1.95	OE
NHDH7E	X	0.0937	0.0060	2.51	0.2030	0.0146	3.55	IC
NJNN3F		0.0887	0.0010	0.42	0.1890	0.0006	0.14	OE
P4P288	X	0.0987	0.0110	4.61	0.1763	-0.0121	-2.94	OE
P97CFA		0.0883	0.0007	0.28	0.1900	0.0016	0.38	OE
P9MDE6		0.0864	-0.0012	-0.52	0.1875	-0.0010	-0.24	OE
PAECQH		0.0867	-0.0010	-0.42	0.1920	0.0036	0.87	IC
PBPG2L		0.0863	-0.0013	-0.56	0.1860	-0.0024	-0.59	IC
PGBFB7	X	0.0832	-0.0044	-1.86	0.1697	-0.0188	-4.56	OE
PMMETR		0.0877	0.0000	0.00	0.1887	0.0002	0.06	OE
PPP6AE		0.0920	0.0043	1.82	0.1944	0.0060	1.45	OE
Q46DW4		0.0847	-0.0030	-1.26	0.1843	-0.0041	-0.99	OE
QMXN96		0.0890	0.0013	0.56	0.1947	0.0062	1.52	OE
QNY6ZB		0.0890	0.0013	0.56	0.1903	0.0019	0.46	OE
QR9MTB		0.0890	0.0013	0.56	0.1957	0.0072	1.76	OE
QW3DD2	X	0.0717	-0.0160	-6.72	0.1700	-0.0184	-4.48	OE
QYNHKY	*	0.0881	0.0004	0.17	0.1973	0.0089	2.17	OE
QYRRMX		0.0887	0.0010	0.43	0.1895	0.0010	0.25	OE
R9V6JR		0.0865	-0.0012	-0.49	0.1857	-0.0028	-0.67	OE
RCE973		0.0850	-0.0027	-1.12	0.1900	0.0016	0.38	OE
RG8DY8		0.0861	-0.0016	-0.67	0.1864	-0.0020	-0.48	AE
RPHPXQ		0.0847	-0.0030	-1.26	0.1860	-0.0024	-0.59	OE
RRP4N6		0.0874	-0.0003	-0.13	0.1872	-0.0012	-0.29	OE
RWGA4R		0.0900	0.0023	0.98	0.1900	0.0016	0.38	OE
RXB878		0.0856	-0.0021	-0.87	0.1830	-0.0054	-1.32	OE
TCNQLD		0.0880	0.0003	0.14	0.1870	-0.0014	-0.35	XX
TFN68H		0.0873	-0.0003	-0.14	0.1837	-0.0048	-1.16	OE
TGJPRW		0.0835	-0.0042	-1.77	0.1790	-0.0094	-2.29	XX
TMTVH2		0.0940	0.0063	2.65	0.1873	-0.0011	-0.27	OE
TUCW46		0.0870	-0.0007	-0.28	0.1867	-0.0018	-0.43	OE
UBTG83		0.0887	0.0010	0.42	0.1943	0.0059	1.44	OE
UBWYA8		0.0890	0.0013	0.56	0.1880	-0.0004	-0.10	OE
UGZ4Y7		0.0893	0.0016	0.67	0.1850	-0.0035	-0.84	OE
UTW87K		0.0903	0.0027	1.12	0.1917	0.0032	0.79	OE
UUM7JJ		0.0913	0.0037	1.54	0.1893	0.0009	0.22	OE
V8TJFB		0.0900	0.0023	0.98	0.1907	0.0022	0.55	OE
VABZ8U	*	0.0820	-0.0057	-2.38	0.1780	-0.0104	-2.54	GD
VDWKKB		0.0880	0.0003	0.14	0.1903	0.0019	0.46	OE
VJMUTN		0.0866	-0.0011	-0.46	0.1901	0.0017	0.42	OE
WGCC8X		0.0837	-0.0040	-1.68	0.1847	-0.0038	-0.91	OE
X2DPEA		0.0857	-0.0020	-0.84	0.1887	0.0003	0.08	OE
X3A8C6		0.0888	0.0011	0.46	0.1908	0.0024	0.59	IC
X7C7Q4		0.0910	0.0033	1.40	0.1913	0.0029	0.71	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 176

Carbon & Low Alloy Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
XE2RW3		0.0827	-0.0050	-2.10	0.1820	-0.0064	-1.56	DR
XR86VE		0.0877	0.0000	0.00	0.1887	0.0002	0.06	OE
YKPW8H		0.0867	-0.0010	-0.42	0.1910	0.0026	0.63	OE
ZCRJM9	X	0.0727	-0.0150	-6.30	0.1817	-0.0068	-1.64	GD
ZR43GU	*	0.0931	0.0054	2.26	0.1906	0.0022	0.54	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.0877	Percent	0.1884	Percent
<b>Std Dev Btwn Labs</b>	0.0024	Percent	0.0041	Percent

Samples L37, L38 : AISI 8740

Statistics based on 125 of 146 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	DR	Spectrometry - Direct Reading OE (DROES)
ED	X-Ray Fluorescence - Energy Dispersive (EDX)	GD	Spectrometry - Glow Discharge (GDS)
IC	Spectrometry - Inductively Coupled Plasma (ICP)	OE	Spectrometry - Optical Emission (OES)
WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)	XX	Please Indicate Method Used for Current Element



**Analysis 176**

**Carbon & Low Alloy Steel, Element #7**  
**NICKEL (Ni)**

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**Comments on Assigned Data Flags for Test #176**

- 27GUH7 (X) - Data for sample L37 are high.
- 3MLLY2 (X) - Data for sample L38 are low.
- 3T8WQB (X) - Data for sample L37 are high.
- 49UCP2 (X) - Data for sample L37 are high.
- 4CCQZT (X) - Data for sample L38 are high.
- 6CRET8 (X) - Data for sample L37 are high. Inconsistent within the determinations of sample L37.
- 6EWUHX (X) - Data for sample L37 are low.
- 6MAWPK (X) - Data for both samples are high.
- 9ELCTA (X) - Data for sample L37 are low.
- CMLYD7 (X) - Data for sample L38 are low. Inconsistent within the determinations of sample L38.
- D4CGNL (X) - Data for sample L38 are low.
- DATWA4 (X) - Data for sample L38 are high.
- DGCCQV (X) - Data for sample L37 are low.
- LPKHDC (X) - Data for sample L37 are high.
- MKLEU4 (X) - Data for sample L38 are low.
- NHDH7E (X) - Data for sample L38 are high.
- P4P288 (X) - Data for sample L37 are high and data for sample L38 are low.
- PGBFB7 (X) - Data for sample L38 are low.
- QW3DD2 (X) - Data for both samples are low.
- ZCRJM9 (X) - Data for sample L37 are low.

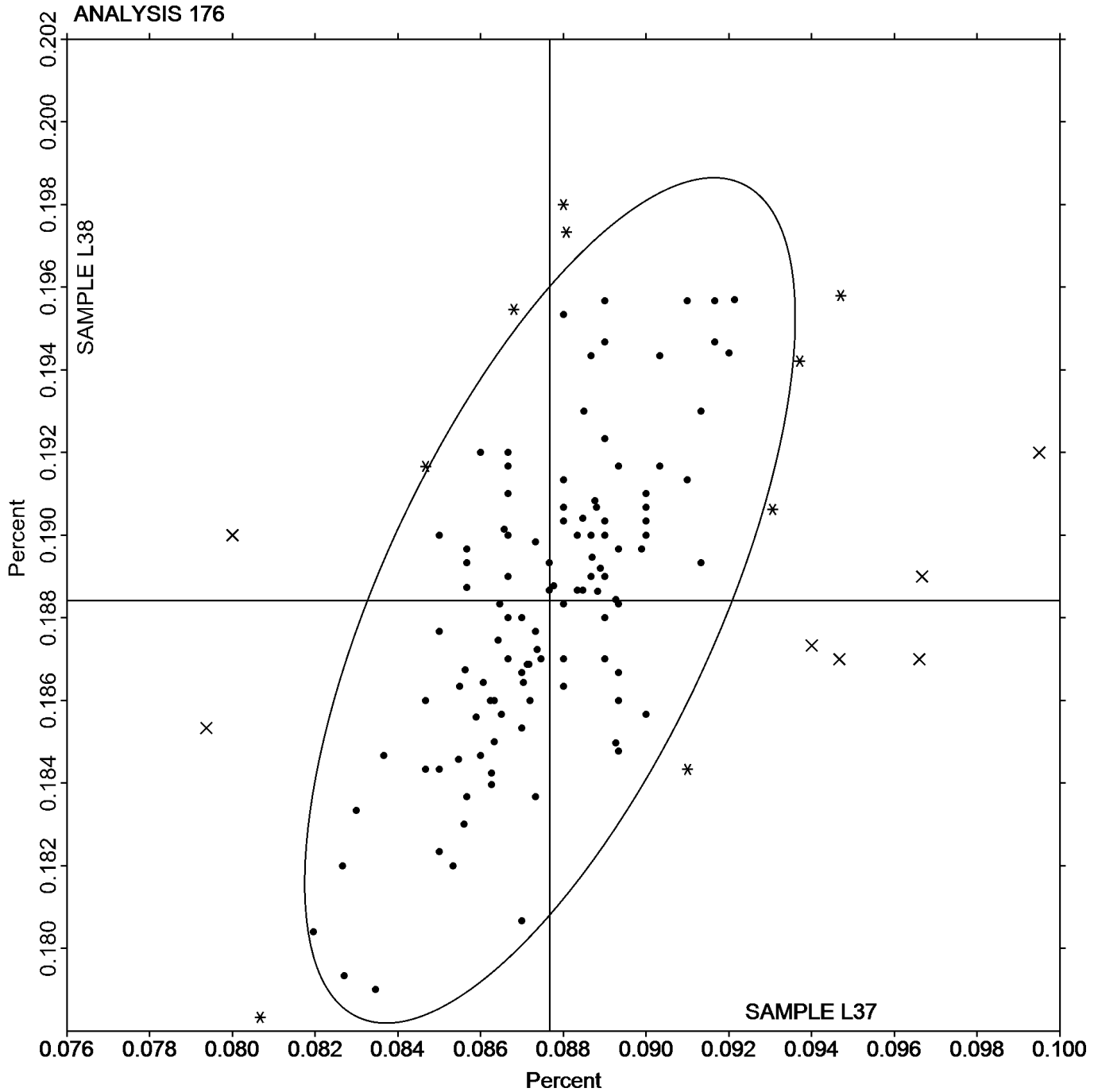


Analysis 176

Carbon & Low Alloy Steel, Element #7  
NICKEL (Ni)

SAMPLE L37  
0.0877 Percent

SAMPLE L38  
0.1884 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 177

Carbon & Low Alloy Steel, Element #8  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7	X	0.8337	-0.0355	-3.39	0.9337	-0.0463	-3.41	OE
29J3D4		0.8757	0.0065	0.62	0.9750	-0.0049	-0.36	ED
2BR244		0.8703	0.0012	0.11	0.9757	-0.0043	-0.32	OE
2NYNC2		0.8640	-0.0052	-0.50	0.9757	-0.0043	-0.32	OE
349ZFE		0.8697	0.0005	0.05	0.9697	-0.0103	-0.76	OE
39EXHQ		0.8660	-0.0032	-0.30	0.9723	-0.0076	-0.56	OE
3KEG8Y		0.8691	0.0000	0.00	0.9813	0.0013	0.10	OE
3M4NRV		0.8500	-0.0192	-1.83	0.9577	-0.0223	-1.64	OE
3MLLY2		0.8793	0.0102	0.97	0.9920	0.0121	0.89	DR
3MWKUA		0.8690	-0.0002	-0.02	0.9779	-0.0020	-0.15	OE
3PJA8V		0.8827	0.0135	1.29	1.001	0.0210	1.55	OE
3QYJ9A		0.8530	-0.0162	-1.54	0.9690	-0.0109	-0.81	OE
3T8WQB		0.8700	0.0008	0.08	0.9900	0.0101	0.74	OE
3TLZK3		0.8707	0.0015	0.14	0.9807	0.0007	0.05	OE
3UGJQA		0.8640	-0.0052	-0.49	0.9763	-0.0036	-0.27	DR
43LXZP		0.8604	-0.0087	-0.83	0.9563	-0.0236	-1.74	OE
49DHPQ	X	0.9227	0.0535	5.10	0.9687	-0.0113	-0.83	GD
49UCP2	*	0.8537	-0.0155	-1.48	0.9853	0.0054	0.40	OE
4AMCJ6		0.8700	0.0008	0.08	0.9793	-0.0006	-0.04	OE
4CCQZT		0.8720	0.0028	0.27	0.9900	0.0101	0.74	OE
4CTW9Q	X	0.8710	0.0018	0.17	1.018	0.0381	2.81	OE
62CHUV		0.8703	0.0012	0.11	0.9743	-0.0056	-0.41	OE
6CRET8		0.8702	0.0010	0.10	0.9817	0.0018	0.13	OE
6EWUHX		0.8700	0.0008	0.08	0.9683	-0.0116	-0.86	IC
6K77EY		0.8753	0.0062	0.59	0.9920	0.0121	0.89	OE
6MAWPK	X	0.9300	0.0608	5.80	1.043	0.0634	4.68	GD
6MBTTN		0.8490	-0.0202	-1.92	0.9623	-0.0176	-1.30	OE
6PVMQP		0.8843	0.0152	1.45	0.9927	0.0128	0.94	IC
6Y7ZVZ		0.8836	0.0144	1.38	1.003	0.0231	1.70	OE
72MQBU		0.8693	0.0002	0.02	0.9807	0.0007	0.05	IC
768ECU		0.8760	0.0068	0.65	0.9923	0.0124	0.91	XX
7BEXJZ		0.8790	0.0098	0.94	0.9950	0.0151	1.11	GD
7ECGGR	*	0.8633	-0.0058	-0.56	0.9933	0.0134	0.99	OE
7FLTW9		0.8487	-0.0205	-1.96	0.9577	-0.0223	-1.64	OE
7PPVAT		0.8609	-0.0082	-0.79	0.9687	-0.0112	-0.83	OE
7PYDMY		0.8837	0.0145	1.38	0.9893	0.0094	0.69	OE
7ZF8W8		0.8725	0.0033	0.31	0.9878	0.0079	0.58	OE
8G23RU		0.8637	-0.0055	-0.52	0.9837	0.0037	0.28	IC
8ZM4EG		0.8780	0.0088	0.84	1.000	0.0201	1.48	XX
93P9MV		0.8550	-0.0142	-1.35	0.9713	-0.0086	-0.63	OE
99GBV2	X	0.9167	0.0475	4.53	1.030	0.0497	3.67	GD
9B4AQB		0.8800	0.0108	1.03	0.9747	-0.0053	-0.39	GD
9ELCTA		0.8667	-0.0025	-0.24	0.9900	0.0101	0.74	OE
9HMH9F		0.8696	0.0004	0.04	0.9800	0.0001	0.01	OE
AAP8EW		0.8820	0.0128	1.22	1.002	0.0217	1.60	OE
AN9NM3		0.8683	-0.0008	-0.08	0.9853	0.0054	0.40	XX
AQTK7L		0.8797	0.0105	1.00	1.007	0.0271	2.00	OE





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 177

Carbon & Low Alloy Steel, Element #8  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
AYQCEF		0.8783	0.0092	0.87	0.9877	0.0077	0.57	DR
B39PZ4		0.8687	-0.0005	-0.05	0.9753	-0.0046	-0.34	IC
B79TVW		0.8713	0.0022	0.21	0.9990	0.0191	1.41	ED
B8B3CR		0.8763	0.0071	0.68	0.9868	0.0069	0.51	OE
BQT2LW		0.8643	-0.0048	-0.46	0.9587	-0.0213	-1.57	OE
BXC39Z		0.8670	-0.0022	-0.21	0.9797	-0.0003	-0.02	DR
C27G7A		0.8807	0.0115	1.10	1.000	0.0201	1.48	OE
C4UVVK		0.8673	-0.0018	-0.18	0.9707	-0.0093	-0.68	OE
CBD6XM	X	0.8193	-0.0498	-4.75	0.9280	-0.0519	-3.83	XX
CMLYD7		0.8667	-0.0025	-0.24	0.9733	-0.0066	-0.49	DR
CN4XPH		0.8573	-0.0118	-1.13	0.9687	-0.0113	-0.83	IC
D4CGNL		0.8733	0.0042	0.40	0.9833	0.0034	0.25	OE
D6KDAQ		0.8620	-0.0071	-0.68	0.9670	-0.0130	-0.96	IC
DATWA4		0.8737	0.0045	0.43	0.9903	0.0104	0.77	OE
DCYA7K		0.8586	-0.0106	-1.01	0.9722	-0.0078	-0.57	OE
DDH4U2		0.8663	-0.0028	-0.27	0.9820	0.0021	0.15	OE
DGCCQV		0.8627	-0.0065	-0.62	0.9803	0.0004	0.03	OE
E3TUMJ	X	0.9310	0.0618	5.90	1.037	0.0567	4.19	GD
EACZKQ		0.8710	0.0018	0.17	0.9843	0.0044	0.32	OE
EH7E2G		0.8503	-0.0188	-1.80	0.9687	-0.0113	-0.83	AE
EHNE7R		0.8683	-0.0008	-0.08	0.9830	0.0031	0.23	OE
EZN9VC		0.8640	-0.0052	-0.49	0.9647	-0.0153	-1.13	OE
FKNPVZ		0.8693	0.0002	0.02	0.9790	-0.0009	-0.07	OE
FNAG2B		0.8724	0.0032	0.31	0.9790	-0.0009	-0.07	OE
FTY3PP		0.8610	-0.0082	-0.78	0.9583	-0.0216	-1.59	OE
FZ4M3L		0.8679	-0.0012	-0.12	0.9682	-0.0117	-0.86	WD
GCCX2W		0.8693	0.0002	0.02	0.9780	-0.0019	-0.14	AE
GF9N2F		0.8774	0.0082	0.78	0.9950	0.0151	1.11	OE
GJQWDM		0.8579	-0.0112	-1.07	0.9623	-0.0177	-1.30	OE
GQA3CE		0.8649	-0.0043	-0.41	0.9802	0.0003	0.02	OE
HQ9JRN		0.8463	-0.0228	-2.18	0.9537	-0.0263	-1.94	OE
HXH3WF		0.8697	0.0005	0.05	0.9970	0.0171	1.26	OE
JRJQQB		0.8653	-0.0038	-0.37	0.9687	-0.0113	-0.83	OE
JW4XXH	*	0.8473	-0.0218	-2.08	0.9447	-0.0353	-2.60	OE
JWBX9J		0.8693	0.0002	0.02	0.9777	-0.0023	-0.17	AE
JX8BUQ	*	0.8502	-0.0190	-1.81	0.9754	-0.0045	-0.33	OE
KB3GWK		0.8707	0.0015	0.14	0.9663	-0.0136	-1.00	OE
KNA8W8		0.8760	0.0068	0.65	0.9783	-0.0016	-0.12	IC
KUHGCG		0.8660	-0.0032	-0.30	0.9610	-0.0189	-1.40	GD
LNPVPL	X	0.8590	-0.0102	-0.97	0.9940	0.0141	1.04	GD
LPKHDC		0.8933	0.0242	2.30	1.000	0.0201	1.48	OE
LUTRGY	*	0.8710	0.0018	0.17	0.9587	-0.0213	-1.57	WD
LY8AUA	X	0.9050	0.0358	3.42	1.018	0.0377	2.78	OE
MCUUWH		0.8643	-0.0048	-0.46	0.9693	-0.0106	-0.78	OE
MD8J2F		0.8600	-0.0092	-0.87	0.9700	-0.0099	-0.73	XX
MKLBN8		0.8740	0.0048	0.46	0.9800	0.0001	0.00	IC
MKLEU4		0.8855	0.0163	1.56	0.9999	0.0200	1.48	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 177

Carbon & Low Alloy Steel, Element #8  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MLCHMB		0.8757	0.0065	0.62	0.9877	0.0077	0.57	XX
MQBRZX		0.8676	-0.0015	-0.15	0.9783	-0.0017	-0.12	OE
MYZMTL	X	0.9090	0.0399	3.80	1.023	0.0430	3.18	OE
MZCJZC		0.8780	0.0088	0.84	0.9911	0.0112	0.83	OE
N24WZA		0.8780	0.0088	0.84	0.9800	0.0001	0.00	OE
NCNZUN		0.8637	-0.0055	-0.52	0.9775	-0.0025	-0.18	OE
NDWC8J		0.8831	0.0140	1.33	0.9981	0.0182	1.34	OE
NHDH7E	X	0.9027	0.0335	3.19	1.010	0.0304	2.24	IC
NJNN3F		0.8603	-0.0088	-0.84	0.9743	-0.0056	-0.41	OE
P4P288		0.8767	0.0075	0.71	0.9900	0.0101	0.74	OE
P97CFA		0.8867	0.0175	1.67	1.000	0.0201	1.48	OE
P9MDE6	X	0.8687	-0.0005	-0.05	0.9444	-0.0355	-2.62	OE
PAECQH		0.8730	0.0038	0.37	0.9800	0.0001	0.00	IC
PBPG2L		0.8660	-0.0032	-0.30	0.9697	-0.0103	-0.76	IC
PGBFB7		0.8510	-0.0182	-1.73	0.9633	-0.0166	-1.23	OE
PMMETR		0.8730	0.0038	0.37	0.9857	0.0057	0.42	OE
PPP6AE	*	0.8940	0.0249	2.37	1.016	0.0361	2.67	OE
Q46DW4		0.8810	0.0118	1.13	0.9917	0.0117	0.87	OE
QMXN96	X	0.8730	0.0038	0.37	1.019	0.0387	2.86	OE
QNY6ZB		0.8590	-0.0102	-0.97	0.9637	-0.0163	-1.20	OE
QR9MTB	*	0.8400	-0.0292	-2.78	0.9493	-0.0306	-2.26	OE
QW3DD2	X	0.8033	-0.0658	-6.28	0.9133	-0.0666	-4.92	OE
QYNHKY		0.8867	0.0175	1.67	1.001	0.0211	1.55	OE
QYRRMX		0.8671	-0.0021	-0.20	0.9773	-0.0026	-0.19	OE
R9V6JR		0.8532	-0.0160	-1.53	0.9522	-0.0278	-2.05	OE
RCE973		0.8700	0.0008	0.08	0.9667	-0.0133	-0.98	OE
RG8DY8		0.8617	-0.0075	-0.72	0.9783	-0.0016	-0.12	AE
RPHPXQ		0.8633	-0.0058	-0.56	0.9760	-0.0039	-0.29	OE
RRP4N6		0.8659	-0.0033	-0.31	0.9722	-0.0078	-0.57	OE
RWGA4R	X	0.8853	0.0162	1.54	0.9633	-0.0166	-1.23	OE
RXB878		0.8820	0.0128	1.22	0.9890	0.0091	0.67	OE
TCNQLD		0.8700	0.0008	0.08	0.9953	0.0154	1.14	XX
TFN68H		0.8853	0.0162	1.54	0.9977	0.0177	1.31	OE
TGJPRW		0.8790	0.0098	0.94	0.9840	0.0041	0.30	XX
TMTVH2		0.8600	-0.0092	-0.87	0.9833	0.0034	0.25	OE
TUCW46		0.8697	0.0005	0.05	0.9830	0.0031	0.23	OE
UBTG83	X	0.8773	0.0082	0.78	1.021	0.0407	3.01	OE
UBWYA8		0.8680	-0.0012	-0.11	0.9817	0.0017	0.13	OE
UGZ4Y7		0.8654	-0.0037	-0.36	0.9829	0.0030	0.22	OE
UTW87K		0.8667	-0.0025	-0.24	0.9773	-0.0026	-0.19	OE
UUM7JJ	*	0.9000	0.0308	2.94	1.013	0.0334	2.46	OE
V8TJFB		0.8713	0.0022	0.21	0.9773	-0.0026	-0.19	OE
VABZ8U	X	0.9240	0.0548	5.23	1.041	0.0611	4.51	GD
VDWKKB		0.8673	-0.0018	-0.18	0.9783	-0.0016	-0.12	OE
VJMUTN	X	0.8172	-0.0520	-4.96	0.9479	-0.0320	-2.36	OE
WGCC8X		0.8677	-0.0015	-0.14	0.9797	-0.0003	-0.02	OE
X2DPEA		0.8788	0.0096	0.92	0.9917	0.0118	0.87	OE



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 115**  
**3rd Qtr 2016**

**Analysis 177**

**Carbon & Low Alloy Steel, Element #8**  
**CHROMIUM (Cr)**

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
X3A8C6		0.8658	-0.0034	-0.32	0.9723	-0.0076	-0.56	IC
X7C7Q4		0.8753	0.0062	0.59	0.9907	0.0107	0.79	OE
XE2RW3		0.8517	-0.0175	-1.67	0.9733	-0.0066	-0.49	DR
XR86VE		0.8860	0.0168	1.60	0.9860	0.0061	0.45	OE
YKPW8H		0.8617	-0.0075	-0.72	0.9667	-0.0133	-0.98	OE
ZCRJM9		0.8530	-0.0162	-1.54	0.9537	-0.0263	-1.94	GD
ZR43GU		0.8866	0.0175	1.67	0.9999	0.0199	1.47	XX

**Summary Statistics**

	Sample L37		Sample L38	
<b>Grand Means</b>	0.8692	Percent	0.9799	Percent
<b>Stnd Dev Btwn Labs</b>	0.0105	Percent	0.0136	Percent

Samples L37, L38 : AISI 8740

Statistics based on 130 of 148 reporting participants

**Key to Method Codes Reported by Participants**

<b>AE</b>	Spectrometry - Atomic Emission (AES)	<b>DR</b>	Spectrometry - Direct Reading OE (DROES)
<b>ED</b>	X-Ray Fluorescence - Energy Dispersive (EDX)	<b>GD</b>	Spectrometry - Glow Discharge (GDS)
<b>IC</b>	Spectrometry - Inductively Coupled Plasma (ICP)	<b>OE</b>	Spectrometry - Optical Emission (OES)
<b>WD</b>	X-Ray Fluorescence - Wavelength Dispersive (WDX)	<b>XX</b>	Please Indicate Method Used for Current Element



**Analysis 177**

**Carbon & Low Alloy Steel, Element #8**  
**CHROMIUM (Cr)**

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**Comments on Assigned Data Flags for Test #177**

- 27GUH7 (X) - Data for both samples are low.
- 49DHPQ (X) - Data for sample L37 are high. Inconsistent within the determinations of sample L38.
- 4CTW9Q (X) - Data for sample L38 are high.
- 6MAWPK (X) - Data for both samples are high.
- 99GBV2 (X) - Data for both samples are high.
- CBD6XM (X) - Data for both samples are low.
- E3TUMJ (X) - Data for both samples are high.
- LNPVPL (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- LY8AUA (X) - Data for both samples are high.
- MYZMTL (X) - Data for both samples are high. Inconsistent within the determinations of sample L37.
- NHDH7E (X) - Data for sample L37 are high.
- P9MDE6 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L37.
- QMXN96 (X) - Data for sample L38 are high.
- QW3DD2 (X) - Data for both samples are low.
- RWGA4R (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L38.
- UBTG83 (X) - Data for sample L38 are high.
- VABZ8U (X) - Data for both samples are high.
- VJMUTN (X) - Data for sample L37 are low.

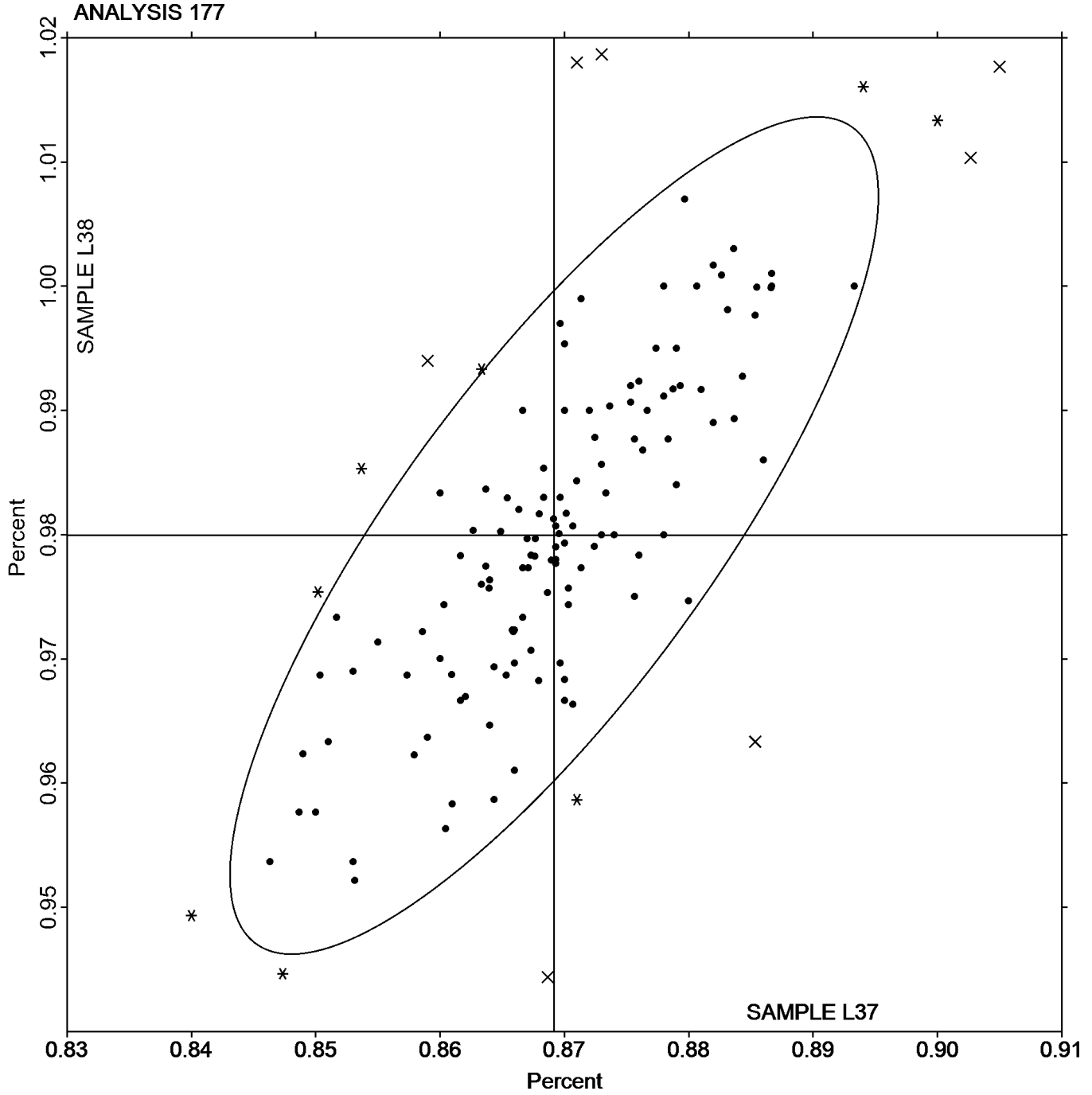


Analysis 177

Carbon & Low Alloy Steel, Element #8  
CHROMIUM (Cr)

SAMPLE L37  
0.8692 Percent

SAMPLE L38  
0.9799 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 178

Carbon & Low Alloy Steel, Element #9  
ALUMINUM (Al)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.0250	-0.0013	-1.00	0.0203	-0.0014	-1.17	OE
29J3D4	X	0.0270	0.0007	0.52	0.0110	-0.0108	-8.77	ED
2BR244		0.0247	-0.0016	-1.20	0.0207	-0.0011	-0.87	OE
2NYNC2		0.0260	-0.0004	-0.27	0.0219	0.0001	0.08	OE
349ZFE		0.0258	-0.0006	-0.42	0.0209	-0.0009	-0.70	OE
39EXHQ		0.0258	-0.0006	-0.42	0.0214	-0.0004	-0.30	OE
3KEG8Y		0.0293	0.0030	2.26	0.0246	0.0028	2.31	OE
3M4NRV		0.0272	0.0008	0.64	0.0216	-0.0002	-0.16	OE
3MLLY2	X	0.0340	0.0077	5.82	0.0293	0.0076	6.17	DR
3MWKUA		0.0265	0.0002	0.14	0.0228	0.0010	0.82	OE
3PJA8V		0.0244	-0.0020	-1.48	0.0195	-0.0023	-1.84	OE
3QYJ9A		0.0253	-0.0010	-0.77	0.0214	-0.0003	-0.27	OE
3TLZK3		0.0237	-0.0027	-2.01	0.0200	-0.0018	-1.44	OE
3UGJQA		0.0287	0.0023	1.78	0.0243	0.0026	2.09	DR
43LXZP		0.0262	-0.0002	-0.11	0.0216	-0.0002	-0.16	OE
49DHPQ		0.0280	0.0017	1.27	0.0203	-0.0014	-1.17	GD
49UCP2		0.0265	0.0002	0.16	0.0215	-0.0003	-0.24	OE
4AMCJ6		0.0284	0.0021	1.58	0.0234	0.0016	1.33	OE
4CCQZT		0.0243	-0.0020	-1.50	0.0200	-0.0018	-1.44	OE
4CTW9Q	X	0.0282	0.0018	1.40	0.0183	-0.0034	-2.79	OE
62CHUV		0.0268	0.0005	0.39	0.0227	0.0010	0.79	OE
6CRET8		0.0268	0.0005	0.39	0.0232	0.0014	1.17	OE
6K77EY		0.0261	-0.0002	-0.17	0.0202	-0.0016	-1.30	OE
6MAWPK	X	0.0330	0.0067	5.06	0.0273	0.0056	4.54	GD
6MBTTN		0.0257	-0.0007	-0.49	0.0210	-0.0008	-0.62	OE
6PVMQP		0.0261	-0.0003	-0.19	0.0210	-0.0008	-0.62	IC
6Y7ZVZ		0.0258	-0.0005	-0.39	0.0210	-0.0007	-0.60	XX
72MQBU		0.0272	0.0009	0.69	0.0226	0.0008	0.65	IC
768ECU	X	0.0317	0.0053	4.05	0.0270	0.0052	4.26	XX
7BEXJZ		0.0255	-0.0008	-0.59	0.0211	-0.0007	-0.57	GD
7ECGGR	X	0.0270	0.0007	0.52	0.0183	-0.0034	-2.79	OE
7FLTW9		0.0260	-0.0003	-0.24	0.0210	-0.0008	-0.62	OE
7PPVAT		0.0274	0.0010	0.79	0.0220	0.0002	0.16	OE
7PYDMY		0.0270	0.0007	0.52	0.0230	0.0012	1.01	OE
7ZF8W8		0.0268	0.0004	0.34	0.0219	0.0001	0.08	OE
8G23RU		0.0243	-0.0020	-1.50	0.0203	-0.0014	-1.17	IC
8ZM4EG	*	0.0270	0.0007	0.52	0.0240	0.0022	1.82	XX
93P9MV		0.0263	0.0000	-0.01	0.0220	0.0002	0.19	OE
99GBV2		0.0260	-0.0003	-0.24	0.0203	-0.0014	-1.17	GD
9B4AQB		0.0247	-0.0017	-1.25	0.0207	-0.0011	-0.89	GD
9ELCTA		0.0260	-0.0003	-0.24	0.0217	-0.0001	-0.08	OE
9HMH9F		0.0245	-0.0018	-1.36	0.0197	-0.0021	-1.67	OE
AAP8EW	X	0.0507	0.0243	18.44	0.0428	0.0211	17.16	OE
AN9NM3		0.0277	0.0013	1.02	0.0230	0.0012	1.01	XX
AQTK7L		0.0282	0.0018	1.40	0.0239	0.0022	1.77	OE
B39PZ4		0.0262	-0.0002	-0.11	0.0220	0.0002	0.16	IC
B8B3CR		0.0263	0.0000	0.02	0.0222	0.0005	0.38	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 178

Carbon & Low Alloy Steel, Element #9  
ALUMINUM (Al)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
BQT2LW	X	0.0303	0.0040	3.04	0.0267	0.0049	3.99	OE
BXC39Z		0.0280	0.0017	1.27	0.0230	0.0012	1.01	DR
C27G7A		0.0240	-0.0023	-1.73	0.0201	-0.0016	-1.33	OE
C4UVVK		0.0257	-0.0006	-0.44	0.0208	-0.0009	-0.76	IC
CMLYD7		0.0273	0.0010	0.77	0.0233	0.0016	1.28	DR
CN4XPH		0.0257	-0.0007	-0.49	0.0217	-0.0001	-0.08	IC
D4CGNL		0.0273	0.0010	0.77	0.0225	0.0007	0.60	OE
D6KDAQ		0.0261	-0.0002	-0.17	0.0221	0.0003	0.27	OE
DCYA7K		0.0273	0.0010	0.77	0.0214	-0.0003	-0.27	OE
DDH4U2		0.0257	-0.0007	-0.49	0.0213	-0.0004	-0.35	OE
DGCCQV		0.0274	0.0011	0.84	0.0217	-0.0001	-0.05	OE
E3TUMJ		0.0250	-0.0013	-1.00	0.0210	-0.0008	-0.62	GD
EACZKQ		0.0270	0.0007	0.52	0.0220	0.0002	0.19	OE
EH7E2G		0.0248	-0.0015	-1.12	0.0208	-0.0009	-0.76	AE
EHNE7R		0.0260	-0.0003	-0.24	0.0218	0.0001	0.06	OE
EZN9VC		0.0267	0.0003	0.26	0.0223	0.0006	0.46	OE
FKNPVZ		0.0268	0.0005	0.36	0.0216	-0.0002	-0.16	OE
FNAG2B		0.0258	-0.0005	-0.39	0.0217	0.0000	-0.03	OE
FTY3PP	X	0.0217	-0.0047	-3.52	0.0183	-0.0034	-2.79	OE
GCCX2W		0.0257	-0.0007	-0.49	0.0217	-0.0001	-0.08	AE
GF9N2F		0.0268	0.0005	0.36	0.0216	-0.0001	-0.11	OE
GJQWDM		0.0258	-0.0005	-0.37	0.0224	0.0006	0.49	OE
GQA3CE		0.0278	0.0015	1.12	0.0227	0.0010	0.79	OE
HQ9JRN		0.0254	-0.0009	-0.70	0.0213	-0.0005	-0.41	OE
HXH3WF		0.0282	0.0019	1.42	0.0226	0.0009	0.71	OE
JRJJQB		0.0261	-0.0003	-0.19	0.0216	-0.0001	-0.11	OE
JW4XXH	X	0.0221	-0.0042	-3.17	0.0173	-0.0045	-3.64	OE
JWBX9J		0.0243	-0.0020	-1.50	0.0207	-0.0011	-0.89	AE
JX8BUQ		0.0257	-0.0006	-0.44	0.0218	0.0000	0.03	OE
KB3GWK	X	0.0306	0.0042	3.22	0.0246	0.0028	2.31	OE
KNA8W8		0.0263	0.0000	0.01	0.0223	0.0006	0.46	IC
KUHGCG		0.0292	0.0029	2.21	0.0243	0.0025	2.04	GD
LNPVPL		0.0257	-0.0007	-0.49	0.0213	-0.0004	-0.35	GD
LUTRGY		0.0257	-0.0007	-0.49	0.0205	-0.0012	-1.00	WD
LY8AUA		0.0280	0.0017	1.27	0.0220	0.0002	0.19	OE
MCUUWH		0.0250	-0.0013	-1.00	0.0210	-0.0008	-0.62	OE
MD8J2F		0.0297	0.0033	2.54	0.0230	0.0012	1.01	XX
MKLBN8		0.0256	-0.0007	-0.54	0.0215	-0.0002	-0.19	IC
MKLEU4		0.0248	-0.0015	-1.15	0.0209	-0.0009	-0.70	OE
MLCHMB		0.0277	0.0013	1.02	0.0220	0.0002	0.19	XX
MQBRZX		0.0263	0.0000	0.01	0.0221	0.0003	0.25	OE
MYZMTL	X	0.0281	0.0018	1.35	0.0273	0.0055	4.51	OE
MZCJZC		0.0271	0.0008	0.62	0.0220	0.0003	0.22	OE
N24WZA	*	0.0280	0.0017	1.27	0.0215	-0.0003	-0.22	OE
NCNZUN	*	0.0230	-0.0033	-2.51	0.0180	-0.0038	-3.07	OE
NDWC8J	*	0.0233	-0.0030	-2.27	0.0183	-0.0034	-2.78	OE
NHDH7E		0.0274	0.0011	0.84	0.0231	0.0013	1.06	IC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 178

Carbon & Low Alloy Steel, Element #9  
ALUMINUM (Al)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
NJNN3F		0.0256	-0.0007	-0.52	0.0212	-0.0006	-0.49	OE
P4P288		0.0270	0.0007	0.52	0.0220	0.0002	0.19	OE
P9MDE6		0.0259	-0.0004	-0.29	0.0228	0.0010	0.81	OE
PAECQH	*	0.0269	0.0005	0.42	0.0237	0.0020	1.60	IC
PBPG2L	X	0.0295	0.0032	2.41	0.0259	0.0041	3.34	IC
PGBFB7		0.0282	0.0019	1.45	0.0230	0.0012	1.01	OE
PMMETR		0.0263	0.0000	0.01	0.0220	0.0002	0.19	OE
PPP6AE	*	0.0302	0.0039	2.94	0.0250	0.0032	2.64	OE
Q46DW4		0.0267	0.0004	0.29	0.0221	0.0003	0.25	OE
QMXN96		0.0286	0.0023	1.73	0.0184	-0.0033	-2.71	OE
QNY6ZB		0.0246	-0.0017	-1.28	0.0208	-0.0010	-0.81	OE
QR9MTB		0.0259	-0.0004	-0.32	0.0223	0.0005	0.41	OE
QW3DD2		0.0260	-0.0003	-0.24	0.0210	-0.0008	-0.62	OE
QYNHXY		0.0268	0.0005	0.36	0.0213	-0.0005	-0.41	OE
QYRRMX		0.0261	-0.0003	-0.19	0.0217	-0.0001	-0.05	OE
R9V6JR		0.0277	0.0014	1.05	0.0233	0.0015	1.25	OE
RCE973		0.0250	-0.0013	-1.00	0.0207	-0.0011	-0.89	OE
RG8DY8		0.0272	0.0009	0.69	0.0223	0.0005	0.41	AE
RPHPXQ		0.0273	0.0010	0.77	0.0220	0.0002	0.19	OE
RRP4N6		0.0259	-0.0004	-0.32	0.0212	-0.0006	-0.46	OE
RWGA4R		0.0283	0.0020	1.53	0.0230	0.0012	1.01	OE
RXB878		0.0280	0.0017	1.27	0.0230	0.0012	1.01	OE
TCNQLD		0.0270	0.0007	0.52	0.0230	0.0012	1.01	XX
TFN68H		0.0265	0.0001	0.11	0.0219	0.0002	0.14	OE
TGJPRW		0.0261	-0.0002	-0.17	0.0216	-0.0002	-0.13	XX
TMTVH2		0.0260	-0.0003	-0.24	0.0213	-0.0004	-0.35	OE
TUCW46		0.0267	0.0003	0.26	0.0223	0.0006	0.46	OE
UBTG83		0.0285	0.0021	1.63	0.0184	-0.0034	-2.74	OE
UBWYA8		0.0271	0.0008	0.59	0.0221	0.0003	0.25	OE
UGZ4Y7		0.0264	0.0001	0.09	0.0221	0.0004	0.30	OE
UTW87K		0.0243	-0.0020	-1.50	0.0193	-0.0024	-1.98	OE
UUM7JJ		0.0257	-0.0007	-0.49	0.0210	-0.0008	-0.62	OE
V8TJFB		0.0267	0.0003	0.26	0.0217	-0.0001	-0.08	OE
VABZ8U	*	0.0240	-0.0023	-1.76	0.0210	-0.0008	-0.62	GD
VDWKKB		0.0260	-0.0003	-0.24	0.0220	0.0002	0.19	OE
VJMUTN		0.0289	0.0026	1.97	0.0246	0.0028	2.28	OE
WGCC8X		0.0243	-0.0020	-1.50	0.0190	-0.0028	-2.25	OE
X2DPEA		0.0254	-0.0009	-0.70	0.0211	-0.0006	-0.51	OE
X3A8C6		0.0265	0.0002	0.16	0.0220	0.0003	0.22	IC
X7C7Q4		0.0282	0.0018	1.40	0.0231	0.0013	1.06	OE
XE2RW3		0.0250	-0.0013	-1.00	0.0210	-0.0008	-0.62	DR
XR86VE		0.0260	-0.0003	-0.24	0.0220	0.0002	0.19	OE
YKPW8H		0.0244	-0.0019	-1.45	0.0197	-0.0021	-1.71	OE
ZCRJM9		0.0270	0.0007	0.52	0.0220	0.0002	0.19	GD
ZR43GU		0.0291	0.0028	2.10	0.0243	0.0025	2.05	XX





Analysis 178

Carbon & Low Alloy Steel, Element #9  
ALUMINUM (Al)

Summary Statistics

	<u>Sample L37</u>		<u>Sample L38</u>	
<b>Grand Means</b>	0.0263	Percent	0.0218	Percent
<b>Std Dev Btwn Labs</b>	0.0013	Percent	0.0012	Percent

Samples L37, L38 : AISI 8740

Statistics based on 122 of 139 reporting participants

Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	DR	Spectrometry - Direct Reading OE (DROES)
ED	X-Ray Fluorescence - Energy Dispersive (EDX)	GD	Spectrometry - Glow Discharge (GDS)
IC	Spectrometry - Inductively Coupled Plasma (ICP)	OE	Spectrometry - Optical Emission (OES)
WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)	XX	Please Indicate Method Used for Current Element

Comments on Assigned Data Flags for Test #178

- 29J3D4 (X) - Data for sample L38 are low.
- 3MLLY2 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- 4CTW9Q (X) - Data for sample L38 are low.
- 6MAWPK (X) - Data for both samples are high. Possible Systematic Error.
- 768ECU (X) - Data for both samples are high. Possible Systematic Error.
- 7ECGGR (X) - Data for sample L38 are low.
- AAP8EW (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- BQT2LW (X) - Data for both samples are high. Possible Systematic Error.
- FTY3PP (X) - Data for both samples are low. Possible Systematic Error.
- JW4XXH (X) - Data for both samples are low. Possible Systematic Error.
- KB3GWK (X) - Data for sample L37 are high.
- MYZMTL (X) - Data for sample L38 are high.
- PBPG2L (X) - Data for sample L38 are high.



# Fasteners and Metals Interlaboratory Testing Program

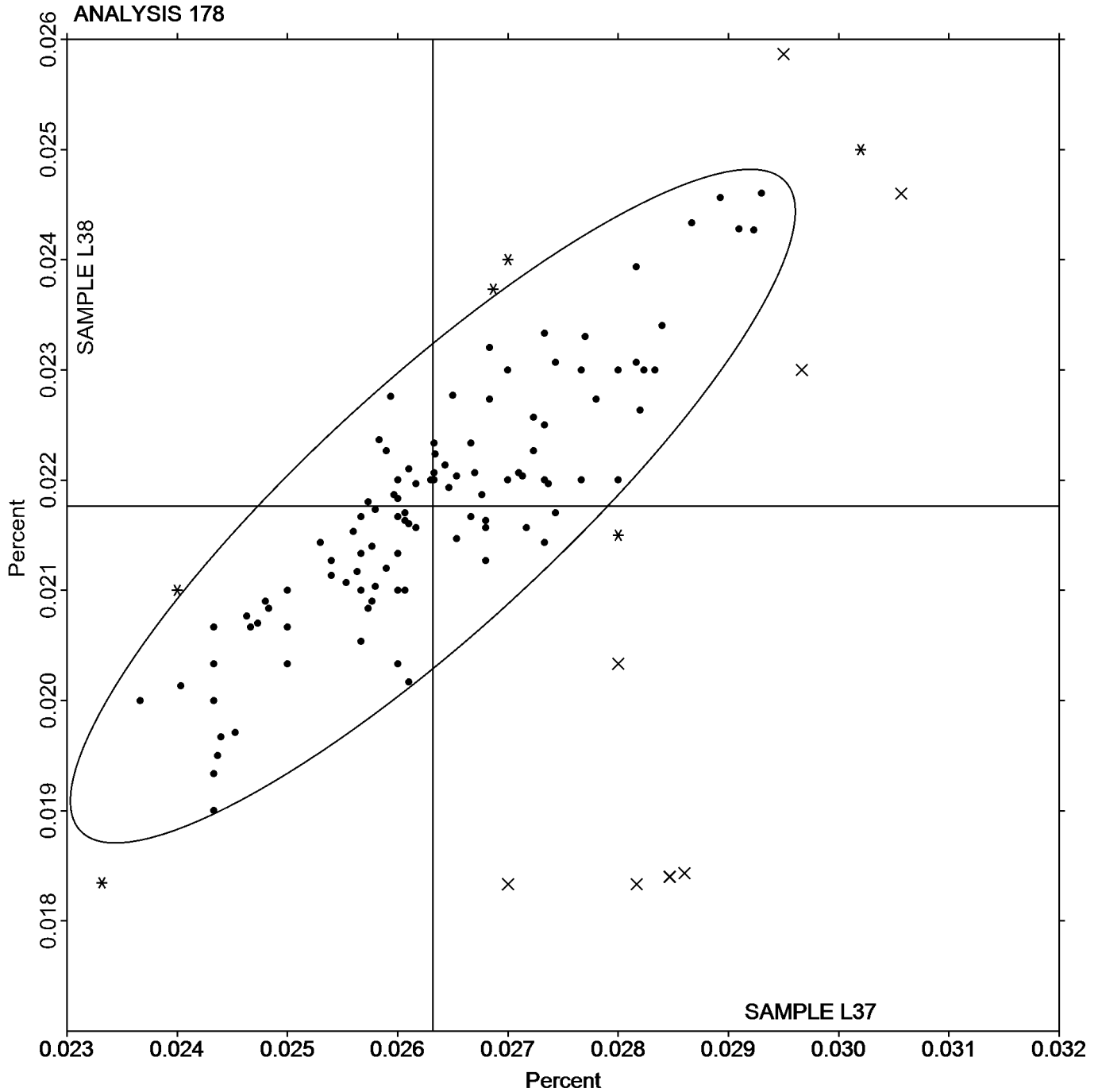
Cycle 115  
3rd Qtr 2016

## Analysis 178

Carbon & Low Alloy Steel, Element #9  
ALUMINUM (Al)

SAMPLE L37  
0.0263 Percent

SAMPLE L38  
0.0218 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 179

Carbon & Low Alloy Steel, Element #10  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
27GUH7		0.1610	-0.0049	-1.30	0.2017	-0.0061	-1.35	OE
29J3D4		0.1640	-0.0019	-0.51	0.2050	-0.0028	-0.62	ED
2BR244		0.1660	0.0001	0.02	0.2057	-0.0021	-0.47	OE
2NYNC2		0.1689	0.0030	0.78	0.2090	0.0012	0.26	OE
349ZFE		0.1677	0.0017	0.46	0.2130	0.0052	1.14	OE
39EXHQ		0.1650	-0.0009	-0.25	0.2070	-0.0008	-0.18	OE
3KEG8Y		0.1637	-0.0023	-0.60	0.2064	-0.0014	-0.30	OE
3M4NRV		0.1647	-0.0013	-0.34	0.2080	0.0002	0.04	OE
3MLLY2		0.1627	-0.0033	-0.86	0.2040	-0.0038	-0.84	DR
3MWKUA		0.1629	-0.0030	-0.79	0.2027	-0.0051	-1.13	OE
3PJA8V		0.1669	0.0009	0.24	0.2094	0.0016	0.36	OE
3QYJ9A		0.1647	-0.0013	-0.34	0.2120	0.0042	0.92	OE
3T8WQB		0.1627	-0.0033	-0.86	0.2067	-0.0011	-0.25	XX
3TLZK3		0.1613	-0.0046	-1.21	0.2040	-0.0038	-0.84	OE
3UGJQA		0.1607	-0.0053	-1.39	0.2017	-0.0061	-1.35	DR
43LXZP		0.1651	-0.0008	-0.22	0.2072	-0.0006	-0.14	OE
49DHPQ		0.1683	0.0024	0.63	0.2053	-0.0025	-0.55	GD
49UCP2		0.1673	0.0014	0.37	0.2037	-0.0041	-0.91	OE
4AMCJ6		0.1663	0.0004	0.10	0.2100	0.0022	0.48	OE
4CCQZT		0.1660	0.0001	0.02	0.2090	0.0012	0.26	OE
4CTW9Q	X	0.1799	0.0139	3.67	0.2264	0.0185	4.08	OE
62CHUV		0.1710	0.0050	1.33	0.2103	0.0025	0.55	OE
6CRET8		0.1598	-0.0061	-1.61	0.2041	-0.0037	-0.82	OE
6EWUHX		0.1593	-0.0066	-1.74	0.1987	-0.0091	-2.01	IC
6K77EY		0.1653	-0.0006	-0.16	0.2093	0.0015	0.33	OE
6MAWPK		0.1600	-0.0059	-1.57	0.2033	-0.0045	-0.99	GD
6MBTTN		0.1627	-0.0033	-0.86	0.2043	-0.0035	-0.77	OE
6PVMQP		0.1602	-0.0058	-1.52	0.2063	-0.0015	-0.33	IC
6Y7ZVZ		0.1651	-0.0008	-0.22	0.2058	-0.0020	-0.44	OE
72MQBU		0.1650	-0.0009	-0.25	0.2073	-0.0005	-0.11	IC
768ECU		0.1670	0.0011	0.28	0.2157	0.0079	1.73	XX
7BEXJZ		0.1633	-0.0026	-0.69	0.2033	-0.0045	-0.99	GD
7ECGGR		0.1683	0.0024	0.63	0.2033	-0.0045	-0.99	OE
7FLTW9		0.1713	0.0054	1.42	0.2157	0.0079	1.73	OE
7PPVAT		0.1684	0.0025	0.66	0.2112	0.0034	0.75	OE
7PYDMY		0.1707	0.0047	1.25	0.2120	0.0042	0.92	OE
7ZF8W8		0.1628	-0.0032	-0.84	0.2044	-0.0034	-0.74	OE
8G23RU		0.1610	-0.0049	-1.30	0.2043	-0.0035	-0.77	IC
8ZM4EG	*	0.1610	-0.0049	-1.30	0.2110	0.0032	0.70	XX
93P9MV		0.1683	0.0024	0.63	0.2103	0.0025	0.55	OE
99GBV2		0.1663	0.0004	0.10	0.2057	-0.0021	-0.47	GD
9B4AQB		0.1623	-0.0036	-0.95	0.2010	-0.0068	-1.50	GD
9ELCTA		0.1633	-0.0026	-0.69	0.2067	-0.0011	-0.25	OE
9HMH9F		0.1691	0.0031	0.82	0.2112	0.0034	0.76	OE
AAP8EW		0.1650	-0.0009	-0.25	0.2053	-0.0025	-0.55	OE
AN9NM3		0.1667	0.0007	0.19	0.2147	0.0069	1.51	XX
AQTK7L	*	0.1767	0.0107	2.83	0.2170	0.0092	2.02	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 179

Carbon & Low Alloy Steel, Element #10  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
AYQCEF		0.1733	0.0074	1.95	0.2157	0.0079	1.73	DR
B39PZ4		0.1647	-0.0013	-0.34	0.2070	-0.0008	-0.18	IC
B79TVW		0.1630	-0.0029	-0.77	0.2080	0.0002	0.04	ED
B8B3CR		0.1673	0.0014	0.37	0.2077	-0.0001	-0.03	OE
BQT2LW	*	0.1660	0.0001	0.02	0.1997	-0.0081	-1.79	CL
BXC39Z		0.1693	0.0034	0.89	0.2120	0.0042	0.92	DR
C27G7A		0.1663	0.0004	0.10	0.2077	-0.0001	-0.03	OE
C4UVVK		0.1647	-0.0013	-0.34	0.2077	-0.0001	-0.03	OE
CBD6XM		0.1603	-0.0056	-1.48	0.2027	-0.0051	-1.13	XX
CMLYD7		0.1733	0.0074	1.95	0.2133	0.0055	1.22	DR
CN4XPH		0.1643	-0.0016	-0.42	0.2063	-0.0015	-0.33	IC
D4CGNL		0.1727	0.0067	1.77	0.2163	0.0085	1.88	OE
D6KDAQ		0.1698	0.0039	1.03	0.2162	0.0084	1.85	IC
DATWA4	*	0.1753	0.0094	2.48	0.2210	0.0132	2.90	XX
DCYA7K		0.1682	0.0023	0.60	0.2095	0.0017	0.38	OE
DDH4U2	X	0.1767	0.0107	2.83	0.2243	0.0165	3.64	OE
DGCCQV		0.1620	-0.0039	-1.04	0.2000	-0.0078	-1.72	OE
E3TUMJ		0.1647	-0.0013	-0.34	0.2063	-0.0015	-0.33	GD
EACZKQ		0.1650	-0.0009	-0.25	0.2077	-0.0001	-0.03	OE
EH7E2G		0.1605	-0.0054	-1.43	0.2046	-0.0032	-0.70	AE
EHNE7R		0.1667	0.0007	0.19	0.2090	0.0012	0.26	OE
EZN9VC		0.1667	0.0007	0.19	0.2013	-0.0065	-1.43	OE
FKNPVZ		0.1650	-0.0009	-0.25	0.2067	-0.0011	-0.25	OE
FNAG2B		0.1667	0.0008	0.20	0.2065	-0.0013	-0.30	OE
FTY3PP	*	0.1560	-0.0099	-2.62	0.1980	-0.0098	-2.16	OE
FZ4M3L		0.1670	0.0011	0.29	0.2076	-0.0002	-0.04	WD
GCCX2W		0.1660	0.0001	0.02	0.2067	-0.0011	-0.25	AE
GF9N2F		0.1675	0.0015	0.40	0.2121	0.0043	0.94	OE
GJQWDM		0.1660	0.0001	0.02	0.2123	0.0045	1.00	OE
GQA3CE		0.1656	-0.0003	-0.09	0.2107	0.0029	0.63	OE
HQ9JRN		0.1710	0.0051	1.33	0.2123	0.0045	1.00	OE
HXH3WF		0.1677	0.0017	0.46	0.2107	0.0029	0.63	OE
JRJQQB		0.1710	0.0051	1.33	0.2134	0.0056	1.22	OE
JW4XXH	X	0.1637	-0.0023	-0.60	0.1783	-0.0295	-6.49	OE
JWBX9J		0.1660	0.0001	0.02	0.2060	-0.0018	-0.40	AE
JX8BUQ		0.1693	0.0034	0.89	0.2103	0.0025	0.55	OE
KB3GWK		0.1717	0.0057	1.51	0.2087	0.0009	0.19	OE
KNA8W8		0.1663	0.0004	0.10	0.2050	-0.0028	-0.62	IC
KUHGCG		0.1603	-0.0056	-1.48	0.2057	-0.0021	-0.47	GD
LNPVPL		0.1623	-0.0036	-0.95	0.2053	-0.0025	-0.55	GD
LPKHDC		0.1693	0.0034	0.89	0.2117	0.0039	0.85	OE
LUTRGY		0.1647	-0.0013	-0.34	0.2070	-0.0008	-0.18	WD
LY8AUA		0.1627	-0.0033	-0.86	0.2060	-0.0018	-0.40	OE
MCUUWH		0.1630	-0.0029	-0.77	0.2030	-0.0048	-1.06	OE
MD8J2F		0.1700	0.0041	1.07	0.2167	0.0089	1.95	XX
MKLBN8		0.1687	0.0027	0.72	0.2110	0.0032	0.70	IC
MKLEU4		0.1681	0.0021	0.56	0.2118	0.0040	0.87	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 179

Carbon & Low Alloy Steel, Element #10  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
MLCHMB		0.1650	-0.0009	-0.25	0.2100	0.0022	0.48	XX
MQBRZX		0.1657	-0.0003	-0.07	0.2078	0.0000	0.00	OE
MYZMTL	*	0.1721	0.0061	1.62	0.2071	-0.0008	-0.17	OE
MZCJZC		0.1689	0.0030	0.78	0.2128	0.0050	1.11	OE
N24WZA		0.1670	0.0011	0.28	0.2090	0.0012	0.26	OE
NCNZUN		0.1685	0.0025	0.67	0.2087	0.0009	0.20	XX
NDWC8J	X	0.1862	0.0202	5.33	0.2336	0.0258	5.68	OE
NHDH7E		0.1683	0.0024	0.63	0.2090	0.0012	0.26	IC
NJNN3F		0.1633	-0.0026	-0.69	0.2013	-0.0065	-1.43	OE
P4P288		0.1577	-0.0083	-2.18	0.1980	-0.0098	-2.16	OE
P97CFA	*	0.1600	-0.0059	-1.57	0.2100	0.0022	0.48	OE
P9MDE6		0.1684	0.0025	0.65	0.2113	0.0035	0.76	OE
PAECQH		0.1713	0.0054	1.42	0.2080	0.0002	0.04	IC
PBPG2L	*	0.1733	0.0074	1.95	0.2073	-0.0005	-0.11	IC
PGBFB7		0.1570	-0.0089	-2.36	0.1983	-0.0095	-2.09	OE
PMMETR		0.1633	-0.0026	-0.69	0.2020	-0.0058	-1.28	OE
PPP6AE		0.1667	0.0008	0.20	0.2075	-0.0003	-0.06	OE
Q46DW4		0.1657	-0.0003	-0.07	0.2100	0.0022	0.48	OE
QMXN96	X	0.1799	0.0139	3.67	0.2265	0.0187	4.12	OE
QNY6ZB		0.1646	-0.0014	-0.36	0.2042	-0.0036	-0.80	OE
QR9MTB		0.1724	0.0065	1.71	0.2183	0.0105	2.31	OE
QW3DD2		0.1667	0.0007	0.19	0.2100	0.0022	0.48	OE
QYNHKY		0.1717	0.0057	1.51	0.2157	0.0079	1.73	OE
QYRRMX		0.1652	-0.0007	-0.19	0.2071	-0.0007	-0.16	OE
R9V6JR		0.1618	-0.0041	-1.08	0.1998	-0.0080	-1.77	OE
RCE973		0.1667	0.0007	0.19	0.2033	-0.0045	-0.99	OE
RG8DY8		0.1675	0.0016	0.42	0.2103	0.0025	0.55	AE
RPHPXQ		0.1670	0.0011	0.28	0.2193	0.0115	2.54	OE
RRP4N6		0.1684	0.0025	0.65	0.2072	-0.0006	-0.14	OE
RWGA4R		0.1690	0.0031	0.81	0.2077	-0.0001	-0.03	OE
RXB878	*	0.1750	0.0091	2.39	0.2200	0.0122	2.68	OE
TCNQLD		0.1640	-0.0019	-0.51	0.2127	0.0049	1.07	XX
TFN68H		0.1605	-0.0054	-1.43	0.2022	-0.0056	-1.23	OE
TGJPRW		0.1630	-0.0029	-0.77	0.2020	-0.0058	-1.28	XX
TMTVH2		0.1673	0.0014	0.37	0.2080	0.0002	0.04	OE
TUCW46		0.1673	0.0014	0.37	0.2093	0.0015	0.33	OE
UBTG83	X	0.1795	0.0136	3.58	0.2264	0.0186	4.09	OE
UBWYA8		0.1633	-0.0026	-0.69	0.2060	-0.0018	-0.40	OE
UGZ4Y7		0.1628	-0.0031	-0.82	0.2056	-0.0022	-0.49	OE
UTW87K	X	0.1703	0.0044	1.16	0.0193	-0.1885	-41.50	OE
UUM7JJ		0.1647	-0.0013	-0.34	0.2020	-0.0058	-1.28	OE
V8TJFB		0.1680	0.0021	0.54	0.2103	0.0025	0.55	OE
VABZ8U		0.1700	0.0041	1.07	0.2150	0.0072	1.58	GD
VDWKKB		0.1660	0.0001	0.02	0.2080	0.0002	0.04	OE
VJMUTN		0.1624	-0.0035	-0.93	0.2111	0.0033	0.73	OE
WGCC8X		0.1660	0.0001	0.02	0.2090	0.0012	0.26	OE
X2DPEA		0.1624	-0.0035	-0.93	0.2075	-0.0003	-0.06	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 179

Carbon & Low Alloy Steel, Element #10  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L37			Sample L38			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
X3A8C6		0.1684	0.0024	0.64	0.2063	-0.0015	-0.33	IC
X7C7Q4		0.1669	0.0010	0.26	0.2087	0.0009	0.20	OE
XE2RW3		0.1653	-0.0006	-0.16	0.2090	0.0012	0.26	DR
XR86VE		0.1627	-0.0033	-0.86	0.2030	-0.0048	-1.06	OE
YKPW8H		0.1620	-0.0039	-1.04	0.2017	-0.0061	-1.35	OE
ZCRJM9	X	0.1570	-0.0089	-2.36	0.1880	-0.0198	-4.36	GD
ZR43GU		0.1695	0.0035	0.93	0.2086	0.0008	0.17	XX

### Summary Statistics

	Sample L37		Sample L38	
<b>Grand Means</b>	0.1659	Percent	0.2078	Percent
<b>Stnd Dev Btwn Labs</b>	0.0038	Percent	0.0045	Percent

Samples L37, L38 : AISI 8740

Statistics based on 139 of 148 reporting participants

### Key to Method Codes Reported by Participants

- |    |   |    |  |
|----|---|----|--|
| AE | Spectrometry - Atomic Emission (AES)            | CL | Colorimetry                                      |
| DR | Spectrometry - Direct Reading OE (DROES)        | ED | X-Ray Fluorescence - Energy Dispersive (EDX)     |
| GD | Spectrometry - Glow Discharge (GDS)             | IC | Spectrometry - Inductively Coupled Plasma (ICP)  |
| OE | Spectrometry - Optical Emission (OES)           | WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element |    |  |

### Comments on Assigned Data Flags for Test #179

- 4CTW9Q (X) - Data for both samples are high.
- DDH4U2 (X) - Data for both samples are high.
- JW4XXH (X) - Data for sample L38 are low.
- NDWC8J (X) - Data for both samples are high.
- QMXN96 (X) - Data for both samples are high.
- UBTG83 (X) - Data for both samples are high.
- UTW87K (X) - Data for sample L38 are low.
- ZCRJM9 (X) - Data for sample L38 are low.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 115  
3rd Qtr 2016

## Analysis 179

Carbon & Low Alloy Steel, Element #10  
MOLYBDENUM (Mo)

SAMPLE L37  
0.1659 Percent

SAMPLE L38  
0.2078 Percent

