

Fasteners & Metals Interlaboratory Testing Program

Summary Report Cycle 124, 4th Qtr 2018

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ABOUT THE FASTENERS & METALS PROGRAM

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

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

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

ABOUT CTS

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

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Key for Fasteners & Metals Program Web Summary Report

- WebCode** - Assigned laboratory identification number(temporary)used to ensure lab confidentiality while permitting a lab to locate its data in the report published on the CTS website.

- Lab Mean** - The average of the test results obtained by the participant.

- Grand Mean** - The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.

- Between-Lab Standard Deviation** - An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).

- Comparative Performance Value (CPV)** - An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN. $CPV = (LAB\ MEAN - GRAND\ MEAN) / BETWEEN-LAB\ STANDARD\ DEVIATION$. The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa).

- Instr. Code** - A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).

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

Data Flags

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

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



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 115

Fastener Wedge Tensile (10 degree)
ASTM F606

WebCode	Data Flag	Sample X55			Sample X56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2MF9GF		143.62	-0.91	-0.61	172.67	-1.07	-0.55
34PAW3		144.71	0.19	0.13	175.88	2.14	1.09
363B9H		144.34	-0.18	-0.12	174.37	0.62	0.32
3X6FC6	*	140.13	-4.40	-2.94	169.19	-4.55	-2.31
444M6C		143.50	-1.03	-0.69	171.68	-2.06	-1.05
47M63H		143.06	-1.47	-0.98	172.06	-1.68	-0.85
4NCH8G	*	145.27	0.74	0.50	171.17	-2.58	-1.31
4T4DMN		145.31	0.79	0.53	174.80	1.06	0.54
62VRZZ	X	141.67	-2.86	-1.91	174.47	0.72	0.37
6Y33FJ		143.53	-0.99	-0.66	172.97	-0.78	-0.39
7HC67B		143.77	-0.76	-0.51	173.73	-0.01	0.00
7LUHU6	X	7,821	7,676.76	5,129.36	9,383	9,209.07	4,683.57
7PZTVF		145.10	0.58	0.39	174.43	0.69	0.35
9FW7NT	*	147.84	3.31	2.21	178.91	5.17	2.63
9VUPPV		143.90	-0.62	-0.42	172.10	-1.64	-0.84
AH2YCQ		145.62	1.10	0.73	174.05	0.30	0.15
AKAEGB		145.29	0.77	0.51	174.84	1.10	0.56
AP4VNF		143.97	-0.56	-0.37	174.23	0.49	0.25
BEV3WF		143.33	-1.19	-0.80	174.00	0.26	0.13
C72VTL		145.93	1.41	0.94	174.00	0.26	0.13
D8DUL9		146.39	1.87	1.25	175.01	1.27	0.65
DCJNF6		142.81	-1.71	-1.14	171.68	-2.06	-1.05
EBK9KE		144.30	-0.22	-0.15	173.10	-0.64	-0.33
EKTPLK		144.81	0.29	0.19	173.13	-0.61	-0.31
FG6UVX	X	146.72	2.20	1.47	181.39	7.65	3.89
FVAT9B		142.97	-1.56	-1.04	173.67	-0.08	-0.04
FZZC2R		144.36	-0.17	-0.11	172.09	-1.65	-0.84
G7HZDA		146.07	1.54	1.03	174.64	0.90	0.46
GCBKHV		144.75	0.23	0.15	172.90	-0.85	-0.43
GKMLVJ		144.52	-0.01	0.00	173.76	0.02	0.01
HG2RM6		142.23	-2.29	-1.53	170.34	-3.40	-1.73
JGY72U		145.53	1.01	0.67	173.50	-0.24	-0.12
JHVFF6		142.57	-1.96	-1.31	171.50	-2.24	-1.14
KBNBWK		144.40	-0.12	-0.08	174.53	0.79	0.40
KGTA9A		144.02	-0.50	-0.34	171.84	-1.90	-0.97
KN863H	X	197.74	53.21	35.56	230.13	56.39	28.68
L42G4E		144.93	0.41	0.27	174.80	1.06	0.54
LB26BY		146.90	2.38	1.59	173.79	0.05	0.02
LTNHQC	X	150.58	6.06	4.05	183.54	9.80	4.98
M38VC9		144.33	-0.19	-0.13	172.90	-0.84	-0.43
MA6MJG		144.63	0.11	0.07	175.57	1.82	0.93
N49KLV		145.10	0.58	0.39	176.20	2.46	1.25
N6UFNC		146.10	1.58	1.06	177.02	3.28	1.67
NV6RT9		144.26	-0.27	-0.18	174.98	1.24	0.63
P4URQX		144.51	-0.01	-0.01	175.65	1.91	0.97
PHBU6F		143.00	-1.52	-1.02	173.33	-0.41	-0.21
PTD6GX		142.60	-1.92	-1.29	171.37	-2.38	-1.21



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 115

Fastener Wedge Tensile (10 degree)
ASTM F606

WebCode	Data Flag	Sample X55			Sample X56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
PZ842Q		145.22	0.70	0.47	172.47	-1.27	-0.65
Q4NWKX		145.40	0.88	0.59	172.43	-1.31	-0.67
QE66FW		148.00	3.48	2.32	177.33	3.59	1.83
QP644D		143.33	-1.19	-0.80	174.00	0.26	0.13
R2ZRGR		144.73	0.21	0.14	174.97	1.23	0.62
R3RN7L		145.79	1.27	0.85	174.77	1.02	0.52
RPK3HM		143.69	-0.83	-0.56	173.95	0.21	0.10
TBJXZW		142.72	-1.80	-1.20	171.23	-2.51	-1.28
U8EDJV		144.45	-0.07	-0.05	174.78	1.03	0.53
UK3EY2	X	144.95	0.42	0.28	168.17	-5.57	-2.83
URZCKJ		142.65	-1.87	-1.25	172.14	-1.60	-0.81
UXA8PT		144.83	0.31	0.21	173.10	-0.64	-0.33
V2JH4N		145.08	0.56	0.37	174.62	0.88	0.45
X7CNQA		147.65	3.12	2.09	177.83	4.09	2.08
XDAGY4		143.81	-0.72	-0.48	171.70	-2.04	-1.04
XMXA9E		145.73	1.21	0.81	174.92	1.18	0.60
XZLEGB	*	147.43	2.91	1.94	179.70	5.96	3.03
Y7L77K		143.93	-0.59	-0.39	172.77	-0.98	-0.50
YQ8LBT		145.06	0.54	0.36	175.36	1.62	0.82
YVFYYT		146.11	1.59	1.06	175.35	1.60	0.82
ZCQCFV	*	146.88	2.36	1.58	173.33	-0.41	-0.21
ZHWMCB		141.75	-2.77	-1.85	170.18	-3.56	-1.81
ZHXXAK		142.80	-1.72	-1.15	171.47	-2.28	-1.16
ZPYUB6	X	147.33	2.81	1.88	180.67	6.92	3.52
ZQ7AKW		143.40	-1.12	-0.75	173.33	-0.41	-0.21
ZZA2U7		143.77	-0.76	-0.51	172.90	-0.84	-0.43

Summary Statistics

	Sample X55		Sample X56	
Grand Means	144.52	ksi	173.74	ksi
Std Dev Btw Labs	1.50	ksi	1.97	ksi

Samples X55, X56 : 3/8-16 x 2 1/4, 3/8-16 x 2 1/4

Statistics based on 66 of 73 reporting participants

Comments on Assigned Data Flags for Test #115

- 62VRZZ (X) - Inconsistent in testing between samples.
- 7LUHU6 (X) - Extreme data.
- FG6UVX (X) - Data for sample X56 are high.
- KN863H (X) - Data for both samples are very high. Inconsistent within the determinations of sample X56.
- LTNHQC (X) - Data for both samples are high. Inconsistent within the determinations of sample X56.
- UK3EY2 (X) - Data for sample X56 are low.
- ZPYUB6 (X) - Data for sample X56 are high.



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 115

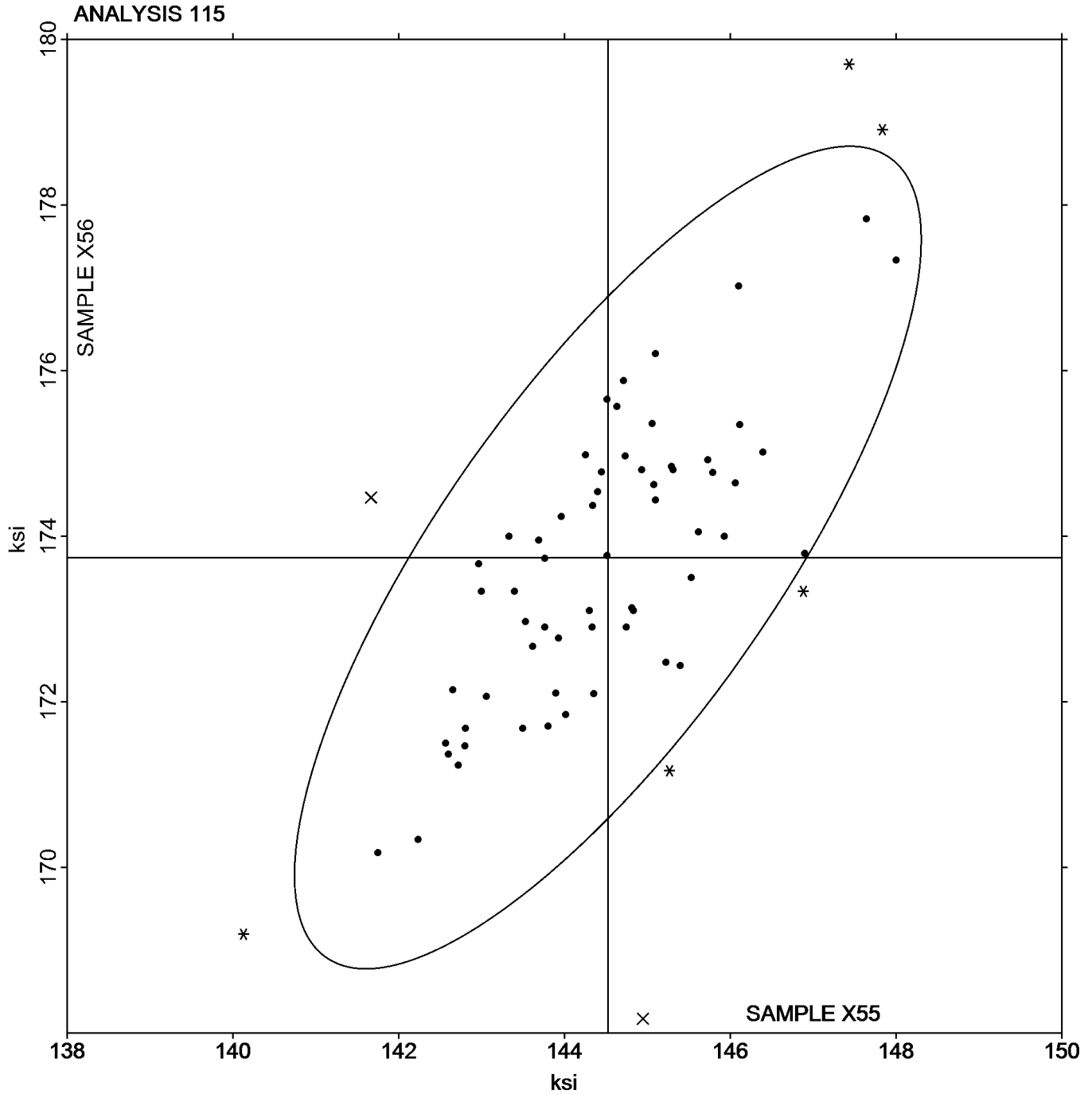
Fastener Wedge Tensile (10 degree)
ASTM F606

SAMPLE X55

144.52 ksi

SAMPLE X56

173.74 ksi





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 116

Fastener Axial Tensile
ASTM F606

WebCode	Data Flag	Sample Q55			Sample Q56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
34PAW3		145.99	1.09	0.57	174.96	0.27	0.11
363B9H		145.20	0.31	0.16	176.60	1.91	0.81
38AK6L		143.53	-1.36	-0.70	175.87	1.17	0.50
3RVU9M		146.35	1.45	0.75	176.30	1.61	0.68
3X6FC6		140.20	-4.69	-2.42	170.24	-4.46	-1.89
43ABGJ	*	150.42	5.52	2.85	180.24	5.55	2.36
444M6C		141.68	-3.22	-1.66	170.30	-4.39	-1.86
47M63H		142.48	-2.42	-1.25	173.95	-0.74	-0.32
4KAXQB		143.30	-1.59	-0.82	171.68	-3.02	-1.28
4NCH8G		144.50	-0.40	-0.21	174.10	-0.59	-0.25
4T4DMN		145.80	0.90	0.46	173.72	-0.98	-0.41
4TJF89		142.80	-2.10	-1.08	170.83	-3.86	-1.64
62VRZZ		143.47	-1.43	-0.74	170.90	-3.79	-1.61
6VNMBF		147.05	2.15	1.11	175.91	1.21	0.52
6Y33FJ	*	146.07	1.17	0.60	172.17	-2.53	-1.07
769UMV		144.35	-0.55	-0.28	175.76	1.07	0.45
7PZTVF		144.80	-0.10	-0.05	174.97	0.27	0.12
8L9UNP		145.40	0.50	0.26	175.96	1.26	0.54
9FW7NT	*	150.24	5.34	2.76	181.46	6.77	2.88
9KCMA4	X	153.33	8.44	4.36	177.67	2.97	1.26
AKAEBB		146.02	1.12	0.58	176.26	1.57	0.66
B8XRZ4		142.57	-2.33	-1.20	170.87	-3.83	-1.62
BEV3WF		145.00	0.10	0.05	174.67	-0.03	-0.01
BLLQVC		145.47	0.57	0.29	173.47	-1.23	-0.52
BQBDMC		147.18	2.28	1.18	178.39	3.69	1.57
C72VTL		143.00	-1.90	-0.98	174.03	-0.66	-0.28
CG3XXX		144.66	-0.24	-0.12	175.36	0.67	0.28
D8DUL9		146.59	1.69	0.87	175.88	1.19	0.51
DCJNF6		144.45	-0.45	-0.23	172.33	-2.37	-1.01
EFLQX		144.87	-0.03	-0.01	173.77	-0.93	-0.39
EHN4P8		143.47	-1.43	-0.74	172.83	-1.86	-0.79
EKTPLK		144.88	-0.02	-0.01	175.22	0.53	0.22
EMWND6		144.20	-0.70	-0.36	172.50	-2.19	-0.93
FG6UVX		149.42	4.52	2.33	179.83	5.13	2.18
FZZC2R		144.53	-0.36	-0.19	174.06	-0.63	-0.27
G33UEE		143.55	-1.35	-0.70	175.41	0.72	0.30
G7HZDA		144.79	-0.11	-0.06	176.11	1.42	0.60
GCBKHV		143.59	-1.31	-0.68	171.33	-3.36	-1.43
GKMLVJ		144.95	0.05	0.03	175.91	1.22	0.52
GUNVYG		144.53	-0.37	-0.19	174.97	0.28	0.12
GVPWBL	X	11.40	-133.50	-68.96	13.71	-160.98	-68.37
HG2RM6		143.61	-1.29	-0.67	171.89	-2.80	-1.19
JHVFF6		144.17	-0.73	-0.38	174.17	-0.53	-0.22
KA7P6N		144.67	-0.23	-0.12	172.70	-1.99	-0.85
KBNBWK		143.63	-1.26	-0.65	175.13	0.44	0.19
KGTA9A		146.07	1.17	0.60	173.17	-1.52	-0.65
KNCF82	X	142.37	-2.53	-1.31	177.20	2.51	1.07



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 116

Fastener Axial Tensile
ASTM F606

WebCode	Data Flag	Sample Q55			Sample Q56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
KPREKY		144.97	0.07	0.04	174.33	-0.36	-0.15
L3TRVG		144.65	-0.25	-0.13	173.89	-0.80	-0.34
L42G4E		146.90	2.00	1.03	177.43	2.74	1.16
LB26BY		144.09	-0.81	-0.42	174.09	-0.60	-0.25
MA6MJG		145.17	0.27	0.14	174.30	-0.39	-0.17
N49KLV		144.23	-0.66	-0.34	176.33	1.64	0.70
N6UFNC		145.92	1.02	0.53	177.45	2.75	1.17
NV6RT9		143.35	-1.54	-0.80	171.83	-2.86	-1.22
PHBU6F		145.00	0.10	0.05	173.33	-1.36	-0.58
PJL7R7		146.33	1.44	0.74	179.33	4.64	1.97
PTD6GX		141.63	-3.26	-1.69	173.30	-1.39	-0.59
Q62H48		148.63	3.73	1.93	176.70	2.01	0.85
Q7CTCQ	X	138.73	-6.16	-3.18	171.80	-2.89	-1.23
QE66FW		146.67	1.77	0.91	176.67	1.97	0.84
QP644D		144.67	-0.23	-0.12	174.67	-0.03	-0.01
R3RN7L		146.46	1.57	0.81	175.03	0.34	0.14
RRCBZX		146.63	1.73	0.90	176.48	1.79	0.76
TBJXZW		143.18	-1.72	-0.89	171.94	-2.75	-1.17
U8EDJV		143.59	-1.31	-0.68	174.12	-0.57	-0.24
URZCKJ		143.71	-1.18	-0.61	173.89	-0.80	-0.34
UX3PJW		145.24	0.34	0.18	175.68	0.99	0.42
UXA8PT		144.27	-0.63	-0.33	174.47	-0.23	-0.10
V2JH4N		145.10	0.21	0.11	176.15	1.46	0.62
WUUF6W		144.77	-0.13	-0.07	175.63	0.94	0.40
WZ4HHD		145.40	0.50	0.26	175.02	0.32	0.14
X7CNQA		146.46	1.57	0.81	176.41	1.72	0.73
XMxA9E		146.06	1.17	0.60	174.25	-0.44	-0.19
XZLEGB	*	150.20	5.30	2.74	179.93	5.24	2.23
YG727F		143.57	-1.33	-0.69	173.00	-1.69	-0.72
Z4AA22		145.45	0.56	0.29	175.58	0.89	0.38
ZHWMCB		140.98	-3.92	-2.02	169.79	-4.90	-2.08
ZHXXAK		143.53	-1.36	-0.70	175.20	0.51	0.22
ZZA2U7		141.90	-3.00	-1.55	174.23	-0.46	-0.20

Summary Statistics

	Sample Q55		Sample Q56	
Grand Means	144.90	ksi	174.69	ksi
Stnd Dev Btrwn Labs	1.94	ksi	2.35	ksi

Samples Q55, Q56 : 3/8-16 x 2 1/4, 3/8-16 x 2 1/4

Statistics based on 76 of 80 reporting participants



Comments on Assigned Data Flags for Test #116

9KCMA4 (X) - Data for sample Q55 are high. Inconsistent within the determinations of sample Q55.

GVPWBL (X) - Extreme data.

KNCF82 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample Q55.

Q7CTCQ (X) - Data for sample Q55 are low.



Analysis 116

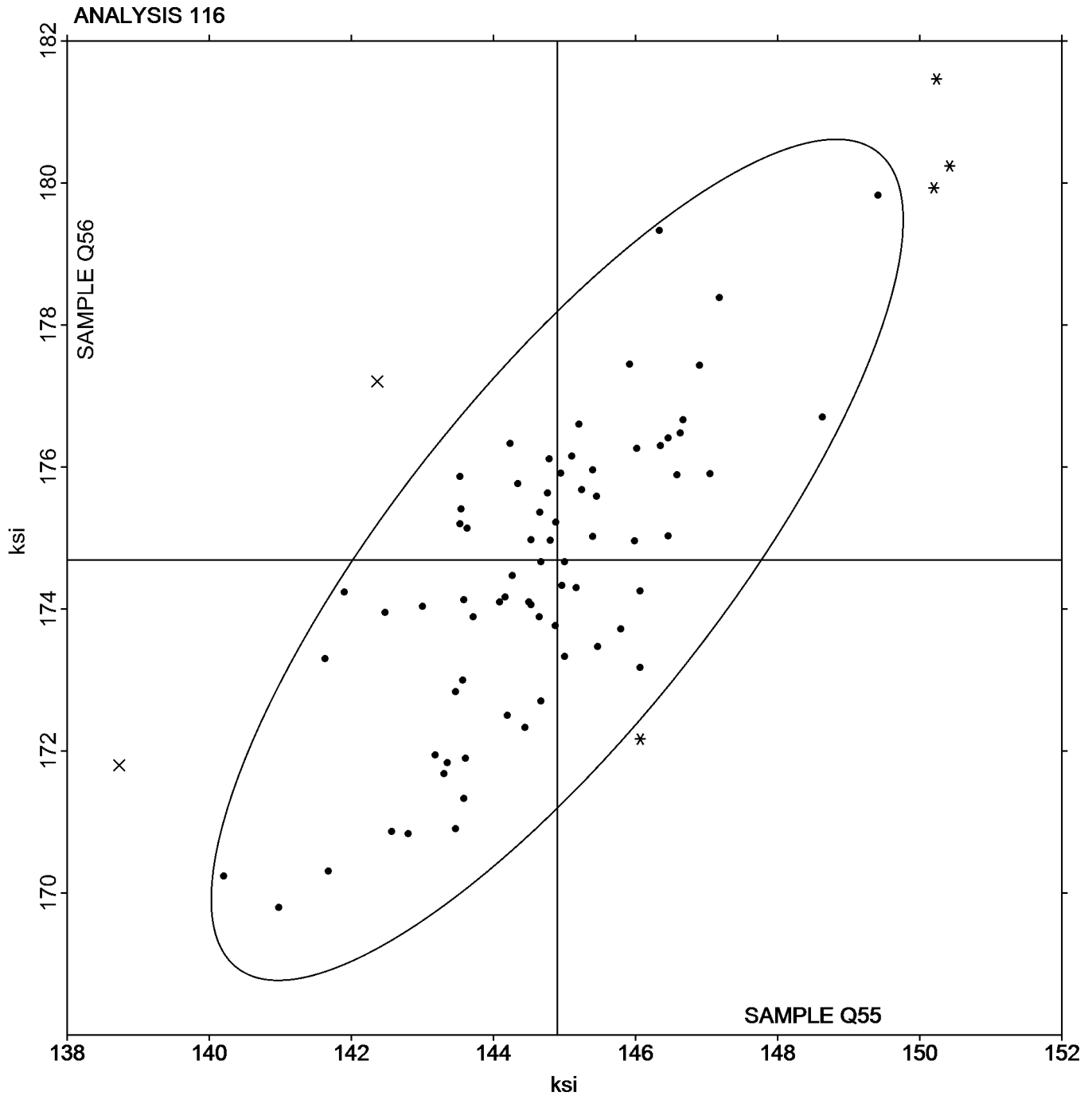
Fastener Axial Tensile
ASTM F606

SAMPLE Q55

144.90 ksi

SAMPLE Q56

174.69 ksi





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 120

Rockwell Hardness: C Scale
ASTM E18

WebCode	Data Flag	Sample E55			Sample E56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2CMH4N		55.96	0.33	0.87	58.92	0.43	1.02
2GGK4H		56.37	0.74	1.96	59.13	0.64	1.52
2MF9GF		55.82	0.19	0.50	58.30	-0.19	-0.46
2R2AZM		55.90	0.27	0.71	58.76	0.27	0.64
2RZJQJ		55.52	-0.11	-0.30	58.44	-0.05	-0.13
379Y6Y		55.59	-0.04	-0.11	58.47	-0.02	-0.05
39J8LT		55.52	-0.11	-0.30	58.24	-0.25	-0.60
3B2MJZ		55.48	-0.15	-0.40	58.24	-0.25	-0.60
3FYX3E		55.54	-0.09	-0.24	58.42	-0.07	-0.17
3Z3MAG	*	56.16	0.53	1.39	58.56	0.07	0.16
4BHDMX		56.00	0.37	0.97	58.94	0.45	1.07
4RTYAU		55.54	-0.09	-0.24	58.38	-0.11	-0.27
4T4DMN		55.86	0.23	0.60	58.98	0.49	1.16
6VNMBF	X	54.58	-1.05	-2.78	58.04	-0.45	-1.08
88UZHC		55.44	-0.19	-0.51	58.40	-0.09	-0.22
8EPX6E		55.12	-0.51	-1.35	58.10	-0.39	-0.94
9WLBVM		55.46	-0.17	-0.45	58.20	-0.29	-0.70
A7MBRQ		55.20	-0.43	-1.14	58.10	-0.39	-0.94
AD9M6D		55.50	-0.13	-0.35	58.24	-0.25	-0.60
AFFZQL		55.80	0.17	0.44	58.80	0.31	0.73
AH2YCQ		55.82	0.19	0.50	58.70	0.21	0.49
B3Y7PL	X	58.86	3.23	8.52	56.16	-2.33	-5.57
CEVFZ2		55.40	-0.24	-0.62	58.52	0.03	0.06
D7UKGU	X	55.42	-0.21	-0.56	58.92	0.43	1.02
D8DUL9		55.56	-0.07	-0.19	58.10	-0.39	-0.94
DN2ZX9		55.42	-0.21	-0.56	58.20	-0.29	-0.70
DYVJ89		55.68	0.05	0.13	58.26	-0.23	-0.56
EVTJB3		56.14	0.51	1.34	58.66	0.17	0.40
F9WKMP		55.02	-0.61	-1.61	57.84	-0.65	-1.56
FCR68U		55.24	-0.39	-1.02	58.01	-0.48	-1.15
FXT234		55.56	-0.07	-0.18	58.28	-0.21	-0.50
G4KZEH		55.16	-0.47	-1.24	58.16	-0.33	-0.80
GCBKHV		55.72	0.09	0.23	58.58	0.09	0.21
GVPWBL		55.44	-0.19	-0.51	58.50	0.01	0.02
H99GDA		55.64	0.01	0.02	58.62	0.13	0.30
HGNM37		55.12	-0.51	-1.35	58.00	-0.49	-1.18
HK4RJV		55.86	0.23	0.60	58.92	0.43	1.02
HVHUY2		55.60	-0.03	-0.08	58.40	-0.09	-0.22
HXP28L	*	55.42	-0.21	-0.56	58.74	0.25	0.59
HZD9CV		55.80	0.17	0.44	58.76	0.27	0.64
J666UE		55.20	-0.43	-1.14	57.82	-0.67	-1.61
JHVFF6		55.44	-0.19	-0.51	58.32	-0.17	-0.41
JJMZ2X		56.14	0.51	1.34	59.02	0.53	1.26
JKXKPJ	X	54.60	-1.03	-2.72	58.82	0.33	0.78
JWCUHX		55.16	-0.47	-1.24	57.92	-0.57	-1.37
JZ3FYY		56.26	0.63	1.66	59.16	0.67	1.59
KMUUBZ		55.99	0.36	0.96	58.89	0.39	0.94



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 120

Rockwell Hardness: C Scale
ASTM E18

WebCode	Data Flag	Sample E55			Sample E56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
KRTKY6		55.84	0.21	0.55	58.88	0.39	0.92
L42G4E		55.52	-0.11	-0.30	58.20	-0.29	-0.70
M8XCH8	X	56.16	0.53	1.39	58.02	-0.47	-1.13
MA6MJG		55.90	0.27	0.71	58.52	0.03	0.06
MWGP97		55.34	-0.29	-0.77	58.48	-0.01	-0.03
N9ZR3H		55.50	-0.13	-0.35	58.10	-0.39	-0.94
NFNVBR		56.00	0.37	0.97	58.82	0.33	0.78
P4URQX		56.48	0.85	2.24	59.44	0.95	2.26
PJL7R7		55.80	0.17	0.44	59.00	0.51	1.21
PNGXY4		55.50	-0.13	-0.35	58.20	-0.29	-0.70
PPTAND		55.84	0.21	0.55	58.88	0.39	0.92
PZ842Q		55.46	-0.17	-0.45	58.58	0.09	0.21
Q2K22U	X	54.48	-1.15	-3.04	57.64	-0.85	-2.04
Q4NWKX		55.94	0.31	0.81	58.90	0.41	0.97
RCUKWP		55.76	0.13	0.34	58.66	0.17	0.40
RLKRP9	*	54.70	-0.93	-2.46	57.40	-1.09	-2.61
RRQUPW		55.90	0.27	0.71	58.56	0.07	0.16
RURUPU		55.30	-0.33	-0.88	57.88	-0.61	-1.46
RW2VV2		55.94	0.31	0.81	58.78	0.29	0.68
TQXPWV		55.47	-0.16	-0.43	58.46	-0.04	-0.09
U3H3F3		55.66	0.03	0.07	58.72	0.23	0.54
U943PN		55.72	0.09	0.23	58.68	0.19	0.45
UJ4XLY	X	58.54	2.91	7.67	55.58	-2.91	-6.95
URYNEL		55.66	0.03	0.07	58.74	0.25	0.59
W3TGHA		55.98	0.35	0.92	59.00	0.51	1.21
W6DPTP	*	54.56	-1.07	-2.83	57.48	-1.01	-2.42
WCHFMG		55.44	-0.19	-0.51	58.26	-0.23	-0.56
WJH29P		55.42	-0.21	-0.56	58.22	-0.27	-0.65
WRDWEZ		55.60	-0.03	-0.08	58.48	-0.01	-0.03
X9AVML	X	54.82	-0.81	-2.14	58.24	-0.25	-0.60
XBKL3H		54.84	-0.79	-2.09	57.74	-0.75	-1.80
XRUBJP		56.48	0.85	2.24	59.46	0.97	2.31
XXB7ZJ		55.62	-0.01	-0.03	58.40	-0.09	-0.22
Y4Z79P		55.94	0.31	0.81	58.50	0.01	0.02
YHDA7Y		56.06	0.43	1.13	59.20	0.71	1.69
YUKFYD		55.68	0.05	0.13	58.50	0.01	0.02
YZAXB3		55.48	-0.15	-0.40	58.38	-0.11	-0.27
Z4AA22		55.82	0.19	0.50	58.74	0.25	0.59
ZKFJWV		55.68	0.05	0.13	58.38	-0.11	-0.27
ZLZL3N		54.82	-0.81	-2.14	57.66	-0.83	-1.99
ZQ7AKW		56.32	0.69	1.82	59.18	0.69	1.64



Analysis 120

Rockwell Hardness: C Scale
ASTM E18

Summary Statistics

	<u>Sample E55</u>		<u>Sample E56</u>	
Grand Means	55.63	HRC	58.49	HRC
Stnd Dev Btwn Labs	0.38	HRC	0.42	HRC

Samples E55, E56 : Steel, Steel

Statistics based on 80 of 88 reporting participants

Comments on Assigned Data Flags for Test #120

- 6VNMBF (X) - Data for sample E55 are low. Inconsistent within the determinations of both samples.
- B3Y7PL (X) - Data for sample E55 are high and data for sample E56 are low. Inconsistent in testing between samples. Data may be transposed between samples.
- D7UKGU (X) - Inconsistent in testing between samples.
- JKXKPJ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- M8XCH8 (X) - Inconsistent in testing between samples.
- Q2K22U (X) - Data for sample E55 are low. Inconsistent within the determinations of both samples.
- UJ4XLY (X) - Data for sample E55 are high and data for sample E56 are low. Inconsistent in testing between samples. Data may be transposed between samples.
- X9AVML (X) - Inconsistent in testing between samples.



Analysis 120

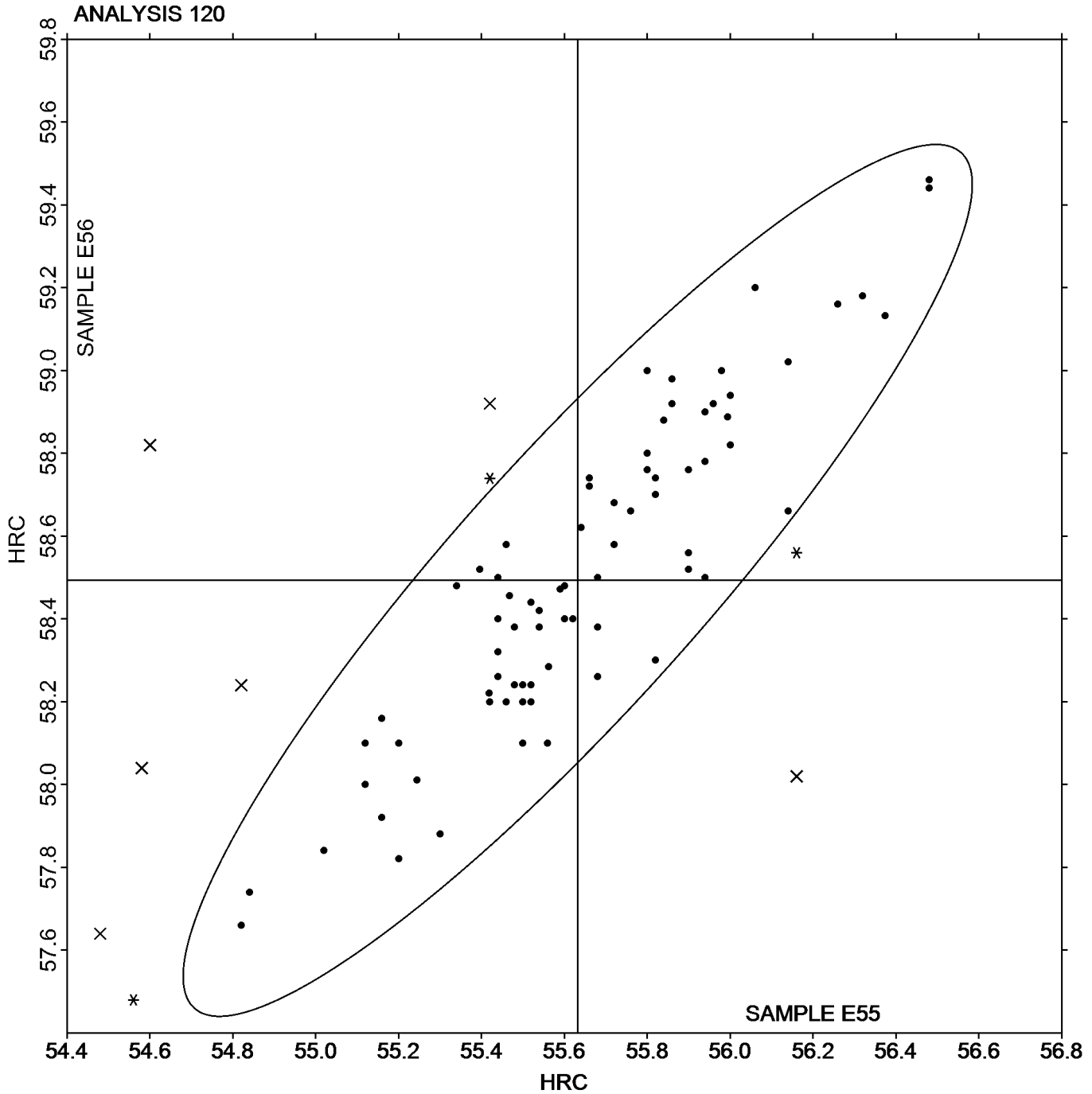
Rockwell Hardness: C Scale
ASTM E18

SAMPLE E55

SAMPLE E56

55.63 HRC

58.49 HRC





Fasteners and Metals Interlaboratory Testing Program
Analysis 125

Cycle 124
4th Qtr 2018

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

WebCode	Data Flag	Sample G55			Sample G56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
28MJKJ		37.24	0.64	1.34	36.98	-0.01	-0.03
2LCPZD	X	34.61	-1.99	-4.17	34.94	-2.04	-3.97
363B9H		36.71	0.11	0.22	36.82	-0.17	-0.33
3X6FC6		36.61	0.01	0.03	36.73	-0.26	-0.51
444M6C		36.98	0.38	0.80	37.31	0.32	0.62
47M63H		36.68	0.08	0.17	36.87	-0.12	-0.23
4PHQRF		36.97	0.37	0.78	37.94	0.95	1.84
4T4DMN		36.36	-0.24	-0.50	36.98	-0.01	-0.01
62VRZZ		36.57	-0.03	-0.06	37.16	0.17	0.33
636DG9		35.86	-0.74	-1.56	37.10	0.11	0.22
6GXW7H		36.66	0.06	0.12	36.66	-0.33	-0.64
72BBKX		36.51	-0.09	-0.18	36.81	-0.18	-0.34
769UMV		36.22	-0.38	-0.80	36.57	-0.42	-0.81
7HC67B		36.75	0.15	0.32	36.44	-0.55	-1.07
8L9UNP		36.49	-0.11	-0.24	37.11	0.12	0.24
9FW7NT	X	34.77	-1.83	-3.85	35.92	-1.07	-2.08
9VUPPV	X	37.31	0.71	1.48	39.25	2.26	4.39
AKAEGB		35.93	-0.67	-1.42	37.13	0.14	0.27
AKQT46		36.75	0.15	0.32	36.88	-0.11	-0.22
AP4VNF		36.75	0.15	0.32	37.59	0.60	1.16
BEV3WF		36.71	0.11	0.24	36.36	-0.63	-1.21
BQBDMC		36.74	0.14	0.30	36.09	-0.89	-1.74
BZZYRA		37.09	0.49	1.02	37.24	0.25	0.48
C72VTL		37.21	0.61	1.27	37.51	0.52	1.02
CG3XXX		36.21	-0.39	-0.83	36.41	-0.58	-1.12
CP98CV		36.94	0.34	0.71	37.57	0.58	1.13
CVZME4		36.32	-0.28	-0.59	37.06	0.07	0.13
D8DUL9		37.22	0.62	1.30	37.34	0.36	0.69
D9N9ZP		37.06	0.46	0.96	36.79	-0.20	-0.39
DCJNF6		35.96	-0.64	-1.35	36.89	-0.09	-0.18
EBK9KE		36.96	0.36	0.76	37.11	0.12	0.23
EE6RM3		36.23	-0.37	-0.77	36.58	-0.41	-0.80
EFLQX		36.07	-0.53	-1.10	36.51	-0.47	-0.92
FG6UVX		36.61	0.01	0.01	36.66	-0.33	-0.63
FPJF7M		36.21	-0.39	-0.81	36.81	-0.18	-0.34
FV8NLR		36.86	0.26	0.55	37.49	0.51	0.98
HG2RM6		36.78	0.18	0.38	37.14	0.15	0.29
HKGJCC		36.28	-0.32	-0.68	37.49	0.51	0.98
HMYR9Q		37.14	0.54	1.13	36.93	-0.06	-0.12
J2HLPB		37.66	1.06	2.23	38.14	1.15	2.23
JGY72U		36.71	0.11	0.22	37.13	0.14	0.28
KA7P6N		36.42	-0.18	-0.38	37.41	0.42	0.82
KBNBWK		36.38	-0.22	-0.46	36.75	-0.24	-0.46
KNCF82		37.04	0.44	0.92	37.08	0.09	0.18
KPREKY		36.83	0.23	0.49	36.88	-0.11	-0.21
KXF6R8		36.44	-0.16	-0.34	36.68	-0.31	-0.61
LQVU7V		36.53	-0.07	-0.16	37.38	0.39	0.75



Fasteners and Metals Interlaboratory Testing Program

Analysis 125

Cycle 124
4th Qtr 2018

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

WebCode	Data Flag	Sample G55			Sample G56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
N3L6UT		36.34	-0.26	-0.55	36.54	-0.44	-0.86
N49KLV		36.41	-0.19	-0.41	36.90	-0.09	-0.17
N6UFNC		36.79	0.19	0.41	36.99	0.01	0.01
N72R8Y	X	35.87	-0.73	-1.54	32.93	-4.05	-7.87
NFTP28		36.78	0.18	0.38	37.12	0.13	0.25
NV6RT9		36.09	-0.51	-1.06	36.23	-0.76	-1.47
PHBU6F	*	36.62	0.02	0.04	35.78	-1.21	-2.34
PJL7R7		37.25	0.65	1.37	37.63	0.64	1.24
PTD6GX	*	35.43	-1.17	-2.45	36.48	-0.51	-1.00
PZ842Q		37.06	0.46	0.97	37.23	0.24	0.46
Q62H48		35.81	-0.79	-1.67	36.24	-0.75	-1.46
Q7CTCQ	X	34.82	-1.78	-3.74	35.89	-1.10	-2.14
QE6FW		37.31	0.71	1.48	37.24	0.25	0.48
QNC3T3		37.45	0.85	1.79	37.20	0.21	0.41
R2ZRGR		36.05	-0.55	-1.15	36.31	-0.68	-1.31
R3RN7L		37.64	1.04	2.17	38.13	1.15	2.23
RCCULJ		37.27	0.67	1.41	37.26	0.27	0.53
RCGC4A		36.23	-0.37	-0.77	36.45	-0.54	-1.04
TYNJKC		35.88	-0.72	-1.52	37.22	0.23	0.45
U2N38B		36.74	0.14	0.29	36.92	-0.07	-0.13
U8EDJV		37.15	0.55	1.16	38.21	1.22	2.37
UGKUX2		35.83	-0.77	-1.63	35.96	-1.03	-1.99
UK3EY2		36.37	-0.23	-0.48	36.41	-0.58	-1.12
URZCKJ		36.61	0.01	0.03	37.59	0.61	1.18
UXA8PT		36.36	-0.24	-0.51	36.76	-0.23	-0.44
VREV6G		37.26	0.66	1.39	37.56	0.57	1.10
WZ4HHD		36.64	0.04	0.09	37.39	0.41	0.79
WZR9MC		36.93	0.33	0.68	37.08	0.09	0.18
XDAGY4		36.69	0.09	0.18	37.39	0.41	0.79
XHJ6CZ		36.31	-0.29	-0.60	36.88	-0.11	-0.22
XMXA9E		36.49	-0.11	-0.22	37.44	0.46	0.88
XZLEGB		35.96	-0.64	-1.35	36.30	-0.69	-1.34
Y7L77K		36.85	0.25	0.53	37.21	0.22	0.42
YFC9DG	*	35.29	-1.31	-2.74	35.54	-1.44	-2.80
YG727F		36.02	-0.58	-1.22	37.09	0.10	0.19
YH3TFL		36.24	-0.36	-0.75	37.03	0.04	0.08
YVFFYT	*	36.36	-0.24	-0.51	37.90	0.91	1.77
ZHWMCB		36.86	0.26	0.54	36.96	-0.03	-0.06

Summary Statistics

	Sample G55		Sample G56	
Grand Means	36.60	HRC	36.99	HRC
Std Dev Btwn Labs	0.48	HRC	0.51	HRC

Samples G55, G56 : 1/2-20 x 2 1/4, 1/2-20 x 2 3/4

Statistics based on 80 of 85 reporting participants



Fasteners and Metals Interlaboratory Testing Program
Analysis 125

Cycle 124
4th Qtr 2018

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

Comments on Assigned Data Flags for Test #125

- 2LCPZD (X) - Data for both samples are low. Inconsistent within the determinations of sample G55.
- 9FW7NT (X) - Data for sample G55 are low.
- 9VUPPV (X) - Data for sample G56 are high.
- N72R8Y (X) - Data for sample G56 are low.
- Q7CTCQ (X) - Data for sample G55 are low.



Analysis 125

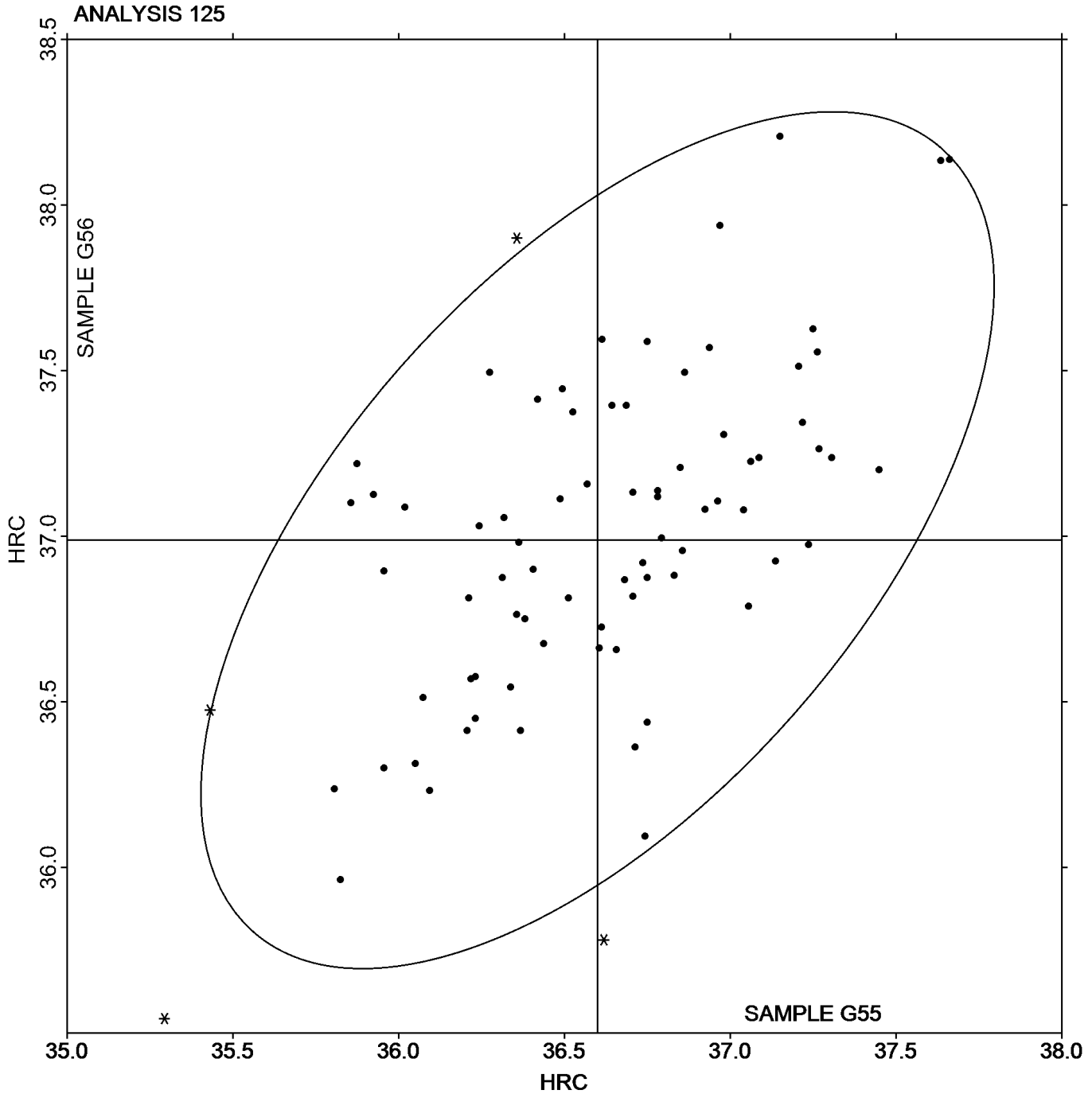
Rockwell Hardness: Externally Threaded Fasteners
ASTM F606/F606M AND ASTM E18

SAMPLE G55

SAMPLE G56

36.60 HRC

36.99 HRC





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

**Cycle 124
4th Qtr 2018**

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

WebCode	Data Flag	Sample V55			Sample V56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
3JJ4YA		358.00	-5.04	-0.84	371.13	2.92	0.45
47M63H		365.81	2.77	0.46	368.19	-0.02	0.00
4U9BP6		358.41	-4.63	-0.77	363.82	-4.39	-0.67
6NXJVX		360.38	-2.67	-0.45	365.38	-2.83	-0.43
6Y33FJ		360.63	-2.42	-0.40	366.38	-1.83	-0.28
769UMV		364.31	1.27	0.21	369.13	0.92	0.14
7ZVURB	*	375.85	12.81	2.14	373.29	5.09	0.78
84BZ3W		356.88	-6.17	-1.03	360.38	-7.83	-1.20
8GV2JH		365.90	2.86	0.48	370.01	1.80	0.28
8L9UNP		364.63	1.58	0.26	369.19	0.98	0.15
8YUCBR		361.65	-1.39	-0.23	365.43	-2.78	-0.43
9DDFQF		368.13	5.08	0.85	371.81	3.61	0.55
AQG749		361.57	-1.47	-0.25	369.59	1.39	0.21
D8DUL9		366.67	3.63	0.61	371.34	3.14	0.48
DCJNF6		356.41	-6.63	-1.11	359.56	-8.65	-1.33
DKAPKF		372.67	9.63	1.61	382.64	14.43	2.21
DKYB8L		354.50	-8.54	-1.43	360.19	-8.02	-1.23
DYVJ89		365.89	2.85	0.48	365.44	-2.76	-0.42
HG2RM6		368.13	5.08	0.85	372.00	3.79	0.58
LQVU7V		358.43	-4.62	-0.77	363.56	-4.64	-0.71
Q2K22U	*	376.84	13.80	2.31	387.73	19.52	2.99
RYBVZ9		356.85	-6.19	-1.03	366.43	-1.78	-0.27
TJ867E		356.43	-6.61	-1.10	363.84	-4.36	-0.67
URZCKJ		363.63	0.58	0.10	374.38	6.17	0.95
XMxA9E		366.69	3.65	0.61	367.00	-1.21	-0.18
XUFKLF		364.64	1.60	0.27	367.03	-1.18	-0.18
ZFPPYE		361.50	-1.54	-0.26	369.00	0.79	0.12
ZHXXAK		353.75	-9.29	-1.55	355.94	-12.27	-1.88

Summary Statistics

	<u>Sample V55</u>		<u>Sample V56</u>	
Grand Means	363.04	HV	368.21	HV
Std Dev Btwn Labs	5.98	HV	6.53	HV

Samples V55, V56 : 1/2-20 x 2 1/4, 1/2-20 x 2 3/4

Statistics based on 28 of 28 reporting participants



Analysis 126

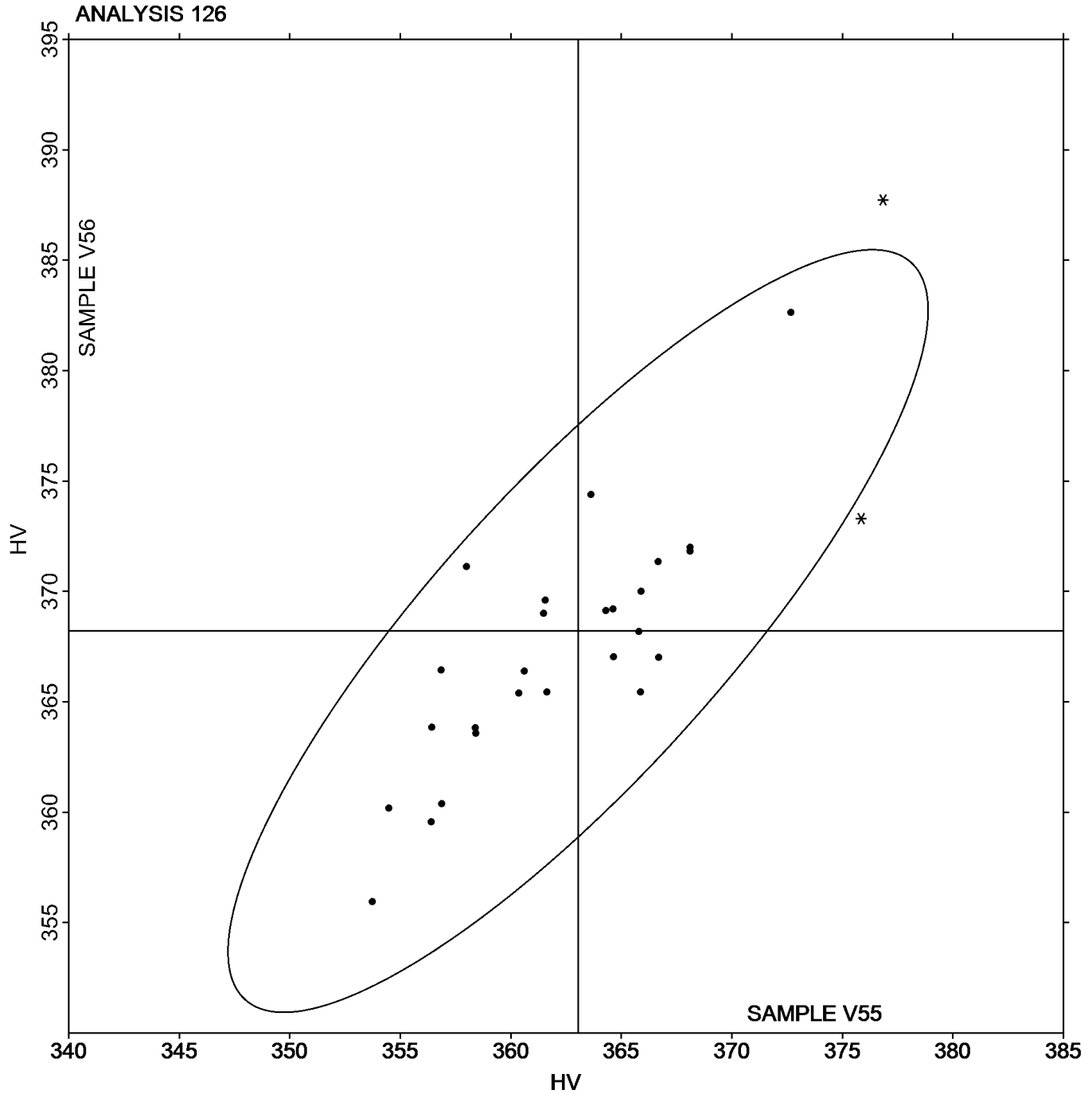
Vickers Hardness: Externally Threaded Fasteners
ASTM E92

SAMPLE V55

SAMPLE V56

363.04 HV

368.21 HV





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 127

Fastener Wedge Tensile (10 degree) - Metric
ASTM F606M

WebCode	Data Flag	Sample B55			Sample B56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
28MJKJ		1,143	-12	-1.18	1,146	-16	-1.30
3JJ4YA		1,176	21	2.08	1,186	24	2.00
49YTТА		1,155	0	-0.01	1,175	14	1.12
4T4DMN		1,162	7	0.64	1,164	2	0.16
636DG9		1,143	-12	-1.15	1,154	-8	-0.67
72BBKX		1,148	-7	-0.72	1,159	-3	-0.25
7ED23V		1,162	6	0.63	1,166	5	0.38
AQG749	X	1,235	80	7.79	1,241	79	6.57
BJT3BV		1,164	9	0.84	1,175	13	1.07
C72VTL		1,163	8	0.76	1,168	6	0.48
DKYB8L		1,140	-15	-1.46	1,154	-8	-0.62
EE6RM3		1,155	0	-0.04	1,170	8	0.69
J2HLPB		1,148	-7	-0.71	1,165	4	0.30
KQYZPQ	*	1,163	8	0.80	1,132	-30	-2.46
LQVU7V		1,149	-6	-0.58	1,169	7	0.61
LTNHQC	X	1,262	107	10.45	1,256	94	7.80
N72R8Y		1,168	13	1.26	1,151	-11	-0.89
PPTAND		1,155	0	0.03	1,178	17	1.37
QNC3T3		1,166	11	1.03	1,161	-1	-0.10
RCCULJ		1,134	-21	-2.03	1,144	-18	-1.50
UGKUX2		1,145	-10	-1.02	1,165	3	0.24
UXA8PT		1,166	11	1.11	1,164	2	0.18
VREV6G		1,154	-1	-0.06	1,169	8	0.63
XDAGY4		1,160	4	0.43	1,160	-1	-0.12
XHJ6CZ		1,142	-13	-1.31	1,142	-20	-1.64
YH3TFL		1,152	-3	-0.34	1,160	-2	-0.17
ZFPPYE		1,157	2	0.19	1,170	8	0.65
ZPYUB6		1,163	8	0.80	1,160	-2	-0.15

Summary Statistics

	Sample B55		Sample B56	
Grand Means	1,155	MPa	1,162	MPa
Std Dev Btwn Labs	10	MPa	12	MPa

Samples B55, B56 : M-10x1.5x70, M-10x1.5x75

Statistics based on 26 of 28 reporting participants

Comments on Assigned Data Flags for Test #127

AQG749 (X) - Data for both samples are high.

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



Analysis 127

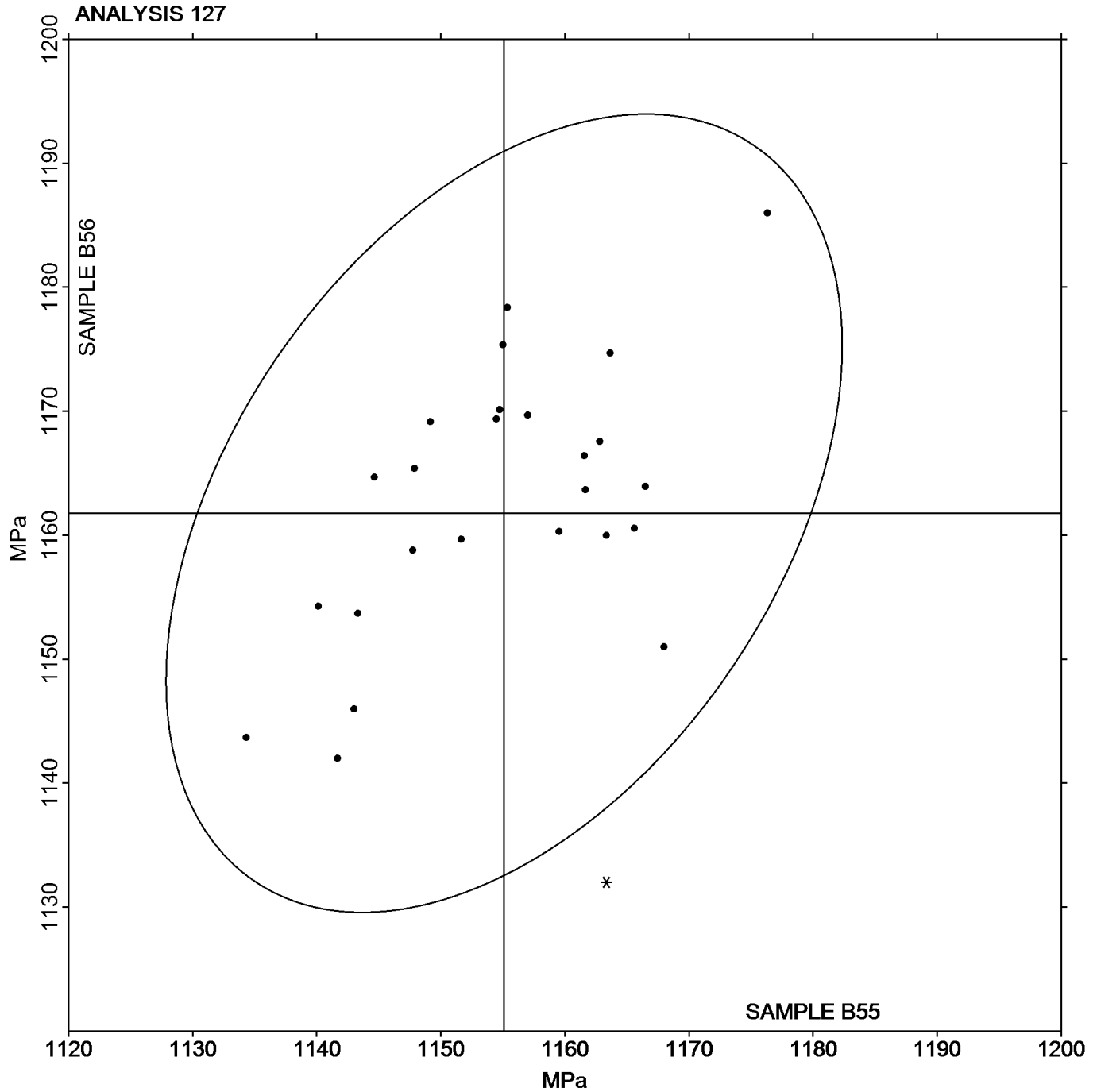
Fastener Wedge Tensile (10 degree) - Metric
ASTM F606M

SAMPLE B55

1,155 MPa

SAMPLE B56

1,162 MPa





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 128

Fastener Axial Tensile - Metric
ASTM F606M

WebCode	Data Flag	Sample T55			Sample T56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
3JJ4YA		1,153	-6	-0.41	1,154	-13	-0.83
4PHQRF		1,154	-4	-0.32	1,164	-3	-0.19
4T4DMN		1,165	7	0.47	1,160	-7	-0.43
4WFKMT		1,143	-16	-1.11	1,160	-7	-0.43
6PG9DH		1,159	0	0.02	1,156	-11	-0.72
7ED23V		1,151	-8	-0.56	1,161	-6	-0.39
DKAPKF		1,153	-5	-0.38	1,174	8	0.52
DKYB8L		1,160	1	0.06	1,161	-5	-0.35
FE3QA3		1,178	19	1.34	1,175	8	0.56
FV8NLR		1,165	7	0.47	1,172	5	0.34
KMUUBZ		1,180	21	1.48	1,171	4	0.30
Q7CTCQ		1,128	-30	-2.15	1,150	-16	-1.07
QRM4LZ		1,161	2	0.14	1,167	1	0.05
TJ867E		1,155	-3	-0.24	1,153	-13	-0.87
U2N38B		1,146	-13	-0.90	1,158	-9	-0.56
VREV6G		1,162	3	0.22	1,178	11	0.75
VYGG4Q	*	1,190	31	2.21	1,218	51	3.40
XDAGY4		1,154	-5	-0.36	1,165	-1	-0.08

Summary Statistics

	Sample T55		Sample T56	
Grand Means	1,159	MPa	1,167	MPa
Stnd Dev Btwn Labs	14	MPa	15	MPa

Samples T55, T56 : M-10x1.5x70, M-10x1.5x75

Statistics based on 18 of 18 reporting participants



Analysis 128

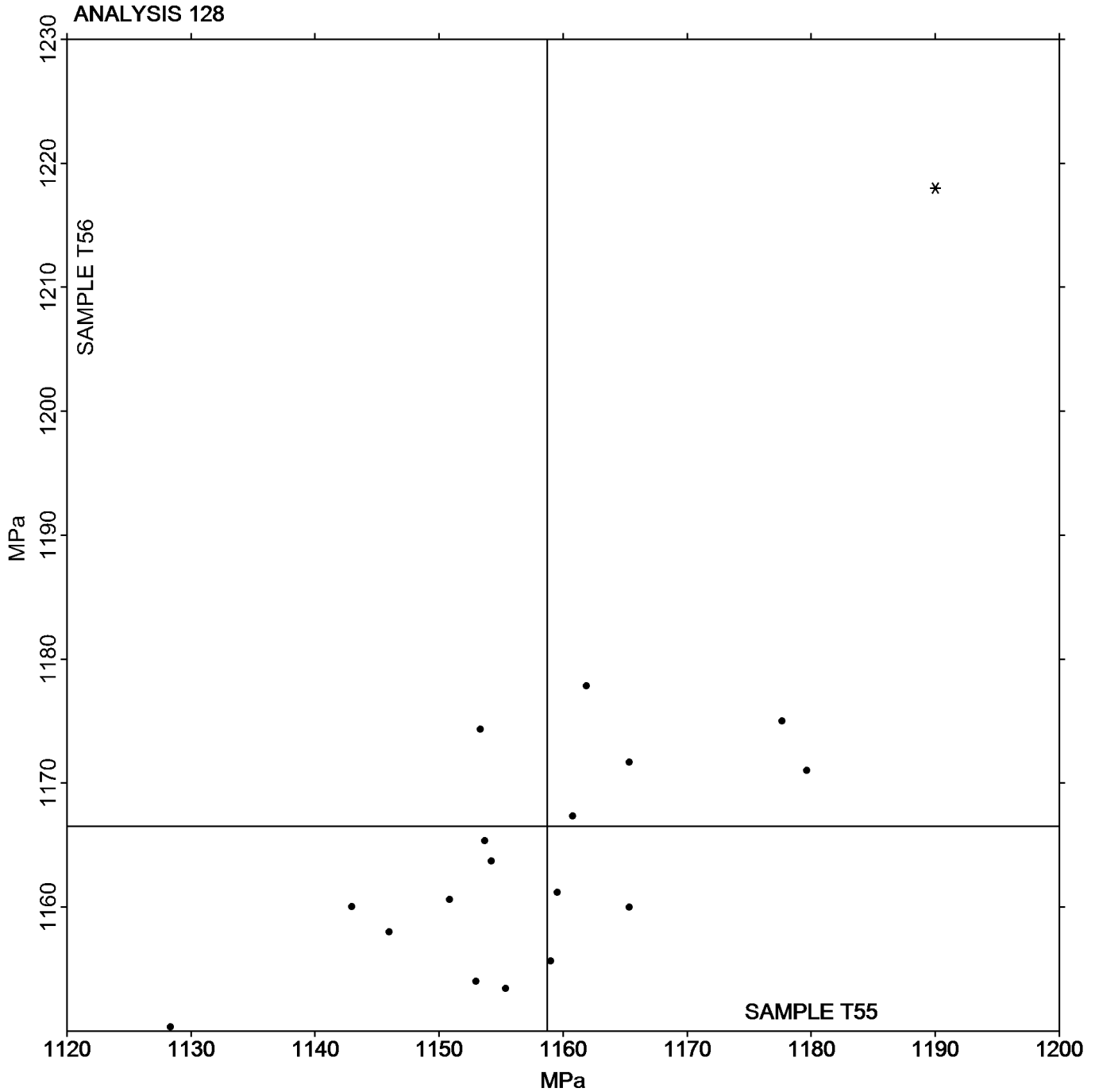
Fastener Axial Tensile - Metric
ASTM F606M

SAMPLE T55

SAMPLE T56

1,159 MPa

1,167 MPa





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 129

Fastener Double Shear
NASM 1312-13

WebCode	Data Flag	Sample Z55			Sample Z56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
3FZH2F		19,385	217	0.49	21,873	-465	-0.90
6Y33FJ		19,210	42	0.09	22,638	300	0.58
769UMV		19,394	226	0.51	22,806	468	0.90
CBW2EX		19,630	461	1.03	23,307	969	1.87
CG3XXX		19,503	335	0.75	22,787	449	0.87
FG6UVX		18,783	-386	-0.86	21,980	-358	-0.69
G7HZDA	X	16,781	-2,388	-5.35	21,096	-1,242	-2.39
GVPWBL		19,320	151	0.34	22,238	-100	-0.19
KNCF82	*	20,433	1,265	2.84	23,667	1,329	2.56
KPREKY		18,740	-428	-0.96	21,933	-405	-0.78
MA6MJG		19,600	431	0.97	22,627	289	0.56
PJL7R7		18,998	-171	-0.38	22,039	-299	-0.58
PNGXY4		19,120	-49	-0.11	22,315	-23	-0.05
PWDGDW		18,719	-449	-1.01	21,958	-380	-0.73
Q62H48		18,878	-291	-0.65	22,227	-111	-0.21
Q7CTCQ		19,201	33	0.07	22,180	-158	-0.30
R3RN7L		19,203	34	0.08	22,213	-125	-0.24
XZLEGB		18,488	-681	-1.53	21,995	-343	-0.66
YH3TFL		19,167	-2	0.00	22,590	252	0.49
ZCQCFV		18,517	-652	-1.46	21,700	-638	-1.23
ZHXXAK		19,079	-89	-0.20	21,688	-650	-1.25

Summary Statistics

	Sample Z55		Sample Z56	
Grand Means	19,168	1b	22,338	1b
Std Dev Btwn Labs	446	1b	519	1b

Samples Z55, Z56 : 3/8-16 x 2 1/4, 3/8-16 x 2 1/4

Statistics based on 20 of 21 reporting participants

Comments on Assigned Data Flags for Test #129

G7HZDA (X) - Data for sample Z55 are low.



Analysis 129

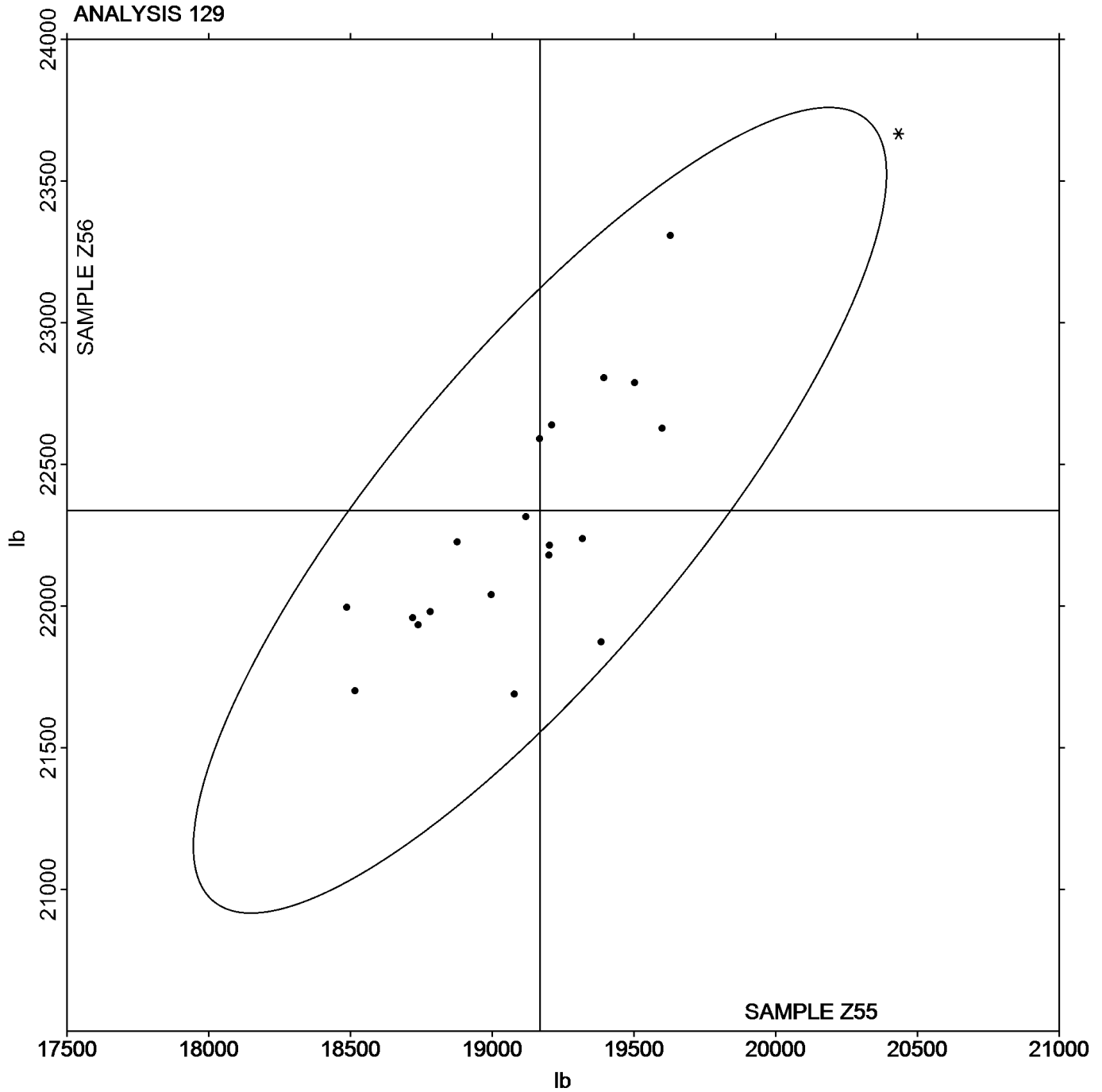
Fastener Double Shear
NASM 1312-13

SAMPLE Z55

19,168 lb

SAMPLE Z56

22,338 lb





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 130

Tensile Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2ERDL7		95.60	-4.18	-2.08	102.70	-0.91	-0.45
2FXPBU		97.00	-2.78	-1.38	104.30	0.69	0.35
2PT3U9		103.30	3.52	1.75	102.40	-1.21	-0.60
2XJ8NP		102.00	2.22	1.11	105.50	1.89	0.95
32XBPQ		101.00	1.22	0.61	106.00	2.39	1.20
379Y6Y		101.52	1.74	0.87	107.10	3.49	1.75
3C2VEJ		99.93	0.15	0.08	101.57	-2.04	-1.02
3JZUUU		99.50	-0.28	-0.14	104.83	1.23	0.61
3NV9CV	X	101.20	1.42	0.71	110.50	6.89	3.45
3UKQNL		97.87	-1.91	-0.95	104.54	0.93	0.47
3XFWCH		101.47	1.69	0.84	101.20	-2.41	-1.21
3YUUT2		99.70	-0.08	-0.04	101.80	-1.81	-0.90
48PA27		97.50	-2.28	-1.13	99.45	-4.16	-2.08
4BHDMX		99.28	-0.50	-0.25	102.18	-1.43	-0.71
4GNJDG		101.00	1.22	0.61	102.00	-1.61	-0.80
4HGLRJ		97.20	-2.58	-1.28	104.30	0.69	0.35
4JBAAE		101.60	1.82	0.91	102.83	-0.78	-0.39
4T4DMN	*	104.48	4.71	2.34	100.62	-2.98	-1.49
6DNFUE		99.30	-0.48	-0.24	100.70	-2.91	-1.46
6PWFQM		98.92	-0.86	-0.43	100.95	-2.66	-1.33
7GJZ7W		101.70	1.92	0.96	106.10	2.49	1.25
7NWYRU		101.50	1.72	0.86	102.50	-1.11	-0.55
7PZTVF		102.10	2.32	1.16	104.20	0.59	0.30
7RJUVT		97.44	-2.34	-1.16	103.34	-0.27	-0.13
7RYZRR		101.73	1.95	0.97	106.95	3.34	1.67
7YFB6T		101.94	2.16	1.08	105.25	1.64	0.82
8CXHGJ		101.20	1.42	0.71	102.50	-1.11	-0.55
8NAUNM		101.50	1.72	0.86	103.00	-0.61	-0.30
8RWEVC		101.72	1.94	0.96	106.23	2.62	1.31
8VAET3		100.50	0.72	0.36	101.96	-1.65	-0.82
8YAFYR		101.53	1.75	0.87	104.47	0.86	0.43
9B3FAU	X	5,058	4,958.22	2,466.91	4,427	4,323.39	2,163.83
9KCMA4		97.76	-2.02	-1.01	104.57	0.97	0.48
9P896D	*	94.50	-5.28	-2.63	101.00	-2.61	-1.31
9XHNKZ		101.24	1.46	0.73	101.60	-2.01	-1.01
A3CGBE		100.54	0.76	0.38	104.98	1.38	0.69
AGTDTW		101.16	1.39	0.69	103.59	-0.02	-0.01
AW4PTN		96.89	-2.89	-1.44	104.43	0.82	0.41
BBVWFN		98.70	-1.08	-0.54	106.02	2.41	1.21
BWWWKE		103.00	3.22	1.60	107.00	3.39	1.70
BZLNXB		99.35	-0.43	-0.21	101.24	-2.37	-1.19
CPX4A6		101.85	2.07	1.03	106.63	3.02	1.51
CYZQTN		100.44	0.66	0.33	102.33	-1.28	-0.64
CZNLQ		100.30	0.52	0.26	104.70	1.09	0.55
DECCZL		97.70	-2.08	-1.03	103.72	0.11	0.05
DVA3WA		100.52	0.74	0.37	102.22	-1.38	-0.69
DVXZ8V		100.70	0.92	0.46	102.20	-1.41	-0.70



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 130

Tensile Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
E22ZT4		100.32	0.55	0.27	102.19	-1.41	-0.71
ECEW2N		97.32	-2.46	-1.22	103.41	-0.20	-0.10
EP48RL		95.40	-4.38	-2.18	102.40	-1.21	-0.60
EW3FUL		97.61	-2.17	-1.08	105.01	1.40	0.70
F36ZGH		99.00	-0.78	-0.39	104.00	0.39	0.20
F9DCJA		100.20	0.42	0.21	104.80	1.19	0.60
F9WKMP		100.20	0.42	0.21	105.60	1.99	1.00
FFC23Z		98.90	-0.88	-0.44	100.80	-2.81	-1.41
FRNDA3		101.30	1.52	0.76	105.00	1.39	0.70
FXT234		100.64	0.86	0.43	101.19	-2.42	-1.21
G2F8KK		99.69	-0.09	-0.04	101.41	-2.20	-1.10
G4ZJYF		101.20	1.42	0.71	106.10	2.49	1.25
GBXGMD		101.00	1.22	0.61	102.00	-1.61	-0.80
GKMLVJ		96.80	-2.98	-1.48	104.00	0.39	0.20
GLXZ8E		98.71	-1.07	-0.53	104.78	1.17	0.59
GLYXHA	X	106.04	6.26	3.11	107.63	4.02	2.01
GUVN8Q		97.50	-2.28	-1.13	105.40	1.79	0.90
GY7Y37		96.33	-3.45	-1.72	102.71	-0.90	-0.45
H67M9D		97.00	-2.78	-1.38	104.50	0.89	0.45
H9PN86	X	113.60	13.82	6.88	103.00	-0.61	-0.30
HCLB2T		102.37	2.59	1.29	102.25	-1.36	-0.68
HDYH2L		99.00	-0.78	-0.39	101.20	-2.41	-1.21
HNE3CP		96.30	-3.48	-1.73	102.00	-1.61	-0.80
HVJQ6Q		101.20	1.42	0.71	106.70	3.09	1.55
HZXPRX		101.00	1.22	0.61	106.00	2.39	1.20
JDZN42		100.10	0.32	0.16	101.30	-2.31	-1.16
JKXKPJ		102.00	2.22	1.11	101.00	-2.61	-1.31
K2TYFQ		100.00	0.22	0.11	105.00	1.39	0.70
K2X8WQ		97.80	-1.98	-0.98	103.70	0.09	0.05
K8NG9B		100.40	0.62	0.31	102.80	-0.81	-0.40
L42G4E		100.90	1.12	0.56	105.80	2.19	1.10
LMD3XA		99.90	0.12	0.06	105.30	1.69	0.85
LNNY6Y		101.24	1.46	0.73	102.40	-1.21	-0.61
M38VC9	*	105.10	5.32	2.65	105.00	1.39	0.70
MA3JWY		99.24	-0.54	-0.27	104.93	1.32	0.66
MFCCX4		101.15	1.37	0.68	105.65	2.04	1.02
MMRVFH		101.57	1.79	0.89	103.46	-0.15	-0.07
MPE4CH		101.70	1.92	0.96	100.70	-2.91	-1.46
NB9ZDN		98.00	-1.78	-0.88	105.20	1.59	0.80
NJ9H8L		100.00	0.22	0.11	101.00	-2.61	-1.31
NMLMGZ		100.60	0.82	0.41	106.90	3.29	1.65
NPU27N		97.21	-2.57	-1.28	104.53	0.92	0.46
P3W49G		102.10	2.32	1.16	101.80	-1.81	-0.90
PF6QFT	*	94.68	-5.10	-2.54	103.10	-0.51	-0.25
PVULKA		96.60	-3.18	-1.58	102.10	-1.51	-0.75
PZT6ZA		98.40	-1.38	-0.69	104.00	0.39	0.20
QDM7X3	*	97.70	-2.08	-1.03	98.30	-5.31	-2.66



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 130

Tensile Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QKEJTP		99.80	0.02	0.01	102.10	-1.51	-0.75
R6AKER		101.27	1.49	0.74	102.56	-1.05	-0.53
RHLKY4		99.06	-0.72	-0.36	108.07	4.46	2.23
TRJ29Z	X	81.10	-18.68	-9.29	85.80	-17.81	-8.91
TZH849		102.25	2.47	1.23	103.70	0.09	0.05
U3H3F3		102.46	2.68	1.33	101.27	-2.34	-1.17
U4TF6C		97.70	-2.08	-1.03	104.62	1.01	0.50
U7YL7Y		99.21	-0.57	-0.28	104.00	0.39	0.20
U943PN	X	106.75	6.97	3.47	105.01	1.40	0.70
UJ4XLY	X	88.67	-11.11	-5.53	93.46	-10.15	-5.08
UJNE22		98.07	-1.71	-0.85	102.69	-0.92	-0.46
UTUA47		99.40	-0.38	-0.19	103.20	-0.41	-0.20
W3TGHA		101.38	1.60	0.80	103.70	0.09	0.05
W7GLLE		99.79	0.01	0.00	106.46	2.85	1.43
WA8QU4		97.64	-2.14	-1.07	104.94	1.33	0.67
WCHFMG		100.80	1.02	0.51	106.30	2.69	1.35
WHKQCL	X	93.70	-6.08	-3.02	100.40	-3.21	-1.61
WMGBKC		98.63	-1.15	-0.57	103.27	-0.34	-0.17
XAQ9PH		98.30	-1.48	-0.74	106.00	2.39	1.20
XG73NL		100.07	0.29	0.15	103.94	0.33	0.17
XUFKLF		101.09	1.31	0.65	105.44	1.84	0.92
XV7CA2		98.49	-1.29	-0.64	105.57	1.97	0.98
Y69X3L		100.00	0.22	0.11	104.00	0.39	0.20
Y8DRFW		100.00	0.22	0.11	105.00	1.39	0.70
YCVENP		97.22	-2.56	-1.27	104.34	0.73	0.36
YG727F		100.60	0.82	0.41	105.00	1.39	0.70
Z8BH6C		97.23	-2.54	-1.27	102.54	-1.07	-0.53
ZDGYUZ		102.10	2.32	1.16	104.55	0.94	0.47
ZHXXAK	*	98.50	-1.28	-0.64	97.60	-6.01	-3.01
ZLBP9Z		100.00	0.22	0.11	106.00	2.39	1.20
ZWDDFK		101.96	2.18	1.09	100.17	-3.44	-1.72

Summary Statistics

	Sample F55		Sample F56	
Grand Means	99.78	ksi	103.61	ksi
Stnd Dev Btwn Labs	2.01	ksi	2.00	ksi

Samples F55, F56 : AISI 4130 - 12G, AISI 4130 - 14G

Statistics based on 117 of 125 reporting participants



Comments on Assigned Data Flags for Test #130

3NV9CV (X) - Data for sample F56 are high.

9B3FAU (X) - Extreme data.

GLYXHA (X) - Data for sample F55 are high.

H9PN86 (X) - Data for sample F55 are high.

TRJ29Z (X) - Data for both samples are very low.

U943PN (X) - Data for sample F55 are high.

UJ4XLY (X) - Data for both samples are low.

WHKQCL (X) - Data for sample F55 are low.



Analysis 130

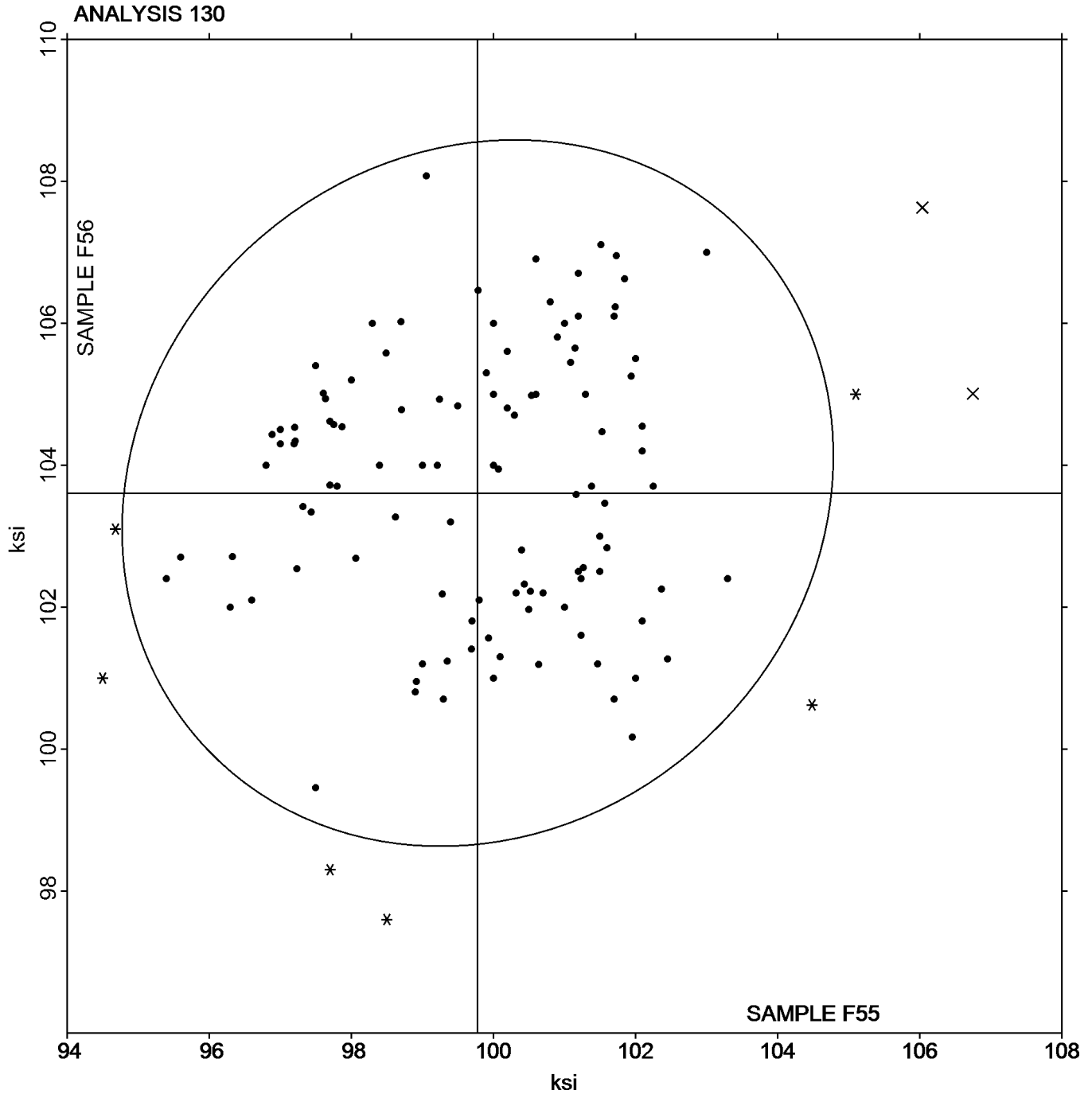
Tensile Strength: Lab-Machined Flat Steel
ASTM E8

SAMPLE F55

99.78 ksi

SAMPLE F56

103.61 ksi





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 131

Yield Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2ERDL7		83.20	-4.00	-1.37	90.40	0.20	0.06
2FXPBU		83.60	-3.60	-1.23	89.90	-0.30	-0.09
2PT3U9		92.80	5.60	1.91	89.00	-1.20	-0.38
2XJ8NP		90.70	3.50	1.19	92.80	2.60	0.82
32XBPQ		88.30	1.10	0.37	95.40	5.20	1.63
379Y6Y	X	93.13	5.92	2.02	56.64	-33.56	-10.54
3C2VEJ		89.24	2.04	0.70	88.76	-1.43	-0.45
3JZUUU		85.34	-1.86	-0.64	90.72	0.52	0.16
3NV9CV		90.35	3.15	1.07	96.10	5.90	1.85
3UKQNL		83.85	-3.35	-1.14	91.68	1.48	0.47
3XFWCH		86.72	-0.48	-0.17	86.44	-3.76	-1.18
3YUUT2		89.90	2.70	0.92	90.80	0.60	0.19
48PA27		89.55	2.35	0.80	89.94	-0.26	-0.08
4BHDMX		85.94	-1.27	-0.43	88.84	-1.36	-0.43
4GNJDG		87.70	0.50	0.17	87.20	-3.00	-0.94
4HGLRJ		85.70	-1.50	-0.51	92.60	2.40	0.75
4JBAAE		88.30	1.10	0.37	91.17	0.97	0.31
4T4DMN	*	93.00	5.80	1.98	84.52	-5.68	-1.78
6DNFUE		88.30	1.10	0.37	87.90	-2.30	-0.72
6PWFQM		88.33	1.12	0.38	90.21	0.02	0.01
7GJZ7W		88.20	1.00	0.34	88.70	-1.50	-0.47
7NWYRU		84.50	-2.70	-0.92	84.90	-5.30	-1.66
7PZTVF		91.10	3.90	1.33	92.00	1.80	0.57
7RJUVT		86.62	-0.59	-0.20	91.56	1.37	0.43
7YFB6T		82.44	-4.76	-1.62	91.23	1.03	0.32
8CXHGJ		87.90	0.70	0.24	87.90	-2.30	-0.72
8NAUNM		88.00	0.80	0.27	88.20	-2.00	-0.63
8RWEVC		83.21	-4.00	-1.36	89.27	-0.92	-0.29
8VAET3		90.92	3.72	1.27	89.97	-0.23	-0.07
9B3FAU		87.98	0.78	0.26	91.38	1.18	0.37
9KCMA4		83.83	-3.37	-1.15	91.37	1.18	0.37
9P896D		84.00	-3.20	-1.09	92.00	1.80	0.57
9XHNKZ		83.44	-3.76	-1.28	84.51	-5.68	-1.78
A3CGBE		90.84	3.64	1.24	93.91	3.71	1.16
AGTDTW		91.46	4.26	1.45	92.17	1.97	0.62
BWWWKE		89.40	2.20	0.75	93.80	3.60	1.13
BZLNXB		86.59	-0.62	-0.21	86.44	-3.75	-1.18
CPX4A6		92.06	4.86	1.66	95.75	5.56	1.74
CYZQTN		87.27	0.07	0.02	88.24	-1.96	-0.61
CZNLQ	*	81.40	-5.80	-1.98	81.90	-8.30	-2.61
DECCZL		83.56	-3.65	-1.24	89.05	-1.14	-0.36
DVA3WA		87.40	0.19	0.07	87.05	-3.15	-0.99
DVXZ8V		91.20	4.00	1.36	90.70	0.50	0.16
E22ZT4		86.14	-1.07	-0.36	87.59	-2.61	-0.82
ECEW2N		85.28	-1.92	-0.66	91.08	0.89	0.28
EP48RL		83.22	-3.99	-1.36	90.30	0.10	0.03
EW3FUL		82.82	-4.39	-1.50	89.49	-0.71	-0.22



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 131

Yield Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
F36ZGH		84.10	-3.10	-1.06	89.50	-0.70	-0.22
F9DCJA	X	86.60	-0.60	-0.21	76.40	-13.80	-4.33
F9WKMP		87.30	0.10	0.03	95.10	4.90	1.54
FFC23Z		85.40	-1.80	-0.62	87.20	-3.00	-0.94
FRNDA3		87.00	-0.20	-0.07	89.90	-0.30	-0.09
FXT234		88.62	1.41	0.48	87.36	-2.84	-0.89
G2F8KK		88.91	1.71	0.58	89.38	-0.82	-0.26
G4ZJYF		89.80	2.60	0.89	92.20	2.00	0.63
GBXGMD		88.40	1.20	0.41	87.20	-3.00	-0.94
GKMLVJ	*	81.20	-6.00	-2.05	94.40	4.20	1.32
GLXZ8E		86.20	-1.01	-0.34	88.14	-2.06	-0.65
GLYXHA		89.50	2.30	0.78	89.70	-0.50	-0.16
GUVN8Q		84.20	-3.00	-1.02	93.00	2.80	0.88
GY7Y37		81.80	-5.40	-1.84	87.55	-2.65	-0.83
H67M9D		86.30	-0.90	-0.31	94.40	4.20	1.32
H9PN86	X	103.60	16.40	5.59	89.37	-0.83	-0.26
HCLB2T		91.30	4.10	1.40	88.69	-1.51	-0.47
HDYH2L		83.70	-3.50	-1.20	85.20	-5.00	-1.57
HNE3CP		86.30	-0.90	-0.31	92.00	1.80	0.57
HVJQ6Q		87.00	-0.20	-0.07	92.90	2.70	0.85
HZXPX		88.20	1.00	0.34	93.30	3.10	0.97
JDZN42		86.00	-1.20	-0.41	83.00	-7.20	-2.26
JKXKPJ		92.20	5.00	1.70	88.60	-1.60	-0.50
K2TYFQ		85.50	-1.70	-0.58	89.30	-0.90	-0.28
K2X8WQ		89.00	1.80	0.61	93.30	3.10	0.97
K8NG9B		91.60	4.40	1.50	91.40	1.20	0.38
L42G4E		86.90	-0.30	-0.10	93.50	3.30	1.04
LMD3XA		86.60	-0.60	-0.21	91.10	0.90	0.28
LNNY6Y		91.95	4.75	1.62	91.52	1.32	0.42
M38VC9		92.20	5.00	1.70	88.60	-1.60	-0.50
MA3JWY		86.86	-0.35	-0.12	92.33	2.14	0.67
MFCCX4		90.50	3.30	1.13	94.71	4.51	1.42
MMRVFH	X	96.00	8.80	3.00	97.50	7.30	2.29
MPE4CH		87.60	0.40	0.13	84.70	-5.50	-1.73
NB9ZDN		85.60	-1.60	-0.55	93.10	2.90	0.91
NJ9H8L		89.10	1.90	0.65	88.30	-1.90	-0.60
NMLMGZ		87.30	0.10	0.03	95.90	5.70	1.79
NPU27N		85.83	-1.37	-0.47	93.27	3.08	0.97
P3W49G		90.20	3.00	1.02	88.70	-1.50	-0.47
PF6QFT	X	33.00	-54.20	-18.49	45.00	-45.20	-14.19
PVULKA		83.00	-4.20	-1.43	88.50	-1.70	-0.53
PZT6ZA		83.50	-3.70	-1.26	89.40	-0.80	-0.25
QDM7X3		88.10	0.90	0.31	85.00	-5.20	-1.63
QKEJTP		85.90	-1.30	-0.44	88.30	-1.90	-0.60
R6AKER		87.81	0.60	0.21	87.76	-2.43	-0.76
RHLKY4		84.60	-2.60	-0.89	94.94	4.74	1.49
TRJ29Z	X	99.50	12.30	4.19	103.00	12.80	4.02



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 131

Yield Strength: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
TZH849		88.47	1.27	0.43	89.92	-0.27	-0.09
U3H3F3		89.75	2.55	0.87	85.79	-4.41	-1.38
U4TF6C		87.42	0.21	0.07	93.01	2.82	0.88
U7YL7Y	*	93.02	5.82	1.98	98.39	8.19	2.57
U943PN	X	100.51	13.31	4.54	93.99	3.79	1.19
UJ4XLY		86.61	-0.59	-0.20	90.98	0.78	0.25
UJNE22		84.11	-3.09	-1.05	87.78	-2.41	-0.76
UTUA47	*	81.30	-5.90	-2.01	82.60	-7.60	-2.39
W3TGHA		89.63	2.43	0.83	89.92	-0.27	-0.09
W7GLLE	X	95.87	8.67	2.96	102.83	12.63	3.97
WA8QU4		84.56	-2.65	-0.90	86.98	-3.22	-1.01
WCHFMG		87.20	0.00	0.00	93.60	3.40	1.07
WHKQCL		80.20	-7.00	-2.39	86.10	-4.10	-1.29
WMGBKC		84.41	-2.79	-0.95	89.63	-0.56	-0.18
XAQ9PH		86.00	-1.20	-0.41	93.10	2.90	0.91
XG73NL		88.20	1.00	0.34	91.20	1.00	0.31
XUFKLF		88.76	1.56	0.53	93.41	3.21	1.01
XV7CA2		87.07	-0.14	-0.05	92.63	2.43	0.76
Y69X3L		90.00	2.80	0.95	97.00	6.80	2.14
Y8DRFW		86.00	-1.20	-0.41	90.00	-0.20	-0.06
YCVENP		84.12	-3.08	-1.05	91.51	1.31	0.41
YG727F		89.00	1.80	0.61	91.20	1.00	0.31
Z8BH6C		85.83	-1.37	-0.47	91.20	1.00	0.31
ZDGYUZ		92.87	5.67	1.93	93.56	3.36	1.06
ZHXXAK		87.80	0.60	0.20	86.00	-4.20	-1.32
ZLBP9Z		88.20	1.00	0.34	93.10	2.90	0.91
ZWDDFK		88.83	1.63	0.56	86.49	-3.71	-1.17

Summary Statistics

	Sample F55		Sample F56	
Grand Means	87.20	ksi	90.20	ksi
Std Dev Btwn Labs	2.93	ksi	3.18	ksi

Samples F55, F56 : AISI 4130 - 12G, AISI 4130 - 14G

Statistics based on 113 of 121 reporting participants



Comments on Assigned Data Flags for Test #131

379Y6Y (X) - Data for sample F56 are low.

F9DCJA (X) - Data for sample F56 are low.

H9PN86 (X) - Data for sample F55 are high.

MMRVFH (X) - Data for sample F55 are high.

PF6QFT (X) - Data for both samples are very low.

TRJ29Z (X) - Data for both samples are high.

U943PN (X) - Data for sample F55 are high.

W7GLLE (X) - Data for both samples are high.



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 131

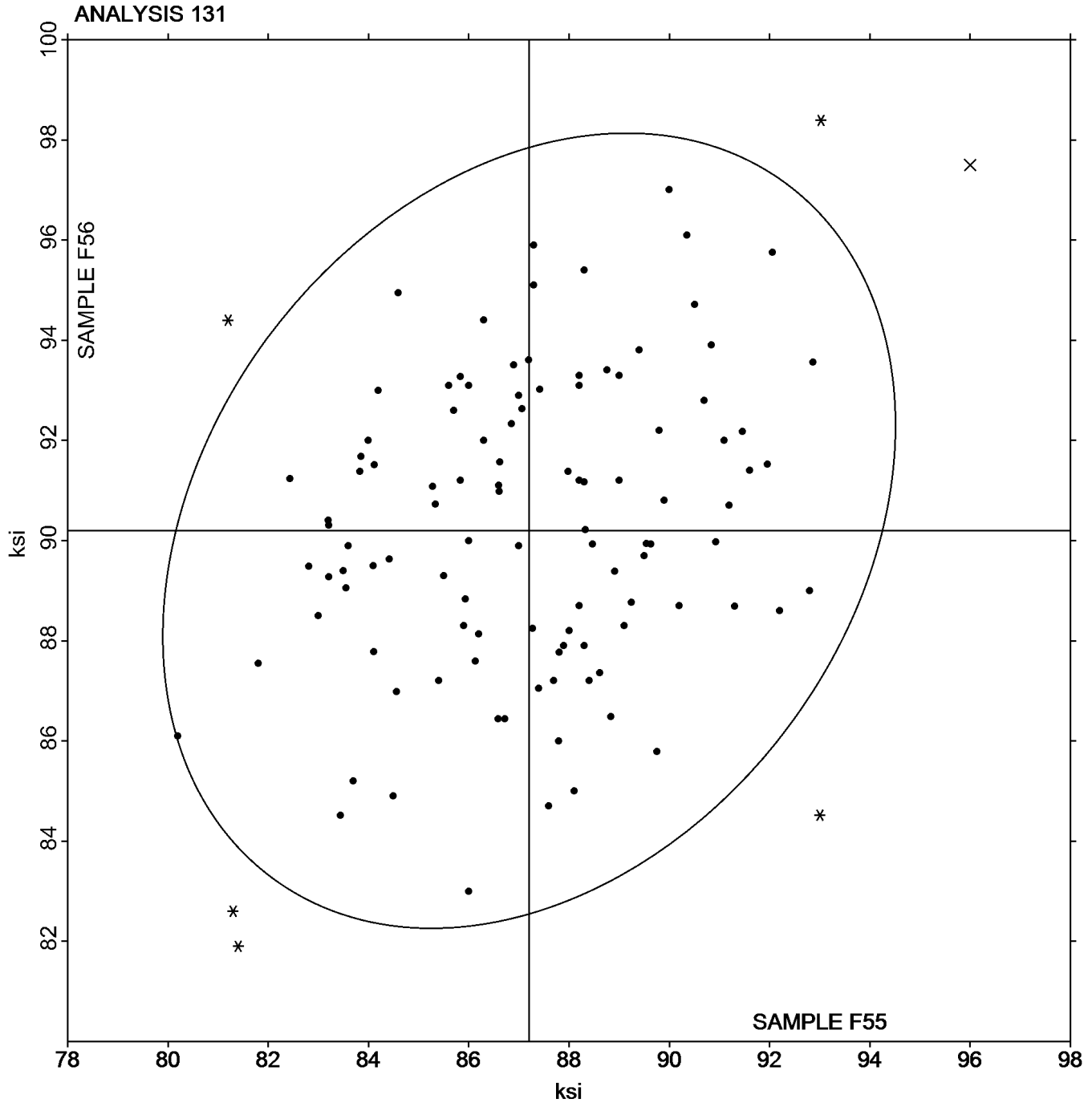
Yield Strength: Lab-Machined Flat Steel
ASTM E8

SAMPLE F55

87.20 ksi

SAMPLE F56

90.20 ksi





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 132

Elongation: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2ERDL7		15.10	-0.16	-0.11	13.40	-1.13	-0.81
2FXPBU		15.35	0.09	0.06	13.20	-1.33	-0.95
2PT3U9		13.50	-1.76	-1.14	15.40	0.87	0.63
2XJ8NP		14.50	-0.76	-0.49	13.50	-1.03	-0.74
32XB PQ		12.00	-3.26	-2.11	12.95	-1.58	-1.13
379Y6Y		12.50	-2.76	-1.78	13.00	-1.53	-1.10
3C2VEJ		16.44	1.18	0.76	14.94	0.41	0.30
3JZUUU		16.70	1.44	0.93	14.30	-0.23	-0.16
3NV9CV		16.50	1.24	0.80	13.50	-1.03	-0.74
3UKQNL		17.30	2.04	1.31	14.10	-0.43	-0.31
3XFWCH		14.60	-0.66	-0.43	15.60	1.07	0.77
3YUUT2		12.70	-2.56	-1.65	13.00	-1.53	-1.10
48PA27		16.51	1.25	0.80	15.78	1.25	0.90
4BHDMX		15.50	0.24	0.15	15.00	0.47	0.34
4GNJDG	*	14.20	-1.06	-0.69	17.10	2.57	1.85
4HGLRJ		16.30	1.04	0.67	14.50	-0.03	-0.02
4JBAAE		16.70	1.44	0.93	16.40	1.87	1.35
4T4DMN		13.60	-1.66	-1.07	15.30	0.77	0.55
6DNFUE		14.90	-0.36	-0.23	13.80	-0.73	-0.52
6PWFQM		17.00	1.74	1.12	17.60	3.07	2.21
7GJZ7W		15.10	-0.16	-0.11	13.30	-1.23	-0.88
7NWYRU		14.30	-0.96	-0.62	14.90	0.37	0.27
7PZTVF		14.50	-0.76	-0.49	14.50	-0.03	-0.02
7RJUVT		15.90	0.64	0.41	14.10	-0.43	-0.31
7RYZRR		15.00	-0.26	-0.17	16.67	2.14	1.54
7YFB6T	X	20.00	4.74	3.05	15.00	0.47	0.34
8CXHGJ		17.25	1.99	1.28	16.40	1.87	1.35
8NAUNM	*	11.80	-3.46	-2.23	11.00	-3.53	-2.53
8RWEVC		14.70	-0.56	-0.36	14.80	0.27	0.20
8VAET3		16.30	1.04	0.67	16.00	1.47	1.06
8YAFYR		13.94	-1.32	-0.85	13.76	-0.77	-0.55
9B3FAU		13.82	-1.44	-0.93	13.28	-1.25	-0.90
9KCMA4		18.60	3.34	2.15	15.60	1.07	0.77
9XHNKZ		14.00	-1.26	-0.82	15.20	0.67	0.48
A3CGBE		14.00	-1.26	-0.82	13.70	-0.83	-0.59
AGTDTW		15.50	0.24	0.15	15.90	1.37	0.99
AW4PTN	X	20.20	4.94	3.18	18.38	3.85	2.77
BBVWFN	X	15.00	-0.26	-0.17	10.00	-4.53	-3.25
BWWWKE		15.00	-0.26	-0.17	14.00	-0.53	-0.38
BZLNXB		12.00	-3.26	-2.11	14.00	-0.53	-0.38
CPX4A6		14.60	-0.66	-0.43	12.40	-2.13	-1.53
CYZQTN		15.20	-0.06	-0.04	15.10	0.57	0.41
CZNL DQ		14.50	-0.76	-0.49	14.20	-0.33	-0.24
DECCZL		16.10	0.84	0.54	15.80	1.27	0.91
DVA3WA		15.20	-0.06	-0.04	15.00	0.47	0.34
DVXZ8V		15.50	0.24	0.15	15.50	0.97	0.70
E22ZT4		15.00	-0.26	-0.17	14.98	0.45	0.33



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 132

Elongation: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
ECEW2N		17.58	2.32	1.49	14.60	0.07	0.05
EP48RL		18.00	2.74	1.76	16.00	1.47	1.06
EW3FUL		16.70	1.44	0.93	14.40	-0.13	-0.09
F36ZGH		16.50	1.24	0.80	15.50	0.97	0.70
F9DCJA	X	8.700	-6.56	-4.23	11.20	-3.33	-2.39
F9WKMP	X	17.80	2.54	1.64	12.00	-2.53	-1.82
FFC23Z		14.70	-0.56	-0.36	15.00	0.47	0.34
FRNDA3		16.90	1.64	1.05	14.80	0.27	0.20
FXT234		12.72	-2.54	-1.64	14.82	0.29	0.21
G2F8KK		15.78	0.52	0.33	15.61	1.08	0.78
G4ZJYF		16.00	0.74	0.47	14.00	-0.53	-0.38
GBXGMD		15.60	0.34	0.22	14.10	-0.43	-0.31
GKMLVJ	X	21.00	5.74	3.70	18.00	3.47	2.49
GLXZ8E		17.00	1.74	1.12	16.10	1.57	1.13
GLYXHA		16.30	1.04	0.67	15.20	0.67	0.48
GUVN8Q		16.40	1.14	0.73	13.60	-0.93	-0.67
GY7Y37		15.22	-0.04	-0.03	13.72	-0.81	-0.58
H67M9D		17.20	1.94	1.25	15.50	0.97	0.70
H9PN86		12.33	-2.94	-1.90	13.33	-1.20	-0.86
HCLB2T		13.60	-1.66	-1.07	15.70	1.17	0.84
HDYH2L		16.05	0.79	0.51	14.70	0.17	0.12
HNE3CP		17.20	1.94	1.25	15.00	0.47	0.34
HVJQ6Q		16.10	0.84	0.54	14.70	0.17	0.12
HZXPRX		15.00	-0.26	-0.17	13.30	-1.23	-0.88
JDZN42	X	18.90	3.64	2.34	19.30	4.77	3.43
JKXKPJ		14.60	-0.66	-0.43	15.20	0.67	0.48
K2TYFQ		15.30	0.04	0.02	15.00	0.47	0.34
K2X8WQ		15.70	0.44	0.28	17.00	2.47	1.78
K8NG9B		16.25	0.99	0.64	16.75	2.22	1.60
L42G4E		15.00	-0.26	-0.17	14.00	-0.53	-0.38
LMD3XA		18.15	2.89	1.86	16.95	2.42	1.74
LNNY6Y		12.00	-3.26	-2.11	12.00	-2.53	-1.82
M38VC9		15.10	-0.16	-0.11	14.50	-0.03	-0.02
MA3JWY		14.70	-0.56	-0.36	14.57	0.04	0.03
MFCCX4		13.20	-2.06	-1.33	12.20	-2.33	-1.67
MMRVFH		14.00	-1.26	-0.82	14.00	-0.53	-0.38
MPE4CH		12.70	-2.56	-1.65	14.40	-0.13	-0.09
NB9ZDN		16.70	1.44	0.93	13.70	-0.83	-0.59
NJ9H8L		17.50	2.24	1.44	16.00	1.47	1.06
NMLMGZ		15.40	0.14	0.09	14.50	-0.03	-0.02
NPU27N		12.80	-2.46	-1.59	12.10	-2.43	-1.74
P3W49G		16.10	0.84	0.54	16.40	1.87	1.35
PF6QFT		12.70	-2.56	-1.65	11.30	-3.23	-2.32
PVULKA		17.00	1.74	1.12	15.50	0.97	0.70
PZT6ZA		17.00	1.74	1.12	15.00	0.47	0.34
QDM7X3	X	5.000	-10.26	-6.62	7.860	-6.67	-4.79
QKEJTP		15.10	-0.16	-0.11	13.10	-1.43	-1.03



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 132

Elongation: Lab-Machined Flat Steel
ASTM E8

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
R6AKER		14.70	-0.56	-0.36	14.50	-0.03	-0.02
RHLKY4		16.63	1.37	0.88	13.85	-0.68	-0.49
TRJ29Z		17.10	1.84	1.18	15.90	1.37	0.99
TZH849	X	9.000	-6.26	-4.04	15.00	0.47	0.34
U3H3F3		14.40	-0.86	-0.56	15.80	1.27	0.91
U4TF6C		16.60	1.34	0.86	15.00	0.47	0.34
U7YL7Y	*	12.30	-2.96	-1.91	10.30	-4.23	-3.04
U943PN		15.54	0.28	0.18	14.26	-0.27	-0.19
UJ4XLY		16.68	1.42	0.91	15.49	0.96	0.69
UJNE22		14.11	-1.16	-0.75	12.66	-1.87	-1.34
UTUA47		15.10	-0.16	-0.11	16.00	1.47	1.06
W3TGHA		13.40	-1.86	-1.20	12.80	-1.73	-1.24
WA8QU4	X	9.000	-6.26	-4.04	8.000	-6.53	-4.69
WCHFMG		17.50	2.24	1.44	16.00	1.47	1.06
WHKQCL		18.90	3.64	2.34	16.60	2.07	1.49
WMGBKC		14.50	-0.76	-0.49	13.80	-0.73	-0.52
XAQ9PH		15.80	0.54	0.35	14.10	-0.43	-0.31
XG73NL		13.90	-1.36	-0.88	13.20	-1.33	-0.95
XUFKLF		16.00	0.74	0.47	14.00	-0.53	-0.38
XV7CA2		13.91	-1.35	-0.87	12.15	-2.38	-1.71
Y69X3L		14.00	-1.26	-0.82	12.00	-2.53	-1.82
Y8DRFW		16.00	0.74	0.47	15.00	0.47	0.34
YCVENP		17.60	2.34	1.51	17.20	2.67	1.92
YG727F		14.80	-0.46	-0.30	12.70	-1.83	-1.31
Z8BH6C		14.80	-0.46	-0.30	12.90	-1.63	-1.17
ZDGYUZ		14.22	-1.04	-0.67	13.80	-0.73	-0.52
ZHXXAK		15.40	0.14	0.09	15.10	0.57	0.41
ZLBP9Z		15.40	0.14	0.09	14.20	-0.33	-0.24
ZWDDFK		16.00	0.74	0.47	16.00	1.47	1.06

Summary Statistics

	Sample F55		Sample F56	
Grand Means	15.26	Percent	14.53	Percent
Stnd Dev Btwn Labs	1.55	Percent	1.39	Percent

Samples F55, F56 : AISI 4130 - 12G, AISI 4130 - 14G

Statistics based on 113 of 123 reporting participants



Comments on Assigned Data Flags for Test #132

- 7YFB6T (X) - Data for sample F55 are high.
- AW4PTN (X) - Data for both samples are high.
- BBVWFN (X) - Data for sample F56 are low.
- F9DCJA (X) - Data for sample F55 are low.
- F9WKMP (X) - Inconsistent in testing between samples.
- GKMLVJ (X) - Data for sample F55 are high.
- JDZN42 (X) - Data for sample F56 are high.
- QDM7X3 (X) - Data for both samples are low.
- TZH849 (X) - Data for sample F55 are low.
- WA8QU4 (X) - Data for both samples are low.



Analysis 132

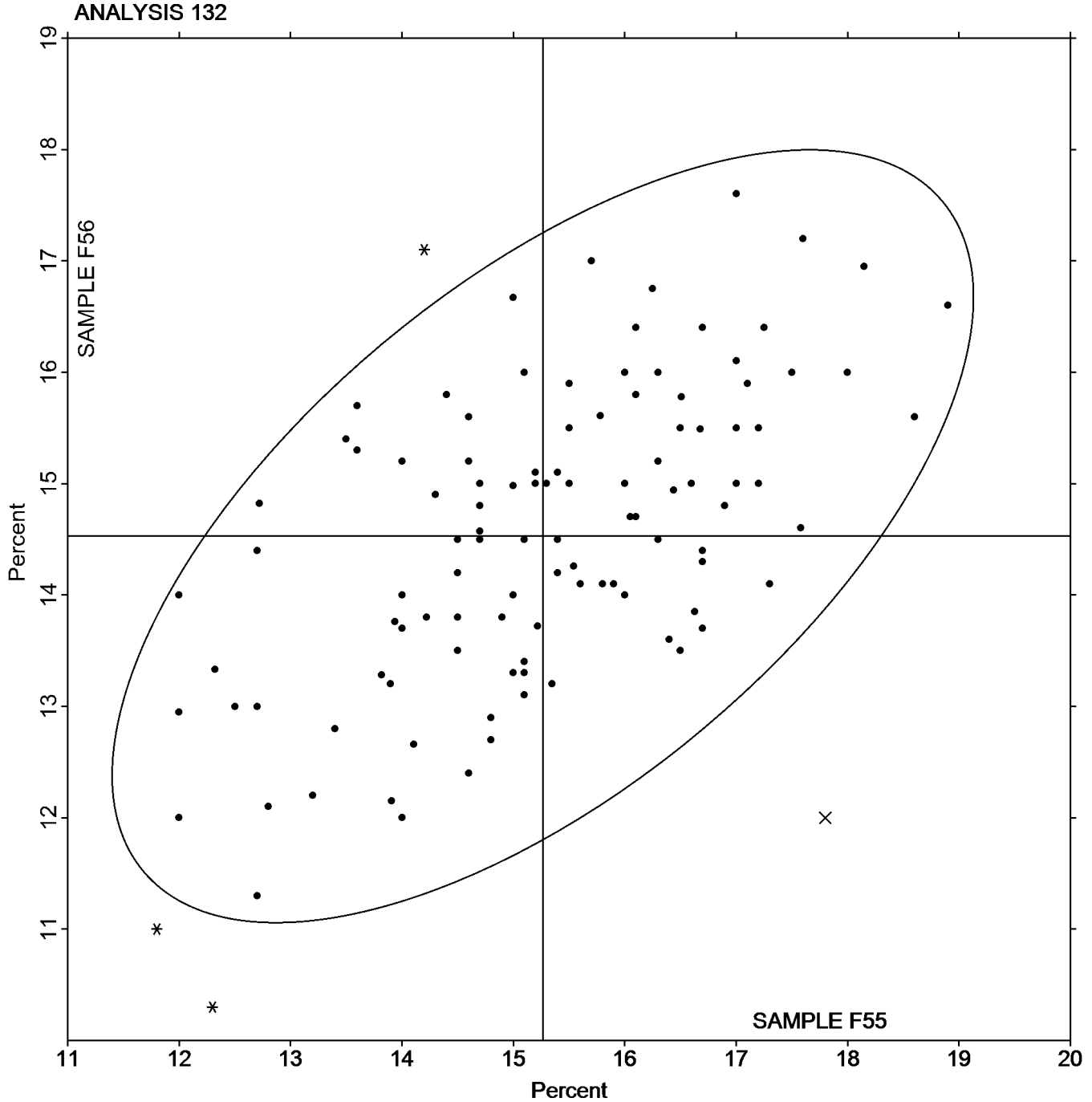
Elongation: Lab-Machined Flat Steel
ASTM E8

SAMPLE F55

15.26 Percent

SAMPLE F56

14.53 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 133

r-Value: Lab-Machined Flat Steel
ASTM E517

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2PT3U9		0.6960	-0.0055	-0.03	0.6580	-0.0188	-0.12
3UKQNL	M	0.4500	-0.2515	-1.55	No Data Reported		
4GNJDG	*	0.3110	-0.3905	-2.41	0.9220	0.2452	1.55
AGTDTW		0.5500	-0.1515	-0.93	0.4700	-0.2068	-1.31
CPX4A6		0.6300	-0.0715	-0.44	0.6100	-0.0668	-0.42
CYZQTN		0.7580	0.0565	0.35	0.7730	0.0962	0.61
CZNLQ		0.5020	-0.1995	-1.23	0.5020	-0.1748	-1.11
DVA3WA		0.7250	0.0235	0.14	0.6850	0.0082	0.05
DVXZ8V		0.6800	-0.0215	-0.13	0.7000	0.0232	0.15
F9WKMP	X	56.40	55.6985	343.67	54.50	53.8232	340.79
G2F8KK		0.7590	0.0575	0.35	0.7730	0.0962	0.61
HCLB2T		0.8300	0.1285	0.79	0.7600	0.0832	0.53
K2X8WQ		0.8370	0.1355	0.84	0.7530	0.0762	0.48
MA3JWY		0.5379	-0.1636	-1.01	0.4489	-0.2279	-1.44
MFCCX4		0.9500	0.2485	1.53	0.8600	0.1832	1.16
NB9ZDN	M	0.4640	-0.2375	-1.47	No Data Reported		
NJ9H8L		0.8800	0.1785	1.10	0.7700	0.0932	0.59
RHLKY4		0.4860	-0.2155	-1.33	0.3960	-0.2808	-1.78
TZH849	X	1.251	0.5495	3.39	2.006	1.3292	8.42
U4TF6C		0.7800	0.0785	0.48	0.6000	-0.0768	-0.49
UJNE22		0.7270	0.0255	0.16	0.9900	0.3132	1.98
WMGBKC		0.9580	0.2565	1.58	0.6070	-0.0698	-0.44
XUFKLF		0.7550	0.0535	0.33	0.7850	0.1082	0.69
XV7CA2		0.7900	0.0885	0.55	0.6600	-0.0168	-0.11
YCVENP		0.5900	-0.1115	-0.69	0.4900	-0.1868	-1.18

Summary Statistics

	Sample F55	Sample F56
Grand Means	0.7015	0.6768
Stnd Dev Btwn Labs	0.1621	0.1579

Samples F55, F56 : AISI 4130 - 12G, AISI 4130 - 14G

Statistics based on 21 of 25 reporting participants

Comments on Assigned Data Flags for Test #133

- 3UKQNL (M) - Participant did not submit data for sample F56.
- F9WKMP (X) - Extreme data.
- NB9ZDN (M) - Participant did not submit data for sample F56.
- TZH849 (X) - Data for both samples are high.



Analysis 133

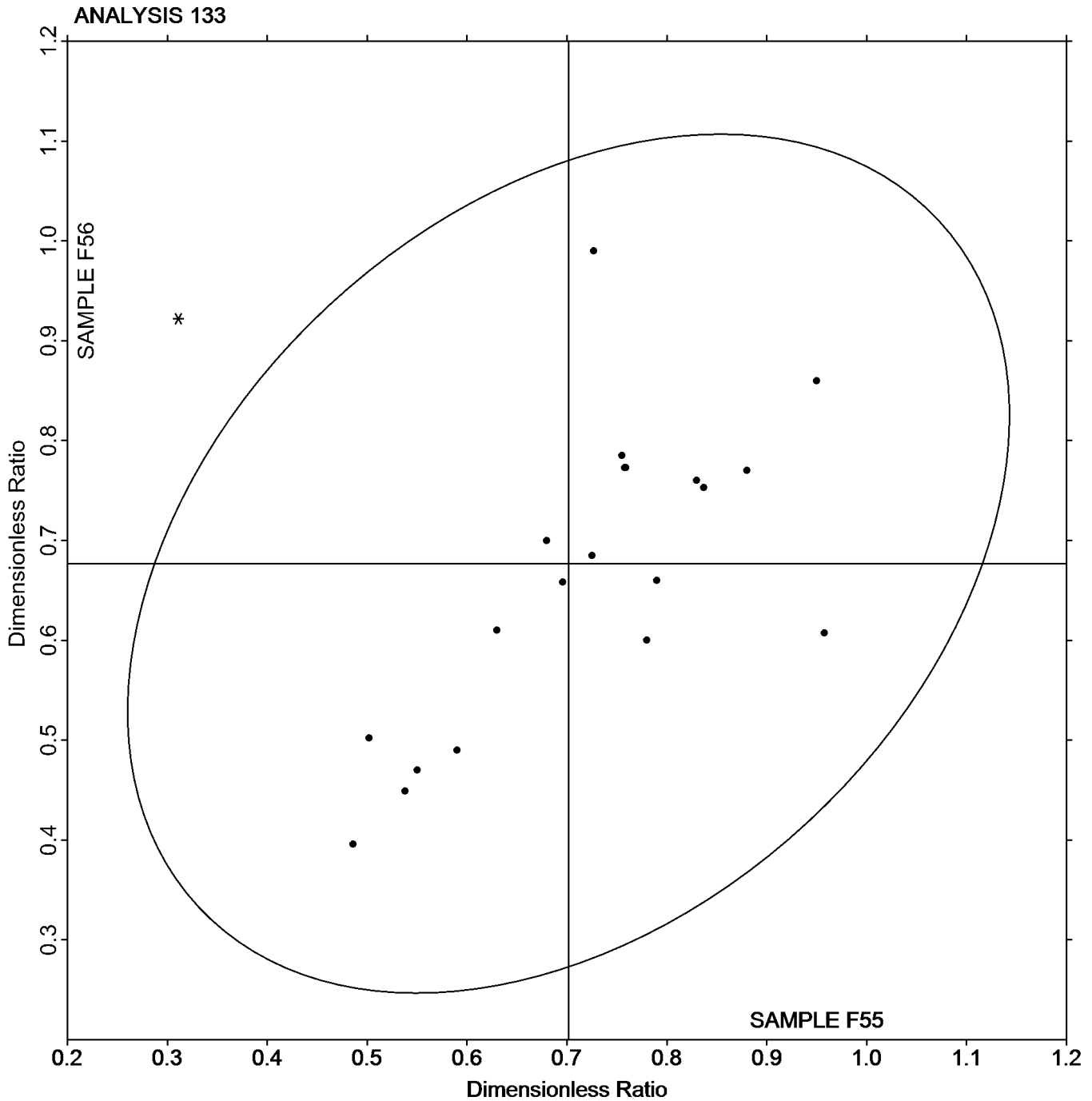
r-Value: Lab-Machined Flat Steel
ASTM E517

SAMPLE F55

SAMPLE F56

0.7015

0.6768





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 134

n-Value: Lab-Machined Flat Steel
ASTM E646

WebCode	Data Flag	Sample F55			Sample F56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2PT3U9		0.0480	0.0027	0.29	0.0600	0.0132	2.05
3C2VEJ		0.0382	-0.0071	-0.78	0.0484	0.0016	0.25
3JZUUU		0.0500	0.0047	0.51	0.0480	0.0012	0.19
3UKQNL	X	0.0590	0.0137	1.49	0.00300	-0.0438	-6.79
3XFWCH	X	-0.204600	-0.2499	-27.30	-0.105200	-0.1520	-23.58
6PWFQM	X	0.1206	0.0753	8.22	0.1419	0.0951	14.76
9XHNKZ	X	0.0630	0.0177	1.93	0.0840	0.0372	5.77
AGTDTW		0.0460	0.0007	0.07	0.0490	0.0022	0.34
BZLNXB	*	0.0200	-0.0253	-2.77	0.0400	-0.0068	-1.05
CYZQTN		0.0410	-0.0043	-0.47	0.0490	0.0022	0.34
CZNLQ	X	0.5020	0.4567	49.87	0.5020	0.4552	70.62
DVA3WA		0.0450	-0.0003	-0.04	0.0540	0.0072	1.12
DVXZ8V		0.0310	-0.0143	-1.57	0.0360	-0.0108	-1.67
EW3FUL		0.0470	0.0017	0.18	0.0440	-0.0028	-0.43
GUVN8Q		0.0481	0.0028	0.30	0.0434	-0.0034	-0.53
H67M9D		0.0530	0.0077	0.84	0.0480	0.0012	0.19
HCLB2T	X	0.1500	0.1047	11.43	0.1700	0.1232	19.11
HNE3CP		0.0503	0.0050	0.54	0.0460	-0.0008	-0.12
HZXPX	M	0.0480	0.0027	0.29	No Data Reported		
K2X8WQ		0.0430	-0.0023	-0.25	0.0460	-0.0008	-0.12
K8NG9B	X	0.8950	0.8497	92.79	0.8290	0.7822	121.34
MA3JWY		0.0450	-0.0003	-0.04	0.0430	-0.0038	-0.59
MFCCX4		0.0420	-0.0033	-0.36	0.0390	-0.0078	-1.21
NB9ZDN		0.0540	0.0087	0.95	0.0450	-0.0018	-0.28
NJ9H8L		0.0310	-0.0143	-1.57	0.0400	-0.0068	-1.05
NPU27N		0.0620	0.0167	1.82	0.0616	0.0148	2.30
RHLKY4	X	0.0610	0.0157	1.71	-0.006000	-0.0528	-8.19
TZH849	X	0.1180	0.0727	7.94	0.1080	0.0612	9.50
U3H3F3		0.0440	-0.0013	-0.15	0.0550	0.0082	1.27
U4TF6C		0.0600	0.0147	1.60	0.0540	0.0072	1.12
U943PN	X	0.0201	-0.0252	-2.76	0.0554	0.0086	1.33
UJNE22		0.0460	0.0007	0.07	0.0430	-0.0038	-0.59
W3TGHA		0.0430	-0.0023	-0.25	0.0450	-0.0018	-0.28
WMGBKC		0.0430	-0.0023	-0.25	0.0410	-0.0058	-0.90
XAQ9PH	M	0.0520	0.0067	0.73	No Data Reported		
XUFKLF		0.0430	-0.0023	-0.25	0.0410	-0.0058	-0.90
XV7CA2		0.0440	-0.0013	-0.15	0.0430	-0.0038	-0.59
Y69X3L	X	-2.300000	-2.3453	-256.13	-3.700000	-3.7468	-581.23
YCVENP		0.0610	0.0157	1.71	0.0540	0.0072	1.12

Summary Statistics

	Sample F55	Sample F56
Grand Means	0.0453	0.0468
Std Dev Btwn Labs	0.0092	0.0064

Samples F55, F56 : AISI 4130 - 12G, AISI 4130 - 14G

Statistics based on 26 of 39 reporting participants



Analysis 134

n-Value: Lab-Machined Flat Steel
ASTM E646

Comments on Assigned Data Flags for Test #134

- 3UKQNL (X) - Data for sample F56 are low.
- 3XFWCH (X) - Extreme data.
- 6PWFQM (X) - Data for both samples are high.
- 9XHMKZ (X) - Data for sample F56 are high.
- CZNLQD (X) - Data appear to be off by a factor of ten.
- HCLB2T (X) - Data for both samples are high.
- HZXPX (M) - Participant did not submit data for sample F56.
- K8NG9B (X) - Extreme data.
- RHLKY4 (X) - Data for sample F56 are low.
- TZH849 (X) - Data for both samples are high.
- U943PN (X) - Data for sample F55 are low.
- XAQ9PH (M) - Participant did not submit data for sample F56.
- Y69X3L (X) - Extreme data.



Analysis 134

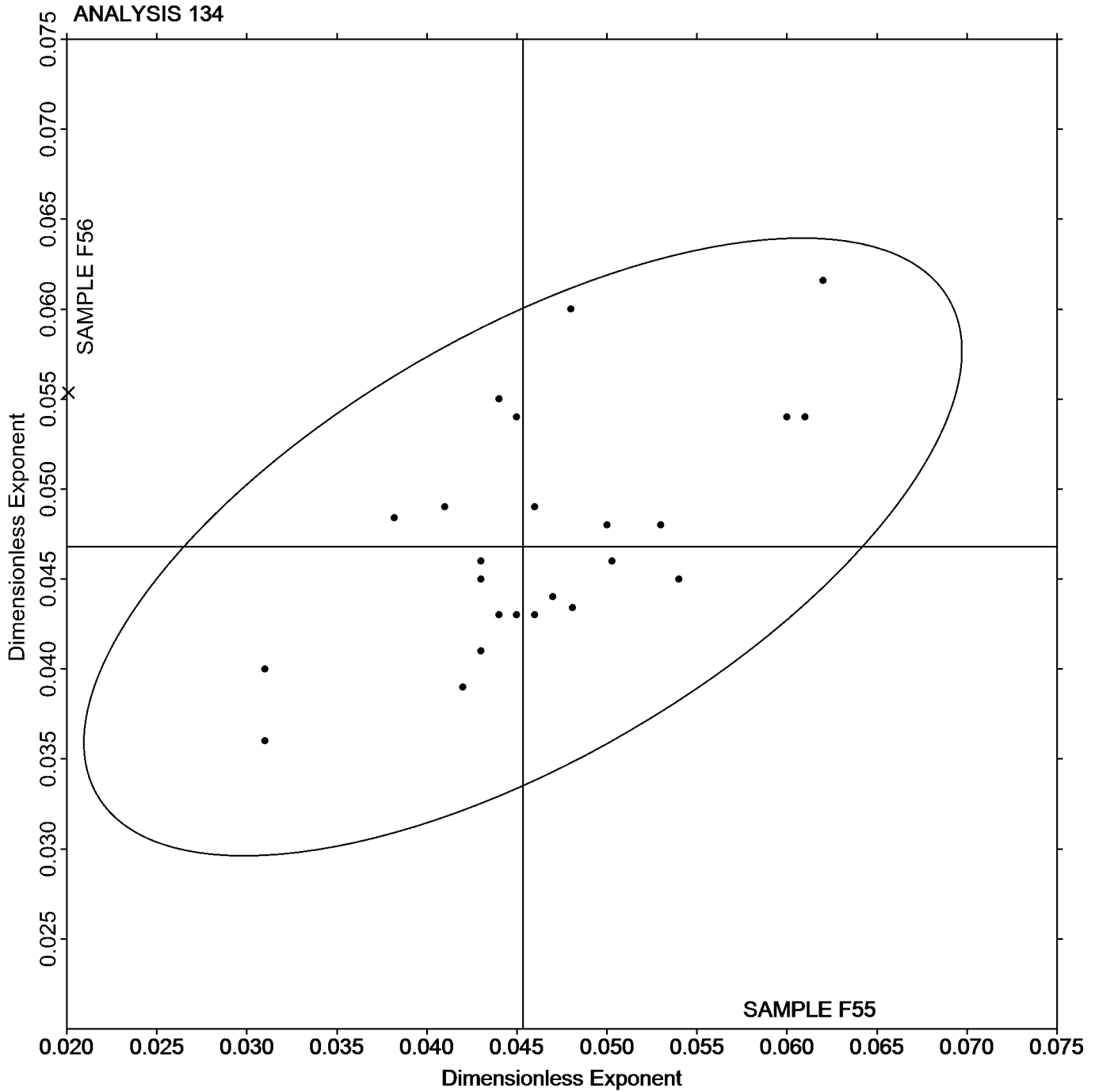
n-Value: Lab-Machined Flat Steel
ASTM E646

SAMPLE F55

0.0453

SAMPLE F56

0.0468





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 136

Rockwell Superficial Hardness (30N Scale)
ASTM E18

WebCode	Data Flag	Sample E55			Sample E56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
28MJKJ	X	76.44	2.98	6.06	74.12	-1.94	-3.78
62VRZZ		73.40	-0.06	-0.12	76.00	-0.06	-0.11
7GJZ7W		73.00	-0.46	-0.93	75.84	-0.22	-0.43
7PZTVF		74.32	0.86	1.75	77.20	1.14	2.23
84BZ3W		73.46	0.00	0.01	76.46	0.40	0.78
88UZHC		73.65	0.19	0.40	76.04	-0.02	-0.04
AGTDTW		73.00	-0.46	-0.93	75.90	-0.16	-0.31
AH2YCQ		73.04	-0.42	-0.85	75.88	-0.18	-0.35
AKAEGB		73.88	0.42	0.86	76.34	0.28	0.55
B6D64A		73.36	-0.10	-0.20	75.38	-0.68	-1.32
BLLQVC		74.22	0.76	1.55	76.50	0.44	0.86
CFQLDR		73.94	0.48	0.98	76.58	0.52	1.02
EE6RM3		73.92	0.46	0.94	76.70	0.64	1.25
EMYAB7		74.06	0.60	1.23	76.56	0.50	0.98
ETNVVD		73.10	-0.36	-0.73	75.23	-0.83	-1.61
EVTJB3		73.20	-0.26	-0.52	75.90	-0.16	-0.31
EVVRGM		73.06	-0.40	-0.81	76.12	0.06	0.12
FCR68U		73.20	-0.26	-0.53	76.09	0.03	0.06
FPJF7M		72.56	-0.90	-1.82	75.20	-0.86	-1.67
FRNDA3		73.20	-0.26	-0.52	75.72	-0.34	-0.66
FWKUQ3		73.04	-0.42	-0.85	75.82	-0.24	-0.46
G2UB2C		73.48	0.02	0.05	75.64	-0.42	-0.82
GUVN8Q	X	73.90	0.44	0.90	74.78	-1.28	-2.49
H67M9D	X	117.80	44.34	90.14	119.00	42.94	83.78
J666UE		73.22	-0.24	-0.48	75.26	-0.80	-1.56
JDZN42		72.58	-0.88	-1.78	75.24	-0.82	-1.60
JWQJJP		72.92	-0.54	-1.09	76.04	-0.02	-0.04
KGTA9A		73.16	-0.30	-0.60	75.84	-0.22	-0.43
KMUUBZ		73.94	0.48	0.98	76.46	0.40	0.79
KN863H		73.30	-0.16	-0.32	75.34	-0.72	-1.40
KPREKY		73.72	0.26	0.53	75.74	-0.32	-0.62
LNNY6Y		73.50	0.04	0.09	76.51	0.45	0.88
LPVJQE		74.00	0.54	1.10	76.50	0.44	0.86
N49KLV		73.70	0.24	0.49	76.42	0.36	0.71
PHBU6F		72.94	-0.52	-1.05	75.10	-0.96	-1.87
PVFMHT		72.86	-0.60	-1.21	75.78	-0.28	-0.54
R2EQJB		73.32	-0.14	-0.28	76.24	0.18	0.35
RPK3HM	*	74.72	1.26	2.57	76.96	0.90	1.76
RW2VV2		73.18	-0.28	-0.56	75.96	-0.10	-0.19
THXG3N		72.84	-0.62	-1.25	75.68	-0.38	-0.74
TQXPVV		73.11	-0.34	-0.70	75.68	-0.37	-0.73
TRZYFC		73.76	0.30	0.62	76.30	0.24	0.47
UGKUX2	X	76.26	2.80	5.70	73.70	-2.36	-4.60
XY4YTG		73.98	0.52	1.06	76.48	0.42	0.82
Y7NRRE		74.32	0.86	1.75	76.84	0.78	1.53
YG727F		73.84	0.38	0.78	76.10	0.04	0.08
YH3TFL		74.00	0.54	1.10	76.58	0.52	1.02



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 136

Rockwell Superficial Hardness (30N Scale)
ASTM E18

WebCode	Data Flag	Sample E55			Sample E56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Z4AA22		73.90	0.44	0.90	76.88	0.82	1.60
ZHXXAK		73.10	-0.36	-0.73	75.64	-0.42	-0.82
ZPYUB6		73.38	-0.08	-0.16	75.66	-0.40	-0.78
ZQ7AKW		73.10	-0.36	-0.73	76.40	0.34	0.67

Summary Statistics

	Sample E55		Sample E56	
Grand Means	73.46	HR30N	76.06	HR30N
Stnd Dev Btwn Labs	0.49	HR30N	0.51	HR30N

Samples E55, E56 : Steel, Steel

Statistics based on 47 of 51 reporting participants

Comments on Assigned Data Flags for Test #136

- 28MJKJ (X) - Data for sample E55 are high and data for sample E56 are low. Inconsistent in testing between samples.
- GUVN8Q (X) - Inconsistent in testing between samples.
- H67M9D (X) - Extreme data.
- UGKUX2 (X) - Data for sample E55 are high and data for sample E56 are low. Inconsistent in testing between samples.



Analysis 136

Rockwell Superficial Hardness (30N Scale)

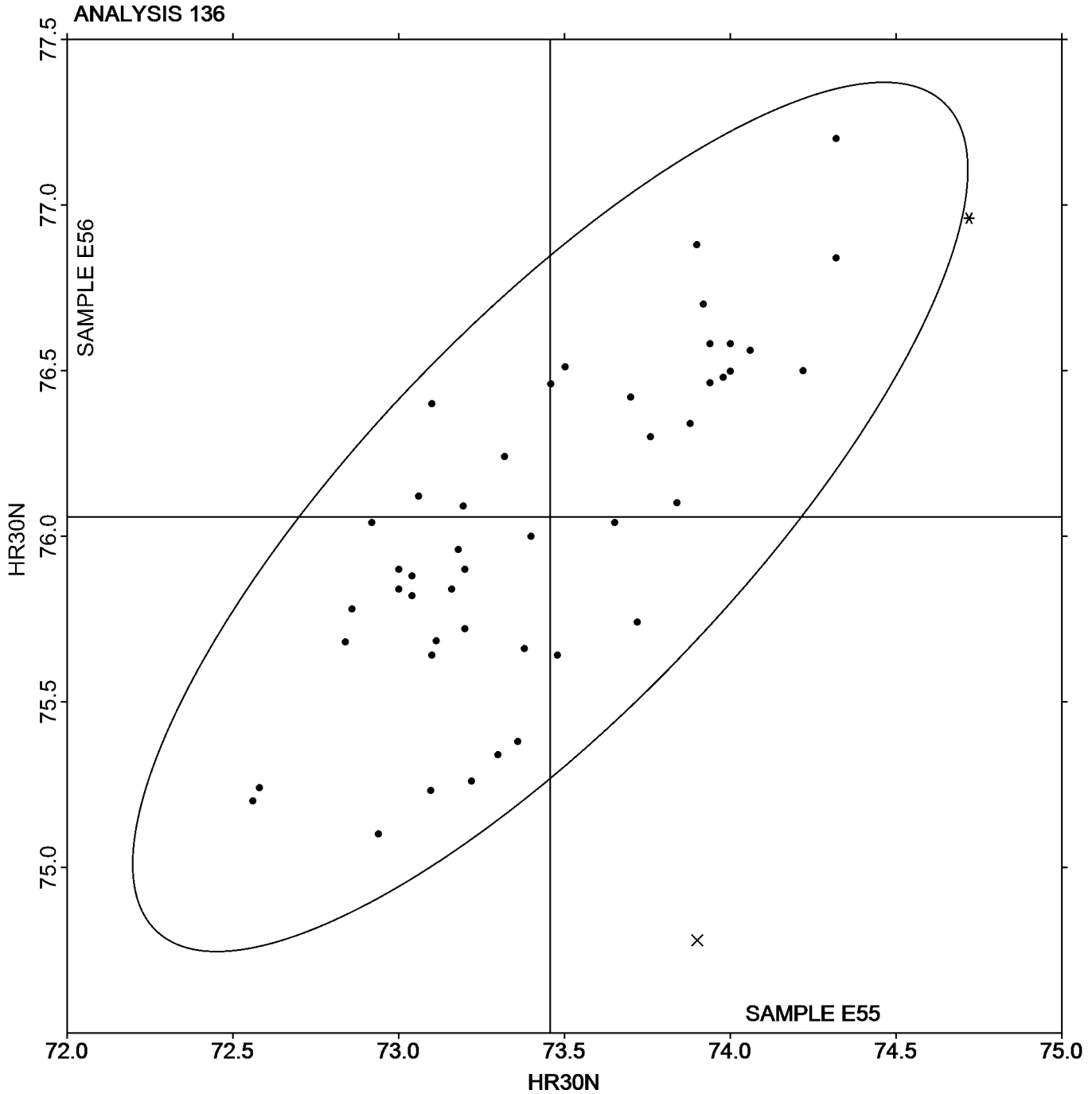
ASTM E18

SAMPLE E55

73.46 HR30N

SAMPLE E56

76.06 HR30N





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 145

Total Case Depth
SAE J423, SAE J78

WebCode	Data Flag	Sample C55			Sample C56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2EMQEZ		0.0241	-0.0029	-0.69	0.0306	-0.0018	-0.42
2MF9GF		0.0282	0.0012	0.30	0.0364	0.0040	0.92
2YQVGZ		0.0270	0.0000	0.01	0.0320	-0.0004	-0.09
38AK6L		0.0200	-0.0070	-1.67	0.0288	-0.0036	-0.82
3CY67F		0.0324	0.0054	1.31	0.0392	0.0068	1.56
3FYX3E		0.0266	-0.0004	-0.08	0.0350	0.0026	0.60
4V8R8E		0.0274	0.0004	0.11	0.0314	-0.0010	-0.23
6Y33FJ		0.0236	-0.0034	-0.81	0.0298	-0.0026	-0.60
7ED23V		0.0287	0.0018	0.43	0.0340	0.0016	0.37
7PZTVF		0.0308	0.0038	0.92	0.0340	0.0016	0.37
8GD4CC		0.0272	0.0002	0.06	0.0328	0.0004	0.09
AGMW3W		0.0314	0.0044	1.06	0.0342	0.0018	0.41
AGTDTW		0.0218	-0.0051	-1.23	0.0249	-0.0075	-1.72
AH2YCQ		0.0238	-0.0032	-0.76	0.0248	-0.0076	-1.75
AK7AYX		0.0312	0.0042	1.02	0.0340	0.0016	0.37
AQDDV8		0.0274	0.0004	0.11	0.0298	-0.0026	-0.59
BW2L86		0.0217	-0.0052	-1.25	0.0288	-0.0036	-0.82
C29VC6		0.0198	-0.0072	-1.72	0.0252	-0.0072	-1.64
C72VTL		0.0298	0.0028	0.68	0.0336	0.0012	0.28
CBW2EX		0.0276	0.0006	0.15	0.0313	-0.0011	-0.25
D8DUL9		0.0370	0.0101	2.41	0.0417	0.0093	2.14
DCJNF6		0.0293	0.0023	0.56	0.0313	-0.0011	-0.25
DVXZ8V		0.0315	0.0045	1.09	0.0380	0.0056	1.28
DWRNTC	X	0.0446	0.0177	4.25	0.0598	0.0274	6.26
EAQ2E2		0.0232	-0.0038	-0.90	0.0288	-0.0036	-0.82
EE6RM3		0.0224	-0.0045	-1.08	0.0268	-0.0056	-1.28
EW3FUL		0.0215	-0.0055	-1.32	0.0301	-0.0023	-0.52
FCR68U		0.0283	0.0013	0.32	0.0319	-0.0005	-0.12
FDMN8B		0.0334	0.0065	1.55	0.0392	0.0068	1.56
FPJF7M		0.0227	-0.0042	-1.02	0.0237	-0.0087	-1.99
FVAT9B		0.0295	0.0026	0.62	0.0360	0.0037	0.83
FWKUQ3		0.0268	-0.0002	-0.04	0.0330	0.0006	0.14
GUVN8Q		0.0248	-0.0022	-0.53	0.0289	-0.0035	-0.80
HVJQ6Q		0.0304	0.0034	0.82	0.0330	0.0007	0.15
HWVDPQ	X	0.0424	0.0155	3.72	0.0437	0.0113	2.59
J666UE		0.0242	-0.0028	-0.66	0.0296	-0.0028	-0.64
L42G4E		0.0260	-0.0009	-0.22	0.0335	0.0011	0.26
LHXPTF		0.0282	0.0012	0.30	0.0332	0.0008	0.19
LQVU7V		0.0251	-0.0018	-0.44	0.0311	-0.0013	-0.29
MJP7LN		0.0247	-0.0022	-0.53	0.0306	-0.0018	-0.40
N49KLV		0.0302	0.0032	0.78	0.0344	0.0020	0.46
NFNVBR		0.0240	-0.0030	-0.71	0.0310	-0.0014	-0.32
PQJUJEC		0.0213	-0.0056	-1.35	0.0248	-0.0076	-1.73
Q2K22U	X	0.0233	-0.0036	-0.87	0.0367	0.0044	0.99
QB4X4A		0.0223	-0.0046	-1.11	0.0274	-0.0050	-1.14
RL8ZYC		0.0228	-0.0042	-1.01	0.0267	-0.0057	-1.30
RLKRP9		0.0270	0.0001	0.01	0.0355	0.0031	0.71



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 145 Total Case Depth SAE J423, SAE J78

WebCode	Data Flag	Sample C55			Sample C56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
RPK3HM		0.0332	0.0062	1.50	0.0404	0.0080	1.83
TEHE9J		0.0275	0.0005	0.13	0.0343	0.0019	0.44
THXG3N	*	0.0328	0.0058	1.40	0.0424	0.0100	2.29
UDWDC8		0.0284	0.0014	0.35	0.0326	0.0002	0.05
UQJJLP		0.0324	0.0054	1.31	0.0374	0.0050	1.15
URZCKJ		0.0366	0.0097	2.33	0.0398	0.0074	1.69
UXA8PT		0.0248	-0.0022	-0.52	0.0324	0.0000	0.00
W82EYN		0.0248	-0.0022	-0.52	0.0302	-0.0022	-0.50
XBKL3H	X	0.0408	0.0138	3.32	0.0352	0.0028	0.64
XMXA9E		0.0327	0.0057	1.37	0.0402	0.0078	1.78
XUFKLF	*	0.0180	-0.0089	-2.14	0.0287	-0.0037	-0.85
XY4YTG		0.0262	-0.0008	-0.18	0.0346	0.0022	0.51
XZLEGB		0.0250	-0.0020	-0.47	0.0314	-0.0010	-0.23
Y7L77K		0.0272	0.0002	0.06	0.0324	0.0000	0.00
ZV4XYH		0.0264	-0.0006	-0.13	0.0311	-0.0013	-0.31

Summary Statistics

	Sample C55		Sample C56	
Grand Means	0.0270	inches	0.0324	inches
Stnd Dev Btwn Labs	0.0042	inches	0.0044	inches

Samples C55, C56 : Steel, Steel

Statistics based on 58 of 62 reporting participants

Comments on Assigned Data Flags for Test #145

- DWRNTC (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- HWVDPQ (X) - Data for sample C55 are high. Inconsistent within the determinations of sample C55.
- Q2K22U (X) - Inconsistent in testing between samples.
- XBKL3H (X) - Data for sample C55 are high. Inconsistent within the determinations of sample C55.

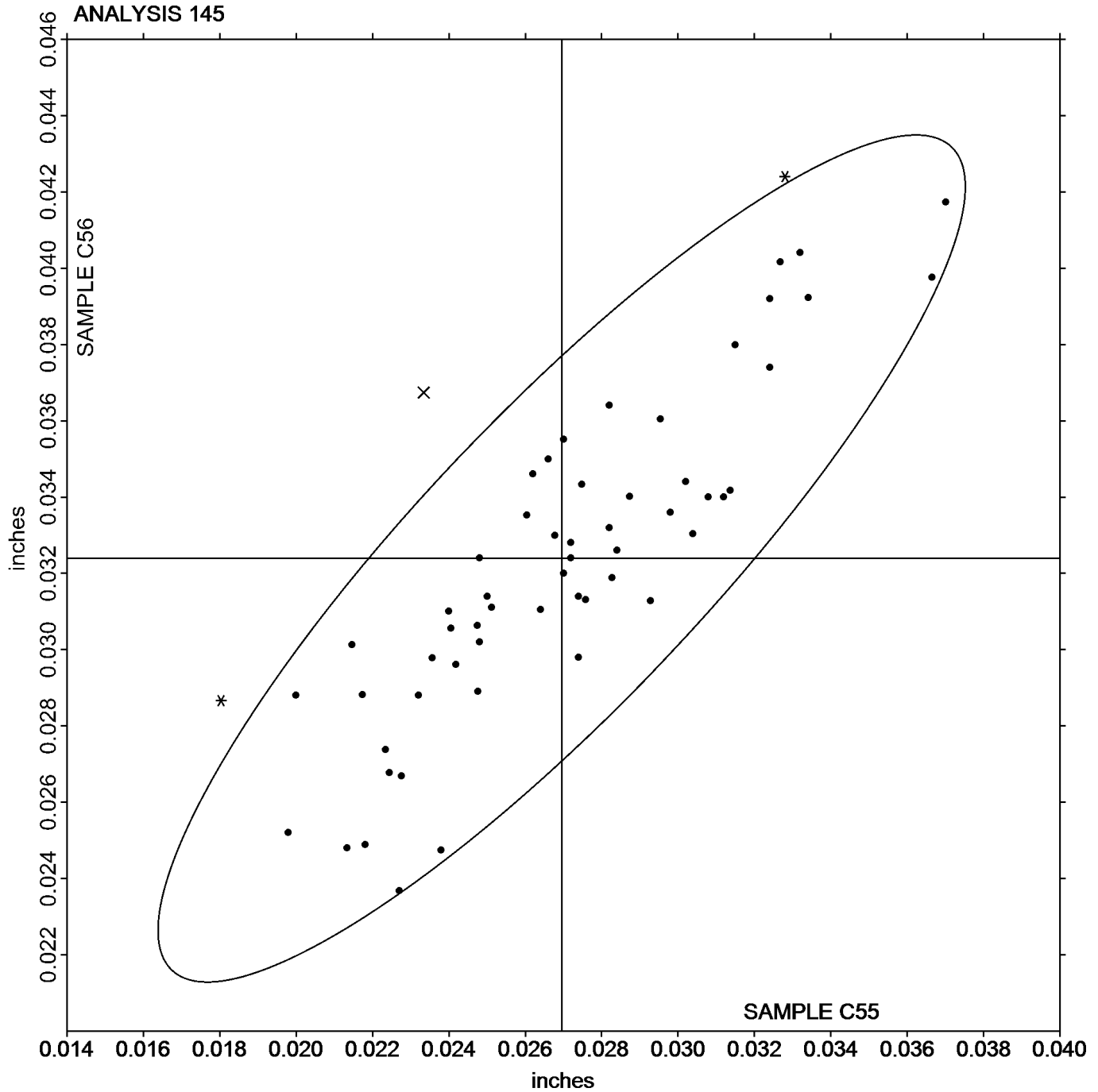


Analysis 145

Total Case Depth
SAE J423, SAE J78

SAMPLE C55
0.0270 inches

SAMPLE C56
0.0324 inches





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 146

Effective Case Depth
SAE J423, SAE J78

WebCode	Data Flag	Sample C55			Sample C56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2EMQEZ		0.0253	0.0010	0.60	0.0283	-0.0013	-0.79
2FHCY6		0.0249	0.0006	0.38	0.0294	-0.0002	-0.12
2MF9GF		0.0230	-0.0013	-0.79	0.0296	0.0000	-0.02
2YQVGZ		0.0248	0.0005	0.30	0.0298	0.0002	0.10
38AK6L		0.0242	-0.0001	-0.06	0.0280	-0.0016	-0.97
3FYX3E		0.0232	-0.0011	-0.67	0.0300	0.0004	0.22
3X6FC6		0.0261	0.0018	1.12	0.0302	0.0006	0.36
4V8R8E		0.0254	0.0011	0.67	0.0294	-0.0002	-0.14
6LYCZ7		0.0254	0.0011	0.69	0.0310	0.0014	0.82
6Y33FJ		0.0230	-0.0013	-0.79	0.0292	-0.0004	-0.26
7ED23V		0.0254	0.0011	0.69	0.0320	0.0023	1.39
7PZTVF		0.0266	0.0023	1.40	0.0302	0.0006	0.33
84BZ3W		0.0232	-0.0011	-0.67	0.0286	-0.0010	-0.62
9VUPPV		0.0254	0.0011	0.67	0.0310	0.0014	0.81
AGMW3W		0.0276	0.0033	2.00	0.0323	0.0026	1.56
AGTDTW		0.0247	0.0004	0.27	0.0290	-0.0006	-0.37
AH2YCQ		0.0236	-0.0007	-0.43	0.0318	0.0021	1.26
AK7AYX		0.0268	0.0025	1.52	0.0288	-0.0008	-0.50
AQDDV8		0.0237	-0.0006	-0.38	0.0309	0.0013	0.75
B3Y7PL		0.0252	0.0009	0.54	0.0303	0.0007	0.40
BW2L86		0.0239	-0.0004	-0.22	0.0301	0.0004	0.26
C29VC6		0.0251	0.0008	0.49	0.0293	-0.0003	-0.20
C72VTL		0.0261	0.0018	1.09	0.0298	0.0002	0.12
CBW2EX		0.0250	0.0007	0.42	0.0290	-0.0006	-0.38
D8DUL9	*	0.0197	-0.0046	-2.81	0.0260	-0.0037	-2.17
DCJNF6		0.0236	-0.0007	-0.43	0.0279	-0.0017	-1.03
DVXZ8V		0.0251	0.0008	0.49	0.0302	0.0005	0.31
DWRNTC		0.0260	0.0017	1.02	0.0322	0.0026	1.53
EAQ2E2		0.0212	-0.0031	-1.89	0.0296	0.0000	-0.02
EDRGX6		0.0233	-0.0010	-0.61	0.0295	-0.0002	-0.10
EE6RM3		0.0250	0.0007	0.44	0.0288	-0.0008	-0.49
EHN4P8		0.0242	-0.0001	-0.06	0.0308	0.0012	0.69
EW3FUL		0.0216	-0.0027	-1.63	0.0299	0.0002	0.14
FCR68U		0.0238	-0.0005	-0.32	0.0285	-0.0011	-0.67
FDMN8B		0.0228	-0.0015	-0.90	0.0315	0.0019	1.12
FPJF7M		0.0250	0.0007	0.43	0.0274	-0.0023	-1.34
FVAT9B		0.0268	0.0025	1.52	0.0314	0.0018	1.05
FWKUQ3		0.0218	-0.0025	-1.52	0.0277	-0.0019	-1.14
GUVN8Q		0.0233	-0.0010	-0.61	0.0271	-0.0025	-1.49
GVPWBL		0.0240	-0.0003	-0.19	0.0270	-0.0026	-1.57
HVJQ6Q		0.0250	0.0007	0.40	0.0310	0.0014	0.82
HWVDPQ		0.0256	0.0013	0.78	0.0292	-0.0004	-0.25
J666UE		0.0236	-0.0007	-0.41	0.0288	-0.0008	-0.47
KN863H		0.0246	0.0003	0.21	0.0284	-0.0012	-0.72
L42G4E		0.0228	-0.0015	-0.91	0.0286	-0.0010	-0.62
LHXPTF		0.0258	0.0015	0.91	0.0312	0.0016	0.93
LQVU7V		0.0252	0.0009	0.53	0.0305	0.0009	0.54



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 146 Effective Case Depth SAE J423, SAE J78

WebCode	Data Flag	Sample C55			Sample C56		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MA6MJG	*	0.0206	-0.0037	-2.25	0.0244	-0.0052	-3.11
MJP7LN		0.0232	-0.0011	-0.67	0.0296	0.0000	-0.02
N49KLV		0.0240	-0.0003	-0.19	0.0292	-0.0004	-0.26
NFNVBR		0.0213	-0.0030	-1.80	0.0284	-0.0013	-0.76
PQJUJEC		0.0272	0.0029	1.74	0.0313	0.0016	0.96
QB4X4A		0.0215	-0.0028	-1.73	0.0263	-0.0033	-1.98
R7RJQ4		0.0265	0.0022	1.36	0.0320	0.0023	1.39
RL8ZYC		0.0229	-0.0014	-0.85	0.0275	-0.0022	-1.28
RLKRP9		0.0240	-0.0003	-0.18	0.0318	0.0022	1.29
RPK3HM	X	0.0324	0.0081	4.92	0.0392	0.0096	5.68
T4ZFDT		0.0266	0.0023	1.40	0.0319	0.0023	1.36
TEHE9J		0.0243	-0.0001	-0.03	0.0300	0.0004	0.24
THXG3N		0.0229	-0.0014	-0.85	0.0284	-0.0012	-0.71
UDWDC8		0.0262	0.0019	1.15	0.0296	0.0000	-0.02
UQJJLP		0.0228	-0.0015	-0.91	0.0274	-0.0022	-1.33
URZCKJ		0.0233	-0.0010	-0.61	0.0292	-0.0004	-0.25
UXA8PT		0.0224	-0.0019	-1.16	0.0302	0.0006	0.33
W82EYN		0.0236	-0.0007	-0.43	0.0280	-0.0016	-0.97
XBKL3H	X	0.0224	-0.0019	-1.16	0.0234	-0.0062	-3.70
XMXA9E	*	0.0273	0.0030	1.84	0.0341	0.0045	2.64
XUFKLF		0.0239	-0.0004	-0.22	0.0307	0.0010	0.61
XY4YTG		0.0248	0.0005	0.30	0.0316	0.0020	1.17
XZLEGB		0.0242	-0.0001	-0.06	0.0312	0.0016	0.93
YG727F		0.0240	-0.0003	-0.19	0.0314	0.0018	1.05
ZHWMCB		0.0256	0.0013	0.78	0.0294	-0.0003	-0.16
ZV4XYH		0.0248	0.0005	0.28	0.0293	-0.0003	-0.17

Summary Statistics

	Sample C55		Sample C56	
Grand Means	0.0243	inches	0.0296	inches
Std Dev Btwn Labs	0.0016	inches	0.0017	inches

Samples C55, C56 : Steel, Steel

Statistics based on 71 of 73 reporting participants

Comments on Assigned Data Flags for Test #146

RPK3HM (X) - Data for both samples are high.

XBKL3H (X) - Data for sample C56 are low.

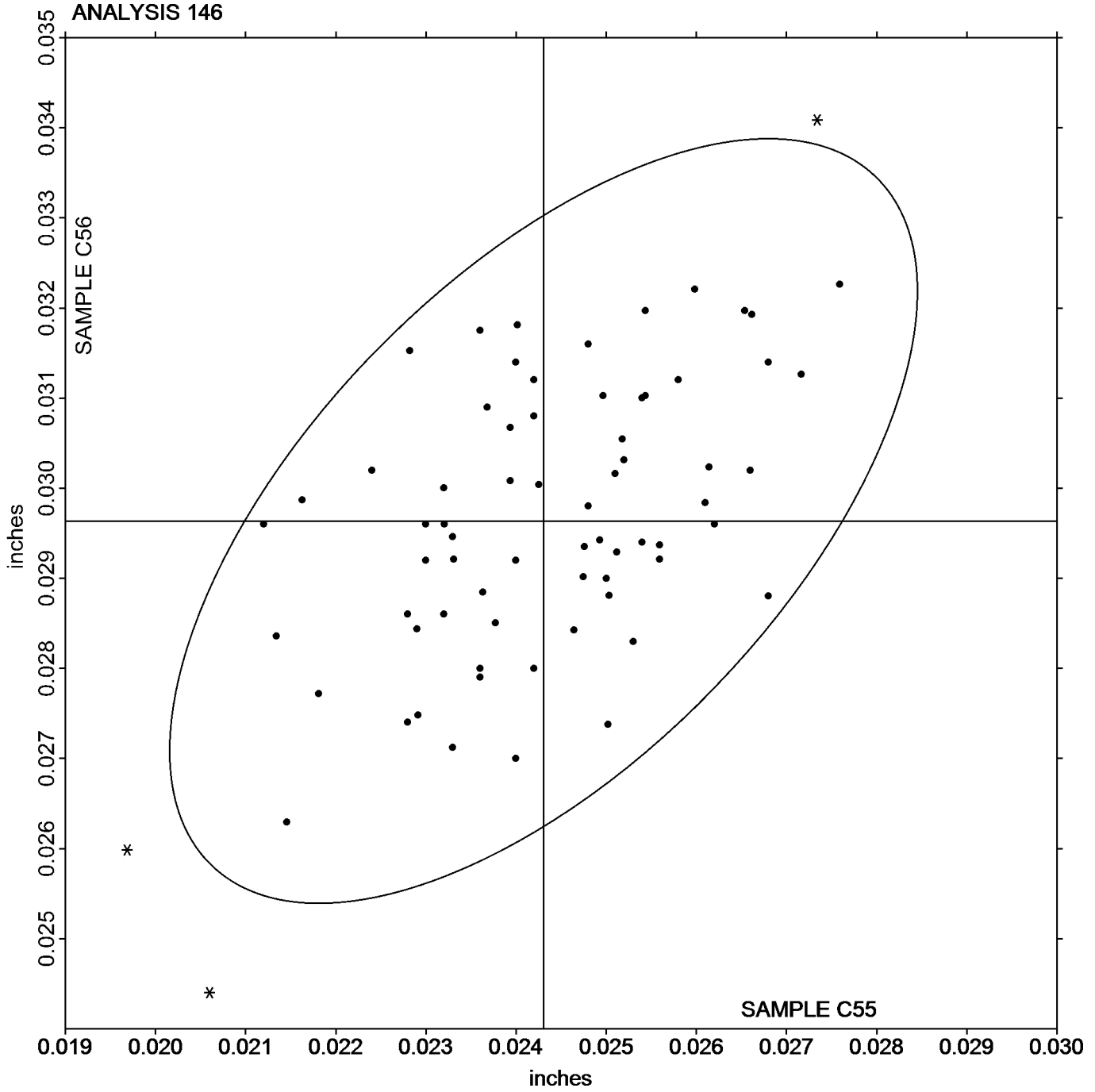


Analysis 146

Effective Case Depth
SAE J423, SAE J78

SAMPLE C55
0.0243 inches

SAMPLE C56
0.0296 inches





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 148

Grain Size (Inconel)
ASTM E112, ASTM E1382

WebCode	Data Flag	Sample J55			Sample J56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2EMQEZ		6.60	-0.81	-1.07	5.16	-0.62	-0.89	Abrams Three-Circle
2R2AZM		6.20	-1.21	-1.60	5.10	-0.68	-0.98	Comparison Method
38AK6L		6.90	-0.51	-0.67	5.10	-0.68	-0.98	Comparison Method
4T4DMN		7.40	-0.01	-0.01	5.60	-0.18	-0.26	Comparison Method
6FQJLV		8.23	0.83	1.09	6.79	1.01	1.44	Heyn Linear Intercept
84BZ3W		7.00	-0.41	-0.54	6.20	0.42	0.59	Comparison Method
8J6CQZ		7.50	0.09	0.12	5.60	-0.18	-0.26	Comparison Method
9XXWWA		7.20	-0.21	-0.27	6.42	0.64	0.91	Heyn Linear Intercept
ANQNNM		7.90	0.49	0.65	6.50	0.72	1.02	Comparison Method
BLLQVC		6.60	-0.81	-1.07	5.20	-0.58	-0.84	Comparison Method
C29VC6		6.50	-0.91	-1.20	6.70	0.92	1.31	Comparison Method
DVXZ8V		8.10	0.69	0.92	5.80	0.02	0.02	Comparison Method
FDMN8B		7.20	-0.21	-0.27	6.00	0.22	0.31	Comparison Method
FG6UVX		7.50	0.09	0.12	6.50	0.72	1.02	N/A
G7J4HK		7.68	0.27	0.36	6.58	0.80	1.14	Automatic Image Analysis
GUVN8Q		7.50	0.09	0.12	7.00	1.22	1.74	Comparison Method
GVPWBL		6.60	-0.81	-1.07	6.00	0.22	0.31	Comparison Method
JKXKPJ		6.30	-1.11	-1.47	4.90	-0.88	-1.27	Comparison Method
JWCUHX		8.81	1.40	1.86	6.53	0.75	1.07	Abrams Three-Circle
KN863H		6.50	-0.91	-1.20	4.00	-1.78	-2.55	Comparison Method
KNCF82	*	9.10	1.69	2.24	5.70	-0.08	-0.12	N/A
KXJQ6E		7.97	0.56	0.75	5.56	-0.22	-0.32	General Intercept
MA6MJG		6.30	-1.11	-1.47	5.10	-0.68	-0.98	Comparison Method
NV6RT9		7.70	0.29	0.39	4.50	-1.28	-1.84	Comparison Method
NVLHNU		7.50	0.09	0.12	6.00	0.22	0.31	Comparison Method
PJL7R7	M	No Data Reported			6.70	0.92	1.31	Comparison Method
PNGXY4		9.20	1.79	2.38	6.20	0.42	0.59	N/A
QB4X4A		7.00	-0.41	-0.54	5.00	-0.78	-1.12	Comparison Method
QP644D		7.50	0.09	0.12	5.50	-0.28	-0.41	Comparison Method
R32LTW		8.00	0.59	0.79	6.60	0.82	1.17	Comparison Method
R3RN7L		7.00	-0.41	-0.54	5.70	-0.08	-0.12	Comparison Method
XJVVL4		7.90	0.49	0.65	6.40	0.62	0.88	Comparison Method
YFC9DG		7.40	-0.01	-0.01	5.40	-0.38	-0.55	Comparison Method
Z4AA22		7.00	-0.41	-0.54	5.20	-0.58	-0.84	Comparison Method
ZJLUEZ		7.94	0.53	0.71	5.96	0.18	0.26	Heyn Linear Intercept
ZZA2U7		7.48	0.07	0.10	5.95	0.17	0.24	General Intercept

Summary Statistics

	Sample J55		Sample J56	
Grand Means	7.41	ASTM Grain Size	5.78	ASTM Grain Size
Std Dev Btwn Labs	0.75	ASTM Grain Size	0.70	ASTM Grain Size

Samples J55, J56 : Inco 625, Waspaloy

Statistics based on 35 of 36 reporting participants

Comments on Assigned Data Flags for Test #148

PJL7R7 (M) - Participant did not submit data for sample J55.



Analysis 148

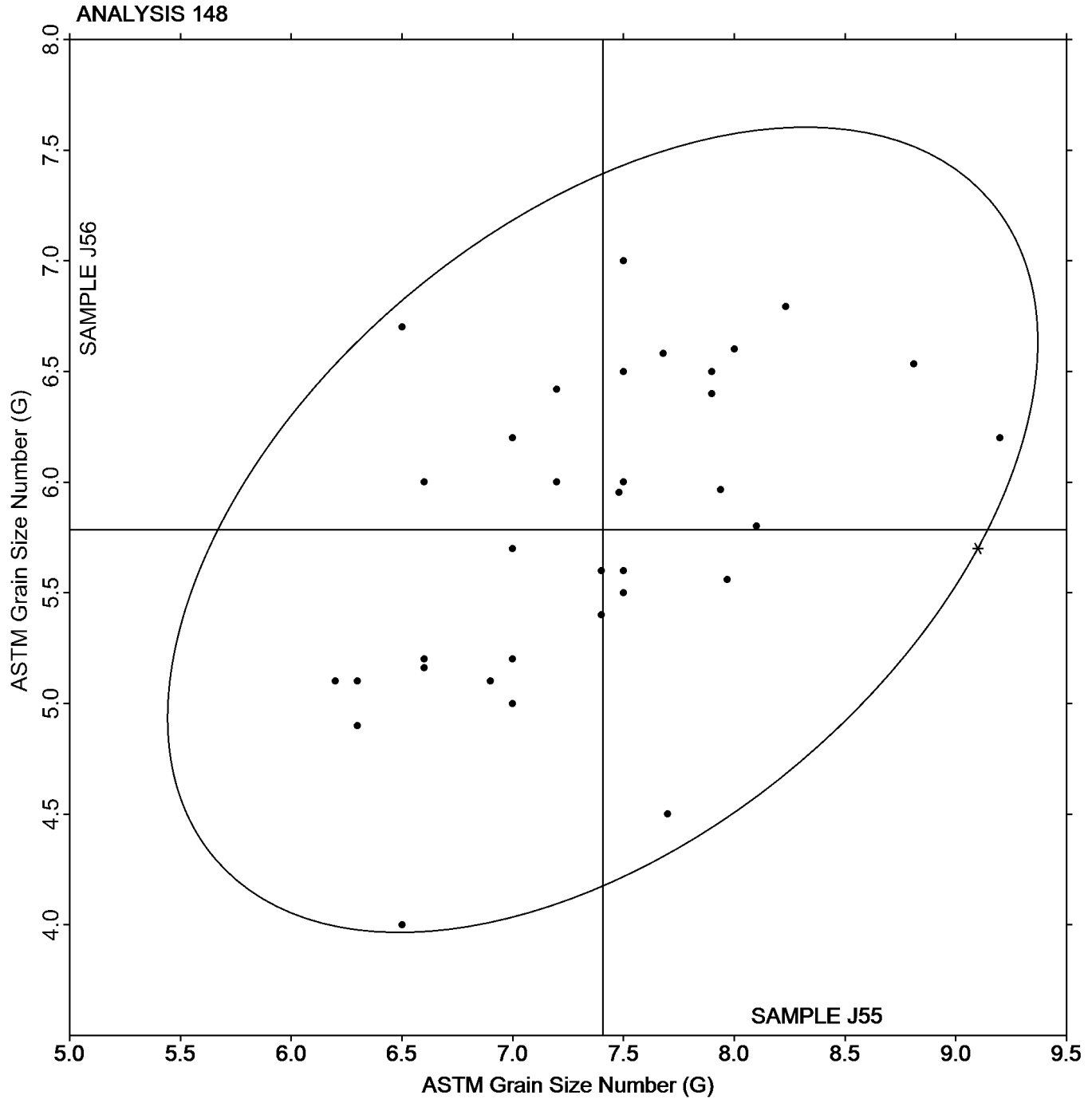
Grain Size (Inconel)
ASTM E112, ASTM E1382

SAMPLE J55

SAMPLE J56

7.41 ASTM Grain Size Number (G)

5.78 ASTM Grain Size Number (G)





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 160

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

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		81.63	0.57	0.84	80.62	0.04	0.07	GD
4T4DMN		81.30	0.23	0.34	80.95	0.38	0.64	GD
74R9QU		81.90	0.84	1.24	81.07	0.49	0.83	XX
8DVGMQ		80.37	-0.70	-1.03	80.57	-0.01	-0.01	AA
9HLFRT		81.69	0.63	0.93	81.15	0.58	0.98	OE
B3342N		81.06	0.00	-0.01	80.86	0.29	0.49	WD
C8C4W9	X	85.07	4.00	5.93	79.80	-0.77	-1.31	IC
D8DUL9		80.98	-0.08	-0.13	80.49	-0.08	-0.14	GR
DKYB8L		80.85	-0.21	-0.32	80.43	-0.14	-0.24	OE
DVXZ8V		81.20	0.14	0.21	80.78	0.20	0.34	IC
EMNQN9		80.92	-0.14	-0.21	80.63	0.05	0.09	EL
F8GW3J		82.26	1.19	1.77	81.34	0.77	1.30	OE
F9WKMP		80.60	-0.46	-0.69	80.20	-0.37	-0.63	XX
G7HZDA		81.06	0.00	0.00	80.64	0.06	0.11	OE
JHVFF6		81.17	0.10	0.15	80.63	0.06	0.10	OE
KN863H		81.11	0.04	0.06	80.65	0.08	0.13	OE
MR6KVL		79.56	-1.50	-2.23	79.12	-1.45	-2.46	OE
P4URQX		81.17	0.10	0.15	80.53	-0.04	-0.07	OE
PZ842Q		81.27	0.20	0.30	80.90	0.33	0.55	OE
Q4NWKX		81.90	0.84	1.24	81.24	0.67	1.13	ED
Q7QELT		80.66	-0.41	-0.60	80.15	-0.42	-0.72	OE
RH28PT		80.85	-0.21	-0.31	80.28	-0.29	-0.49	IC
TEHE9J		81.65	0.59	0.87	80.97	0.40	0.67	GD
UJ4XLY	*	79.27	-1.80	-2.66	78.77	-1.81	-3.06	XX
V2JH4N		81.13	0.07	0.10	80.80	0.23	0.38	WD

Summary Statistics

	Sample K55		Sample K56	
Grand Means	81.06	Percent	80.57	Percent
Stnd Dev Btrwn Labs	0.68	Percent	0.59	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 24 of 25 reporting participants

Key to Method Codes Reported by Participants

AA	Spectrometry - Atomic Absorption (AAS)	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

C8C4W9 (X) - Data for sample K55 are high. Inconsistent within the determinations of both samples.



Analysis 160

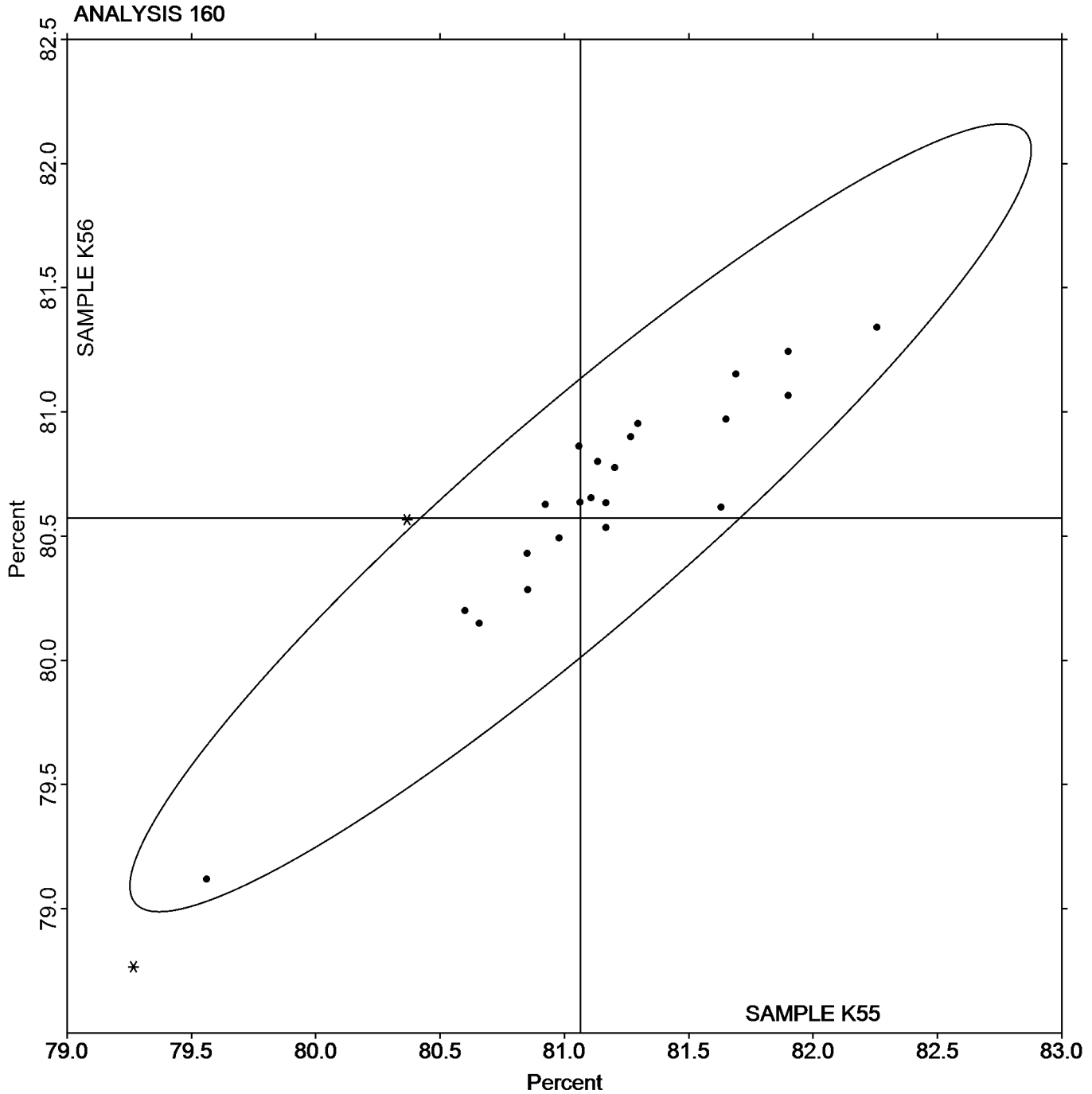
Copper-based Alloy, Element #1
COPPER (Cu)

SAMPLE K55

81.06 Percent

SAMPLE K56

80.57 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 161

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

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		0.0143	-0.0005	-0.08	0.0163	-0.0008	-0.13	GD
4T4DMN	*	0.0330	0.0182	3.09	0.0343	0.0172	2.85	GD
74R9QU		0.0252	0.0104	1.77	0.0289	0.0118	1.94	OE
9HLFRT		0.00933	-0.0055	-0.92	0.0116	-0.0055	-0.92	OE
B3342N		0.0154	0.0006	0.10	0.0181	0.0010	0.17	WD
BTVZ2Y		0.0111	-0.0037	-0.62	0.0135	-0.0036	-0.60	IC
C8C4W9		0.0132	-0.0016	-0.27	0.0144	-0.0027	-0.44	IC
D8DUL9		0.0128	-0.0020	-0.34	0.0147	-0.0024	-0.40	IC
DKYB8L		0.0130	-0.0018	-0.30	0.0160	-0.0011	-0.18	XX
DVXZ8V		0.0108	-0.0040	-0.68	0.0130	-0.0041	-0.68	IC
F8GW3J		0.0239	0.0091	1.55	0.0279	0.0108	1.78	OE
F9WKMP		0.0189	0.0041	0.70	0.0213	0.0042	0.69	XX
G7HZDA		0.0110	-0.0038	-0.64	0.0127	-0.0044	-0.73	OE
JHVFF6		0.0128	-0.0020	-0.34	0.0153	-0.0018	-0.30	OE
L42G4E		0.0111	-0.0037	-0.62	0.0130	-0.0041	-0.68	OE
MR6KVL		0.0180	0.0032	0.55	0.0180	0.0009	0.15	OE
P4URQX		0.0126	-0.0022	-0.36	0.0133	-0.0038	-0.62	OE
PZ842Q		0.0133	-0.0015	-0.25	0.0157	-0.0014	-0.24	OE
Q7QELT		0.0133	-0.0015	-0.25	0.0180	0.0009	0.15	OE
RH28PT		0.0111	-0.0037	-0.62	0.0133	-0.0038	-0.63	IC
TEHE9J		0.00600	-0.0088	-1.49	0.00900	-0.0081	-1.34	GD
UJ4XLY		0.0173	0.0025	0.43	0.0210	0.0039	0.64	XX
V2JH4N		0.0123	-0.0025	-0.42	0.0143	-0.0028	-0.46	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	0.0148	Percent	0.0171	Percent
Stnd Dev Btwn Labs	0.0059	Percent	0.0061	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 23 of 23 reporting participants

Key to Method Codes Reported by Participants

- | | | | |
|----|---|----|--|
| GD | Spectrometry - Glow Discharge (GDS) | IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) | WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element | | |



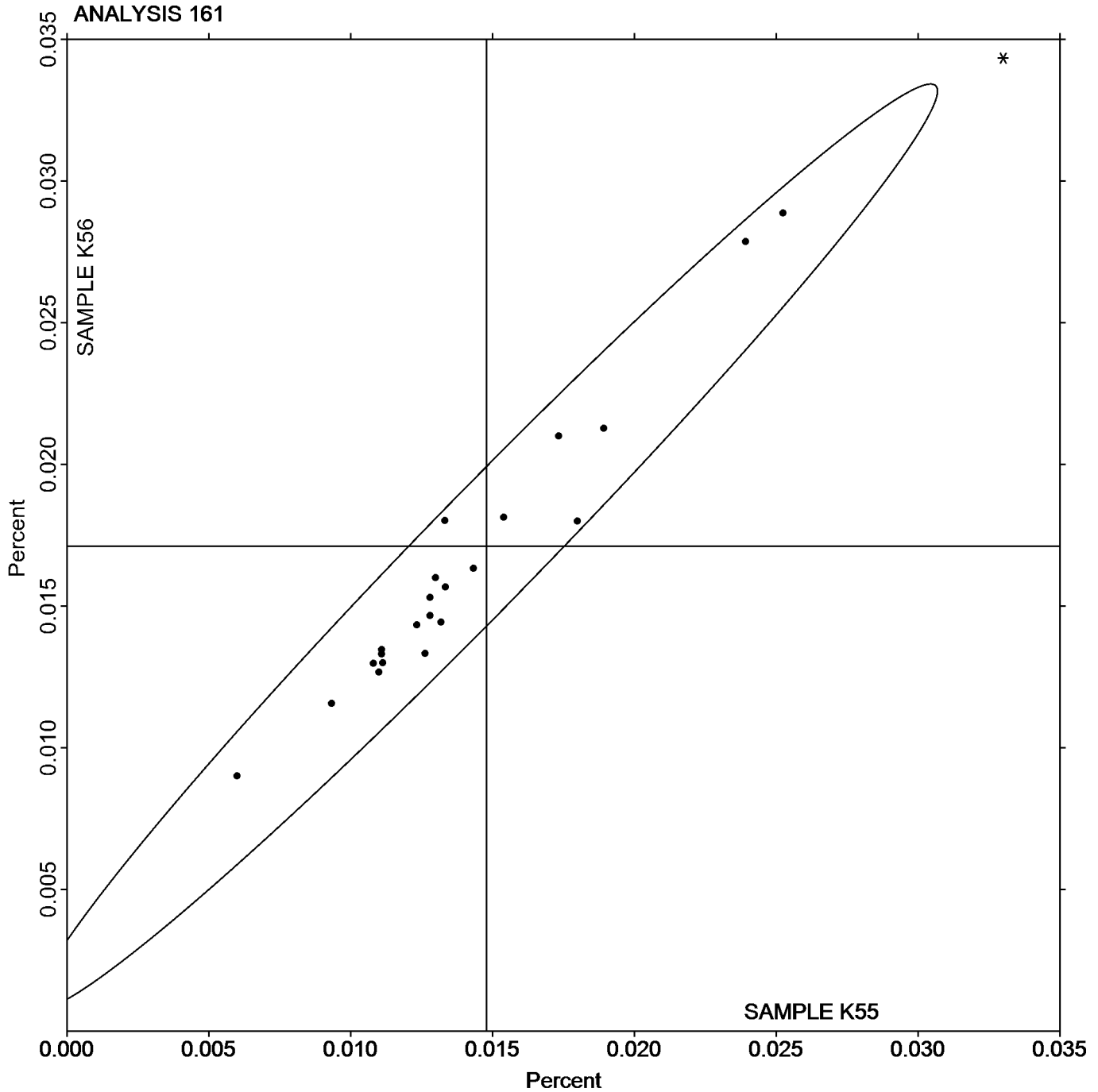
Analysis 161

Copper-based Alloy, Element #2

TIN (Sn)

SAMPLE K55
0.0148 Percent

SAMPLE K56
0.0171 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 162

Copper-based Alloy, Element #3
ALUMINUM (Al)

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		9.737	-0.28	-1.09	9.957	0.003	0.01	GD
4T4DMN		10.12	0.11	0.42	10.06	0.102	0.40	GD
6Y63MT		9.752	-0.26	-1.03	9.667	-0.286	-1.12	XX
74R9QU	X	8.663	-1.35	-5.28	8.613	-1.340	-5.24	OE
9HLFRT		9.695	-0.32	-1.25	9.606	-0.348	-1.36	OE
B3342N		10.09	0.08	0.31	9.836	-0.118	-0.46	WD
BTVZ2Y		9.887	-0.13	-0.50	9.816	-0.137	-0.53	IC
C8C4W9	X	12.20	2.18	8.53	10.29	0.337	1.32	IC
D8DUL9		9.822	-0.19	-0.75	9.544	-0.409	-1.60	IC
DKYB8L		10.23	0.21	0.82	10.15	0.197	0.77	XX
DVXZ8V		10.00	-0.02	-0.06	9.917	-0.036	-0.14	IC
F8GW3J	X	7.897	-2.12	-8.27	7.873	-2.081	-8.13	OE
F9WKMP		10.19	0.18	0.69	10.13	0.177	0.69	XX
G7HZDA		10.07	0.05	0.20	10.03	0.073	0.29	OE
JHVFF6		10.11	0.10	0.38	10.32	0.363	1.42	OE
KN863H		9.811	-0.20	-0.80	9.709	-0.244	-0.95	OE
L42G4E		9.843	-0.17	-0.67	9.773	-0.180	-0.70	OE
MR6KVL		9.766	-0.25	-0.97	9.745	-0.208	-0.81	OE
P4URQX		10.01	0.00	-0.01	9.980	0.027	0.10	OE
PZ842Q		10.00	-0.02	-0.06	9.963	0.010	0.04	OE
Q4NWKX		10.25	0.24	0.93	10.03	0.073	0.29	ED
Q7QELT		10.16	0.14	0.55	10.04	0.088	0.34	OE
RH28PT		10.21	0.20	0.77	10.15	0.200	0.78	IC
TEHE9J		9.751	-0.26	-1.03	9.901	-0.052	-0.20	GD
UJ4XLY	*	10.86	0.84	3.30	10.74	0.787	3.08	XX
V2JH4N		9.982	-0.03	-0.13	9.869	-0.084	-0.33	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	10.02	Percent	9.953	Percent
Stnd Dev Btwn Labs	0.26	Percent	0.256	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 23 of 26 reporting participants

Key to Method Codes Reported by Participants

- 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 #162

- 74R9QU (X) - Data for both samples are low. Possible Systematic Error.
- C8C4W9 (X) - Data for sample K55 are high. Inconsistent within the determinations of both samples.
- F8GW3J (X) - Data for both samples are low. Possible Systematic Error.



Analysis 162

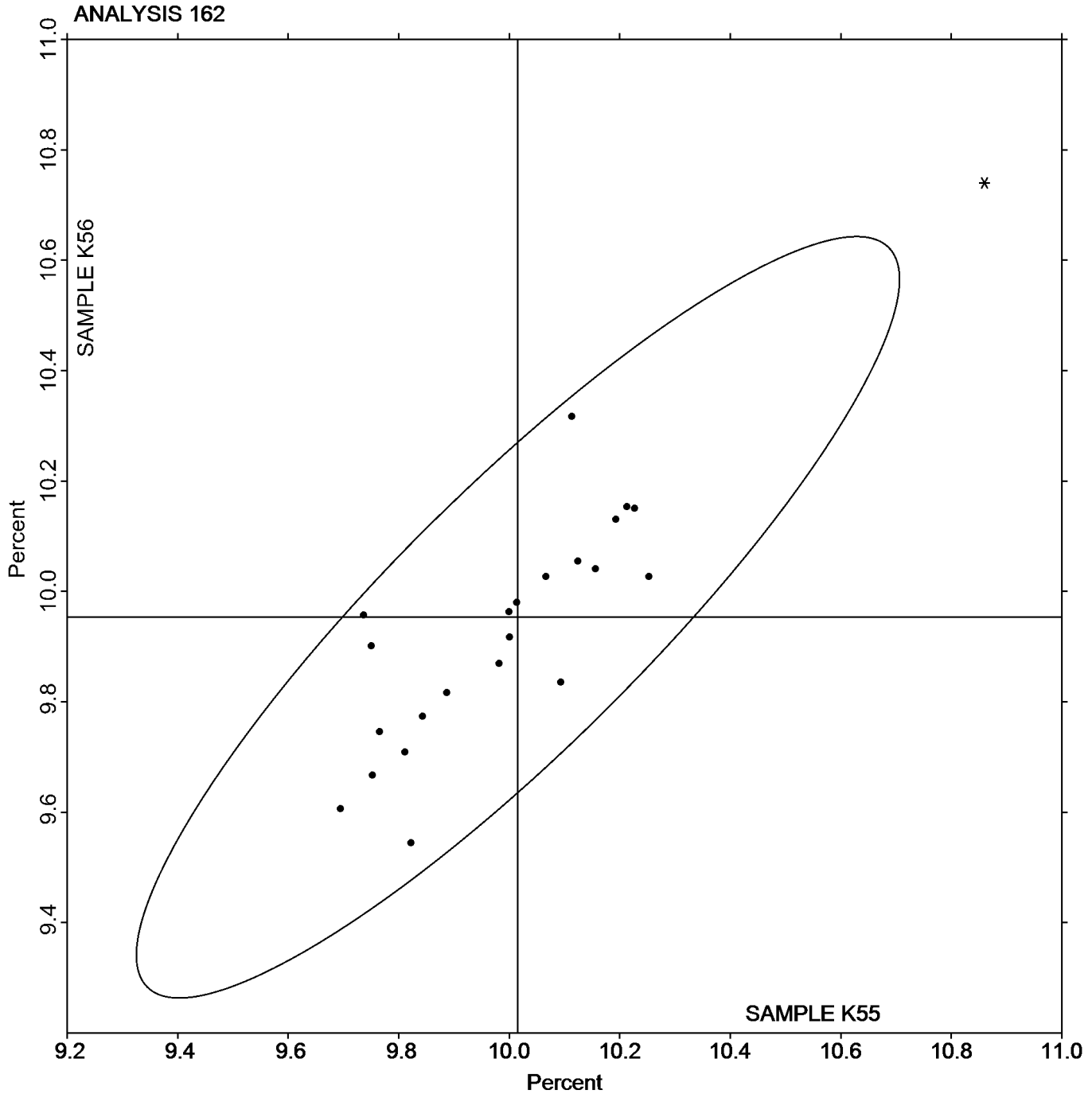
Copper-based Alloy, Element #3
ALUMINUM (Al)

SAMPLE K55

10.02 Percent

SAMPLE K56

9.953 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 163

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

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		0.1640	0.0082	0.68	0.0663	-0.0007	-0.10	GD
4T4DMN	X	0.1367	-0.0191	-1.58	0.0203	-0.0467	-6.47	GD
6Y63MT		0.1533	-0.0025	-0.21	0.0642	-0.0028	-0.39	XX
8DVGMQ		0.1520	-0.0038	-0.31	0.0633	-0.0037	-0.52	AA
9HLFRT		0.1550	-0.0008	-0.06	0.0667	-0.0004	-0.06	OE
B3342N		0.1607	0.0050	0.41	0.0684	0.0014	0.19	WD
BTVZ2Y		0.1457	-0.0101	-0.83	0.0713	0.0043	0.59	IC
C8C4W9	X	0.3719	0.2161	17.85	0.3486	0.2816	38.94	XX
D8DUL9		0.1581	0.0023	0.19	0.0699	0.0028	0.39	IC
DKYB8L		0.1583	0.0026	0.21	0.0667	-0.0004	-0.06	XX
DVXZ8V		0.1633	0.0076	0.63	0.0667	-0.0004	-0.06	IC
F9WKMP		0.1263	-0.0294	-2.43	0.0570	-0.0101	-1.40	XX
G7HZDA		0.1617	0.0059	0.49	0.0847	0.0176	2.43	OE
JHVFF6		0.1703	0.0146	1.20	0.0597	-0.0074	-1.03	OE
KN863H		0.1627	0.0069	0.57	0.0667	-0.0004	-0.06	OE
L42G4E		0.1390	-0.0168	-1.39	0.0740	0.0069	0.96	OE
MR6KVL		0.1280	-0.0278	-2.29	0.0523	-0.0147	-2.04	OE
P4URQX		0.1597	0.0039	0.32	0.0837	0.0166	2.29	OE
PZ842Q		0.1630	0.0072	0.60	0.0681	0.0011	0.15	OE
Q7QELT		0.1655	0.0097	0.80	0.0618	-0.0053	-0.73	OE
RH28PT		0.1587	0.0029	0.24	0.0653	-0.0017	-0.24	IC
TEHE9J		0.1730	0.0172	1.42	0.0680	0.0009	0.13	XX
UJ4XLY		0.1470	-0.0088	-0.72	0.0647	-0.0024	-0.33	XX
V2JH4N		0.1617	0.0059	0.49	0.0663	-0.0007	-0.10	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	0.1558	Percent	0.0671	Percent
Stnd Dev Brwn Labs	0.0121	Percent	0.0072	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 22 of 24 reporting participants

Key to Method Codes Reported by Participants

AA	Spectrometry - Atomic Absorption (AAS)	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

4T4DMN (X) - Data for sample K56 are low.

C8C4W9 (X) - Data for both samples are high. Very inconsistent within the determinations of both samples.

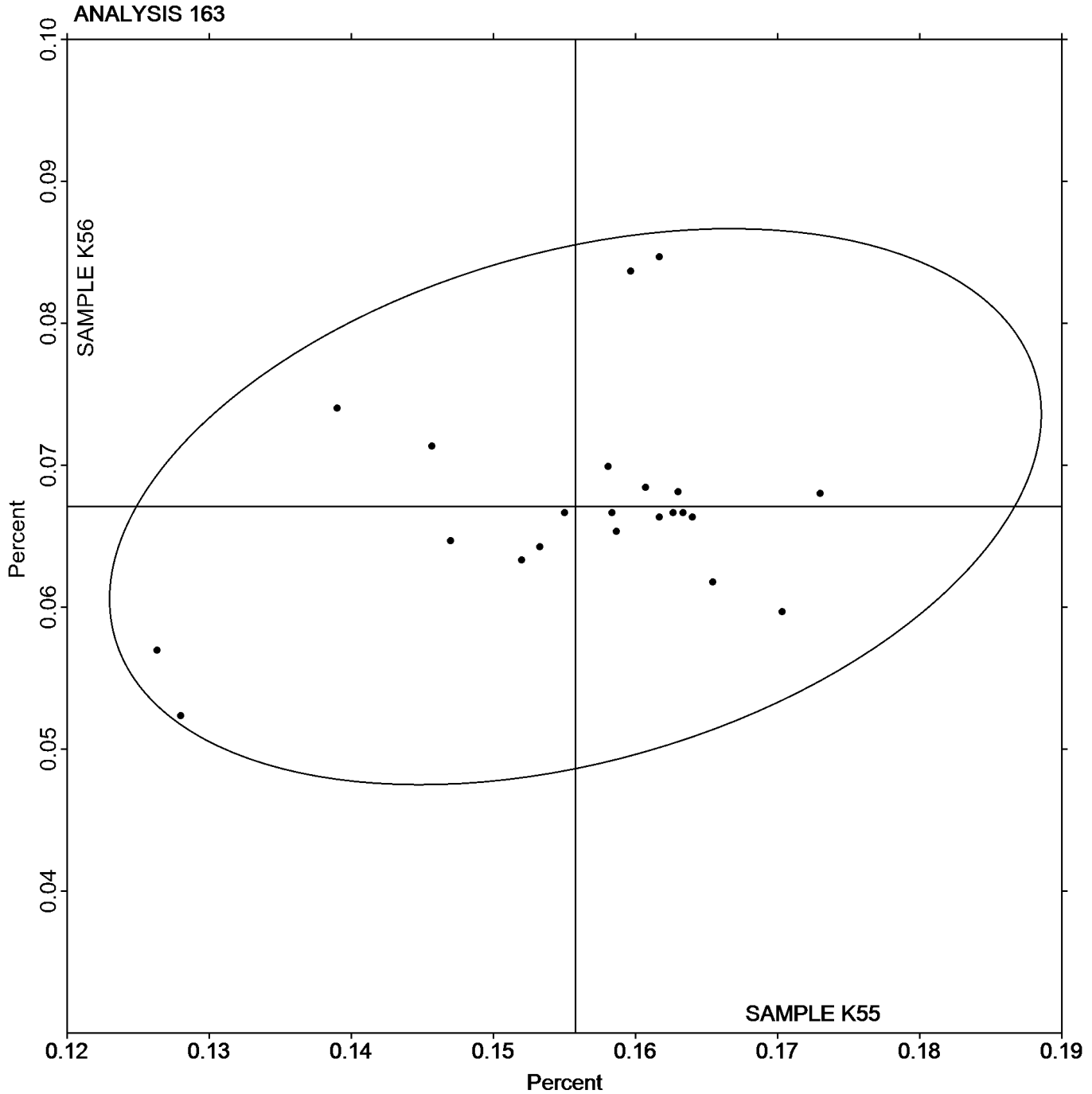


Analysis 163

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

SAMPLE K55
0.1558 Percent

SAMPLE K56
0.0671 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 164

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

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		3.047	-0.190	-0.77	3.617	-0.102	-0.30	GD
4T4DMN		3.138	-0.099	-0.40	3.638	-0.081	-0.24	GD
74R9QU		3.697	0.460	1.87	4.447	0.728	2.11	XX
8DVGMQ		2.950	-0.286	-1.16	3.450	-0.269	-0.78	AA
9HLFRT		2.961	-0.275	-1.12	3.454	-0.265	-0.77	OE
B3342N		3.180	-0.056	-0.23	3.612	-0.107	-0.31	WD
BTVZ2Y		3.122	-0.114	-0.46	3.639	-0.080	-0.23	IC
C8C4W9	*	3.745	0.509	2.07	4.595	0.876	2.54	IC
D8DUL9		3.169	-0.067	-0.27	3.510	-0.209	-0.61	IC
DKYB8L		3.265	0.029	0.12	3.668	-0.050	-0.15	XX
DVXZ8V		3.124	-0.112	-0.46	3.568	-0.151	-0.44	IC
F8GW3J		3.862	0.626	2.55	4.610	0.891	2.59	OE
F9WKMP		3.350	0.114	0.46	3.740	0.021	0.06	XX
G7HZDA		3.140	-0.096	-0.39	3.570	-0.149	-0.43	OE
JHVFF6		3.165	-0.072	-0.29	3.459	-0.259	-0.75	OE
KN863H		3.163	-0.073	-0.30	3.666	-0.052	-0.15	OE
L42G4E		3.202	-0.035	-0.14	3.654	-0.065	-0.19	OE
MR6KVL		3.095	-0.142	-0.58	3.497	-0.221	-0.64	OE
P4URQX		3.260	0.024	0.10	3.743	0.025	0.07	OE
PZ842Q		3.080	-0.156	-0.64	3.427	-0.292	-0.85	OE
Q4NWKX		3.216	-0.020	-0.08	3.690	-0.029	-0.08	ED
Q7QELT		3.139	-0.097	-0.39	3.599	-0.120	-0.35	OE
RH28PT		3.075	-0.162	-0.66	3.560	-0.159	-0.46	IC
TEHE9J		3.071	-0.165	-0.67	3.426	-0.293	-0.85	GD
UJ4XLY		3.750	0.514	2.09	4.230	0.511	1.48	XX
V2JH4N		3.175	-0.061	-0.25	3.621	-0.098	-0.28	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	3.236	Percent	3.719	Percent
Std Dev Btwn Labs	0.246	Percent	0.344	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 26 of 26 reporting participants

Key to Method Codes Reported by Participants

- | | | | |
|----|---|----|--|
| AA | Spectrometry - Atomic Absorption (AAS) | 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 | | |



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 164

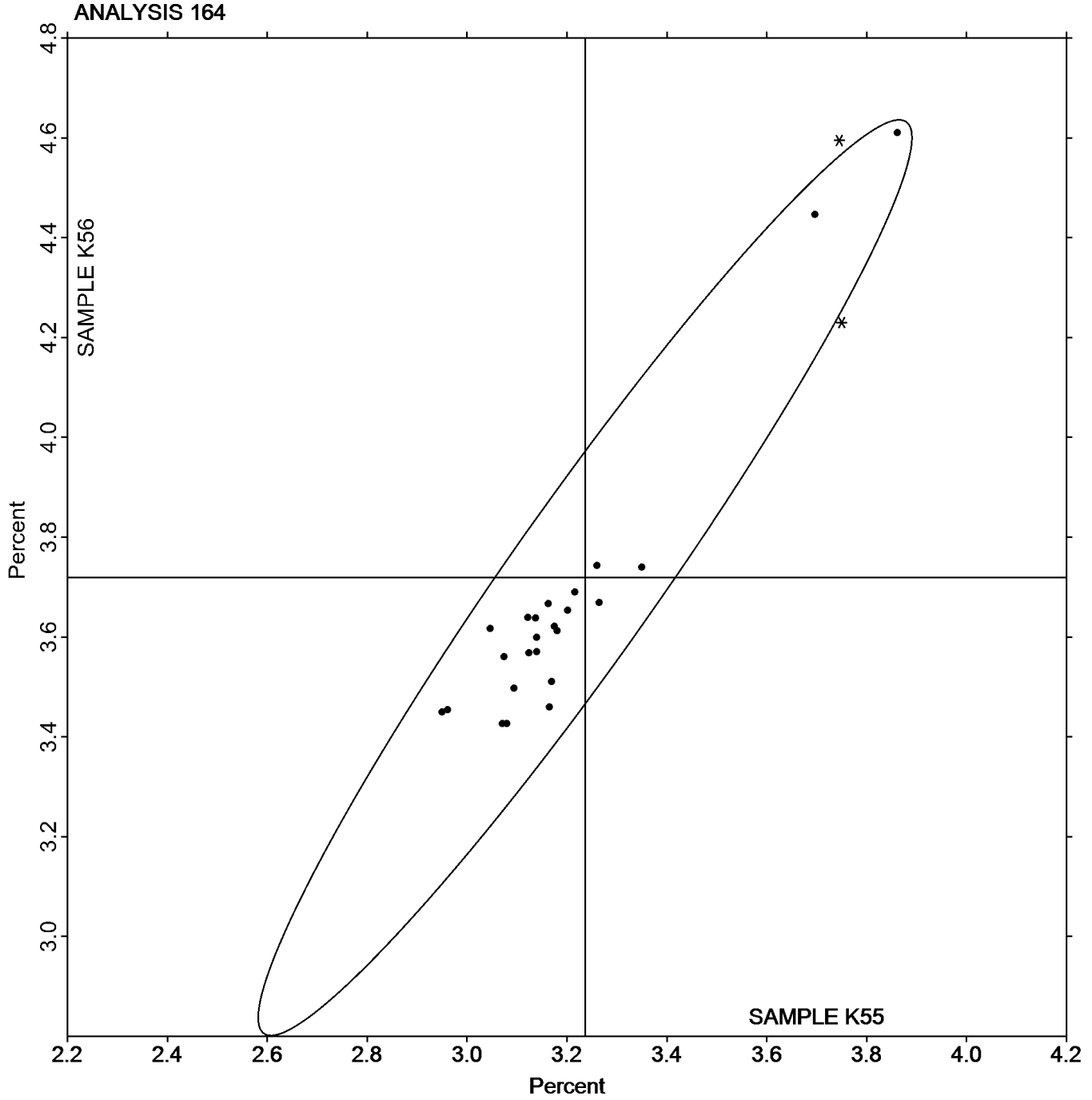
Copper-based Alloy, Element #5
IRON (Fe)

SAMPLE K55

3.236 Percent

SAMPLE K56

3.719 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 165

Copper-based Alloy, Element #6
NICKEL (Ni)

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		4.767	-0.080	-0.61	4.777	-0.146	-1.07	GD
4T4DMN		4.731	-0.116	-0.88	4.661	-0.262	-1.91	GD
6Y63MT		4.670	-0.177	-1.35	4.725	-0.198	-1.44	XX
74R9QU		4.837	-0.010	-0.08	4.870	-0.053	-0.39	OE
8DVGMQ		4.800	-0.047	-0.36	4.950	0.027	0.20	AA
9HLFRT		4.834	-0.013	-0.10	4.952	0.029	0.21	OE
B3342N		4.819	-0.028	-0.21	4.873	-0.050	-0.36	WD
BTVZ2Y		4.773	-0.073	-0.56	4.869	-0.054	-0.39	IC
C8C4W9		5.047	0.200	1.53	5.169	0.246	1.79	IC
D8DUL9		4.932	0.085	0.65	4.971	0.048	0.35	IC
DKYB8L		4.813	-0.034	-0.26	4.904	-0.019	-0.14	XX
DVXZ8V		4.750	-0.096	-0.74	4.838	-0.085	-0.62	IC
F8GW3J		5.050	0.204	1.56	5.081	0.158	1.15	OE
F9WKMP		4.900	0.053	0.41	4.963	0.040	0.29	XX
G7HZDA		4.860	0.013	0.10	4.903	-0.020	-0.14	OE
JHVFF6		4.685	-0.162	-1.24	4.791	-0.132	-0.96	OE
KN863H		5.109	0.262	2.01	5.152	0.229	1.67	OE
L42G4E		4.927	0.080	0.61	4.975	0.052	0.38	OE
MR6KVL	X	6.590	1.743	13.32	6.659	1.736	12.66	OE
P4URQX		4.747	-0.100	-0.76	4.933	0.010	0.08	OE
PZ842Q		4.773	-0.073	-0.56	4.813	-0.110	-0.80	OE
Q4NWKX		4.953	0.106	0.81	4.918	-0.005	-0.04	ED
Q7QELT		5.076	0.229	1.75	5.201	0.278	2.03	OE
RH28PT		4.971	0.125	0.95	5.133	0.210	1.53	IC
TEHE9J		4.866	0.019	0.15	4.951	0.028	0.20	GD
UJ4XLY		4.637	-0.210	-1.61	4.780	-0.143	-1.04	XX
V2JH4N		4.687	-0.159	-1.22	4.843	-0.080	-0.58	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	4.847	Percent	4.923	Percent
Stnd Dev Btwn Labs	0.131	Percent	0.137	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 26 of 27 reporting participants

Key to Method Codes Reported by Participants

- | | | | |
|----|---|----|--|
| AA | Spectrometry - Atomic Absorption (AAS) | 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 #165

MR6KVL (X) - Data for both samples are high. Possible Systematic Error.

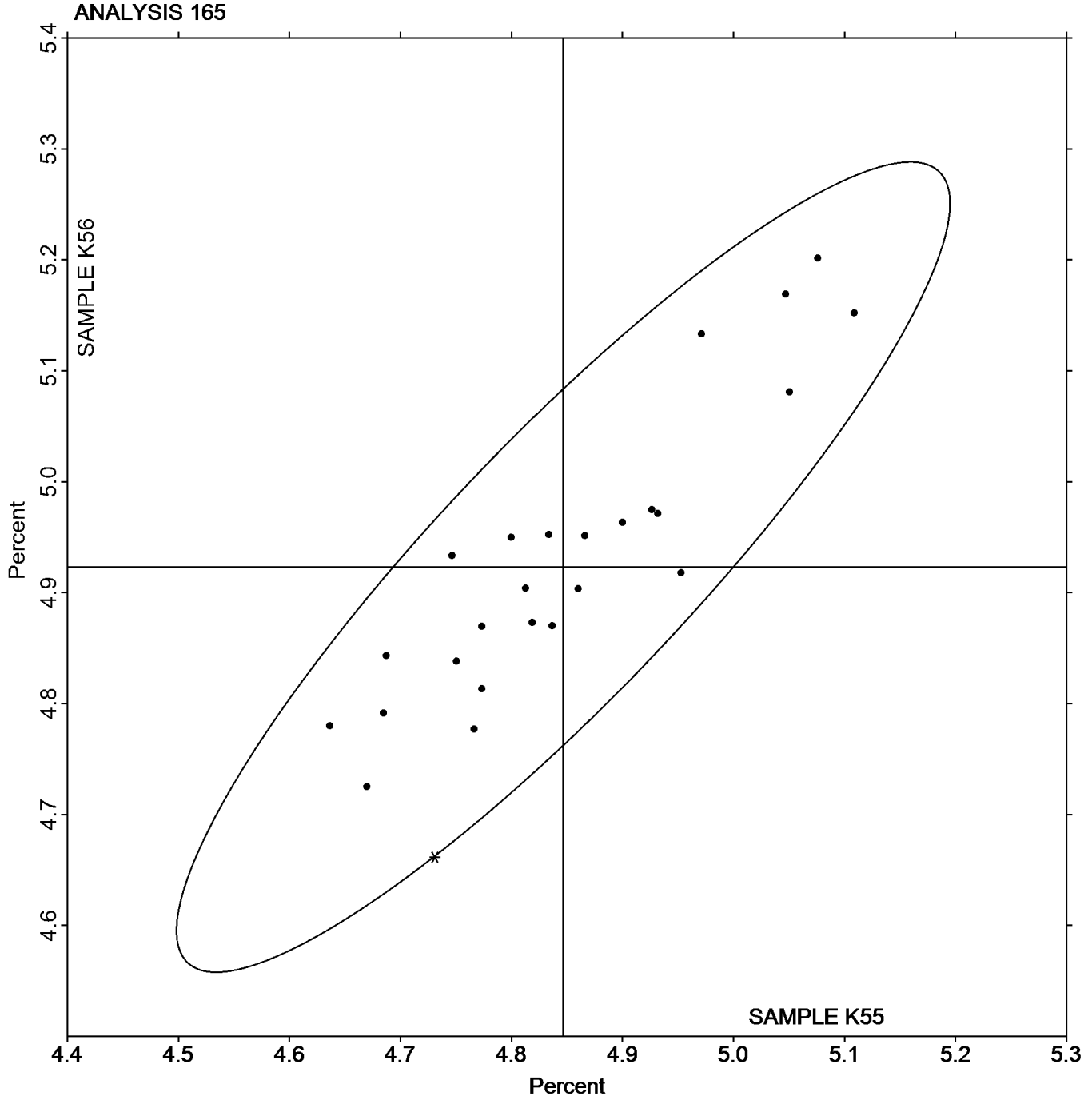


Analysis 165

Copper-based Alloy, Element #6
NICKEL (Ni)

SAMPLE K55
4.847 Percent

SAMPLE K56
4.923 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 166

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

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		0.0363	0.0001	0.03	0.0210	-0.0039	-0.73	GD
4T4DMN		0.0240	-0.0122	-2.34	0.0150	-0.0099	-1.86	GD
74R9QU		0.0402	0.0040	0.77	0.0287	0.0038	0.72	OE
9HLFRT		0.0397	0.0035	0.67	0.0296	0.0047	0.88	OE
B3342N		0.0331	-0.0031	-0.59	0.0219	-0.0030	-0.56	WD
BTVZ2Y		0.0364	0.0002	0.04	0.0262	0.0013	0.25	IC
D8DUL9		0.0341	-0.0021	-0.40	0.0241	-0.0008	-0.14	IC
DKYB8L		0.0343	-0.0019	-0.36	0.0263	0.0014	0.27	XX
DVXZ8V		0.0334	-0.0028	-0.54	0.0217	-0.0032	-0.61	IC
F8GW3J		0.0367	0.0005	0.09	0.0260	0.0011	0.21	OE
F9WKMP		0.0333	-0.0029	-0.55	0.0226	-0.0023	-0.43	XX
G7HZDA		0.0390	0.0028	0.54	0.0237	-0.0012	-0.23	OE
JHVFF6		0.0388	0.0026	0.49	0.0307	0.0058	1.08	OE
KN863H		0.0361	-0.0001	-0.02	0.0263	0.0014	0.26	OE
L42G4E		0.0354	-0.0008	-0.15	0.0254	0.0005	0.09	OE
MR6KVL		0.0290	-0.0072	-1.38	0.0120	-0.0129	-2.42	OE
P4URQX		0.0380	0.0018	0.35	0.0270	0.0021	0.40	OE
PZ842Q		0.0340	-0.0022	-0.43	0.0234	-0.0015	-0.28	OE
Q7QELT		0.0426	0.0064	1.23	0.0285	0.0036	0.68	OE
RH28PT		0.0287	-0.0075	-1.43	0.0194	-0.0055	-1.03	IC
TEHE9J		0.0440	0.0078	1.50	0.0330	0.0081	1.52	GD
UJ4XLY		0.0487	0.0125	2.39	0.0360	0.0111	2.09	XX
V2JH4N		0.0367	0.0005	0.09	0.0240	-0.0009	-0.17	OE

Summary Statistics				
	Sample K55		Sample K56	
Grand Means	0.0362	Percent	0.0249	Percent
Stnd Dev Btwn Labs	0.0052	Percent	0.0053	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 23 of 23 reporting participants

Key to Method Codes Reported by Participants

- GD Spectrometry - Glow Discharge (GDS)
- 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)

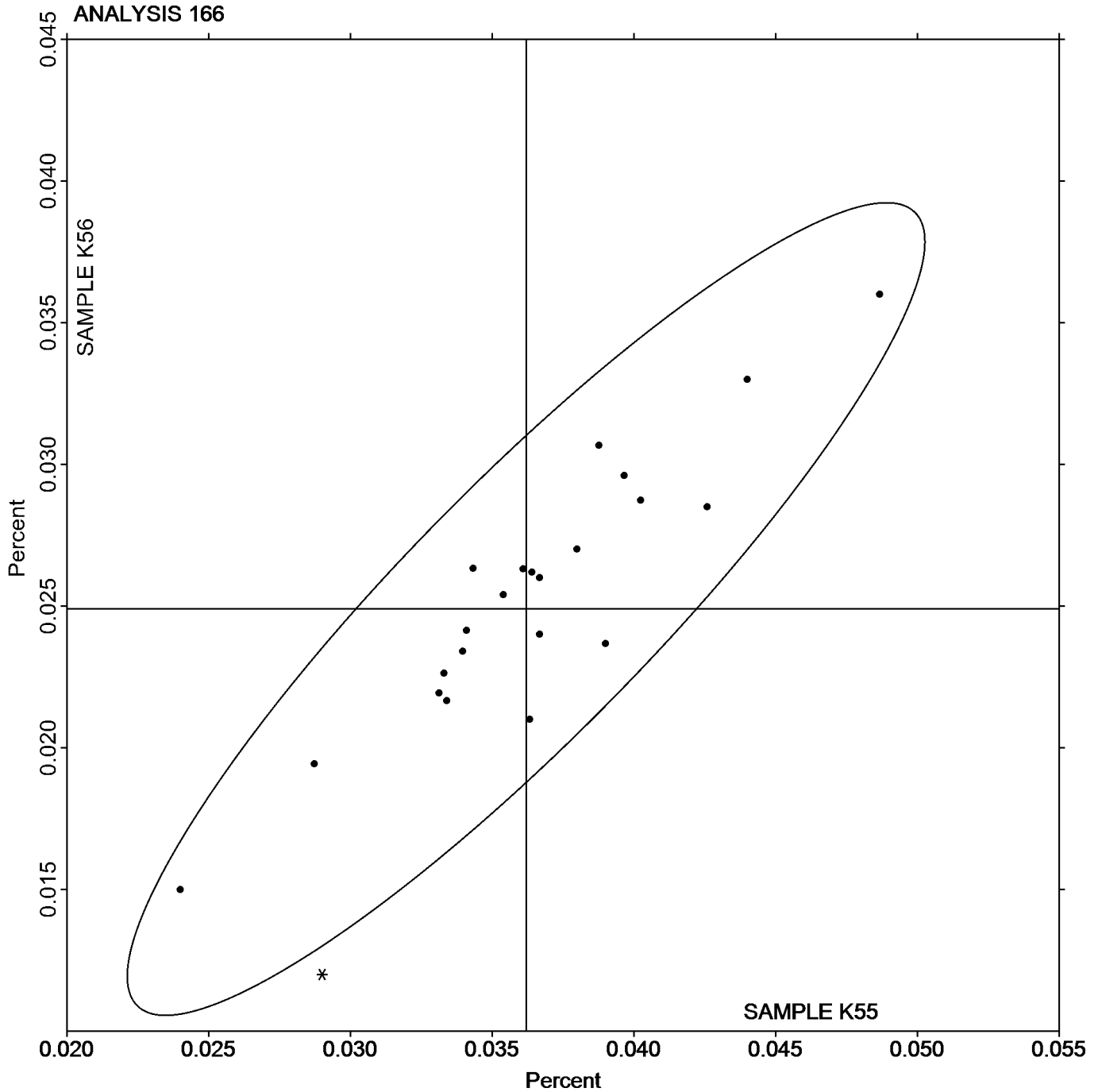


Analysis 166

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

SAMPLE K55
0.0362 Percent

SAMPLE K56
0.0249 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 167

Copper-based Alloy, Element #8
MANGANESE (Mn)

WebCode	Data Flag	Sample K55			Sample K56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
23F9PN		0.6177	0.0068	0.19	0.6980	-0.0149	-0.32	GD
4T4DMN		0.5173	-0.0935	-2.61	0.6227	-0.0902	-1.97	GD
6Y63MT		0.5955	-0.0154	-0.43	0.6980	-0.0149	-0.33	XX
74R9QU		0.6367	0.0258	0.72	0.7740	0.0611	1.34	XX
8DVGMQ		0.5950	-0.0159	-0.44	0.6750	-0.0379	-0.83	AA
9HLFRT		0.5867	-0.0242	-0.67	0.6977	-0.0152	-0.33	OE
B3342N		0.6179	0.0071	0.20	0.7188	0.0059	0.13	WD
BTVZ2Y		0.6040	-0.0069	-0.19	0.7147	0.0018	0.04	IC
C8C4W9		0.6604	0.0495	1.38	0.7666	0.0537	1.17	IC
D8DUL9		0.6077	-0.0032	-0.09	0.7099	-0.0030	-0.06	IC
DKYB8L		0.6030	-0.0079	-0.22	0.7027	-0.0102	-0.22	XX
DVXZ8V		0.6217	0.0108	0.30	0.7220	0.0091	0.20	IC
F8GW3J		0.6783	0.0675	1.88	0.8263	0.1135	2.48	OE
F9WKMP		0.6020	-0.0089	-0.25	0.7000	-0.0129	-0.28	XX
G7HZDA		0.5740	-0.0369	-1.03	0.6673	-0.0455	-0.99	OE
JHVFF6		0.6163	0.0055	0.15	0.6890	-0.0239	-0.52	OE
KN863H		0.6707	0.0598	1.67	0.7990	0.0861	1.88	OE
L42G4E		0.5853	-0.0255	-0.71	0.7020	-0.0109	-0.24	OE
MR6KVL		0.5837	-0.0272	-0.76	0.6810	-0.0319	-0.70	OE
P4URQX		0.6110	0.0001	0.00	0.6993	-0.0135	-0.30	OE
PZ842Q		0.6410	0.0301	0.84	0.7473	0.0345	0.75	OE
Q4NWKX		0.6677	0.0568	1.58	0.7643	0.0515	1.12	ED
Q7QELT		0.6081	-0.0027	-0.08	0.6751	-0.0377	-0.82	OE
RH28PT		0.6153	0.0045	0.12	0.7187	0.0058	0.13	IC
TEHE9J		0.5420	-0.0689	-1.92	0.6290	-0.0839	-1.83	GD
UJ4XLY		0.6067	-0.0042	-0.12	0.7100	-0.0029	-0.06	XX
V2JH4N		0.6277	0.0168	0.47	0.7387	0.0258	0.56	OE

Summary Statistics

	Sample K55		Sample K56	
Grand Means	0.6109	Percent	0.7129	Percent
Stnd Dev Btwn Labs	0.0359	Percent	0.0458	Percent

Samples K55, K56 : CDA630 - UNS C63000, CDA630 - UNS C63000

Statistics based on 27 of 27 reporting participants

Key to Method Codes Reported by Participants

- | | | | |
|----|---|----|--|
| AA | Spectrometry - Atomic Absorption (AAS) | ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) | IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) | WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element | | |

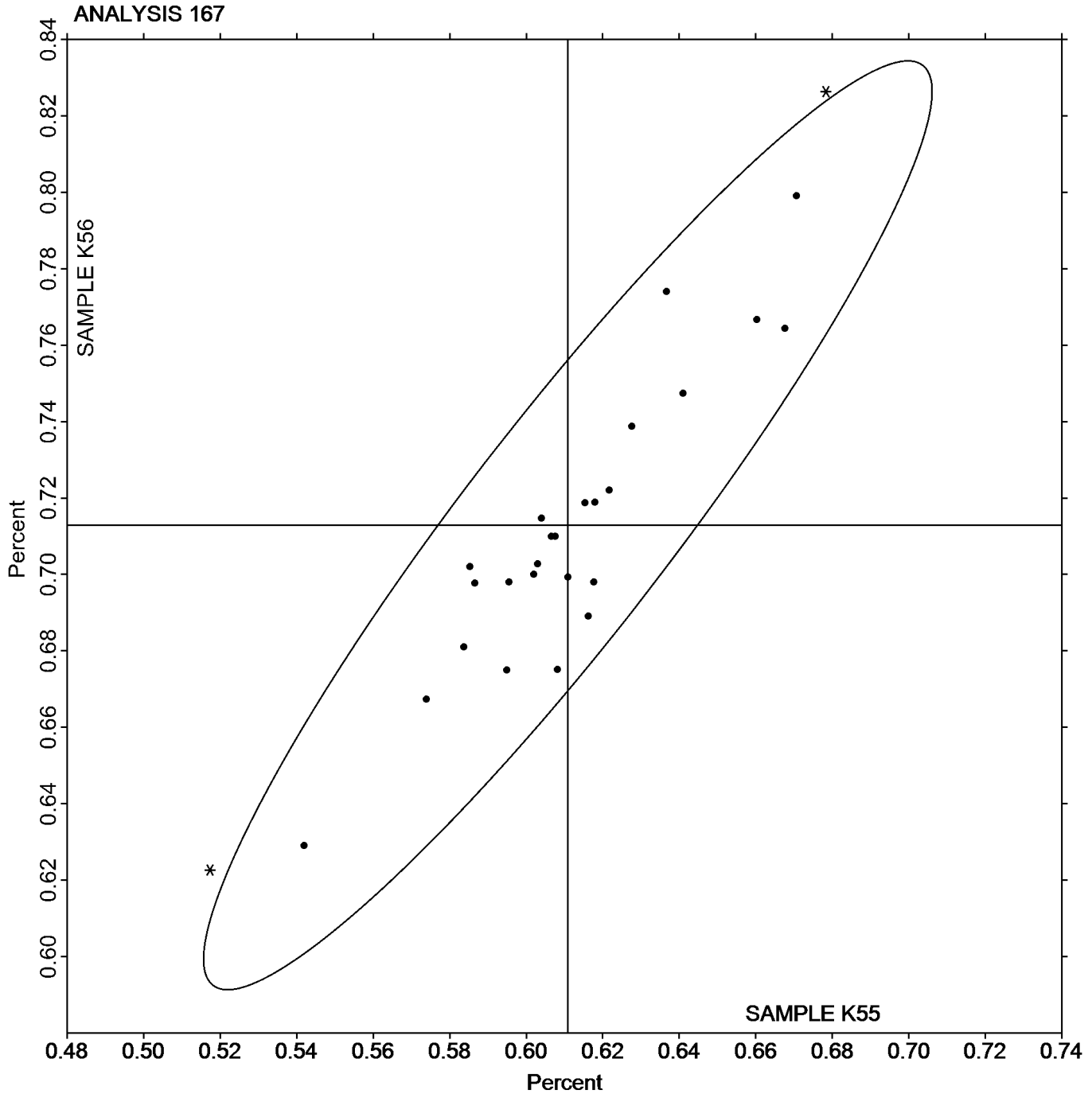


Analysis 167

Copper-based Alloy, Element #8
MANGANESE (Mn)

SAMPLE K55
0.6109 Percent

SAMPLE K56
0.7129 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 180

Corrosion Resistant Steel, Element #1
CARBON (C)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.0472	0.0033	1.05	0.0438	0.0018	0.57	CI
379Y6Y		0.0391	-0.0048	-1.54	0.0398	-0.0022	-0.69	OE
4APN43		0.0460	0.0021	0.66	0.0427	0.0007	0.22	CI
6XAL9B		0.0423	-0.0017	-0.53	0.0411	-0.0009	-0.28	CI
7ED23V		0.0423	-0.0016	-0.51	0.0400	-0.0020	-0.64	OE
7ZDLZV		0.0417	-0.0023	-0.73	0.0390	-0.0030	-0.96	CI
96HH2R		0.0414	-0.0026	-0.82	0.0359	-0.0061	-1.96	CI
9GDU9Y	X	0.0591	0.0152	4.86	0.0474	0.0054	1.74	CI
9HLFRT		0.0463	0.0023	0.75	0.0468	0.0048	1.56	OE
AGTDTW		0.0427	-0.0012	-0.39	0.0436	0.0016	0.53	OE
B24H9C		0.0460	0.0021	0.67	0.0423	0.0003	0.10	CI
B3342N		0.0455	0.0016	0.51	0.0424	0.0004	0.12	CO
BNJ6UG		0.0460	0.0021	0.67	0.0426	0.0006	0.19	OE
BTVZ2Y		0.0502	0.0063	2.02	0.0455	0.0035	1.12	CO
C29VC6		0.0427	-0.0013	-0.41	0.0417	-0.0003	-0.10	CI
CVZME4		0.0435	-0.0004	-0.14	0.0447	0.0027	0.87	OE
D8DUL9		0.0410	-0.0029	-0.94	0.0400	-0.0020	-0.64	OE
DECCZL		0.0420	-0.0019	-0.62	0.0409	-0.0011	-0.35	CI
DHDWWD		0.0435	-0.0004	-0.14	0.0420	0.0000	-0.01	CI
DKYB8L		0.0440	0.0001	0.02	0.0423	0.0003	0.11	OE
DVXZ8V		0.0447	0.0008	0.24	0.0426	0.0006	0.20	CI
E7BWXD		0.0430	-0.0010	-0.31	0.0417	-0.0003	-0.08	CI
EMNQN9		0.0420	-0.0019	-0.62	0.0441	0.0021	0.69	GD
F9WKMP		0.0393	-0.0046	-1.49	0.0389	-0.0031	-0.99	OE
GBB9DA		0.0449	0.0009	0.30	0.0416	-0.0004	-0.14	OE
GLXZ8E		0.0470	0.0031	0.98	0.0483	0.0063	2.04	OE
GN9XMG		0.0513	0.0074	2.37	0.0493	0.0073	2.37	OE
HVJQ6Q		0.0463	0.0024	0.77	0.0430	0.0010	0.33	GD
HWVDPQ		0.0409	-0.0031	-0.98	0.0394	-0.0026	-0.83	OE
J7GYCZ		0.0410	-0.0029	-0.94	0.0430	0.0010	0.33	OE
JHVFF6		0.0400	-0.0039	-1.25	0.0337	-0.0083	-2.67	OE
JP7A3F	X	0.0576	0.0136	4.37	0.0560	0.0140	4.50	OE
KN863H		0.0371	-0.0068	-2.19	0.0337	-0.0083	-2.66	OE
KPREKY		0.0424	-0.0015	-0.49	0.0405	-0.0015	-0.47	OE
KUWMGU		0.0437	-0.0003	-0.09	0.0410	-0.0010	-0.32	OE
L42G4E		0.0494	0.0055	1.75	0.0428	0.0008	0.27	OE
MA3JWY		0.0434	-0.0006	-0.18	0.0415	-0.0005	-0.16	OE
N49KLV		0.0452	0.0013	0.40	0.0430	0.0010	0.33	OE
N9ZR3H		0.0502	0.0062	2.00	0.0494	0.0074	2.39	OE
NMANPC		0.0422	-0.0018	-0.57	0.0424	0.0004	0.14	CI
P4URQX		0.0457	0.0017	0.55	0.0433	0.0013	0.43	OE
PWDGDW		0.0493	0.0054	1.72	0.0430	0.0010	0.32	OE
PZ842Q		0.0442	0.0003	0.09	0.0422	0.0002	0.07	OE
Q2K22U		0.0427	-0.0012	-0.40	0.0417	-0.0003	-0.10	OE
QB4X4A		0.0410	-0.0029	-0.94	0.0433	0.0013	0.43	OE
TEHE9J		0.0390	-0.0049	-1.58	0.0390	-0.0030	-0.96	GD
U2N38B		0.0471	0.0032	1.01	0.0445	0.0025	0.81	OE



Fasteners and Metals Interlaboratory Testing Program

**Cycle 124
4th Qtr 2018**

Analysis 180

**Corrosion Resistant Steel, Element #1
CARBON (C)**

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U943PN		0.0425	-0.0015	-0.47	0.0418	-0.0002	-0.06	OE
UEWNWV		0.0404	-0.0035	-1.13	0.0359	-0.0061	-1.96	CI
UX87JF		0.0440	0.0001	0.02	0.0420	0.0000	0.00	CI
V2JH4N		0.0467	0.0027	0.87	0.0460	0.0040	1.29	OE
VGZF84	X	0.0287	-0.0153	-4.89	0.0273	-0.0147	-4.72	CO
WMGBKC		0.0427	-0.0012	-0.39	0.0404	-0.0016	-0.52	CI
XLXTWW		0.0472	0.0033	1.04	0.0442	0.0022	0.70	OE
XZLEGB		0.0486	0.0047	1.49	0.0439	0.0019	0.62	CO
YKJAHX		0.0407	-0.0033	-1.05	0.0391	-0.0029	-0.94	GD
Z8BH6C		0.0428	-0.0011	-0.36	0.0407	-0.0013	-0.43	OE
ZZDN8D		0.0447	0.0007	0.23	0.0413	-0.0007	-0.21	CI

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.0439	Percent	0.0420	Percent
Stnd Dev Btwn Labs	0.0031	Percent	0.0031	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 55 of 58 reporting participants

Key to Method Codes Reported by Participants

- CI Combustion / IR
- GD Spectrometry - Glow Discharge (GDS)
- CO Combustion
- OE Spectrometry - Optical Emission (OES)

Comments on Assigned Data Flags for Test #180

- 9GDU9Y (X) - Data for sample M55 are high.
- JP7A3F (X) - Data for both samples are high. Possible Systematic Error.
- VGZF84 (X) - Data for both samples are low. Possible Systematic Error.

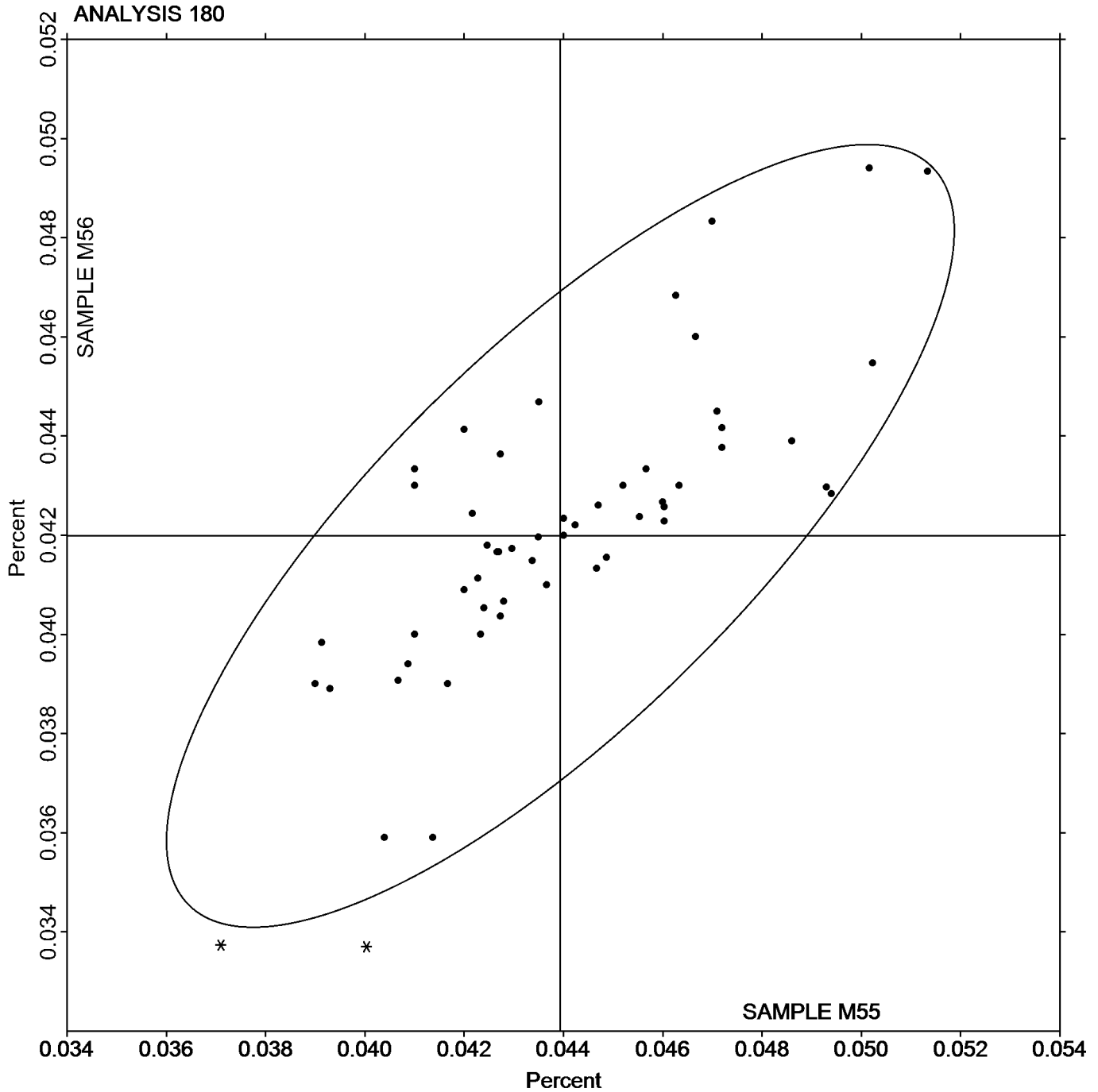


Analysis 180

Corrosion Resistant Steel, Element #1
CARBON (C)

SAMPLE M55
0.0439 Percent

SAMPLE M56
0.0420 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 181

Corrosion Resistant Steel, Element #2
MANGANESE (Mn)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		1.509	0.042	1.87	1.447	0.022	0.95	IC
379Y6Y		1.461	-0.007	-0.30	1.452	0.027	1.16	OE
38AK6L		1.490	0.023	1.02	1.427	0.002	0.08	WD
4APN43		1.459	-0.009	-0.39	1.419	-0.006	-0.26	OE
6XAL9B		1.453	-0.015	-0.67	1.408	-0.017	-0.74	WD
74R9QU	X	1.549	0.081	3.65	1.501	0.076	3.27	OE
7ED23V		1.480	0.012	0.55	1.447	0.021	0.92	OE
7ZDLZV		1.464	-0.004	-0.19	1.411	-0.014	-0.62	IC
96HH2R		1.458	-0.010	-0.44	1.407	-0.019	-0.81	WD
9HLFRT		1.460	-0.008	-0.36	1.441	0.015	0.66	OE
AGTDTW		1.461	-0.006	-0.29	1.434	0.009	0.39	OE
B24H9C		1.466	-0.002	-0.08	1.423	-0.002	-0.10	OE
B3342N		1.458	-0.010	-0.45	1.411	-0.015	-0.64	WD
BNJ6UG		1.456	-0.012	-0.53	1.409	-0.017	-0.72	WD
BTVZ2Y		1.459	-0.008	-0.38	1.407	-0.018	-0.80	IC
C29VC6		1.480	0.012	0.55	1.433	0.008	0.34	IC
CVZME4		1.459	-0.009	-0.40	1.449	0.024	1.02	OE
D8DUL9		1.462	-0.005	-0.24	1.416	-0.009	-0.39	OE
DECCZL		1.473	0.005	0.24	1.420	-0.005	-0.22	WD
DHDWWD		1.463	-0.004	-0.20	1.418	-0.008	-0.34	XR
DKYB8L		1.460	-0.008	-0.35	1.437	0.011	0.49	XX
DVXZ8V		1.488	0.020	0.90	1.444	0.019	0.80	IC
E7BWXD		1.461	-0.007	-0.32	1.418	-0.008	-0.33	WD
EMNQN9		1.497	0.029	1.30	1.470	0.045	1.93	GD
F9WKMP		1.473	0.006	0.25	1.433	0.008	0.34	OE
GBB9DA		1.461	-0.007	-0.32	1.412	-0.014	-0.60	OE
GLXZ8E	*	1.510	0.042	1.90	1.497	0.071	3.08	OE
GN9XMG		1.507	0.039	1.75	1.437	0.011	0.49	OE
HVJQ6Q		1.483	0.016	0.70	1.417	-0.009	-0.38	GD
HWVDPQ		1.447	-0.021	-0.95	1.407	-0.019	-0.81	OE
J7GYCZ		1.495	0.028	1.24	1.448	0.023	0.99	OE
JHVFF6		1.461	-0.006	-0.29	1.410	-0.016	-0.68	OE
JP7A3F	*	1.527	0.059	2.65	1.493	0.068	2.94	OE
KN863H		1.408	-0.060	-2.70	1.364	-0.061	-2.64	OE
KPREKY		1.460	-0.008	-0.35	1.413	-0.012	-0.52	OE
KUWMGU		1.490	0.022	1.00	1.440	0.015	0.63	OE
L42G4E		1.468	0.000	0.01	1.404	-0.022	-0.94	OE
MA3JWY		1.474	0.007	0.30	1.414	-0.012	-0.51	OE
N49KLV		1.457	-0.011	-0.50	1.403	-0.022	-0.95	OE
N9ZR3H		1.447	-0.021	-0.95	1.407	-0.019	-0.81	OE
NMANPC		1.440	-0.027	-1.23	1.399	-0.027	-1.16	WD
P4URQX		1.453	-0.014	-0.65	1.417	-0.009	-0.38	OE
PWDGDW	*	1.474	0.006	0.27	1.392	-0.033	-1.43	OE
PZ842Q		1.437	-0.031	-1.39	1.407	-0.019	-0.81	OE
Q2K22U		1.482	0.014	0.63	1.453	0.028	1.19	WD
QB4X4A		1.454	-0.014	-0.62	1.436	0.011	0.46	OE
TEHE9J		1.430	-0.038	-1.69	1.394	-0.031	-1.36	GD



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 181

Corrosion Resistant Steel, Element #2
MANGANESE (Mn)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U2N38B		1.486	0.018	0.82	1.444	0.019	0.82	OE
U943PN		1.423	-0.044	-1.99	1.403	-0.022	-0.95	OE
UEWNWV		1.469	0.002	0.07	1.419	-0.006	-0.28	XR
UX87JF		1.463	-0.004	-0.20	1.419	-0.006	-0.26	WD
V2JH4N		1.493	0.026	1.15	1.443	0.018	0.77	OE
VGZF84		1.500	0.032	1.45	1.443	0.018	0.77	OE
WMGBKC		1.490	0.022	1.00	1.443	0.018	0.76	WD
XLXTWW		1.456	-0.012	-0.54	1.429	0.004	0.17	OE
XZLEGB		1.432	-0.035	-1.59	1.413	-0.013	-0.55	OE
YKJAHX		1.462	-0.006	-0.27	1.425	-0.001	-0.03	GD
Z8BH6C		1.472	0.004	0.18	1.423	-0.003	-0.12	WD
ZZDN8D	*	1.512	0.045	2.00	1.412	-0.014	-0.59	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	1.468	Percent	1.425	Percent
Stnd Dev Btwn Labs	0.022	Percent	0.023	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 57 of 59 reporting participants

Key to Method Codes Reported by Participants

- GD Spectrometry - Glow Discharge (GDS)
- OE Spectrometry - Optical Emission (OES)
- XR X-Ray Fluorescence - ED or WD not specified
- IC Spectrometry - Inductively Coupled Plasma (ICP)
- WD X-Ray Fluorescence - Wavelength Dispersive (WDX)
- XX Please Indicate Method Used for Current Element

Comments on Assigned Data Flags for Test #181

74R9QU (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample M55.



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 181

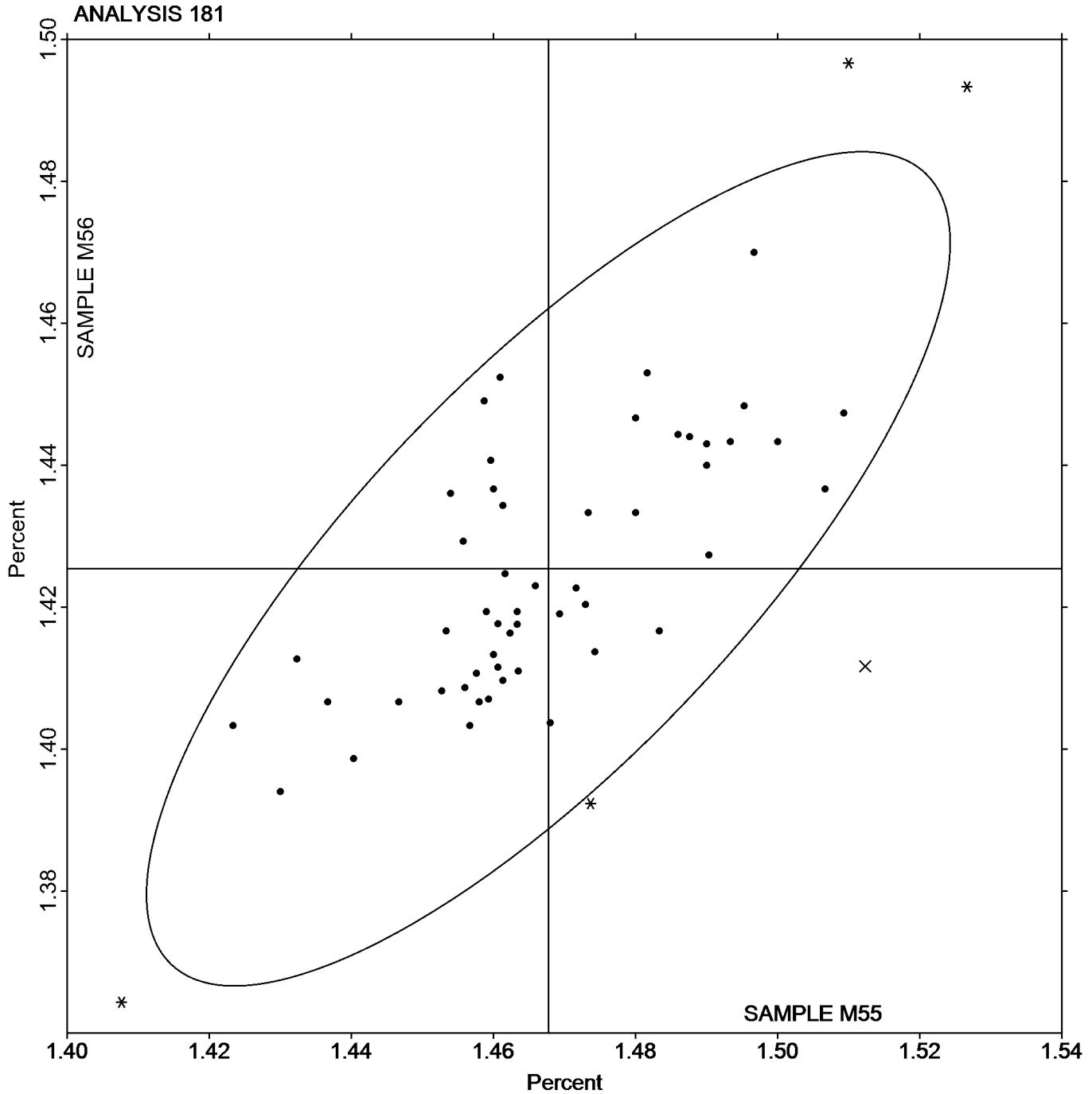
Corrosion Resistant Steel, Element #2
MANGANESE (Mn)

SAMPLE M55

1.468 Percent

SAMPLE M56

1.425 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 182

Corrosion Resistant Steel, Element #3
PHOSPHORUS (P)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.0347	0.0030	1.61	0.0309	0.0018	0.95	IC
379Y6Y		0.0329	0.0012	0.65	0.0317	0.0025	1.34	OE
4APN43		0.0330	0.0013	0.69	0.0303	0.0012	0.64	OE
6XAL9B		0.0318	0.0001	0.07	0.0289	-0.0002	-0.10	WD
74R9QU		0.0317	0.0000	-0.02	0.0277	-0.0015	-0.77	OE
7ED23V	X	0.0250	-0.0067	-3.57	0.0250	-0.0041	-2.18	OE
7ZDLZV		0.0338	0.0021	1.12	0.0302	0.0011	0.58	IC
96HH2R		0.0326	0.0009	0.49	0.0291	0.0000	0.00	WD
9HLFRT		0.0296	-0.0021	-1.14	0.0291	0.0000	0.00	OE
AGDTW		0.0333	0.0016	0.83	0.0328	0.0037	1.96	OE
B24H9C		0.0309	-0.0008	-0.45	0.0283	-0.0009	-0.45	OE
B3342N		0.0299	-0.0018	-0.94	0.0278	-0.0014	-0.72	OE
BNJ6UG		0.0327	0.0010	0.53	0.0297	0.0005	0.29	WD
BTVZ2Y		0.0314	-0.0003	-0.14	0.0275	-0.0016	-0.84	IC
C29VC6		0.0300	-0.0017	-0.91	0.0267	-0.0025	-1.30	IC
CVZME4		0.0345	0.0028	1.51	0.0342	0.0051	2.67	OE
D8DUL9		0.0290	-0.0027	-1.44	0.0280	-0.0011	-0.59	OE
DECCZL		0.0309	-0.0008	-0.43	0.0276	-0.0016	-0.82	WD
DHDWWD		0.0322	0.0005	0.25	0.0292	0.0001	0.06	XR
DKYB8L		0.0320	0.0003	0.16	0.0307	0.0015	0.81	XX
DVXZ8V		0.0323	0.0006	0.33	0.0297	0.0006	0.30	IC
E7BWXD		0.0312	-0.0005	-0.27	0.0287	-0.0005	-0.24	WD
EMNQN9		0.0322	0.0005	0.28	0.0326	0.0034	1.82	GD
F9WKMP		0.0298	-0.0019	-1.01	0.0272	-0.0019	-1.00	OE
GBB9DA		0.0336	0.0019	1.03	0.0300	0.0008	0.43	OE
GLXZ8E		0.0340	0.0023	1.22	0.0320	0.0029	1.52	OE
GN9XMG		0.0363	0.0046	2.46	0.0330	0.0039	2.04	OE
HVJQ6Q		0.0350	0.0033	1.75	0.0300	0.0009	0.46	GD
HWVDPQ		0.0293	-0.0024	-1.28	0.0275	-0.0016	-0.84	OE
J7GYCZ		0.0317	0.0000	-0.02	0.0313	0.0022	1.16	OE
JHVFF6		0.0328	0.0011	0.60	0.0285	-0.0006	-0.31	OE
JP7A3F		0.0321	0.0004	0.23	0.0281	-0.0011	-0.56	OE
KN863H		0.0294	-0.0023	-1.24	0.0274	-0.0018	-0.93	OE
KPREKY		0.0303	-0.0014	-0.73	0.0279	-0.0012	-0.65	OE
KUWMGU		0.0317	0.0000	-0.02	0.0280	-0.0011	-0.59	OE
L42G4E		0.0316	-0.0001	-0.07	0.0279	-0.0012	-0.63	OE
MA3JWY		0.0301	-0.0016	-0.85	0.0261	-0.0030	-1.59	OE
N49KLV		0.0347	0.0030	1.60	0.0281	-0.0010	-0.54	OE
N9ZR3H	X	0.0200	-0.0117	-6.21	0.0179	-0.0112	-5.92	OE
NMANPC		0.0297	-0.0020	-1.09	0.0274	-0.0018	-0.93	WD
P4URQX		0.0313	-0.0004	-0.20	0.0287	-0.0005	-0.24	OE
PWDGDW		0.0333	0.0016	0.83	0.0275	-0.0016	-0.84	OE
PZ842Q	X	0.0374	0.0057	3.02	0.0381	0.0090	4.75	OE
Q2K22U		0.0321	0.0004	0.19	0.0286	-0.0005	-0.26	OE
QB4X4A		0.0316	-0.0001	-0.07	0.0306	0.0015	0.78	OE
TEHE9J		0.0290	-0.0027	-1.44	0.0270	-0.0021	-1.12	GD
U2N38B		0.0347	0.0030	1.60	0.0318	0.0027	1.41	OE



Fasteners and Metals Interlaboratory Testing Program

**Cycle 124
4th Qtr 2018**

Analysis 182

**Corrosion Resistant Steel, Element #3
PHOSPHORUS (P)**

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U943PN		0.0271	-0.0046	-2.47	0.0262	-0.0029	-1.54	OE
UEWNWV		0.0315	-0.0002	-0.13	0.0284	-0.0008	-0.40	XR
UX87JF		0.0317	0.0000	-0.02	0.0290	-0.0001	-0.07	WD
V2JH4N		0.0293	-0.0024	-1.26	0.0277	-0.0014	-0.75	OE
VGZF84		0.0330	0.0013	0.69	0.0310	0.0019	0.99	OE
WMGBKC		0.0290	-0.0027	-1.44	0.0260	-0.0031	-1.65	WD
XLXTWW		0.0323	0.0006	0.33	0.0310	0.0018	0.97	OE
XZLEGB		0.0300	-0.0017	-0.91	0.0310	0.0019	0.99	OE
YKJAHX		0.0323	0.0006	0.30	0.0297	0.0006	0.32	GD
Z8BH6C		0.0317	0.0000	0.02	0.0288	-0.0004	-0.19	WD
ZZDN8D		0.0291	-0.0026	-1.39	0.0272	-0.0020	-1.03	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.0317	Percent	0.0291	Percent
Stnd Dev Btwn Labs	0.0019	Percent	0.0019	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 55 of 58 reporting participants

Key to Method Codes Reported by Participants

- GD Spectrometry - Glow Discharge (GDS)
- OE Spectrometry - Optical Emission (OES)
- XR X-Ray Fluorescence - ED or WD not specified
- IC Spectrometry - Inductively Coupled Plasma (ICP)
- WD X-Ray Fluorescence - Wavelength Dispersive (WDX)
- XX Please Indicate Method Used for Current Element

Comments on Assigned Data Flags for Test #182

- 7ED23V (X) - Data for sample M55 are low.
- N9ZR3H (X) - Data for both samples are low.
- PZ842Q (X) - Data for both samples are high.

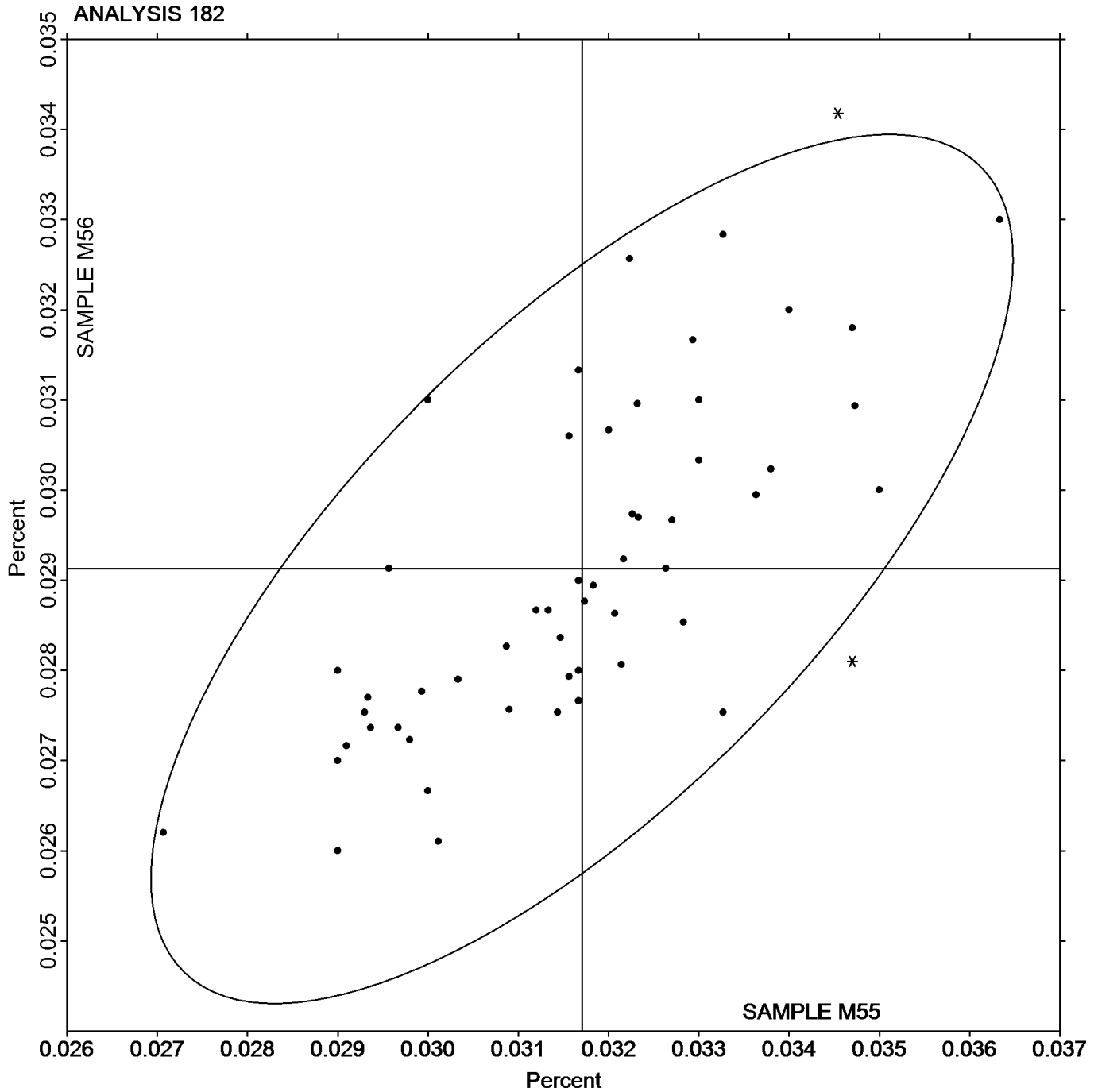


Analysis 182

Corrosion Resistant Steel, Element #3
PHOSPHORUS (P)

SAMPLE M55
0.0317 Percent

SAMPLE M56
0.0291 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 183

Corrosion Resistant Steel, Element #4
TITANIUM (Ti)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.4035	0.0134	0.92	0.3830	0.0015	0.12	IC
379Y6Y		0.3655	-0.0246	-1.70	0.3698	-0.0117	-0.92	OE
38AK6L		0.3880	-0.0022	-0.15	0.3750	-0.0065	-0.51	DR
4APN43		0.3963	0.0062	0.42	0.3770	-0.0045	-0.35	OE
6XAL9B		0.3913	0.0012	0.08	0.3867	0.0052	0.41	WD
74R9QU		0.3880	-0.0022	-0.15	0.3677	-0.0138	-1.09	OE
7ED23V		0.4033	0.0132	0.91	0.3967	0.0152	1.20	OE
7ZDLZV		0.3923	0.0021	0.14	0.3803	-0.0012	-0.09	IC
96HH2R		0.3957	0.0055	0.38	0.3887	0.0072	0.57	CI
9HLFRT		0.4080	0.0178	1.23	0.4030	0.0215	1.69	OE
AGTDTW		0.3653	-0.0248	-1.71	0.3677	-0.0138	-1.09	OE
B24H9C		0.3996	0.0095	0.65	0.3943	0.0128	1.01	OE
B3342N		0.3949	0.0047	0.32	0.3896	0.0081	0.64	WD
BNJ6UG		0.3780	-0.0122	-0.84	0.3750	-0.0065	-0.51	WD
BTVZ2Y		0.3887	-0.0015	-0.10	0.3673	-0.0142	-1.12	IC
C29VC6		0.3967	0.0065	0.45	0.3947	0.0132	1.04	IC
CVZME4		0.3852	-0.0050	-0.34	0.3806	-0.0009	-0.07	OE
D8DUL9		0.3937	0.0035	0.24	0.3710	-0.0105	-0.83	OE
DECCZL		0.3960	0.0058	0.40	0.3943	0.0128	1.01	WD
DHDWWD		0.3821	-0.0081	-0.56	0.3781	-0.0034	-0.27	XR
DKYB8L		0.3943	0.0042	0.29	0.3730	-0.0085	-0.67	XX
DVXZ8V		0.4067	0.0165	1.14	0.3893	0.0078	0.62	IC
E7BWXD		0.3943	0.0042	0.29	0.3913	0.0098	0.78	WD
EMNQN9		0.3670	-0.0232	-1.60	0.3620	-0.0195	-1.54	GD
F9WKMP	*	0.3837	-0.0065	-0.45	0.4027	0.0212	1.67	OE
GBB9DA		0.3613	-0.0288	-1.99	0.3670	-0.0145	-1.14	OE
GLXZ8E		0.3967	0.0065	0.45	0.3900	0.0085	0.67	OE
GN9XMG		0.4187	0.0285	1.96	0.3927	0.0112	0.88	OE
HVJQ6Q		0.3920	0.0018	0.13	0.3720	-0.0095	-0.75	GD
HWVDPQ		0.3547	-0.0355	-2.45	0.3540	-0.0275	-2.17	OE
JHVFF6		0.3843	-0.0058	-0.40	0.3777	-0.0038	-0.30	OE
JP7A3F		0.3817	-0.0085	-0.59	0.3647	-0.0168	-1.33	OE
KN863H		0.3640	-0.0262	-1.80	0.3663	-0.0152	-1.19	OE
KPREKY		0.4023	0.0122	0.84	0.3943	0.0128	1.01	OE
KUWMGU		0.4000	0.0098	0.68	0.3777	-0.0038	-0.30	OE
L42G4E		0.4013	0.0112	0.77	0.3697	-0.0118	-0.93	OE
MA3JWY		0.3743	-0.0158	-1.09	0.3710	-0.0105	-0.82	OE
N49KLV		0.3787	-0.0115	-0.79	0.3680	-0.0135	-1.06	OE
N9ZR3H		0.4013	0.0112	0.77	0.3960	0.0145	1.14	OE
NMANPC		0.4008	0.0106	0.73	0.3966	0.0151	1.19	WD
P4URQX		0.3733	-0.0168	-1.16	0.3667	-0.0148	-1.17	OE
PWDGDW		0.4030	0.0128	0.88	0.3623	-0.0192	-1.51	OE
PZ842Q		0.3897	-0.0005	-0.03	0.3753	-0.0062	-0.49	OE
Q2K22U		0.3815	-0.0087	-0.60	0.3700	-0.0115	-0.91	WD
Q4NWKX		0.3867	-0.0035	-0.24	0.3867	0.0052	0.41	ED
QB4X4A		0.3857	-0.0045	-0.31	0.3807	-0.0008	-0.07	OE
TEHE9J		0.3590	-0.0312	-2.15	0.3730	-0.0085	-0.67	GD



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 183

Corrosion Resistant Steel, Element #4
TITANIUM (Ti)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U2N38B		0.4187	0.0285	1.96	0.4080	0.0265	2.09	OE
U943PN		0.4063	0.0162	1.11	0.3957	0.0142	1.12	OE
UEWNWV		0.3973	0.0072	0.49	0.3897	0.0082	0.64	XR
UX87JF		0.4007	0.0105	0.72	0.4007	0.0192	1.51	WD
V2JH4N		0.4120	0.0218	1.50	0.3957	0.0142	1.12	OE
VGZF84	X	0.3500	-0.0402	-2.77	0.3300	-0.0515	-4.06	OE
WMGBKC	X	0.4300	0.0398	2.74	0.4290	0.0475	3.74	WD
XLXTWW	X	0.4624	0.0722	4.97	0.4449	0.0634	4.99	OE
XZLEGB		0.3997	0.0095	0.65	0.3920	0.0105	0.83	OE
Z8BH6C		0.3870	-0.0032	-0.22	0.3843	0.0028	0.22	WD
ZZDN8D		0.3883	-0.0018	-0.13	0.3850	0.0035	0.28	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.3902	Percent	0.3815	Percent
Std Dev Btwn Labs	0.0145	Percent	0.0127	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 55 of 58 reporting participants

Key to Method Codes Reported by Participants

- CI Combustion / IR
- ED X-Ray Fluorescence - Energy Dispersive (EDX)
- IC Spectrometry - Inductively Coupled Plasma (ICP)
- WD X-Ray Fluorescence - Wavelength Dispersive (WDX)
- XX Please Indicate Method Used for Current Element
- DR Spectrometry - Direct Reading OE (DROES)
- GD Spectrometry - Glow Discharge (GDS)
- OE Spectrometry - Optical Emission (OES)
- XR X-Ray Fluorescence - ED or WD not specified

Comments on Assigned Data Flags for Test #183

- VGZF84 (X) - Data for both samples are low.
- WMGBKC (X) - Data for both samples are high.
- XLXTWW (X) - Data for both samples are high.

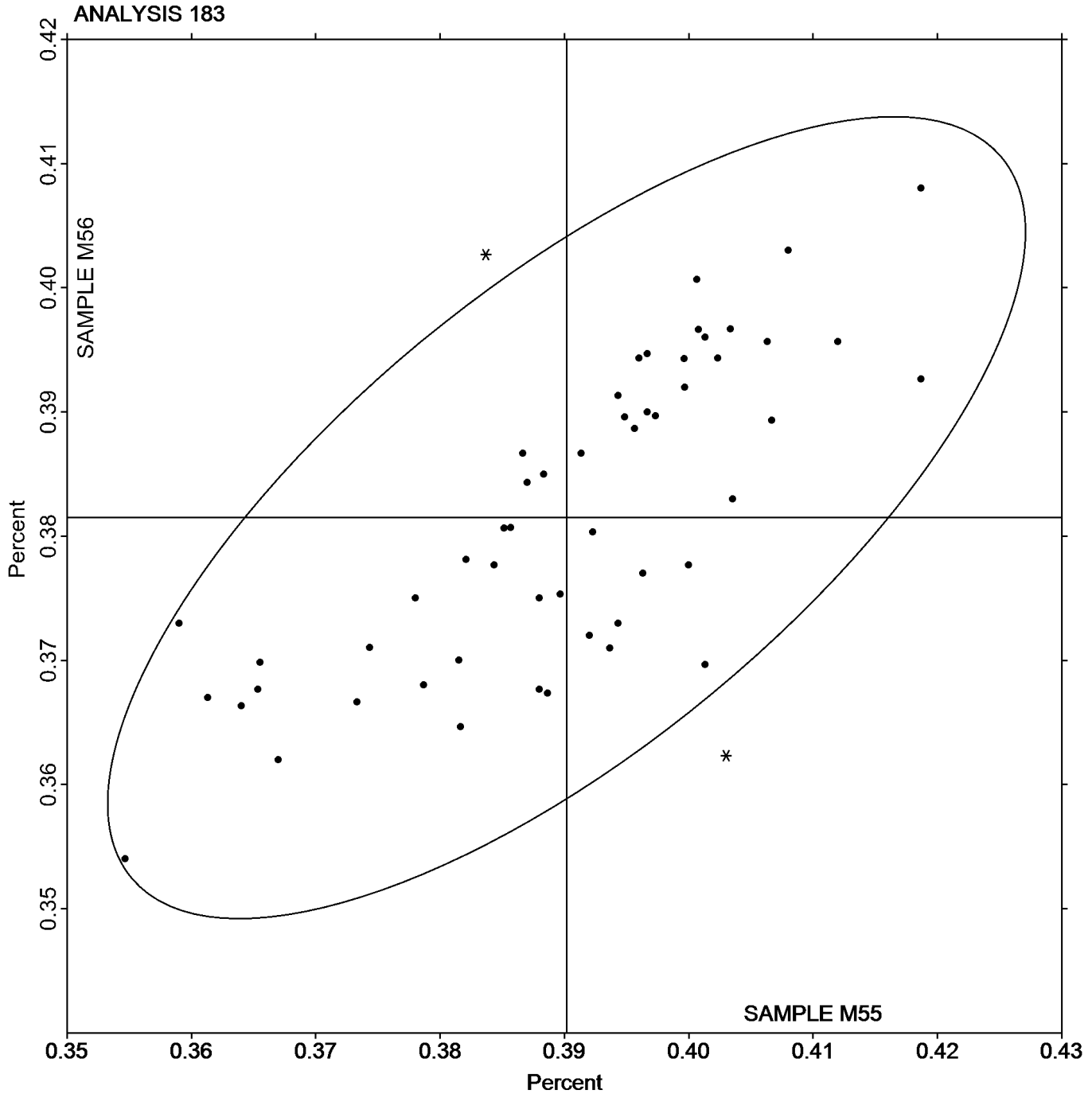


Analysis 183

Corrosion Resistant Steel, Element #4
TITANIUM (Ti)

SAMPLE M55
0.3902 Percent

SAMPLE M56
0.3815 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 184

Corrosion Resistant Steel, Element #5
SILICON (Si)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.4613	0.0092	0.62	0.4130	0.0066	0.46	IC
379Y6Y	X	0.5204	0.0683	4.59	0.4589	0.0525	3.70	OE
38AK6L		0.4537	0.0015	0.10	0.4053	-0.0011	-0.08	WD
4APN43		0.4750	0.0229	1.54	0.4250	0.0186	1.31	OE
6XAL9B		0.4563	0.0042	0.28	0.4160	0.0096	0.67	OE
74R9QU		0.4383	-0.0138	-0.93	0.3897	-0.0168	-1.18	OE
7ED23V		0.4510	-0.0011	-0.08	0.4090	0.0026	0.18	OE
7ZDLZV		0.4561	0.0040	0.27	0.4035	-0.0030	-0.21	IC
96HH2R		0.4363	-0.0158	-1.06	0.3887	-0.0178	-1.25	WD
9HLFRT		0.4823	0.0302	2.03	0.4420	0.0356	2.51	OE
AGTDTW		0.4357	-0.0165	-1.11	0.3953	-0.0111	-0.78	OE
B24H9C		0.4580	0.0058	0.39	0.4134	0.0070	0.49	OE
B3342N		0.4479	-0.0042	-0.28	0.4021	-0.0043	-0.30	OE
BNJ6UG		0.4500	-0.0021	-0.14	0.3993	-0.0071	-0.50	OE
BTVZ2Y		0.4503	-0.0018	-0.12	0.4010	-0.0054	-0.38	IC
C29VC6		0.4457	-0.0065	-0.44	0.3980	-0.0084	-0.60	IC
CVZME4		0.4281	-0.0241	-1.62	0.3889	-0.0176	-1.24	OE
D8DUL9		0.4477	-0.0045	-0.30	0.4020	-0.0044	-0.31	OE
DECCZL		0.4520	-0.0001	-0.01	0.4070	0.0006	0.04	WD
DHDWWD		0.4422	-0.0100	-0.67	0.3972	-0.0092	-0.65	XR
DKYB8L		0.4583	0.0062	0.42	0.4110	0.0046	0.32	XX
DVXZ8V		0.4720	0.0199	1.34	0.4260	0.0196	1.38	IC
E7BWXD		0.4400	-0.0121	-0.82	0.3930	-0.0134	-0.95	WD
EMNQ9N		0.4663	0.0142	0.96	0.4267	0.0202	1.43	GD
F9WKMP		0.4337	-0.0185	-1.24	0.3887	-0.0178	-1.25	OE
GBB9DA		0.4473	-0.0048	-0.32	0.4000	-0.0064	-0.45	OE
GLXZ8E	X	0.3900	-0.0621	-4.18	0.3500	-0.0564	-3.98	OE
GN9XMG		0.4690	0.0169	1.14	0.4130	0.0066	0.46	OE
HVJQ6Q		0.4690	0.0169	1.14	0.4163	0.0099	0.70	GD
HWVDPQ		0.4703	0.0182	1.23	0.4190	0.0126	0.88	OE
J7GYCZ		0.4653	0.0132	0.89	0.4253	0.0189	1.33	OE
JHVFF6		0.4513	-0.0008	-0.05	0.4047	-0.0018	-0.13	OE
JP7A3F		0.4328	-0.0194	-1.30	0.3878	-0.0187	-1.32	OE
KN863H		0.4587	0.0065	0.44	0.4073	0.0009	0.06	OE
KPREKY		0.4613	0.0092	0.62	0.4127	0.0062	0.44	OE
KUWMGU		0.4620	0.0099	0.66	0.4207	0.0142	1.00	OE
L42G4E		0.4580	0.0059	0.39	0.4000	-0.0064	-0.45	OE
MA3JWY	*	0.4270	-0.0251	-1.69	0.4006	-0.0059	-0.41	OE
N49KLV		0.4580	0.0059	0.39	0.4097	0.0032	0.23	OE
N9ZR3H		0.4270	-0.0251	-1.69	0.3873	-0.0191	-1.35	OE
NMANPC		0.4353	-0.0169	-1.14	0.3947	-0.0118	-0.83	WD
P4URQX		0.4467	-0.0055	-0.37	0.4033	-0.0031	-0.22	OE
PWDGDW		0.4690	0.0169	1.14	0.4093	0.0029	0.20	OE
PZ842Q		0.4410	-0.0111	-0.75	0.4043	-0.0021	-0.15	OE
QB4X4A		0.4550	0.0029	0.19	0.4123	0.0059	0.42	OE
TEHE9J		0.4330	-0.0191	-1.29	0.3860	-0.0204	-1.44	GD
U2N38B	*	0.4897	0.0375	2.53	0.4453	0.0389	2.74	OE



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 184

Corrosion Resistant Steel, Element #5
SILICON (Si)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U943PN		0.4450	-0.0071	-0.48	0.4000	-0.0064	-0.45	OE
UEWNWV		0.4590	0.0069	0.46	0.4040	-0.0024	-0.17	XR
UX87JF		0.4430	-0.0091	-0.61	0.3980	-0.0084	-0.60	WD
V2JH4N		0.4557	0.0035	0.24	0.4137	0.0072	0.51	OE
VGZF84		0.4567	0.0045	0.31	0.4200	0.0136	0.96	OE
WMGBKC	*	0.4113	-0.0408	-2.75	0.3677	-0.0388	-2.73	WD
XLXTWW		0.4719	0.0198	1.33	0.4289	0.0225	1.59	OE
XZLEGB		0.4510	-0.0011	-0.08	0.4123	0.0059	0.42	OE
YKJAHX		0.4292	-0.0230	-1.55	0.3952	-0.0112	-0.79	GD
Z8BH6C		0.4500	-0.0021	-0.14	0.4000	-0.0064	-0.45	WD
ZZDN8D		0.4567	0.0045	0.31	0.4137	0.0072	0.51	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.4521	Percent	0.4064	Percent
Stnd Dev Btwn Labs	0.0149	Percent	0.0142	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 55 of 58 reporting participants

Key to Method Codes Reported by Participants

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 #184

379Y6Y (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample M56.

GLXZ8E (X) - Data for both samples are low. Possible Systematic Error.



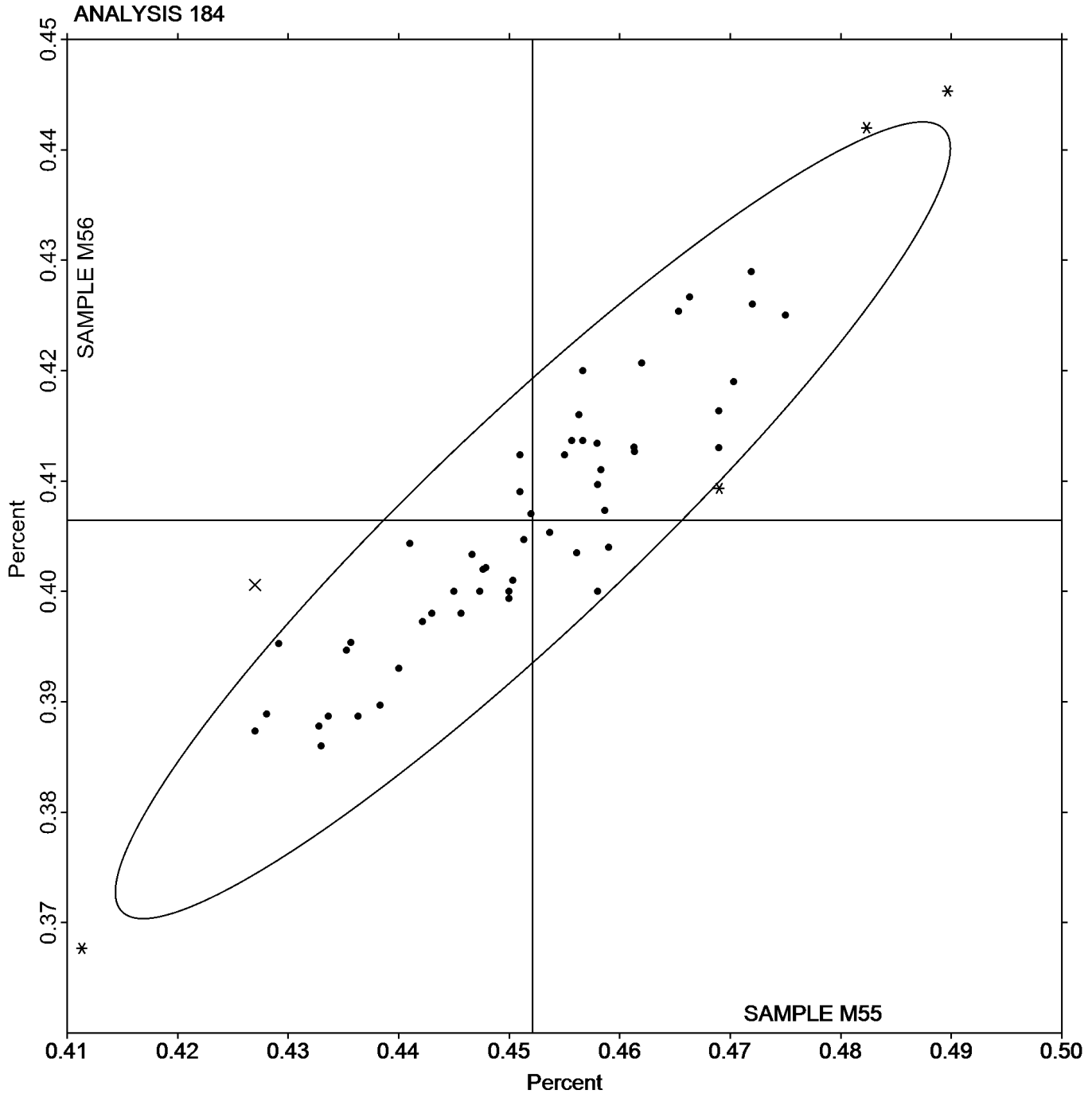
Analysis 184

Corrosion Resistant Steel, Element #5

SILICON (Si)

SAMPLE M55
0.4521 Percent

SAMPLE M56
0.4064 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 185

Corrosion Resistant Steel, Element #6
COBALT (Co)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.1900	0.0037	0.80	0.1726	0.0028	0.59	IC
379Y6Y	*	0.1968	0.0105	2.29	0.1828	0.0130	2.77	OE
4APN43		0.1890	0.0027	0.59	0.1713	0.0016	0.33	OE
6XAL9B		0.1863	0.0000	0.01	0.1700	0.0002	0.05	WD
74R9QU		0.1893	0.0030	0.66	0.1713	0.0016	0.33	OE
7ED23V		0.1817	-0.0046	-1.01	0.1657	-0.0041	-0.87	OE
7ZDLZV		0.1864	0.0001	0.03	0.1703	0.0005	0.11	IC
96HH2R		0.1847	-0.0016	-0.36	0.1693	-0.0004	-0.09	WD
9HLFRT		0.1850	-0.0013	-0.29	0.1693	-0.0004	-0.09	OE
AGTDTW	X	0.2037	0.0174	3.78	0.1700	0.0002	0.05	OE
B24H9C		0.1888	0.0025	0.55	0.1721	0.0023	0.49	OE
B3342N		0.1868	0.0005	0.11	0.1688	-0.0010	-0.20	WD
BNJ6UG		0.1913	0.0050	1.10	0.1753	0.0056	1.18	WD
BTVZ2Y		0.1880	0.0017	0.37	0.1737	0.0039	0.83	IC
C29VC6		0.1877	0.0014	0.30	0.1723	0.0026	0.54	IC
CVZME4		0.1866	0.0003	0.07	0.1706	0.0008	0.17	OE
D8DUL9		0.1853	-0.0010	-0.21	0.1700	0.0002	0.05	OE
DECCZL		0.1898	0.0035	0.75	0.1742	0.0044	0.93	WD
DHDWWD		0.1833	-0.0030	-0.65	0.1660	-0.0038	-0.80	OE
DKYB8L		0.1940	0.0077	1.68	0.1750	0.0052	1.11	XX
DVXZ8V		0.1843	-0.0020	-0.43	0.1670	-0.0028	-0.59	IC
E7BWXD		0.1857	-0.0006	-0.14	0.1707	0.0009	0.19	WD
EMNQN9		0.1897	0.0034	0.73	0.1747	0.0049	1.04	GD
F9WKMP		0.1803	-0.0060	-1.30	0.1653	-0.0044	-0.94	OE
GBB9DA		0.1837	-0.0026	-0.58	0.1670	-0.0028	-0.59	OE
GLXZ8E	X	0.1700	-0.0163	-3.56	0.1600	-0.0098	-2.07	OE
GN9XMG	*	0.1933	0.0070	1.53	0.1723	0.0026	0.54	OE
HVJQ6Q		0.1850	-0.0013	-0.29	0.1687	-0.0011	-0.23	GD
HWVDPQ		0.1833	-0.0030	-0.65	0.1683	-0.0014	-0.30	OE
J7GYCZ		0.1907	0.0044	0.95	0.1750	0.0052	1.11	OE
JHVFF6	X	0.1693	-0.0170	-3.70	0.1567	-0.0131	-2.78	OE
JP7A3F		0.1882	0.0019	0.42	0.1709	0.0011	0.24	OE
KN863H		0.1803	-0.0060	-1.30	0.1643	-0.0054	-1.15	OE
KPREKY	X	0.1603	-0.0260	-5.66	0.1453	-0.0244	-5.18	OE
KUWMGU	X	0.1717	-0.0146	-3.19	0.1523	-0.0174	-3.70	OE
L42G4E		0.1850	-0.0013	-0.29	0.1670	-0.0028	-0.59	OE
MA3JWY		0.1849	-0.0014	-0.31	0.1674	-0.0024	-0.51	OE
N49KLV		0.1793	-0.0070	-1.52	0.1630	-0.0068	-1.44	OE
N9ZR3H		0.1950	0.0087	1.90	0.1797	0.0099	2.10	OE
NMANPC		0.1845	-0.0018	-0.40	0.1694	-0.0004	-0.08	WD
P4URQX		0.1900	0.0037	0.80	0.1700	0.0002	0.05	OE
PWDGDW		0.1890	0.0027	0.59	0.1717	0.0019	0.40	OE
PZ842Q		0.1917	0.0054	1.17	0.1767	0.0069	1.46	OE
Q2K22U	X	0.2075	0.0212	4.62	0.2008	0.0310	6.58	WD
QB4X4A		0.1830	-0.0033	-0.72	0.1690	-0.0008	-0.16	OE
TEHE9J		0.1770	-0.0093	-2.03	0.1580	-0.0118	-2.50	GD
U943PN		0.1760	-0.0103	-2.25	0.1600	-0.0098	-2.07	OE



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 185

Corrosion Resistant Steel, Element #6
COBALT (Co)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
UEWNWV		0.1873	0.0010	0.22	0.1707	0.0009	0.19	XR
UX87JF		0.1773	-0.0090	-1.96	0.1633	-0.0064	-1.36	WD
V2JH4N		0.1847	-0.0016	-0.36	0.1690	-0.0008	-0.16	OE
VGZF84		0.1900	0.0037	0.80	0.1720	0.0022	0.47	OE
WMGBKC		0.1917	0.0054	1.17	0.1743	0.0046	0.97	WD
XZLEGB		0.1853	-0.0010	-0.21	0.1687	-0.0011	-0.23	OE
YKJAHX		0.1795	-0.0068	-1.48	0.1590	-0.0107	-2.28	GD
Z8BH6C		0.1830	-0.0033	-0.72	0.1670	-0.0028	-0.59	WD
ZZDN8D		0.1857	-0.0006	-0.14	0.1677	-0.0021	-0.45	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.1863	Percent	0.1698	Percent
Std Dev Btwn Labs	0.0046	Percent	0.0047	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 50 of 56 reporting participants

Key to Method Codes Reported by Participants

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 #185

AGTDTW (X) - Data for sample M55 are high.

GLXZ8E (X) - Data for sample M55 are low.

JHVFF6 (X) - Data for both samples are low. Possible Systematic Error.

KPREKY (X) - Data for both samples are low. Possible Systematic Error.

KUWMGU (X) - Data for both samples are low. Possible Systematic Error.

Q2K22U (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.

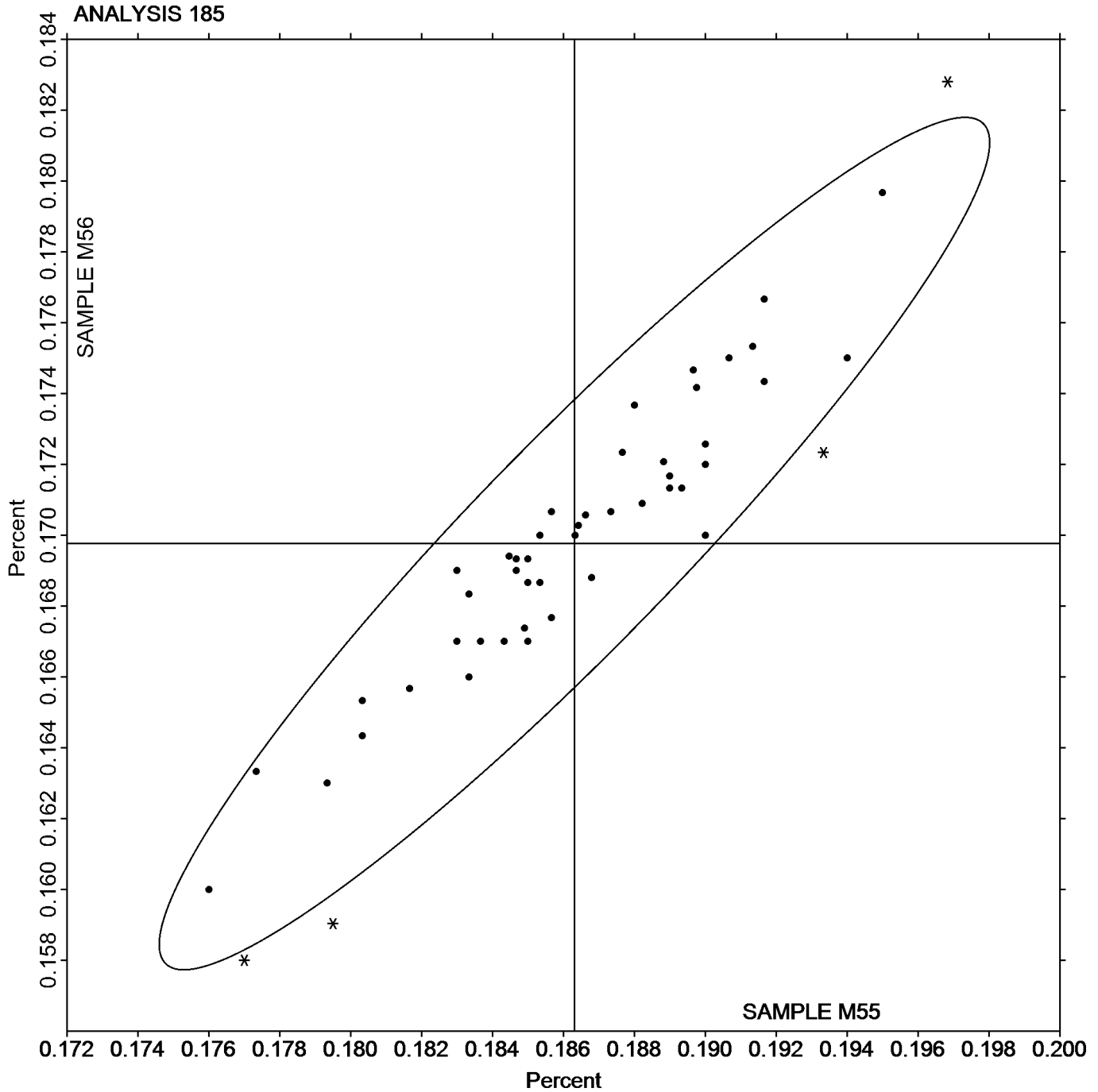


Analysis 185

Corrosion Resistant Steel, Element #6
COBALT (Co)

SAMPLE M55
0.1863 Percent

SAMPLE M56
0.1698 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 186

Corrosion Resistant Steel, Element #7
NICKEL (Ni)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU	*	9.437	0.387	2.51	9.492	0.401	2.57	IC
379Y6Y		9.274	0.223	1.45	9.431	0.339	2.17	OE
38AK6L		9.110	0.060	0.39	9.085	-0.007	-0.04	WD
4APN43		8.972	-0.079	-0.51	8.986	-0.106	-0.68	OE
6XAL9B		8.965	-0.086	-0.56	9.011	-0.080	-0.51	WD
74R9QU		8.895	-0.155	-1.01	8.772	-0.319	-2.04	OE
7ED23V		9.233	0.183	1.19	9.367	0.275	1.76	OE
7ZDLZV		9.115	0.065	0.42	9.098	0.007	0.04	IC
96HH2R		9.031	-0.019	-0.13	9.019	-0.073	-0.46	WD
9HLFRT		9.047	-0.003	-0.02	9.243	0.151	0.97	OE
AGTDTW		9.232	0.182	1.18	9.432	0.340	2.18	OE
B24H9C		8.987	-0.064	-0.41	9.030	-0.062	-0.40	OE
B3342N		9.020	-0.030	-0.19	9.019	-0.072	-0.46	WD
BNJ6UG		8.953	-0.097	-0.63	8.973	-0.118	-0.76	WD
BTVZ2Y		9.079	0.028	0.18	9.003	-0.089	-0.57	IC
C29VC6		9.077	0.026	0.17	9.103	0.012	0.08	IC
CVZME4	X	9.127	0.077	0.50	9.449	0.358	2.29	OE
D8DUL9		9.174	0.124	0.80	9.155	0.063	0.41	OE
DECCZL		9.025	-0.026	-0.17	9.039	-0.052	-0.33	WD
DHDWWD		8.937	-0.114	-0.74	8.994	-0.098	-0.62	XR
DKYB8L		9.043	-0.007	-0.05	9.130	0.038	0.25	XX
DVXZ8V		9.031	-0.019	-0.12	9.077	-0.015	-0.09	IC
E7BWXD		8.959	-0.091	-0.59	9.012	-0.080	-0.51	WD
EMNQ9		9.143	0.093	0.60	9.200	0.108	0.69	GD
F9WKMP		9.057	0.006	0.04	9.060	-0.032	-0.20	OE
GBB9DA		9.190	0.140	0.91	9.195	0.103	0.66	OE
GLXZ8E		8.840	-0.210	-1.36	9.030	-0.062	-0.39	OE
GN9XMG		9.397	0.346	2.25	9.337	0.245	1.57	OE
HVJQ6Q		9.247	0.196	1.27	9.210	0.118	0.76	GD
HWVDPQ		8.943	-0.107	-0.69	9.007	-0.085	-0.54	OE
J7GYCZ		9.197	0.146	0.95	9.269	0.177	1.13	OE
JHVFF6		9.097	0.046	0.30	9.013	-0.078	-0.50	OE
JP7A3F		9.109	0.059	0.38	8.924	-0.167	-1.07	OE
K4QJQB		9.086	0.035	0.23	9.150	0.058	0.37	WC
KN863H	*	8.627	-0.424	-2.75	8.693	-0.399	-2.55	OE
KPREKY		8.936	-0.115	-0.74	9.030	-0.062	-0.40	OE
KUWMGU		9.380	0.330	2.14	9.473	0.382	2.44	OE
L42G4E		9.085	0.035	0.23	9.020	-0.072	-0.46	OE
MA3JWY		9.010	-0.041	-0.26	8.969	-0.123	-0.79	OE
N49KLV		9.207	0.156	1.01	9.217	0.125	0.80	OE
N9ZR3H		8.977	-0.074	-0.48	9.087	-0.005	-0.03	OE
NMANPC		8.977	-0.073	-0.47	9.021	-0.070	-0.45	WD
P4URQX		9.063	0.013	0.08	9.137	0.045	0.29	OE
PWDGDW	*	9.239	0.189	1.22	9.037	-0.055	-0.35	OE
PZ842Q		8.790	-0.260	-1.69	8.947	-0.145	-0.93	OE
Q2K22U		9.274	0.224	1.45	9.301	0.210	1.34	WD
Q4NWKX		8.966	-0.084	-0.54	9.036	-0.055	-0.35	ED



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 186

Corrosion Resistant Steel, Element #7
NICKEL (Ni)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QB4X4A		8.997	-0.054	-0.35	9.210	0.118	0.76	OE
TEHE9J		8.707	-0.343	-2.23	8.883	-0.209	-1.33	GD
U2N38B		8.956	-0.094	-0.61	8.993	-0.099	-0.63	OE
U943PN		8.950	-0.100	-0.65	9.047	-0.045	-0.29	OE
UEWNWV		9.035	-0.015	-0.10	9.029	-0.063	-0.40	XR
UX87JF		8.997	-0.053	-0.34	9.050	-0.042	-0.27	WD
V2JH4N		8.905	-0.145	-0.94	9.028	-0.064	-0.41	OE
VGZF84		9.150	0.100	0.65	9.083	-0.008	-0.05	OE
WMGBKC		9.107	0.056	0.37	9.155	0.063	0.40	XX
XLXTWW		8.952	-0.098	-0.64	9.113	0.022	0.14	OE
XZLEGB		8.973	-0.077	-0.50	9.093	0.002	0.01	OE
YKJAHX		9.062	0.012	0.08	9.133	0.041	0.27	GD
Z8BH6C		9.013	-0.037	-0.24	9.034	-0.058	-0.37	WD
ZZDN8D		8.783	-0.267	-1.73	8.807	-0.285	-1.82	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	9.050	Percent	9.092	Percent
Stnd Dev Btwn Labs	0.154	Percent	0.156	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 60 of 61 reporting participants

Key to Method Codes Reported by Participants

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

CVZME4 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample M56.



Analysis 186

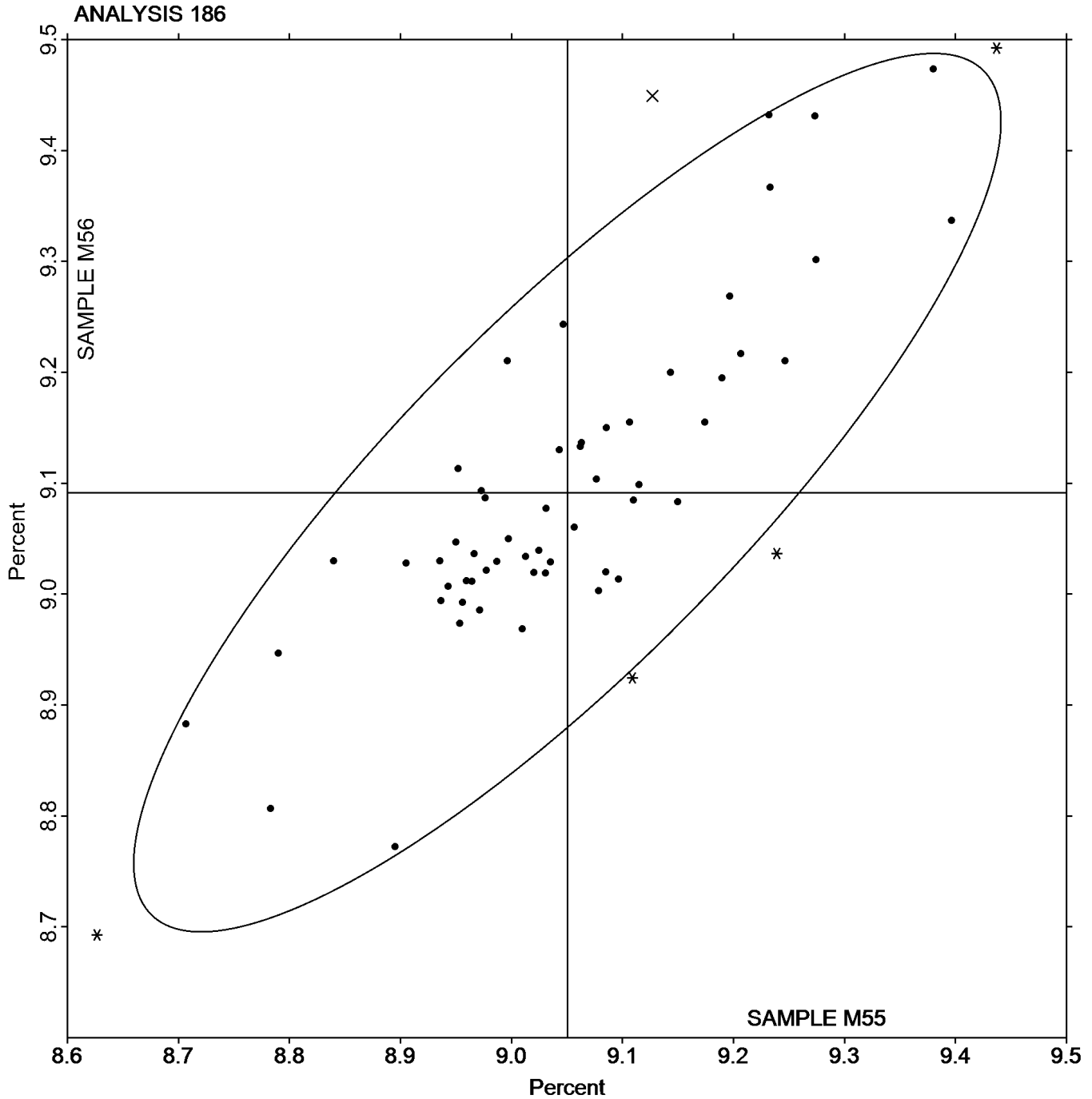
Corrosion Resistant Steel, Element #7
NICKEL (Ni)

SAMPLE M55

9.050 Percent

SAMPLE M56

9.092 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 187

Corrosion Resistant Steel, Element #8
CHROMIUM (Cr)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		17.46	0.03	0.30	17.35	0.08	0.89	IC
379Y6Y	X	17.71	0.28	3.28	17.60	0.33	3.65	OE
38AK6L		17.40	-0.03	-0.31	17.19	-0.08	-0.89	WD
4APN43		17.40	-0.03	-0.34	17.24	-0.03	-0.34	OE
6XAL9B		17.42	-0.01	-0.10	17.25	-0.02	-0.27	WD
74R9QU		17.50	0.07	0.84	17.38	0.12	1.27	OE
7ED23V		17.39	-0.04	-0.44	17.27	0.00	-0.03	OE
7ZDLZV		17.46	0.03	0.33	17.31	0.05	0.50	IC
96HH2R		17.39	-0.04	-0.48	17.25	-0.01	-0.16	WD
9HLFRT		17.35	-0.08	-0.90	17.16	-0.11	-1.21	OE
AGTDTW		17.35	-0.08	-0.94	17.37	0.10	1.11	OE
B24H9C		17.43	0.00	-0.03	17.27	0.00	-0.05	OE
B3342N		17.42	-0.01	-0.08	17.23	-0.04	-0.41	WD
BNJ6UG		17.41	-0.02	-0.24	17.25	-0.02	-0.18	WD
BTVZ2Y		17.38	-0.05	-0.59	17.21	-0.06	-0.65	IC
C29VC6		17.39	-0.04	-0.44	17.18	-0.09	-0.95	TI
CVZME4		17.39	-0.04	-0.49	17.24	-0.03	-0.37	OE
D8DUL9		17.45	0.02	0.21	17.25	-0.02	-0.24	OE
DECCZL		17.42	-0.01	-0.14	17.27	0.00	-0.02	WD
DHDWWD		17.37	-0.06	-0.70	17.22	-0.05	-0.57	XR
DKYB8L		17.39	-0.04	-0.44	17.33	0.06	0.63	XX
DVXZ8V		17.42	-0.01	-0.17	17.22	-0.05	-0.58	IC
E7BWXD		17.46	0.03	0.34	17.31	0.04	0.45	WD
EMNQ9		17.50	0.07	0.80	17.27	0.00	-0.03	GD
F9WKMP		17.54	0.11	1.27	17.37	0.10	1.11	OE
GBB9DA		17.48	0.05	0.53	17.30	0.03	0.28	OE
GLXZ8E		17.33	-0.10	-1.14	17.14	-0.13	-1.46	OE
GN9XMG		17.39	-0.04	-0.48	17.27	0.00	-0.03	OE
HVJQ6Q		17.43	0.00	0.03	17.30	0.03	0.34	GD
HWVDPQ		17.38	-0.05	-0.55	17.25	-0.02	-0.18	OE
J7GYCZ		17.57	0.14	1.65	17.43	0.16	1.81	OE
JHVFF6		17.34	-0.09	-1.06	17.08	-0.19	-2.09	OE
JP7A3F		17.45	0.02	0.26	17.35	0.08	0.85	OE
K4QJQB		17.43	0.00	0.02	17.27	0.00	0.02	WC
KN863H		17.44	0.01	0.10	17.28	0.01	0.15	OE
KPREKY	*	17.63	0.20	2.35	17.49	0.22	2.47	OE
KUWMGU		17.37	-0.06	-0.75	17.24	-0.03	-0.32	OE
L42G4E		17.39	-0.04	-0.48	17.22	-0.05	-0.58	OE
MA3JWY	*	17.68	0.25	2.87	17.50	0.23	2.50	OE
N49KLV	*	17.43	0.00	0.03	17.10	-0.17	-1.90	OE
N9ZR3H		17.28	-0.15	-1.72	17.11	-0.16	-1.79	OE
NMANPC		17.53	0.10	1.14	17.38	0.11	1.19	WD
P4URQX		17.46	0.03	0.38	17.17	-0.10	-1.10	OE
PWDGDW	X	16.79	-0.64	-7.41	16.53	-0.74	-8.16	OE
PZ842Q		17.47	0.04	0.49	17.27	0.00	0.04	OE
Q2K22U		17.26	-0.17	-2.03	17.15	-0.12	-1.35	WD
Q4NWKX		17.52	0.09	1.07	17.38	0.11	1.26	ED



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 187

Corrosion Resistant Steel, Element #8
CHROMIUM (Cr)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QB4X4A		17.50	0.07	0.76	17.34	0.07	0.78	OE
TEHE9J	X	17.10	-0.33	-3.85	16.90	-0.37	-4.07	GD
U2N38B		17.54	0.11	1.23	17.37	0.10	1.11	OE
U943PN		17.37	-0.06	-0.75	17.28	0.01	0.15	OE
UEWNWV		17.45	0.02	0.22	17.29	0.02	0.19	XR
UX87JF		17.42	-0.01	-0.13	17.29	0.02	0.24	WD
V2JH4N		17.45	0.02	0.23	17.26	-0.01	-0.15	OE
VGZF84		17.60	0.17	1.96	17.30	0.03	0.34	OE
WMGBKC		17.62	0.19	2.15	17.45	0.18	2.03	WD
XLXTWW		17.38	-0.05	-0.63	17.14	-0.13	-1.47	OE
XZLEGB		17.39	-0.04	-0.48	17.19	-0.08	-0.84	OE
YKJAHX		17.28	-0.15	-1.78	17.20	-0.07	-0.79	GD
Z8BH6C		17.35	-0.08	-0.94	17.22	-0.04	-0.49	WD
ZZDN8D		17.27	-0.16	-1.83	17.25	-0.02	-0.21	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	17.43	Percent	17.27	Percent
Std Dev Btwn Labs	0.09	Percent	0.09	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 58 of 61 reporting participants

Key to Method Codes Reported by Participants

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

379Y6Y (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample M55.

PWDGDW (X) - Data for both samples are low. Possible Systematic Error.

TEHE9J (X) - Data for both samples are low. Possible Systematic Error.



Analysis 187

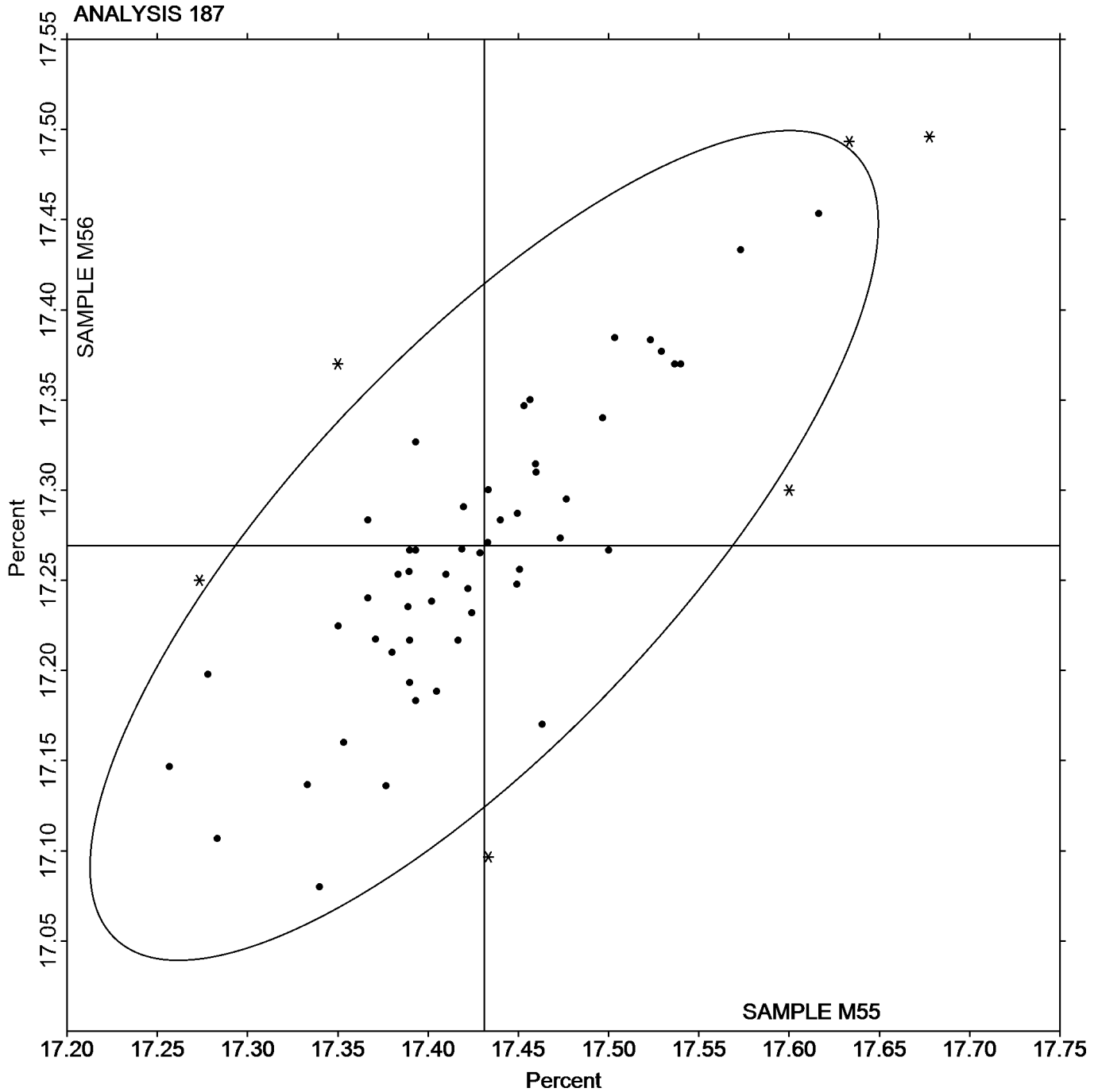
Corrosion Resistant Steel, Element #8
CHROMIUM (Cr)

SAMPLE M55

17.43 Percent

SAMPLE M56

17.27 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 188

Corrosion Resistant Steel, Element #9
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBUB		0.4025	0.0166	1.31	0.3706	0.0156	1.30	IC
379Y6Y	*	0.4240	0.0381	3.01	0.3890	0.0340	2.84	OE
38AK6L		0.3817	-0.0042	-0.33	0.3507	-0.0043	-0.36	WD
4APN43		0.3860	0.0001	0.01	0.3560	0.0010	0.09	OE
6XAL9B		0.3793	-0.0065	-0.52	0.3478	-0.0072	-0.60	WD
74R9QU		0.3820	-0.0039	-0.31	0.3483	-0.0066	-0.55	XX
7ED23V		0.3813	-0.0045	-0.36	0.3493	-0.0056	-0.47	OE
7ZDLZV		0.3926	0.0067	0.53	0.3644	0.0094	0.78	IC
96HH2R		0.3860	0.0001	0.01	0.3537	-0.0013	-0.11	WD
9HLFRT		0.4017	0.0158	1.25	0.3730	0.0180	1.50	OE
AGTDTW		0.3927	0.0068	0.54	0.3653	0.0104	0.87	OE
B24H9C		0.3783	-0.0076	-0.60	0.3474	-0.0076	-0.63	XX
B3342N		0.3768	-0.0090	-0.71	0.3461	-0.0089	-0.74	OE
BNJ6UG		0.3787	-0.0072	-0.57	0.3470	-0.0080	-0.66	WD
BTVZ2Y		0.3880	0.0021	0.17	0.3540	-0.0010	-0.08	IC
C29VC6		0.4017	0.0158	1.25	0.3763	0.0214	1.78	IC
CVZME4		0.3880	0.0021	0.17	0.3572	0.0022	0.18	OE
D8DUL9		0.3817	-0.0042	-0.33	0.3543	-0.0006	-0.05	OE
DECCZL		0.3847	-0.0012	-0.10	0.3560	0.0010	0.09	WD
DHDWWD		0.3853	-0.0006	-0.04	0.3528	-0.0022	-0.18	XR
DKYB8L		0.3907	0.0048	0.38	0.3550	0.0000	0.00	XX
DVXZ8V		0.3883	0.0025	0.20	0.3563	0.0014	0.11	IC
E7BWXD		0.3810	-0.0049	-0.39	0.3500	-0.0050	-0.41	XX
EMNQ9N		0.3977	0.0118	0.93	0.3690	0.0140	1.17	GD
F9WKMP		0.4177	0.0318	2.52	0.3847	0.0297	2.48	OE
GBB9DA		0.3827	-0.0032	-0.25	0.3485	-0.0065	-0.54	OE
GLXZ8E		0.3700	-0.0159	-1.26	0.3467	-0.0083	-0.69	OE
GN9XMG		0.3557	-0.0302	-2.39	0.3257	-0.0293	-2.44	OE
HVJQ6Q		0.3943	0.0085	0.67	0.3570	0.0020	0.17	GD
HWVDPQ		0.3840	-0.0019	-0.15	0.3483	-0.0066	-0.55	OE
J7GYCZ		0.3820	-0.0039	-0.31	0.3553	0.0004	0.03	OE
JHVFF6		0.3777	-0.0082	-0.65	0.3450	-0.0100	-0.83	OE
JP7A3F		0.3794	-0.0064	-0.51	0.3473	-0.0076	-0.64	OE
KN863H		0.3907	0.0048	0.38	0.3567	0.0017	0.14	OE
KPREKY		0.3937	0.0078	0.62	0.3640	0.0090	0.75	OE
KUWMGU		0.3803	-0.0055	-0.44	0.3453	-0.0096	-0.80	OE
L42G4E		0.3860	0.0001	0.01	0.3477	-0.0073	-0.61	OE
MA3JWY		0.3840	-0.0019	-0.15	0.3475	-0.0075	-0.62	OE
N49KLV	*	0.3487	-0.0372	-2.94	0.3233	-0.0316	-2.64	OE
N9ZR3H		0.4137	0.0278	2.20	0.3810	0.0260	2.17	OE
NMANPC		0.3892	0.0033	0.26	0.3576	0.0026	0.22	WD
P4URQX		0.3900	0.0041	0.33	0.3567	0.0017	0.14	OE
PWDGDW		0.3903	0.0045	0.35	0.3530	-0.0020	-0.16	OE
PZ842Q		0.3660	-0.0199	-1.57	0.3433	-0.0116	-0.97	OE
Q2K22U		0.3886	0.0028	0.22	0.3551	0.0001	0.01	WD
Q4NWKX		0.3807	-0.0052	-0.41	0.3483	-0.0066	-0.55	ED
QB4X4A		0.3757	-0.0102	-0.81	0.3510	-0.0040	-0.33	OE



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 188

Corrosion Resistant Steel, Element #9
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
TEHE9J		0.3710	-0.0149	-1.18	0.3420	-0.0130	-1.08	GD
U2N38B		0.4130	0.0271	2.15	0.3840	0.0290	2.42	OE
U943PN		0.3797	-0.0062	-0.49	0.3520	-0.0030	-0.25	OE
UEWNWV		0.3850	-0.0009	-0.07	0.3527	-0.0023	-0.19	XR
UX87JF		0.3740	-0.0119	-0.94	0.3450	-0.0100	-0.83	WD
V2JH4N		0.3900	0.0041	0.33	0.3637	0.0087	0.73	OE
VGZF84		0.3900	0.0041	0.33	0.3600	0.0050	0.42	OE
WMGBKC		0.3843	-0.0015	-0.12	0.3527	-0.0023	-0.19	WD
XLXTWW		0.3833	-0.0025	-0.20	0.3564	0.0015	0.12	OE
XZLEGB		0.3737	-0.0122	-0.97	0.3490	-0.0060	-0.50	OE
YKJAHX		0.3900	0.0042	0.33	0.3567	0.0017	0.14	GD
Z8BH6C		0.3843	-0.0015	-0.12	0.3533	-0.0016	-0.14	WD
ZZDN8D		0.3823	-0.0035	-0.28	0.3520	-0.0030	-0.25	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.3859	Percent	0.3550	Percent
Std Dev Btwn Labs	0.0126	Percent	0.0120	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 60 of 60 reporting participants

Key to Method Codes Reported by Participants

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		

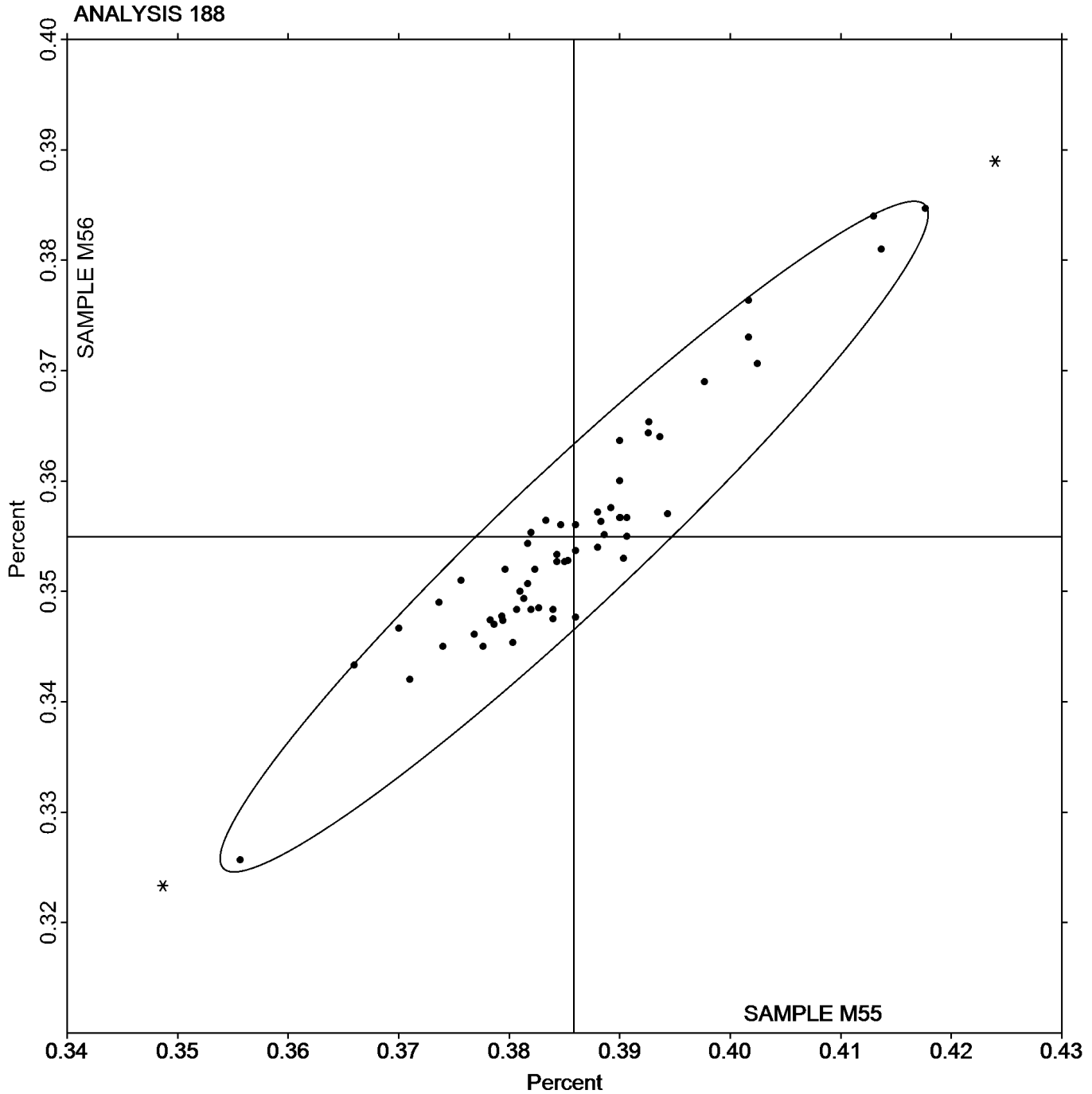


Analysis 188

Corrosion Resistant Steel, Element #9
MOLYBDENUM (Mo)

SAMPLE M55
0.3859 Percent

SAMPLE M56
0.3550 Percent





Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 189

Corrosion Resistant Steel, Element #10
COPPER (Cu)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2FXPBU		0.4645	0.0226	1.69	0.4000	0.0153	1.30	IC
379Y6Y	X	0.2891	-0.1529	-11.46	0.2475	-0.1371	-11.60	OE
4APN43		0.4500	0.0080	0.60	0.3910	0.0064	0.54	OE
6XAL9B		0.4486	0.0066	0.50	0.3873	0.0026	0.22	WD
74R9QU	X	0.3700	-0.0720	-5.40	0.3177	-0.0670	-5.67	OE
7ED23V		0.4197	-0.0223	-1.67	0.3633	-0.0213	-1.80	OE
7ZDLZV		0.4490	0.0071	0.53	0.3874	0.0027	0.23	IC
96HH2R		0.4437	0.0017	0.13	0.3820	-0.0026	-0.22	WD
9HLFRT		0.4520	0.0100	0.75	0.4010	0.0164	1.38	OE
AGDTW		0.4533	0.0114	0.85	0.4023	0.0177	1.50	OE
B24H9C		0.4323	-0.0097	-0.73	0.3764	-0.0083	-0.70	OE
B3342N		0.4434	0.0014	0.10	0.3835	-0.0011	-0.10	OE
BNJ6UG		0.4450	0.0030	0.23	0.3870	0.0024	0.20	WD
BTVZ2Y		0.4403	-0.0016	-0.12	0.3847	0.0000	0.00	IC
C29VC6		0.4630	0.0210	1.58	0.4043	0.0197	1.67	IC
CVZME4		0.4463	0.0044	0.33	0.4004	0.0158	1.34	OE
D8DUL9		0.4400	-0.0020	-0.15	0.3893	0.0047	0.40	OE
DECCZL		0.4390	-0.0030	-0.22	0.3800	-0.0046	-0.39	WD
DHDWWD		0.4437	0.0017	0.13	0.3860	0.0013	0.11	XR
DKYB8L		0.4393	-0.0026	-0.20	0.3830	-0.0016	-0.14	XX
DVXZ8V		0.4550	0.0130	0.98	0.3923	0.0077	0.65	IC
E7BWXD		0.4433	0.0014	0.10	0.3847	0.0000	0.00	WD
EMNQN9		0.4513	0.0094	0.70	0.3970	0.0124	1.05	GD
F9WKMP		0.4303	-0.0116	-0.87	0.3723	-0.0123	-1.04	OE
GBB9DA		0.4563	0.0144	1.08	0.3930	0.0084	0.71	OE
GLXZ8E		0.4333	-0.0086	-0.65	0.3867	0.0020	0.17	OE
GN9XMG		0.4477	0.0057	0.43	0.3833	-0.0013	-0.11	OE
HVJQ6Q	*	0.4540	0.0120	0.90	0.3753	-0.0093	-0.79	GD
HWVDPQ		0.4437	0.0017	0.13	0.3873	0.0027	0.23	OE
J7GYCZ	*	0.4013	-0.0406	-3.05	0.3493	-0.0353	-2.99	OE
JHVFF6		0.4460	0.0040	0.30	0.3783	-0.0063	-0.53	OE
JP7A3F	X	0.3638	-0.0782	-5.86	0.3150	-0.0696	-5.89	OE
KN863H		0.4150	-0.0270	-2.02	0.3643	-0.0203	-1.72	OE
KPREKY		0.4390	-0.0030	-0.22	0.3883	0.0037	0.31	OE
KUWMGU	X	0.3900	-0.0520	-3.90	0.3333	-0.0513	-4.34	OE
L42G4E		0.4447	0.0027	0.20	0.3737	-0.0110	-0.93	OE
MA3JWY		0.4193	-0.0227	-1.70	0.3675	-0.0172	-1.45	OE
N49KLV		0.4547	0.0127	0.95	0.3843	-0.0003	-0.03	OE
N9ZR3H		0.4093	-0.0326	-2.45	0.3577	-0.0270	-2.28	OE
NMANPC		0.4529	0.0110	0.82	0.3935	0.0089	0.75	WD
P4URQX		0.4400	-0.0020	-0.15	0.3800	-0.0046	-0.39	OE
PWDGDW	X	0.4873	0.0454	3.40	0.4090	0.0244	2.06	OE
PZ842Q		0.4167	-0.0253	-1.90	0.3660	-0.0186	-1.58	OE
Q2K22U		0.4459	0.0039	0.29	0.3760	-0.0087	-0.73	WD
QB4X4A		0.4413	-0.0006	-0.05	0.3860	0.0014	0.11	OE
TEHE9J		0.4250	-0.0170	-1.27	0.3880	0.0034	0.28	GD
U2N38B		0.4640	0.0220	1.65	0.4043	0.0197	1.67	OE



Fasteners and Metals Interlaboratory Testing Program

Cycle 124
4th Qtr 2018

Analysis 189

Corrosion Resistant Steel, Element #10
COPPER (Cu)

WebCode	Data Flag	Sample M55			Sample M56			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
U943PN		0.4327	-0.0093	-0.70	0.3840	-0.0006	-0.05	OE
UEWNWV		0.4447	0.0027	0.20	0.3827	-0.0020	-0.17	XR
UX87JF		0.4410	-0.0010	-0.07	0.3853	0.0007	0.06	WD
V2JH4N		0.4343	-0.0076	-0.57	0.3843	-0.0003	-0.03	OE
VGZF84		0.4367	-0.0053	-0.40	0.3833	-0.0013	-0.11	OE
WMGBKC		0.4607	0.0187	1.40	0.3983	0.0137	1.16	WD
XLXTWW		0.4512	0.0092	0.69	0.4069	0.0223	1.88	OE
XZLEGB		0.4410	-0.0010	-0.07	0.3880	0.0034	0.28	OE
YKJAHX		0.4450	0.0030	0.23	0.3903	0.0056	0.48	GD
Z8BH6C		0.4500	0.0080	0.60	0.3900	0.0054	0.45	WD
ZZDN8D		0.4440	0.0020	0.15	0.3747	-0.0100	-0.84	OE

Summary Statistics

	Sample M55		Sample M56	
Grand Means	0.4420	Percent	0.3846	Percent
Std Dev Btwn Labs	0.0133	Percent	0.0118	Percent

Samples M55, M56 : AISI 321 - UNS S32100, AISI 321 - UNS S32100

Statistics based on 53 of 58 reporting participants

Key to Method Codes Reported by Participants

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

- 379Y6Y (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample M56.
- 74R9QU (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample M55.
- JP7A3F (X) - Data for both samples are low. Possible Systematic Error.
- KUWMGU (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample M55.
- PWDGDW (X) - Data for sample M55 are high. Inconsistent within the determinations of sample M55.



Fasteners and Metals Interlaboratory Testing Program

Cycle 124

Analysis 189

4th Qtr 2018

Corrosion Resistant Steel, Element #10

COPPER (Cu)

SAMPLE M55
0.4420 Percent

SAMPLE M56
0.3846 Percent

