



# Fasteners & Metals Interlaboratory Testing Program

Summary Report Cycle 120, 4th Qtr 2017

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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.

For further information contact:

**COLLABORATIVE TESTING SERVICES, INC.**  
21331 Gentry Drive  
Sterling, VA 20166

Phone: (571) 434-1925  
FAX: (571)434-1937  
e-mail: [metals@cts-interlab.com](mailto:metals@cts-interlab.com)  
[www.collaborativetesting.com](http://www.collaborativetesting.com)  
Office Hours: 8:00 a.m. - 4:30 p.m. ET

## 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.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 115

Fastener Wedge Tensile (10 degree)  
ASTM F606

WebCode	Data Flag	Sample X47			Sample X48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
298EKA		144.73	0.30	0.21	166.07	-1.50	-0.83
2NF8TR		146.32	1.88	1.34	168.32	0.75	0.41
2RHLGN		144.67	0.23	0.16	165.87	-1.70	-0.94
2VUELV		144.27	-0.17	-0.12	168.17	0.60	0.33
2VX9J3	X	145.10	0.66	0.47	162.60	-4.97	-2.73
392KE9		143.85	-0.59	-0.42	168.40	0.82	0.45
3DWG2E		142.83	-1.60	-1.14	167.40	-0.17	-0.09
3Z7JZG		143.52	-0.92	-0.65	165.34	-2.23	-1.23
4E7B8L		144.82	0.39	0.28	169.22	1.65	0.90
4ERC8N		142.94	-1.50	-1.07	165.89	-1.69	-0.92
4L466K		144.27	-0.17	-0.12	168.20	0.63	0.34
4LLECK		143.33	-1.10	-0.79	167.00	-0.57	-0.31
4TJF6J		142.80	-1.64	-1.17	167.27	-0.30	-0.17
63LT2D		146.48	2.04	1.46	170.33	2.76	1.51
6GR3PM		145.70	1.27	0.90	168.57	1.00	0.55
72QWPN		144.90	0.46	0.33	165.13	-2.44	-1.34
7HWD6H		146.30	1.86	1.33	166.80	-0.77	-0.42
7URK22		144.67	0.23	0.16	167.00	-0.57	-0.31
8C4EXL		144.07	-0.36	-0.26	169.31	1.74	0.95
8XK74N		145.33	0.90	0.64	170.47	2.90	1.59
9DQEDT		144.73	0.30	0.21	167.50	-0.07	-0.04
9G84WZ		142.04	-2.39	-1.71	164.18	-3.39	-1.86
9NXUMM	X	150.20	5.76	4.11	170.40	2.83	1.55
A2GRBN		146.80	2.36	1.69	168.50	0.93	0.51
B997A9		144.60	0.17	0.12	167.39	-0.18	-0.10
BEHWNT		144.86	0.42	0.30	166.35	-1.22	-0.67
BUD7YE	*	141.37	-3.07	-2.19	162.43	-5.14	-2.82
BZ3U9Q		145.80	1.37	0.98	167.78	0.21	0.11
CLBWR8		146.23	1.80	1.28	169.58	2.01	1.10
DLVKJ8		143.04	-1.40	-1.00	167.82	0.25	0.14
DUM29B	X	149.10	4.66	3.33	169.67	2.10	1.15
E2D69Q		142.43	-2.01	-1.43	165.83	-1.74	-0.96
EATAEC		143.70	-0.74	-0.52	168.83	1.26	0.69
ENXWY8	X	135.08	-9.35	-6.67	163.54	-4.03	-2.21
EYEJ99		143.93	-0.51	-0.36	166.55	-1.02	-0.56
F2YD8F		144.26	-0.18	-0.13	166.31	-1.26	-0.69
FJVJ9Z		145.88	1.44	1.03	168.83	1.26	0.69
FYTCFV		143.19	-1.24	-0.89	166.76	-0.81	-0.44
G6U8C2		145.40	0.96	0.69	165.54	-2.03	-1.11
JUML78	X	147.50	3.06	2.18	174.95	7.38	4.05
K8N3NY		143.40	-1.04	-0.74	165.97	-1.60	-0.88
K9HQ9F		144.44	0.01	0.00	168.28	0.70	0.39
KKD2DG	X	166.46	22.03	15.70	144.65	-22.92	-12.57
KQ4EGP		146.00	1.56	1.12	171.33	3.76	2.06
LCF72H	X	152.46	8.02	5.72	181.92	14.35	7.87
LN7LWQ		144.09	-0.35	-0.25	166.02	-1.55	-0.85
LYBHWM		145.97	1.53	1.09	169.67	2.10	1.15



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 115

Fastener Wedge Tensile (10 degree)  
ASTM F606

WebCode	Data Flag	Sample X47			Sample X48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MQTY6F		143.73	-0.71	-0.50	166.19	-1.38	-0.76
MYQ6X3		143.63	-0.81	-0.58	167.02	-0.55	-0.30
NN2NYZ	X	0.00156	-144.43	-102.97	0.00180	-167.57	-91.93
P7E8R4		143.22	-1.21	-0.87	167.77	0.20	0.11
PEEYMX		142.47	-1.97	-1.40	168.93	1.36	0.75
PFMC6Y		143.63	-0.80	-0.57	169.50	1.93	1.06
QGY7MK		146.11	1.67	1.19	167.57	0.00	0.00
R2C42T	X	163.27	18.83	13.42	188.26	20.69	11.35
R2WDYG		146.94	2.50	1.79	171.36	3.79	2.08
RDWPMW		143.93	-0.51	-0.36	165.89	-1.68	-0.92
RXXU7V		142.37	-2.07	-1.48	166.88	-0.69	-0.38
RZ4FUV		144.20	-0.24	-0.17	169.40	1.83	1.00
TGBMTX		145.70	1.26	0.90	167.87	0.30	0.16
UXNUXQ		144.41	-0.03	-0.02	168.54	0.97	0.53
WTKF9L	X	151.77	7.33	5.23	175.43	7.86	4.31
WXXMK6	X	143.78	-0.65	-0.47	186.62	19.05	10.45
X4MUUJ		143.20	-1.24	-0.88	165.10	-2.47	-1.36
X9DYB8	X	11.16	-133.28	-95.01	13.01	-154.56	-84.80
XACAMX	X	145.82	1.39	0.99	173.77	6.20	3.40
Z4W7FY		142.82	-1.62	-1.16	166.27	-1.30	-0.71
ZC7F27		146.00	1.56	1.12	168.33	0.76	0.42
ZG2UKU	*	148.10	3.66	2.61	172.03	4.46	2.45
ZYH63M		144.43	0.00	0.00	166.70	-0.87	-0.48

### Summary Statistics

	Sample X47		Sample X48	
<b>Grand Means</b>	144.44	ksi	167.57	ksi
<b>Stnd Dev Btwn Labs</b>	1.40	ksi	1.82	ksi

Samples X47, X48 : 3/8-16x2 1/4, 3/8-16x2 1/4

Statistics based on 57 of 70 reporting participants



**Analysis 115**

**Fastener Wedge Tensile (10 degree)**  
**ASTM F606**

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**Comments on Assigned Data Flags for Test #115**

- 2VX9J3 (X) - Data for sample X48 are low. Inconsistent within the determinations of sample X48.
- 9NXUMM (X) - Data for sample X47 are high.
- DUM29B (X) - Data for sample X47 are high.
- ENXWY8 (X) - Data for sample X47 are low.
- JUML78 (X) - Data for sample X48 are high.
- KKD2DG (X) - Data appear to be transposed between samples.
- LCF72H (X) - Data for both samples are high.
- NN2NYZ (X) - Extreme data.
- R2C42T (X) - Data for both samples are very high.
- WTKF9L (X) - Data for both samples are high.
- WXXMK6 (X) - Data for sample X48 are very high. Inconsistent within the determinations of sample X48.
- X9DYB8 (X) - Extreme data.
- XACAMX (X) - Data for sample X48 are high.



Fasteners and Metals Interlaboratory Testing Program

Cycle 120

Analysis 115

4th Qtr 2017

Fastener Wedge Tensile (10 degree)

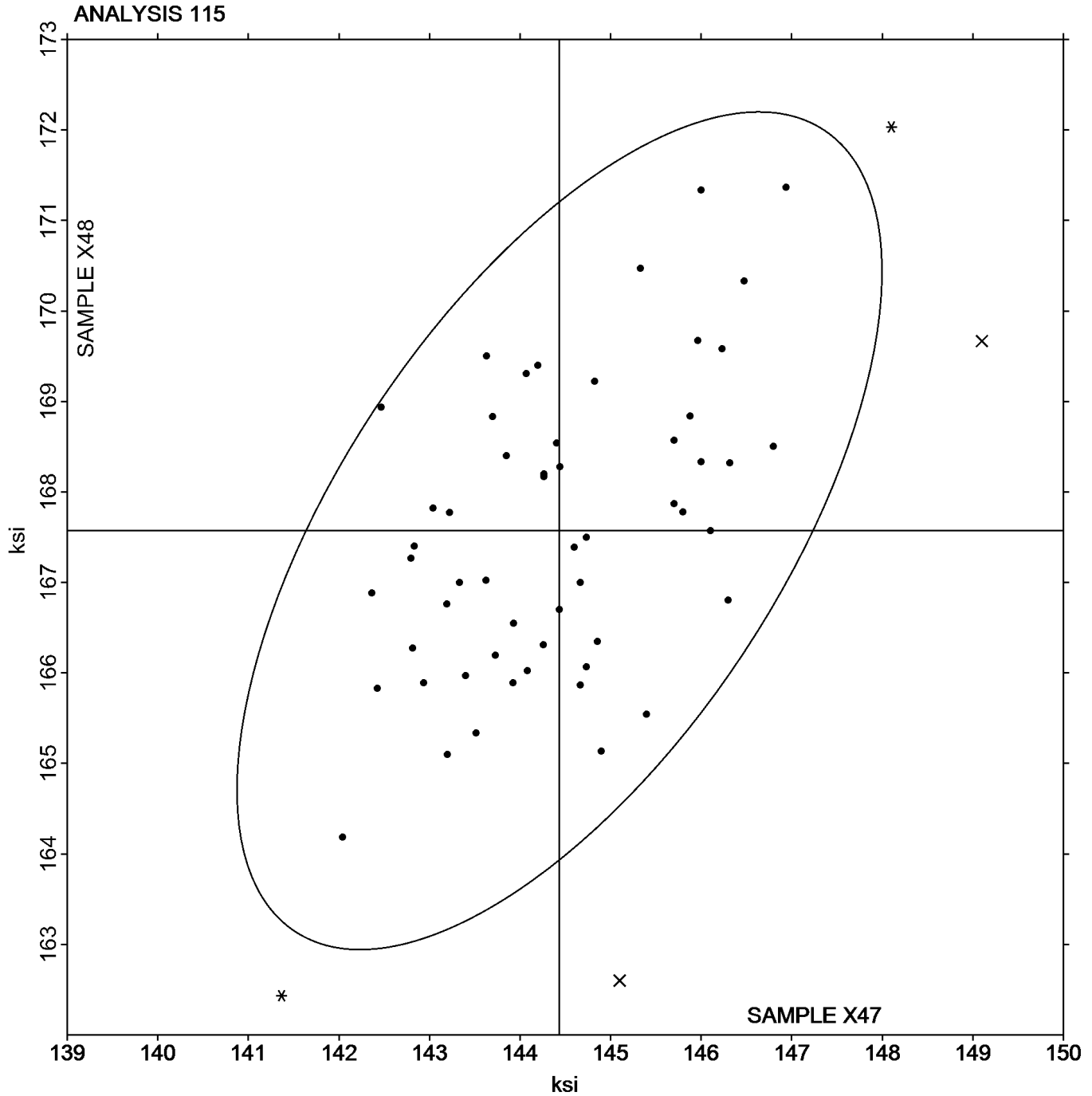
ASTM F606

SAMPLE X47

SAMPLE X48

144.44 ksi

167.57 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 116

Fastener Axial Tensile  
ASTM F606

WebCode	Data Flag	Sample Q47			Sample Q48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
298EKA		143.87	-0.76	-0.44	169.17	0.83	0.41
2NF8TR		145.58	0.95	0.54	167.27	-1.07	-0.53
2VUELV		144.27	-0.36	-0.21	170.10	1.76	0.87
2VX9J3		143.17	-1.46	-0.83	168.87	0.53	0.26
392KE9		143.08	-1.55	-0.89	166.48	-1.86	-0.92
3DWG2E		142.47	-2.16	-1.23	167.87	-0.47	-0.23
3Z7JZG		143.81	-0.82	-0.47	167.72	-0.62	-0.30
4E7B8L		144.23	-0.41	-0.23	168.94	0.60	0.30
4ERC8N		142.10	-2.53	-1.44	166.48	-1.86	-0.92
4L466K		147.07	2.44	1.39	169.97	1.63	0.80
4LLECK		143.67	-0.96	-0.55	167.67	-0.67	-0.33
63LT2D		146.36	1.73	0.99	171.22	2.88	1.43
6GR3PM		145.78	1.15	0.66	171.09	2.75	1.36
6UCW9M		144.87	0.24	0.14	169.66	1.32	0.65
6X9RMF		147.85	3.21	1.83	170.67	2.33	1.15
72QWPN		141.63	-3.00	-1.71	167.53	-0.81	-0.40
7URK22		144.67	0.04	0.02	167.33	-1.01	-0.50
7VKDWK		144.67	0.04	0.02	169.67	1.33	0.66
8C4EXL		145.23	0.60	0.34	170.42	2.08	1.03
8DDV27		143.53	-1.10	-0.63	168.39	0.05	0.02
8XK74N		145.37	0.74	0.42	169.93	1.59	0.79
94QKHJ		144.63	0.00	0.00	165.50	-2.84	-1.40
9DQEDT		145.03	0.40	0.23	169.60	1.26	0.62
9G84WZ		142.52	-2.11	-1.20	167.47	-0.87	-0.43
9M6WCV		145.06	0.43	0.25	170.49	2.15	1.06
9NXUMM	*	148.60	3.97	2.26	173.40	5.06	2.50
9NZKT6		143.97	-0.66	-0.38	167.13	-1.21	-0.60
B997A9		143.52	-1.11	-0.63	167.65	-0.69	-0.34
BEHWNT		142.30	-2.33	-1.33	168.33	-0.01	0.00
BUD7YE	*	143.07	-1.56	-0.89	162.90	-5.44	-2.69
CCPTLT		145.00	0.37	0.21	167.00	-1.34	-0.66
CLBWR8		144.22	-0.41	-0.23	167.63	-0.71	-0.35
CX9VMK		144.60	-0.03	-0.02	168.17	-0.17	-0.09
DLVKJ8		144.08	-0.55	-0.31	167.63	-0.71	-0.35
DUM29B		147.40	2.77	1.58	172.13	3.79	1.87
E2D69Q		142.72	-1.91	-1.09	167.57	-0.77	-0.38
EATAEC		145.00	0.37	0.21	169.33	0.99	0.49
EJG3Q9	X	154.94	10.30	5.87	175.83	7.49	3.70
EKPECQ	X	132.64	-12.00	-6.83	152.83	-15.51	-7.67
ENXWY8	X	135.49	-9.15	-5.21	166.93	-1.41	-0.69
F2YD8F		144.07	-0.56	-0.32	168.17	-0.17	-0.08
FFYXGW		145.20	0.57	0.32	168.67	0.33	0.16
FYTCFV		143.60	-1.03	-0.58	167.89	-0.45	-0.22
G6U8C2		143.37	-1.26	-0.72	169.13	0.79	0.39
HN29RE		145.33	0.70	0.40	168.00	-0.34	-0.17
JM4HX6		143.30	-1.33	-0.76	167.04	-1.30	-0.64
JUML78		148.26	3.63	2.07	169.86	1.52	0.75





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 116

Fastener Axial Tensile  
ASTM F606

WebCode	Data Flag	Sample Q47			Sample Q48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
K8N3NY		143.73	-0.90	-0.51	166.67	-1.67	-0.83
KKD2DG		145.27	0.64	0.36	167.54	-0.80	-0.39
KP72TW		145.57	0.93	0.53	167.05	-1.29	-0.64
LCF72H	X	154.80	10.17	5.79	179.92	11.58	5.72
LYBHWM		146.53	1.90	1.08	170.68	2.34	1.16
ME2XGY		144.67	0.04	0.02	168.88	0.54	0.27
MQTY6F		148.11	3.48	1.98	168.53	0.19	0.09
NN2NYZ		148.21	3.58	2.04	170.19	1.85	0.92
P4CQXZ	X	151.33	6.70	3.82	172.67	4.33	2.14
P7J77Q	X	111.15	-33.48	-19.07	130.53	-37.81	-18.68
P7UM76	*	140.20	-4.44	-2.53	162.56	-5.78	-2.86
PEEYMX		143.80	-0.83	-0.47	167.90	-0.44	-0.22
PF43YY		146.50	1.87	1.07	166.47	-1.87	-0.92
QB4L94	*	146.59	1.96	1.12	165.58	-2.76	-1.36
QGY7MK		146.49	1.86	1.06	168.60	0.26	0.13
QPQ8MQ		143.99	-0.65	-0.37	168.43	0.09	0.05
R2WDYG		146.00	1.37	0.78	170.96	2.62	1.29
RDTQBU		144.56	-0.08	-0.04	167.08	-1.26	-0.62
RDWPMW		143.75	-0.88	-0.50	163.91	-4.43	-2.19
RLK6CE	X	158.79	14.16	8.07	181.28	12.94	6.39
RXXU7V		141.94	-2.70	-1.54	167.31	-1.03	-0.51
TGBMTX		146.00	1.37	0.78	166.60	-1.74	-0.86
UK3UCD		143.56	-1.07	-0.61	168.41	0.07	0.03
UTEC46		141.33	-3.30	-1.88	165.06	-3.28	-1.62
WTKF9L	X	150.39	5.76	3.28	177.24	8.90	4.40
X4MFF6		144.09	-0.55	-0.31	168.60	0.26	0.13
XACAMX		148.10	3.47	1.98	173.29	4.95	2.45
YZGRLU	X	128.69	-15.95	-9.08	149.52	-18.82	-9.30
Z4W7FY		143.24	-1.39	-0.79	166.76	-1.58	-0.78
ZEZCFT		144.63	0.00	0.00	169.67	1.33	0.66
ZLEHDE		144.00	-0.63	-0.36	169.33	0.99	0.49
ZYH63M		145.20	0.57	0.32	170.60	2.26	1.12

### Summary Statistics

	Sample Q47		Sample Q48	
<b>Grand Means</b>	144.63	ksi	168.34	ksi
<b>Stnd Dev Brwn Labs</b>	1.76	ksi	2.02	ksi

Samples Q47, Q48 : 3/8-16x2 1/4, 3/8-16x2 1/4

Statistics based on 70 of 79 reporting participants



**Analysis 116**

**Fastener Axial Tensile**  
**ASTM F606**

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**Comments on Assigned Data Flags for Test #116**

- EJG3Q9 (X) - Data for both samples are high. Inconsistent within the determinations of sample Q48.
- EKPECQ (X) - Data for both samples are low. Inconsistent within the determinations of both samples.
- ENXWY8 (X) - Data for sample Q47 are low.
- LCF72H (X) - Data for both samples are high.
- P4CQXZ (X) - Data for sample Q47 are high.
- P7J77Q (X) - Data for both samples are very low.
- RLK6CE (X) - Data for both samples are high.
- WTKF9L (X) - Data for both samples are high. Inconsistent within the determinations of sample Q47.
- YZGRLU (X) - Data for both samples are low.



Analysis 116

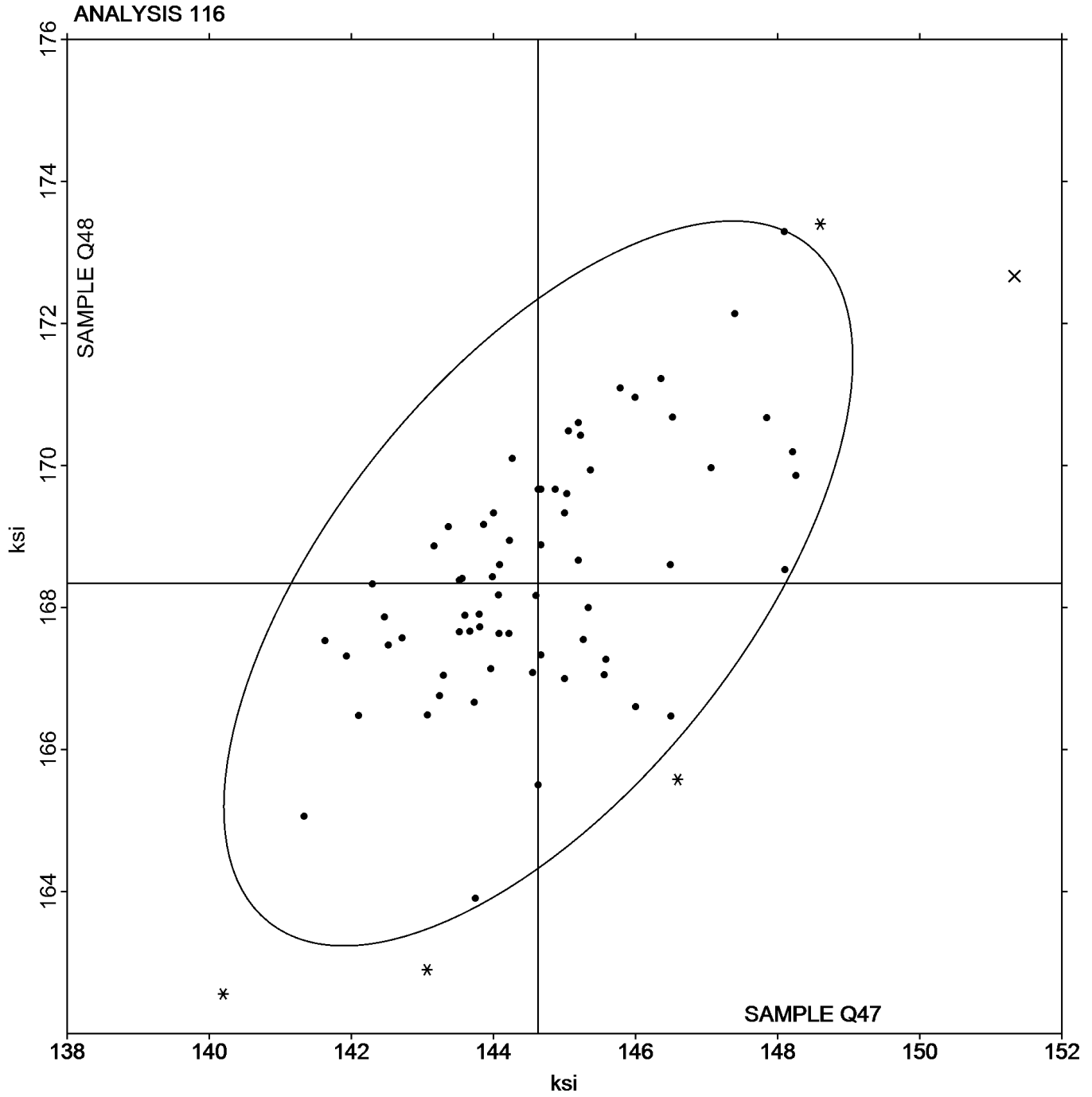
Fastener Axial Tensile  
ASTM F606

SAMPLE Q47

SAMPLE Q48

144.63 ksi

168.34 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 120

Rockwell Hardness: C Scale  
ASTM E18

WebCode	Data Flag	Sample E47			Sample E48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DWLUP		56.98	0.10	0.23	59.04	0.17	0.42
2F9U8W		56.78	-0.10	-0.22	59.36	0.49	1.20
2FMB8V		57.04	0.16	0.37	59.20	0.33	0.81
2HTYLL		55.94	-0.94	-2.14	58.38	-0.49	-1.18
2KD8UF		57.58	0.70	1.60	59.86	0.99	2.41
2MHUA7		57.60	0.72	1.64	59.30	0.43	1.05
2PD93Q		57.24	0.36	0.82	59.04	0.17	0.42
2RHLGN		56.80	-0.08	-0.18	58.96	0.09	0.23
2VX9J3		56.90	0.02	0.05	58.86	-0.01	-0.02
2WB6J2		56.62	-0.26	-0.59	58.82	-0.05	-0.11
2ZQ489		56.72	-0.16	-0.36	58.38	-0.49	-1.18
33T7NX		56.22	-0.66	-1.50	58.46	-0.41	-0.99
392KE9		56.50	-0.38	-0.86	58.50	-0.37	-0.89
39HDXD		57.12	0.25	0.56	59.52	0.65	1.58
3C28Z6		56.58	-0.30	-0.68	58.91	0.04	0.10
3JYY7D		56.94	0.06	0.14	59.26	0.39	0.95
3NC9PN	*	56.30	-0.58	-1.32	57.80	-1.07	-2.59
42EDU8		56.54	-0.34	-0.77	58.30	-0.57	-1.37
4L466K	*	56.14	-0.74	-1.68	58.90	0.03	0.08
4TJF6J		57.44	0.56	1.28	59.40	0.53	1.29
4XV38		56.14	-0.74	-1.68	58.54	-0.33	-0.79
633NAL		56.74	-0.14	-0.31	58.64	-0.23	-0.55
63LT2D		57.10	0.22	0.51	58.88	0.01	0.03
669EQU		55.86	-1.02	-2.31	58.13	-0.73	-1.78
698H9N	X	54.68	-2.20	-5.01	56.50	-2.37	-5.74
6PFXKW		57.04	0.16	0.37	58.56	-0.31	-0.74
6V2GHY	X	56.24	-0.64	-1.45	57.56	-1.31	-3.17
6Y4TLX		56.66	-0.22	-0.50	58.32	-0.55	-1.32
7GJT92		57.04	0.16	0.37	59.08	0.21	0.52
7H9G7M		56.75	-0.13	-0.30	59.11	0.24	0.59
7HWD6H		57.22	0.34	0.78	59.08	0.21	0.52
7HYNWZ		57.16	0.28	0.64	59.40	0.53	1.29
7KHABN		56.84	-0.04	-0.09	58.52	-0.35	-0.84
7QMG4Q		56.02	-0.86	-1.95	58.50	-0.37	-0.89
8C4EXL		56.46	-0.42	-0.95	58.78	-0.09	-0.21
8TDCDY		57.18	0.30	0.69	59.02	0.15	0.37
8VZEDX		57.02	0.14	0.32	58.98	0.11	0.28
8WNPTC		56.63	-0.24	-0.56	58.79	-0.07	-0.18
9MJ3G7		57.38	0.50	1.15	59.26	0.39	0.94
AE44JR		57.00	0.12	0.28	58.94	0.07	0.18
BNNUEH		56.90	0.02	0.05	59.08	0.21	0.52
BNRRZU	*	57.84	0.96	2.19	59.17	0.30	0.74
CPTPRT		56.60	-0.28	-0.63	58.54	-0.33	-0.79
CYENUD	X	54.90	-1.98	-4.50	56.70	-2.17	-5.25
D7ZTPD	X	56.40	-0.48	-1.09	57.40	-1.47	-3.56
DH7H8R		56.92	0.04	0.10	59.18	0.31	0.76
DHPPPP		57.40	0.52	1.19	58.75	-0.11	-0.27



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 120

Rockwell Hardness: C Scale  
ASTM E18

WebCode	Data Flag	Sample E47			Sample E48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
DHUL3M		56.91	0.03	0.06	59.10	0.23	0.56
EATAEC		57.34	0.46	1.05	59.08	0.21	0.52
EKPECQ		56.40	-0.48	-1.09	58.80	-0.07	-0.16
EW4P2M		57.24	0.36	0.82	59.10	0.23	0.57
FJDYHP		56.96	0.08	0.19	58.90	0.03	0.08
FQFKQX		56.52	-0.36	-0.82	58.60	-0.27	-0.65
HN29RE	*	58.00	1.12	2.56	59.80	0.93	2.26
J4C8FC		55.94	-0.94	-2.14	57.92	-0.95	-2.29
J9H4YC		56.76	-0.12	-0.27	58.78	-0.09	-0.21
JADQD2		57.40	0.52	1.19	59.28	0.41	1.00
JGJJ3J		56.72	-0.16	-0.36	58.36	-0.51	-1.23
JNB7MN		57.12	0.24	0.55	59.30	0.43	1.05
K2Y63C		56.74	-0.14	-0.31	58.32	-0.55	-1.32
K9HQ9F	X	56.20	-0.68	-1.54	59.18	0.31	0.76
KWNAHU		56.80	-0.08	-0.18	58.86	-0.01	-0.02
KXMKBB		56.74	-0.14	-0.31	59.14	0.27	0.66
MA4Q8H		56.82	-0.06	-0.13	58.90	0.03	0.08
MUWPDF		57.30	0.42	0.96	58.94	0.07	0.18
N3HQCH		56.82	-0.06	-0.13	58.84	-0.03	-0.06
NJR4KM		57.48	0.60	1.37	59.30	0.43	1.05
PF43YY		57.64	0.76	1.74	59.50	0.63	1.54
PPTTJ7		56.50	-0.38	-0.86	58.38	-0.49	-1.18
Q7DBX6		56.90	0.02	0.05	58.82	-0.05	-0.11
QP7NK4		57.00	0.12	0.28	58.80	-0.07	-0.16
R2C42T		57.32	0.44	1.01	59.16	0.29	0.71
R2GGM4		57.02	0.14	0.32	59.12	0.25	0.61
R2WDYG		56.42	-0.46	-1.04	58.60	-0.27	-0.65
R9YE73	*	56.00	-0.88	-2.00	57.64	-1.23	-2.97
RH2AAM		57.16	0.28	0.64	59.12	0.25	0.61
RT6PB7		56.86	-0.02	-0.04	59.10	0.23	0.57
TDMW6T		57.16	0.28	0.64	58.86	-0.01	-0.02
TGBMTX		56.38	-0.50	-1.13	58.52	-0.35	-0.84
TXPV6D		57.54	0.66	1.51	59.48	0.61	1.49
UF9ZDQ		57.26	0.38	0.87	59.20	0.33	0.81
UPT7AU		56.50	-0.38	-0.86	58.00	-0.87	-2.10
VYKQPQ		56.80	-0.08	-0.18	59.12	0.25	0.61
WP4TW2		56.56	-0.32	-0.72	58.28	-0.59	-1.42
WQJKXC		56.88	0.00	0.00	58.88	0.01	0.03
X3UP96		56.66	-0.22	-0.50	58.86	-0.01	-0.02
X788MZ		56.88	0.00	0.00	58.94	0.07	0.18
XL3PEJ		56.86	-0.02	-0.04	58.62	-0.25	-0.60
YFALTE		57.38	0.50	1.14	59.00	0.13	0.32
YQTHPQ		56.70	-0.18	-0.41	58.92	0.05	0.13
Z26BTQ		56.60	-0.28	-0.63	58.66	-0.21	-0.50
ZGFDBT	X	56.46	-0.42	-0.95	59.74	0.87	2.12
ZGJQ6G		57.50	0.62	1.42	58.98	0.11	0.28
ZLEHDE	X	56.28	-0.60	-1.36	57.10	-1.77	-4.28



# Fasteners and Metals Interlaboratory Testing Program

**Cycle 120**  
**4th Qtr 2017**

## Analysis 120

Rockwell Hardness: C Scale  
ASTM E18

WebCode	Data Flag	Sample E47			Sample E48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
ZLWKW8	X	57.52	0.64	1.46	60.22	1.35	3.28

### Summary Statistics

	Sample E47			Sample E48		
<b>Grand Means</b>	56.88	HRC		58.87	HRC	
<b>Stnd Dev Btrwn Labs</b>	0.44	HRC		0.41	HRC	

Samples E47, E48 : Steel, Steel

Statistics based on 87 of 95 reporting participants

### Comments on Assigned Data Flags for Test #120

- 698H9N (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample E47.
- 6V2GHY (X) - Data for sample E48 are low.
- CYENUD (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of both samples.
- D7ZTPD (X) - Data for sample E48 are low. Inconsistent within the determinations of both samples.
- K9HQ9F (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample E47.
- ZGFDBT (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample E47.
- ZLEHDE (X) - Data for sample E48 are low. Inconsistent within the determinations of sample E48.
- ZLWKW8 (X) - Data for sample E48 are high.



Analysis 120

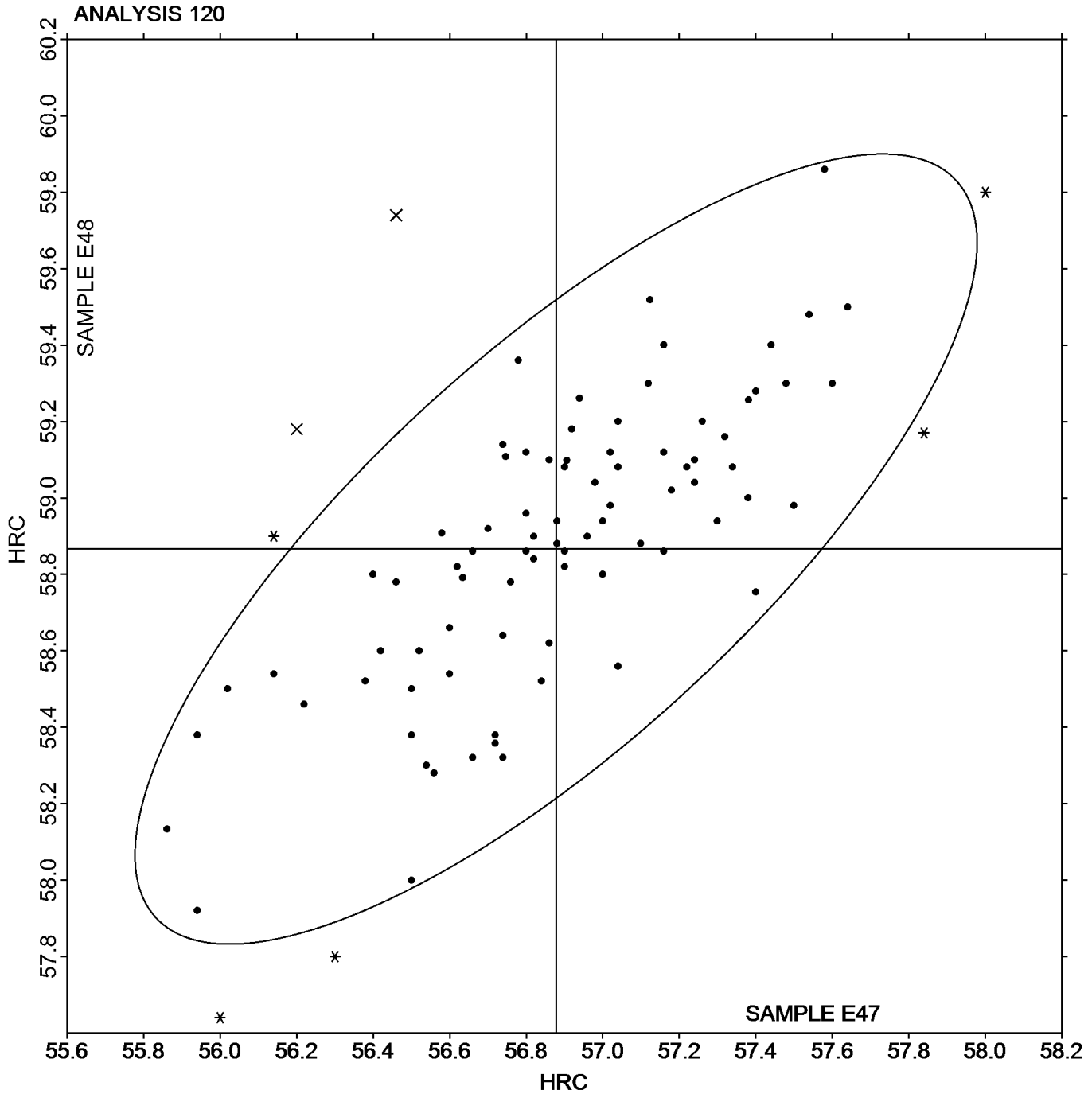
Rockwell Hardness: C Scale  
ASTM E18

SAMPLE E47

SAMPLE E48

56.88 HRC

58.87 HRC





# Fasteners and Metals Interlaboratory Testing Program

## Analysis 125

**Cycle 120**  
**4th Qtr 2017**

### Rockwell Hardness: Externally Threaded Fasteners ASTM F606/F606M AND ASTM E18

WebCode	Data Flag	Sample G47			Sample G48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
24V4G2		35.29	-0.80	-1.46	36.14	-0.49	-0.82
298EKA		35.12	-0.96	-1.77	36.51	-0.13	-0.21
2VUELV		36.95	0.87	1.59	37.33	0.70	1.16
3DWG2E		36.42	0.34	0.62	37.48	0.84	1.39
3TP9LF		36.24	0.15	0.28	36.97	0.34	0.56
3Z7JZG		36.29	0.20	0.37	37.10	0.46	0.77
484BNJ		36.16	0.08	0.14	36.63	-0.01	-0.01
4ERC8N	*	34.75	-1.33	-2.45	36.39	-0.24	-0.40
6GR3PM		36.38	0.29	0.54	37.10	0.47	0.77
72QWPN		35.93	-0.15	-0.28	36.88	0.25	0.41
7A3VFT		36.29	0.20	0.37	36.85	0.22	0.36
7DJA9U		35.63	-0.46	-0.84	36.50	-0.13	-0.22
8C4EXL		36.68	0.59	1.09	37.09	0.46	0.75
8KJXGK		36.38	0.29	0.54	36.94	0.31	0.50
8XK74N	X	34.32	-1.76	-3.24	35.99	-0.64	-1.06
8YDJKR		35.53	-0.55	-1.02	37.16	0.52	0.87
8Z9AMZ	*	34.76	-1.32	-2.43	34.90	-1.74	-2.87
8ZQFAZ	*	36.52	0.44	0.80	35.49	-1.14	-1.88
94QKHJ		35.95	-0.14	-0.25	36.61	-0.02	-0.04
9DQEDT	*	34.64	-1.45	-2.66	35.68	-0.95	-1.57
9G84WZ		35.89	-0.19	-0.35	36.09	-0.54	-0.90
9M6WCV		36.66	0.58	1.06	37.03	0.39	0.65
9NE738		36.41	0.32	0.59	37.35	0.72	1.19
9NXUMM		36.62	0.54	0.98	36.40	-0.23	-0.38
9T6XGA		36.49	0.40	0.74	36.11	-0.52	-0.86
A2GRBN		36.46	0.38	0.70	36.86	0.23	0.38
BD4XKR		35.66	-0.42	-0.77	35.49	-1.14	-1.88
BEHWNT		36.76	0.68	1.25	36.97	0.34	0.56
BMGFAX		36.46	0.37	0.69	37.44	0.81	1.33
BUD7YE		35.79	-0.29	-0.53	36.64	0.01	0.02
BZ3U9Q		36.80	0.72	1.32	37.73	1.10	1.82
C9TM6M		35.05	-1.03	-1.90	35.75	-0.88	-1.46
DGZTAP		35.99	-0.09	-0.17	36.16	-0.48	-0.79
DLVKJ8		35.89	-0.20	-0.36	36.29	-0.34	-0.56
DUM29B		36.41	0.33	0.60	36.68	0.05	0.08
E2D69Q		36.51	0.42	0.78	36.53	-0.11	-0.18
EJ2G2K		36.26	0.17	0.32	36.63	0.00	0.00
EJG3Q9		36.61	0.53	0.97	36.24	-0.39	-0.65
EYEJ99		35.74	-0.35	-0.64	36.55	-0.08	-0.14
F2YD8F		35.93	-0.15	-0.28	35.76	-0.88	-1.45
FJVJ9Z		37.03	0.95	1.74	37.73	1.10	1.82
FQCA22		36.56	0.47	0.87	37.23	0.59	0.98
FYTCFV		36.50	0.42	0.77	36.92	0.29	0.47
G6U8C2		36.63	0.54	1.00	37.48	0.84	1.39
H6AMNG		36.37	0.29	0.52	36.69	0.06	0.09
HN29RE		36.56	0.48	0.88	36.88	0.24	0.40
HTVTRU		36.27	0.18	0.34	36.57	-0.06	-0.11





**Fasteners and Metals Interlaboratory Testing Program**  
**Analysis 125**

**Cycle 120**  
**4th Qtr 2017**

**Rockwell Hardness: Externally Threaded Fasteners**  
**ASTM F606/F606M AND ASTM E18**

WebCode	Data Flag	Sample G47			Sample G48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
J4C8FC		36.51	0.43	0.79	36.93	0.30	0.49
J7G3WU		36.12	0.04	0.06	37.03	0.40	0.66
JPUXTR		36.24	0.15	0.28	36.78	0.14	0.24
JRGKKF		36.91	0.82	1.51	37.70	1.07	1.76
K8N3NY		36.17	0.09	0.16	36.48	-0.15	-0.25
K9HQ9F		36.04	-0.05	-0.09	36.78	0.14	0.24
KF2YME		36.19	0.10	0.19	37.28	0.64	1.06
KQ4EGP		35.34	-0.75	-1.37	35.71	-0.92	-1.52
L2YZ3E		36.46	0.38	0.70	36.83	0.19	0.32
LCF72H		35.81	-0.27	-0.50	35.76	-0.88	-1.45
LCGWC8		35.73	-0.36	-0.66	37.46	0.82	1.36
LN7LWQ		35.81	-0.27	-0.50	35.83	-0.81	-1.34
LWFGVK		36.06	-0.02	-0.04	36.00	-0.64	-1.05
LXFRUE		36.04	-0.05	-0.09	36.66	0.03	0.05
LYBHWM		36.85	0.76	1.40	37.17	0.53	0.88
ME2XGY		36.48	0.40	0.73	37.18	0.54	0.90
MFARFJ		35.23	-0.85	-1.57	35.33	-1.30	-2.15
MJUCAA		36.14	0.05	0.10	36.33	-0.30	-0.50
MK7JNG		35.67	-0.41	-0.76	36.77	0.14	0.23
NN2NYZ		36.87	0.79	1.44	36.73	0.09	0.15
P7J77Q		35.39	-0.70	-1.28	36.48	-0.16	-0.26
P7UM76		36.49	0.41	0.75	37.12	0.49	0.80
PYM2L3		36.33	0.24	0.44	36.85	0.22	0.36
Q8RT4W		35.54	-0.55	-1.00	35.25	-1.38	-2.29
QB4L94		36.61	0.53	0.97	37.41	0.78	1.29
QF3ZXE		35.21	-0.87	-1.60	35.68	-0.95	-1.57
QGY7MK		35.92	-0.16	-0.30	35.75	-0.88	-1.46
R2WDYG		36.22	0.14	0.25	36.57	-0.06	-0.11
RXXU7V		36.08	0.00	0.00	36.62	-0.01	-0.02
U3MJTZ		36.36	0.28	0.51	36.66	0.03	0.05
V3Y6T7		36.54	0.46	0.85	37.59	0.96	1.59
V7XQAB	*	35.13	-0.96	-1.76	37.21	0.57	0.95
WBQG9E		36.16	0.07	0.13	37.25	0.62	1.02
X4MFF6		36.29	0.21	0.38	37.02	0.39	0.65
X9DYB8		36.08	0.00	0.00	36.71	0.08	0.13
XACAMX		34.88	-1.21	-2.22	36.23	-0.41	-0.67
Y2RPWQ		35.37	-0.71	-1.31	36.50	-0.13	-0.22
YEHQLQ		36.19	0.10	0.19	36.36	-0.28	-0.46
Z4W7FY		36.19	0.10	0.19	36.39	-0.24	-0.41
ZEZCFT		35.57	-0.51	-0.95	36.41	-0.23	-0.37
ZYH63M		35.91	-0.17	-0.31	36.38	-0.26	-0.43



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 125**

**Cycle 120  
4th Qtr 2017**

**Rockwell Hardness: Externally Threaded Fasteners  
ASTM F606/F606M AND ASTM E18**

**Summary Statistics**

	<u><b>Sample G47</b></u>		<u><b>Sample G48</b></u>	
<b>Grand Means</b>	36.08	HRC	36.63	HRC
<b>Std Dev Btwn Labs</b>	0.54	HRC	0.60	HRC

Samples G47, G48 : 1/2-20x2 3/4, 1/2-20x2 1/2

*Statistics based on 87 of 88 reporting participants*

**Comments on Assigned Data Flags for Test #125**

8XK74N (X) - Data for sample G47 are low.



Analysis 125

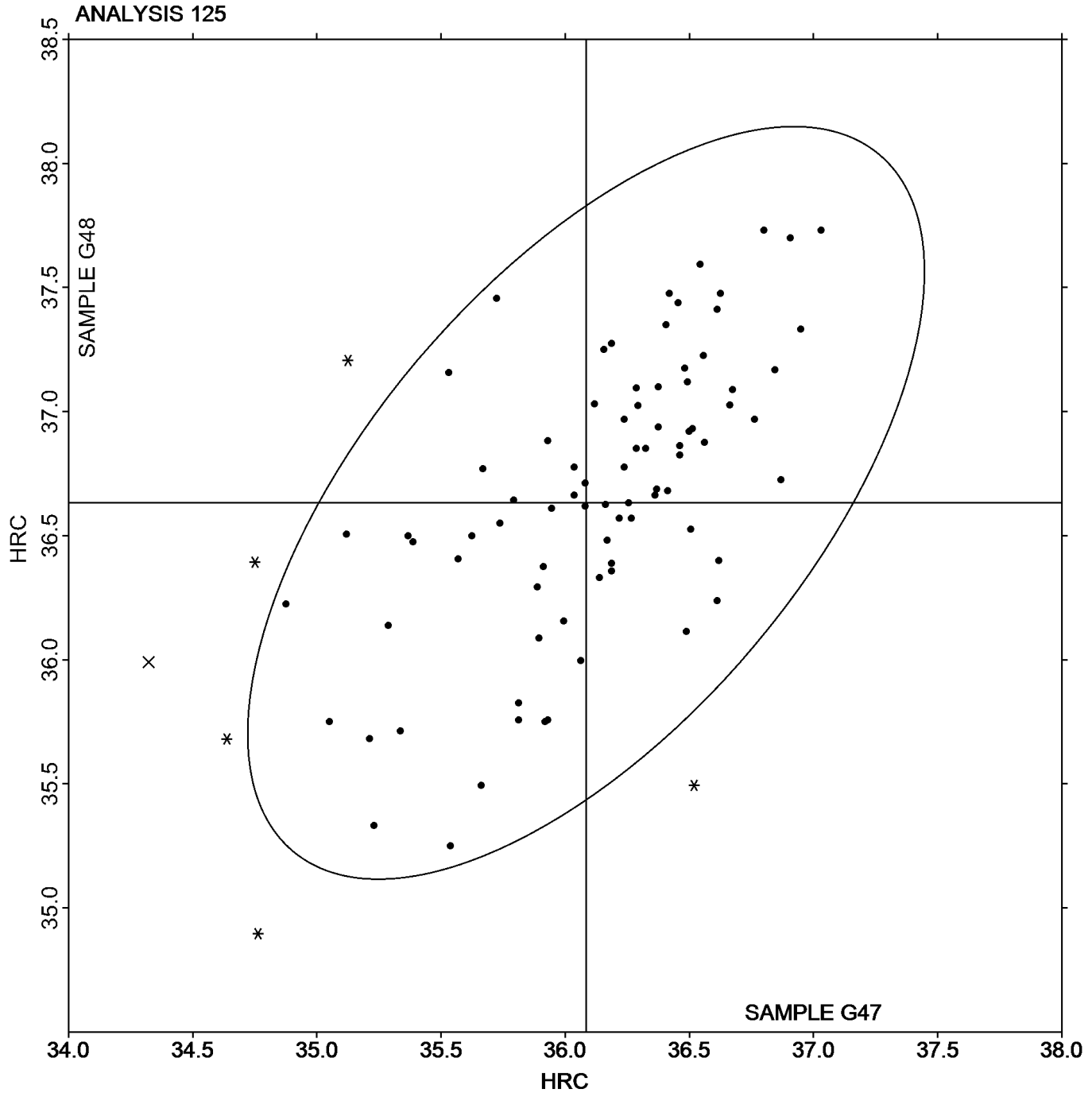
Rockwell Hardness: Externally Threaded Fasteners  
ASTM F606/F606M AND ASTM E18

SAMPLE G47

SAMPLE G48

36.08 HRC

36.63 HRC





**Fasteners and Metals Interlaboratory Testing Program  
Analysis 126**

**Cycle 120  
4th Qtr 2017**

**Vickers Hardness: Externally Threaded Fasteners  
ASTM E92**

WebCode	Data Flag	Sample V47			Sample V48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2HTYLL		363.84	6.73	1.04	370.37	6.27	0.89
2VUEL		352.63	-4.48	-0.69	356.44	-7.66	-1.08
3PPXQF		365.51	8.40	1.30	369.45	5.35	0.76
4ERC8N		348.81	-8.29	-1.28	356.31	-7.78	-1.10
9G84WZ		349.06	-8.04	-1.24	349.38	-14.72	-2.08
9T6XGA		345.88	-11.23	-1.73	355.51	-8.59	-1.22
BNNUEH		361.95	4.85	0.75	366.72	2.62	0.37
DH7H8R		358.63	1.52	0.23	364.69	0.59	0.08
DLVKJ8		360.33	3.22	0.50	362.64	-1.46	-0.21
EHPEH7		345.75	-11.35	-1.75	360.44	-3.66	-0.52
G6U8C2		361.31	4.21	0.65	367.13	3.03	0.43
GUV6GJ		367.61	10.50	1.62	376.33	12.23	1.73
HD3DV6		353.17	-3.93	-0.61	363.95	-0.15	-0.02
KVUL2J		349.63	-7.48	-1.15	358.13	-5.97	-0.85
L2YZ3E		359.43	2.32	0.36	368.15	4.05	0.57
L8X982		351.19	-5.92	-0.91	366.31	2.22	0.31
LWFGVK	*	358.66	1.55	0.24	353.75	-10.35	-1.46
MFARFJ		344.56	-12.54	-1.93	353.31	-10.78	-1.53
N68GGF		359.88	2.77	0.43	365.50	1.40	0.20
P7J77Q		358.38	1.27	0.20	360.63	-3.47	-0.49
PYM2L3		362.31	5.21	0.80	370.75	6.65	0.94
QPQ8MQ		356.56	-0.54	-0.08	369.88	5.78	0.82
RYARBZ		361.19	4.08	0.63	362.75	-1.35	-0.19
VKKQBB		367.05	9.95	1.53	375.14	11.05	1.56
VL84HF		357.73	0.63	0.10	365.14	1.04	0.15
X9DYB8		364.88	7.77	1.20	379.19	15.09	2.14
XMGZB4		354.81	-2.29	-0.35	366.31	2.22	0.31
YK4HGJ		357.73	0.62	0.10	361.18	-2.92	-0.41
ZEFLKM		357.56	0.46	0.07	363.38	-0.72	-0.10

**Summary Statistics**

	Sample V47		Sample V48	
<b>Grand Means</b>	357.10	HV	364.10	HV
<b>Std Dev Btwn Labs</b>	6.49	HV	7.07	HV

Samples V47, V48 : 1/2-20x2 3/4, 1/2-20x2 1/2

Statistics based on 29 of 29 reporting participants



Analysis 126

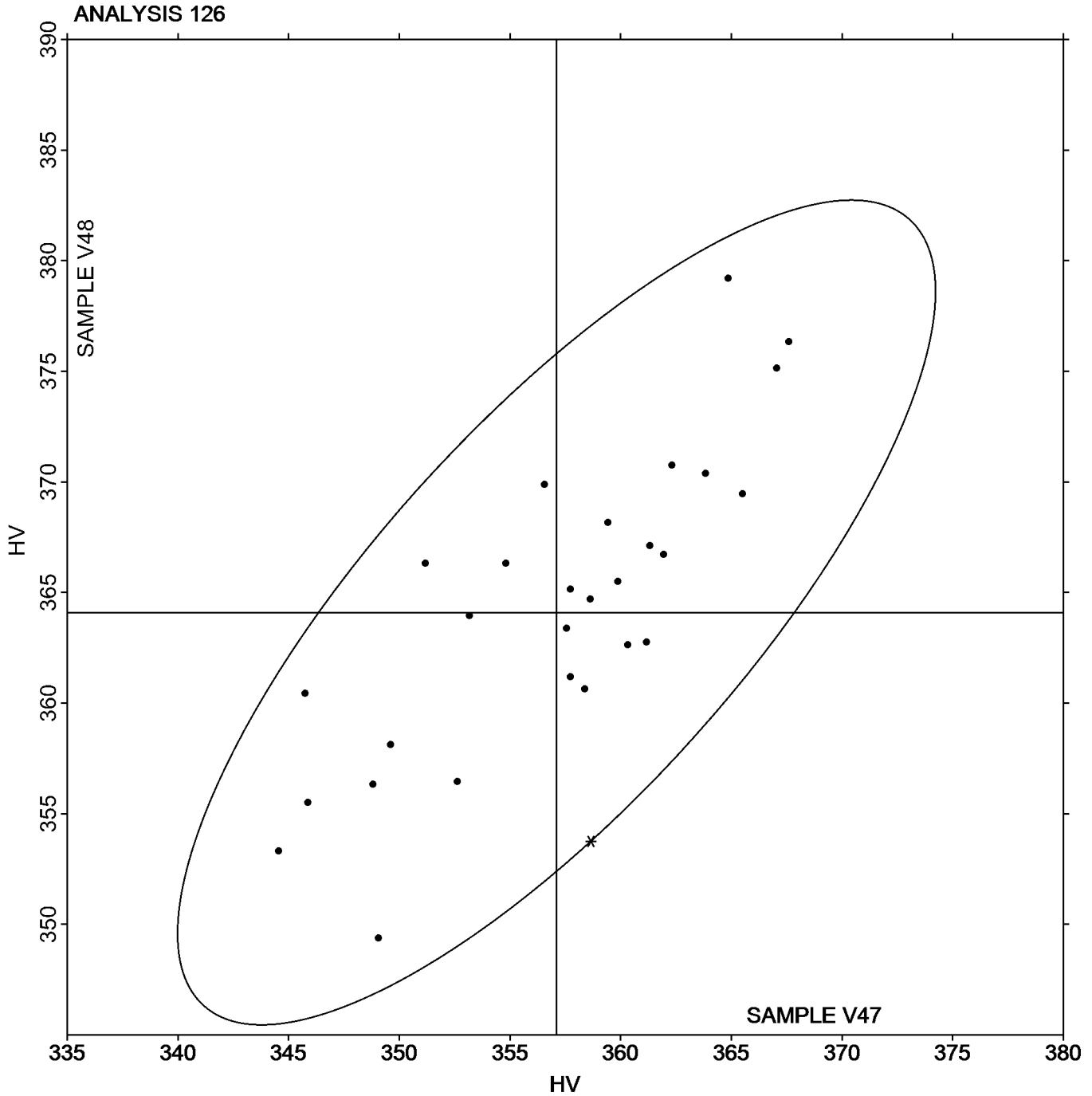
Vickers Hardness: Externally Threaded Fasteners  
ASTM E92

SAMPLE V47

SAMPLE V48

357.10 HV

364.10 HV





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 127

Fastener Wedge Tensile (10 degree) - Metric  
ASTM F606M

WebCode	Data Flag	Sample B47			Sample B48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
484BNJ	X	15,298	14,149	1,616.00	15,715	14,551	1,274.28
72QWPN		1,160	11	1.29	1,180	16	1.39
8973FM		1,143	-5	-0.62	1,164	0	0.02
8KJXGK		1,167	18	2.11	1,182	18	1.56
8W9YQZ		1,140	-8	-0.96	1,163	-1	-0.07
8Z9AMZ		1,151	3	0.30	1,158	-6	-0.51
8ZQFAZ		1,137	-11	-1.30	1,147	-17	-1.47
9T6XGA		1,158	10	1.15	1,158	-6	-0.56
BMGFAX		1,149	1	0.06	1,165	0	0.04
CX8N66		1,142	-7	-0.78	1,171	7	0.59
DUM29B		1,163	15	1.68	1,184	19	1.70
EW4P2M		1,158	9	1.06	1,171	7	0.59
FJVJ9Z		1,141	-8	-0.88	1,154	-10	-0.88
GUV6GJ		1,152	4	0.45	1,157	-7	-0.65
H6AMNG		1,146	-2	-0.27	1,162	-2	-0.14
HTVTRU		1,140	-8	-0.96	1,152	-13	-1.10
J7G3WU		1,150	1	0.14	1,163	-1	-0.10
KQ4EGP		1,153	5	0.56	1,163	-1	-0.07
KVUL2J		1,143	-5	-0.60	1,175	11	0.94
L2YZ3E	*	1,158	10	1.13	1,200	36	3.11
LCGWC8		1,146	-3	-0.31	1,163	-1	-0.09
MJUCAA		1,146	-2	-0.27	1,152	-12	-1.06
MZYU7Z	X	65,691	64,543	7,371.50	66,884	65,720	5,755.53
NPH8WY		1,145	-4	-0.42	1,164	0	-0.01
Q8RT4W		1,147	-1	-0.16	1,164	0	0.02
RYARBZ	*	1,164	16	1.82	1,155	-9	-0.80
U3MJTZ		1,143	-6	-0.63	1,163	-2	-0.13
V7XQAB		1,135	-13	-1.53	1,150	-14	-1.24
VKKQBB		1,142	-6	-0.73	1,153	-11	-0.94
WBQG9E		1,136	-12	-1.42	1,162	-2	-0.21
ZEFLKM		1,149	1	0.07	1,165	1	0.05

### Summary Statistics

	Sample B47		Sample B48	
<b>Grand Means</b>	1,148	MPa	1,164	MPa
<b>Std Dev Btwn Labs</b>	9	MPa	11	MPa

Samples B47, B48 : M10x1.5x70, M10x1.5x75

Statistics based on 29 of 31 reporting participants

### Comments on Assigned Data Flags for Test #127

484BNJ (X) - Extreme data.

MZYU7Z (X) - Extreme data.



Analysis 127

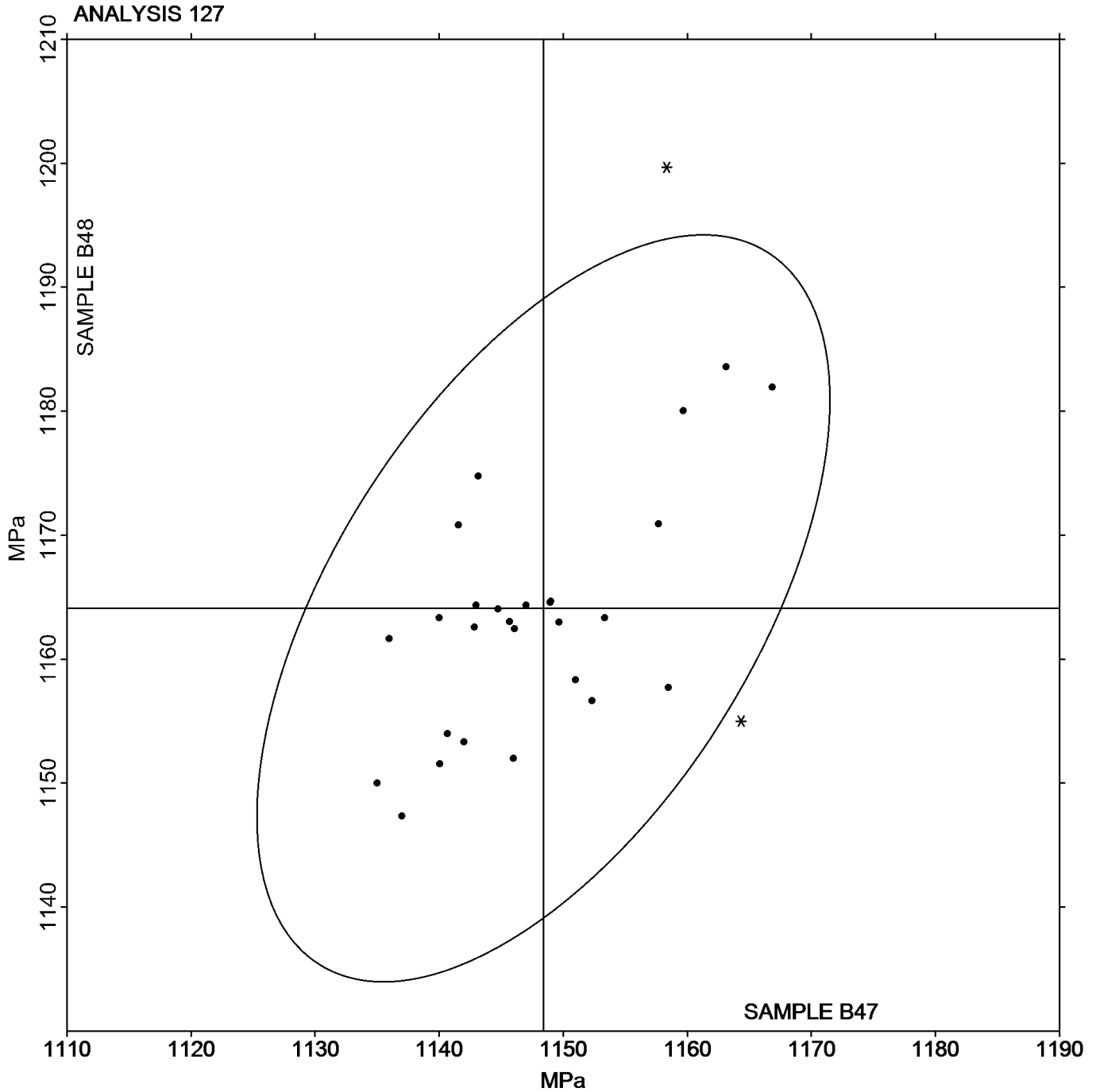
Fastener Wedge Tensile (10 degree) - Metric  
ASTM F606M

SAMPLE B47

SAMPLE B48

1,148 MPa

1,164 MPa





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 128**

**Fastener Axial Tensile - Metric**  
**ASTM F606M**

WebCode	Data Flag	<b>Sample T47</b>			<b>Sample T48</b>		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
3L7EF6		1,140	-15	-1.88	1,165	-6	-0.66
3VYN8M		1,171	16	1.95	1,179	8	0.80
84BFF8		1,154	-2	-0.21	1,189	18	1.80
8KJXGK		1,160	5	0.64	1,179	8	0.83
9T6XGA		1,154	-2	-0.21	1,160	-12	-1.20
CX8N66		1,158	2	0.30	1,170	-1	-0.13
EJ2G2K		1,156	1	0.09	1,174	3	0.27
FJVJ9Z		1,150	-5	-0.66	1,156	-15	-1.56
JZQM9M		1,146	-9	-1.16	1,168	-3	-0.34
KVUL2J		1,152	-3	-0.41	1,159	-12	-1.22
LXFRUE		1,155	0	-0.04	1,175	4	0.41
RYARBZ		1,156	1	0.13	1,170	-1	-0.10
ZGJQ6G		1,167	12	1.46	1,182	11	1.12

**Summary Statistics**

	<b>Sample T47</b>		<b>Sample T48</b>	
<b>Grand Means</b>	1,155	MPa	1,171	MPa
<b>Std Dev Btwn Labs</b>	8	MPa	10	MPa

Samples T47, T48 : M10x1.5x70, M10x1.5x75

Statistics based on 13 of 13 reporting participants





Analysis 128

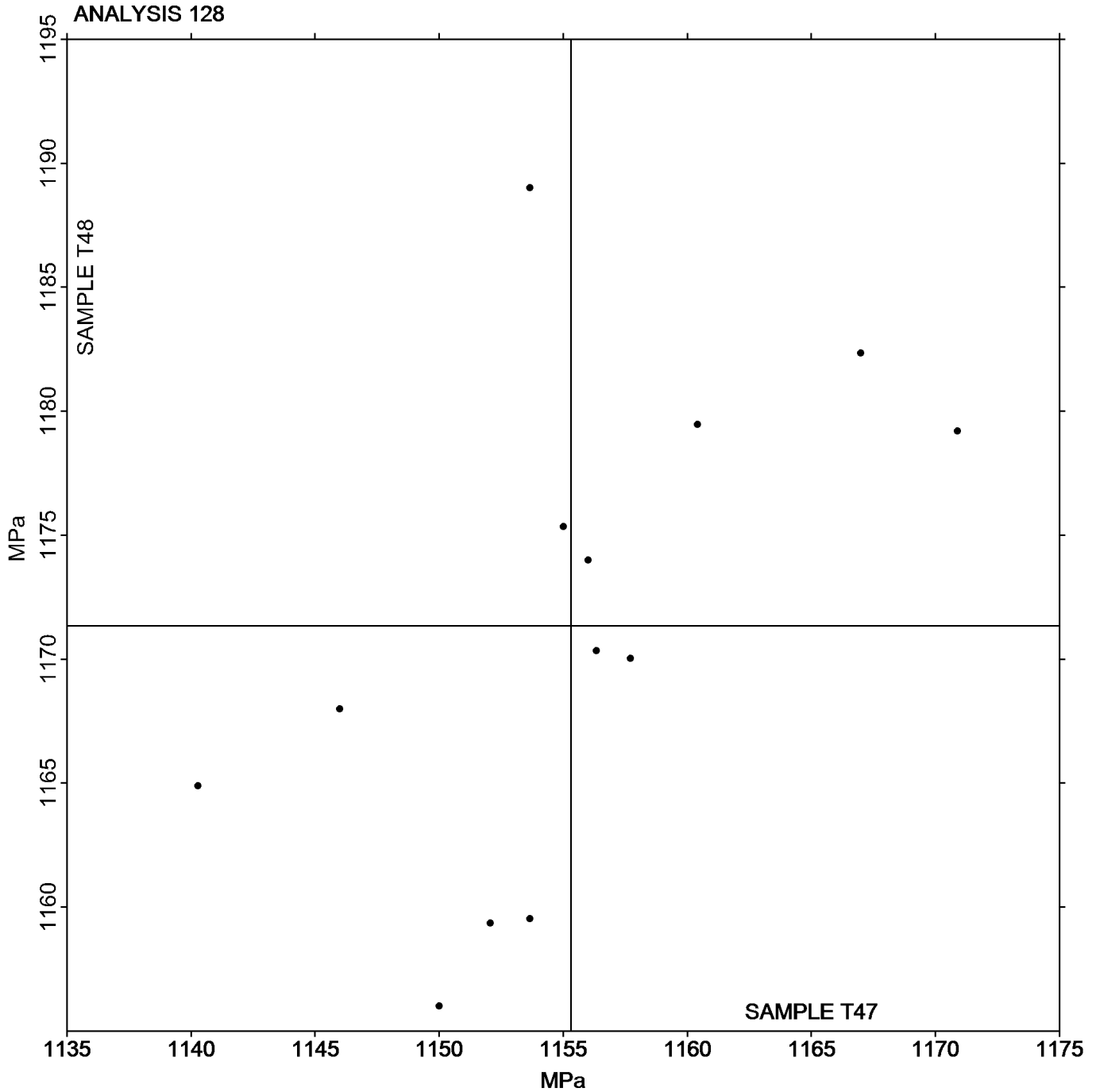
Fastener Axial Tensile - Metric  
ASTM F606M

SAMPLE T47

SAMPLE T48

1,155 MPa

1,171 MPa





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 129

Fastener Double Shear  
NASM 1312-13

WebCode	Data Flag	Sample Z47			Sample Z48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2VUELV		19,525	149	0.33	22,222	737	1.28
3CHNTD		19,291	-84	-0.19	21,688	203	0.35
3DWG2E		19,143	-232	-0.51	21,533	49	0.08
3Z7JZG		19,245	-131	-0.29	21,438	-47	-0.08
6UCW9M		19,235	-140	-0.31	21,638	154	0.27
7VKDWK	*	19,907	531	1.17	20,024	-1,460	-2.53
8AXUB7		19,265	-110	-0.24	21,913	429	0.74
9DQEDT		18,967	-409	-0.90	21,109	-375	-0.65
9M6WCV		19,200	-176	-0.39	21,770	286	0.49
CLBWR8		19,083	-293	-0.64	20,920	-564	-0.98
EATAEC		19,142	-234	-0.51	20,341	-1,143	-1.98
EJG3Q9		20,211	836	1.84	22,144	659	1.14
HN29RE		19,014	-361	-0.79	21,384	-100	-0.17
JWBZW3		19,768	392	0.86	22,076	592	1.02
KP72TW	X	19.77	-19,356	-42.53	21.90	-21,462	-37.15
P4CQXZ		20,190	815	1.79	21,625	141	0.24
P7J77Q		18,978	-397	-0.87	21,122	-363	-0.63
PFMC6Y		18,789	-587	-1.29	21,251	-233	-0.40
Q8RT4W		19,001	-375	-0.82	21,670	186	0.32
QPPRQX		19,925	550	1.21	21,330	-154	-0.27
RDTQBU		18,911	-465	-1.02	21,240	-244	-0.42
X4MFF6		20,250	874	1.92	22,517	1,032	1.79
ZEZCFT		19,223	-152	-0.33	21,700	216	0.37

### Summary Statistics

	Sample Z47		Sample Z48	
<b>Grand Means</b>	19,376	1b	21,484	1b
<b>Stnd Dev Btwn Labs</b>	455	1b	578	1b

Samples Z47, Z48 : 3/8-16x2 1/4, 3/8-16x2 1/4

Statistics based on 22 of 23 reporting participants

### Comments on Assigned Data Flags for Test #129

KP72TW (X) - Data appears to be off by a factor of one thousand.



Analysis 129

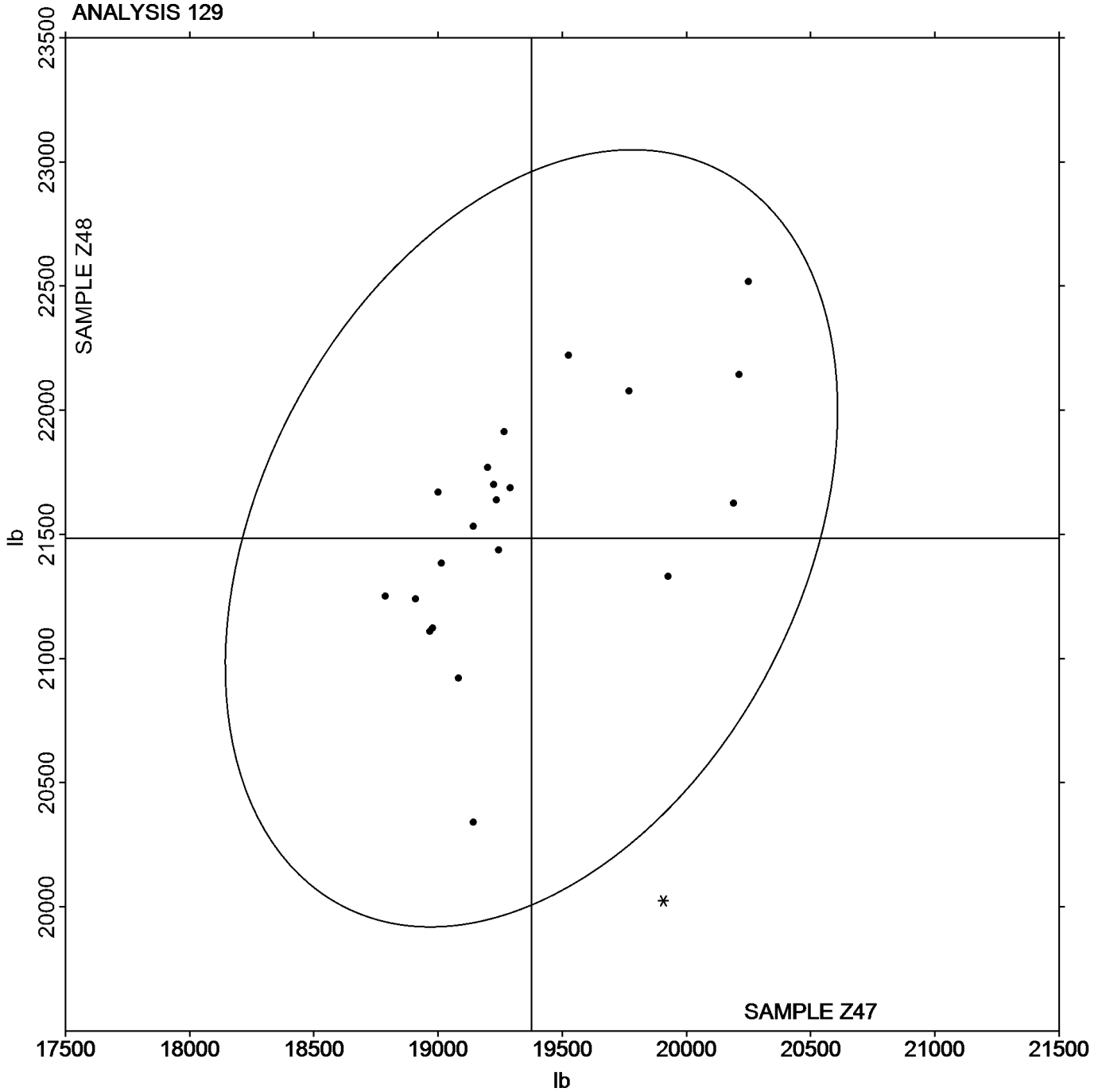
Fastener Double Shear  
NASM 1312-13

SAMPLE Z47

SAMPLE Z48

19,376 lb

21,484 lb





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 130

Tensile Strength: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
22ZPMG		75.04	-1.59	-1.65	68.15	-2.39	-2.06
2GFBZZ		76.50	-0.13	-0.14	70.30	-0.24	-0.21
3ABU6K	*	74.70	-1.93	-2.01	71.20	0.66	0.57
3CH66V		77.59	0.95	0.99	71.57	1.03	0.88
3CK9PT		77.10	0.47	0.48	71.80	1.26	1.09
3DEW73		76.90	0.27	0.28	71.90	1.36	1.17
3GUVN4		78.16	1.53	1.59	71.13	0.59	0.51
3MXPZ7		76.24	-0.40	-0.41	70.99	0.44	0.38
3QXJBU		76.00	-0.63	-0.66	70.40	-0.14	-0.12
3Z4JQM		77.56	0.93	0.96	72.23	1.69	1.46
47AKH6		76.80	0.17	0.17	69.50	-1.04	-0.90
4DRVW7	*	79.20	2.57	2.66	70.40	-0.14	-0.12
4JYE2P		75.80	-0.83	-0.86	70.30	-0.24	-0.21
4LLECK		76.00	-0.63	-0.66	71.00	0.46	0.40
4N4AN7		75.80	-0.83	-0.86	70.70	0.16	0.14
4PLRQX		75.70	-0.93	-0.97	68.60	-1.94	-1.67
4TJNJR		76.15	-0.49	-0.51	70.20	-0.34	-0.29
66FGLU		76.78	0.15	0.15	71.76	1.22	1.05
68WHA9		76.47	-0.16	-0.17	71.85	1.31	1.13
6GM73P		76.49	-0.14	-0.14	70.23	-0.31	-0.27
6GR3PM		77.60	0.97	1.00	70.60	0.06	0.05
6LE99B		75.87	-0.76	-0.79	69.63	-0.91	-0.78
77EZGL		76.58	-0.05	-0.05	71.79	1.25	1.08
7BUJPV		75.87	-0.76	-0.79	68.25	-2.29	-1.97
7CA94M	*	75.13	-1.50	-1.56	71.94	1.40	1.21
7KX7NZ	*	74.85	-1.78	-1.85	71.78	1.24	1.07
7PVJUX		76.70	0.07	0.07	70.90	0.36	0.31
7WUKYD	X	79.47	2.84	2.95	74.09	3.55	3.06
7XCWW4		77.25	0.62	0.64	70.25	-0.29	-0.25
828KW6		76.30	-0.33	-0.35	68.90	-1.64	-1.41
86HXCH		77.10	0.47	0.48	70.60	0.06	0.05
8973FM		77.45	0.82	0.85	71.94	1.40	1.21
8GWQ4X	X	57.00	-19.63	-20.37	95.40	24.86	21.42
8KW2ZX		76.16	-0.48	-0.49	70.13	-0.41	-0.36
8ZUJ3W		76.50	-0.13	-0.14	70.50	-0.04	-0.03
922D2T		76.65	0.02	0.02	69.26	-1.28	-1.11
93TN43		77.00	0.37	0.38	71.40	0.86	0.74
A8LXHD	X	40.00	-36.63	-38.01	28.00	-42.54	-36.66
AE44JR		77.60	0.96	1.00	69.62	-0.92	-0.79
AGR6BF		77.20	0.57	0.59	71.80	1.26	1.09
AME6JF		77.30	0.67	0.69	70.60	0.06	0.05
AP2JAB		76.20	-0.43	-0.45	70.90	0.36	0.31
AQ3ALK		77.00	0.37	0.38	71.20	0.66	0.57
BNJKFQ		77.00	0.37	0.38	69.70	-0.84	-0.72
BPYJXU		75.30	-1.33	-1.38	69.90	-0.64	-0.55
C2RH4Q		78.03	1.40	1.45	72.60	2.06	1.77
C4ELQP		76.50	-0.13	-0.14	72.00	1.46	1.26



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 130

Tensile Strength: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
C7GR2P		75.70	-0.93	-0.97	71.31	0.77	0.66
CGKBRD		77.58	0.95	0.98	70.75	0.21	0.18
CR229V		75.70	-0.93	-0.97	69.20	-1.34	-1.16
CYENUD	X	104.48	27.84	28.89	105.53	34.99	30.15
D9Z76P		76.90	0.27	0.28	70.80	0.26	0.22
DGGK8V		78.00	1.37	1.42	70.20	-0.34	-0.29
DHABDA		77.50	0.87	0.90	71.50	0.96	0.83
DHUL3M		76.41	-0.23	-0.24	68.93	-1.61	-1.39
DNXLHJ		78.82	2.19	2.27	72.14	1.60	1.38
DY32GJ		75.60	-1.03	-1.07	70.40	-0.14	-0.12
E7RDLB		77.03	0.40	0.41	71.53	0.99	0.86
E94ATF		77.00	0.37	0.38	69.60	-0.94	-0.81
ED9VUC		75.50	-1.14	-1.18	69.12	-1.42	-1.22
EJ3AZR		78.13	1.50	1.56	70.69	0.15	0.13
EMZT2Q		77.20	0.57	0.59	69.00	-1.54	-1.33
EYGFBQ		77.60	0.96	1.00	69.62	-0.92	-0.79
F2UZDR		76.30	-0.33	-0.35	70.70	0.16	0.14
F79CDK		77.50	0.87	0.90	70.40	-0.14	-0.12
FQCA22		77.50	0.87	0.90	71.30	0.76	0.65
FQDUJF		77.52	0.89	0.92	71.26	0.72	0.62
FVCJAH		75.90	-0.73	-0.76	70.60	0.06	0.05
FXJU98		76.40	-0.23	-0.24	71.50	0.96	0.83
G42TVX		75.44	-1.20	-1.24	71.02	0.48	0.42
GL27JJ		77.80	1.17	1.21	70.70	0.16	0.14
GP2FPE		77.65	1.02	1.06	71.11	0.57	0.49
H6P63M		77.20	0.57	0.59	69.70	-0.84	-0.72
HACJLG		76.68	0.04	0.05	71.78	1.24	1.07
HDLG8B		74.88	-1.75	-1.82	70.03	-0.51	-0.44
HUNYFV		76.11	-0.52	-0.54	69.95	-0.59	-0.51
JAZXZL		77.10	0.47	0.48	70.60	0.06	0.05
JM4HX6		76.80	0.17	0.17	71.00	0.46	0.40
JMLAAB		76.40	-0.23	-0.24	70.10	-0.44	-0.38
JUZ8TN		75.57	-1.07	-1.11	70.63	0.09	0.08
JVFCHD		74.94	-1.69	-1.76	70.72	0.18	0.16
JW6RJ9		76.55	-0.08	-0.08	72.80	2.25	1.94
KJYA9K		76.54	-0.09	-0.10	69.58	-0.96	-0.83
KMKUGB		75.98	-0.65	-0.68	70.43	-0.11	-0.09
KUGNE9		76.87	0.24	0.25	71.07	0.53	0.46
LB7PVD	*	76.19	-0.44	-0.46	67.66	-2.88	-2.48
LW2ZQJ		75.95	-0.68	-0.71	69.44	-1.10	-0.95
MFARFJ		76.73	0.09	0.10	71.36	0.82	0.71
MFWB7C		77.80	1.17	1.21	70.40	-0.14	-0.12
MPFYUJ		76.80	0.17	0.17	72.10	1.56	1.34
MTXQV8		76.20	-0.43	-0.45	69.97	-0.57	-0.49
PDGVPG		76.93	0.30	0.31	70.37	-0.17	-0.14
PQ6ZT7	*	79.20	2.57	2.66	72.60	2.06	1.77
Q4P8GE		76.87	0.24	0.25	71.50	0.96	0.83



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 130

Tensile Strength: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QF3ZXE		76.30	-0.33	-0.35	69.10	-1.44	-1.24
QGCLDL		74.76	-1.87	-1.94	69.14	-1.40	-1.21
QL8L2B		76.44	-0.19	-0.20	68.49	-2.05	-1.77
QPRNTG		78.15	1.51	1.57	70.90	0.35	0.31
QZ8DT8		74.55	-2.08	-2.16	69.33	-1.21	-1.04
R34T99		76.27	-0.36	-0.38	68.28	-2.26	-1.95
R79JXV		76.03	-0.60	-0.63	70.31	-0.23	-0.19
R7VY6L		77.43	0.80	0.83	71.44	0.90	0.78
RCX4W6		74.66	-1.98	-2.05	68.74	-1.81	-1.56
RKNEW6		77.60	0.97	1.00	71.30	0.76	0.65
RN6LED		76.35	-0.28	-0.29	71.53	0.98	0.85
RWKUUF	X	71.70	-4.93	-5.12	75.90	5.36	4.62
RXEKZV		76.00	-0.63	-0.66	71.10	0.56	0.48
RZ4FUV		79.00	2.37	2.46	72.00	1.46	1.26
TJR VFJ		74.71	-1.92	-1.99	68.46	-2.08	-1.79
TN2Z6X		76.87	0.23	0.24	72.49	1.95	1.68
UYK9M6		77.71	1.08	1.12	71.66	1.12	0.96
V6NC9W		76.29	-0.34	-0.36	69.18	-1.36	-1.17
V7V7V3		76.96	0.33	0.34	71.62	1.08	0.93
VH8TNZ		77.70	1.07	1.11	69.10	-1.44	-1.24
W7TX7F	X	79.76	3.13	3.24	71.74	1.20	1.03
W88M6L	X	72.90	-3.73	-3.87	67.20	-3.34	-2.88
W94G4W		77.50	0.87	0.90	71.70	1.16	1.00
WQJKXC		77.10	0.47	0.48	70.90	0.36	0.31
X3L74T		75.51	-1.12	-1.17	69.05	-1.49	-1.29
X788MZ		76.60	-0.03	-0.03	70.00	-0.54	-0.47
X8JJBQ		75.90	-0.73	-0.76	71.60	1.06	0.91
XL3PEJ		76.30	-0.33	-0.35	69.00	-1.54	-1.33
XMGZB4		75.86	-0.78	-0.81	68.17	-2.37	-2.04
XQYDVQ		78.26	1.63	1.69	72.10	1.56	1.34
YFCPKP		75.10	-1.53	-1.59	69.88	-0.66	-0.57
YGLB2W		76.20	-0.43	-0.45	71.40	0.86	0.74
YVNK67		77.80	1.17	1.21	73.20	2.66	2.29
YXPXHX		76.58	-0.05	-0.05	70.78	0.24	0.21
YXRTE4		76.20	-0.43	-0.45	68.80	-1.74	-1.50
ZFBYAZ		77.00	0.37	0.38	70.20	-0.34	-0.29
ZG2UKU		76.80	0.17	0.17	71.50	0.96	0.83
ZJ9RW4		76.15	-0.49	-0.51	69.47	-1.07	-0.92
ZQ6MU2		76.10	-0.53	-0.55	68.60	-1.94	-1.67

### Summary Statistics

	Sample F47		Sample F48	
<b>Grand Means</b>	76.63	ksi	70.54	ksi
<b>Std Dev Btwn Labs</b>	0.96	ksi	1.16	ksi

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 126 of 133 reporting participants



**Comments on Assigned Data Flags for Test #130**

7WUKYD (X) - Data for both samples are high.

8GWQ4X (X) - Data for sample F47 are very low and data for sample F48 are very high.

A8LXHD (X) - Data for both samples are very low.

CYENUD (X) - Data for both samples are very high.

RWKUUF (X) - Data appear to be transposed between samples.

W7TX7F (X) - Data for sample F47 are high.

W88M6L (X) - Data for both samples are low.



Analysis 130

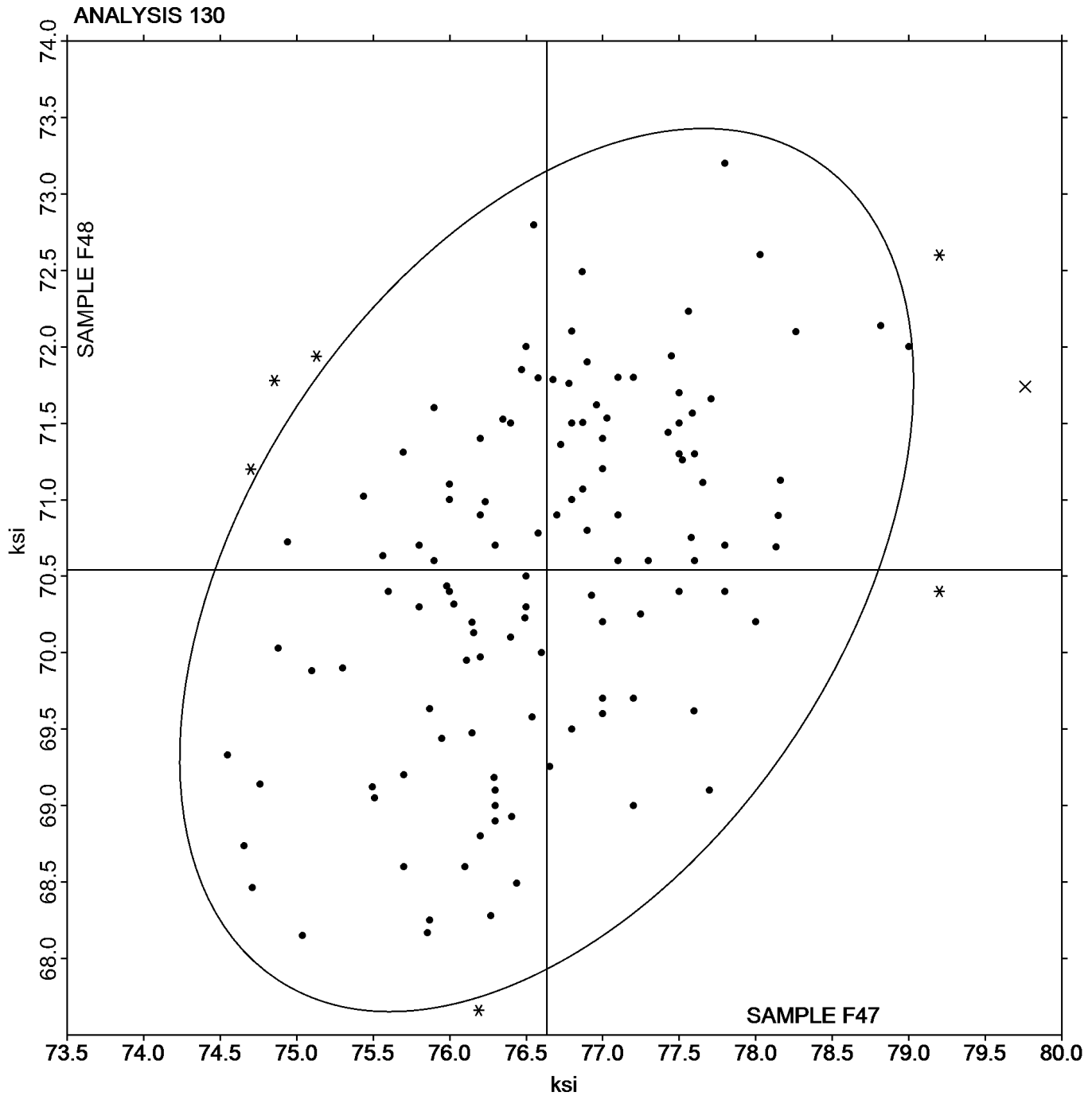
Tensile Strength: Lab-Machined Flat Steel  
ASTM E8

SAMPLE F47

76.63 ksi

SAMPLE F48

70.54 ksi







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 1311

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

The F47 samples exhibited a significant bimodal statistical distribution in their yield strength properties. Those F47 samples etched T101 through to T512 had a mean yield strength of 62.74 ksi while those etched T601 and onwards had a mean yield strength of 54.10 ksi. In order to ensure that published statistics are meaningful, CTS has split Analysis 131 into Analysis 1311 and 1312 according to the sample material that the laboratories received. This deviation is unique to the yield strength property. There was no statistically significant deviation between the groups for any other tensile property. If you have any questions, please contact CTS.

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GFBZZ		63.30	0.56	0.38	38.80	-0.56	-0.65
3ABU6K		61.20	-1.54	-1.05	40.10	0.74	0.86
3CH66V		62.97	0.23	0.16	41.23	1.88	2.18
3GUVN4		64.56	1.81	1.24	39.51	0.15	0.18
4PLRQX		63.00	0.26	0.18	39.00	-0.36	-0.41
66FGLU		61.34	-1.40	-0.96	39.83	0.47	0.55
6GR3PM		63.90	1.16	0.79	39.80	0.44	0.51
7CA94M		60.63	-2.12	-1.44	38.58	-0.78	-0.90
7KX7NZ		61.19	-1.55	-1.06	40.15	0.79	0.92
7PVJUX		62.50	-0.24	-0.17	39.40	0.04	0.05
7XCWW4		62.16	-0.58	-0.40	39.75	0.39	0.46
8ZUJ3W		62.20	-0.54	-0.37	39.50	0.14	0.17
922D2T		65.17	2.43	1.66	40.14	0.78	0.90
A8LXHD	X	24.00	-38.74	-26.45	16.00	-23.36	-27.10
AE44JR		64.83	2.09	1.43	38.58	-0.78	-0.90
BNJKFQ		62.10	-0.64	-0.44	39.40	0.04	0.05
C2RH4Q		62.77	0.03	0.02	40.60	1.24	1.44
CGKBRD		63.89	1.15	0.78	38.91	-0.44	-0.51
CR229V		62.40	-0.34	-0.23	39.60	0.24	0.28
DHUL3M		63.59	0.85	0.58	38.99	-0.36	-0.42
DNXLHJ		64.80	2.06	1.40	40.25	0.89	1.03
E94ATF		62.30	-0.44	-0.30	39.30	-0.06	-0.07
EJ3AZR		64.61	1.87	1.28	38.78	-0.57	-0.67
EMZT2Q		63.40	0.66	0.45	37.65	-1.71	-1.98
EYGFBQ		64.54	1.80	1.23	40.61	1.25	1.45
F79CDK		64.00	1.26	0.86	39.50	0.14	0.17
FQDUJF		63.72	0.97	0.66	39.68	0.33	0.38
GL27JJ		64.40	1.66	1.13	39.30	-0.06	-0.07
GP2FPE		64.01	1.26	0.86	38.97	-0.39	-0.45
H6P63M		64.70	1.96	1.34	38.70	-0.66	-0.76
LB7PVD		62.38	-0.36	-0.25	38.55	-0.81	-0.94
MFWB7C		63.10	0.36	0.24	39.60	0.24	0.28
PDGVPG	X	55.06	-7.69	-5.25	39.19	-0.17	-0.20
PQ6ZT7	*	61.70	-1.04	-0.71	41.60	2.24	2.60
QF3ZXE		61.60	-1.14	-0.78	38.70	-0.66	-0.76
QL8L2B		63.69	0.95	0.65	39.87	0.51	0.59
QPRNTG		64.14	1.39	0.95	39.74	0.38	0.44
QZ8DT8		60.92	-1.83	-1.25	39.60	0.24	0.28
R34T99		64.08	1.34	0.91	39.98	0.62	0.72
RKNEW6		64.90	2.16	1.47	39.50	0.14	0.17
RZ4FUV		61.60	-1.14	-0.78	39.20	-0.16	-0.18



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 1311

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

The F47 samples exhibited a significant bimodal statistical distribution in their yield strength properties. Those F47 samples etched T101 through to T512 had a mean yield strength of 62.74 ksi while those etched T601 and onwards had a mean yield strength of 54.10 ksi. In order to ensure that published statistics are meaningful, CTS has split Analysis 131 into Analysis 1311 and 1312 according to the sample material that the laboratories received. This deviation is unique to the yield strength property. There was no statistically significant deviation between the groups for any other tensile property. If you have any questions, please contact CTS.

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
UYK9M6		61.32	-1.42	-0.97	40.49	1.13	1.31
V6NC9W	*	60.19	-2.55	-1.74	37.13	-2.23	-2.58
W94G4W		63.90	1.16	0.79	39.20	-0.16	-0.18
WQJKXC		62.50	-0.24	-0.17	39.80	0.44	0.51
X788MZ		62.80	0.06	0.04	38.40	-0.96	-1.11
XL3PEJ		61.20	-1.54	-1.05	38.20	-1.16	-1.34
XMGZB4	*	58.60	-4.15	-2.83	38.73	-0.63	-0.73
XQYDVQ		61.99	-0.75	-0.51	38.48	-0.88	-1.02
YFCPKP		61.61	-1.13	-0.77	40.47	1.11	1.29
YXRTE4		62.00	-0.74	-0.51	38.30	-1.06	-1.23
ZFBYAZ		62.00	-0.74	-0.51	39.30	-0.06	-0.07
ZJ9RW4		59.90	-2.84	-1.94	39.45	0.09	0.11
ZQ6MU2		62.30	-0.44	-0.30	37.70	-1.66	-1.92

#### Summary Statistics

	Sample F47		Sample F48	
<b>Grand Means</b>	62.74	ksi	39.36	ksi
<b>Stnd Dev Btwn Labs</b>	1.46	ksi	0.86	ksi

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 52 of 54 reporting participants

#### Comments on Assigned Data Flags for Test #1311

A8LXHD (X) - Data for both samples are very low.

PDGVPG (X) - Data for sample F47 are low.



Analysis 1311

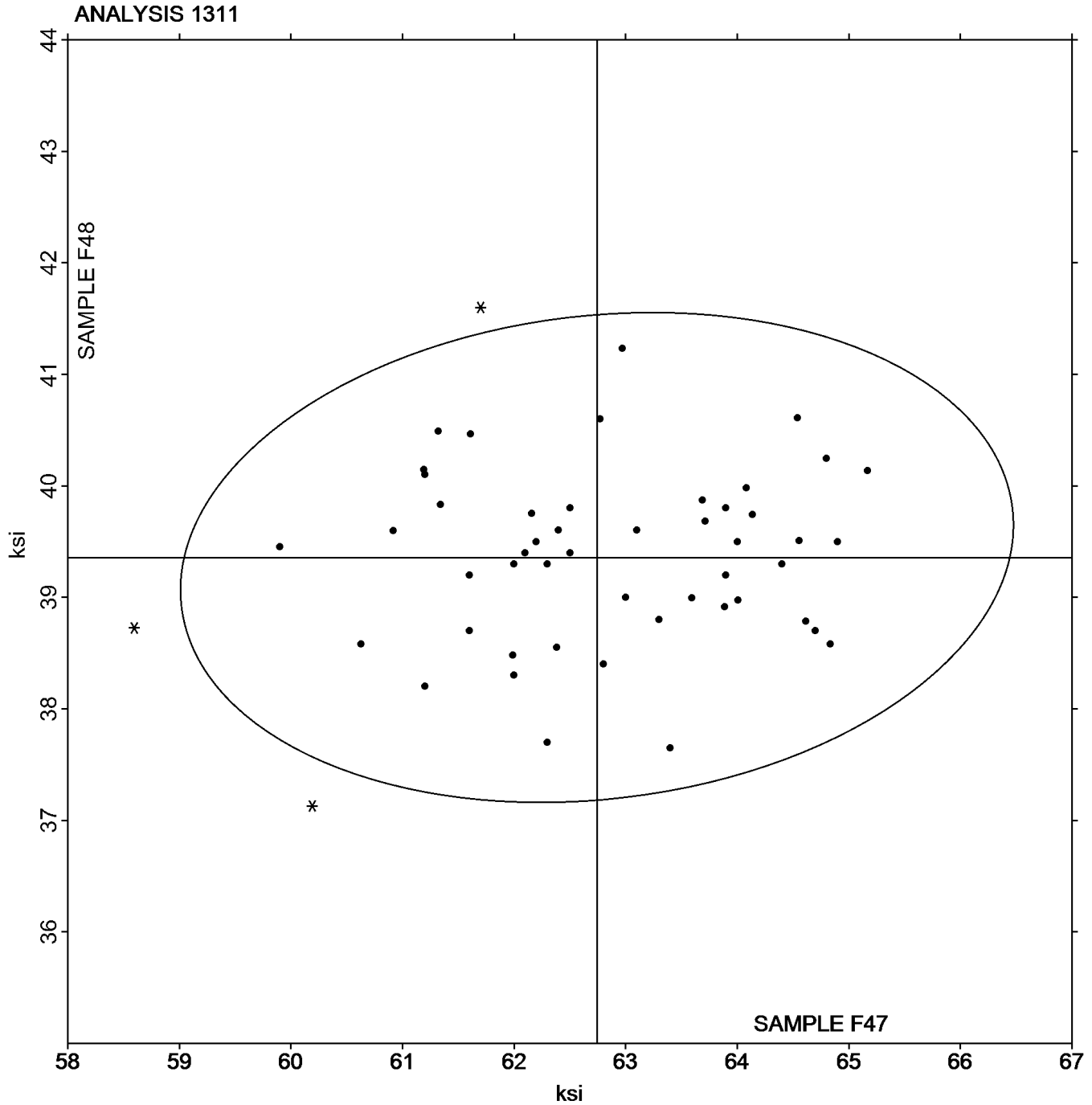
Yield Strength: Lab-Machined Flat Steel  
ASTM E8

SAMPLE F47

SAMPLE F48

62.74 ksi

39.36 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 1312

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

The F47 samples exhibited a significant bimodal statistical distribution in their yield strength properties. Those F47 samples etched T101 through to T512 had a mean yield strength of 62.74 ksi while those etched T601 and onwards had a mean yield strength of 54.10 ksi. In order to ensure that published statistics are meaningful, CTS has split Analysis 131 into Analysis 1311 and 1312 according to the sample material that the laboratories received. This deviation is unique to the yield strength property. There was no statistically significant deviation between the groups for any other tensile property. If you have any questions, please contact CTS.

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
22ZPMG		52.14	-1.96	-1.56	38.05	-1.95	-1.25
3CK9PT	X	45.20	-8.90	-7.09	39.70	-0.30	-0.19
3DEW73		53.90	-0.20	-0.16	39.30	-0.70	-0.45
3MXPZ7		54.64	0.54	0.43	38.48	-1.52	-0.97
3QXJBU		55.40	1.30	1.04	42.50	2.50	1.60
3Z4JQM		54.58	0.48	0.39	40.82	0.82	0.53
47AKH6		54.40	0.30	0.24	43.20	3.20	2.05
4DRVW7	X	58.60	4.50	3.59	41.00	1.00	0.64
4JYE2P		52.50	-1.60	-1.27	40.40	0.40	0.26
4LLECK		55.50	1.40	1.12	41.00	1.00	0.64
4N4AN7		52.90	-1.20	-0.95	38.40	-1.60	-1.03
4TJNJR		52.07	-2.03	-1.61	38.87	-1.13	-0.72
68WHA9		54.47	0.37	0.30	37.66	-2.34	-1.50
6GM73P		52.71	-1.39	-1.11	39.89	-0.11	-0.07
6LE99B		51.75	-2.34	-1.87	37.18	-2.82	-1.81
77EZGL	X	56.28	2.18	1.74	46.99	6.99	4.48
7BUJPV		52.43	-1.67	-1.33	39.71	-0.29	-0.19
7WUKYD		56.10	2.00	1.60	40.60	0.60	0.38
828KW6		53.60	-0.50	-0.39	38.90	-1.10	-0.70
86HXCH		53.70	-0.40	-0.32	41.10	1.10	0.70
8973FM		54.10	0.00	0.00	39.60	-0.40	-0.26
8GWQ4X	X	30.80	-23.30	-18.56	68.90	28.90	18.51
8KW2ZX		54.24	0.15	0.12	40.19	0.19	0.12
93TN43		53.80	-0.30	-0.24	40.00	0.00	0.00
AGR6BF		55.00	0.90	0.72	38.50	-1.50	-0.96
AME6JF	X	50.30	-3.80	-3.02	39.80	-0.20	-0.13
AP2JAB		53.80	-0.30	-0.24	39.40	-0.60	-0.38
AQ3ALK		53.40	-0.70	-0.55	40.80	0.80	0.51
BPYJXU		54.30	0.20	0.16	39.30	-0.70	-0.45
C4ELQP		53.00	-1.10	-0.87	40.60	0.60	0.38
C7GR2P		56.81	2.72	2.17	42.62	2.62	1.68
CYENUD	X	80.62	26.53	21.14	74.21	34.21	21.92
D9Z76P		56.10	2.00	1.60	40.90	0.90	0.58
DGGK8V	*	57.60	3.50	2.79	43.00	3.00	1.92
DHABDA		53.90	-0.20	-0.16	41.50	1.50	0.96
DY32GJ		54.00	-0.10	-0.08	39.30	-0.70	-0.45
E7RDLB		55.25	1.15	0.92	39.04	-0.96	-0.61
F2UZDR		55.40	1.30	1.04	40.40	0.40	0.26
FQCA22		56.00	1.90	1.52	41.00	1.00	0.64
FVCJAH		55.20	1.10	0.88	42.70	2.70	1.73
FXJU98		53.80	-0.30	-0.24	41.70	1.70	1.09



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 1312

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

The F47 samples exhibited a significant bimodal statistical distribution in their yield strength properties. Those F47 samples etched T101 through to T512 had a mean yield strength of 62.74 ksi while those etched T601 and onwards had a mean yield strength of 54.10 ksi. In order to ensure that published statistics are meaningful, CTS has split Analysis 131 into Analysis 1311 and 1312 according to the sample material that the laboratories received. This deviation is unique to the yield strength property. There was no statistically significant deviation between the groups for any other tensile property. If you have any questions, please contact CTS.

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
G42TVX	X	51.47	-2.63	-2.10	52.64	12.64	8.10
HACJLG		53.79	-0.30	-0.24	39.73	-0.27	-0.18
HDLG8B		52.28	-1.82	-1.45	38.41	-1.59	-1.02
JAZXZL		54.00	-0.10	-0.08	39.50	-0.50	-0.32
JM4HX6	*	51.70	-2.40	-1.91	40.70	0.70	0.45
JMLAAB		53.00	-1.10	-0.87	40.20	0.20	0.13
JUZ8TN		54.24	0.15	0.12	41.05	1.05	0.67
JVFCHD		53.59	-0.50	-0.40	38.79	-1.21	-0.78
JW6RJ9	X	66.57	12.48	9.94	63.31	23.31	14.93
KJYA9K		55.37	1.27	1.02	40.91	0.91	0.58
KMKUGB	X	53.55	-0.54	-0.43	52.34	12.34	7.90
KUGNE9		52.94	-1.16	-0.92	38.87	-1.13	-0.72
LW2ZQJ		53.06	-1.03	-0.82	36.41	-3.59	-2.30
MFARFJ		53.52	-0.58	-0.46	39.31	-0.69	-0.44
MPFYUJ		55.30	1.20	0.96	40.70	0.70	0.45
MTXQV8		53.35	-0.75	-0.59	38.66	-1.34	-0.86
Q4P8GE		54.01	-0.08	-0.07	40.09	0.09	0.06
R79JXV		54.39	0.29	0.23	39.73	-0.27	-0.18
R7VY6L	*	53.96	-0.14	-0.11	36.10	-3.90	-2.50
RCX4W6		54.12	0.03	0.02	40.04	0.04	0.03
RN6LED		53.97	-0.13	-0.10	39.90	-0.10	-0.06
RWKUUF	X	42.80	-11.30	-9.00	57.40	17.40	11.15
RXEKZV		55.10	1.00	0.80	41.50	1.50	0.96
TJRVFJ		52.27	-1.83	-1.45	39.65	-0.35	-0.22
TN2Z6X		53.89	-0.20	-0.16	40.07	0.07	0.05
V7V7V3		56.42	2.32	1.85	41.80	1.80	1.15
VH8TNZ	*	56.10	2.00	1.60	44.60	4.60	2.95
W88M6L		52.70	-1.40	-1.11	37.80	-2.20	-1.41
X8JJBQ		54.30	0.20	0.16	39.50	-0.50	-0.32
YGLB2W		54.50	0.40	0.32	39.60	-0.40	-0.26
YVNK67		54.40	0.30	0.24	40.70	0.70	0.45
YXPXHX		54.03	-0.07	-0.05	39.00	-1.00	-0.64
ZG2UKU		53.30	-0.80	-0.63	40.10	0.10	0.06

#### Summary Statistics

	Sample F47		Sample F48	
<b>Grand Means</b>	54.10	ksi	40.00	ksi
<b>Std Dev Btwn Labs</b>	1.25	ksi	1.56	ksi

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 64 of 74 reporting participants



**Comments on Assigned Data Flags for Test #1312**

- 3CK9PT (X) - Data for sample F47 are low.
- 4DRVW7 (X) - Data for sample F47 are high.
- 77EZGL (X) - Data for sample F48 are high.
- 8GWQ4X (X) - Data for sample F47 are very low and data for sample F48 are very high.
- AME6JF (X) - Data for sample F47 are low.
- CYENUD (X) - Data for both samples are very high.
- G42TVX (X) - Data for sample F48 are high.
- JW6RJ9 (X) - Data for both samples are very high.
- KMKUGB (X) - Data for sample F48 are high.
- RWKUUF (X) - Data appear to be transposed between samples.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 1312

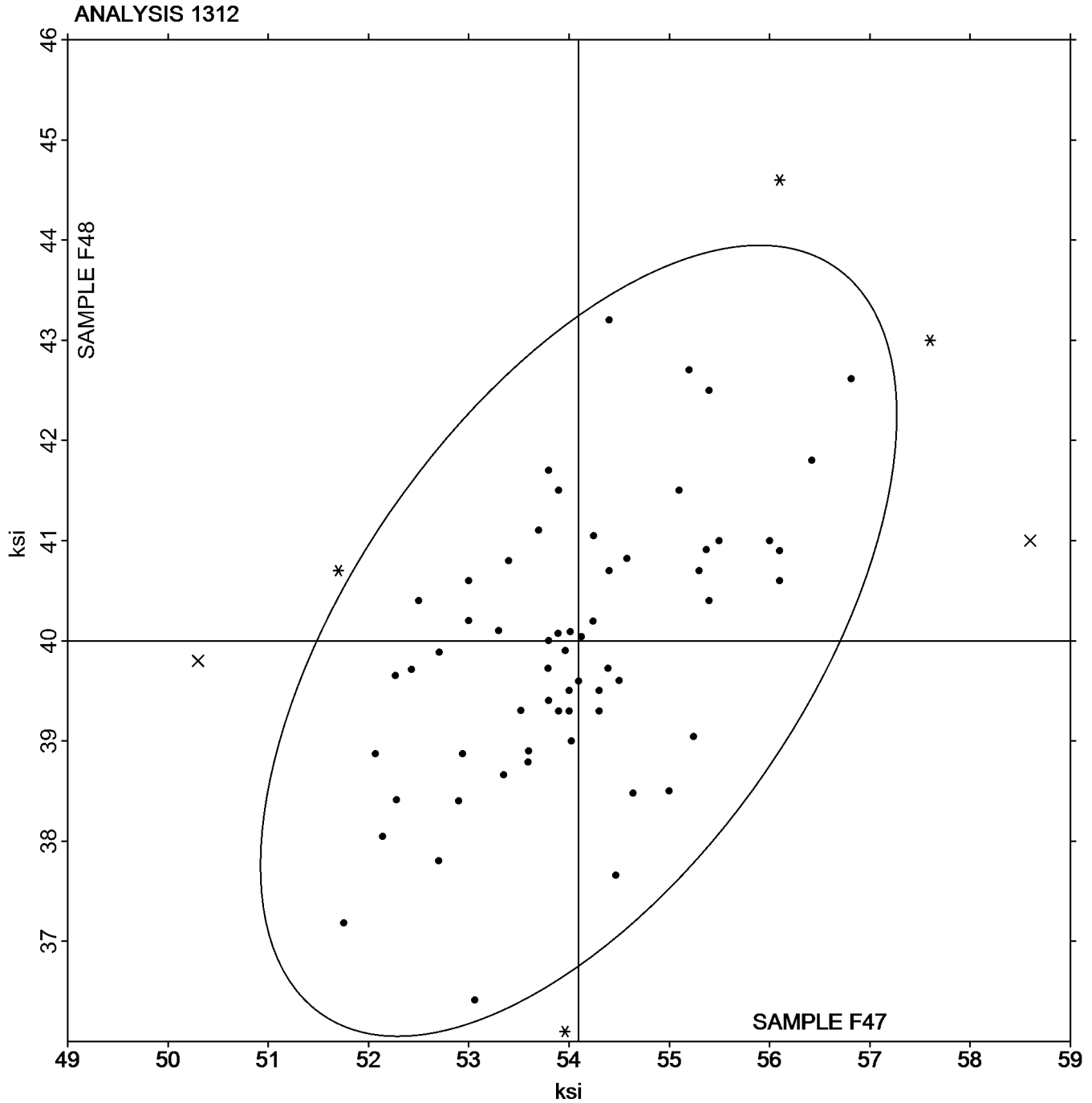
Yield Strength: Lab-Machined Flat Steel  
ASTM E8

SAMPLE F47

54.10 ksi

SAMPLE F48

40.00 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 132

Elongation: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
22ZPMG		33.00	4.42	2.09	34.00	4.24	2.04
2GFBZZ		30.00	1.42	0.67	32.00	2.24	1.08
3ABU6K		29.50	0.92	0.44	29.50	-0.26	-0.13
3CH66V		28.10	-0.48	-0.23	29.10	-0.66	-0.32
3CK9PT	X	18.60	-9.98	-4.72	19.70	-10.06	-4.85
3DEW73		30.60	2.02	0.96	31.70	1.94	0.93
3GUVN4		26.70	-1.88	-0.89	29.20	-0.56	-0.27
3MXPZ7		30.00	1.42	0.67	32.00	2.24	1.08
3QXJBU		25.50	-3.08	-1.46	27.00	-2.76	-1.33
3Z4JQM		29.23	0.65	0.31	29.43	-0.33	-0.16
47AKH6	X	13.76	-14.82	-7.02	10.73	-19.03	-9.18
4DRVW7		26.00	-2.58	-1.22	28.20	-1.56	-0.75
4JYE2P		30.00	1.42	0.67	30.10	0.34	0.16
4LLECK	*	33.00	4.42	2.09	36.00	6.24	3.01
4N4AN7		28.80	0.22	0.10	30.20	0.44	0.21
4PLRQX		23.40	-5.18	-2.45	26.00	-3.76	-1.82
4TJNJR		29.54	0.96	0.45	29.16	-0.60	-0.29
66FGLU		27.17	-1.41	-0.67	28.20	-1.56	-0.75
68WHA9	*	31.68	3.10	1.47	29.58	-0.18	-0.09
6GM73P		27.96	-0.62	-0.29	29.06	-0.70	-0.34
6GR3PM		28.50	-0.08	-0.04	31.00	1.24	0.60
6LE99B		28.37	-0.21	-0.10	29.02	-0.75	-0.36
77EZGL		31.00	2.42	1.15	31.00	1.24	0.60
7BUJPV		30.70	2.12	1.00	32.90	3.14	1.51
7CA94M		26.93	-1.65	-0.78	28.40	-1.36	-0.66
7KX7NZ		28.15	-0.43	-0.20	28.99	-0.77	-0.37
7PVJUX		32.00	3.42	1.62	33.00	3.24	1.56
7WUKYD		30.40	1.82	0.86	32.80	3.04	1.46
7XCWW4		28.00	-0.58	-0.27	30.00	0.24	0.11
828KW6		29.50	0.92	0.44	29.50	-0.26	-0.13
86HXCH		28.10	-0.48	-0.23	28.90	-0.86	-0.42
8973FM		30.00	1.42	0.67	30.00	0.24	0.11
8GWQ4X		28.50	-0.08	-0.04	28.50	-1.26	-0.61
8KW2ZX	X	30.96	2.38	1.13	36.92	7.16	3.45
8ZUJ3W		26.20	-2.38	-1.13	28.30	-1.46	-0.71
922D2T		30.35	1.77	0.84	30.46	0.70	0.34
93TN43	X	29.40	0.82	0.39	25.60	-4.16	-2.01
A8LXHD		29.00	0.42	0.20	29.00	-0.76	-0.37
AE44JR		30.90	2.32	1.10	32.10	2.34	1.13
AGR6BF		27.50	-1.08	-0.51	29.50	-0.26	-0.13
AME6JF		29.30	0.72	0.34	29.50	-0.26	-0.13
AP2JAB		27.20	-1.38	-0.65	29.50	-0.26	-0.13
AQ3ALK		30.70	2.12	1.00	30.00	0.24	0.11
BNJKFQ		26.80	-1.78	-0.84	28.70	-1.06	-0.51
BPYJXU		30.80	2.22	1.05	31.50	1.74	0.84
C2RH4Q		28.49	-0.09	-0.04	29.33	-0.43	-0.21
C4ELQP		28.00	-0.58	-0.27	29.00	-0.76	-0.37





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 132

Elongation: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
C7GR2P		26.01	-2.57	-1.22	27.31	-2.45	-1.18
CGKBRD		27.10	-1.48	-0.70	28.10	-1.66	-0.80
CR229V		28.60	0.02	0.01	31.20	1.44	0.69
CYENUD	X	24.30	-4.28	-2.03	21.98	-7.79	-3.76
D9Z76P		26.90	-1.68	-0.80	27.70	-2.06	-1.00
DGGK8V	X	27.80	-0.78	-0.37	20.60	-9.16	-4.42
DHABDA		30.50	1.92	0.91	30.70	0.94	0.45
DHUL3M		27.50	-1.08	-0.51	29.00	-0.76	-0.37
DNXLHJ		25.40	-3.18	-1.51	29.40	-0.36	-0.18
DY32GJ		29.50	0.92	0.44	30.30	0.54	0.26
E7RDLB		32.70	4.12	1.95	32.00	2.24	1.08
E94ATF		26.10	-2.48	-1.17	30.00	0.24	0.11
EJ3AZR		26.90	-1.68	-0.80	30.20	0.44	0.21
EMZT2Q		26.00	-2.58	-1.22	25.75	-4.01	-1.94
EYGFBQ		24.00	-4.58	-2.17	26.00	-3.76	-1.82
F2UZDR		29.00	0.42	0.20	32.50	2.74	1.32
F79CDK		27.80	-0.78	-0.37	29.90	0.14	0.07
FQCA22		29.90	1.32	0.62	29.90	0.14	0.07
FQDUJF		29.60	1.02	0.48	33.00	3.24	1.56
FVCJAH	X	25.80	-2.78	-1.32	20.80	-8.96	-4.32
FXJU98		29.40	0.82	0.39	29.50	-0.26	-0.13
G42TVX	*	27.48	-1.10	-0.52	31.94	2.18	1.05
GL27JJ		25.90	-2.68	-1.27	28.50	-1.26	-0.61
GP2FPE		29.60	1.02	0.48	31.30	1.54	0.74
H6P63M		26.70	-1.88	-0.89	29.10	-0.66	-0.32
HACJLG		28.20	-0.38	-0.18	29.10	-0.66	-0.32
HDLG8B		30.06	1.48	0.70	30.24	0.48	0.23
HUNYFV	X	58.33	29.75	14.08	54.17	24.41	11.77
JAZXZL		29.20	0.62	0.29	30.40	0.64	0.31
JM4HX6		31.70	3.12	1.48	31.40	1.64	0.79
JMLAAB		32.00	3.42	1.62	34.00	4.24	2.04
JUZ8TN		25.60	-2.98	-1.41	25.50	-4.26	-2.06
JVFCHD		26.50	-2.08	-0.98	26.50	-3.26	-1.57
JW6RJ9		31.90	3.32	1.57	32.60	2.84	1.37
KJYA9K		29.88	1.30	0.62	31.34	1.58	0.76
KMKUGB		30.35	1.77	0.84	30.33	0.57	0.27
KUGNE9		27.60	-0.98	-0.46	28.60	-1.16	-0.56
LB7PVD	X	30.00	1.42	0.67	36.00	6.24	3.01
LW2ZQJ		31.30	2.72	1.29	29.70	-0.06	-0.03
MFARFJ		30.81	2.23	1.06	30.45	0.69	0.33
MFWB7C		26.20	-2.38	-1.13	27.90	-1.86	-0.90
MPFYUJ		29.00	0.42	0.20	30.00	0.24	0.11
MTXQV8		30.00	1.42	0.67	31.00	1.24	0.60
PDGVPG		27.90	-0.68	-0.32	28.40	-1.36	-0.66
PQ6ZT7	*	27.40	-1.18	-0.56	25.80	-3.96	-1.91
Q4P8GE		27.60	-0.98	-0.46	28.20	-1.56	-0.75
QF3ZXE	*	32.00	3.42	1.62	35.00	5.24	2.53



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 132

Elongation: Lab-Machined Flat Steel  
ASTM E8

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QGCLDL		31.50	2.92	1.38	30.50	0.74	0.36
QL8L2B		30.00	1.42	0.67	33.00	3.24	1.56
QPRNTG		28.20	-0.38	-0.18	29.00	-0.76	-0.37
QZ8DT8		28.00	-0.58	-0.27	29.00	-0.76	-0.37
R34T99	*	34.00	5.42	2.57	34.00	4.24	2.04
R79JXV		26.80	-1.78	-0.84	27.70	-2.06	-1.00
R7VY6L	X	58.33	29.75	14.08	58.33	28.57	13.78
RCX4W6		28.60	0.02	0.01	30.80	1.04	0.50
RKNEW6		27.00	-1.58	-0.75	30.10	0.34	0.16
RN6LED		31.60	3.02	1.43	31.20	1.44	0.69
RWKUUF	X	27.70	-0.88	-0.42	23.90	-5.86	-2.83
RXEKZV		27.00	-1.58	-0.75	28.60	-1.16	-0.56
RZ4FUV		25.00	-3.58	-1.69	27.50	-2.26	-1.09
TJRVFJ		24.80	-3.78	-1.79	27.15	-2.61	-1.26
TN2Z6X		30.00	1.42	0.67	29.90	0.14	0.07
UYK9M6		26.30	-2.28	-1.08	28.53	-1.23	-0.60
V7V7V3		25.10	-3.48	-1.65	26.00	-3.76	-1.82
VH8TNZ	X	27.20	-1.38	-0.65	11.65	-18.11	-8.74
W7TX7F	X	58.33	29.75	14.08	54.17	24.41	11.77
W88M6L		30.00	1.42	0.67	31.50	1.74	0.84
W94G4W		24.60	-3.98	-1.88	27.00	-2.76	-1.33
WQJKXC		28.20	-0.38	-0.18	30.00	0.24	0.11
X788MZ		27.90	-0.68	-0.32	31.40	1.64	0.79
X8JJBQ		28.50	-0.08	-0.04	30.00	0.24	0.11
XL3PEJ		29.20	0.62	0.29	32.30	2.54	1.22
XMGZB4	*	25.00	-3.58	-1.69	24.00	-5.76	-2.78
XQYDVQ		28.90	0.32	0.15	29.60	-0.16	-0.08
YFCPKP		25.10	-3.48	-1.65	25.20	-4.56	-2.20
YGLB2W		28.50	-0.08	-0.04	28.50	-1.26	-0.61
YVNK67		29.80	1.22	0.58	28.80	-0.96	-0.46
YXPXHX		28.50	-0.08	-0.04	28.80	-0.96	-0.46
YXRTE4		28.40	-0.18	-0.09	30.80	1.04	0.50
ZFBYAZ		26.40	-2.18	-1.03	28.10	-1.66	-0.80
ZG2UKU		30.40	1.82	0.86	30.20	0.44	0.21
ZJ9RW4		28.40	-0.18	-0.09	30.70	0.94	0.45
ZQ6MU2		28.80	0.22	0.10	31.40	1.64	0.79

### Summary Statistics

	Sample F47		Sample F48	
<b>Grand Means</b>	28.58	Percent	29.76	Percent
<b>Std Dev Btwn Labs</b>	2.11	Percent	2.07	Percent

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 117 of 130 reporting participants



**Analysis 132**

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

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**Comments on Assigned Data Flags for Test #132**

- 3CK9PT (X) - Data for both samples are low. Possible Systematic Error.
- 47AKH6 (X) - Data for both samples are low. Possible Systematic Error.
- 8KW2ZX (X) - Data for sample F48 are high.
- 93TN43 (X) - Inconsistent in testing between samples.
- CYENUD (X) - Data for sample F48 are low.
- DGGK8V (X) - Data for sample F48 are low.
- FVCJAH (X) - Data for sample F48 are low.
- HUNYFV (X) - Data for both samples are very high. Possible Systematic Error.
- LB7PVD (X) - Data for sample F48 are high.
- R7VY6L (X) - Data for both samples are very high. Possible Systematic Error.
- RWKUUF (X) - Data for sample F48 are low.
- VH8TNZ (X) - Data for sample F48 are low.
- W7TX7F (X) - Data for both samples are very high. Possible Systematic Error.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 132

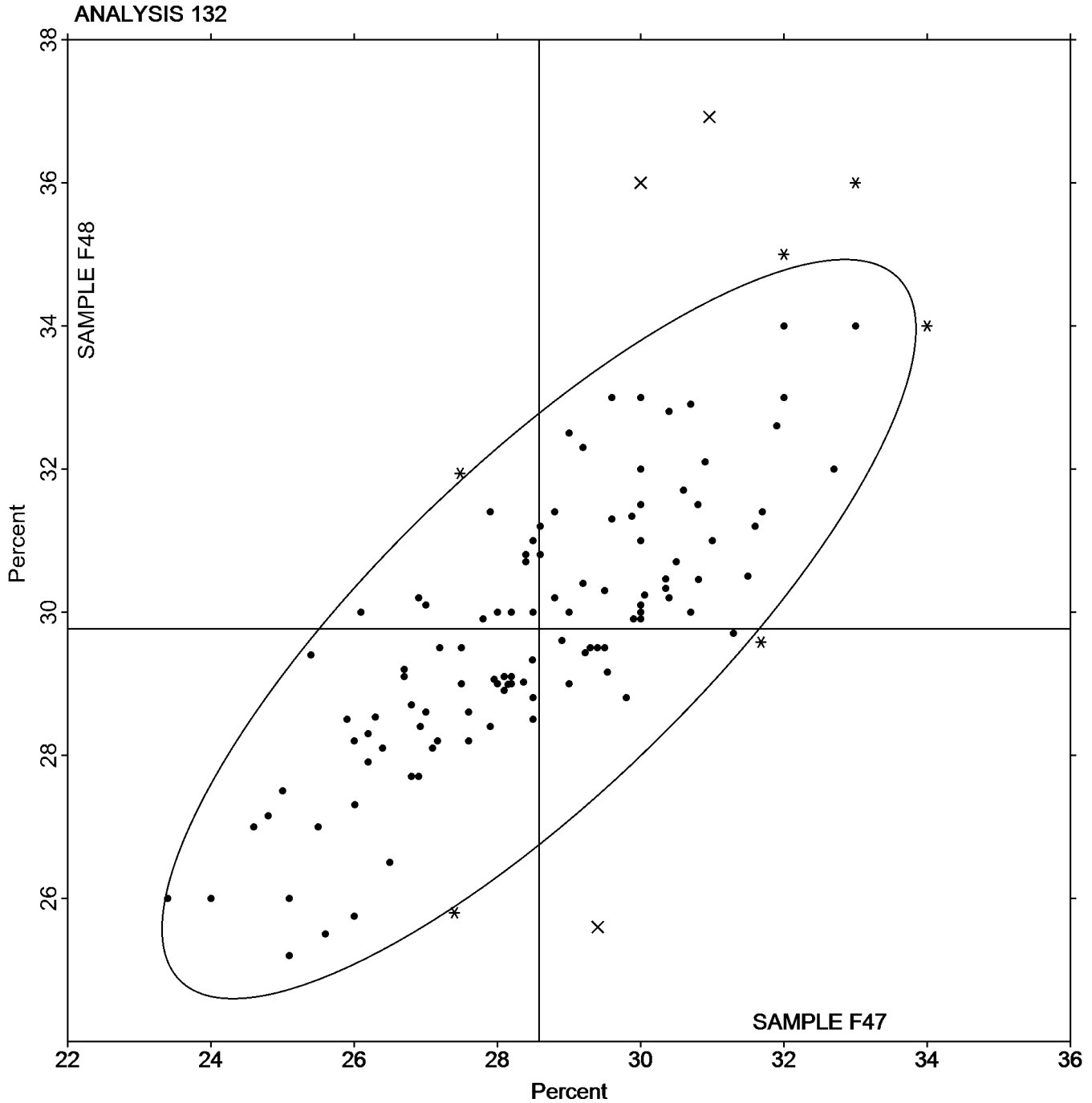
Elongation: Lab-Machined Flat Steel  
ASTM E8

SAMPLE F47

28.58 Percent

SAMPLE F48

29.76 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 133

r-Value: Lab-Machined Flat Steel  
ASTM E517

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GFBZZ		0.8200	0.0900	1.28	0.9800	0.1063	1.31
3CH66V		0.7400	0.0100	0.14	1.000	0.1263	1.56
3DEW73		0.7420	0.0120	0.17	0.9680	0.0943	1.16
3GUVN4		0.6200	-0.1100	-1.56	0.8100	-0.0637	-0.79
7CA94M		0.6060	-0.1240	-1.76	0.7542	-0.1195	-1.47
7KX7NZ	X	-0.293000	-1.0230	-14.52	-0.315000	-1.1887	-14.67
8973FM		0.7230	-0.0070	-0.10	0.8100	-0.0637	-0.79
8KW2ZX		0.6480	-0.0820	-1.16	0.7600	-0.1137	-1.40
8ZUJ3W		0.7380	0.0080	0.11	0.8890	0.0153	0.19
AE44JR		0.6800	-0.0500	-0.71	0.9200	0.0463	0.57
BPYJXU	X	0.1830	-0.5470	-7.77	0.1920	-0.6817	-8.41
C7GR2P	*	0.6700	-0.0600	-0.85	0.9900	0.1163	1.44
CR229V		0.7460	0.0160	0.23	0.8200	-0.0537	-0.66
EJ3AZR		0.6400	-0.0900	-1.28	0.7700	-0.1037	-1.28
EYGFBQ		0.7070	-0.0230	-0.33	0.8210	-0.0527	-0.65
F79CDK		0.8300	0.1000	1.42	0.9100	0.0363	0.45
FQDUJF		0.7700	0.0400	0.57	0.9300	0.0563	0.69
GP2FPE		0.7700	0.0400	0.57	0.8100	-0.0637	-0.79
H6P63M		0.6500	-0.0800	-1.14	0.7300	-0.1437	-1.77
HACJLG		0.8030	0.0730	1.04	0.9020	0.0283	0.35
JAZXZL	M	No Data Reported			0.9100	0.0363	0.45
JM4HX6		0.7390	0.0090	0.13	0.9220	0.0483	0.60
KJYA9K		0.8800	0.1500	2.13	0.9500	0.0763	0.94
KMKUGB	X	1.110	0.3800	5.40	0.9900	0.1163	1.44
LB7PVD	X	1.290	0.5600	7.95	1.000	0.1263	1.56
MFWB7C		0.6690	-0.0610	-0.87	0.7600	-0.1137	-1.40
PDGVPG		0.7500	0.0200	0.28	0.8800	0.0063	0.08
QPRNTG		0.6500	-0.0800	-1.14	0.8300	-0.0437	-0.54
R79JXV		0.7390	0.0090	0.13	0.9100	0.0363	0.45
RKNEW6		0.8200	0.0900	1.28	0.9800	0.1063	1.31
TN2Z6X		0.7690	0.0390	0.55	0.8732	-0.0005	-0.01
VH8TNZ	X	0.5020	-0.2280	-3.24	0.5020	-0.3717	-4.59
X788MZ	X	53.00	52.2700	742.13	57.60	56.7263	700.00
ZFBYAZ	X	0.9250	0.1950	2.77	0.7890	-0.0847	-1.04
ZJ9RW4		0.7900	0.0600	0.85	0.9100	0.0363	0.45

### Summary Statistics

	Sample F47	Sample F48
<b>Grand Means</b>	0.7300	0.8737
<b>Stnd Dev Btwn Labs</b>	0.0704	0.0810

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 27 of 35 reporting participants



**Comments on Assigned Data Flags for Test #133**

7KX7NZ (X) - Extreme data.

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

JAZXZL (M) - Participant did not submit data for sample F47.

KMKUGB (X) - Data for sample F47 are high.

LB7PVD (X) - Data for sample F47 are high.

VH8TNZ (X) - Data for both samples are low.

X788MZ (X) - Extreme data.

ZFBYAZ (X) - Data for sample F47 are high.



Analysis 133

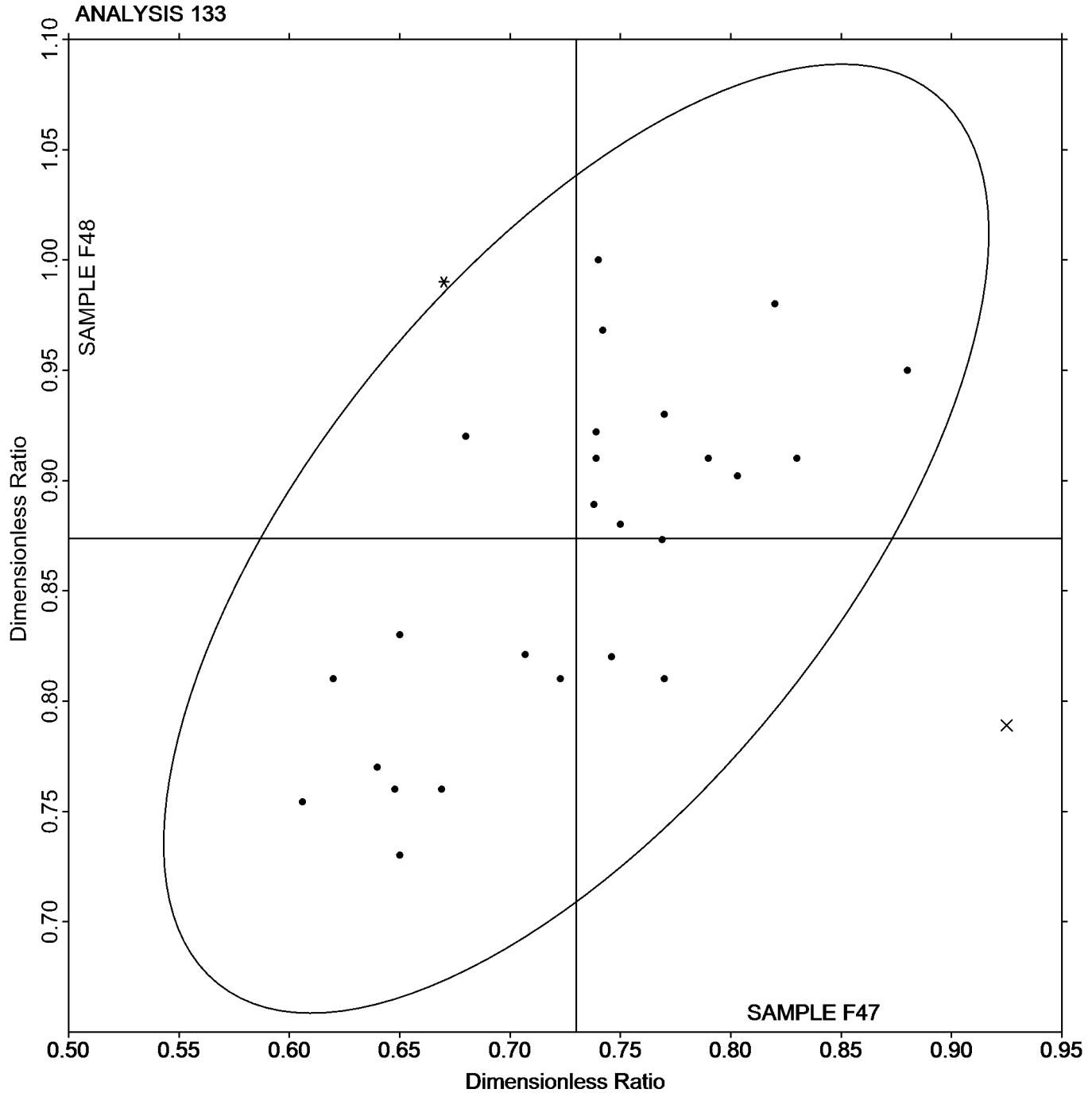
r-Value: Lab-Machined Flat Steel  
ASTM E517

SAMPLE F47

SAMPLE F48

0.7300

0.8737





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 134

n-Value: Lab-Machined Flat Steel  
ASTM E646

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2GFBZZ	X	0.1570	-0.0153	-0.91	0.2130	0.0287	1.77
3CH66V		0.1650	-0.0073	-0.43	0.1890	0.0047	0.29
3DEW73		0.1660	-0.0063	-0.37	0.1710	-0.0133	-0.82
3GUVN4		0.1800	0.0077	0.46	0.2000	0.0157	0.97
66FGLU		0.1740	0.0017	0.10	0.1930	0.0087	0.54
6GM73P		0.1640	-0.0083	-0.49	0.1690	-0.0153	-0.94
6LE99B		0.1689	-0.0034	-0.20	0.1827	-0.0016	-0.10
7CA94M	X	0.1700	-0.0023	-0.14	0.2350	0.0507	3.12
7KX7NZ		0.1590	-0.0133	-0.79	0.1680	-0.0163	-1.00
86HXCH		0.1574	-0.0149	-0.88	0.1523	-0.0320	-1.97
8973FM		0.1670	-0.0053	-0.31	0.1720	-0.0123	-0.75
8KW2ZX	*	0.1910	0.0187	1.11	0.2200	0.0357	2.20
8ZUJ3W		0.1570	-0.0153	-0.91	0.1700	-0.0143	-0.88
922D2T		0.1545	-0.0178	-1.06	0.1675	-0.0168	-1.03
AE44JR		0.1600	-0.0123	-0.73	0.1800	-0.0043	-0.26
AME6JF		0.1521	-0.0202	-1.20	0.1580	-0.0263	-1.62
BPYJXU		0.1760	0.0037	0.22	0.1810	-0.0033	-0.20
C7GR2P		0.1490	-0.0233	-1.38	0.1630	-0.0213	-1.31
CR229V		0.1720	-0.0003	-0.02	0.1940	0.0097	0.60
DY32GJ		0.1870	0.0147	0.87	0.1930	0.0087	0.54
E94ATF		0.1630	-0.0093	-0.55	0.1840	-0.0003	-0.02
EJ3AZR		0.1800	0.0077	0.46	0.2000	0.0157	0.97
F79CDK	X	0.1700	-0.0023	-0.14	0.2200	0.0357	2.20
FQDUJF		0.1730	0.0007	0.04	0.2020	0.0177	1.09
FXJU98		0.1500	-0.0223	-1.32	0.1600	-0.0243	-1.49
GP2FPE		0.1720	-0.0003	-0.02	0.2020	0.0177	1.09
H6P63M		0.1500	-0.0223	-1.32	0.1640	-0.0203	-1.25
HACJLG		0.2100	0.0377	2.24	0.2190	0.0347	2.14
HDLG8B		0.1745	0.0022	0.13	0.1743	-0.0100	-0.61
JAZXZL		0.1860	0.0137	0.81	0.1920	0.0077	0.48
JM4HX6		0.1890	0.0167	0.99	0.1910	0.0067	0.41
JMLAAB		0.1800	0.0077	0.46	0.1900	0.0057	0.35
JUZ8TN	X	0.2400	0.0677	4.02	0.2300	0.0457	2.81
KJYA9K		0.2010	0.0287	1.71	0.2080	0.0237	1.46
KMKUGB		0.1590	-0.0133	-0.79	0.1590	-0.0253	-1.55
KUGNE9		0.2030	0.0307	1.82	0.1990	0.0147	0.91
LB7PVD		0.1560	-0.0163	-0.97	0.1770	-0.0073	-0.45
MFWB7C		0.1680	-0.0043	-0.25	0.1860	0.0017	0.11
PDGVPG		0.1890	0.0167	0.99	0.1950	0.0107	0.66
PQ6ZT7		0.1410	-0.0313	-1.86	0.1650	-0.0193	-1.19
Q4P8GE		0.1900	0.0177	1.05	0.1950	0.0107	0.66
QPRNTG		0.1800	0.0077	0.46	0.2000	0.0157	0.97
QZ8DT8		0.1780	0.0057	0.34	0.1850	0.0007	0.04
R79JXV		0.1850	0.0127	0.76	0.1900	0.0057	0.35
RKNEW6		0.1440	-0.0283	-1.68	0.1620	-0.0223	-1.37
RN6LED		0.1850	0.0127	0.76	0.1890	0.0047	0.29
RXEKZV	*	0.2100	0.0377	2.24	0.2000	0.0157	0.97





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 134**

n-Value: Lab-Machined Flat Steel  
ASTM E646

WebCode	Data Flag	Sample F47			Sample F48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
TN2Z6X		0.1881	0.0158	0.94	0.2005	0.0162	1.00
UYK9M6		0.1680	-0.0043	-0.25	0.1920	0.0077	0.48
VH8TNZ	X	0.5020	0.3297	19.57	0.5020	0.3177	19.54
YVNK67		0.1540	-0.0183	-1.08	0.1680	-0.0163	-1.00
YXPXHX		0.1910	0.0187	1.11	0.1970	0.0127	0.78
ZFBYAZ		0.1660	-0.0063	-0.37	0.1890	0.0047	0.29
ZJ9RW4		0.1580	-0.0143	-0.85	0.1710	-0.0133	-0.82

Summary Statistics		
	Sample F47	Sample F48
<b>Grand Means</b>	0.1723	0.1843
<b>Stnd Dev Btwn Labs</b>	0.0168	0.0163

Samples F47, F48 : AISI 4130 - 12G (T), AISI 4130 - 14G (X)

Statistics based on 49 of 54 reporting participants

**Comments on Assigned Data Flags for Test #134**

- 2GFBZZ (X) - Inconsistent in testing between samples.
- 7CA94M (X) - Data for sample F48 are high.
- F79CDK (X) - Inconsistent in testing between samples.
- JUZ8TN (X) - Data for both samples are high. Possible Systematic Error.
- VH8TNZ (X) - Data for both samples are very high. Possible Systematic Error.



Analysis 134

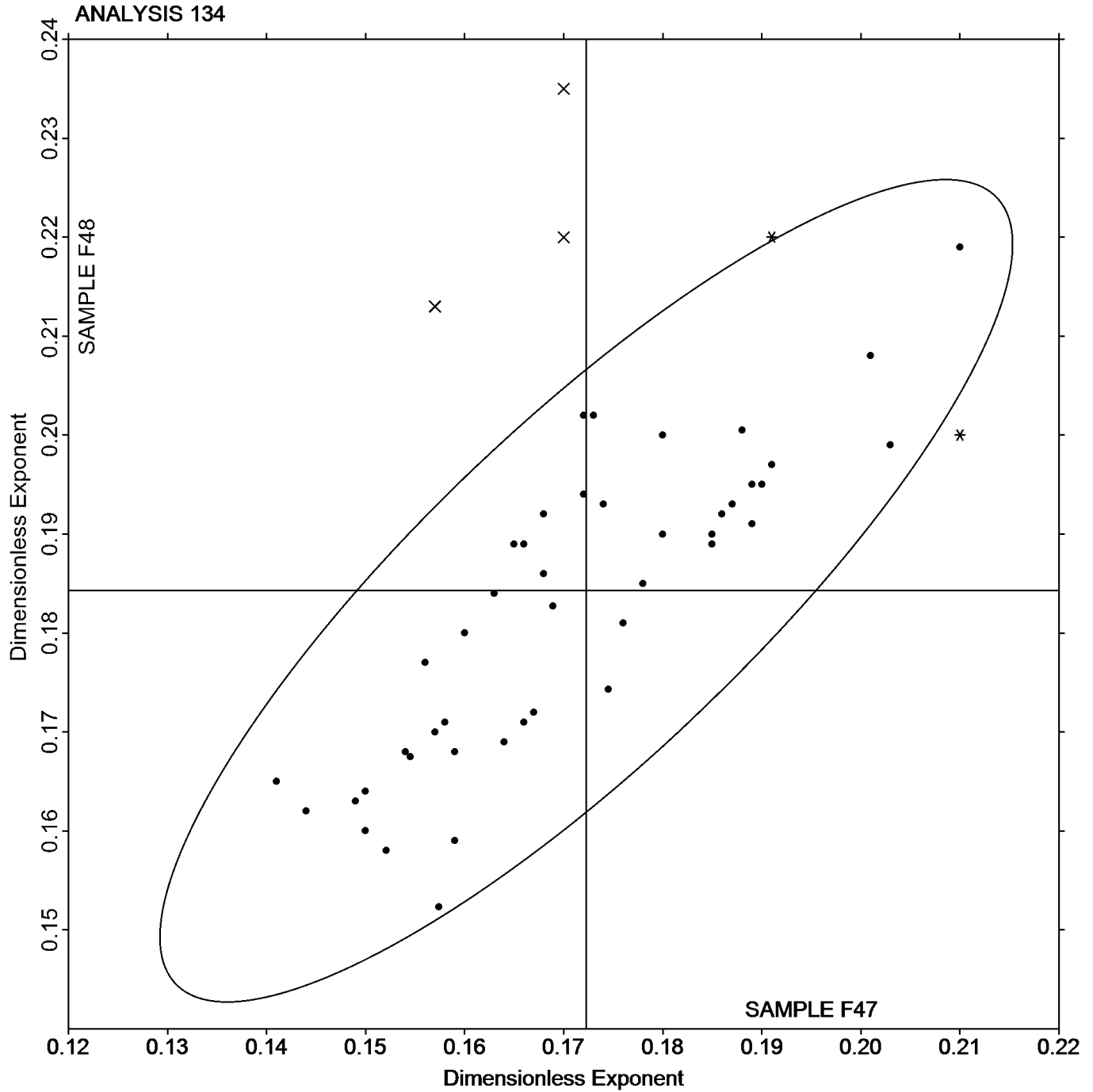
n-Value: Lab-Machined Flat Steel  
ASTM E646

SAMPLE F47

0.1723

SAMPLE F48

0.1843





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 136

Rockwell Superficial Hardness (30N Scale)  
ASTM E18

WebCode	Data Flag	Sample E47			Sample E48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2J7C7N		75.02	0.11	0.20	76.86	0.59	1.00
2VUELV		74.72	-0.19	-0.33	76.02	-0.25	-0.42
4LLECK		74.48	-0.43	-0.76	76.14	-0.13	-0.22
4PLRQX		74.72	-0.19	-0.33	76.22	-0.05	-0.09
4TJF6J		75.30	0.39	0.70	76.40	0.13	0.22
7993MV		74.40	-0.51	-0.90	75.88	-0.39	-0.66
7HWD6H		74.28	-0.63	-1.12	76.12	-0.15	-0.25
7VKDWK	X	72.74	-2.17	-3.86	71.46	-4.81	-8.15
8937VW		75.02	0.11	0.20	76.14	-0.13	-0.22
99X9YR		75.30	0.39	0.70	76.56	0.29	0.49
9KDZM2		75.54	0.63	1.13	77.44	1.17	1.98
9NZKT6		75.40	0.49	0.88	76.96	0.69	1.17
AGR6BF		73.92	-0.99	-1.76	75.06	-1.21	-2.05
BBGUYR		75.24	0.33	0.60	76.66	0.39	0.66
BEHWNT	X	72.62	-2.29	-4.08	73.52	-2.75	-4.66
BPYJXU		74.66	-0.25	-0.44	75.54	-0.73	-1.24
BZ3U9Q		74.78	-0.13	-0.22	76.20	-0.07	-0.12
DY32GJ		75.36	0.45	0.81	76.36	0.09	0.15
E7YLAJ	X	74.56	-0.35	-0.62	73.92	-2.35	-3.98
EHPEH7		75.36	0.45	0.81	76.68	0.41	0.69
FYTCFV		74.00	-0.91	-1.61	76.00	-0.27	-0.46
GJDZCN		75.28	0.37	0.67	76.42	0.15	0.25
GL27JJ		74.88	-0.03	-0.05	76.30	0.03	0.05
GUWLDC		74.48	-0.43	-0.76	75.80	-0.47	-0.80
H6AMNG		75.00	0.09	0.17	76.26	-0.01	-0.02
HYJVZF		74.64	-0.27	-0.47	76.44	0.17	0.29
J7G3WU		74.38	-0.53	-0.94	76.38	0.11	0.19
JM4HX6		75.60	0.69	1.24	76.56	0.29	0.49
JUZ8TN		75.57	0.66	1.19	76.73	0.46	0.77
KF2YME		75.32	0.41	0.74	76.72	0.45	0.76
KP72TW		75.20	0.29	0.53	76.24	-0.03	-0.05
KQ4EGP		73.90	-1.01	-1.79	75.22	-1.05	-1.78
KUGNE9	*	76.36	1.45	2.59	77.24	0.97	1.64
LB7PVD		74.36	-0.55	-0.97	76.50	0.23	0.39
LCGWC8		75.24	0.33	0.60	75.88	-0.39	-0.66
LZMKX9	*	76.32	1.41	2.52	77.63	1.36	2.30
M4HGPR		74.32	-0.59	-1.04	74.94	-1.33	-2.25
MA4Q8H		74.42	-0.49	-0.87	76.16	-0.11	-0.19
MJUCAA		74.88	-0.03	-0.05	76.08	-0.19	-0.32
P3W2E3		74.96	0.05	0.10	76.50	0.23	0.39
PF43YY		75.14	0.23	0.42	76.24	-0.03	-0.05
PYM2L3		75.44	0.53	0.95	76.56	0.29	0.49
Q8RT4W		74.98	0.07	0.13	76.72	0.45	0.76
RDWPMW		74.78	-0.13	-0.22	76.04	-0.23	-0.39
RXEKZV		75.02	0.11	0.20	76.18	-0.09	-0.15
RXXU7V	X	73.06	-1.85	-3.29	74.18	-2.09	-3.54
TD78U7		74.48	-0.43	-0.76	76.34	0.07	0.12



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 136**

**Rockwell Superficial Hardness (30N Scale)**  
**ASTM E18**

WebCode	Data Flag	Sample E47			Sample E48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
UHXRGM	*	74.70	-0.21	-0.37	74.80	-1.47	-2.49
WP4TW2	X	74.36	-0.55	-0.97	74.20	-2.07	-3.51
WXXMK6	*	73.44	-1.47	-2.61	75.76	-0.51	-0.86
XPLL6V		75.12	0.21	0.38	76.54	0.27	0.46
Y2RPWQ	*	74.96	0.05	0.10	74.94	-1.33	-2.25
YQB3MP		75.32	0.41	0.74	76.80	0.53	0.90
ZEZCFT		74.48	-0.43	-0.76	76.42	0.15	0.25
ZYH63M		74.80	-0.11	-0.19	76.94	0.67	1.13

Summary Statistics						
	Sample E47			Sample E48		
<b>Grand Means</b>		74.91	HR30N		76.27	HR30N
<b>Stnd Dev Brwn Labs</b>		0.56	HR30N		0.59	HR30N

Samples E47, E48 : Steel, Steel

Statistics based on 50 of 55 reporting participants

**Comments on Assigned Data Flags for Test #136**

- 7VKDWK (X) - Data for both samples are low. Inconsistent within the determinations of sample E47.
- BEHWNT (X) - Data for both samples are low. Inconsistent within the determinations of both samples.
- E7YLAJ (X) - Data for sample E48 are low.
- RXXU7V (X) - Data for both samples are low.
- WP4TW2 (X) - Data for sample E48 are low.



Analysis 136

Rockwell Superficial Hardness (30N Scale)

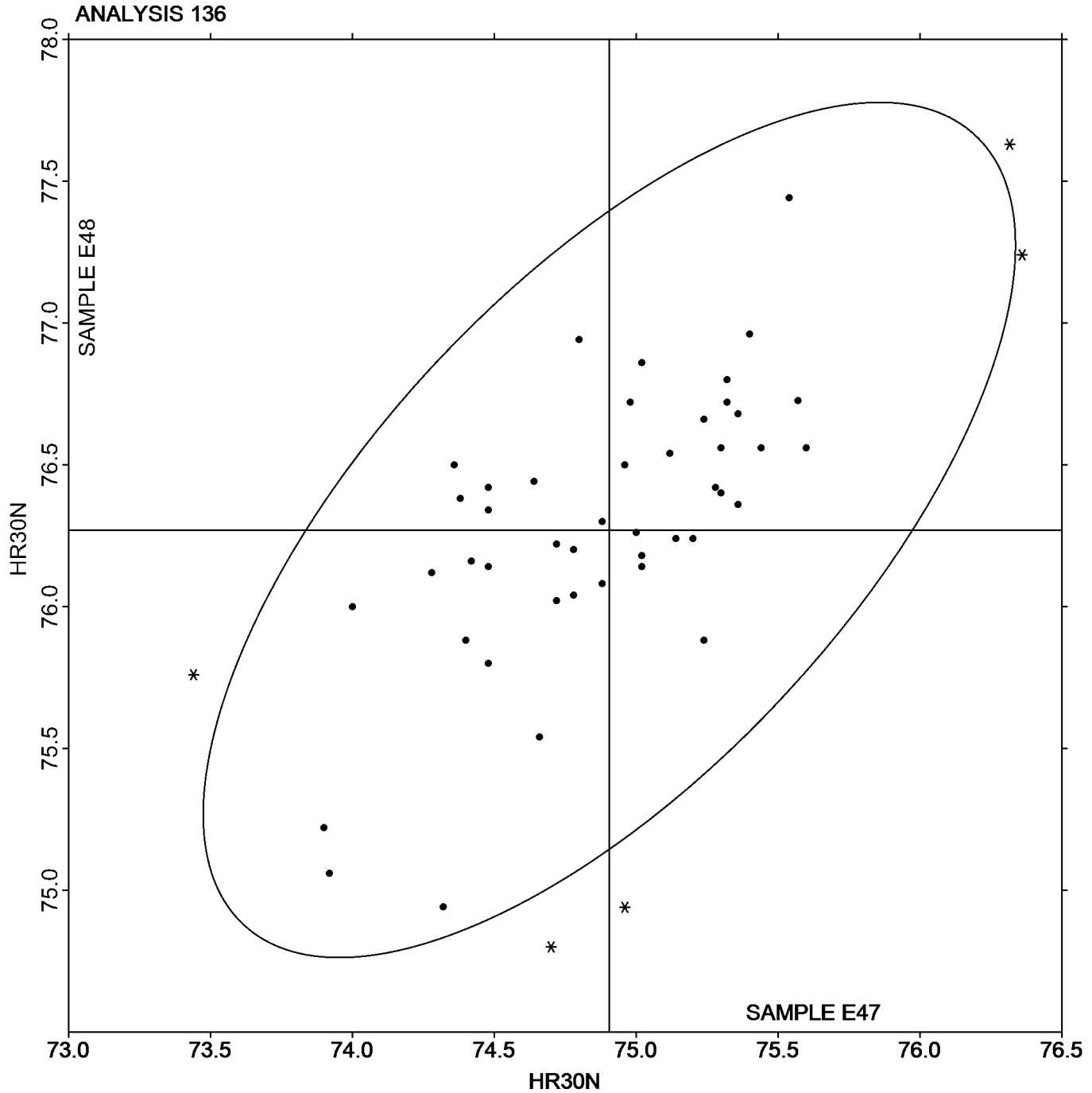
ASTM E18

SAMPLE E47

SAMPLE E48

74.91 HR30N

76.27 HR30N





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 145

Total Case Depth  
SAE J423, SAE J78

WebCode	Data Flag	Sample C47			Sample C48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
22ZPMG		0.0272	0.0034	0.93	0.0305	0.0022	0.51
2FMB8V		0.0240	0.0002	0.05	0.0270	-0.0013	-0.31
2HTYLL		0.0218	-0.0020	-0.55	0.0242	-0.0041	-0.97
2VUELIV		0.0211	-0.0027	-0.74	0.0261	-0.0022	-0.51
33T7NX		0.0254	0.0016	0.43	0.0304	0.0021	0.49
37XPV7		0.0235	-0.0003	-0.07	0.0286	0.0003	0.07
3NC9PN		0.0274	0.0036	0.97	0.0320	0.0037	0.88
3PPXQF		0.0211	-0.0027	-0.73	0.0236	-0.0047	-1.11
4ERC8N	*	0.0223	-0.0016	-0.42	0.0209	-0.0074	-1.75
4L466K		0.0227	-0.0012	-0.31	0.0270	-0.0013	-0.30
4LLECK		0.0241	0.0003	0.08	0.0289	0.0006	0.15
6DL2P6		0.0214	-0.0024	-0.66	0.0246	-0.0037	-0.87
72QWPN		0.0214	-0.0024	-0.66	0.0288	0.0005	0.12
7DJA9U		0.0173	-0.0065	-1.77	0.0217	-0.0066	-1.56
7HWD6H		0.0236	-0.0002	-0.06	0.0318	0.0035	0.82
8C4EXL		0.0265	0.0027	0.74	0.0306	0.0022	0.53
99X9YR		0.0250	0.0011	0.31	0.0305	0.0022	0.51
9DQEDT	*	0.0322	0.0084	2.28	0.0330	0.0047	1.11
BZ3U9Q		0.0248	0.0010	0.27	0.0272	-0.0011	-0.26
CX8N66		0.0294	0.0056	1.53	0.0361	0.0078	1.83
DUM29B		0.0249	0.0010	0.28	0.0306	0.0023	0.54
DY32GJ	*	0.0139	-0.0099	-2.69	0.0181	-0.0102	-2.41
FFYXGW		0.0204	-0.0034	-0.93	0.0246	-0.0037	-0.87
FQCA22		0.0320	0.0082	2.22	0.0376	0.0093	2.18
G6U8C2		0.0268	0.0030	0.80	0.0334	0.0051	1.20
GJDZCN		0.0254	0.0016	0.42	0.0314	0.0031	0.74
H6AMNG		0.0192	-0.0046	-1.26	0.0250	-0.0033	-0.79
J4C8FC		0.0224	-0.0014	-0.37	0.0276	-0.0008	-0.18
JADQD2		0.0224	-0.0014	-0.38	0.0288	0.0005	0.12
JJ3TVG		0.0218	-0.0020	-0.55	0.0272	-0.0011	-0.26
JRX44L		0.0190	-0.0048	-1.31	0.0258	-0.0025	-0.59
JWBLG3		0.0244	0.0006	0.16	0.0286	0.0003	0.07
KP72TW		0.0214	-0.0024	-0.66	0.0242	-0.0041	-0.97
KUGNE9		0.0213	-0.0025	-0.67	0.0251	-0.0032	-0.75
L2XKYA		0.0282	0.0044	1.20	0.0345	0.0062	1.46
L2YZ3E		0.0285	0.0047	1.28	0.0310	0.0027	0.63
LB7PVD		0.0263	0.0025	0.68	0.0327	0.0044	1.03
LCF72H		0.0241	0.0003	0.08	0.0254	-0.0029	-0.68
LMXMR4		0.0236	-0.0002	-0.05	0.0278	-0.0005	-0.13
M44W6U		0.0303	0.0065	1.77	0.0352	0.0069	1.63
MPFYUJ		0.0213	-0.0026	-0.69	0.0224	-0.0059	-1.38
N98B8B		0.0192	-0.0046	-1.25	0.0238	-0.0045	-1.06
PBDH9X		0.0211	-0.0028	-0.75	0.0255	-0.0028	-0.67
PFMC6Y		0.0226	-0.0012	-0.34	0.0275	-0.0008	-0.19
QPPRQX		0.0199	-0.0039	-1.05	0.0250	-0.0033	-0.78
R2C42T		0.0226	-0.0012	-0.33	0.0286	0.0003	0.07
TCDAQ7	*	0.0308	0.0070	1.90	0.0388	0.0105	2.48



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 145

Total Case Depth  
SAE J423, SAE J78

WebCode	Data Flag	Sample C47			Sample C48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
TD78U7		0.0240	0.0002	0.05	0.0282	-0.0001	-0.02
TDJCE6		0.0286	0.0048	1.30	0.0312	0.0029	0.68
TQYF6U	X	0.0216	-0.0022	-0.60	0.0182	-0.0101	-2.38
UZD7Q6		0.0226	-0.0012	-0.33	0.0236	-0.0047	-1.10
WP4TW2		0.0226	-0.0012	-0.33	0.0272	-0.0011	-0.25
Y2RPWQ		0.0200	-0.0038	-1.03	0.0261	-0.0022	-0.53
YQB3MP		0.0236	-0.0002	-0.07	0.0282	-0.0001	-0.03
ZDX7XR		0.0232	-0.0006	-0.17	0.0276	-0.0007	-0.17
ZYH63M		0.0292	0.0054	1.46	0.0352	0.0069	1.63

### Summary Statistics

	Sample C47		Sample C48	
<b>Grand Means</b>	0.0238	inches	0.0283	inches
<b>Stnd Dev Btrwn Labs</b>	0.0037	inches	0.0042	inches

Samples C47, C48 : Steel, Steel

Statistics based on 55 of 56 reporting participants

### Comments on Assigned Data Flags for Test #145

TQYF6U (X) - Inconsistent in testing between samples.

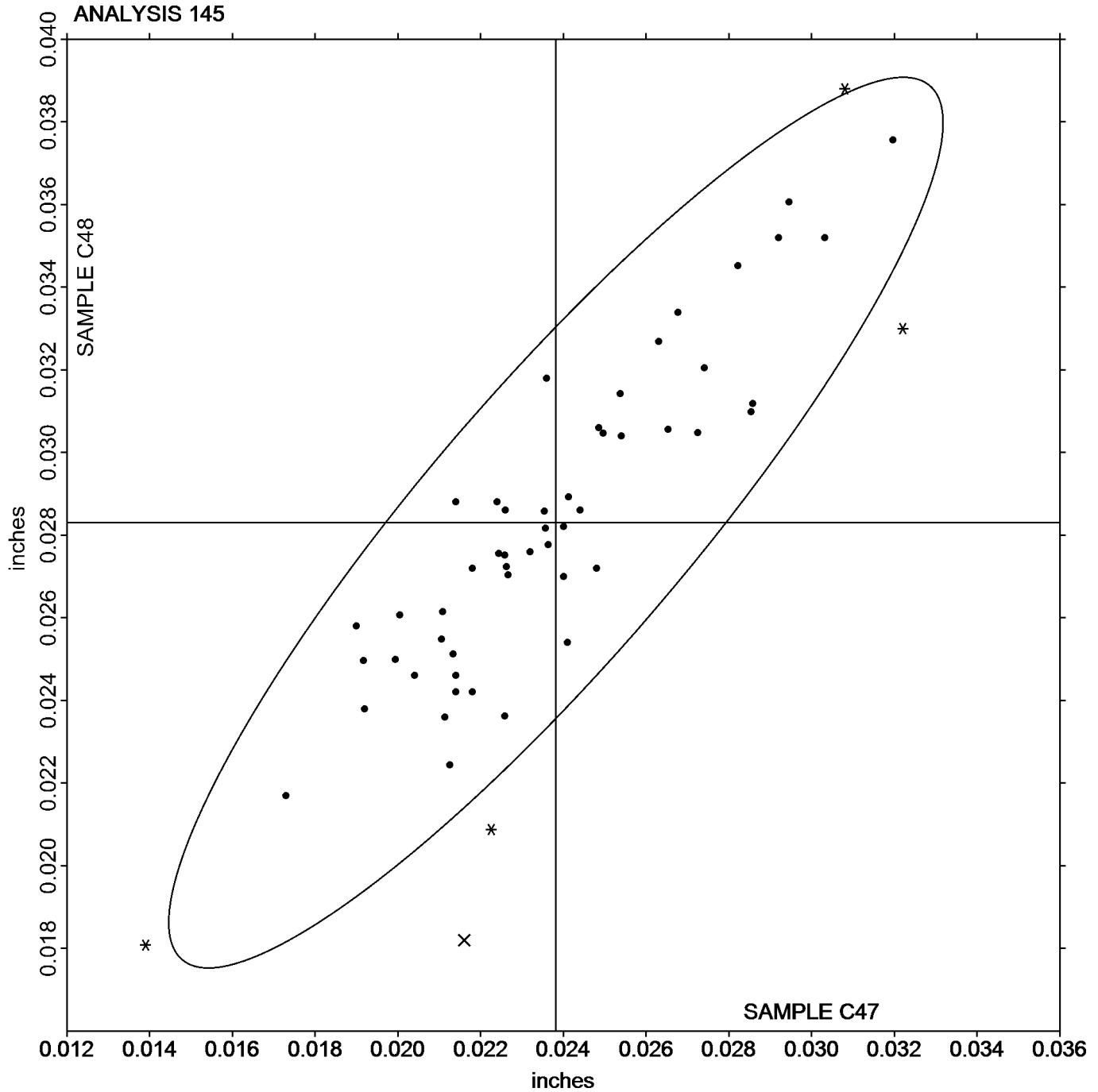


Analysis 145

Total Case Depth  
SAE J423, SAE J78

SAMPLE C47  
0.0238 inches

SAMPLE C48  
0.0283 inches







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 146

Effective Case Depth  
SAE J423, SAE J78

WebCode	Data Flag	Sample C47			Sample C48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
22ZPMG		0.0227	0.0008	0.58	0.0269	0.0002	0.12
24V4G2		0.0218	0.0000	-0.01	0.0262	-0.0005	-0.26
2FMB8V		0.0208	-0.0011	-0.78	0.0235	-0.0032	-1.74
2HTYLL		0.0204	-0.0015	-1.03	0.0264	-0.0002	-0.13
2VUJLV		0.0228	0.0009	0.66	0.0270	0.0004	0.20
33T7NX		0.0214	-0.0005	-0.32	0.0238	-0.0028	-1.56
37XPV7		0.0202	-0.0017	-1.20	0.0262	-0.0004	-0.23
3MEZDX	*	0.0176	-0.0043	-3.00	0.0228	-0.0038	-2.11
3NC9PN		0.0243	0.0025	1.74	0.0294	0.0028	1.55
3PPXQF		0.0239	0.0020	1.42	0.0275	0.0009	0.48
4E7B8L		0.0210	-0.0009	-0.61	0.0249	-0.0017	-0.96
4ERC8N		0.0235	0.0017	1.18	0.0294	0.0027	1.51
4L466K		0.0218	-0.0001	-0.04	0.0262	-0.0004	-0.24
4LLECK		0.0232	0.0013	0.92	0.0281	0.0015	0.82
6DL2P6		0.0226	0.0007	0.52	0.0260	-0.0006	-0.35
72QWPN		0.0190	-0.0029	-2.02	0.0264	-0.0002	-0.13
7DJA9U		0.0202	-0.0017	-1.17	0.0256	-0.0010	-0.57
7HWD6H		0.0232	0.0013	0.95	0.0298	0.0032	1.74
7KHABN		0.0211	-0.0008	-0.54	0.0268	0.0002	0.09
8AXUB7		0.0228	0.0009	0.66	0.0304	0.0038	2.07
8C4EXL		0.0208	-0.0011	-0.76	0.0252	-0.0014	-0.79
93TN43		0.0232	0.0013	0.95	0.0272	0.0006	0.31
99X9YR		0.0200	-0.0019	-1.33	0.0248	-0.0019	-1.03
9DQEDT		0.0220	0.0001	0.10	0.0256	-0.0010	-0.57
BZ3U9Q		0.0227	0.0009	0.61	0.0278	0.0012	0.64
CX8N66		0.0212	-0.0007	-0.48	0.0272	0.0006	0.33
DUM29B		0.0228	0.0009	0.65	0.0275	0.0009	0.47
DY32GJ	X	0.0288	0.0069	4.89	0.0418	0.0152	8.34
E2D69Q		0.0221	0.0003	0.19	0.0268	0.0001	0.07
EATAEC		0.0206	-0.0013	-0.89	0.0240	-0.0026	-1.45
F79CDK		0.0240	0.0022	1.52	0.0299	0.0033	1.81
FFYXGW		0.0196	-0.0023	-1.59	0.0242	-0.0024	-1.34
FQCA22		0.0213	-0.0005	-0.37	0.0272	0.0005	0.29
G6U8C2		0.0232	0.0013	0.93	0.0301	0.0034	1.88
GJDZCN		0.0209	-0.0009	-0.64	0.0272	0.0005	0.29
H6AMNG		0.0199	-0.0020	-1.41	0.0255	-0.0011	-0.61
HTEFNR		0.0216	-0.0003	-0.18	0.0254	-0.0012	-0.68
HYJVZF	*	0.0244	0.0025	1.79	0.0252	-0.0014	-0.79
J4C8FC		0.0216	-0.0003	-0.20	0.0283	0.0016	0.90
JADQD2		0.0222	0.0003	0.24	0.0284	0.0018	0.97
JJ3TVG		0.0198	-0.0021	-1.45	0.0252	-0.0014	-0.79
JUML78		0.0232	0.0013	0.93	0.0275	0.0009	0.50
JWBLG3		0.0216	-0.0003	-0.18	0.0246	-0.0020	-1.12
KF2YME		0.0204	-0.0015	-1.03	0.0250	-0.0016	-0.90
KP72TW		0.0208	-0.0011	-0.75	0.0230	-0.0036	-2.00
KUGNE9		0.0212	-0.0006	-0.44	0.0255	-0.0012	-0.63
L2XKYA		0.0243	0.0025	1.75	0.0302	0.0036	1.96



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 146 Effective Case Depth SAE J423, SAE J78

WebCode	Data Flag	Sample C47			Sample C48		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
L2YZ3E		0.0210	-0.0009	-0.62	0.0252	-0.0014	-0.79
LB7PVD		0.0216	-0.0002	-0.15	0.0256	-0.0010	-0.56
LCF72H	*	0.0237	0.0018	1.30	0.0248	-0.0019	-1.03
LMXMR4		0.0223	0.0004	0.31	0.0265	-0.0001	-0.06
M44W6U		0.0224	0.0005	0.35	0.0256	-0.0010	-0.58
N98B8B		0.0200	-0.0019	-1.31	0.0266	0.0000	-0.02
NJR4KM		0.0229	0.0011	0.74	0.0280	0.0014	0.77
NVZMGW		0.0218	0.0000	-0.03	0.0283	0.0017	0.94
P8TLPD		0.0216	-0.0003	-0.21	0.0286	0.0019	1.07
PBDH9X		0.0221	0.0003	0.20	0.0279	0.0012	0.67
PFMC6Y		0.0208	-0.0011	-0.75	0.0252	-0.0014	-0.79
QPPRQX		0.0210	-0.0009	-0.61	0.0262	-0.0004	-0.24
R2C42T		0.0220	0.0001	0.10	0.0286	0.0020	1.08
TCDAQ7		0.0212	-0.0007	-0.47	0.0259	-0.0007	-0.41
TD78U7		0.0214	-0.0005	-0.32	0.0256	-0.0010	-0.57
TDJCE6		0.0236	0.0018	1.24	0.0260	-0.0007	-0.36
UZD7Q6		0.0225	0.0006	0.42	0.0236	-0.0030	-1.65
VHRCT8		0.0213	-0.0006	-0.43	0.0276	0.0010	0.55
WP4TW2		0.0209	-0.0010	-0.69	0.0265	-0.0002	-0.10
WXXMK6		0.0219	0.0000	0.02	0.0258	-0.0008	-0.45
Y2RPWQ	*	0.0258	0.0039	2.75	0.0290	0.0024	1.31
YQB3MP		0.0232	0.0013	0.94	0.0278	0.0012	0.64
Z4W7FY		0.0223	0.0004	0.30	0.0276	0.0010	0.55
ZDX7XR		0.0224	0.0005	0.38	0.0268	0.0002	0.09
ZYH63M		0.0228	0.0009	0.66	0.0302	0.0036	1.96

### Summary Statistics

	Sample C47		Sample C48	
<b>Grand Means</b>	0.0219	inches	0.0266	inches
<b>Stnd Dev Btrwn Labs</b>	0.0014	inches	0.0018	inches

Samples C47, C48 : Steel, Steel

Statistics based on 71 of 72 reporting participants

### Comments on Assigned Data Flags for Test #146

DY32GJ (X) - Data for both samples are high. Inconsistent within the determinations of both samples.

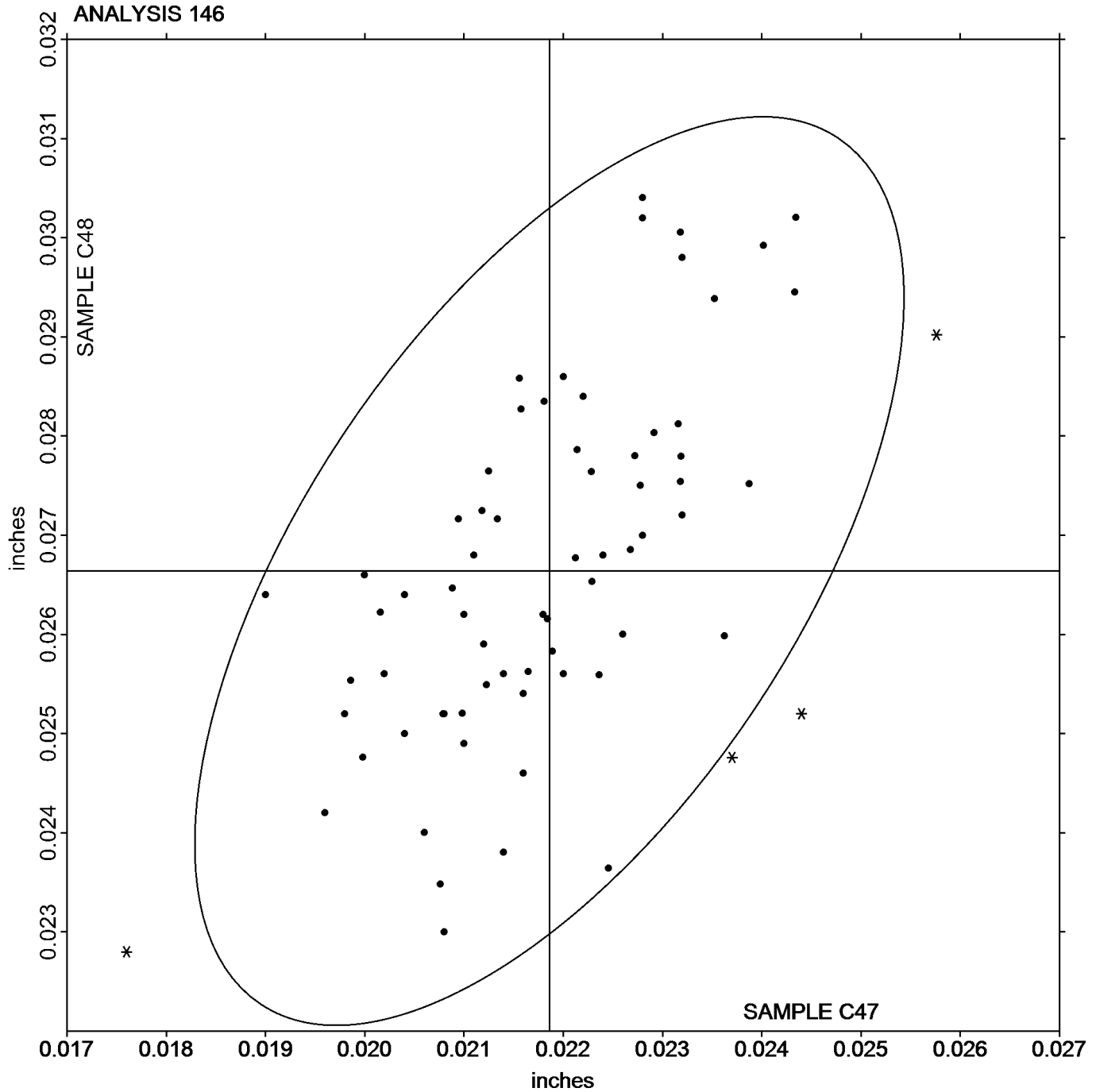


Analysis 146

Effective Case Depth  
SAE J423, SAE J78

SAMPLE C47  
0.0219 inches

SAMPLE C48  
0.0266 inches





# Fasteners and Metals Interlaboratory Testing Program

**Cycle 120**  
**4th Qtr 2017**

## Analysis 148

Grain Size (Inconel)  
ASTM E112, ASTM E1382

WebCode	Data Flag	Sample J47			Sample J48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2PD93Q		8.60	1.16	1.34	5.90	0.22	0.44	Comparison Method
2VUELV	*	8.90	1.46	1.69	7.10	1.42	2.79	Comparison Method
3CHNTD		8.00	0.56	0.65	6.00	0.32	0.63	Comparison Method
3Z7JZG		7.70	0.26	0.30	6.40	0.72	1.42	Comparison Method
6D66GW		7.50	0.06	0.07	5.30	-0.38	-0.74	Comparison Method
7KHABN		6.76	-0.68	-0.78	5.68	0.00	0.00	Abrams Three-Circle
7VYWKN	X	10.95	3.51	4.05	7.77	2.09	4.10	Automatic Image Analysis
7ZUT4N		7.20	-0.24	-0.27	5.40	-0.28	-0.55	Comparison Method
8VZEDX		9.00	1.56	1.81	5.60	-0.08	-0.15	Comparison Method
9NZKT6		7.00	-0.44	-0.50	5.60	-0.08	-0.15	Comparison Method
DHPPPP		7.43	-0.01	-0.01	6.40	0.72	1.41	Abrams Three-Circle
DY32GJ		8.30	0.86	1.00	6.10	0.42	0.83	Comparison Method
EATAEC		7.50	0.06	0.07	6.20	0.52	1.02	Comparison Method
FFYXGW		6.50	-0.94	-1.08	5.50	-0.18	-0.35	N/A
FQFKQX		6.00	-1.44	-1.66	5.20	-0.48	-0.94	Comparison Method
HN29RE	M	No Data Reported			7.10	1.42	2.79	Comparison Method
HTEFNR		7.00	-0.44	-0.50	5.00	-0.68	-1.33	Comparison Method
JRX44L		7.70	0.26	0.30	5.60	-0.08	-0.15	Comparison Method
KP72TW		7.40	-0.04	-0.04	4.80	-0.88	-1.72	Comparison Method
LMXMR4		7.46	0.02	0.03	5.64	-0.04	-0.07	General Intercept
LYBHWM		7.50	0.06	0.07	5.50	-0.18	-0.35	N/A
M6DCMG		7.00	-0.44	-0.50	5.00	-0.68	-1.33	Comparison Method
N98B8B	*	5.40	-2.04	-2.35	5.80	0.12	0.24	Comparison Method
NEBN3H		8.16	0.72	0.83	6.08	0.40	0.79	Abrams Three-Circle
NEVF4F		6.38	-1.05	-1.21	5.94	0.27	0.52	Heyn Linear Intercept
NN2NYZ		6.60	-0.84	-0.97	5.40	-0.28	-0.55	Comparison Method
P4CQXZ		6.50	-0.94	-1.08	5.90	0.22	0.44	Comparison Method
PF43YY		7.10	-0.34	-0.39	5.60	-0.08	-0.15	Comparison Method
PHNWTE		7.20	-0.24	-0.27	5.50	-0.18	-0.35	Comparison Method
QP7NK4		7.60	0.16	0.19	5.40	-0.28	-0.55	Comparison Method
X4MFF6		9.10	1.66	1.92	5.70	0.02	0.04	N/A
XL3PEJ		6.90	-0.54	-0.62	4.50	-1.18	-2.31	Comparison Method
YEV7B7		8.17	0.73	0.85	5.76	0.08	0.16	Abrams Three-Circle
ZGFDBT		8.40	0.96	1.11	6.20	0.52	1.02	Abrams Three-Circle

### Summary Statistics

	Sample J47		Sample J48	
<b>Grand Means</b>	7.44	ASTM Grain Si	5.68	ASTM Grain Si
<b>Std Dev Btwn Labs</b>	0.87	ASTM Grain Si	0.51	ASTM Grain Si

Samples J47, J48 : Inco 625, Waspaloy

Statistics based on 32 of 34 reporting participants

### Comments on Assigned Data Flags for Test #148

7VYWKN (X) - Data for both samples are high.

HN29RE (M) - Participant did not submit data for sample J47.





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 160

Copper-based Alloy, Element #1  
COPPER (Cu)

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2RHLGN		61.23	-0.12	-0.27	60.26	-0.27	-0.54	ED
2VX9J3		61.41	0.06	0.13	60.54	0.01	0.01	WD
4N7YT4		61.06	-0.29	-0.63	60.39	-0.14	-0.29	WD
8C4EXL		61.69	0.34	0.73	61.03	0.50	1.02	GR
98PZTR		61.70	0.35	0.75	60.77	0.24	0.48	OE
CLBWR8		61.53	0.18	0.38	60.83	0.30	0.62	OE
E7ECAB		61.99	0.64	1.38	60.27	-0.26	-0.52	OE
HTEFNR		61.27	-0.08	-0.17	60.67	0.14	0.29	OE
JMHWFM		61.37	0.02	0.03	60.73	0.20	0.42	OE
K9HQ9F		61.37	0.02	0.03	60.53	0.00	0.01	OE
KVUL2J		61.29	-0.06	-0.14	60.84	0.31	0.63	XX
LDPBF8		62.18	0.83	1.78	61.40	0.87	1.78	OE
M4ED49		60.83	-0.52	-1.11	59.97	-0.56	-1.15	XX
MNZ8TA		61.32	-0.03	-0.07	60.26	-0.27	-0.54	EL
MPFYUJ		62.00	0.65	1.39	60.20	-0.33	-0.67	GD
MYQ6X3		61.33	-0.02	-0.04	60.83	0.30	0.62	OE
PFMC6Y		61.31	-0.04	-0.08	60.86	0.33	0.67	OE
QLR8NY		60.40	-0.95	-2.04	59.80	-0.73	-1.49	BD
QYUY7X		61.14	-0.21	-0.46	61.45	0.92	1.87	EL
RZ4FUV		61.41	0.06	0.12	60.74	0.21	0.44	OE
TGBMTX		61.53	0.18	0.39	60.17	-0.36	-0.74	OE
TXTAY2		61.21	-0.14	-0.31	59.97	-0.56	-1.15	OE
UU82UX		62.08	0.73	1.56	61.17	0.64	1.30	OE
WQFMF9	X	69.03	7.68	16.51	68.10	7.57	15.47	OE
WXXMK6		60.20	-1.15	-2.47	59.47	-1.06	-2.17	OE
X788MZ		60.93	-0.42	-0.90	60.10	-0.43	-0.88	OE
XYMV78	X	70.09	8.74	18.78	62.68	2.15	4.40	IC

### Summary Statistics

	Sample K47		Sample K48	
<b>Grand Means</b>	61.35	Percent	60.53	Percent
<b>Std Dev Btwn Labs</b>	0.47	Percent	0.49	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 25 of 27 reporting participants

### Key to Method Codes Reported by Participants

BD	By Difference	ED	X-Ray Fluorescence - Energy Dispersive (EDX)
EL	Electrochemistry	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 #160**

WQFMF9 (X) - Data for both samples are very high.

XYMV78 (X) - Data for sample K47 are very high. Data for sample K48 are high. Very inconsistent within the determinations of sample K48.



Fasteners and Metals Interlaboratory Testing Program

Cycle 120

Analysis 160

4th Qtr 2017

Copper-based Alloy, Element #1

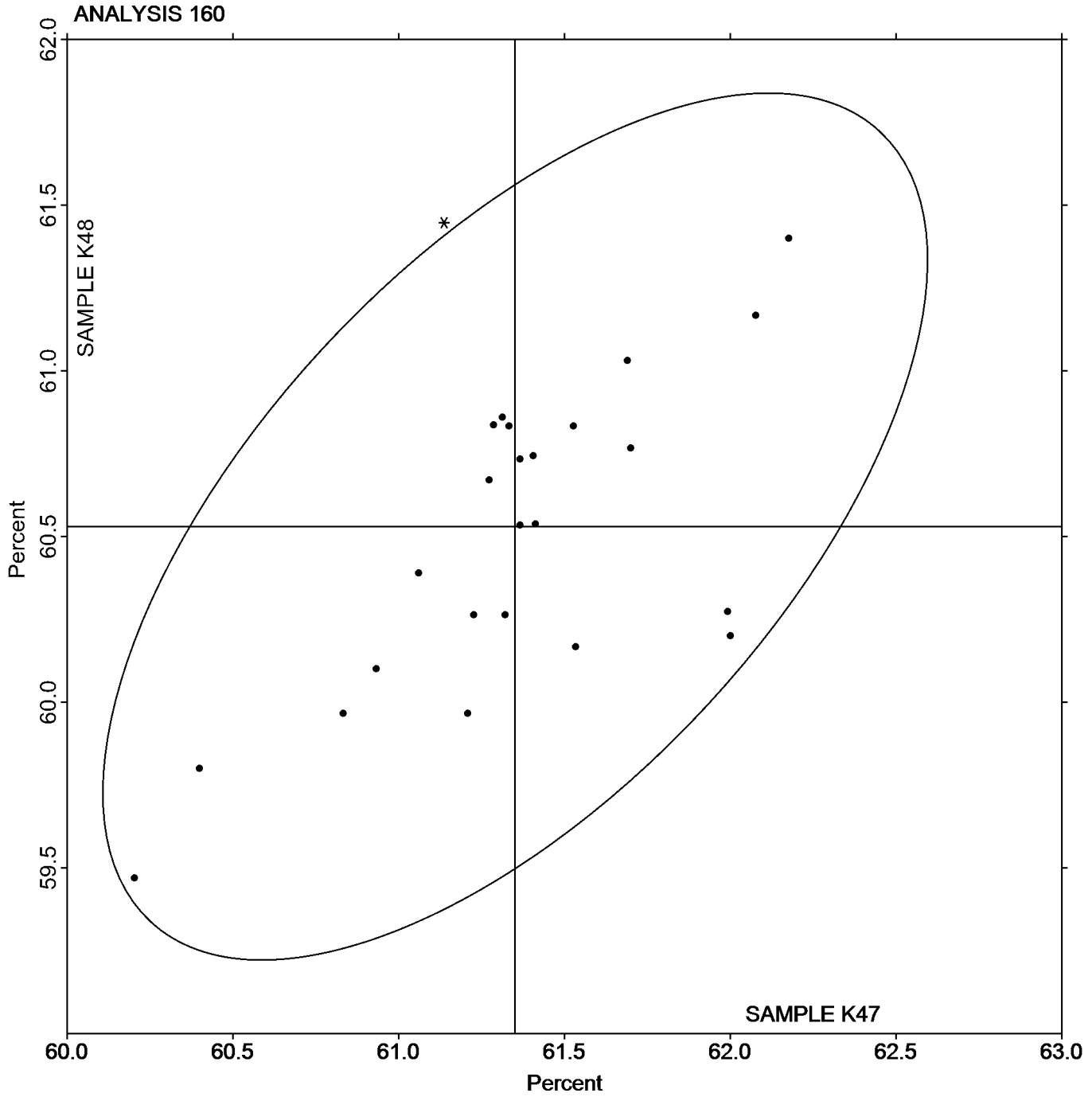
COPPER (Cu)

SAMPLE K47

SAMPLE K48

61.35 Percent

60.53 Percent







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 161

Copper-based Alloy, Element #2  
TIN (Sn)

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2RHLGN		0.5937	-0.0287	-1.16	0.7097	-0.0278	-0.90	ED
2VX9J3		0.6010	-0.0214	-0.86	0.7093	-0.0281	-0.91	WD
4L466K		0.6283	0.0060	0.24	0.7380	0.0005	0.02	OE
4N7YT4		0.6300	0.0076	0.31	0.7433	0.0059	0.19	IC
8C4EXL		0.6261	0.0037	0.15	0.7597	0.0223	0.72	IC
98PZTR		0.6667	0.0443	1.79	0.7767	0.0392	1.27	OE
CLBWR8		0.6303	0.0080	0.32	0.7267	-0.0108	-0.35	OE
E7ECAB		0.6607	0.0383	1.54	0.7630	0.0255	0.83	OE
HTEFNR		0.6257	0.0033	0.13	0.7407	0.0032	0.10	OE
JMHWFM		0.6190	-0.0034	-0.14	0.7407	0.0032	0.10	OE
K9HQ9F		0.6043	-0.0180	-0.73	0.7293	-0.0081	-0.26	OE
KVUL2J		0.6153	-0.0070	-0.28	0.7287	-0.0088	-0.29	XX
LDPBF8		0.6643	0.0420	1.69	0.8033	0.0659	2.14	XX
M4ED49		0.6100	-0.0124	-0.50	0.7267	-0.0108	-0.35	XX
MNZ8TA		0.6160	-0.0063	-0.26	0.7258	-0.0116	-0.38	IC
MPFYUJ	*	0.6220	-0.0004	-0.02	0.6730	-0.0645	-2.09	GD
MYQ6X3		0.5800	-0.0424	-1.71	0.6800	-0.0575	-1.87	OE
PFMC6Y		0.6307	0.0083	0.33	0.7487	0.0112	0.36	OE
QLR8NY		0.6317	0.0093	0.37	0.7433	0.0059	0.19	OE
QYUY7X	X	0.7353	0.1130	4.55	0.6253	-0.1121	-3.64	IC
RZ4FUV		0.6173	-0.0050	-0.20	0.7280	-0.0095	-0.31	OE
TGBMTX		0.6080	-0.0144	-0.58	0.7463	0.0089	0.29	OE
TXTAY2		0.5855	-0.0369	-1.49	0.6832	-0.0543	-1.76	OE
UU82UX		0.6766	0.0543	2.19	0.8130	0.0755	2.45	OE
WQFMF9	X	1.077	0.4543	18.32	1.280	0.5425	17.60	OE
WXXMK6		0.6183	-0.0040	-0.16	0.7253	-0.0121	-0.39	OE
X788MZ		0.5910	-0.0314	-1.27	0.7033	-0.0341	-1.11	OE
XEZAKP		0.6290	0.0066	0.27	0.7443	0.0069	0.22	IC
XYMV78	X	0.8833	0.2610	10.52	1.032	0.2945	9.56	IC

### Summary Statistics

	Sample K47		Sample K48	
<b>Grand Means</b>	0.6224	Percent	0.7375	Percent
<b>Stnd Dev Btwn Labs</b>	0.0248	Percent	0.0308	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 25 of 29 reporting participants

### Key to Method Codes Reported by Participants

<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 #161**

QYUY7X (X) - Data appear to be transposed between samples.

WQFMF9 (X) - Data for both samples are very high. Inconsistent within the determinations of both samples.

XYMV78 (X) - Data for both samples are very high. Very inconsistent within the determinations of sample K48.



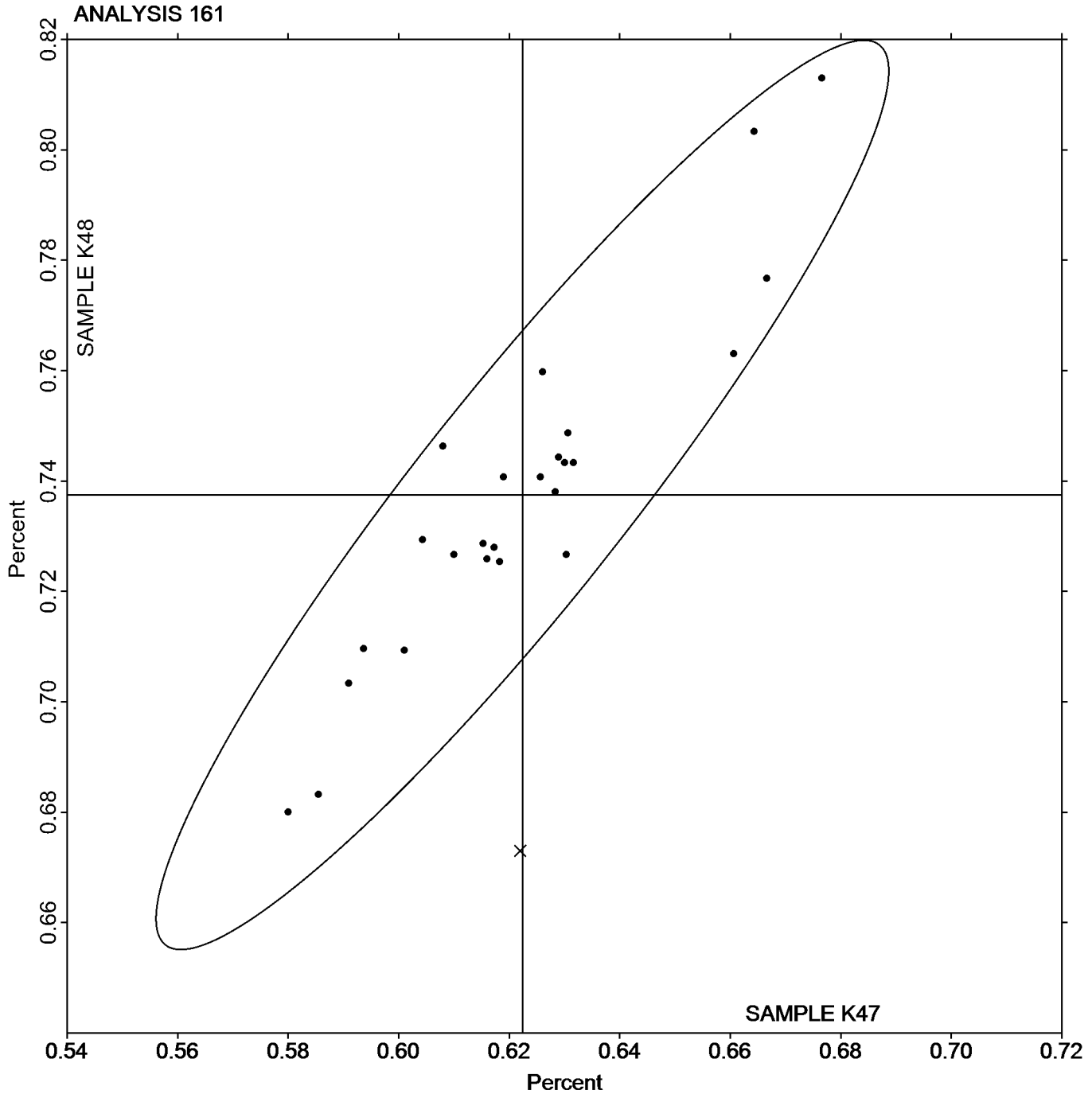
Analysis 161

Copper-based Alloy, Element #2

TIN (Sn)

SAMPLE K47  
0.6224 Percent

SAMPLE K48  
0.7375 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 162

Copper-based Alloy, Element #3  
LEAD (Pb)

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2RHLGN		1.595	-0.299	-1.14	1.740	-0.062	-0.26	ED
2VX9J3		1.644	-0.250	-0.95	1.711	-0.092	-0.38	WD
4L466K		1.972	0.079	0.30	1.740	-0.063	-0.26	OE
4N7YT4		1.740	-0.154	-0.58	1.737	-0.066	-0.27	WD
8C4EXL		1.769	-0.125	-0.47	1.770	-0.033	-0.14	IC
98PZTR		1.980	0.086	0.33	1.843	0.041	0.17	OE
CLBWR8		1.876	-0.018	-0.07	1.705	-0.097	-0.40	OE
E7ECAB		2.096	0.202	0.77	2.094	0.291	1.21	OE
HTEFNR		1.974	0.081	0.31	1.740	-0.063	-0.26	OE
JMHWFN		1.790	-0.104	-0.39	1.680	-0.123	-0.51	OE
K9HQ9F		1.797	-0.097	-0.37	1.733	-0.069	-0.29	OE
KVUL2J		1.820	-0.074	-0.28	1.694	-0.109	-0.45	XX
LDPBF8		1.446	-0.448	-1.70	1.390	-0.413	-1.71	OE
M4ED49		1.617	-0.277	-1.05	1.620	-0.183	-0.76	XX
MNZ8TA		1.930	0.036	0.14	1.809	0.006	0.02	IC
MPFYUJ		1.832	-0.062	-0.23	1.706	-0.097	-0.40	GD
MYQ6X3		1.850	-0.044	-0.17	1.607	-0.196	-0.81	OE
PFMC6Y		2.319	0.425	1.62	1.978	0.175	0.73	OE
QLR8NY		1.884	-0.010	-0.04	1.733	-0.069	-0.29	OE
QYUY7X		1.683	-0.210	-0.80	1.637	-0.166	-0.69	IC
RZ4FUV		2.010	0.116	0.44	1.740	-0.063	-0.26	OE
TGBMTX		1.858	-0.036	-0.14	1.800	-0.003	-0.01	OE
TXTAY2		2.180	0.287	1.09	2.041	0.238	0.99	OE
UU82UX		1.437	-0.457	-1.74	1.391	-0.412	-1.71	OE
WQFMF9		2.217	0.323	1.23	2.257	0.454	1.88	OE
WXXMK6	*	2.694	0.800	3.04	2.581	0.779	3.23	OE
X788MZ		2.190	0.296	1.13	1.970	0.167	0.69	DR
XEZAKP		1.794	-0.100	-0.38	1.742	-0.060	-0.25	IC
XYMV78		1.923	0.030	0.11	2.093	0.291	1.21	IC

### Summary Statistics

	Sample K47		Sample K48	
<b>Grand Means</b>	1.894	Percent	1.803	Percent
<b>Stnd Dev Btwn Labs</b>	0.263	Percent	0.241	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 29 of 29 reporting participants

### Key to Method Codes Reported by Participants

<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		





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 163

Copper-based Alloy, Element #4  
ZINC (Zn)

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2RHLGN		35.82	-0.14	-0.35	36.50	-0.25	-0.60	ED
2VX9J3		36.02	0.06	0.16	36.72	-0.03	-0.07	WD
4L466K		35.74	-0.23	-0.57	36.42	-0.34	-0.80	OE
4N7YT4		36.45	0.49	1.25	37.09	0.34	0.81	WD
8C4EXL		35.33	-0.63	-1.61	35.66	-1.09	-2.59	IC
98PZTR		35.56	-0.40	-1.02	36.53	-0.23	-0.54	OE
CLBWR8		35.77	-0.20	-0.50	36.60	-0.16	-0.37	OE
E7ECAB		35.15	-0.82	-2.08	36.82	0.06	0.15	OE
HTEFNR		35.99	0.02	0.06	36.75	0.00	-0.01	OE
JMHWFM		36.08	0.11	0.29	36.77	0.02	0.04	OE
K9HQ9F		36.12	0.15	0.39	36.97	0.21	0.50	OE
KVUL2J		36.13	0.17	0.43	36.64	-0.11	-0.26	XX
LDPBF8		35.61	-0.36	-0.91	36.35	-0.40	-0.96	OE
M4ED49		36.53	0.57	1.45	37.37	0.61	1.45	XX
MPFYUJ	X	37.40	1.44	3.66	36.60	-0.15	-0.37	GD
MYQ6X3		36.17	0.21	0.54	36.85	0.09	0.22	OE
PFMC6Y		35.69	-0.27	-0.69	36.43	-0.32	-0.76	OE
QLR8NY		36.96	1.00	2.54	37.65	0.89	2.12	OE
QYUY7X		36.27	0.31	0.78	36.25	-0.50	-1.19	IC
RZ4FUV		35.88	-0.08	-0.20	36.60	-0.16	-0.37	OE
TGBMTX		35.92	-0.04	-0.11	37.27	0.51	1.22	OE
TXTAY2		35.95	-0.01	-0.04	37.29	0.53	1.27	OE
UU82UX		35.68	-0.29	-0.73	36.58	-0.18	-0.42	OE
WQFMF9	X	23.88	-12.08	-30.73	24.54	-12.21	-29.01	OE
WXXMK6		36.39	0.43	1.09	37.04	0.29	0.69	OE
X788MZ		36.18	0.22	0.55	37.20	0.44	1.05	DR
XEZAKP		35.68	-0.28	-0.72	36.52	-0.23	-0.55	IC
XYMV78	X	45.96	10.00	25.45	46.08	9.33	22.16	IC

### Summary Statistics

	Sample K47		Sample K48	
<b>Grand Means</b>	35.96	Percent	36.75	Percent
<b>Stnd Dev Btwn Labs</b>	0.39	Percent	0.42	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 25 of 28 reporting participants

### Key to Method Codes Reported by Participants

- |    |   |    |  |
|----|---|----|--|
| 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 #163**

MPFYUJ (X) - Data for sample K47 are high.

WQFMF9 (X) - Data for both samples are very low.

XYMV78 (X) - Data for both samples are very high. Very inconsistent within the determinations of sample K48.



Analysis 163

Copper-based Alloy, Element #4

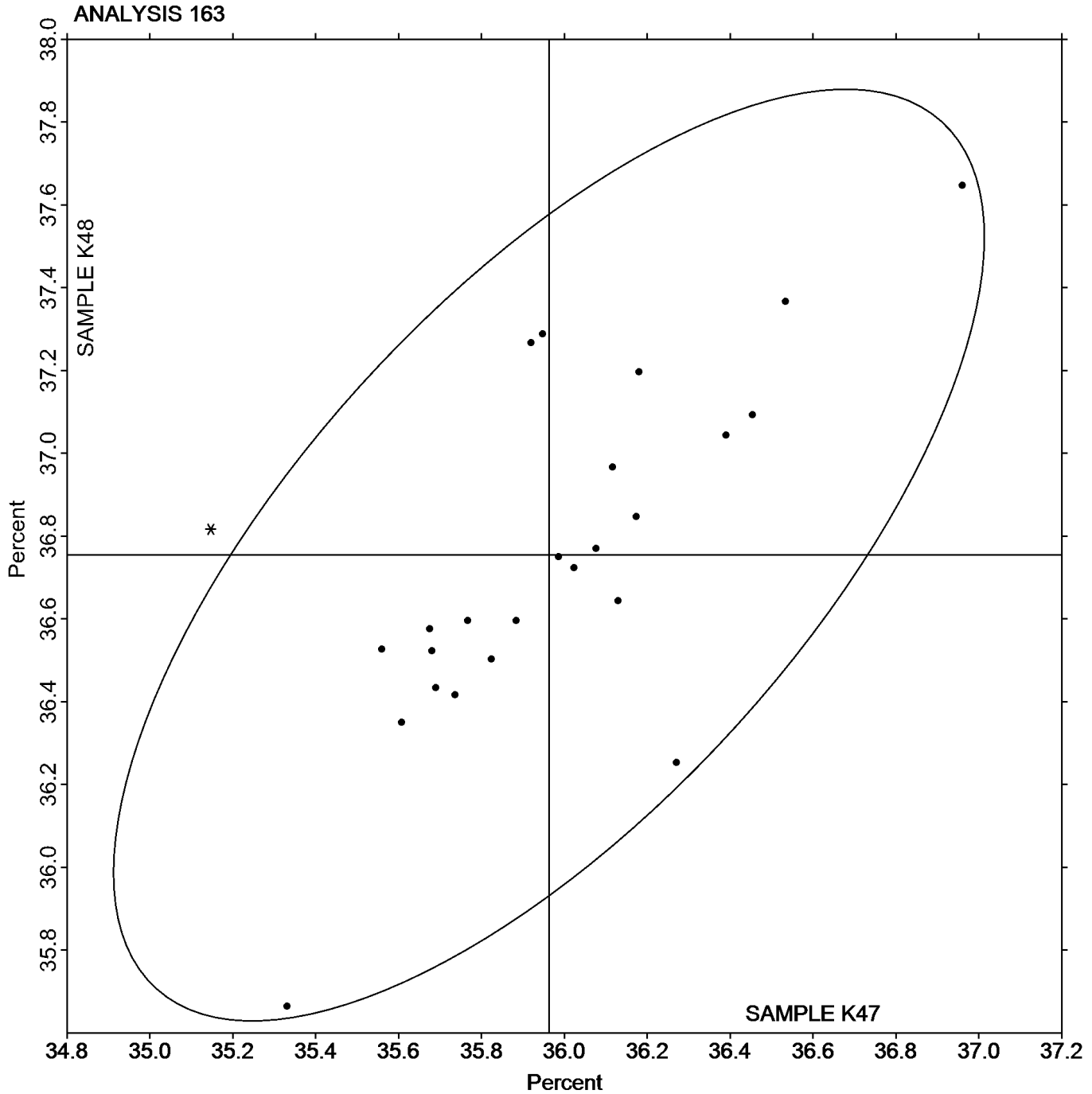
ZINC (Zn)

SAMPLE K47

SAMPLE K48

35.96 Percent

36.75 Percent







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 164

Copper-based Alloy, Element #5  
IRON (Fe)

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2VX9J3		0.0703	0.0030	0.86	0.0259	0.0021	0.79	WD
4L466K		0.0667	-0.0006	-0.18	0.0251	0.0014	0.52	OE
4N7YT4		0.0647	-0.0026	-0.74	0.0220	-0.0017	-0.64	WD
8C4EXL		0.0651	-0.0022	-0.61	0.0241	0.0004	0.14	IC
98PZTR		0.0700	0.0027	0.76	0.0250	0.0013	0.47	OE
CLBWR8		0.0681	0.0008	0.22	0.0269	0.0032	1.18	OE
E7ECAB		0.0680	0.0007	0.20	0.0229	-0.0008	-0.31	OE
HTEFNR		0.0690	0.0017	0.48	0.0231	-0.0007	-0.24	OE
JMHWFN		0.0698	0.0025	0.70	0.0249	0.0012	0.44	OE
K9HQ9F		0.0686	0.0013	0.37	0.0233	-0.0004	-0.16	OE
KVUL2J		0.0700	0.0027	0.76	0.0253	0.0016	0.59	XX
LDPBF8		0.0700	0.0027	0.76	0.0250	0.0013	0.47	OE
M4ED49	M	0.0667	-0.0006	-0.18	No Data Reported			XX
MPFYUJ		0.0700	0.0027	0.76	0.0280	0.0043	1.57	GD
MYQ6X3		0.0657	-0.0016	-0.46	0.0243	0.0006	0.22	OE
PFMC6Y		0.0655	-0.0018	-0.50	0.0248	0.0011	0.40	OE
QLR8NY		0.0670	-0.0003	-0.09	0.0240	0.0003	0.10	OE
QYUY7X	X	0.0294	-0.0379	-10.71	0.1197	0.0959	35.30	IC
RZ4FUV		0.0661	-0.0012	-0.33	0.0223	-0.0014	-0.51	OE
TGBMTX	M	0.0757	0.0084	2.36	No Data Reported			OE
TXTAY2		0.0600	-0.0073	-2.05	0.0164	-0.0073	-2.69	OE
UU82UX		0.0702	0.0029	0.81	0.0242	0.0005	0.17	OE
WQFMF9		0.0753	0.0080	2.27	0.0260	0.0023	0.83	OE
WXXMK6		0.0603	-0.0070	-1.97	0.0206	-0.0031	-1.14	OE
X788MZ		0.0618	-0.0055	-1.54	0.0171	-0.0066	-2.43	DR
XEZAQP		0.0657	-0.0016	-0.46	0.0244	0.0006	0.23	IC
XYMV78	X	0.0871	0.0198	5.60	0.0318	0.0081	2.98	IC

### Summary Statistics

	Sample K47		Sample K48	
<b>Grand Means</b>	0.0673	Percent	0.0237	Percent
<b>Stnd Dev Btwn Labs</b>	0.0035	Percent	0.0027	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 23 of 27 reporting participants

### Key to Method Codes Reported by Participants

DR	Spectrometry - Direct Reading OE (DROES)	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 #164**

M4ED49 (M) - Participant did not submit data for sample K48.

QYUY7X (X) - Data for sample K47 are very low and data for sample K48 are very high.

TGBMTX (M) - Participant did not submit data for sample K47.

XYMV78 (X) - Data for both samples are high. Inconsistent within the determinations of sample K48.

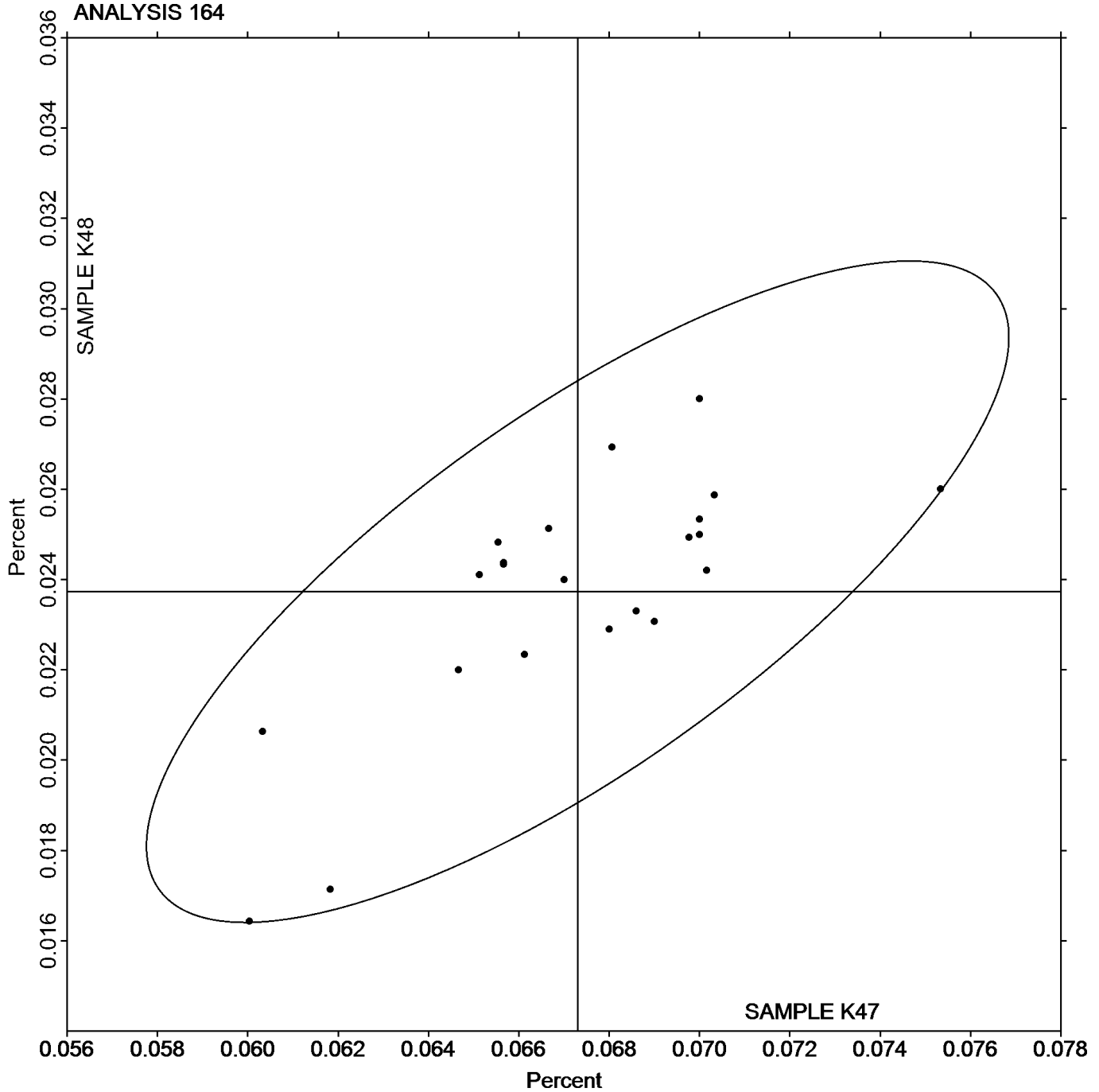


Analysis 164

Copper-based Alloy, Element #5  
IRON (Fe)

SAMPLE K47  
0.0673 Percent

SAMPLE K48  
0.0237 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 165**

**Copper-based Alloy, Element #6**  
**ARSENIC (As)**

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2VX9J3		0.0131	0.0022	0.98	0.0225	0.0016	0.41	WD
4L466K		0.00940	-0.0014	-0.62	0.0191	-0.0018	-0.46	OE
4N7YT4		0.00933	-0.0015	-0.65	0.0187	-0.0022	-0.58	IC
8C4EXL		0.00890	-0.0019	-0.84	0.0175	-0.0034	-0.87	IC
E7ECAB		0.0102	-0.0006	-0.27	0.0216	0.0007	0.19	OE
HTEFNR		0.0109	0.0000	0.02	0.0212	0.0003	0.09	OE
JMHWFN		0.00890	-0.0019	-0.84	0.0187	-0.0022	-0.56	OE
K9HQ9F		0.0103	-0.0005	-0.23	0.0201	-0.0008	-0.20	OE
KVUL2J		0.0140	0.0032	1.39	0.0253	0.0044	1.15	XX
LDPBF8		0.00997	-0.0009	-0.37	0.0201	-0.0008	-0.20	OE
PFMC6Y		0.00976	-0.0011	-0.47	0.0187	-0.0022	-0.56	XX
QLR8NY		0.0151	0.0042	1.86	0.0275	0.0066	1.70	OE
RZ4FUV		0.00900	-0.0018	-0.80	0.0137	-0.0072	-1.86	OE
UU82UX		0.00980	-0.0010	-0.45	0.0200	-0.0009	-0.23	XX
WQFMF9		0.0167	0.0058	2.56	0.0310	0.0101	2.62	OE
WXXMK6		0.00940	-0.0014	-0.62	0.0189	-0.0020	-0.52	OE
X788MZ		0.0104	-0.0004	-0.17	0.0206	-0.0003	-0.08	DR
XEZAKP		0.00860	-0.0022	-0.97	0.0182	-0.0027	-0.70	IC
XYMV78		0.0119	0.0011	0.49	0.0234	0.0025	0.64	IC

**Summary Statistics**

	Sample K47		Sample K48	
<b>Grand Means</b>	0.0108	Percent	0.0209	Percent
<b>Stnd Dev Btwn Labs</b>	0.0023	Percent	0.0039	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 19 of 19 reporting participants

**Key to Method Codes Reported by Participants**

- DR Spectrometry - Direct Reading OE (DROES)
- OE Spectrometry - Optical Emission (OES)
- XX Please Indicate Method Used for Current Element
- IC Spectrometry - Inductively Coupled Plasma (ICP)
- WD X-Ray Fluorescence - Wavelength Dispersive (WDX)





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 166**

**Copper-based Alloy, Element #7**  
**SILICON (Si)**

WebCode	Data Flag	Sample K47			Sample K48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
4N7YT4		0.000700	-0.00220	-0.75	0.000700	-0.00230	-0.76	GR
8C4EXL		0.00287	-0.00003	-0.01	0.00283	-0.00016	-0.05	IC
E7ECAB		0.000400	-0.00250	-0.86	0.000500	-0.00250	-0.83	OE
HTEFNR		0.00340	0.00050	0.17	0.00387	0.00087	0.29	OE
JMHWFM		0.00613	0.00323	1.11	0.00623	0.00324	1.07	OE
KVUL2J		0.00867	0.00577	1.97	0.00900	0.00600	1.99	XX
LDPBF8		0.000200	-0.00270	-0.92	0.000200	-0.00280	-0.93	OE
QLR8NY		0.00323	0.00033	0.11	0.00313	0.00014	0.05	OE
WQFMF9		0.000500	-0.00240	-0.82	0.000500	-0.00250	-0.83	OE

**Summary Statistics**

	Sample K47		Sample K48	
<b>Grand Means</b>	0.00290	Percent	0.00300	Percent
<b>Stnd Dev Btrwn Labs</b>	0.00292	Percent	0.00302	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 9 of 9 reporting participants

**Key to Method Codes Reported by Participants**

- GR Gravimetry
- IC Spectrometry - Inductively Coupled Plasma (ICP)
- OE Spectrometry - Optical Emission (OES)
- XX Please Indicate Method Used for Current Element

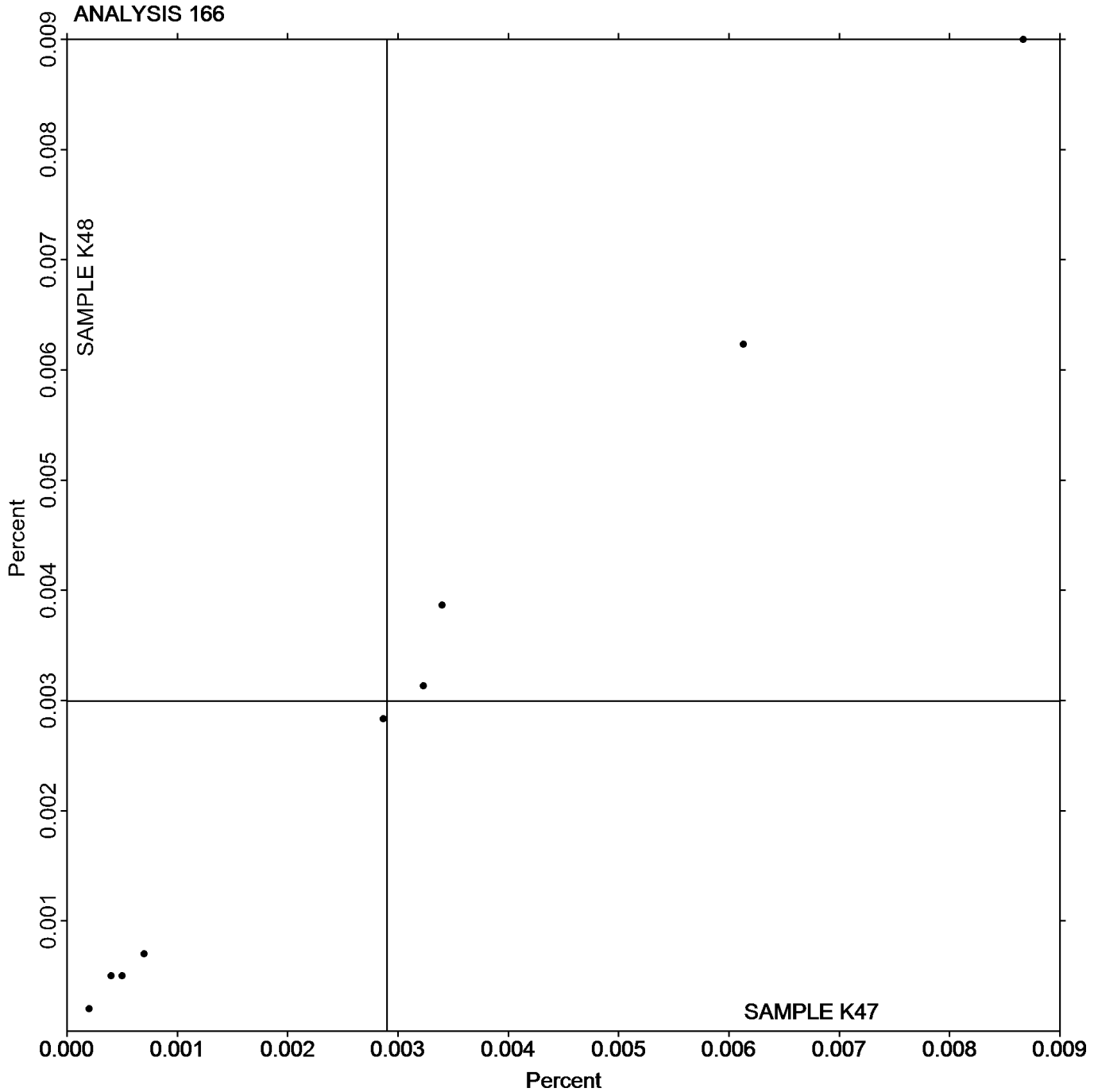


Analysis 166

Copper-based Alloy, Element #7  
SILICON (Si)

SAMPLE K47  
0.00290 Percent

SAMPLE K48  
0.00300 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 167**

**Copper-based Alloy, Element #8**  
**SULFUR (S)**

WebCode	Data Flag	Sample K47			Sample			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2VX9J3	M	0.000800	-0.00253	-1.16	No Data Reported			OE
4N7YT4	M	0.00173	-0.00160	-0.73	No Data Reported			OE
98PZTR		0.00167	-0.00167	-0.76	0.00100	-0.00108	-0.71	OE
HTEFNR		0.00243	-0.00090	-0.41	0.00103	-0.00104	-0.69	OE
JMHWFM	M	0.00153	-0.00180	-0.82	No Data Reported			OE
K9HQ9F		0.00333	0.00000	0.00	0.00260	0.00052	0.35	OE
KVUL2J		0.00200	-0.00133	-0.61	0.000667	-0.00141	-0.93	XX
M4ED49		0.000167	-0.00317	-1.44	0.000100	-0.00198	-1.31	XX
QLR8NY		0.00507	0.00173	0.79	0.00420	0.00212	1.41	OE
TXTAY2		0.00210	-0.00123	-0.56	0.00140	-0.00067	-0.45	OE
WQFMF9		0.00613	0.00280	1.28	0.00463	0.00256	1.69	OE
WXXMK6		0.00727	0.00393	1.79	0.00280	0.00072	0.48	OE
X788MZ		0.00317	-0.00017	-0.08	0.00233	0.00026	0.17	DR

**Summary Statistics**

	Sample K47		Sample K48	
<b>Grand Means</b>	0.00333	Percent	0.00208	Percent
<b>Std Dev Btwn Labs</b>	0.00219	Percent	0.00151	Percent

Samples K47, K48 : CDA 485, CDA 485

Statistics based on 10 of 13 reporting participants

**Key to Method Codes Reported by Participants**

- DR Spectrometry - Direct Reading OE (DROES)
- OE Spectrometry - Optical Emission (OES)
- XX Please Indicate Method Used for Current Element

**Comments on Assigned Data Flags for Test #167**

- 2VX9J3 (M) - Participant did not submit data for sample K48.
- 4N7YT4 (M) - Participant did not submit data for sample K48.
- JMHWFM (M) - Participant did not submit data for sample K48.



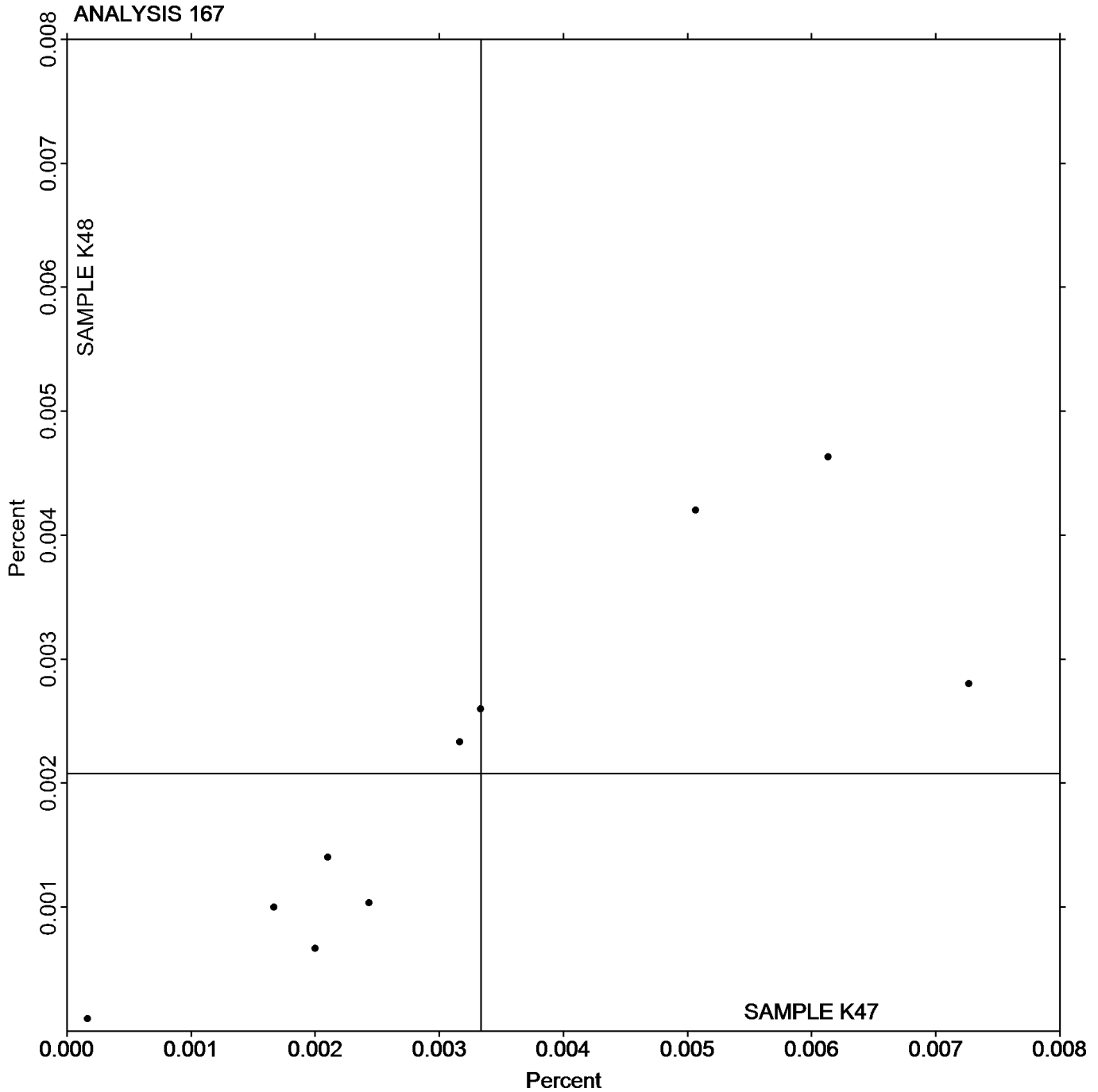


Analysis 167

Copper-based Alloy, Element #8  
SULFUR (S)

SAMPLE K47  
0.00333 Percent

SAMPLE K48  
0.00208 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 180

Corrosion Resistant Steel, Element #1  
CARBON (C)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.0470	-0.0003	-0.21	0.0537	-0.0002	-0.14	GD
2AZZZ2		0.0467	-0.0007	-0.42	0.0534	-0.0005	-0.28	CI
2HTYLL		0.0482	0.0008	0.51	0.0536	-0.0003	-0.17	CI
2MHUA7	X	0.0554	0.0081	5.00	0.0607	0.0068	3.73	CI
2VX9J3		0.0459	-0.0014	-0.89	0.0520	-0.0019	-1.06	CI
32ZDVZ		0.0457	-0.0016	-1.02	0.0530	-0.0009	-0.50	CI
3M2T9P		0.0485	0.0011	0.70	0.0542	0.0003	0.14	CI
4L466K		0.0487	0.0013	0.82	0.0550	0.0011	0.60	OE
4NACMR	X	0.0417	-0.0057	-3.52	0.0467	-0.0072	-4.00	OE
4NNYZY		0.0454	-0.0020	-1.22	0.0508	-0.0031	-1.72	OE
6GR3PM		0.0473	0.0000	0.00	0.0530	-0.0009	-0.50	CI
7A3VFT		0.0466	-0.0007	-0.46	0.0514	-0.0025	-1.37	OE
7CA94M		0.0484	0.0011	0.68	0.0568	0.0029	1.61	OE
7KX7NZ		0.0453	-0.0020	-1.24	0.0537	-0.0002	-0.14	OE
8AXUB7		0.0473	0.0000	0.00	0.0537	-0.0002	-0.14	OE
8C4EXL		0.0460	-0.0013	-0.83	0.0530	-0.0009	-0.50	OE
8GWQ4X		0.0489	0.0016	0.97	0.0557	0.0018	0.97	OE
98PZTR	X	0.0463	-0.0010	-0.62	0.0470	-0.0069	-3.82	OE
9DQEDT		0.0493	0.0020	1.22	0.0548	0.0009	0.47	CO
CLT98R		0.0443	-0.0030	-1.87	0.0507	-0.0032	-1.79	CI
CX8N66		0.0473	0.0000	0.00	0.0513	-0.0026	-1.42	OE
D3J9W7		0.0467	-0.0007	-0.42	0.0553	0.0014	0.78	OE
DHUL3M		0.0477	0.0003	0.20	0.0519	-0.0020	-1.13	OE
E7ECAB		0.0485	0.0012	0.74	0.0547	0.0008	0.42	OE
EJ2G2K		0.0466	-0.0008	-0.48	0.0527	-0.0012	-0.69	OE
FFYXGW		0.0489	0.0015	0.95	0.0556	0.0017	0.91	CO
GLVWKR		0.0503	0.0030	1.86	0.0560	0.0021	1.15	CI
HEWUWK		0.0493	0.0020	1.24	0.0567	0.0028	1.52	CI
HTEFNR		0.0436	-0.0037	-2.32	0.0505	-0.0034	-1.88	CO
JJP39R		0.0433	-0.0040	-2.49	0.0503	-0.0036	-1.98	OE
K9HQ9F	X	0.0422	-0.0052	-3.21	0.0537	-0.0002	-0.10	OE
KVUL2J		0.0470	-0.0003	-0.21	0.0537	-0.0002	-0.14	OE
LAAJMT		0.0473	0.0000	0.00	0.0567	0.0028	1.52	OE
LB7PVD		0.0450	-0.0023	-1.45	0.0540	0.0001	0.05	OE
LCF72H	M	No Data Reported			0.0537	-0.0002	-0.12	GD
LMXMR4		0.0500	0.0027	1.65	0.0553	0.0014	0.78	OE
MFARFJ		0.0463	-0.0010	-0.63	0.0534	-0.0006	-0.31	XX
MPFYUJ		0.0480	0.0007	0.41	0.0570	0.0031	1.70	GD
MYQ6X3		0.0467	-0.0007	-0.42	0.0530	-0.0009	-0.50	OE
N98B8B	X	0.0603	0.0130	8.07	0.0623	0.0084	4.65	CI
PFMC6Y		0.0480	0.0007	0.41	0.0555	0.0016	0.88	OE
Q6F26M	X	0.0523	0.0050	3.10	0.0480	-0.0059	-3.26	CI
QLR8NY		0.0453	-0.0021	-1.29	0.0527	-0.0012	-0.69	OE
QTRYNG		0.0483	0.0009	0.58	0.0549	0.0010	0.56	CO
QYUY7X		0.0494	0.0021	1.28	0.0543	0.0004	0.21	GD
R79JXV		0.0470	-0.0004	-0.23	0.0532	-0.0007	-0.38	CI
TCCE29	X	0.0546	0.0073	4.51	0.0559	0.0020	1.08	CO



# Fasteners and Metals Interlaboratory Testing Program

**Cycle 120**  
**4th Qtr 2017**

## Analysis 180

Corrosion Resistant Steel, Element #1  
CARBON (C)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
TGBMTX		0.0483	0.0010	0.60	0.0553	0.0014	0.78	OE
THH9YB		0.0457	-0.0017	-1.04	0.0520	-0.0019	-1.06	CO
UVMNJK		0.0448	-0.0025	-1.56	0.0501	-0.0038	-2.12	CI
UWR3KE		0.0498	0.0025	1.55	0.0562	0.0023	1.26	CI
UZD7Q6		0.0486	0.0013	0.78	0.0563	0.0024	1.34	OE
V7V7V3	X	0.0580	0.0107	6.62	0.0557	0.0018	0.97	CO
V8DVX2		0.0467	-0.0007	-0.42	0.0547	0.0008	0.42	GD
VPABC7		0.0497	0.0023	1.45	0.0563	0.0024	1.34	OE
WCJVPH		0.0477	0.0003	0.20	0.0543	0.0004	0.23	CI
WNQHJU		0.0479	0.0006	0.35	0.0538	-0.0001	-0.08	CI
WXXMK6	X	0.0560	0.0087	5.38	0.0653	0.0114	6.30	OE
X788MZ		0.0473	0.0000	-0.02	0.0525	-0.0014	-0.76	OE
XE4G3K	X	0.0392	-0.0081	-5.05	0.0445	-0.0094	-5.18	OE
XEZAKP		0.0491	0.0018	1.09	0.0550	0.0011	0.60	CO
XXMPLQ		0.0475	0.0002	0.10	0.0554	0.0015	0.84	OE
XQYDVQ		0.0469	-0.0004	-0.25	0.0534	-0.0005	-0.27	CI
ZEZCFT		0.0477	0.0003	0.20	0.0557	0.0018	0.97	OE
ZYH63M		0.0487	0.0013	0.82	0.0533	-0.0006	-0.32	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	0.0473	Percent	0.0539	Percent
<b>Std Dev Btwn Labs</b>	0.0016	Percent	0.0018	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 54 of 65 reporting participants

### Key to Method Codes Reported by Participants

- |    |   |    |                                       |
|----|---|----|---------------------------------------|
| CI | Combustion / IR                                 | CO | Combustion                            |
| GD | Spectrometry - Glow Discharge (GDS)             | OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |    |                                       |



**Comments on Assigned Data Flags for Test #180**

- 2MHUA7 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- 4NACMR (X) - Data for both samples are low. Possible Systematic Error.
- 98PZTR (X) - Data for sample M48 are low.
- K9HQ9F (X) - Data for sample M47 are low. Inconsistent within the determinations of both samples.
- LCF72H (M) - Participant did not submit data for sample M47.
- N98B8B (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- Q6F26M (X) - Data for sample M47 are high and data for sample M48 are low. Inconsistent in testing between samples.
- TCCE29 (X) - Data for sample M47 are high. Inconsistent within the determinations of sample M47.
- V7V7V3 (X) - Data for sample M47 are high.
- WXXMK6 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample M47.
- XE4G3K (X) - Data for both samples are low. Possible Systematic Error.

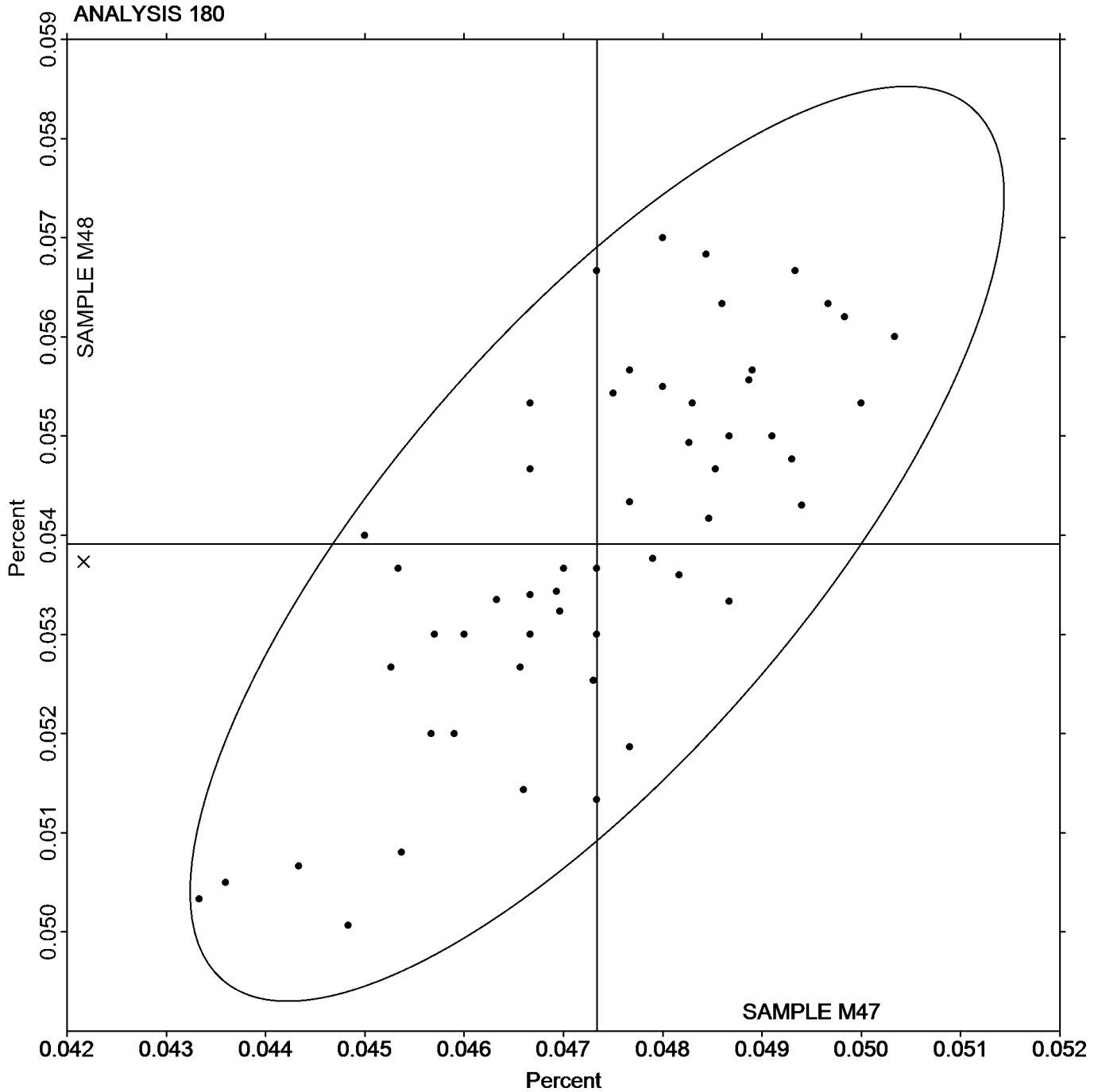


Analysis 180

Corrosion Resistant Steel, Element #1  
CARBON (C)

SAMPLE M47  
0.0473 Percent

SAMPLE M48  
0.0539 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 181

Corrosion Resistant Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		1.440	0.008	0.56	1.773	-0.008	-0.49	GD
2AZZZ2		1.422	-0.010	-0.70	1.773	-0.009	-0.52	XR
2HTYLL		1.424	-0.008	-0.57	1.786	0.005	0.26	WD
2MHUA7	X	1.457	0.025	1.72	1.920	0.138	7.98	OE
2VX9J3		1.427	-0.005	-0.36	1.800	0.019	1.07	OE
32ZDVZ		1.440	0.008	0.59	1.784	0.003	0.15	IC
3M2T9P		1.418	-0.014	-0.97	1.758	-0.024	-1.39	WD
4L466K		1.451	0.019	1.33	1.798	0.016	0.92	OE
4NACMR		1.449	0.017	1.21	1.802	0.020	1.15	OE
4NNYZY	*	1.474	0.042	2.90	1.817	0.035	2.01	OE
6GR3PM		1.460	0.028	1.96	1.793	0.012	0.67	DR
7A3VFT		1.421	-0.011	-0.78	1.769	-0.013	-0.73	OE
7CA94M	X	1.381	-0.051	-3.57	1.723	-0.059	-3.40	OE
7KX7NZ		1.440	0.008	0.56	1.797	0.015	0.86	WD
8AXUB7		1.440	0.008	0.56	1.803	0.022	1.24	OE
8C4EXL		1.437	0.005	0.35	1.782	0.000	0.01	OE
8GWQ4X		1.455	0.023	1.59	1.799	0.017	0.97	OE
98PZTR		1.437	0.005	0.33	1.783	0.002	0.09	OE
9DQEDT	X	1.389	-0.043	-3.01	1.782	0.000	-0.01	OE
CLT98R		1.439	0.007	0.47	1.783	0.001	0.08	IC
CX8N66		1.430	-0.002	-0.13	1.763	-0.018	-1.07	OE
D3J9W7		1.421	-0.011	-0.74	1.760	-0.022	-1.26	OE
DHUL3M		1.456	0.024	1.70	1.799	0.017	0.99	OE
E7ECAB	X	1.491	0.059	4.09	1.852	0.071	4.07	OE
EJ2G2K		1.433	0.001	0.10	1.769	-0.013	-0.74	OE
FFYXGW		1.425	-0.007	-0.48	1.778	-0.003	-0.20	DR
GLVWKR		1.430	-0.002	-0.16	1.750	-0.032	-1.84	OE
HEWUWK	X	1.468	0.036	2.54	1.865	0.083	4.80	DR
HTEFNR		1.423	-0.009	-0.62	1.776	-0.006	-0.34	OE
JJP39R	X	0.5500	-0.882	-61.43	0.7267	-1.055	-60.94	OE
K9HQ9F		1.447	0.015	1.03	1.787	0.005	0.28	OE
KVUL2J		1.437	0.005	0.33	1.807	0.025	1.44	XX
LAAJMT		1.424	-0.008	-0.53	1.755	-0.026	-1.53	OE
LB7PVD		1.432	0.000	-0.02	1.774	-0.008	-0.45	OE
LCF72H	M	No Data Reported			1.862	0.081	4.65	GD
LDPBF8	X	1.553	0.121	8.46	1.923	0.142	8.17	OE
LMXMR4		1.438	0.006	0.45	1.817	0.035	2.03	OE
MFARFJ		1.431	0.000	-0.03	1.768	-0.014	-0.81	XX
MPFYUJ	X	1.520	0.088	6.14	1.941	0.159	9.19	GD
MYQ6X3		1.440	0.008	0.56	1.787	0.005	0.28	OE
N98B8B		1.413	-0.019	-1.29	1.773	-0.008	-0.49	IC
PBNG7R		1.410	-0.022	-1.53	1.760	-0.022	-1.26	ED
PFMC6Y		1.417	-0.015	-1.01	1.770	-0.011	-0.66	OE
Q6F26M		1.428	-0.004	-0.27	1.787	0.005	0.28	WD
QLR8NY		1.435	0.003	0.24	1.789	0.007	0.40	OE
QTRYNG		1.419	-0.013	-0.92	1.806	0.024	1.40	OE
QYUY7X		1.430	-0.002	-0.13	1.790	0.008	0.47	GD



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 181

Corrosion Resistant Steel, Element #2  
MANGANESE (Mn)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
R79JXV		1.410	-0.022	-1.50	1.758	-0.024	-1.39	WD
TGBMTX	*	1.450	0.018	1.24	1.741	-0.041	-2.36	OE
THH9YB		1.439	0.007	0.47	1.778	-0.003	-0.20	XR
UVMNJK		1.410	-0.022	-1.53	1.763	-0.018	-1.07	WD
UWR3KE		1.447	0.015	1.03	1.804	0.022	1.29	OE
UZD7Q6		1.419	-0.013	-0.88	1.757	-0.025	-1.43	OE
V7V7V3	X	1.410	-0.022	-1.53	1.700	-0.082	-4.72	OE
V8DVX2		1.437	0.005	0.33	1.807	0.025	1.44	GD
VPABC7		1.433	0.001	0.10	1.786	0.005	0.26	OE
WCJVPH		1.418	-0.014	-0.95	1.776	-0.006	-0.34	WD
WNQHJU		1.433	0.001	0.05	1.788	0.007	0.38	WD
WXXMK6		1.435	0.003	0.19	1.773	-0.009	-0.53	OE
X788MZ		1.443	0.011	0.80	1.790	0.008	0.47	OE
XE4G3K		1.414	-0.018	-1.25	1.799	0.017	0.99	OE
XEZAKP		1.454	0.022	1.54	1.798	0.017	0.95	IC
XMXPQLQ		1.410	-0.022	-1.53	1.770	-0.012	-0.68	OE
XQYDVQ		1.433	0.001	0.10	1.776	-0.005	-0.32	WD
ZEZCFT		1.400	-0.032	-2.22	1.743	-0.038	-2.22	OE
ZYH63M		1.427	-0.005	-0.36	1.767	-0.015	-0.87	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	1.432	Percent	1.782	Percent
<b>Stnd Dev Btwn Labs</b>	0.014	Percent	0.017	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 55 of 66 reporting participants

### Key to Method Codes Reported by Participants

<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>XR</b>	X-Ray Fluorescence - ED or WD not specified	<b>XX</b>	Please Indicate Method Used for Current Element



**Analysis 181**

**Corrosion Resistant Steel, Element #2**  
**MANGANESE (Mn)**

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**Comments on Assigned Data Flags for Test #181**

- 2MHUA7 (X) - Data for sample M48 are high. Inconsistent within the determinations of sample M47.
- 7CA94M (X) - Data for both samples are low.
- 9DQEDT (X) - Data for sample M47 are low. Inconsistent within the determinations of sample M47.
- E7ECAB (X) - Data for both samples are high.
- HEWUWK (X) - Data for sample M48 are high.
- JJP39R (X) - Data for both samples are extremely low. Inconsistent within the determinations of both samples.
- LCF72H (M) - Participant did not submit data for sample M47.
- LDPBF8 (X) - Data for both samples are high. Inconsistent within the determinations of sample M47.
- MPFYUJ (X) - Data for both samples are high.
- V7V7V3 (X) - Data for sample M48 are low. Inconsistent within the determinations of both samples.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 182

Corrosion Resistant Steel, Element #3  
NIOBIUM (Nb)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.5590	-0.0075	-0.36	0.7233	-0.0094	-0.39	GD
2AZZZ2		0.5670	0.0005	0.02	0.7276	-0.0052	-0.22	XR
2HTYLL		0.5330	-0.0335	-1.61	0.7110	-0.0218	-0.90	WD
2MHUA7		0.5267	-0.0399	-1.91	0.6967	-0.0361	-1.49	OE
2RHLGN		0.5720	0.0055	0.26	0.7293	-0.0034	-0.14	ED
2VX9J3		0.5753	0.0088	0.42	0.7343	0.0016	0.07	OE
32ZDVZ		0.5750	0.0085	0.41	0.7430	0.0102	0.42	IC
3M2T9P		0.5550	-0.0115	-0.55	0.7087	-0.0241	-1.00	WD
4L466K		0.5517	-0.0149	-0.71	0.7477	0.0149	0.62	OE
4NACMR		0.5467	-0.0199	-0.95	0.7320	-0.0008	-0.03	OE
4NNYZY		0.5568	-0.0097	-0.47	0.7167	-0.0160	-0.66	OE
6GR3PM		0.5633	-0.0032	-0.15	0.7200	-0.0128	-0.53	WD
7A3VFT		0.5811	0.0146	0.70	0.7394	0.0066	0.27	OE
7CA94M	X	0.7443	0.1778	8.53	0.9835	0.2508	10.38	OE
7KX7NZ		0.5787	0.0121	0.58	0.7377	0.0049	0.20	WD
8C4EXL		0.5410	-0.0255	-1.23	0.7127	-0.0201	-0.83	OE
8GWQ4X		0.5623	-0.0042	-0.20	0.7490	0.0162	0.67	OE
98PZTR	X	0.0560	-0.5105	-24.50	0.7067	-0.0261	-1.08	OE
9DQEDT		0.5960	0.0295	1.41	0.7470	0.0142	0.59	OE
CLT98R		0.5710	0.0044	0.21	0.7269	-0.0058	-0.24	IC
CX8N66		0.5670	0.0005	0.02	0.7060	-0.0268	-1.11	OE
D3J9W7		0.5177	-0.0489	-2.35	0.6827	-0.0501	-2.07	OE
DHUL3M		0.5827	0.0162	0.78	0.7114	-0.0213	-0.88	OE
E7ECAB		0.5643	-0.0022	-0.11	0.7140	-0.0188	-0.78	OE
FFYXGW		0.5743	0.0078	0.37	0.7437	0.0109	0.45	DR
GLVWKR		0.5463	-0.0202	-0.97	0.7270	-0.0058	-0.24	OE
HEWUWK		0.5840	0.0175	0.84	0.7787	0.0459	1.90	DR
HTEFNR		0.5587	-0.0079	-0.38	0.7400	0.0072	0.30	OE
K9HQ9F		0.5733	0.0068	0.33	0.7423	0.0096	0.40	OE
KVUL2J		0.5713	0.0048	0.23	0.7257	-0.0071	-0.29	XX
LAAJMT	X	0.3640	-0.2025	-9.72	0.4807	-0.2521	-10.43	OE
LB7PVD		0.5930	0.0265	1.27	0.7647	0.0319	1.32	OE
LCF72H	M	No Data Reported			0.8067	0.0739	3.06	GD
LDPBF8		0.5847	0.0181	0.87	0.7443	0.0116	0.48	OE
LMXMR4		0.5740	0.0075	0.36	0.7417	0.0089	0.37	OE
MFARFJ		0.5916	0.0250	1.20	0.7622	0.0295	1.22	XX
MPFYUJ	*	0.5960	0.0295	1.41	0.7990	0.0662	2.74	GD
MYQ6X3		0.5757	0.0091	0.44	0.7307	-0.0021	-0.09	OE
N98B8B		0.5483	-0.0182	-0.87	0.7010	-0.0318	-1.31	IC
PBNG7R	X	0.5400	-0.0265	-1.27	0.6500	-0.0828	-3.43	ED
PFMC6Y		0.6093	0.0428	2.05	0.7937	0.0609	2.52	OE
Q6F26M		0.5687	0.0021	0.10	0.7313	-0.0014	-0.06	WD
QLR8NY		0.5503	-0.0162	-0.78	0.7153	-0.0174	-0.72	OE
QTRYNG		0.5641	-0.0024	-0.12	0.7415	0.0087	0.36	OE
QYUY7X		0.5647	-0.0019	-0.09	0.7527	0.0199	0.82	GD
R79JXV		0.5683	0.0018	0.09	0.7303	-0.0024	-0.10	WD
TGBMTX		0.5797	0.0131	0.63	0.7410	0.0082	0.34	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 182

Corrosion Resistant Steel, Element #3  
NIOBIUM (Nb)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
THH9YB		0.5660	-0.0005	-0.03	0.7467	0.0139	0.58	OE
UVMNJK		0.5757	0.0091	0.44	0.7383	0.0056	0.23	WD
UWR3KE		0.5515	-0.0150	-0.72	0.7131	-0.0197	-0.81	OE
UZD7Q6	X	0.4503	-0.1162	-5.58	0.5903	-0.1424	-5.90	OE
V7V7V3		0.6000	0.0335	1.61	0.7600	0.0272	1.13	OE
V8DVX2		0.5413	-0.0252	-1.21	0.7273	-0.0054	-0.22	GD
WCJVPH		0.5553	-0.0112	-0.54	0.7143	-0.0184	-0.76	WD
WNQHJU		0.5577	-0.0089	-0.43	0.7110	-0.0218	-0.90	WD
WXXMK6		0.5367	-0.0299	-1.43	0.7067	-0.0261	-1.08	OE
X788MZ	*	0.6283	0.0618	2.97	0.7920	0.0592	2.45	OE
XE4G3K	M	0.6100	0.0435	2.09	No Data Reported			OE
XEZAKP		0.5580	-0.0085	-0.41	0.7430	0.0102	0.42	IC
XXMPLQ		0.5680	0.0015	0.07	0.7370	0.0042	0.18	OE
XQYDVQ		0.5665	0.0000	0.00	0.7158	-0.0170	-0.70	WD
ZEZCFT		0.5210	-0.0455	-2.19	0.6833	-0.0494	-2.05	OE
ZYH63M		0.5803	0.0138	0.66	0.7223	-0.0104	-0.43	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	0.5665	Percent	0.7328	Percent
<b>Std Dev Brwn Labs</b>	0.0208	Percent	0.0242	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 56 of 63 reporting participants

### Key to Method Codes Reported by Participants

<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>XR</b>	X-Ray Fluorescence - ED or WD not specified	<b>XX</b>	Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #182

- 7CA94M (X) - Data for both samples are high.
- 98PZTR (X) - Data for sample M47 appear to be off by a factor of ten.
- LAAJMT (X) - Data for both samples are low.
- LCF72H (M) - Participant did not submit data for sample M47.
- PBNG7R (X) - Data for sample M48 are low.
- UZD7Q6 (X) - Data for both samples are low.
- XE4G3K (M) - Participant did not submit data for sample M48.

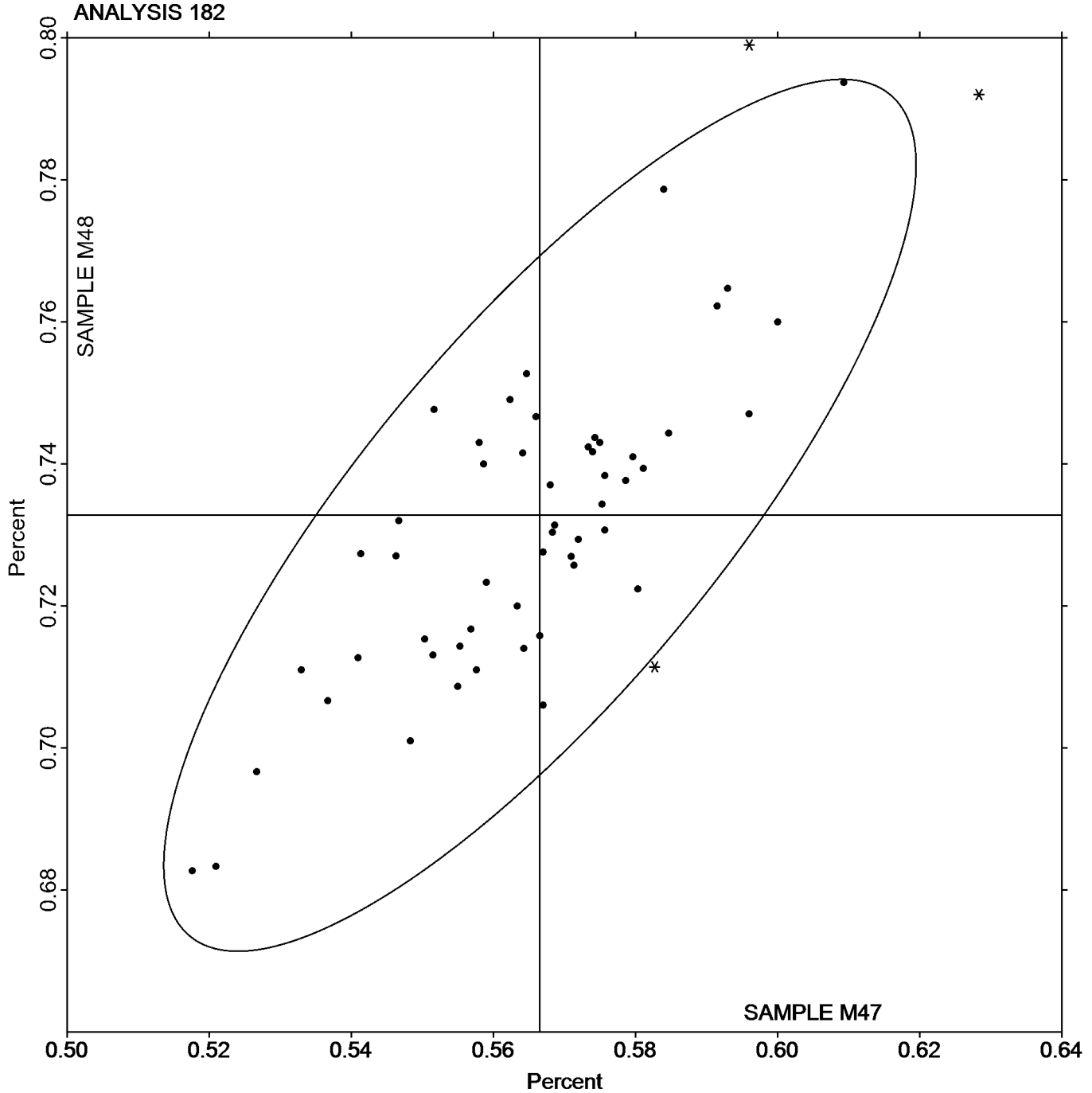


Analysis 182

Corrosion Resistant Steel, Element #3  
NIOBIUM (Nb)

SAMPLE M47  
0.5665 Percent

SAMPLE M48  
0.7328 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 183

Corrosion Resistant Steel, Element #4  
NITROGEN (N)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2AZZZ2		0.0501	-0.0002	-0.09	0.0157	-0.0017	-0.50	CI
2HTYLL		0.0519	0.0016	0.78	0.0162	-0.0013	-0.36	CO
2MHUA7		0.0495	-0.0009	-0.42	0.0150	-0.0024	-0.69	CI
32ZDVZ		0.0520	0.0017	0.81	0.0157	-0.0017	-0.50	CO
3M2T9P		0.0497	-0.0006	-0.30	0.0167	-0.0008	-0.22	CI
4L466K		0.0513	0.0010	0.49	0.0160	-0.0015	-0.42	OE
4NACMR	X	0.0410	-0.0093	-4.53	0.0257	0.0082	2.38	OE
4NNYZY		0.0459	-0.0044	-2.15	0.0147	-0.0027	-0.79	OE
6GR3PM		0.0503	0.0000	0.01	0.0167	-0.0008	-0.22	XX
7CA94M	X	0.0725	0.0221	10.75	0.0283	0.0108	3.13	OE
7KX7NZ	X	0.4900	0.4397	213.50	0.0150	-0.0024	-0.70	OE
8GWQ4X		0.0517	0.0013	0.65	0.0162	-0.0013	-0.36	OE
9DQEDT		0.0510	0.0007	0.35	0.0167	-0.0007	-0.20	IR
CLT98R		0.0507	0.0004	0.18	0.0152	-0.0023	-0.65	CO
DHUL3M	X	0.0514	0.0011	0.54	0.0351	0.0177	5.12	OE
E7ECAB		0.0507	0.0004	0.20	0.0142	-0.0033	-0.94	OE
GLVWKR		0.0510	0.0007	0.33	0.0148	-0.0026	-0.75	OE
HEWUWK		0.0483	-0.0020	-0.97	0.0150	-0.0024	-0.70	DR
HTEFNR		0.0499	-0.0005	-0.22	0.0201	0.0026	0.76	OE
KVUL2J		0.0490	-0.0013	-0.64	0.0223	0.0049	1.42	XX
MFARFJ	*	0.0534	0.0030	1.47	0.0278	0.0104	3.01	XX
N98B8B		0.0532	0.0029	1.40	0.0170	-0.0005	-0.13	CI
PFMC6Y		0.0454	-0.0049	-2.39	0.0144	-0.0030	-0.87	OE
Q6F26M		0.0510	0.0007	0.33	0.0160	-0.0014	-0.41	CI
QLR8NY	*	0.0540	0.0037	1.79	0.0275	0.0101	2.91	OE
QTRYNG		0.0479	-0.0024	-1.16	0.0157	-0.0017	-0.49	CO
R79JXV		0.0511	0.0008	0.39	0.0162	-0.0012	-0.34	CO
UVMNJK	X	0.00510	-0.0452	-21.96	0.0160	-0.0014	-0.40	CI
UWR3KE		0.0495	-0.0009	-0.42	0.0160	-0.0014	-0.40	CO
WCJVPH		0.0513	0.0010	0.49	0.0173	-0.0001	-0.03	CI
WNQHJU		0.0511	0.0008	0.38	0.0162	-0.0012	-0.34	CO
X788MZ		0.0453	-0.0050	-2.42	0.0201	0.0026	0.76	OE
XEZAKP		0.0510	0.0007	0.33	0.0160	-0.0014	-0.40	CO
XMPLQ		0.0509	0.0006	0.30	0.0190	0.0016	0.46	OE
XQYDVQ		0.0504	0.0000	0.02	0.0166	-0.0008	-0.24	CI
ZYH63M		0.0513	0.0010	0.47	0.0231	0.0057	1.64	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	0.0503	Percent	0.0174	Percent
<b>Std Dev Btwn Labs</b>	0.0021	Percent	0.0035	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 31 of 36 reporting participants



**Key to Method Codes Reported by Participants**

CI	Combustion / IR	CO	Combustion
DR	Spectrometry - Direct Reading OE (DROES)	IR	IR (Absorption / Detection)
OE	Spectrometry - Optical Emission (OES)	XX	Please Indicate Method Used for Current Element

**Comments on Assigned Data Flags for Test #183**

- 4NACMR (X) - Data for sample M47 are low. Inconsistent within the determinations of sample M48.
- 7CA94M (X) - Data for both samples are high. Inconsistent within the determinations of both samples.
- 7KX7NZ (X) - Data for sample M47 appear to be off by a factor of ten.
- DHUL3M (X) - Data for sample M48 are high.
- UVMNJK (X) - Data for sample M47 appear to be off by a factor of ten.



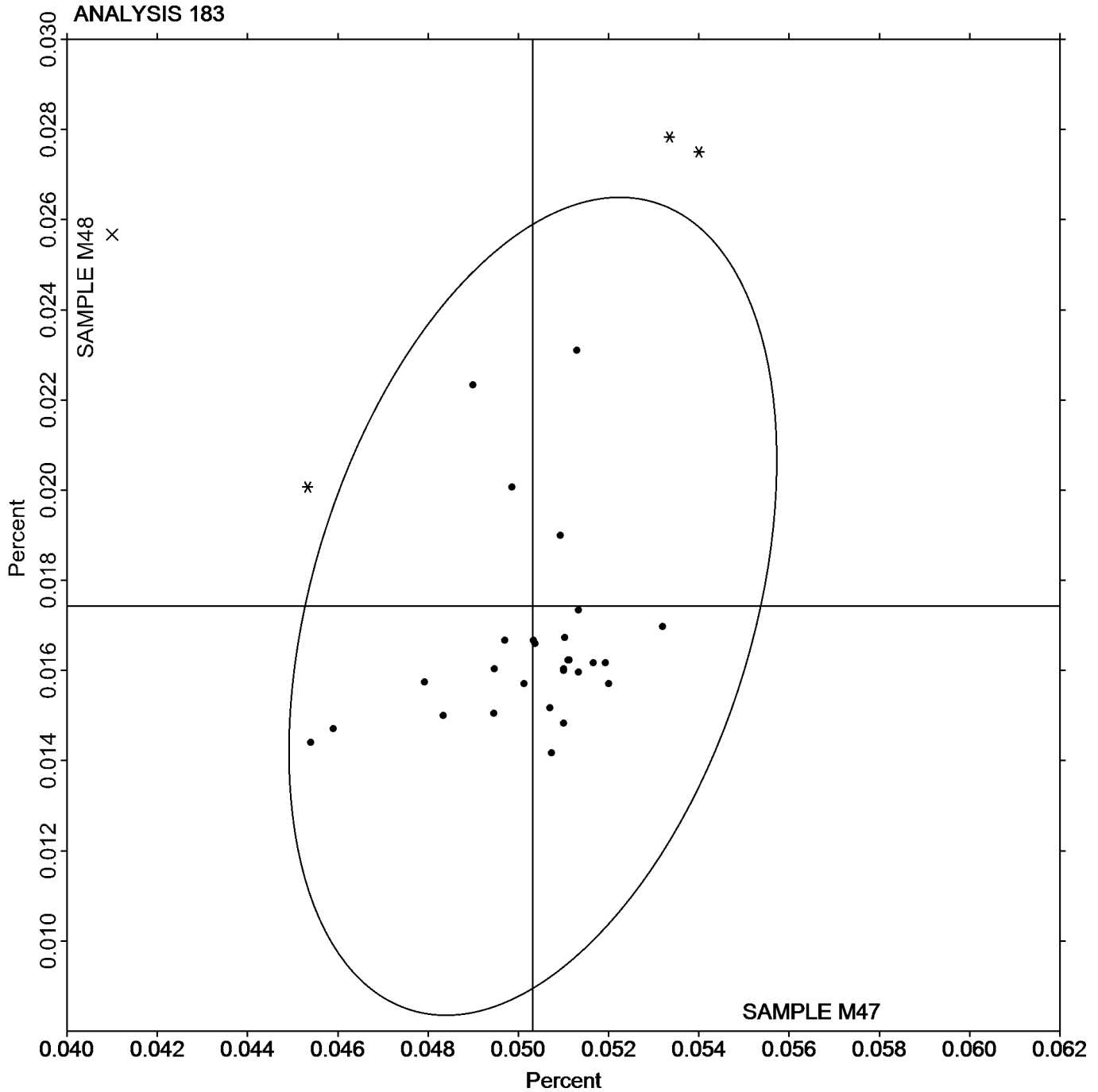
Analysis 183

Corrosion Resistant Steel, Element #4

NITROGEN (N)

SAMPLE M47  
0.0503 Percent

SAMPLE M48  
0.0174 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 184

Corrosion Resistant Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.3533	0.0037	0.35	0.2760	0.0109	0.96	GD
2AZZZ2		0.3657	0.0160	1.54	0.2707	0.0055	0.49	OE
2HTYLL	X	0.3057	-0.0440	-4.23	0.2267	-0.0385	-3.40	WD
2MHUA7		0.3623	0.0127	1.22	0.2710	0.0059	0.52	OE
2VX9J3		0.3497	0.0000	0.00	0.2683	0.0032	0.28	OE
32ZDVZ		0.3647	0.0150	1.44	0.2743	0.0092	0.81	IC
3M2T9P		0.3523	0.0027	0.26	0.2663	0.0012	0.11	WD
4L466K		0.3530	0.0033	0.32	0.2633	-0.0018	-0.16	OE
4NACMR		0.3513	0.0017	0.16	0.2850	0.0199	1.76	OE
4NNYZY		0.3509	0.0012	0.12	0.2670	0.0019	0.17	OE
6GR3PM		0.3533	0.0037	0.35	0.2700	0.0049	0.43	DR
7A3VFT		0.3551	0.0054	0.52	0.2678	0.0027	0.24	OE
7CA94M		0.3372	-0.0124	-1.20	0.2491	-0.0160	-1.42	OE
7KX7NZ		0.3400	-0.0097	-0.93	0.2500	-0.0151	-1.34	WD
8AXUB7	*	0.3343	-0.0153	-1.47	0.2340	-0.0311	-2.75	OE
8C4EXL		0.3513	0.0017	0.16	0.2657	0.0005	0.05	OE
8GWQ4X		0.3543	0.0047	0.45	0.2683	0.0032	0.28	OE
98PZTR		0.3437	-0.0060	-0.58	0.2587	-0.0065	-0.57	OE
9DQEDT		0.3463	-0.0033	-0.32	0.2667	0.0015	0.14	OE
CLT98R		0.3333	-0.0164	-1.58	0.2435	-0.0217	-1.92	IC
CX8N66		0.3500	0.0003	0.03	0.2613	-0.0038	-0.34	OE
D3J9W7		0.3437	-0.0060	-0.58	0.2720	0.0069	0.61	OE
DHUL3M	X	0.3518	0.0021	0.20	0.2129	-0.0522	-4.62	OE
E7ECAB	*	0.3803	0.0307	2.95	0.2883	0.0232	2.05	OE
EJ2G2K		0.3340	-0.0157	-1.51	0.2483	-0.0168	-1.49	OE
FFYXGW		0.3465	-0.0031	-0.30	0.2693	0.0042	0.37	DR
GLVWKR		0.3527	0.0030	0.29	0.2820	0.0169	1.49	OE
HEWUWK		0.3640	0.0143	1.38	0.2630	-0.0021	-0.19	DR
HTEFNR		0.3503	0.0007	0.07	0.2690	0.0039	0.34	OE
JJP39R	*	0.3190	-0.0307	-2.95	0.2480	-0.0171	-1.52	OE
K9HQ9F		0.3573	0.0077	0.74	0.2713	0.0062	0.55	OE
KVUL2J		0.3563	0.0067	0.64	0.2723	0.0072	0.64	XX
LAAJMT		0.3327	-0.0170	-1.63	0.2660	0.0009	0.08	OE
LB7PVD		0.3380	-0.0117	-1.12	0.2693	0.0042	0.37	OE
LDPBF8		0.3440	-0.0057	-0.54	0.2593	-0.0058	-0.51	OE
LMXMR4		0.3497	0.0000	0.00	0.2607	-0.0045	-0.39	OE
MFARFJ		0.3491	-0.0005	-0.05	0.2698	0.0047	0.41	XX
MPFYUJ		0.3550	0.0053	0.51	0.2750	0.0099	0.87	GD
MYQ6X3		0.3560	0.0063	0.61	0.2723	0.0072	0.64	OE
N98B8B		0.3477	-0.0020	-0.19	0.2570	-0.0081	-0.72	IC
PBNG7R		0.3600	0.0103	1.00	0.2600	-0.0051	-0.45	ED
PFMC6Y		0.3607	0.0110	1.06	0.2740	0.0089	0.78	OE
Q6F26M		0.3343	-0.0153	-1.47	0.2467	-0.0185	-1.63	WD
QLR8NY		0.3517	0.0020	0.19	0.2673	0.0022	0.19	OE
QTRYNG		0.3545	0.0049	0.47	0.2860	0.0209	1.85	OE
QYUY7X		0.3547	0.0050	0.48	0.2683	0.0032	0.28	GD
R79JXV		0.3353	-0.0143	-1.38	0.2467	-0.0185	-1.63	WD





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 184

Corrosion Resistant Steel, Element #5  
SILICON (Si)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
TCCE29	X	0.0673	-0.2823	-27.15	0.0397	-0.2255	-19.94	OE
TGBMTX		0.3623	0.0127	1.22	0.2853	0.0202	1.79	OE
THH9YB		0.3463	-0.0033	-0.32	0.2647	-0.0005	-0.04	OE
UVMNJK		0.3470	-0.0027	-0.26	0.2593	-0.0058	-0.51	WD
UWR3KE		0.3495	-0.0001	-0.01	0.2655	0.0003	0.03	OE
UZD7Q6		0.3577	0.0080	0.77	0.2793	0.0142	1.26	OE
V7V7V3		0.3560	0.0063	0.61	0.2750	0.0099	0.87	OE
V8DVX2	X	0.2957	-0.0540	-5.19	0.1887	-0.0765	-6.76	GD
VPABC7		0.3280	-0.0217	-2.08	0.2390	-0.0261	-2.31	OE
WCJVPH		0.3347	-0.0150	-1.44	0.2497	-0.0155	-1.37	WD
WNQHJU		0.3417	-0.0080	-0.77	0.2553	-0.0098	-0.87	WD
WXXMK6		0.3583	0.0087	0.83	0.2693	0.0042	0.37	OE
X788MZ		0.3543	0.0047	0.45	0.2657	0.0005	0.05	OE
XE4G3K		0.3580	0.0083	0.80	0.2660	0.0009	0.08	OE
XEZAKP		0.3497	0.0000	0.00	0.2607	-0.0045	-0.39	IC
XMXPQLQ		0.3507	0.0010	0.10	0.2690	0.0039	0.34	OE
XQYDVQ		0.3497	0.0000	0.00	0.2630	-0.0021	-0.19	WD
ZEZCFT		0.3590	0.0093	0.90	0.2747	0.0095	0.84	OE
ZYH63M		0.3460	-0.0037	-0.35	0.2573	-0.0078	-0.69	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	0.3497	Percent	0.2651	Percent
<b>Stnd Dev Btwn Labs</b>	0.0104	Percent	0.0113	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 62 of 66 reporting participants

### Key to Method Codes Reported by Participants

- |    |   |    |  |
|----|---|----|--|
| 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 #184

- 2HTYLL (X) - Data for both samples are low. Possible Systematic Error.
- DHUL3M (X) - Data for sample M48 are low.
- TCCE29 (X) - Data for both samples are very low. Possible Systematic Error. Inconsistent within the determinations of both samples.
- V8DVX2 (X) - Data for both samples are low. Possible Systematic Error.



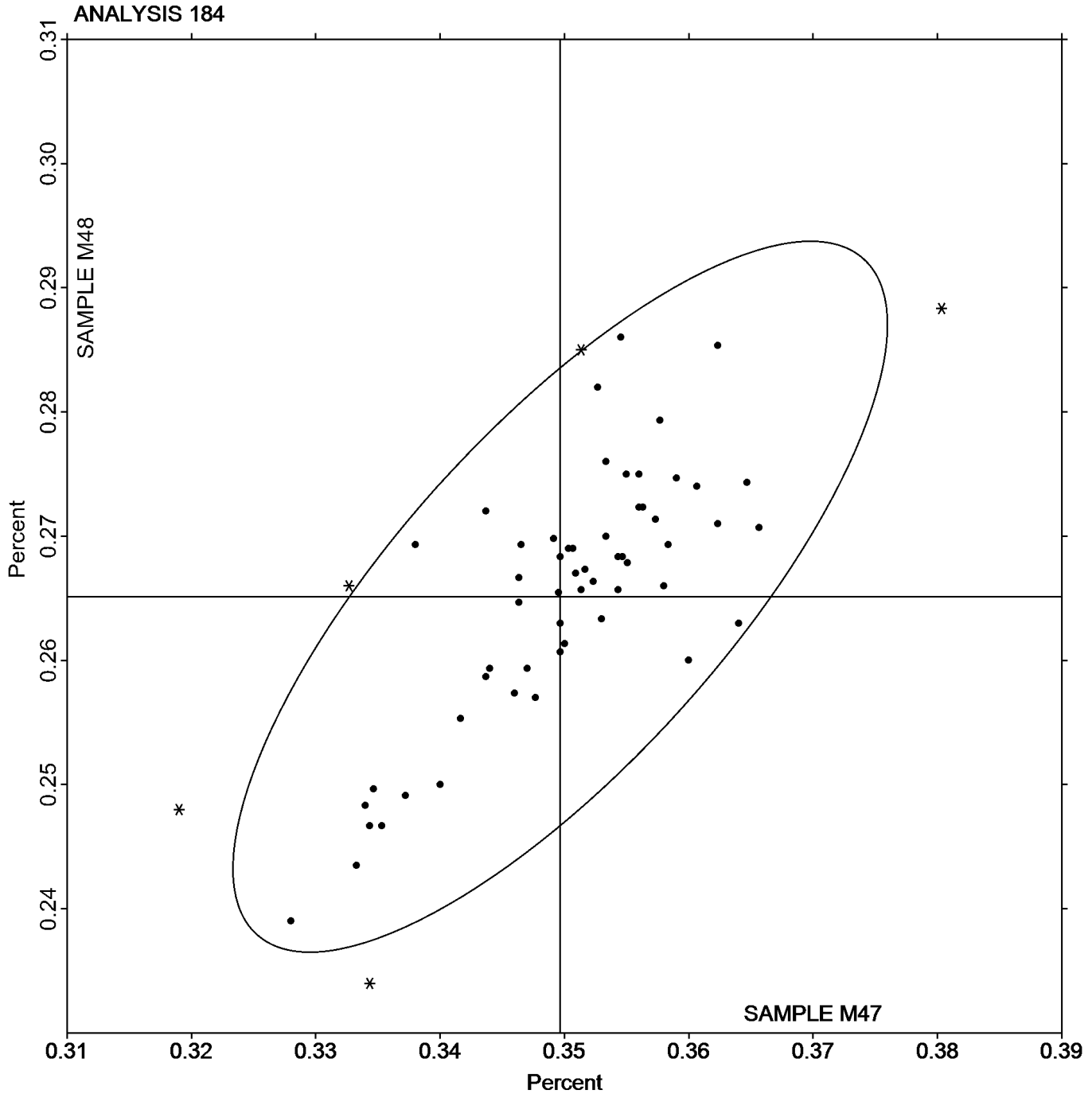
Analysis 184

Corrosion Resistant Steel, Element #5

SILICON (Si)

SAMPLE M47  
0.3497 Percent

SAMPLE M48  
0.2651 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 185

Corrosion Resistant Steel, Element #6  
VANADIUM (V)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.0583	-0.0086	-1.87	0.0533	-0.0097	-2.02	GD
2AZZZ2		0.0763	0.0094	2.03	0.0730	0.0100	2.09	OE
2HTYLL		0.0573	-0.0096	-2.09	0.0543	-0.0087	-1.81	WD
2MHUA7		0.0607	-0.0063	-1.37	0.0580	-0.0050	-1.04	OE
2VX9J3		0.0677	0.0007	0.15	0.0650	0.0020	0.42	OE
32ZDVZ		0.0660	-0.0010	-0.21	0.0617	-0.0013	-0.28	IC
3M2T9P		0.0703	0.0034	0.73	0.0670	0.0040	0.83	WD
4L466K		0.0660	-0.0010	-0.21	0.0613	-0.0017	-0.35	OE
4NACMR		0.0610	-0.0060	-1.29	0.0577	-0.0053	-1.11	OE
4NNYZY		0.0654	-0.0016	-0.34	0.0622	-0.0008	-0.17	OE
6GR3PM	*	0.0700	0.0030	0.66	0.0600	-0.0030	-0.63	DR
7A3VFT		0.0645	-0.0025	-0.54	0.0608	-0.0022	-0.45	OE
7CA94M		0.0715	0.0046	0.99	0.0674	0.0044	0.93	OE
7KX7NZ		0.0670	0.0000	0.01	0.0630	0.0000	0.00	OE
8C4EXL		0.0637	-0.0033	-0.72	0.0610	-0.0020	-0.42	OE
8GWQ4X		0.0657	-0.0013	-0.28	0.0610	-0.0020	-0.42	OE
98PZTR		0.0680	0.0010	0.22	0.0640	0.0010	0.21	OE
9DQEDT		0.0630	-0.0040	-0.86	0.0597	-0.0033	-0.70	OE
CLT98R		0.0701	0.0031	0.67	0.0656	0.0026	0.55	IC
CX8N66		0.0710	0.0040	0.88	0.0673	0.0043	0.90	OE
D3J9W7		0.0650	-0.0020	-0.43	0.0610	-0.0020	-0.42	OE
DHUL3M		0.0661	-0.0009	-0.19	0.0629	-0.0001	-0.02	OE
E7ECAB		0.0707	0.0037	0.80	0.0670	0.0040	0.83	OE
EJ2G2K		0.0700	0.0030	0.66	0.0667	0.0037	0.76	OE
GLVWKR		0.0687	0.0017	0.37	0.0640	0.0010	0.21	OE
HEWUWK		0.0650	-0.0020	-0.43	0.0600	-0.0030	-0.63	DR
HTEFNR		0.0717	0.0047	1.02	0.0680	0.0050	1.04	OE
JJP39R		0.0547	-0.0123	-2.67	0.0513	-0.0117	-2.44	OE
K9HQ9F		0.0598	-0.0072	-1.55	0.0550	-0.0080	-1.67	OE
KVUL2J		0.0687	0.0017	0.37	0.0660	0.0030	0.63	XX
LAAJMT		0.0667	-0.0003	-0.07	0.0640	0.0010	0.21	OE
LB7PVD		0.0727	0.0057	1.24	0.0707	0.0077	1.60	OE
LDPBF8		0.0701	0.0031	0.68	0.0653	0.0023	0.48	XX
LMXMR4		0.0740	0.0070	1.53	0.0703	0.0073	1.53	OE
MFARFJ		0.0698	0.0028	0.60	0.0643	0.0013	0.27	XX
MPFYUJ		0.0690	0.0020	0.44	0.0630	0.0000	0.00	GD
MYQ6X3		0.0667	-0.0003	-0.07	0.0623	-0.0007	-0.14	OE
N98B8B		0.0713	0.0044	0.95	0.0660	0.0030	0.63	IC
PFMC6Y		0.0669	-0.0001	-0.01	0.0605	-0.0025	-0.52	OE
Q6F26M		0.0660	-0.0010	-0.21	0.0613	-0.0017	-0.35	WD
QLR8NY		0.0757	0.0087	1.89	0.0730	0.0100	2.09	OE
QTRYNG		0.0665	-0.0004	-0.09	0.0624	-0.0006	-0.12	OE
QYUY7X		0.0718	0.0048	1.04	0.0690	0.0060	1.25	GD
R79JXV		0.0690	0.0020	0.44	0.0650	0.0020	0.42	WD
TCCE29	*	0.0780	0.0110	2.39	0.0693	0.0063	1.32	OE
TGBMTX		0.0620	-0.0050	-1.08	0.0580	-0.0050	-1.04	OE
THH9YB		0.0640	-0.0030	-0.64	0.0600	-0.0030	-0.63	OE



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 185**

**Corrosion Resistant Steel, Element #6**  
**VANADIUM (V)**

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
UVMNJK		0.0677	0.0007	0.15	0.0640	0.0010	0.21	WD
UWR3KE		0.0639	-0.0031	-0.67	0.0600	-0.0030	-0.63	OE
UZD7Q6		0.0650	-0.0020	-0.43	0.0620	-0.0010	-0.21	OE
V7V7V3		0.0680	0.0010	0.22	0.0610	-0.0020	-0.42	OE
V8DVX2	*	0.0667	-0.0003	-0.07	0.0677	0.0047	0.97	GD
WCJVPH		0.0650	-0.0020	-0.43	0.0607	-0.0023	-0.49	WD
WNQHJU		0.0657	-0.0013	-0.28	0.0620	-0.0010	-0.21	WD
WXXMK6		0.0717	0.0047	1.02	0.0683	0.0053	1.11	XX
X788MZ		0.0555	-0.0114	-2.48	0.0513	-0.0117	-2.44	OE
XE4G3K	X	0.0903	0.0234	5.07	0.0870	0.0240	5.01	OE
XEZAKP		0.0650	-0.0020	-0.43	0.0597	-0.0033	-0.70	IC
XMPLQ		0.0727	0.0057	1.24	0.0685	0.0055	1.15	OE
XQYDVQ		0.0675	0.0005	0.11	0.0635	0.0005	0.10	WD
ZEZCFT		0.0667	-0.0003	-0.07	0.0613	-0.0017	-0.35	OE
ZYH63M		0.0740	0.0070	1.53	0.0713	0.0083	1.74	OE

**Summary Statistics**

	Sample M47		Sample M48	
<b>Grand Means</b>	0.0670	Percent	0.0630	Percent
<b>Stnd Dev Btwn Labs</b>	0.0046	Percent	0.0048	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 58 of 62 reporting participants

**Key to Method Codes Reported by Participants**

- DR Spectrometry - Direct Reading OE (DROES)
- 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 #185**

XE4G3K (X) - Data for both samples are high. Possible Systematic Error.



# Fasteners and Metals Interlaboratory Testing Program

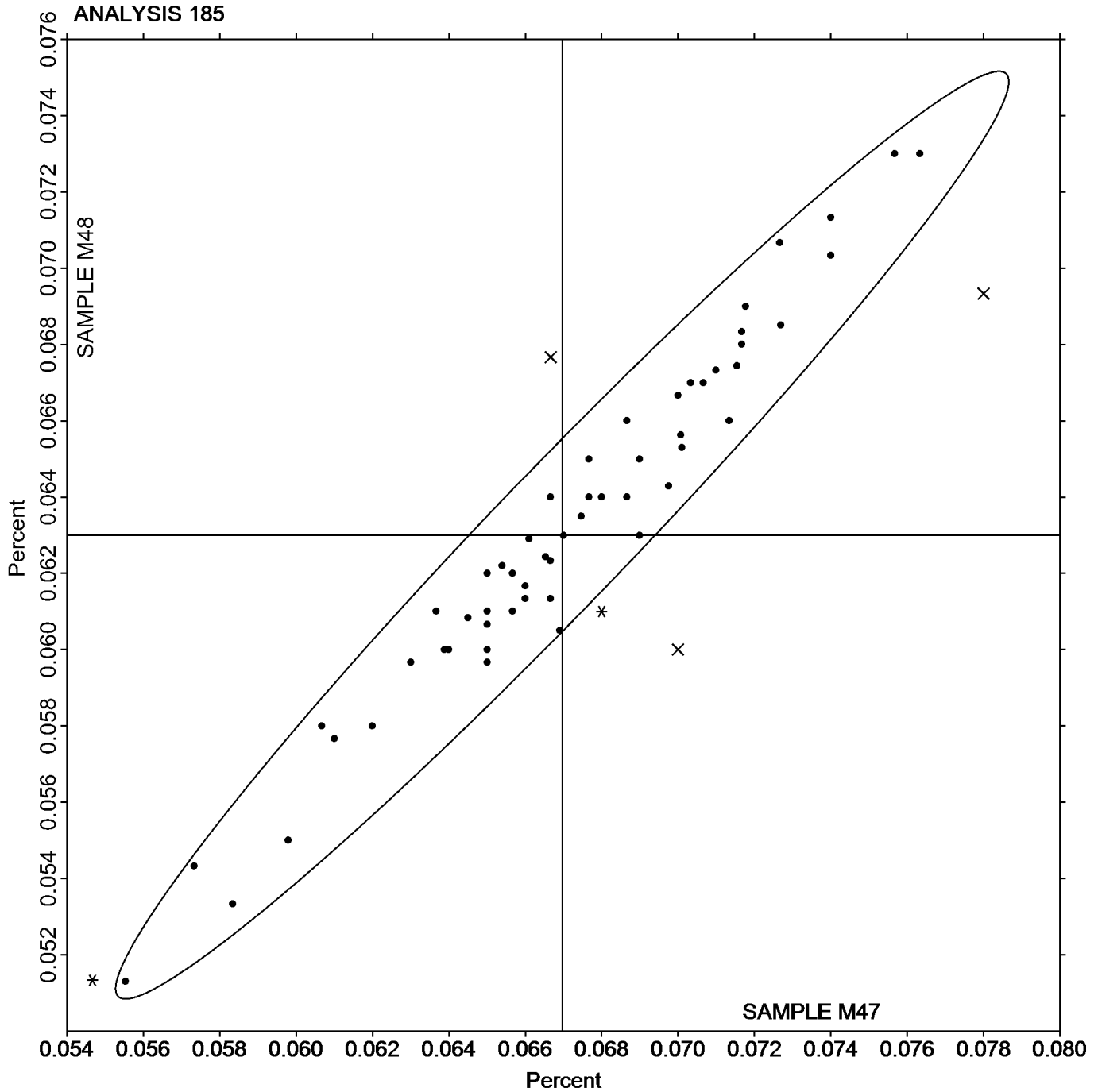
Cycle 120  
4th Qtr 2017

## Analysis 185

Corrosion Resistant Steel, Element #6  
VANADIUM (V)

SAMPLE M47  
0.0670 Percent

SAMPLE M48  
0.0630 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 186

Corrosion Resistant Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		9.277	0.206	2.69	9.787	0.046	0.48	GD
2AZZZ2		9.031	-0.040	-0.53	9.664	-0.077	-0.81	XR
2HTYLL		9.134	0.063	0.82	9.844	0.103	1.09	WD
2MHUA7	*	8.833	-0.238	-3.11	9.607	-0.134	-1.42	OE
2RHLGN		9.070	-0.001	-0.01	9.681	-0.060	-0.63	ED
2VX9J3		9.178	0.107	1.41	9.793	0.052	0.55	OE
32ZDVZ		9.128	0.057	0.75	9.784	0.043	0.45	IC
3M2T9P		9.006	-0.065	-0.85	9.616	-0.125	-1.32	WD
4L466K		9.140	0.069	0.90	9.876	0.135	1.43	OE
4NACMR		9.019	-0.052	-0.68	9.782	0.041	0.43	OE
4NNYZY		9.030	-0.041	-0.54	9.520	-0.221	-2.33	OE
6GR3PM		9.120	0.049	0.64	9.687	-0.054	-0.57	WD
7A3VFT		9.121	0.050	0.66	9.814	0.073	0.77	OE
7CA94M		9.098	0.027	0.36	9.738	-0.003	-0.03	OE
7KX7NZ		9.087	0.016	0.21	9.712	-0.029	-0.30	WD
8AXUB7		9.043	-0.028	-0.36	9.803	0.062	0.66	OE
8C4EXL		9.000	-0.071	-0.92	9.665	-0.076	-0.80	OE
8GWQ4X		9.152	0.081	1.06	9.902	0.161	1.70	OE
98PZTR		9.013	-0.058	-0.75	9.643	-0.098	-1.03	OE
9DQEDT		9.068	-0.003	-0.04	9.780	0.039	0.41	OE
CLT98R		9.070	-0.001	-0.01	9.707	-0.034	-0.36	IC
CX8N66		9.013	-0.058	-0.75	9.650	-0.091	-0.96	OE
D3J9W7		9.083	0.012	0.16	9.792	0.051	0.54	OE
DHUL3M		9.223	0.152	1.99	9.743	0.002	0.03	OE
E7ECAB	X	9.717	0.646	8.45	10.37	0.632	6.67	OE
EJ2G2K		8.937	-0.134	-1.76	9.570	-0.171	-1.80	OE
FFYXGW		8.950	-0.121	-1.58	9.819	0.078	0.82	WD
GLVWKR		9.040	-0.031	-0.41	9.491	-0.250	-2.64	OE
HEWUWK		8.945	-0.126	-1.64	9.629	-0.112	-1.18	DR
HTEFNR		9.028	-0.043	-0.56	9.737	-0.004	-0.04	OE
JJP39R		9.147	0.076	0.99	9.923	0.182	1.92	OE
K9HQ9F		9.077	0.006	0.07	9.807	0.066	0.69	OE
KVUL2J		9.117	0.046	0.60	9.770	0.029	0.31	XX
LAAJMT		8.932	-0.139	-1.82	9.612	-0.129	-1.36	OE
LB7PVD		9.027	-0.044	-0.58	9.772	0.031	0.33	OE
LDPBF8		9.080	0.009	0.12	9.680	-0.061	-0.64	OE
LMXMR4		9.190	0.119	1.56	9.707	-0.034	-0.36	OE
MFARFJ		9.006	-0.065	-0.85	9.696	-0.045	-0.47	XX
MPFYUJ	X	9.575	0.504	6.60	10.07	0.325	3.43	GD
MYQ6X3		9.093	0.022	0.29	9.743	0.002	0.03	OE
N98B8B		9.040	-0.031	-0.41	9.803	0.062	0.66	IC
PBNG7R	X	8.890	-0.181	-2.37	9.390	-0.351	-3.70	ED
PFMC6Y		9.024	-0.047	-0.61	9.759	0.018	0.19	OE
Q6F26M		9.094	0.023	0.30	9.745	0.004	0.04	WD
QLR8NY		9.075	0.004	0.05	9.841	0.100	1.06	OE
QTRYNG		9.096	0.025	0.32	9.803	0.062	0.66	OE
QVFBML		9.061	-0.010	-0.13	9.718	-0.023	-0.25	WC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 186

Corrosion Resistant Steel, Element #7  
NICKEL (Ni)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QYUY7X		9.090	0.019	0.25	9.813	0.072	0.76	GD
R79JXV		9.030	-0.041	-0.53	9.659	-0.082	-0.87	WD
TCCE29	X	8.343	-0.728	-9.53	8.843	-0.898	-9.47	OE
TGBMTX		9.080	0.009	0.12	9.733	-0.008	-0.08	OE
THH9YB		9.042	-0.029	-0.38	9.918	0.177	1.86	OE
UVMNJK		9.073	0.002	0.03	9.743	0.002	0.03	WD
UWR3KE		9.215	0.144	1.89	9.914	0.173	1.83	OE
UZD7Q6		9.051	-0.020	-0.26	9.798	0.057	0.60	OE
V7V7V3		9.100	0.029	0.38	9.617	-0.124	-1.30	XR
V8DVX2		9.011	-0.060	-0.78	9.698	-0.043	-0.46	GD
VPABC7		8.999	-0.072	-0.94	9.663	-0.078	-0.82	OE
WCJVPH		9.118	0.047	0.62	9.765	0.024	0.25	WD
WNQHJU		9.079	0.008	0.11	9.702	-0.039	-0.41	WD
WXXMK6	X	8.749	-0.322	-4.21	9.465	-0.276	-2.91	OE
X788MZ		8.947	-0.124	-1.63	9.610	-0.131	-1.38	OE
XE4G3K		9.183	0.112	1.47	9.857	0.116	1.22	OE
XEZAKP		9.114	0.043	0.57	9.829	0.088	0.93	IC
XMXPLO		9.053	-0.018	-0.23	9.773	0.032	0.34	OE
XQYDVQ		9.101	0.030	0.39	9.718	-0.023	-0.25	WD
ZEZCFT		9.140	0.069	0.90	9.903	0.162	1.71	OE
ZYH63M		9.147	0.076	0.99	9.750	0.009	0.10	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	9.071	Percent	9.741	Percent
<b>Std Dev Btwn Labs</b>	0.076	Percent	0.095	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 63 of 68 reporting participants

### Key to Method Codes Reported by Participants

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)	WC	Wet Chemistry
WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)	XR	X-Ray Fluorescence - ED or WD not specified
XX	Please Indicate Method Used for Current Element		

### Comments on Assigned Data Flags for Test #186

- E7ECAB (X) - Data for both samples are high.
- MPFYUJ (X) - Data for both samples are high.
- PBNG7R (X) - Data for sample M48 are low.
- TCCE29 (X) - Data for both samples are low.
- WXXMK6 (X) - Data for both samples are low.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 187

Corrosion Resistant Steel, Element #8  
CHROMIUM (Cr)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		17.40	0.06	0.75	18.47	0.16	1.29	GD
2AZZZ2		17.30	-0.04	-0.51	18.36	0.05	0.39	XR
2HTYLL		17.20	-0.14	-1.79	18.16	-0.15	-1.23	WD
2MHUA7		17.49	0.15	1.93	18.52	0.21	1.75	OE
2RHLGN	X	17.22	-0.12	-1.47	18.66	0.35	2.83	ED
2VX9J3		17.32	-0.02	-0.29	18.26	-0.05	-0.39	OE
32ZDVZ		17.34	0.00	0.00	18.31	0.00	0.01	IC
3M2T9P		17.34	0.00	0.03	18.30	0.00	-0.03	WD
4L466K		17.23	-0.11	-1.38	18.05	-0.26	-2.10	OE
4NACMR		17.35	0.01	0.13	18.27	-0.04	-0.29	OE
4NNYZY		17.23	-0.11	-1.34	18.15	-0.15	-1.26	OE
6GR3PM		17.34	0.00	0.00	18.34	0.03	0.26	WD
7A3VFT		17.24	-0.10	-1.31	18.35	0.04	0.35	OE
7CA94M		17.43	0.09	1.07	18.41	0.10	0.79	OE
7KX7NZ		17.41	0.07	0.89	18.42	0.11	0.93	WD
8AXUB7		17.42	0.08	1.05	18.45	0.14	1.15	OE
8C4EXL		17.32	-0.02	-0.23	18.33	0.03	0.21	OE
8GWQ4X		17.28	-0.06	-0.71	18.13	-0.18	-1.48	OE
98PZTR		17.35	0.01	0.17	18.38	0.07	0.58	OE
9DQEDT		17.34	0.00	0.04	18.26	-0.05	-0.37	OE
CLT98R		17.40	0.06	0.79	18.36	0.05	0.44	IC
CX8N66		17.45	0.11	1.42	18.42	0.11	0.88	OE
D3J9W7		17.40	0.06	0.80	18.32	0.01	0.09	OE
DHUL3M		17.45	0.11	1.42	18.43	0.12	1.02	OE
E7ECAB	X	18.03	0.69	8.67	19.04	0.73	5.95	OE
EJ2G2K	X	17.61	0.27	3.43	18.48	0.17	1.37	OE
FFYXGW		17.32	-0.02	-0.23	18.32	0.02	0.12	WD
GLVWKR		17.38	0.04	0.46	18.34	0.03	0.26	OE
HEWUWK		17.41	0.07	0.87	18.38	0.08	0.61	DR
HTEFNR		17.16	-0.18	-2.30	18.08	-0.23	-1.86	OE
JJP39R		17.25	-0.09	-1.13	18.21	-0.10	-0.77	OE
K9HQ9F		17.30	-0.04	-0.46	18.25	-0.06	-0.48	XX
KVUL2J		17.45	0.11	1.34	18.38	0.07	0.61	XX
LAAJMT		17.41	0.07	0.83	18.38	0.07	0.54	OE
LB7PVD	X	17.58	0.24	2.97	18.33	0.02	0.15	OE
LDPBF8	X	17.04	-0.30	-3.73	18.05	-0.26	-2.10	OE
LMXMR4		17.34	0.00	0.04	18.48	0.17	1.42	OE
MFARFJ		17.38	0.04	0.44	18.35	0.04	0.35	XX
MPFYUJ	*	17.10	-0.24	-3.01	18.00	-0.31	-2.51	XX
MYQ6X3		17.29	-0.05	-0.67	18.32	0.01	0.12	OE
N98B8B		17.28	-0.06	-0.71	18.20	-0.11	-0.88	TI
PBNG7R		17.35	0.01	0.13	18.34	0.03	0.26	ED
PFMC6Y		17.34	0.00	0.04	18.16	-0.15	-1.24	OE
Q6F26M		17.27	-0.07	-0.82	18.25	-0.06	-0.48	WD
QLR8NY		17.31	-0.03	-0.33	18.26	-0.05	-0.37	OE
QTRYNG		17.39	0.05	0.69	18.34	0.03	0.22	OE
QVFBML		17.34	0.00	0.00	18.35	0.04	0.36	WC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 187

Corrosion Resistant Steel, Element #8  
CHROMIUM (Cr)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QYUY7X		17.41	0.07	0.88	18.28	-0.03	-0.23	GD
R79JXV	*	17.48	0.14	1.75	18.66	0.35	2.83	WD
TCCE29	X	12.61	-4.73	-59.41	14.83	-3.47	-28.28	OE
TGBMTX		17.17	-0.17	-2.14	18.06	-0.25	-2.05	OE
THH9YB		17.43	0.09	1.15	18.36	0.05	0.39	XR
UVMNJK		17.35	0.01	0.17	18.42	0.11	0.91	WD
UWR3KE		17.23	-0.11	-1.34	18.21	-0.10	-0.79	OE
UZD7Q6		17.30	-0.04	-0.54	18.21	-0.10	-0.80	OE
V7V7V3		17.28	-0.06	-0.75	18.07	-0.24	-1.94	OE
V8DVX2		17.38	0.04	0.55	18.29	-0.02	-0.18	GD
VPABC7		17.36	0.02	0.30	18.41	0.10	0.84	OE
WCJVPH		17.35	0.01	0.12	18.32	0.01	0.07	WD
WNQHJU		17.41	0.07	0.92	18.45	0.14	1.15	WD
WXXMK6		17.32	-0.02	-0.21	18.36	0.05	0.45	OE
X788MZ		17.37	0.03	0.34	18.30	-0.01	-0.04	OE
XE4G3K		17.28	-0.06	-0.71	18.21	-0.10	-0.77	OE
XEZAKP		17.31	-0.03	-0.33	18.18	-0.13	-1.02	IC
XMXPLO		17.32	-0.02	-0.21	18.28	-0.03	-0.20	OE
XQYDVQ		17.34	0.00	-0.02	18.36	0.05	0.43	WD
ZEZCFT		17.38	0.04	0.46	18.42	0.11	0.93	OE
ZYH63M		17.46	0.12	1.51	18.40	0.09	0.77	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	17.34	Percent	18.31	Percent
<b>Std Dev Btwn Labs</b>	0.08	Percent	0.12	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 62 of 68 reporting participants

### Key to Method Codes Reported by Participants

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)	TI	Titrimetry
WC	Wet Chemistry	WD	X-Ray Fluorescence - Wavelength Dispersive (WDX)
XR	X-Ray Fluorescence - ED or WD not specified	XX	Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #187

2RHLGN (X) - Data for sample M48 are high.

E7ECAB (X) - Data for both samples are high.

EJ2G2K (X) - Data for sample M47 are high.

LB7PVD (X) - Data for sample M47 are high. Inconsistent within the determinations of both samples.

LDPBF8 (X) - Data for sample M47 are low.

TCCE29 (X) - Data for both samples are very low.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 187

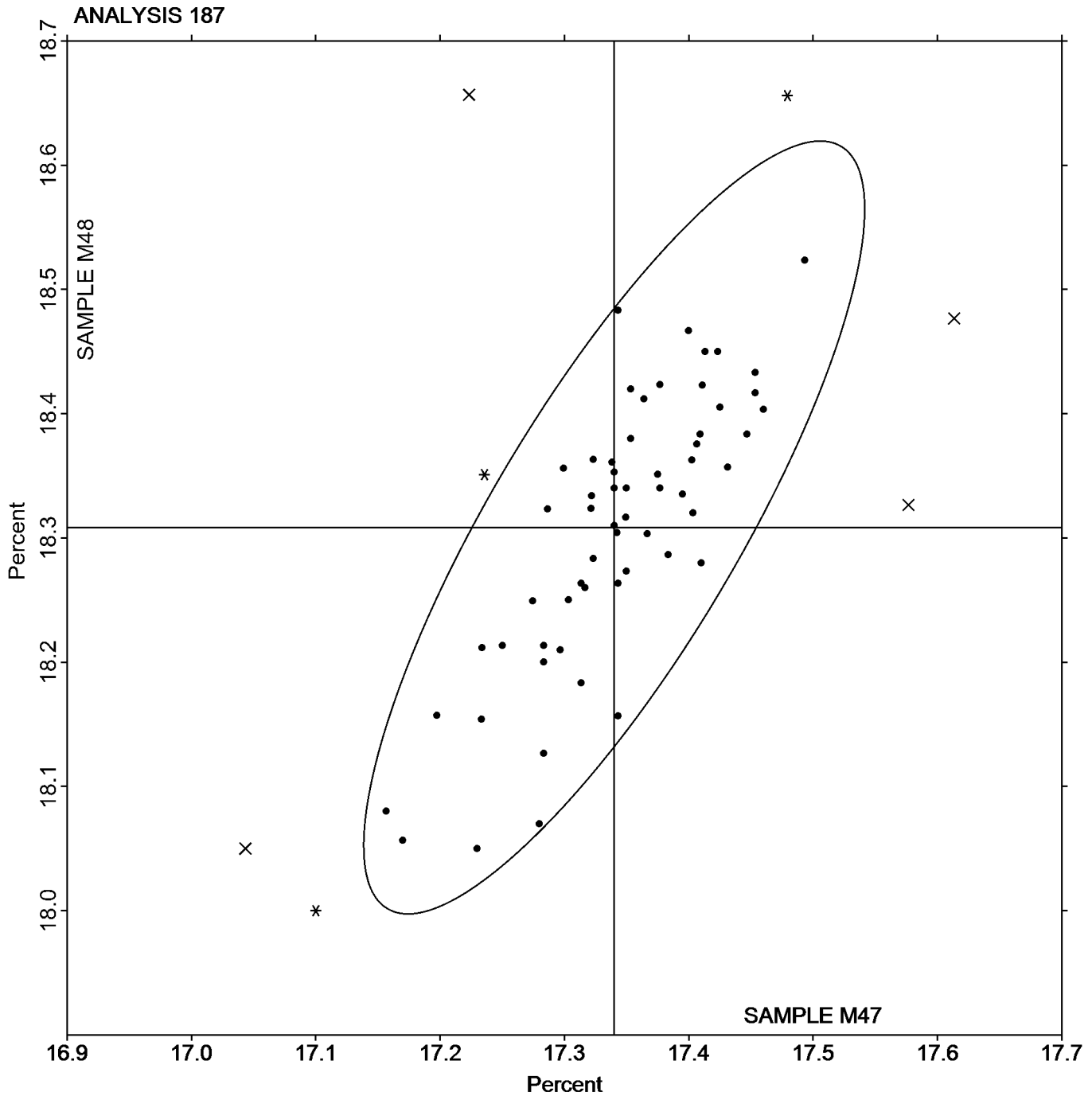
Corrosion Resistant Steel, Element #8  
CHROMIUM (Cr)

SAMPLE M47

17.34 Percent

SAMPLE M48

18.31 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 188

Corrosion Resistant Steel, Element #9  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.3860	0.0195	1.49	0.2067	0.0060	0.80	GD
2AZZZ2		0.3613	-0.0052	-0.39	0.1943	-0.0063	-0.85	XR
2HTYLL		0.3690	0.0025	0.19	0.2000	-0.0007	-0.09	WD
2MHUA7	*	0.3293	-0.0372	-2.83	0.1880	-0.0127	-1.69	OE
2RHLGN		0.3607	-0.0058	-0.44	0.2010	0.0003	0.04	ED
2VX9J3		0.3770	0.0105	0.80	0.1983	-0.0023	-0.31	OE
32ZDVZ		0.3707	0.0042	0.32	0.2007	0.0000	0.00	IC
3M2T9P		0.3663	-0.0002	-0.01	0.1953	-0.0053	-0.71	WD
4L466K		0.3557	-0.0108	-0.83	0.2040	0.0033	0.44	OE
4NACMR		0.3757	0.0092	0.70	0.2093	0.0087	1.15	OE
4NNYZY		0.4016	0.0351	2.68	0.2197	0.0190	2.53	OE
6GR3PM		0.3633	-0.0032	-0.24	0.1900	-0.0107	-1.42	DR
7A3VFT		0.3791	0.0126	0.96	0.2020	0.0013	0.17	OE
7CA94M		0.3447	-0.0218	-1.67	0.1924	-0.0083	-1.10	OE
7KX7NZ		0.3703	0.0038	0.29	0.2010	0.0003	0.04	WD
8AXUB7		0.3683	0.0018	0.14	0.2013	0.0007	0.09	XX
8C4EXL		0.3650	-0.0015	-0.11	0.2020	0.0013	0.18	OE
8GWQ4X		0.3560	-0.0105	-0.80	0.2040	0.0033	0.44	OE
98PZTR		0.3320	-0.0345	-2.63	0.1810	-0.0197	-2.63	OE
9DQEDT	X	0.3677	0.0012	0.09	0.2307	0.0300	4.00	OE
CLT98R		0.3736	0.0071	0.54	0.1986	-0.0020	-0.27	IC
CX8N66		0.3580	-0.0085	-0.65	0.1947	-0.0060	-0.80	OE
D3J9W7	X	0.3850	0.0185	1.41	0.2290	0.0283	3.78	OE
DHUL3M	*	0.3801	0.0136	1.04	0.1902	-0.0105	-1.40	OE
E7ECAB		0.3880	0.0215	1.64	0.2097	0.0090	1.20	OE
EJ2G2K		0.3433	-0.0232	-1.77	0.1920	-0.0087	-1.16	OE
FFYXGW		0.3708	0.0043	0.33	0.1898	-0.0109	-1.46	WD
GLVWKR		0.3630	-0.0035	-0.27	0.1993	-0.0013	-0.18	OE
HEWUWK		0.3780	0.0115	0.88	0.2100	0.0093	1.24	DR
HTEFNR		0.3677	0.0012	0.09	0.1997	-0.0010	-0.14	OE
JJP39R	X	0.3760	0.0095	0.72	0.1740	-0.0267	-3.56	OE
K9HQ9F		0.3623	-0.0042	-0.32	0.2077	0.0070	0.93	OE
KVUL2J		0.3620	-0.0045	-0.34	0.1943	-0.0063	-0.85	XX
LAAJMT	X	0.3483	-0.0182	-1.38	0.1477	-0.0530	-7.07	OE
LB7PVD		0.3797	0.0132	1.00	0.2087	0.0080	1.07	OE
LDPBF8	X	0.3553	-0.0112	-0.85	0.2370	0.0363	4.85	OE
LMXMR4		0.3693	0.0028	0.22	0.2023	0.0017	0.22	OE
MFARFJ		0.3787	0.0122	0.93	0.1983	-0.0024	-0.32	XX
MPFYUJ		0.3870	0.0205	1.56	0.2180	0.0173	2.31	GD
MYQ6X3		0.3693	0.0028	0.22	0.2007	0.0000	0.00	OE
N98B8B		0.3470	-0.0195	-1.49	0.1900	-0.0107	-1.42	IC
PBNG7R		0.3560	-0.0105	-0.80	0.1970	-0.0037	-0.49	ED
PFMC6Y		0.3730	0.0065	0.50	0.2070	0.0063	0.84	OE
Q6F26M		0.3680	0.0015	0.11	0.2010	0.0003	0.04	WD
QLR8NY		0.3510	-0.0155	-1.18	0.1940	-0.0067	-0.89	OE
QTRYNG		0.3644	-0.0021	-0.16	0.1928	-0.0079	-1.05	OE
QYUY7X		0.3703	0.0038	0.29	0.2143	0.0137	1.82	GD



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 120**  
**4th Qtr 2017**

**Analysis 188**

**Corrosion Resistant Steel, Element #9**  
**MOLYBDENUM (Mo)**

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
R79JXV		0.3620	-0.0045	-0.34	0.1973	-0.0033	-0.45	XX
TCCE29	X	0.3630	-0.0035	-0.27	1.523	1.3227	176.44	OE
TGBMTX		0.3457	-0.0208	-1.59	0.1960	-0.0047	-0.62	OE
THH9YB		0.3673	0.0008	0.06	0.2037	0.0030	0.40	OE
UVMNJK		0.3727	0.0062	0.47	0.2040	0.0033	0.44	WD
UWR3KE		0.3631	-0.0034	-0.26	0.2010	0.0003	0.04	OE
UZD7Q6		0.3557	-0.0108	-0.83	0.2100	0.0093	1.24	OE
V7V7V3	X	0.3760	0.0095	0.72	0.2270	0.0263	3.51	OE
V8DVX2		0.3697	0.0032	0.24	0.1973	-0.0033	-0.45	GD
VPABC7		0.3863	0.0198	1.51	0.2070	0.0063	0.84	OE
WCJVPH		0.3697	0.0032	0.24	0.2010	0.0003	0.04	WD
WNQHJU		0.3690	0.0025	0.19	0.2000	-0.0007	-0.09	WD
WXXMK6		0.3787	0.0122	0.93	0.2147	0.0140	1.87	OE
X788MZ	X	0.3210	-0.0455	-3.47	0.1983	-0.0023	-0.31	OE
XE4G3K		0.3623	-0.0042	-0.32	0.2040	0.0033	0.44	OE
XEZAKP		0.3643	-0.0022	-0.16	0.1993	-0.0013	-0.18	IC
XMXPLO		0.3650	-0.0015	-0.11	0.2030	0.0023	0.31	OE
XQYDVQ		0.3660	-0.0005	-0.04	0.1993	-0.0013	-0.18	WD
ZEZCFT	X	0.3887	0.0222	1.69	0.1793	-0.0213	-2.85	OE

**Summary Statistics**

	Sample M47		Sample M48	
<b>Grand Means</b>	0.3665	Percent	0.2007	Percent
<b>Stnd Dev Btwn Labs</b>	0.0131	Percent	0.0075	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 57 of 66 reporting participants

**Key to Method Codes Reported by Participants**

- |   |  |
|---|--|
| <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>XR</b> X-Ray Fluorescence - ED or WD not specified | <b>XX</b> Please Indicate Method Used for Current Element  |



**Analysis 188**

**Corrosion Resistant Steel, Element #9**  
**MOLYBDENUM (Mo)**

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**Comments on Assigned Data Flags for Test #188**

9DQEDT (X) - Data for sample M48 are high.

D3J9W7 (X) - Data for sample M48 are high.

JJP39R (X) - Data for sample M48 are low. Inconsistent within the determinations of both samples.

LAAJMT (X) - Data for sample M48 are low.

LDPBF8 (X) - Data for sample M48 are high.

TCCE29 (X) - Data for sample M48 are extremely high. Inconsistent within the determinations of sample M48.

V7V7V3 (X) - Data for sample M48 are high. Inconsistent within the determinations of sample M48.

X788MZ (X) - Data for sample M47 are low.

ZEZCFT (X) - Data for sample M48 are low.

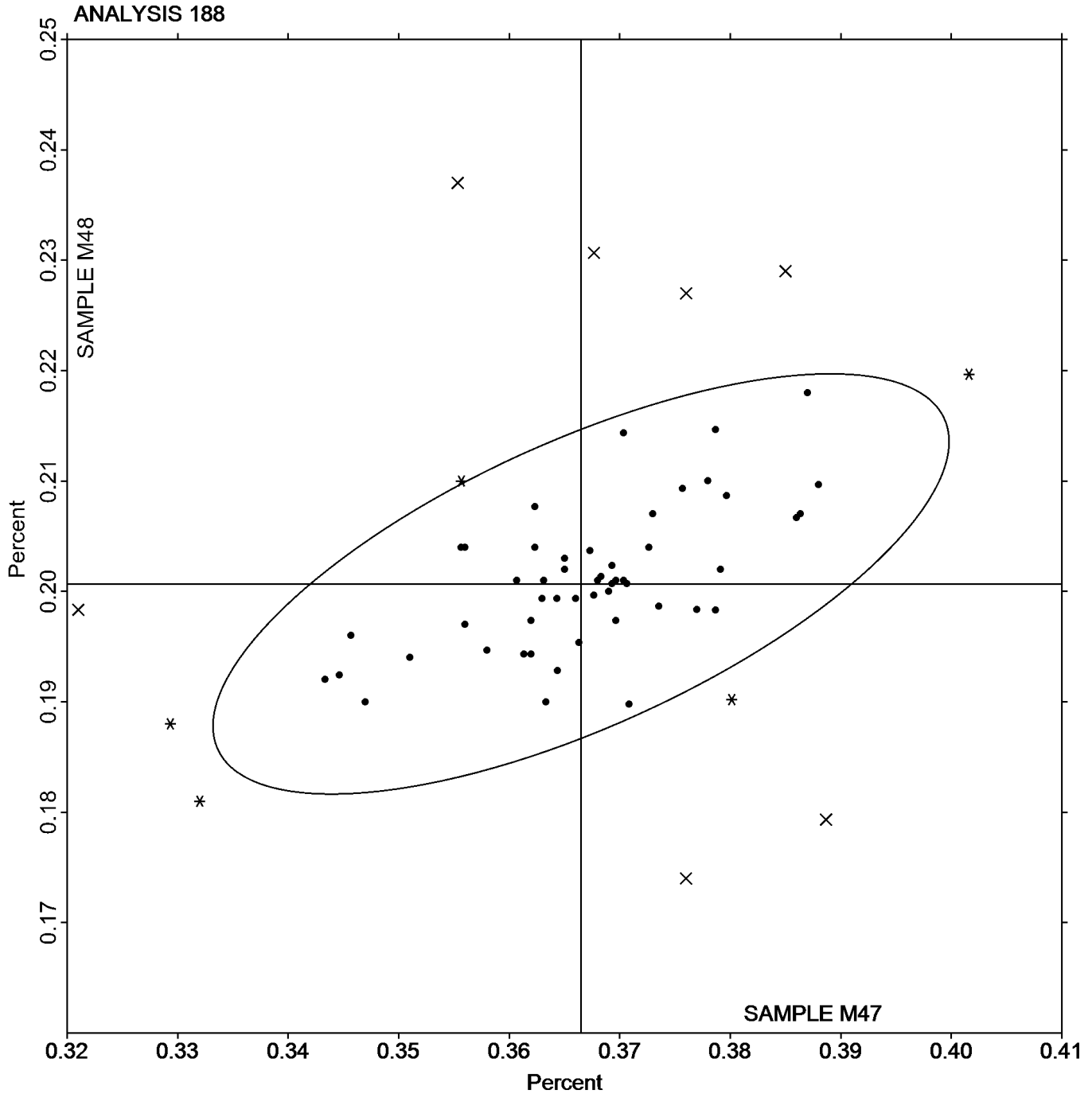


Analysis 188

Corrosion Resistant Steel, Element #9  
MOLYBDENUM (Mo)

SAMPLE M47  
0.3665 Percent

SAMPLE M48  
0.2007 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 189

Corrosion Resistant Steel, Element #10  
COPPER (Cu)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
22ZPMG		0.4687	0.0005	0.04	0.2983	-0.0035	-0.45	GD
2AZZZ2		0.4796	0.0114	1.01	0.3067	0.0048	0.62	XR
2HTYLL	*	0.4873	0.0191	1.71	0.2967	-0.0052	-0.66	WD
2MHUA7	*	0.4557	-0.0125	-1.12	0.3137	0.0118	1.51	OE
2VX9J3	*	0.4400	-0.0282	-2.51	0.3110	0.0092	1.17	OE
32ZDVZ		0.4753	0.0071	0.64	0.3023	0.0005	0.06	IC
3M2T9P		0.4653	-0.0029	-0.25	0.2960	-0.0058	-0.75	WD
4L466K		0.4803	0.0121	1.08	0.3090	0.0072	0.91	OE
4NACMR	X	0.4020	-0.0662	-5.90	0.2713	-0.0305	-3.90	OE
4NNYZY		0.4599	-0.0083	-0.74	0.3037	0.0018	0.23	OE
6GR3PM		0.4767	0.0085	0.76	0.3000	-0.0018	-0.24	DR
7A3VFT		0.4768	0.0086	0.77	0.3068	0.0049	0.63	OE
7CA94M	*	0.4648	-0.0034	-0.30	0.3117	0.0098	1.25	OE
7KX7NZ		0.4700	0.0018	0.16	0.3000	-0.0018	-0.24	WD
8C4EXL		0.4727	0.0045	0.40	0.3053	0.0035	0.45	OE
8GWQ4X		0.4813	0.0131	1.17	0.3117	0.0098	1.26	OE
98PZTR		0.4400	-0.0282	-2.51	0.2900	-0.0118	-1.52	OE
9DQEDT		0.4797	0.0115	1.02	0.3097	0.0078	1.00	OE
CLT98R		0.4701	0.0019	0.17	0.2974	-0.0044	-0.56	IC
CX8N66		0.4660	-0.0022	-0.19	0.2943	-0.0075	-0.96	OE
D3J9W7		0.4717	0.0035	0.31	0.3010	-0.0008	-0.11	OE
DHUL3M		0.4565	-0.0117	-1.04	0.2974	-0.0044	-0.56	OE
E7ECAB	X	0.3760	-0.0922	-8.21	0.2313	-0.0705	-9.02	OE
EJ2G2K		0.4717	0.0035	0.31	0.3053	0.0035	0.45	OE
FFYXGW		0.4821	0.0139	1.24	0.3072	0.0054	0.69	WD
GLVWKR		0.4513	-0.0169	-1.50	0.2843	-0.0175	-2.24	OE
HEWUWK		0.4750	0.0068	0.61	0.3103	0.0085	1.08	DR
HTEFNR		0.4553	-0.0129	-1.14	0.3000	-0.0018	-0.24	OE
JJP39R		0.4600	-0.0082	-0.73	0.3033	0.0015	0.19	OE
K9HQ9F		0.4637	-0.0045	-0.40	0.3000	-0.0018	-0.24	OE
KVUL2J		0.4707	0.0025	0.22	0.3056	0.0037	0.48	XX
LAAJMT		0.4547	-0.0135	-1.20	0.2900	-0.0118	-1.52	OE
LB7PVD		0.4817	0.0135	1.20	0.3157	0.0138	1.77	OE
LDPBF8		0.4420	-0.0262	-2.33	0.2873	-0.0145	-1.86	OE
LMXMR4		0.4700	0.0018	0.16	0.3047	0.0028	0.36	OE
MFARFJ	X	0.5111	0.0429	3.82	0.3227	0.0208	2.66	XX
MPFYUJ	*	0.4980	0.0298	2.66	0.3240	0.0222	2.83	GD
MYQ6X3		0.4673	-0.0009	-0.08	0.2957	-0.0062	-0.79	OE
N98B8B		0.4410	-0.0272	-2.42	0.2877	-0.0142	-1.81	IC
PBNG7R	X	0.5200	0.0518	4.62	0.3360	0.0342	4.37	ED
PFMC6Y		0.4820	0.0138	1.23	0.3090	0.0072	0.91	OE
Q6F26M		0.4687	0.0005	0.04	0.2987	-0.0032	-0.41	WD
QLR8NY		0.4663	-0.0019	-0.17	0.3010	-0.0008	-0.11	OE
QTRYNG		0.4841	0.0159	1.42	0.3033	0.0014	0.18	OE
QYUY7X		0.4673	-0.0009	-0.08	0.3003	-0.0015	-0.19	GD
R79JXV		0.4693	0.0011	0.10	0.2990	-0.0028	-0.36	WD
TCCE29	X	0.3033	-0.1649	-14.68	0.0700	-0.2318	-29.65	OE





# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 189

Corrosion Resistant Steel, Element #10  
COPPER (Cu)

WebCode	Data Flag	Sample M47			Sample M48			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
TGBMTX	*	0.4863	0.0181	1.62	0.2930	-0.0088	-1.13	OE
THH9YB		0.4640	-0.0042	-0.37	0.3017	-0.0002	-0.02	OE
UVMNJK		0.4773	0.0091	0.81	0.3063	0.0045	0.57	WD
UWR3KE		0.4643	-0.0038	-0.34	0.2965	-0.0053	-0.68	OE
UZD7Q6		0.4663	-0.0019	-0.17	0.2947	-0.0072	-0.92	OE
V7V7V3		0.4720	0.0038	0.34	0.3110	0.0092	1.17	OE
V8DVX2		0.4713	0.0031	0.28	0.2983	-0.0035	-0.45	GD
VPABC7		0.4637	-0.0045	-0.40	0.2977	-0.0042	-0.53	OE
WCJVPH		0.4650	-0.0032	-0.28	0.2980	-0.0038	-0.49	WD
WNQHJU		0.4717	0.0035	0.31	0.3013	-0.0005	-0.07	WD
WXXMK6		0.4597	-0.0085	-0.76	0.3030	0.0012	0.15	OE
X788MZ		0.4457	-0.0225	-2.01	0.2830	-0.0188	-2.41	OE
XE4G3K		0.4743	0.0061	0.55	0.3100	0.0082	1.04	OE
XEZAKP		0.4787	0.0105	0.93	0.3083	0.0065	0.83	IC
XXMPLQ		0.4673	-0.0009	-0.08	0.2997	-0.0022	-0.28	OE
XQYDVQ		0.4717	0.0035	0.31	0.3043	0.0025	0.32	WD
ZEZCFT		0.4740	0.0058	0.52	0.3160	0.0142	1.81	OE
ZYH63M		0.4540	-0.0142	-1.26	0.3000	-0.0018	-0.24	OE

### Summary Statistics

	Sample M47		Sample M48	
<b>Grand Means</b>	0.4682	Percent	0.3018	Percent
<b>Stnd Dev Btwn Labs</b>	0.0112	Percent	0.0078	Percent

Samples M47, M48 : AISI 347, AISI 347

Statistics based on 56 of 65 reporting participants

### Key to Method Codes Reported by Participants

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)
XR	X-Ray Fluorescence - ED or WD not specified	XX	Please Indicate Method Used for Current Element

### Comments on Assigned Data Flags for Test #189

4NACMR (X) - Data for both samples are low.

E7ECAB (X) - Data for both samples are low.

MFARFJ (X) - Data for sample M47 are high. Inconsistent within the determinations of both samples.

PBNG7R (X) - Data for both samples are high.

TCCE29 (X) - Data for both samples are low. Inconsistent within the determinations of both samples.



# Fasteners and Metals Interlaboratory Testing Program

Cycle 120  
4th Qtr 2017

## Analysis 189

Corrosion Resistant Steel, Element #10  
COPPER (Cu)

SAMPLE M47  
0.4682 Percent

SAMPLE M48  
0.3018 Percent

