

# Fasteners & Metals Interlaboratory Testing Program

Summary Report Cycle 135, 3rd Qtr 2021

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## ABOUT THE FASTENERS & METALS PROGRAM

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

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

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

## ABOUT CTS

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

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## Key for Fasteners & Metals Program Web Summary Report

- WebCode** - Assigned laboratory identification number(temporary)used to ensure lab confidentiality while permitting a lab to locate its data in the report published on the CTS website.
  
- Lab Mean** - The average of the test results obtained by the participant.
  
- Grand Mean** - The average of the LAB MEANS for all included participants. Laboratories flagged with an X or an M (see DATA FLAG column) are excluded from the GRAND MEAN.
  
- Between-Lab Standard Deviation** - An indication of the precision of measurement between the laboratories. The greater the spread of the LAB MEANS about the GRAND MEAN, the larger the BETWEEN-LAB STANDARD DEVIATION (and vice versa).
  
- Comparative Performance Value (CPV)** - An indication of how well a laboratory's results agree with the other participants. The CPV is a ratio indicating the number of standard deviations from the GRAND MEAN.  $CPV = (LAB\ MEAN - GRAND\ MEAN) / BETWEEN-LAB\ STANDARD\ DEVIATION$ . The closer a laboratory's COMPARATIVE PERFORMANCE VALUE is to zero, the more consistent its results are with the other participants' data (and vice versa).
  
- Instr. Code** - A code indicating the manufacturer of the instrument used to perform the test (see separate INSTRUMENT CODE LIST for each test section).
  
- Data Flag** - DATA FLAGS are assigned based on the simultaneous analysis of both samples tested. Refer to the following chart for an explanation of each symbol:

### Data Flags

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

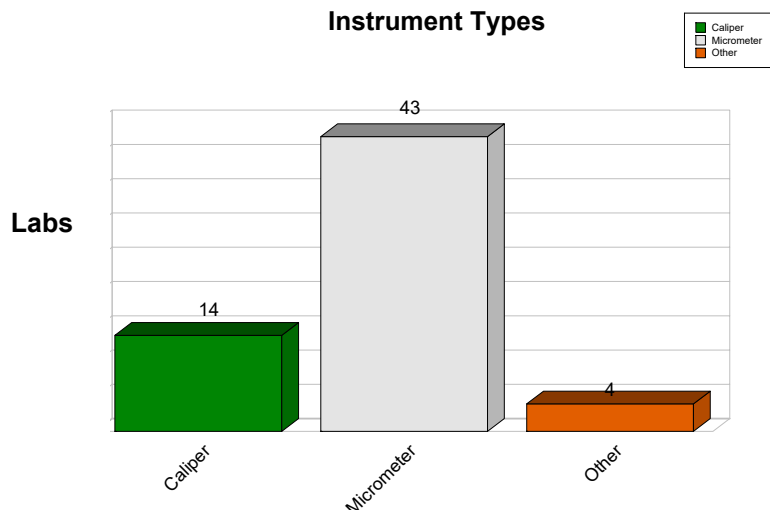
  

**Graph** - For each laboratory, the Lab Mean for the second sample (y-axis) is plotted against the Lab Mean for the first sample (x-axis) with each point representing a laboratory. The horizontal and vertical cross-hairs are the Grand Means for each sample. When 20 or more laboratories are included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



Dimensional: Outside Diameter of Plain Plug Gage  
ISO GUM

During Cycle 135, CTS conducted the Analysis #101 - Round Dimensional. For this test all participants received two samples I77 and I78 with nominal diameters; 0.3750 in. and 0.3746 in. Each sample is an English Class X gage pin with 0.00002 in roundness limit made from 52100 bearing steel, hardened to 60-62 Rockwell C. Laboratories were asked to determine the outside diameter of the pins. 61 laboratories that subscribed for this test reported testing results. The graph below shows a breakdown of the types of instruments used.



Analysis of the Results

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

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

Where the assigned value, Xref, is determined in a reference laboratory, Uref is the expanded uncertainty of Xref, and Ulab is the **Expanded Uncertainty** of a participant's result, Xlab. En is not calculated for Labs who did not report their Expanded Uncertainty.

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

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

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



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1001**

**Cycle 135  
3rd Qtr 2021**

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

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

Xref1 = 0.3750 in.

Xref2 = 0.3746 in.

**Sample I77**

**Sample I78**

WebCode	Data Flag (if assigned)	Reference Uncertainty (Uref)	Expanded Uncertainty (Ulab)	Lab Mean (Xlab)	Performance Statistic (En1)	Lab Mean (Xlab)	Performance Statistic (En2)	Instrument
2BALKH		0.00004	0.00012	0.37490	-0.82	0.37450	-0.83	Micrometer
2CM26B		0.00004	0.00030	0.37503	0.10	0.37461	0.03	Micrometer
3XVHJY		0.00004	0.00011	0.37500	0.00	0.37458	-0.21	Micrometer
4WMYG3		0.00004	0.00001	0.37499	-0.18	0.37459	-0.20	Other
62WEN6	X	0.00004	0.00005	0.37486	-2.29	0.37454	-0.91	Micrometer
6EETND		0.00004	0.00030	0.37500	0.00	0.37450	-0.33	Caliper
6N7RAX		0.00004	0.00014	0.37492	-0.55	0.37452	-0.55	Micrometer
8NJYU6		0.00004	0.00030	0.37490	-0.33	0.37450	-0.33	Micrometer
8UADGR		0.00004	0.00100	0.37484	-0.16	0.37451	-0.09	Caliper
8WBCU6	X	0.00004	0.00100	0.37410	-0.90	0.37350	-1.10	Caliper
8YC8Q9	X	0.00004	0.00006	0.37488	-1.73	0.37445	-2.22	Micrometer
9UHQVT		0.00004	0.00005	0.37494	-0.94	0.37454	-0.94	Micrometer
AUXTD8		0.00004	0.00039	0.37490	-0.25	0.37448	-0.30	Micrometer
AYC986		0.00004	Not Reported	0.37450		0.37440		Other
BG83AU	X	0.00004	0.00100	0.34750	-27.48	0.37400	-0.60	Caliper
BQV3UX		0.00004	0.00016	0.37502	0.15	0.37457	-0.20	Micrometer
BTGB3T		0.00004	0.00047	0.37500	0.00	0.37450	-0.21	Caliper
C8T7VU		0.00004	0.00031	0.37495	-0.17	0.37452	-0.25	Micrometer
D7GTQX		0.00004	0.07874	0.37495	0.00	0.37454	0.00	Micrometer
E6X2XK		0.00004	0.00016	0.37495	-0.30	0.37454	-0.36	Micrometer
EUH6WM		0.00004	0.00040	0.37500	0.00	0.37450	-0.25	Caliper
F6V7W9		0.00004	0.00039	0.37480	-0.50	0.37441	-0.48	Caliper
F9DUHC		0.00004	0.00260	0.37460	-0.15	0.37450	-0.04	Caliper
GMDZ4U		0.00004	0.00094	0.37518	0.19	0.37450	-0.11	Micrometer
H8GYBT		0.00004	0.00201	0.37500	0.00	0.37460	0.00	Micrometer
HC8KQU		0.00004	Not Reported	0.37442		0.37490		Caliper
JAXRFT		0.00004	0.00050	0.37493	-0.14	0.37453	-0.14	Micrometer
JEWY4B		0.00004	Not Reported	0.37495		0.37440		Micrometer
KQLHW8	X	0.00004	0.00020	0.37442	-2.85	0.37456	-0.20	Micrometer
LA7ZMD		0.00004	0.00020	0.37500	0.00	0.37450	-0.49	Micrometer
LDMZQC		0.00004	0.00004	0.37498	-0.36	0.37459	-0.18	Micrometer
LK2F42	X	0.00004	0.00006	0.37480	-2.89	0.37454	-0.83	Micrometer
LL6JWX		0.00004	0.00170	0.37346	-0.91	0.37306	-0.91	Caliper



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1001**

**Cycle 135  
3rd Qtr 2021**

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

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

Xref1 = 0.3750 in.

Xref2 = 0.3746 in.

**Sample I77**

**Sample I78**

<u>WebCode</u>	<u>Data Flag</u> (if assigned)	<u>Reference</u> <u>Uncertainty</u> (Uref)	<u>Expanded</u> <u>Uncertainty</u> (Ulab)	<u>Lab Mean</u> (Xlab)	<u>Performance</u> <u>Statistic (En1)</u>	<u>Lab Mean</u> (Xlab)	<u>Performance</u> <u>Statistic (En2)</u>	<u>Instrument</u>
LMUVPC	X	0.00004	0.00020	0.34790	-132.87	0.34750	-132.87	Micrometer
LYNART		0.00004	0.00024	0.37485	-0.62	0.37445	-0.62	Micrometer
MN3YME	X	0.00004	0.00020	0.37490	-0.49	0.37420	-1.96	Caliper
MV2UU7		0.00004	0.00210	0.37500	0.00	0.37400	-0.29	Caliper
PYFYUD		0.00004	0.00009	0.37508	0.84	0.37464	0.42	Micrometer
Q3D88M		0.00004	0.00030	0.37493	-0.23	0.37453	-0.23	Micrometer
Q9JQHY		0.00004	0.00050	0.37490	-0.20	0.37450	-0.20	Micrometer
QDXBHT		0.00004	0.00020	0.37497	-0.13	0.37456	-0.20	Micrometer
QJ2DJM		0.00004	0.00040	0.37494	-0.15	0.37448	-0.30	Micrometer
QP6CZ4		0.00004	0.00008	0.37496	-0.44	0.37457	-0.37	Micrometer
R7M2NY	X	0.00004	0.00008	0.37480	-2.23	0.37441	-2.16	Caliper
RBLTYM		0.00004	0.00059	0.37500	0.00	0.37460	0.00	Micrometer
TDKRMK		0.00004	0.00500	0.37500	0.00	0.37500	0.08	Micrometer
TEFAPL		0.00004	0.00030	0.37475	-0.83	0.37432	-0.93	Micrometer
TTZKJ4		0.00004	0.00015	0.37503	0.19	0.37457	-0.19	Micrometer
TUWX8W		0.00004	<u>Not Reported</u>	0.37496		0.37446		Other
UJ9VVF		0.00004	0.00015	0.37498	-0.13	0.37456	-0.26	Micrometer
UWKUBG		0.00004	0.00076	0.37500	0.00	0.37450	-0.13	Micrometer
VDYTQY		0.00004	0.00118	0.37480	-0.17	0.37441	-0.16	Caliper
VJ6LLU		0.00004	0.00010	0.37500	0.00	0.37460	0.00	Other
VPN7RA		0.00004	0.00006	0.37500	-0.01	0.37459	-0.21	Micrometer
VX4DKD	X	0.00004	0.00024	0.93677	2,264.05	0.93260	2,248.84	Micrometer
VX4E4Q	X	0.00004	0.00001	0.37512	2.93	0.37469	2.11	Micrometer
XXL22Y		0.00004	<u>Not Reported</u>	0.37495		0.37457		Micrometer
YY42GZ		0.00004	0.00013	0.37490	-0.76	0.37450	-0.76	Micrometer
Z73NKQ		0.00004	0.00030	0.37500	0.00	0.37460	0.00	Micrometer
ZGMVNL		0.00004	0.12000	0.37500	0.00	0.37470	0.00	Micrometer
ZLFZBY		0.00004	720.00000	0.37500	0.00	0.37450	0.00	Micrometer



Analysis 1001

Dimensional: Outside Diameter of Plain Plug Gage  
ISO GUM

Summary Statistics

	<u>Sample 177</u>	<u>Sample 178</u>
<b>Grand Means</b>	0.3749 inch	0.3745 inch
<b>Std Dev Btwn Labs</b>	0.0001 inch	0.0001 inch

Samples 177, 178 : 52100 Steel, 52100 Steel

Statistics based on 48 of 61 reporting participants

**Comments on Assigned Data Flags for Test #1001**

62WEN6 (X) - En value for sample 177 was low.

8WBUCU6 (X) - En value for sample 178 was low.

8YC8Q9 (X) - En value for both samples was low.

BG83AU (X) - En value for sample 177 was extreme. Potential typo in data submission.

KQLHW8 (X) - En value for sample 177 was low.

LK2F42 (X) - En value for sample 177 was low.

LMUVPC (X) - En value for both samples was extreme. Potential typo in data submission.

MN3YME (X) - En value for sample 178 was low.

R7M2NY (X) - En value for both samples was low.

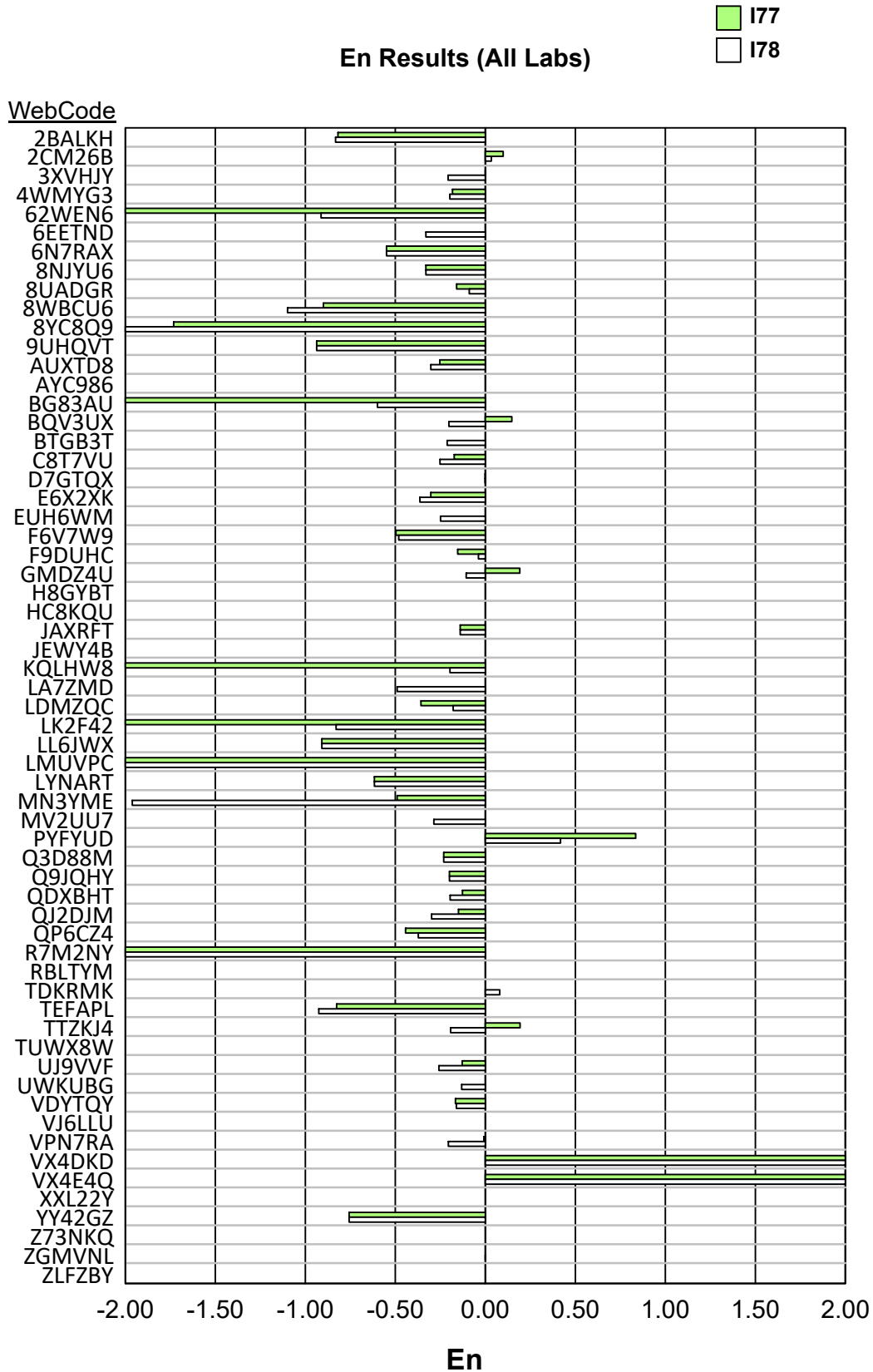
VX4DKD (X) - Extreme data.

VX4E4Q (X) - En value for both samples was high.



Analysis 1001

Dimensional: Outside Diameter of Plain Plug Gage  
ISO GUM







# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1101

Tensile Strength: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2HQZL3		48.40	0.08	0.16	49.50	-0.18	-0.39
38MVJY	X	49.11	0.79	1.60	48.21	-1.47	-3.15
3T3ETF		47.71	-0.61	-1.24	49.16	-0.52	-1.12
4WMYG3		47.90	-0.42	-0.85	49.50	-0.18	-0.39
6R28GE	X	44.60	-3.72	-7.54	49.50	-0.18	-0.39
6RMJH9		48.00	-0.32	-0.65	50.00	0.32	0.69
6TEV3Z	*	47.40	-0.92	-1.86	50.40	0.72	1.55
ADBP2R	X	47.90	-0.42	-0.85	62.10	12.42	26.66
AME4L6		48.30	-0.02	-0.04	49.50	-0.18	-0.39
B4DKZ3		48.70	0.38	0.77	49.80	0.12	0.26
CV6738		48.10	-0.22	-0.45	49.30	-0.38	-0.81
EZPFAM		48.75	0.43	0.87	50.62	0.94	2.02
FDVWPG		48.10	-0.22	-0.45	49.40	-0.28	-0.60
FZGJ9V		48.10	-0.22	-0.45	49.20	-0.48	-1.03
GEYNX4		48.22	-0.10	-0.20	49.41	-0.27	-0.58
GHFJTL		48.20	-0.12	-0.24	49.50	-0.18	-0.39
GKZHWH		49.00	0.68	1.38	49.80	0.12	0.26
GTVXTW		48.10	-0.22	-0.45	50.10	0.42	0.90
H3GFLV		48.40	0.08	0.16	49.10	-0.58	-1.24
H6HJCW		48.40	0.08	0.16	50.50	0.82	1.76
HBFEJG		48.83	0.51	1.04	49.69	0.01	0.02
HNE3CP		48.00	-0.32	-0.65	49.40	-0.28	-0.60
HZD42T		48.40	0.08	0.16	50.60	0.92	1.98
J7ECT2		48.26	-0.06	-0.12	49.95	0.27	0.58
J9L23H	*	49.60	1.28	2.60	50.17	0.49	1.04
JKEZ2U		48.29	-0.03	-0.07	50.07	0.39	0.83
JNDCWU		48.50	0.18	0.37	48.90	-0.78	-1.67
KP6KTG		48.20	-0.12	-0.24	49.70	0.02	0.04
KU4D3K		48.30	-0.02	-0.04	49.80	0.12	0.26
LAB38W		48.60	0.28	0.57	50.30	0.62	1.33
LCX4AT		48.20	-0.12	-0.24	50.00	0.32	0.69
M7777M		49.17	0.85	1.72	49.59	-0.09	-0.20
METCTT		48.50	0.18	0.37	49.60	-0.08	-0.17
MN3YME		47.50	-0.82	-1.66	49.00	-0.68	-1.46
MX7WPW	*	48.20	-0.12	-0.24	48.50	-1.18	-2.53
NF84JP		48.00	-0.32	-0.65	50.00	0.32	0.69
NX7FRQ		48.00	-0.32	-0.65	49.80	0.12	0.26
P2YR99		48.07	-0.25	-0.51	49.75	0.07	0.15
PEQRDA		47.41	-0.91	-1.84	48.83	-0.84	-1.81
PVUZXP		49.00	0.68	1.38	49.40	-0.28	-0.60
Q42Z8Q		48.40	0.08	0.16	49.80	0.12	0.26
QFFF8P		47.90	-0.42	-0.85	49.20	-0.48	-1.03
R6XBJQ		49.00	0.68	1.38	50.10	0.42	0.90
R6XHGC		48.50	0.18	0.37	49.60	-0.08	-0.17
RY7MKT		48.40	0.08	0.16	49.50	-0.18	-0.39
TPVKYT		48.20	-0.12	-0.24	50.10	0.42	0.90
UD8D2W		48.30	-0.02	-0.04	49.20	-0.48	-1.03



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1101

Tensile Strength: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
UQQY63		48.60	0.28	0.57	49.90	0.22	0.47
VA4W7E	X	38.04	-10.28	-20.83	40.63	-9.05	-19.43
VNGLP9	*	49.40	1.08	2.19	50.60	0.92	1.98
XACCC7	*	47.00	-1.32	-2.67	49.60	-0.08	-0.17
XBJRJC		48.80	0.48	0.97	49.60	-0.08	-0.17
XCCACH		49.10	0.78	1.58	49.60	-0.08	-0.17
YLCGUH		48.40	0.08	0.16	49.60	-0.08	-0.17
YZV64F		48.30	-0.02	-0.04	50.20	0.52	1.12
Z6QU36		48.15	-0.17	-0.34	49.31	-0.37	-0.79
ZLU3MK		47.67	-0.65	-1.31	49.27	-0.41	-0.88

### Summary Statistics

	Sample R77		Sample R78	
<b>Grand Means</b>	48.32	ksi	49.68	ksi
<b>Stnd Dev Btwn Labs</b>	0.49	ksi	0.47	ksi

Samples R77, R78 : 16G 6061-T6 (A), 14G 6061-T6 (B)

Statistics based on 53 of 57 reporting participants

### Comments on Assigned Data Flags for Test #1101

- 38MVJY (X) - Data for sample R78 are low.
- 6R28GE (X) - Data for sample R77 are low.
- ADBP2R (X) - Data for sample R78 are high.
- VA4W7E (X) - Data for both samples are low.



Analysis 1101

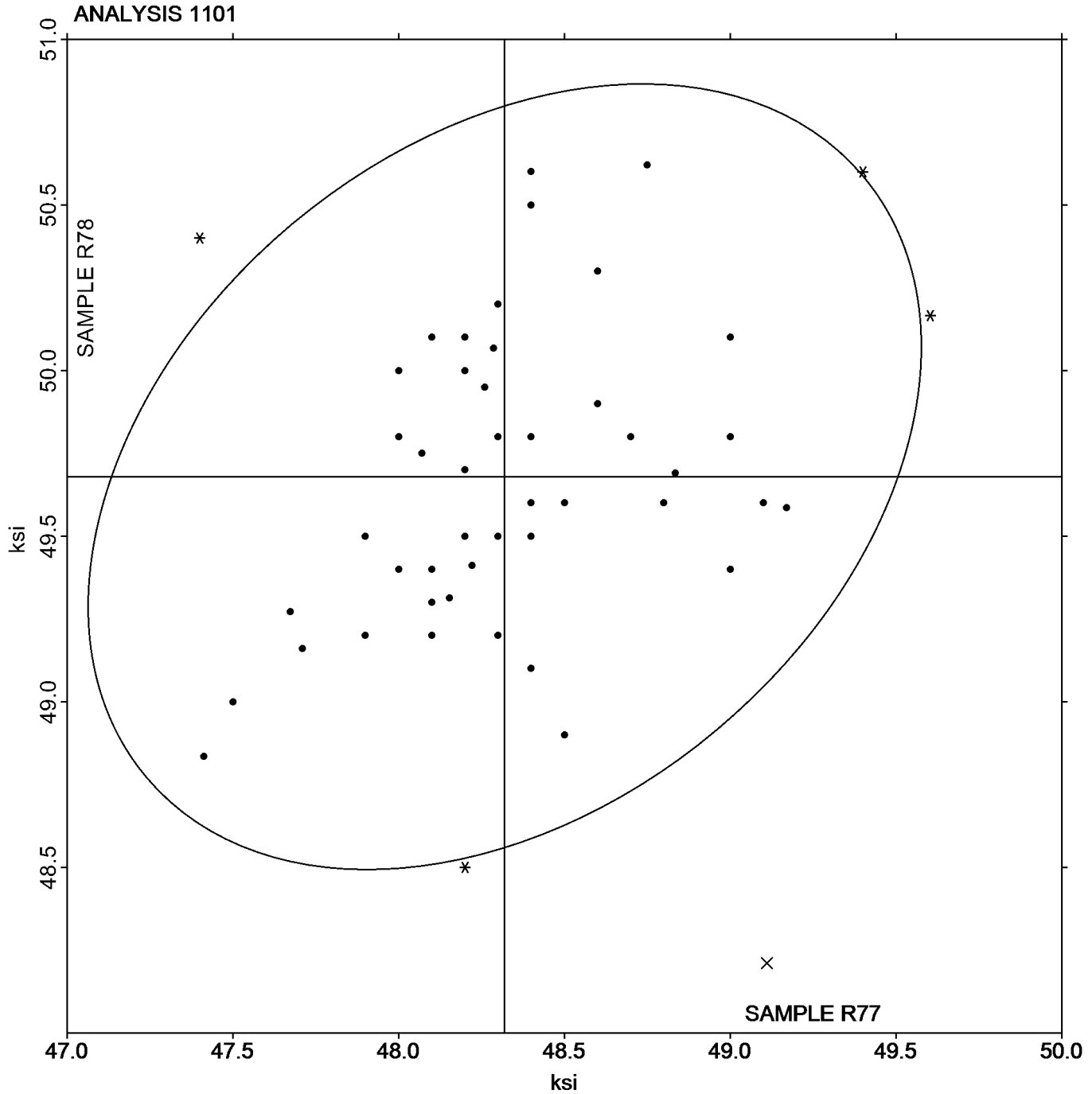
Tensile Strength: Lab-Machined Flat Aluminum  
ASTM B557

SAMPLE R77

SAMPLE R78

48.32 ksi

49.68 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1102

Yield Strength: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2HQZL3		39.90	0.06	0.13	40.90	-0.63	-1.11
38MVJY	*	40.45	0.61	1.37	40.48	-1.05	-1.85
3T3ETF		39.06	-0.78	-1.76	41.21	-0.32	-0.56
4WMYG3		39.20	-0.64	-1.45	41.00	-0.53	-0.93
6R28GE	X	36.90	-2.94	-6.64	41.60	0.07	0.13
6RMJH9		39.80	-0.04	-0.10	41.80	0.27	0.48
6TEV3Z	*	38.50	-1.34	-3.03	41.50	-0.03	-0.05
ADBP2R	X	37.60	-2.24	-5.06	45.40	3.87	6.85
AME4L6		40.20	0.36	0.81	41.90	0.37	0.66
B4DKZ3		40.10	0.26	0.58	41.60	0.07	0.13
CV6738		39.30	-0.54	-1.22	41.20	-0.33	-0.58
EZPFAM		40.20	0.36	0.81	42.80	1.27	2.25
FDVWPG		39.40	-0.44	-1.00	41.40	-0.13	-0.22
FZGJ9V		39.70	-0.14	-0.32	40.80	-0.73	-1.28
GEYNX4		39.77	-0.08	-0.17	41.15	-0.37	-0.66
GHFJTL		39.77	-0.07	-0.16	41.35	-0.18	-0.31
GKZHHW		40.40	0.56	1.26	41.80	0.27	0.48
GTVXTW		39.40	-0.44	-1.00	41.70	0.17	0.31
H3GFLV		39.70	-0.14	-0.32	41.20	-0.33	-0.58
H6HJCW		39.80	-0.04	-0.10	42.20	0.67	1.19
HBFEJG		40.10	0.26	0.59	41.86	0.33	0.59
HNE3CP		39.20	-0.64	-1.45	41.10	-0.43	-0.75
HZD42T	*	40.60	0.76	1.71	43.10	1.57	2.78
J7ECT2		39.88	0.04	0.09	42.02	0.49	0.87
J9L23H		40.35	0.50	1.13	41.92	0.39	0.69
JKEZ2U		39.98	0.13	0.30	42.36	0.83	1.47
JNDCWU		40.00	0.16	0.36	40.60	-0.93	-1.64
KP6KTG		39.80	-0.04	-0.10	42.00	0.47	0.84
KU4D3K		40.80	0.96	2.16	42.00	0.47	0.84
LAB38W		40.10	0.26	0.58	42.50	0.97	1.72
LCX4AT		39.70	-0.14	-0.32	41.80	0.27	0.48
M7777M		40.64	0.80	1.80	40.97	-0.56	-0.99
METCTT		40.10	0.26	0.58	41.30	-0.23	-0.40
MN3YME		40.50	0.66	1.48	41.20	-0.33	-0.58
MX7WPW		39.90	0.06	0.13	40.20	-1.33	-2.34
NF84JP		39.80	-0.04	-0.10	42.00	0.47	0.84
NX7FRQ		39.50	-0.34	-0.77	41.70	0.17	0.31
P2YR99		39.83	-0.01	-0.03	41.95	0.42	0.75
PEQRDA		39.31	-0.54	-1.21	40.52	-1.00	-1.77
PVUZXP		40.50	0.66	1.48	41.50	-0.03	-0.05
Q42Z8Q		39.80	-0.04	-0.10	41.60	0.07	0.13
QFFF8P		39.40	-0.44	-1.00	41.30	-0.23	-0.40
R6XBJQ		39.70	-0.14	-0.32	41.70	0.17	0.31
R6XHGC		39.70	-0.14	-0.32	41.40	-0.13	-0.22
RY7MKT		40.10	0.26	0.58	41.40	-0.13	-0.22
TPVKYT		39.70	-0.14	-0.32	42.00	0.47	0.84
UD8D2W		39.50	-0.34	-0.77	40.80	-0.73	-1.28



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1102**

**Cycle 135  
3rd Qtr 2021**

**Yield Strength: Lab-Machined Flat Aluminum  
ASTM B557**

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
UQQY63		39.90	0.06	0.13	41.80	0.27	0.48
VA4W7E	X	30.87	-8.97	-20.23	31.59	-9.94	-17.57
VNGLP9		39.90	0.06	0.13	41.70	0.17	0.31
XACCC7	X	38.50	-1.34	-3.03	42.20	0.67	1.19
XBJRJC		40.00	0.16	0.36	41.00	-0.53	-0.93
XCCACH		40.40	0.56	1.26	41.80	0.27	0.48
YLCGUH		39.60	-0.24	-0.55	41.40	-0.13	-0.22
YZV64F		39.80	-0.04	-0.10	41.70	0.17	0.31
Z6QU36		39.74	-0.10	-0.23	41.63	0.10	0.18
ZLU3MK		39.17	-0.67	-1.52	41.07	-0.46	-0.81

**Summary Statistics**

	Sample R77		Sample R78	
<b>Grand Means</b>	39.84	ksi	41.53	ksi
<b>Stnd Dev Btwn Labs</b>	0.44	ksi	0.57	ksi

Samples R77, R78 : 16G 6061-T6 (A), 14G 6061-T6 (B)

*Statistics based on 53 of 57 reporting participants*

**Comments on Assigned Data Flags for Test #1102**

- 6R28GE (X) - Data for sample R77 are low.
- ADBP2R (X) - Data for sample R77 are low and data for sample R78 are high.
- VA4W7E (X) - Data for both samples are low.
- XACCC7 (X) - Data for sample R77 are low.



Analysis 1102

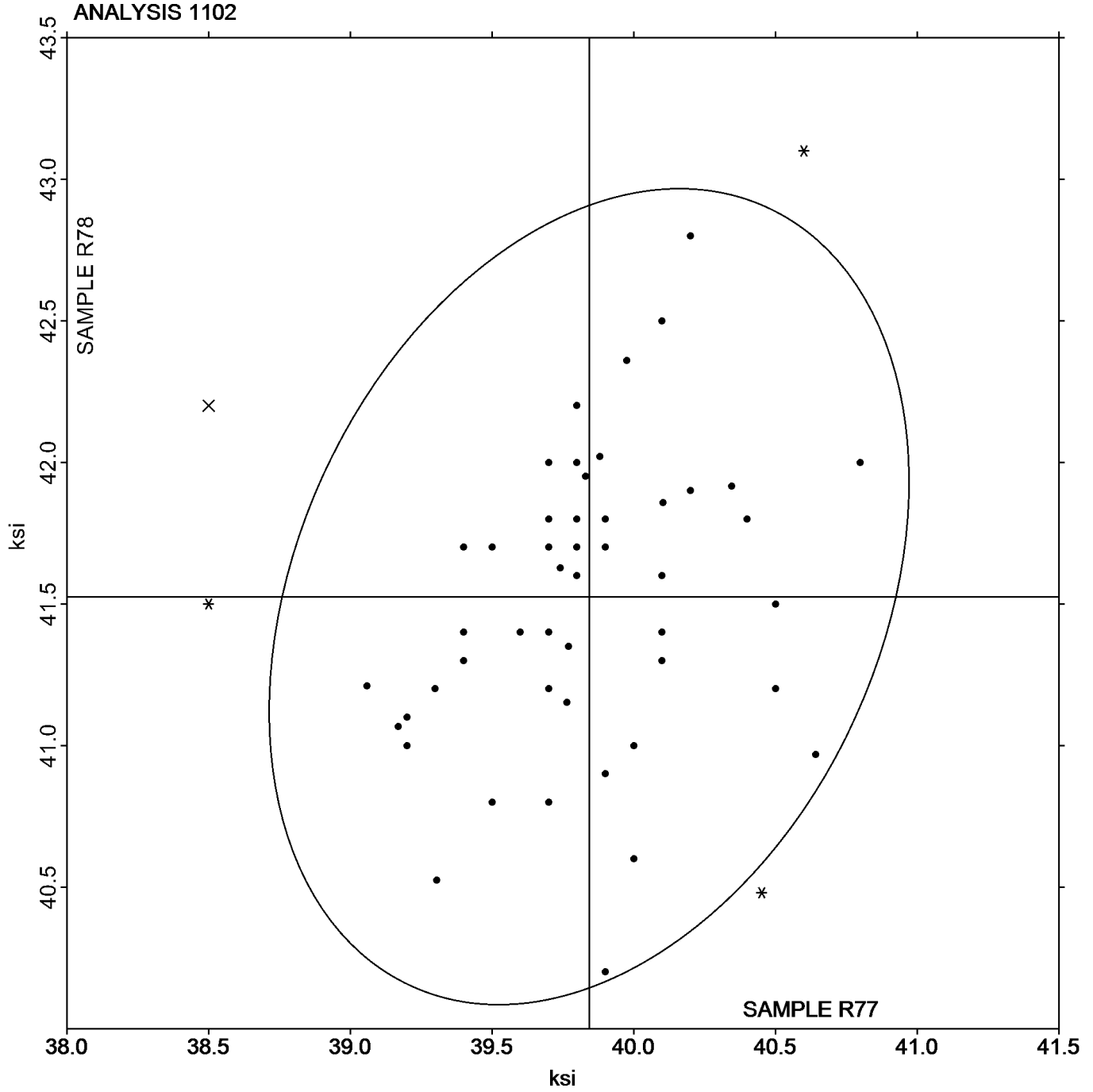
Yield Strength: Lab-Machined Flat Aluminum  
ASTM B557

SAMPLE R77

SAMPLE R78

39.84 ksi

41.53 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1103

Elongation: Lab-Machined Flat Aluminum  
ASTM B557

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2HQZL3	*	18.30	2.64	2.87	17.80	2.08	2.09
38MVJY		14.50	-1.16	-1.26	14.10	-1.62	-1.64
3T3ETF		15.82	0.16	0.18	15.50	-0.22	-0.23
4WMYG3		16.70	1.04	1.13	16.70	0.98	0.98
6R28GE		15.90	0.24	0.26	15.90	0.18	0.18
6RMJH9		14.50	-1.16	-1.26	14.50	-1.22	-1.23
6TEV3Z		16.00	0.34	0.37	15.00	-0.72	-0.73
ADBP2R	X	13.50	-2.16	-2.34	16.20	0.48	0.48
AME4L6		14.80	-0.86	-0.93	14.00	-1.72	-1.74
B4DKZ3		16.50	0.84	0.91	16.00	0.28	0.28
CV6738		15.10	-0.56	-0.61	15.30	-0.42	-0.43
EZPFAM		14.40	-1.26	-1.37	14.30	-1.42	-1.43
FDVWPG		15.20	-0.46	-0.50	14.40	-1.32	-1.33
FZGJ9V		16.10	0.44	0.48	17.10	1.38	1.39
GEYNX4		16.30	0.64	0.70	16.86	1.14	1.14
GHFJTL		15.50	-0.16	-0.17	16.20	0.48	0.48
GKZHWH	*	17.00	1.34	1.46	18.20	2.48	2.50
GTVXTW		15.50	-0.16	-0.17	16.00	0.28	0.28
H3GFLV		15.50	-0.16	-0.17	15.00	-0.72	-0.73
H6HJCW		15.00	-0.66	-0.71	15.50	-0.22	-0.23
HBFEJG		16.40	0.74	0.81	16.70	0.98	0.98
HNE3CP		16.50	0.84	0.91	16.20	0.48	0.48
HZD42T		15.00	-0.66	-0.71	15.00	-0.72	-0.73
J7ECT2		16.80	1.14	1.24	16.18	0.46	0.46
J9L23H		14.10	-1.56	-1.69	14.50	-1.22	-1.23
JKEZ2U		16.00	0.34	0.37	15.50	-0.22	-0.23
JNDCWU		15.50	-0.16	-0.17	15.50	-0.22	-0.23
KP6KTG	X	11.40	-4.26	-4.62	11.00	-4.72	-4.76
KU4D3K	*	18.00	2.34	2.54	17.00	1.28	1.29
LAB38W		15.00	-0.66	-0.71	15.50	-0.22	-0.23
LCX4AT		15.50	-0.16	-0.17	15.50	-0.22	-0.23
M7777M		15.25	-0.41	-0.44	15.35	-0.37	-0.38
METCTT		15.50	-0.16	-0.17	16.00	0.28	0.28
MN3YME		15.40	-0.26	-0.28	15.90	0.18	0.18
MX7WPW		16.30	0.64	0.70	16.00	0.28	0.28
NF84JP		15.00	-0.66	-0.71	15.00	-0.72	-0.73
NX7FRQ		16.00	0.34	0.37	16.50	0.78	0.78
P2YR99	*	14.04	-1.62	-1.76	15.70	-0.02	-0.02
PEQRDA		16.10	0.44	0.48	17.30	1.58	1.59
PVUZXP		15.00	-0.66	-0.71	14.50	-1.22	-1.23
Q42Z8Q		16.00	0.34	0.37	15.50	-0.22	-0.23
QFFF8P		16.00	0.34	0.37	16.60	0.88	0.88
R6XBJQ		16.00	0.34	0.37	16.00	0.28	0.28
R6XHGC		16.00	0.34	0.37	17.00	1.28	1.29
RY7MKT		14.50	-1.16	-1.26	15.50	-0.22	-0.23
TPVKYT		14.50	-1.16	-1.26	15.00	-0.72	-0.73
UD8D2W		16.70	1.04	1.13	15.80	0.08	0.08



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1103**

**Elongation: Lab-Machined Flat Aluminum**  
**ASTM B557**

WebCode	Data Flag	Sample R77			Sample R78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
UQQY63		14.60	-1.06	-1.15	14.30	-1.42	-1.43
VA4W7E	X	11.60	-4.06	-4.40	16.10	0.38	0.38
VNGLP9		16.00	0.34	0.37	16.00	0.28	0.28
XACCC7		14.00	-1.66	-1.80	13.50	-2.22	-2.24
XBJRJC		17.00	1.34	1.46	16.50	0.78	0.78
XCCACH		14.60	-1.06	-1.15	14.60	-1.12	-1.13
YLCGUH		15.50	-0.16	-0.17	15.50	-0.22	-0.23
YZV64F		16.00	0.34	0.37	16.50	0.78	0.78
Z6QU36		16.10	0.44	0.48	15.60	-0.12	-0.12
ZLU3MK		16.00	0.34	0.37	17.00	1.28	1.29

**Summary Statistics**

	Sample R77		Sample R78	
<b>Grand Means</b>	15.66	Percent	15.72	Percent
<b>Stnd Dev Btwn Labs</b>	0.92	Percent	0.99	Percent

Samples R77, R78 : 16G 6061-T6 (A), 14G 6061-T6 (B)

Statistics based on 54 of 57 reporting participants

**Comments on Assigned Data Flags for Test #1103**

ADBP2R (X) - Inconsistent in testing between samples.

KP6KTG (X) - Data for both samples are low. Possible Systematic Error.

VA4W7E (X) - Data for sample R77 are low.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1111

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

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		138.80	0.23	0.21	166.50	0.02	0.01
3CXYLU	X	137.87	-0.70	-0.65	137.61	-28.87	-23.47
3J4ZBA		140.10	1.53	1.42	168.90	2.42	1.97
3KWCUB		138.38	-0.19	-0.18	166.12	-0.36	-0.30
3VT499		139.20	0.63	0.58	166.50	0.02	0.01
63NMM9		138.20	-0.37	-0.35	165.29	-1.19	-0.97
67PL4T		138.30	-0.27	-0.25	166.40	-0.08	-0.07
68XMZY		139.58	1.01	0.93	166.00	-0.49	-0.40
7VKCYA		138.20	-0.37	-0.35	165.60	-0.88	-0.72
8AGJE4		138.80	0.22	0.21	166.15	-0.33	-0.27
8DWJMB		138.15	-0.42	-0.39	167.30	0.82	0.67
8UADGR		137.00	-1.57	-1.46	164.00	-2.48	-2.02
9E632D		136.40	-2.17	-2.02	167.00	0.52	0.42
9NTJNY		138.60	0.03	0.02	165.70	-0.78	-0.64
9ZNR82	*	139.96	1.39	1.29	169.70	3.21	2.61
AGMATQ		138.90	0.33	0.30	165.30	-1.18	-0.96
AQBQC8		138.77	0.20	0.18	166.93	0.45	0.37
AQDDV8		138.00	-0.57	-0.53	165.00	-1.48	-1.20
B422ZJ		139.00	0.43	0.40	166.40	-0.08	-0.07
BQ8ATF		139.85	1.28	1.19	169.37	2.89	2.35
CC6NWN	*	137.20	-1.37	-1.28	163.30	-3.18	-2.59
CDHV67		136.54	-2.03	-1.89	166.90	0.42	0.34
CJ67C2		139.00	0.43	0.40	166.00	-0.48	-0.39
CV6738		139.40	0.83	0.77	167.30	0.82	0.67
D7Z84U		139.55	0.98	0.91	167.48	1.00	0.82
D9QCQZ		138.20	-0.37	-0.35	166.50	0.02	0.01
DNYP7R		138.90	0.33	0.30	166.70	0.22	0.18
EVULCL		139.80	1.23	1.14	166.60	0.12	0.10
FAUX9W		138.14	-0.44	-0.41	165.78	-0.70	-0.57
FKKB62		137.40	-1.17	-1.09	166.18	-0.30	-0.25
G4Y3Q4		139.40	0.83	0.77	166.60	0.12	0.10
H6QN9E		140.54	1.97	1.83	166.50	0.02	0.02
HM6ZLK	*	137.90	-0.67	-0.63	169.40	2.92	2.37
JATYJY		137.33	-1.24	-1.15	166.08	-0.40	-0.33
JDFW6P		139.90	1.33	1.23	167.00	0.52	0.42
JEWY4B		138.22	-0.36	-0.33	166.16	-0.32	-0.26
K8JW2E		140.11	1.53	1.42	165.34	-1.14	-0.92
KGR7TD		140.69	2.11	1.96	167.23	0.75	0.61
KVWH7R		138.00	-0.57	-0.53	166.00	-0.48	-0.39
L3AVJG		139.66	1.09	1.01	166.54	0.06	0.05
LA7ZMD		137.10	-1.47	-1.37	165.60	-0.88	-0.72
LAB38W		139.00	0.43	0.40	167.00	0.52	0.42
LGD7HN		138.90	0.33	0.30	167.40	0.92	0.75
LJVQ8K		137.01	-1.57	-1.46	164.50	-1.98	-1.61
LK2F42		137.82	-0.76	-0.70	167.52	1.04	0.84
LL6JWX		139.86	1.28	1.19	169.28	2.80	2.27
M34HGZ	*	137.00	-1.57	-1.46	168.00	1.52	1.23



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1111

Tensile Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MBWTQV		136.71	-1.86	-1.73	166.28	-0.20	-0.16
MFCPKH		139.00	0.43	0.40	167.00	0.52	0.42
MJP4Y6		137.64	-0.93	-0.87	166.48	-0.01	0.00
NEDXVN		138.71	0.14	0.13	165.78	-0.70	-0.57
PDWQZE		139.30	0.73	0.67	166.10	-0.38	-0.31
Q3VKNR		137.40	-1.17	-1.09	165.60	-0.88	-0.72
QLREQV		139.10	0.53	0.49	167.00	0.52	0.42
QVX9XG		138.50	-0.07	-0.07	165.40	-1.08	-0.88
R6XBJQ		139.00	0.43	0.40	166.00	-0.48	-0.39
R7M2NY		136.76	-1.82	-1.69	165.04	-1.44	-1.17
TLFQZR		139.45	0.88	0.82	166.85	0.37	0.30
TTZKJ4		137.54	-1.03	-0.96	166.17	-0.31	-0.25
TVPY3M		137.63	-0.95	-0.88	164.27	-2.22	-1.80
UWCLUV		138.00	-0.57	-0.53	167.00	0.52	0.42
UWKUBG		137.40	-1.17	-1.09	164.90	-1.59	-1.29
WH2PNY		137.70	-0.87	-0.81	166.40	-0.08	-0.07
WVVK4J		140.00	1.43	1.32	168.00	1.52	1.23
WX2XUY		138.19	-0.39	-0.36	165.90	-0.58	-0.47
X2YY9L		140.37	1.80	1.67	168.40	1.92	1.56
X467RE		139.70	1.13	1.05	166.70	0.22	0.18
XFEVH3		139.59	1.02	0.94	165.96	-0.52	-0.42

### Summary Statistics

	Sample A77		Sample A78	
<b>Grand Means</b>	138.57	ksi	166.48	ksi
<b>Stnd Dev Btwn Labs</b>	1.08	ksi	1.23	ksi

Samples A77, A78 : AISI 4340 (L), AISI 4340 (S)

Statistics based on 67 of 68 reporting participants

### Comments on Assigned Data Flags for Test #1111

3CXylU (X) - Data for sample A78 are low.





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1112

Yield Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		111.40	0.86	0.65	152.30	1.71	1.64
3CXYLU	X	119.19	8.66	6.56	118.90	-31.69	-30.43
3J4ZBA		111.50	0.96	0.73	152.80	2.21	2.12
3KWCUB		110.56	0.03	0.02	150.40	-0.20	-0.19
3VT499		109.80	-0.74	-0.56	149.20	-1.39	-1.34
63NMM9		110.72	0.19	0.14	149.85	-0.75	-0.72
67PL4T		110.60	0.06	0.05	149.70	-0.89	-0.86
68XMZY	X	104.15	-6.39	-4.84	151.44	0.84	0.81
7VKCYA		110.90	0.36	0.28	150.70	0.11	0.10
8AGJE4		110.39	-0.14	-0.11	150.48	-0.11	-0.11
8DWJMB	*	114.07	3.54	2.68	151.17	0.58	0.56
8UADGR	*	108.00	-2.54	-1.92	148.00	-2.59	-2.49
9E632D		108.40	-2.14	-1.62	151.00	0.41	0.39
9NTJNY	X	111.00	0.46	0.35	165.70	15.11	14.50
9ZNR82	X	115.31	4.77	3.61	155.19	4.60	4.41
AGMATQ		109.80	-0.74	-0.56	149.40	-1.19	-1.15
AQBQC8		110.93	0.39	0.30	151.69	1.09	1.05
AQDDV8		109.00	-1.54	-1.16	149.00	-1.59	-1.53
B422ZJ		110.30	-0.24	-0.18	149.90	-0.69	-0.67
BQ8ATF	X	123.28	12.75	9.65	153.90	3.30	3.17
CC6NWN	*	108.90	-1.64	-1.24	147.50	-3.09	-2.97
CDHV67		108.49	-2.05	-1.55	150.60	0.01	0.01
CJ67C2		111.00	0.46	0.35	150.00	-0.59	-0.57
CV6738		110.40	-0.14	-0.10	150.30	-0.29	-0.28
D7Z84U		111.30	0.77	0.58	151.26	0.67	0.64
D9QCQZ		110.10	-0.44	-0.33	150.20	-0.39	-0.38
DNYP7R		111.10	0.56	0.43	150.60	0.01	0.01
EVULCL		110.70	0.16	0.12	150.10	-0.49	-0.47
FAUX9W	X	115.38	4.84	3.67	148.80	-1.80	-1.73
FKKB62		108.32	-2.22	-1.68	150.00	-0.59	-0.57
G4Y3Q4		110.80	0.26	0.20	150.30	-0.29	-0.28
H6QN9E		111.39	0.85	0.65	150.84	0.25	0.24
HM6ZLK	X	113.90	3.36	2.55	155.70	5.11	4.90
JATYJY		110.01	-0.53	-0.40	149.83	-0.76	-0.73
JDFW6P		112.00	1.46	1.11	151.70	1.11	1.06
JEWY4B	X	110.90	0.36	0.28	159.75	9.16	8.79
K8JW2E		110.23	-0.31	-0.23	150.12	-0.48	-0.46
KGR7TD		110.81	0.27	0.21	150.84	0.25	0.24
KVWH7R	X	112.00	1.46	1.11	155.00	4.41	4.23
L3AVJG		111.08	0.54	0.41	150.86	0.27	0.26
LA7ZMD		109.50	-1.04	-0.78	150.70	0.11	0.10
LAB38W		110.00	-0.54	-0.41	151.00	0.41	0.39
LGD7HN		111.50	0.96	0.73	151.90	1.31	1.25
LK2F42	*	107.39	-3.15	-2.39	150.84	0.25	0.24
LL6JWX	X	110.28	-0.26	-0.20	155.66	5.06	4.86
M34HGZ		108.90	-1.64	-1.24	151.70	1.11	1.06
MBWTQV		108.07	-2.47	-1.87	150.07	-0.52	-0.50



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1112

Yield Strength: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MFCPKH		110.00	-0.54	-0.41	151.00	0.41	0.39
MJP4Y6		113.17	2.64	2.00	151.73	1.13	1.09
NEDXVN		110.69	0.15	0.12	150.48	-0.11	-0.11
PDWQZE		111.20	0.66	0.50	150.10	-0.49	-0.47
Q3VKNR		109.80	-0.74	-0.56	149.70	-0.89	-0.86
QLREQV		111.00	0.46	0.35	151.40	0.81	0.77
QVX9XG		110.80	0.26	0.20	149.60	-0.99	-0.95
R6XBJQ		111.00	0.46	0.35	150.00	-0.59	-0.57
R7M2NY	X	104.62	-5.92	-4.48	150.32	-0.28	-0.26
TLFQZR		111.17	0.64	0.48	151.75	1.16	1.11
TTZKJ4		113.20	2.67	2.02	150.04	-0.55	-0.53
TVPY3M		111.14	0.61	0.46	149.29	-1.30	-1.25
UWCLUV		110.00	-0.54	-0.41	151.00	0.41	0.39
UWKUBG	X	105.29	-5.25	-3.98	149.50	-1.10	-1.05
WH2PNY		110.00	-0.54	-0.41	151.00	0.41	0.39
WVVK4J		111.00	0.46	0.35	153.00	2.41	2.31
WX2XUY		112.69	2.15	1.63	150.99	0.39	0.38
X2YY9L		110.29	-0.25	-0.19	152.10	1.51	1.45
X467RE		112.70	2.16	1.64	151.60	1.01	0.97
XFEVH3		111.28	0.74	0.56	151.05	0.46	0.44

### Summary Statistics

	Sample A77		Sample A78	
<b>Grand Means</b>	110.54	ksi	150.59	ksi
<b>Std Dev Btwn Labs</b>	1.32	ksi	1.04	ksi

Samples A77, A78 : AISI 4340 (L), AISI 4340 (S)

Statistics based on 55 of 67 reporting participants

### Comments on Assigned Data Flags for Test #1112

- 3CXylU (X) - Data for sample A77 are high and data for sample A78 are low.
- 68XMZY (X) - Data for sample A77 are low.
- 9NTJNY (X) - Data for sample A78 are high.
- 9ZNR82 (X) - Data for both samples are high.
- BQ8ATF (X) - Data for both samples are high.
- FAUX9W (X) - Data for sample A77 are high.
- HM6ZLK (X) - Data for sample A78 are high.
- JEWY4B (X) - Data for sample A78 are high.
- KVWH7R (X) - Data for sample A78 are high.
- LL6JWX (X) - Data for sample A78 are high.
- R7M2NY (X) - Data for sample A77 are low.
- UWKUBG (X) - Data for sample A77 are low.



Analysis 1112

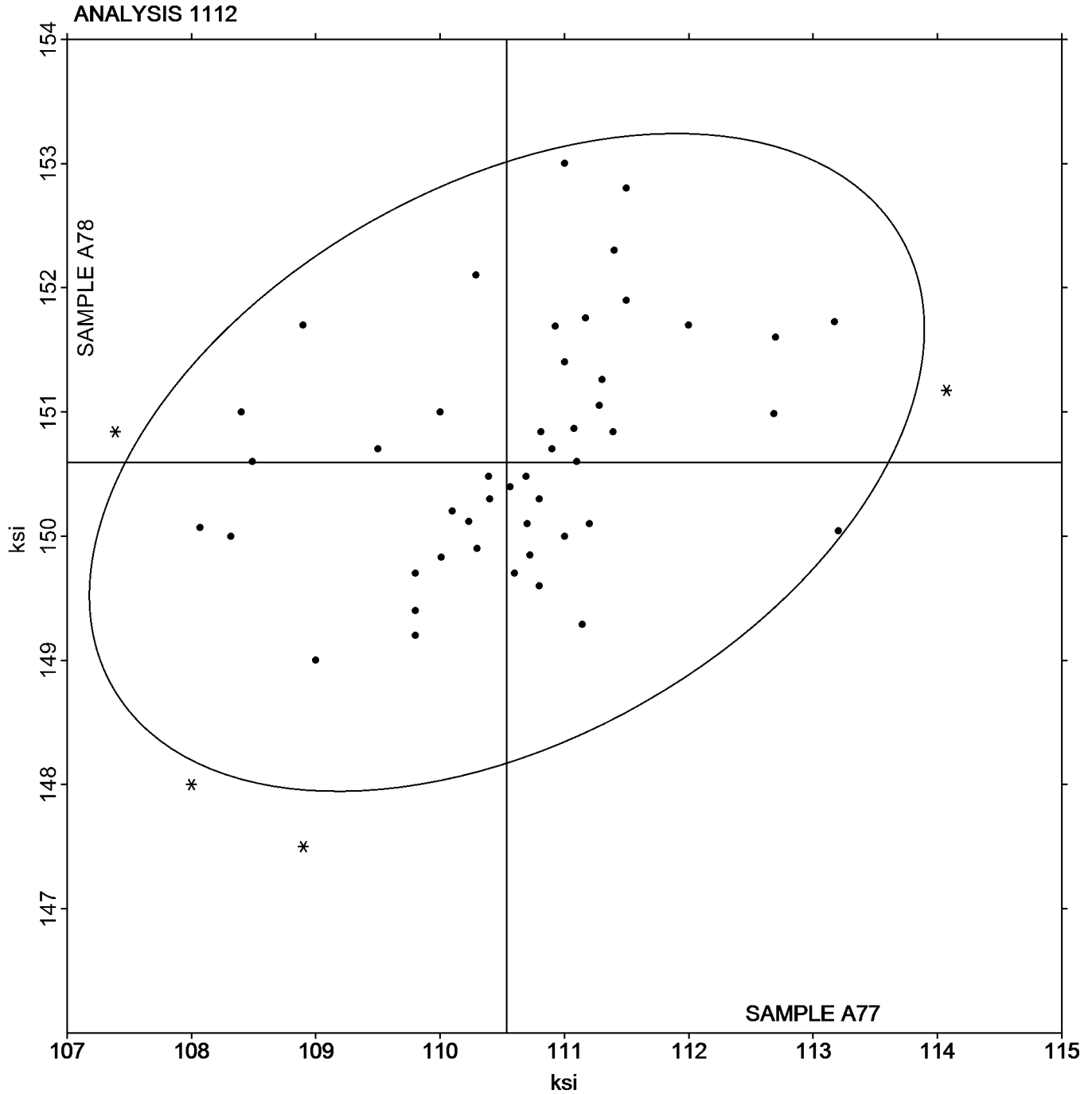
Yield Strength: Pre-Machined Round Steel  
ASTM E8

SAMPLE A77

110.54 ksi

SAMPLE A78

150.59 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1113

Elongation: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		16.65	-0.81	-1.12	16.10	-0.21	-0.32
3CXYLU	*	18.40	0.94	1.29	18.10	1.79	2.62
3J4ZBA	X	17.50	0.04	0.05	18.60	2.29	3.36
3KWCUB		17.91	0.45	0.61	16.44	0.13	0.18
3VT499		17.90	0.44	0.60	16.60	0.29	0.42
63NMM9		16.20	-1.26	-1.74	15.90	-0.41	-0.61
67PL4T		18.20	0.74	1.01	16.60	0.29	0.42
68XMZY	X	22.67	5.21	7.15	22.67	6.36	9.34
7VKCYA	*	16.30	-1.16	-1.60	17.00	0.69	1.01
8AGJE4		17.00	-0.46	-0.64	15.80	-0.51	-0.76
8DWJMB		17.00	-0.46	-0.64	16.00	-0.31	-0.46
8UADGR		18.00	0.54	0.74	17.00	0.69	1.01
9E632D		17.70	0.24	0.32	16.10	-0.21	-0.32
9NTJNY		17.40	-0.06	-0.09	17.20	0.89	1.30
9ZNR82		18.00	0.54	0.74	17.00	0.69	1.01
AGMATQ		17.20	-0.26	-0.36	16.10	-0.21	-0.32
AQBQC8		17.03	-0.43	-0.60	17.48	1.17	1.71
AQDDV8		16.00	-1.46	-2.01	16.00	-0.31	-0.46
B422ZJ		18.05	0.59	0.80	16.85	0.54	0.79
BQ8ATF		18.00	0.54	0.74	16.00	-0.31	-0.46
CC6NWN		17.60	0.14	0.19	16.00	-0.31	-0.46
CDHV67		17.72	0.26	0.35	15.69	-0.62	-0.92
CJ67C2	X	23.00	5.54	7.61	16.00	-0.31	-0.46
CV6738		17.00	-0.46	-0.64	16.40	0.09	0.13
D7Z84U		17.11	-0.35	-0.49	16.12	-0.19	-0.29
D9QCQZ		17.20	-0.26	-0.36	16.30	-0.01	-0.02
DNYP7R		16.70	-0.76	-1.05	15.40	-0.91	-1.34
EVULCL		17.80	0.34	0.46	15.90	-0.41	-0.61
FAUX9W		17.30	-0.16	-0.23	16.10	-0.21	-0.32
FKKB62		17.60	0.14	0.19	15.81	-0.50	-0.74
G4Y3Q4		18.90	1.44	1.97	17.50	1.19	1.74
H6QN9E		17.40	-0.06	-0.09	15.70	-0.61	-0.90
HM6ZLK		18.50	1.04	1.42	16.90	0.59	0.86
JATYJY		17.30	-0.16	-0.23	16.16	-0.15	-0.23
JDFW6P		16.60	-0.86	-1.19	16.80	0.49	0.71
JEWY4B	X	51.04	33.58	46.15	53.25	36.94	54.28
K8JW2E		17.00	-0.46	-0.64	16.00	-0.31	-0.46
KGR7TD		17.00	-0.46	-0.64	16.00	-0.31	-0.46
KVWH7R		16.60	-0.86	-1.19	16.40	0.09	0.13
L3AVJG		16.90	-0.56	-0.78	15.90	-0.41	-0.61
LA7ZMD		18.40	0.94	1.29	17.90	1.59	2.33
LAB38W		16.00	-1.46	-2.01	15.00	-1.31	-1.93
LGD7HN		17.80	0.34	0.46	16.60	0.29	0.42
LK2F42		17.60	0.14	0.19	15.50	-0.81	-1.20
LL6JWX		19.20	1.74	2.38	17.10	0.79	1.15
M34HGZ		17.90	0.44	0.60	16.00	-0.31	-0.46
MBWTQV		17.54	0.08	0.10	15.54	-0.77	-1.14





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1113

Elongation: Pre-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MFCPKH		17.00	-0.46	-0.64	17.00	0.69	1.01
MJP4Y6	*	19.40	1.94	2.66	17.00	0.69	1.01
NEDXVN		18.05	0.59	0.80	17.00	0.69	1.01
PDWQZE		17.10	-0.36	-0.50	15.30	-1.01	-1.49
Q3VKNR		17.70	0.24	0.32	16.90	0.59	0.86
QLREQV		18.00	0.54	0.74	17.00	0.69	1.01
QVX9XG		17.50	0.04	0.05	17.00	0.69	1.01
R6XBJQ		16.00	-1.46	-2.01	15.00	-1.31	-1.93
R7M2NY	X	23.30	5.84	8.02	20.60	4.29	6.30
TLFQZR		17.00	-0.46	-0.64	15.90	-0.41	-0.61
TTZKJ4		18.31	0.85	1.16	17.15	0.84	1.23
TVPY3M		17.77	0.31	0.42	15.34	-0.97	-1.43
UWCLUV		16.50	-0.96	-1.33	15.70	-0.61	-0.90
UWKUBG		17.25	-0.21	-0.30	16.30	-0.01	-0.02
V8BA6B		17.42	-0.04	-0.06	15.38	-0.93	-1.37
WH2PNY		18.00	0.54	0.74	16.00	-0.31	-0.46
WVVK4J		17.00	-0.46	-0.64	16.00	-0.31	-0.46
WX2XUY		16.97	-0.50	-0.68	16.28	-0.04	-0.06
X2YY9L		17.70	0.24	0.32	15.80	-0.51	-0.76
X467RE		18.00	0.54	0.74	15.80	-0.51	-0.76
XFEVH3		18.00	0.54	0.74	17.00	0.69	1.01

### Summary Statistics

	Sample A77		Sample A78	
<b>Grand Means</b>	17.46	Percent	16.31	Percent
<b>Stnd Dev Btwn Labs</b>	0.73	Percent	0.68	Percent

Samples A77, A78 : AISI 4340 (L), AISI 4340 (S)

Statistics based on 63 of 68 reporting participants

### Comments on Assigned Data Flags for Test #1113

- 3J4ZBA (X) - Data for sample A78 are high.
- 68XMZY (X) - Data for both samples are high.
- CJ67C2 (X) - Data for sample A77 are high.
- JEWY4B (X) - Extreme data.
- R7M2NY (X) - Data for both samples are high.



Analysis 1113

Elongation: Pre-Machined Round Steel

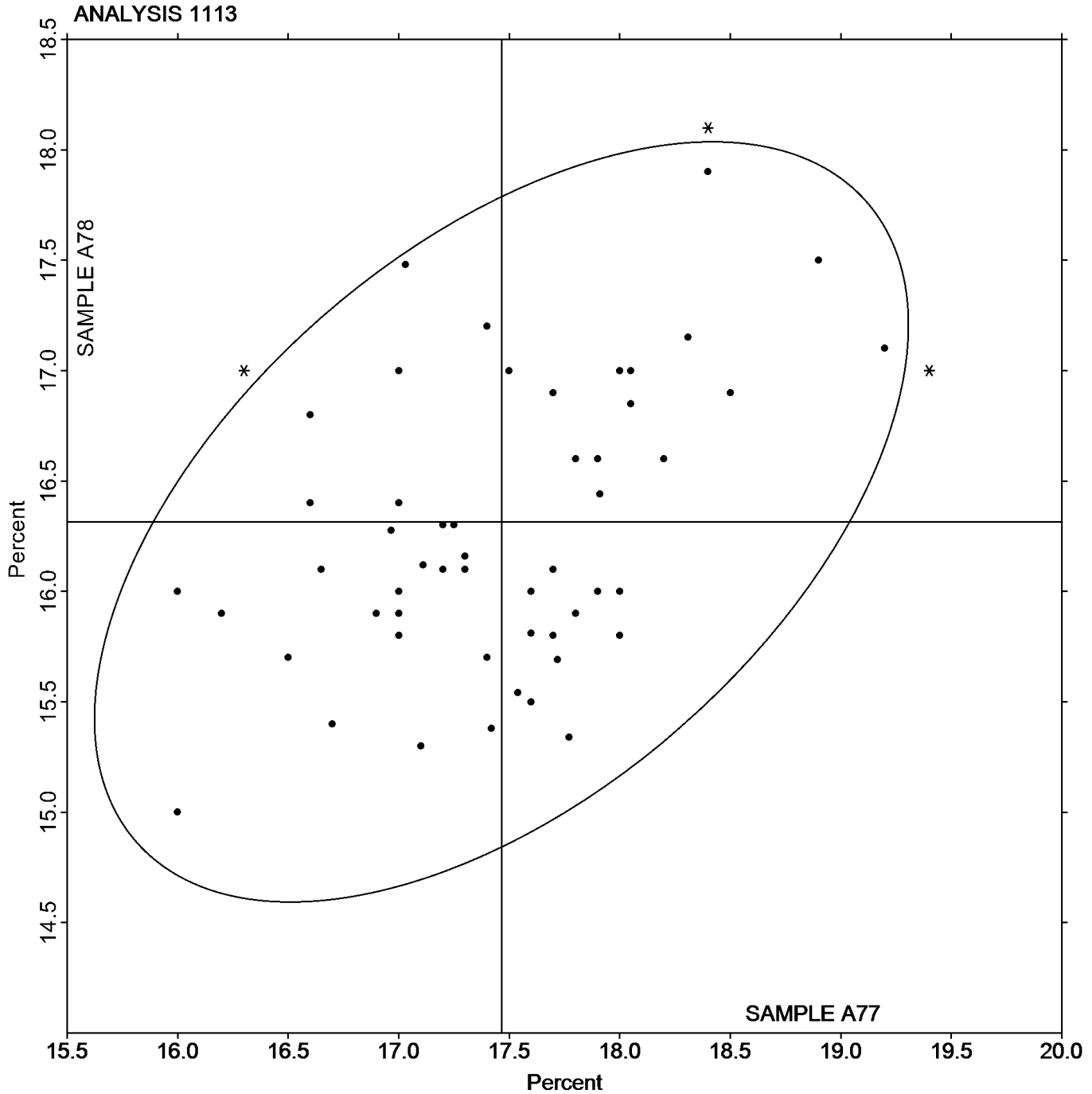
ASTM E8

SAMPLE A77

17.46 Percent

SAMPLE A78

16.31 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1114

### Reduction of Area: Pre-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		50.10	-2.73	-2.06	52.00	-0.51	-0.32
3J4ZBA	X	53.84	1.01	0.76	18.58	-33.93	-21.04
3KWCUB		53.15	0.32	0.24	52.88	0.37	0.23
3VT499		54.10	1.27	0.95	51.60	-0.91	-0.56
63NMM9		53.70	0.87	0.65	55.10	2.59	1.61
67PL4T		54.40	1.57	1.18	52.40	-0.11	-0.07
68XMZY		51.00	-1.83	-1.38	49.59	-2.92	-1.81
7VKCYA		52.00	-0.83	-0.63	53.00	0.49	0.30
8AGJE4		52.50	-0.33	-0.25	54.40	1.89	1.17
8DWJMB		54.00	1.17	0.88	53.50	0.99	0.62
8UADGR		54.00	1.17	0.88	53.00	0.49	0.30
9E632D		54.00	1.17	0.88	52.00	-0.51	-0.32
9NTJNY		51.70	-1.13	-0.85	53.70	1.19	0.74
9ZNR82		52.00	-0.83	-0.63	53.00	0.49	0.30
AGMATQ		53.30	0.47	0.35	53.10	0.59	0.37
AQBQC8		52.28	-0.55	-0.42	53.66	1.15	0.71
AQDDV8		51.00	-1.83	-1.38	54.00	1.49	0.93
B422ZJ		54.30	1.47	1.11	53.75	1.24	0.77
BQ8ATF	X	31.96	-20.87	-15.74	28.44	-24.07	-14.92
CC6NWN		52.30	-0.53	-0.40	51.10	-1.41	-0.87
CDHV67	*	54.90	2.07	1.56	48.30	-4.21	-2.61
CJ67C2	X	100.00	47.17	35.56	100.00	47.49	29.45
CV6738		49.70	-3.13	-2.36	52.10	-0.41	-0.25
D7Z84U		52.48	-0.35	-0.27	53.50	0.99	0.62
D9QCQZ		52.70	-0.13	-0.10	54.00	1.49	0.93
DNYP7R		53.30	0.47	0.35	50.00	-2.51	-1.56
EVULCL		53.00	0.17	0.13	52.00	-0.51	-0.32
FAUX9W		55.10	2.27	1.71	54.60	2.09	1.30
FKKB62		52.30	-0.53	-0.40	50.70	-1.81	-1.12
G4Y3Q4		53.70	0.87	0.65	53.30	0.79	0.49
H6QN9E		52.70	-0.13	-0.10	51.40	-1.11	-0.69
HM6ZLK		53.70	0.87	0.65	50.60	-1.91	-1.18
JATYJY		52.60	-0.23	-0.18	51.40	-1.11	-0.69
JDFW6P		50.30	-2.53	-1.91	54.30	1.79	1.11
JEWY4B		52.67	-0.16	-0.12	52.67	0.17	0.10
K8JW2E		52.00	-0.83	-0.63	52.00	-0.51	-0.32
KGR7TD		52.00	-0.83	-0.63	52.00	-0.51	-0.32
KVWH7R		51.40	-1.43	-1.08	53.40	0.89	0.55
L3AVJG		52.20	-0.63	-0.48	52.70	0.19	0.12
LA7ZMD		54.50	1.67	1.26	55.60	3.09	1.92
LAB38W		51.00	-1.83	-1.38	52.00	-0.51	-0.32
LGD7HN		52.80	-0.03	-0.03	53.00	0.49	0.30
LK2F42		54.80	1.97	1.48	50.80	-1.71	-1.06
LL6JWX		52.47	-0.36	-0.27	53.66	1.15	0.71
M34HGZ		52.90	0.07	0.05	48.50	-4.01	-2.49
MBWTQV		51.80	-1.03	-0.78	50.70	-1.81	-1.12
MFCPKH		53.00	0.17	0.13	55.00	2.49	1.55



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1114**

**Cycle 135  
3rd Qtr 2021**

**Reduction of Area: Pre-Machined Round Steel  
ASTM E8**

WebCode	Data Flag	Sample A77			Sample A78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MJP4Y6		54.70	1.87	1.41	50.50	-2.01	-1.25
NEDXVN		53.21	0.38	0.28	53.76	1.25	0.78
PDWQZE		51.40	-1.43	-1.08	52.30	-0.21	-0.13
Q3VKNR		53.30	0.47	0.35	54.20	1.69	1.05
QLREQV	X	49.00	-3.83	-2.89	49.00	-3.51	-2.18
QVX9XG		51.90	-0.93	-0.70	54.50	1.99	1.24
R6XBJQ		51.00	-1.83	-1.38	52.00	-0.51	-0.32
R7M2NY	X	26.50	-26.33	-19.85	17.90	-34.61	-21.46
TLFQZR		51.30	-1.53	-1.16	53.20	0.69	0.43
TTZKJ4		54.94	2.11	1.59	52.60	0.09	0.06
TVPY3M		53.40	0.57	0.43	52.64	0.13	0.08
UWCLUV		51.80	-1.03	-0.78	51.00	-1.51	-0.94
UWKUBG		55.11	2.28	1.72	53.94	1.43	0.89
V8BA6B		53.31	0.48	0.36	54.04	1.53	0.95
WH2PNY		54.00	1.17	0.88	50.80	-1.71	-1.06
WVVK4J		53.80	0.97	0.73	51.90	-0.61	-0.38
WX2XUY		52.56	-0.28	-0.21	54.21	1.70	1.06
X2YY9L		54.70	1.87	1.41	53.20	0.69	0.43
X467RE	*	54.40	1.57	1.18	48.70	-3.81	-2.36
XFEVH3		51.00	-1.83	-1.38	52.00	-0.51	-0.32

Summary Statistics		Sample A77		Sample A78	
<b>Grand Means</b>		52.83	Percent	52.51	Percent
<b>Stnd Dev Btwn Labs</b>		1.33	Percent	1.61	Percent

Samples A77, A78 : AISI 4340 (L), AISI 4340 (S)

Statistics based on 62 of 67 reporting participants

**Comments on Assigned Data Flags for Test #1114**

- 3J4ZBA (X) - Data for sample A78 are low.
- BQ8ATF (X) - Data for both samples are low.
- CJ67C2 (X) - Extreme data.
- QLREQV (X) - Data for sample A77 are low.
- R7M2NY (X) - Data for both samples are low.



Analysis 1114

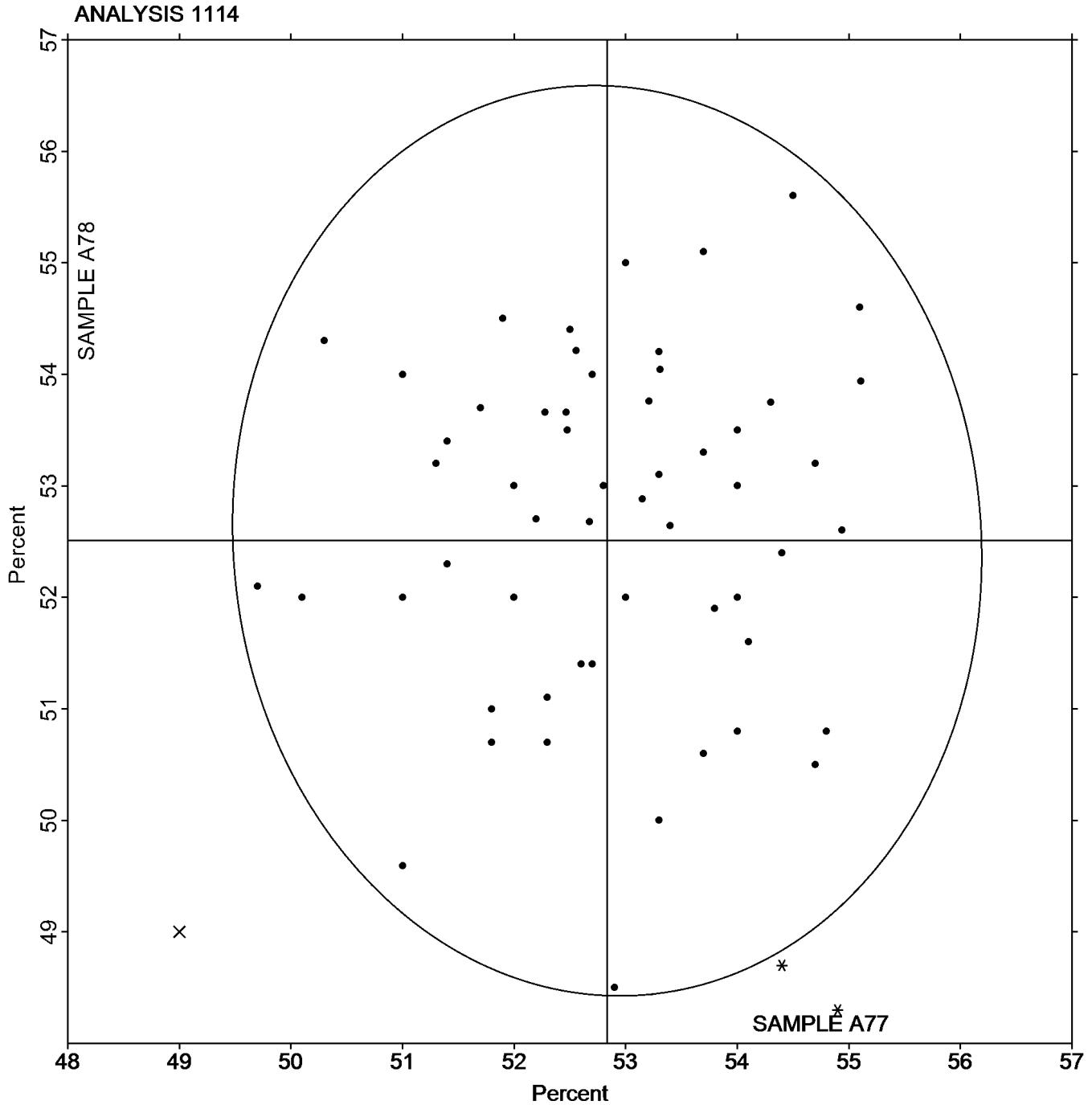
Reduction of Area: Pre-Machined Round Steel  
ASTM E8

SAMPLE A77

52.83 Percent

SAMPLE A78

52.51 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1121

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

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2264YZ		166.79	0.09	0.07	138.37	-0.83	-0.61
2P9ZU8		166.55	-0.15	-0.11	136.87	-2.33	-1.71
2XLGBZ		166.00	-0.71	-0.52	139.00	-0.20	-0.15
32GNFU		165.80	-0.91	-0.66	138.70	-0.50	-0.37
3VT499		167.30	0.59	0.43	140.10	0.90	0.66
3YWJXY	*	170.42	3.72	2.72	139.24	0.04	0.03
49JUVX		167.57	0.86	0.63	140.44	1.24	0.91
4R6XZW	X	169.12	2.41	1.76	152.87	13.67	10.04
4Y9ACF		164.71	-2.00	-1.46	139.05	-0.15	-0.11
4Z3XVC		167.00	0.29	0.22	138.00	-1.20	-0.88
668BRZ		168.66	1.95	1.43	139.81	0.61	0.45
6P29RL		167.60	0.89	0.65	139.60	0.40	0.29
6ZJXKZ		166.30	-0.41	-0.30	138.90	-0.30	-0.22
7MMFZQ		167.31	0.60	0.44	138.64	-0.56	-0.41
7QQBJU		167.72	1.02	0.74	138.67	-0.53	-0.39
7YH3W9		164.84	-1.86	-1.36	139.95	0.75	0.55
8AGJE4		164.96	-1.75	-1.28	138.92	-0.28	-0.21
8BWUKN		166.00	-0.71	-0.52	137.00	-2.20	-1.62
8E9FV2		167.60	0.89	0.65	138.60	-0.60	-0.44
8H9RQ2	X	167.08	0.38	0.28	123.56	-15.64	-11.49
8PAAJD		167.52	0.81	0.60	140.54	1.34	0.99
8REBAW		166.30	-0.41	-0.30	141.80	2.60	1.91
8UADGR	*	163.00	-3.71	-2.71	138.00	-1.20	-0.88
93PDZM		165.63	-1.07	-0.78	138.37	-0.83	-0.61
93TBEA		167.00	0.29	0.22	139.00	-0.20	-0.15
9ENHCE		165.80	-0.91	-0.66	138.70	-0.50	-0.37
9JEBAV		166.58	-0.13	-0.09	141.25	2.05	1.51
B27QDV		165.30	-1.41	-1.03	139.20	0.00	0.00
BBG2VM		166.18	-0.53	-0.39	138.54	-0.66	-0.48
BWZXJZ		164.20	-2.51	-1.83	139.10	-0.10	-0.07
CDHLK2		166.50	-0.21	-0.15	140.90	1.70	1.25
CFACGK		167.14	0.43	0.31	139.14	-0.06	-0.04
CM98PZ		168.80	2.09	1.53	140.10	0.90	0.66
CX2WZ7		167.95	1.24	0.91	139.89	0.69	0.51
D6KYZL		166.30	-0.41	-0.30	139.00	-0.20	-0.15
DB96F3		166.73	0.02	0.02	141.21	2.01	1.48
EUKAKQ	X	163.02	-3.68	-2.69	141.12	1.92	1.41
EYD7C4		165.05	-1.65	-1.21	139.96	0.76	0.56
F4GU6V		165.62	-1.08	-0.79	139.92	0.72	0.53
FHFLZ8		167.00	0.29	0.22	138.90	-0.30	-0.22
FZ3FUN		165.10	-1.61	-1.17	138.30	-0.90	-0.66
GA6X6Q		166.79	0.09	0.07	139.79	0.59	0.43
GTYD8H	X	163.90	-2.81	-2.05	143.77	4.57	3.36
HA3PDJ		165.00	-1.71	-1.25	139.00	-0.20	-0.15
HBFEJG		164.34	-2.36	-1.73	137.63	-1.57	-1.15
HLUEAH		166.39	-0.32	-0.23	139.07	-0.13	-0.09
HQNHVV		167.30	0.59	0.43	140.20	1.00	0.73



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1121

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

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
HYLZFD		165.20	-1.51	-1.10	138.40	-0.80	-0.59
JNJ6UM		168.13	1.42	1.04	138.86	-0.34	-0.25
K4QX6Q	*	165.77	-0.94	-0.68	135.49	-3.71	-2.72
K7RADC		166.93	0.22	0.16	137.96	-1.24	-0.91
KU4D3K		165.30	-1.41	-1.03	137.50	-1.70	-1.25
KVYV4L		165.70	-1.01	-0.74	137.70	-1.50	-1.10
L3AVJG		169.66	2.95	2.16	139.78	0.58	0.42
L6DYKY		165.26	-1.45	-1.06	140.62	1.42	1.04
LHY2RA		166.62	-0.09	-0.07	138.16	-1.04	-0.77
LLYCMA		166.90	0.20	0.14	138.48	-0.72	-0.53
LUENAN		168.54	1.83	1.34	139.38	0.18	0.13
M7777M	*	169.19	2.48	1.81	137.12	-2.08	-1.53
MA3VMU	*	166.50	-0.21	-0.15	143.00	3.80	2.79
MDLFKN		167.04	0.33	0.24	139.21	0.01	0.01
MEJQGR		168.00	1.29	0.95	139.70	0.50	0.37
MN3YME		166.60	-0.11	-0.08	141.50	2.30	1.69
MV2UU7		167.40	0.69	0.51	139.30	0.10	0.07
NLV99P		169.26	2.55	1.87	138.51	-0.69	-0.50
PJLDRD	*	167.10	0.39	0.29	142.60	3.40	2.50
PNWUCF		169.34	2.64	1.93	141.35	2.15	1.58
QACMZZ		166.79	0.09	0.07	140.40	1.20	0.88
QH383T		166.00	-0.71	-0.52	138.00	-1.20	-0.88
QT9ZRM		168.25	1.54	1.13	140.98	1.78	1.31
R2UMVN		166.10	-0.61	-0.44	139.30	0.10	0.07
RAT6GR		166.00	-0.71	-0.52	138.00	-1.20	-0.88
RX28X3		164.60	-2.11	-1.54	136.00	-3.20	-2.35
RXW7G9		165.20	-1.51	-1.10	136.02	-3.18	-2.34
T6PTUQ		168.53	1.82	1.33	140.05	0.85	0.63
TAKFRK		165.60	-1.11	-0.81	140.50	1.30	0.96
TCBHYU		169.00	2.29	1.68	141.00	1.80	1.32
TDKRMK		166.70	-0.01	0.00	137.70	-1.50	-1.10
TLJCR2		167.50	0.79	0.58	140.10	0.90	0.66
U8A8TK		164.59	-2.12	-1.55	137.91	-1.29	-0.94
VA4W7E		168.62	1.91	1.40	141.84	2.64	1.94
VDYTQY		166.20	-0.50	-0.37	138.47	-0.73	-0.53
VNFNFD		165.80	-0.91	-0.66	138.80	-0.40	-0.29
VX4E4Q		166.00	-0.71	-0.52	138.90	-0.30	-0.22
WCYQ2F		167.45	0.74	0.54	140.07	0.87	0.64
WVVK4J		167.00	0.29	0.22	139.00	-0.20	-0.15
X2YY9L		169.12	2.41	1.76	141.39	2.19	1.61
X6DJAF		165.70	-1.01	-0.74	138.50	-0.70	-0.51
XACCC7	X	165.00	-1.71	-1.25	133.00	-6.20	-4.55
XAR7YE		165.92	-0.78	-0.57	139.24	0.04	0.03
XCCACH		167.20	0.49	0.36	139.80	0.60	0.44
XGBLDA		165.84	-0.87	-0.63	138.19	-1.01	-0.74
XJZLXY		165.70	-1.01	-0.74	139.00	-0.20	-0.15
XQF4WM		167.10	0.39	0.29	139.22	0.02	0.01



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1121**

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

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Y429QG		167.90	1.19	0.87	140.10	0.90	0.66
YJR7X4		168.59	1.88	1.37	137.61	-1.59	-1.17
YMDVHG	X	160.50	-6.21	-4.54	140.40	1.20	0.88
ZGMVNL		166.30	-0.41	-0.30	138.50	-0.70	-0.51
ZK2KWW		167.26	0.55	0.40	139.00	-0.20	-0.15

**Summary Statistics**

	Sample P77		Sample P78	
<b>Grand Means</b>	166.71	ksi	139.20	ksi
<b>Stnd Dev Btwn Labs</b>	1.37	ksi	1.36	ksi

Samples P77, P78 : AISI 4340 (E), AISI 4340 (F)

Statistics based on 93 of 99 reporting participants

**Comments on Assigned Data Flags for Test #1121**

- 4R6XZW (X) - Data for sample P78 are high.
- 8H9RQ2 (X) - Data for sample P78 are low.
- EUKAKQ (X) - Inconsistent in testing between samples.
- GTYD8H (X) - Data for sample P78 are high.
- XACCC7 (X) - Data for sample P78 are low.
- YMDVHG (X) - Data for sample P77 are low.





Analysis 1121

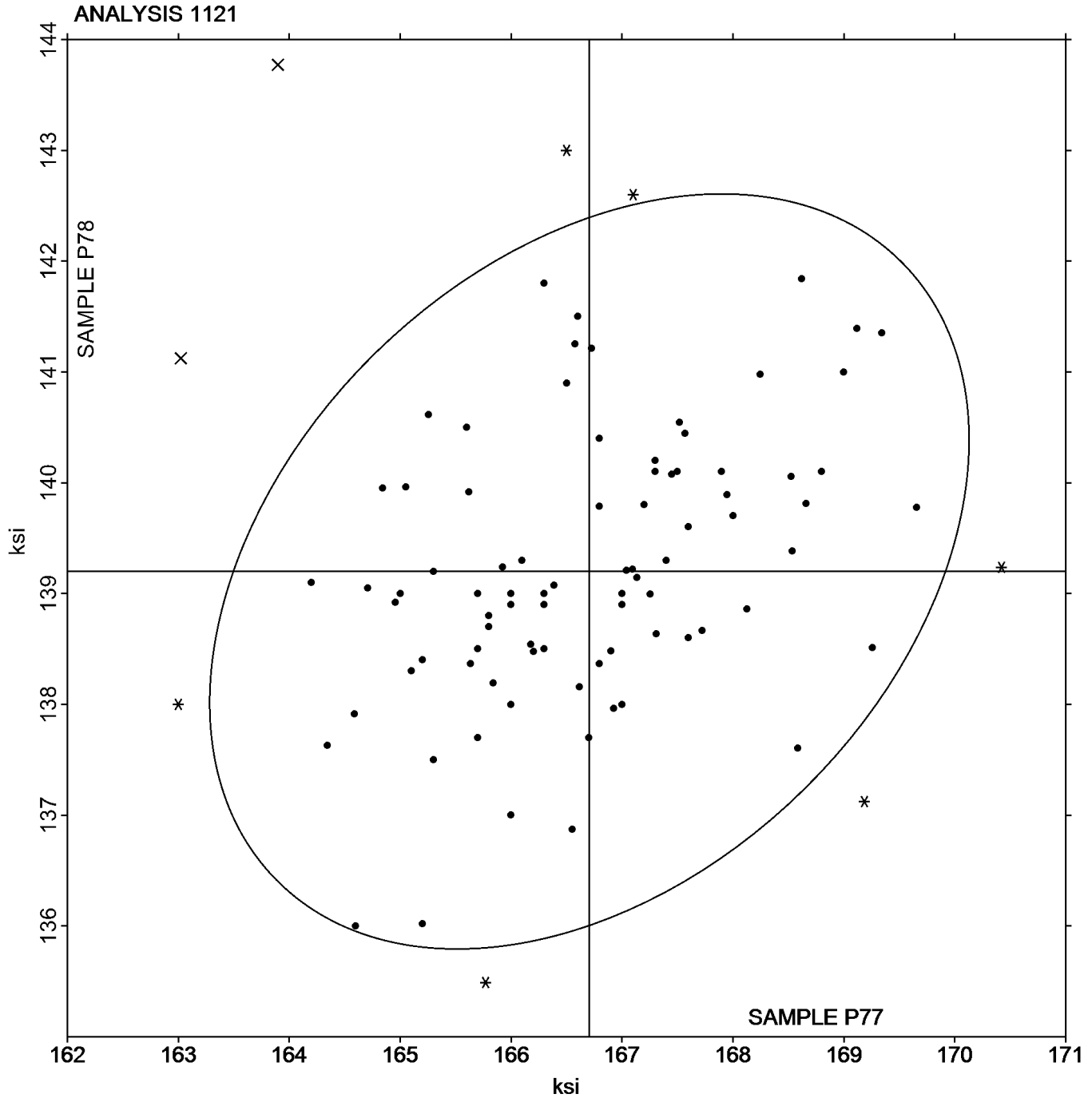
Tensile Strength: Lab-Machined Round Steel  
ASTM E8

SAMPLE P77

166.71 ksi

SAMPLE P78

139.20 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1122

Yield Strength: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2264YZ		150.26	-0.37	-0.23	110.23	-0.18	-0.13
2P9ZU8		150.93	0.29	0.18	108.47	-1.93	-1.37
2XLGBZ	X	151.70	1.07	0.66	117.20	6.79	4.82
32GNFU		149.50	-1.13	-0.70	109.80	-0.61	-0.43
3VT499		150.50	-0.13	-0.08	109.70	-0.71	-0.50
3YWJXY	X	155.19	4.56	2.81	115.31	4.90	3.48
49JUVX		150.97	0.33	0.20	111.99	1.58	1.12
4R6XZW	X	53.52	-97.11	-59.79	45.25	-65.15	-46.26
4Y9ACF	X	123.75	-26.89	-16.55	100.25	-10.16	-7.21
4Z3XVC		150.00	-0.63	-0.39	110.00	-0.41	-0.29
668BRZ		153.51	2.88	1.77	111.42	1.01	0.72
6P29RL		151.40	0.77	0.47	111.50	1.09	0.78
6ZJXKZ		150.00	-0.63	-0.39	109.70	-0.71	-0.50
7MMFZQ		151.65	1.01	0.62	109.89	-0.52	-0.37
7QQBJU		152.35	1.71	1.06	110.03	-0.37	-0.26
7YH3W9		148.65	-1.99	-1.22	109.32	-1.09	-0.77
8AGJE4		148.84	-1.80	-1.11	110.46	0.05	0.04
8BWUKN	X	143.00	-7.63	-4.70	107.00	-3.41	-2.42
8E9FV2		151.40	0.77	0.47	110.10	-0.31	-0.22
8H9RQ2		149.17	-1.46	-0.90	109.65	-0.76	-0.54
8PAAJD		150.70	0.06	0.04	111.68	1.27	0.90
8REBAW	*	149.20	-1.43	-0.88	113.10	2.69	1.91
8UADGR		148.00	-2.63	-1.62	108.00	-2.41	-1.71
93PDZM		150.12	-0.52	-0.32	110.66	0.26	0.18
93TBEA		150.00	-0.63	-0.39	111.00	0.59	0.42
9ENHCE		150.10	-0.53	-0.33	109.40	-1.01	-0.71
9JEBAV		150.69	0.05	0.03	112.78	2.37	1.68
B27QDV		148.00	-2.63	-1.62	108.90	-1.51	-1.07
BBG2VM		150.28	-0.35	-0.22	109.78	-0.63	-0.45
BWZXJZ	*	146.80	-3.83	-2.36	110.50	0.09	0.07
CDHLK2	*	150.00	-0.63	-0.39	113.50	3.09	2.20
CFACGK		151.47	0.83	0.51	110.62	0.21	0.15
CM98PZ		152.20	1.57	0.96	110.20	-0.21	-0.15
CX2WZ7		151.59	0.96	0.59	110.73	0.33	0.23
D6KYZL		150.40	-0.23	-0.14	111.80	1.39	0.99
DB96F3	X	140.04	-10.60	-6.52	122.59	12.18	8.65
EUKAKQ	X	146.63	-4.00	-2.46	112.55	2.14	1.52
EYD7C4		148.96	-1.68	-1.03	111.53	1.13	0.80
F4GU6V		150.41	-0.23	-0.14	108.92	-1.49	-1.05
FHFLZ8		150.10	-0.53	-0.33	110.60	0.19	0.14
FZ3FUN		149.80	-0.83	-0.51	111.20	0.79	0.56
GA6X6Q		150.91	0.28	0.17	111.10	0.69	0.49
GTYD8H	X	147.38	-3.26	-2.01	113.31	2.90	2.06
HA3PDJ		150.00	-0.63	-0.39	112.00	1.59	1.13
HBFEJG		147.85	-2.78	-1.71	108.82	-1.58	-1.12
HLUEAH		148.15	-2.49	-1.53	109.88	-0.52	-0.37
HQNHVW		150.20	-0.43	-0.27	111.10	0.69	0.49



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1122

Yield Strength: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
HYZLFD		149.70	-0.93	-0.58	110.40	-0.01	0.00
JNJ6UM		153.65	3.02	1.86	110.32	-0.09	-0.06
K4QX6Q		150.30	-0.33	-0.21	108.70	-1.71	-1.21
K7RADC		150.97	0.34	0.21	109.63	-0.77	-0.55
KU4D3K		149.20	-1.43	-0.88	108.40	-2.01	-1.42
KVYV4L		148.90	-1.73	-1.07	108.20	-2.21	-1.57
L3AVJG		153.46	2.83	1.74	110.04	-0.37	-0.26
L6DYKY		150.56	-0.07	-0.04	111.40	1.00	0.71
LHY2RA		150.95	0.31	0.19	109.71	-0.70	-0.50
LLYCMA		151.32	0.68	0.42	109.81	-0.60	-0.43
LUENAN	X	163.89	13.26	8.16	118.79	8.38	5.95
M7777M		150.44	-0.20	-0.12	108.96	-1.45	-1.03
MA3VMU	*	150.30	-0.33	-0.21	113.70	3.29	2.34
MDLFKN		150.29	-0.34	-0.21	109.95	-0.46	-0.32
MEJQGR		152.60	1.97	1.21	110.90	0.49	0.35
MN3YME	X	151.90	1.27	0.78	116.28	5.87	4.17
MV2UU7		150.20	-0.43	-0.27	110.40	-0.01	0.00
NLV99P	*	155.05	4.41	2.72	110.95	0.55	0.39
PJLDRD		152.00	1.37	0.84	111.50	1.09	0.78
PNWUCF		152.60	1.97	1.21	111.94	1.53	1.09
QACMZZ		152.29	1.66	1.02	112.55	2.14	1.52
QH383T		150.00	-0.63	-0.39	112.00	1.59	1.13
QT9ZRM		152.73	2.09	1.29	111.53	1.13	0.80
R2UMVN		150.90	0.27	0.16	111.90	1.49	1.06
RAT6GR	*	150.00	-0.63	-0.39	107.00	-3.41	-2.42
RX28X3		147.70	-2.93	-1.81	107.90	-2.51	-1.78
RXW7G9	*	147.30	-3.33	-2.05	107.10	-3.31	-2.35
T6PTUQ		152.31	1.68	1.03	111.39	0.99	0.70
TAKFRK		150.90	0.27	0.16	111.40	0.99	0.71
TCBHYU	*	155.00	4.37	2.69	113.00	2.59	1.84
TDKRMK		150.90	0.27	0.16	110.20	-0.21	-0.15
TLJCR2		151.10	0.47	0.29	109.60	-0.81	-0.57
U8A8TK		147.92	-2.72	-1.67	108.45	-1.96	-1.39
VA4W7E		152.79	2.15	1.33	113.02	2.61	1.85
VDYTQY		150.76	0.12	0.08	111.12	0.72	0.51
VNFNFD		149.50	-1.13	-0.70	110.20	-0.21	-0.15
VX4E4Q		150.30	-0.33	-0.21	107.60	-2.81	-1.99
WCYQ2F		152.20	1.56	0.96	110.87	0.47	0.33
WVVK4J		151.00	0.37	0.23	111.00	0.59	0.42
X2YY9L		153.25	2.62	1.61	112.40	1.99	1.42
X6DJAF		151.00	0.37	0.23	111.20	0.79	0.56
XACCC7	X	148.00	-2.63	-1.62	104.00	-6.41	-4.55
XAR7YE		151.13	0.50	0.31	110.23	-0.18	-0.13
XCCACH		151.00	0.37	0.23	111.00	0.59	0.42
XGBLDA		149.91	-0.72	-0.44	109.20	-1.21	-0.86
XJZLXY		150.70	0.07	0.04	109.80	-0.61	-0.43
XQF4WM		150.97	0.34	0.21	110.60	0.19	0.13



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1122**

**Cycle 135  
3rd Qtr 2021**

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

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
Y429QG		148.20	-2.43	-1.50	108.30	-2.11	-1.50
YJR7X4	*	154.26	3.62	2.23	109.42	-0.99	-0.70
YMDVHG		151.30	0.67	0.41	111.00	0.59	0.42
ZGMVNL		149.30	-1.33	-0.82	109.40	-1.01	-0.71
ZK2KWW		151.67	1.04	0.64	110.40	0.00	0.00

**Summary Statistics**

	Sample P77		Sample P78	
<b>Grand Means</b>	150.63	ksi	110.41	ksi
<b>Std Dev Btwn Labs</b>	1.62	ksi	1.41	ksi

Samples P77, P78 : AISI 4340 (E), AISI 4340 (F)

Statistics based on 88 of 99 reporting participants

**Comments on Assigned Data Flags for Test #1122**

- 2XLGBZ (X) - Data for sample P78 are high.
- 3YWJXY (X) - Data for both samples are high.
- 4R6XZW (X) - Extreme data.
- 4Y9ACF (X) - Data for both samples are low.
- 8BWUKN (X) - Data for sample P77 are low.
- DB96F3 (X) - Data for sample P77 are low and data for sample P78 are high.
- EUKAKQ (X) - Inconsistent in testing between samples.
- GTYD8H (X) - Inconsistent in testing between samples.
- LUENAN (X) - Data for both samples are high.
- MN3YME (X) - Data for sample P78 are high.
- XACCC7 (X) - Data for sample P78 are low.



Analysis 1122

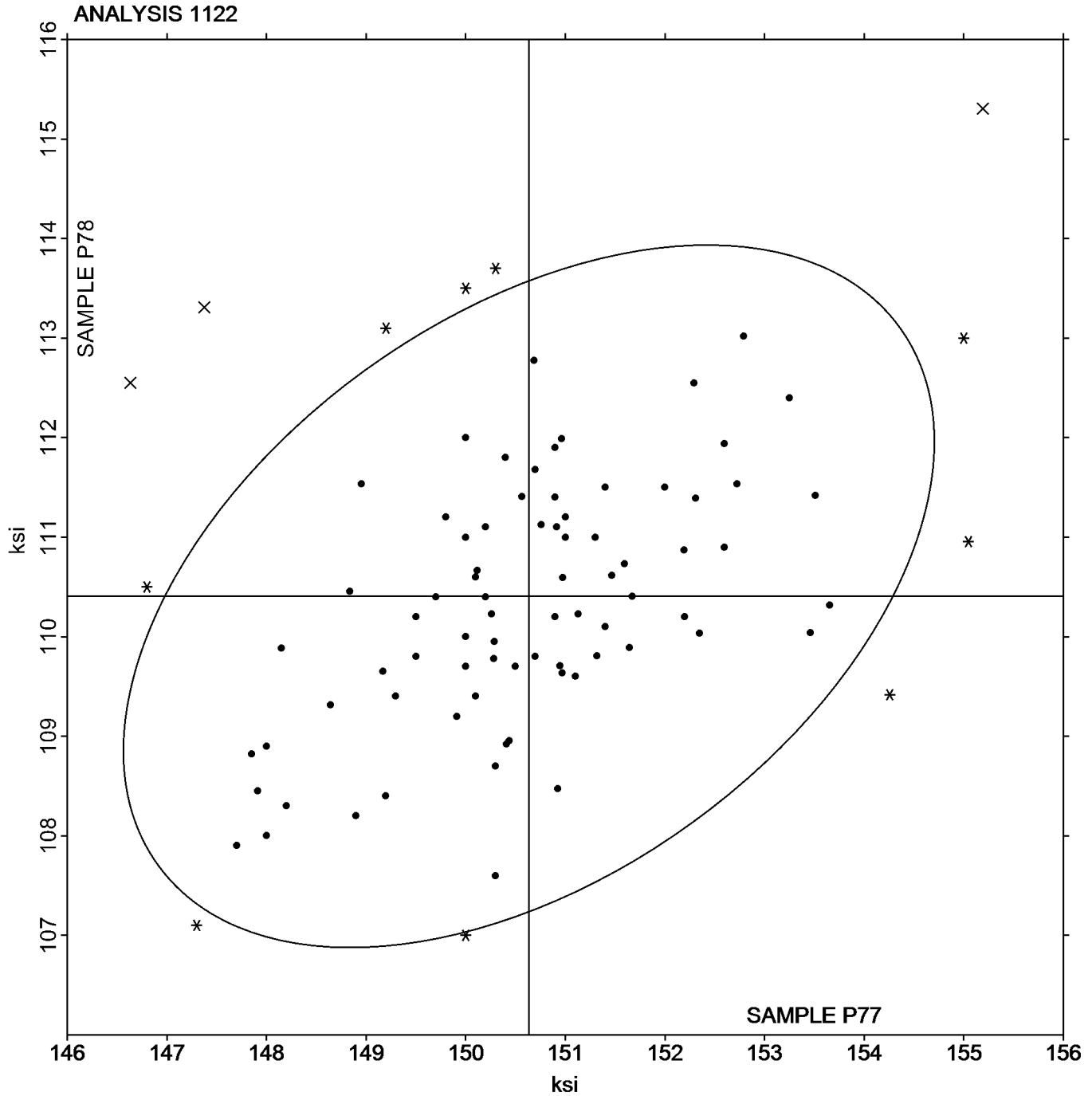
Yield Strength: Lab-Machined Round Steel  
ASTM E8

SAMPLE P77

150.63 ksi

SAMPLE P78

110.41 ksi





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1123

Elongation: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2264YZ		16.30	-0.53	-0.44	18.40	0.31	0.26
2P9ZU8		14.00	-2.83	-2.37	16.00	-2.09	-1.71
2XLGBZ		19.55	2.72	2.28	20.40	2.31	1.89
32GNFU		17.50	0.67	0.56	19.70	1.61	1.32
3VT499		16.80	-0.03	-0.03	17.40	-0.69	-0.56
3YWJXY	*	16.00	-0.83	-0.70	15.00	-3.09	-2.53
49JUVX		16.00	-0.83	-0.70	19.50	1.41	1.16
4R6XZW	X	22.00	5.17	4.34	20.60	2.51	2.06
4Y9ACF	X	21.78	4.95	4.15	23.28	5.19	4.25
4Z3XVC		15.50	-1.33	-1.12	16.90	-1.19	-0.97
668BRZ		16.64	-0.19	-0.16	18.60	0.51	0.42
6P29RL		16.00	-0.83	-0.70	17.50	-0.59	-0.48
6ZJXKZ	X	18.20	1.37	1.15	37.40	19.31	15.82
7MMFZQ		16.50	-0.33	-0.28	17.50	-0.59	-0.48
7QQBJU		16.50	-0.33	-0.28	17.50	-0.59	-0.48
7YH3W9		17.40	0.57	0.48	17.70	-0.39	-0.32
8AGJE4		16.50	-0.33	-0.28	16.90	-1.19	-0.97
8BWUKN		17.00	0.17	0.14	19.00	0.91	0.75
8E9FV2		15.95	-0.88	-0.74	19.25	1.16	0.95
8H9RQ2		16.40	-0.43	-0.36	18.60	0.51	0.42
8PAAJD		17.40	0.57	0.48	18.80	0.71	0.58
8REBAW		18.00	1.17	0.98	17.50	-0.59	-0.48
8UADGR		16.00	-0.83	-0.70	19.00	0.91	0.75
93PDZM		18.00	1.17	0.98	19.00	0.91	0.75
93TBEA		17.00	0.17	0.14	18.00	-0.09	-0.07
9ENHCE		19.10	2.27	1.90	20.20	2.11	1.73
9JEBAV		17.00	0.17	0.14	18.00	-0.09	-0.07
B27QDV		16.40	-0.43	-0.36	17.10	-0.99	-0.81
BBG2VM	*	16.00	-0.83	-0.70	20.00	1.91	1.57
BWZXJZ		16.30	-0.53	-0.44	18.00	-0.09	-0.07
CDHLK2		16.40	-0.43	-0.36	16.50	-1.59	-1.30
CFACGK		16.00	-0.83	-0.70	17.00	-1.09	-0.89
CM98PZ		16.40	-0.43	-0.36	18.30	0.21	0.17
CX2WZ7		18.90	2.07	1.74	19.30	1.21	0.99
D6KYZL		18.60	1.77	1.48	20.20	2.11	1.73
DB96F3		17.65	0.82	0.69	17.85	-0.24	-0.20
EUKAKQ		18.50	1.67	1.40	19.50	1.41	1.16
EYD7C4		17.50	0.67	0.56	19.50	1.41	1.16
F4GU6V		16.10	-0.73	-0.61	16.90	-1.19	-0.97
FHFLZ8		17.00	0.17	0.14	18.20	0.11	0.09
FZ3FUN	X	21.00	4.17	3.50	19.20	1.11	0.91
GA6X6Q		15.90	-0.93	-0.78	17.60	-0.49	-0.40
GTYD8H		16.36	-0.47	-0.39	17.15	-0.94	-0.77
HA3PDJ		15.00	-1.83	-1.54	16.00	-2.09	-1.71
HBFEJG		18.00	1.17	0.98	18.00	-0.09	-0.07
HLUEAH		16.08	-0.75	-0.63	18.60	0.51	0.42
HQNHVW		15.90	-0.93	-0.78	17.30	-0.79	-0.65



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1123

Elongation: Lab-Machined Round Steel  
ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
HYLZFD		15.10	-1.73	-1.45	17.60	-0.49	-0.40
JNJ6UM		18.10	1.27	1.07	19.40	1.31	1.07
K4QX6Q		14.40	-2.43	-2.04	17.40	-0.69	-0.56
KU4D3K		18.00	1.17	0.98	19.00	0.91	0.75
KVYV4L		18.00	1.17	0.98	19.00	0.91	0.75
L3AVJG		19.50	2.67	2.24	20.80	2.71	2.22
L6DYKY		16.73	-0.10	-0.08	18.37	0.28	0.23
LHY2RA		16.00	-0.83	-0.70	17.50	-0.59	-0.48
LLYCMA		16.00	-0.83	-0.70	17.50	-0.59	-0.48
LUENAN		18.00	1.17	0.98	20.00	1.91	1.57
M7777M		18.15	1.32	1.11	19.30	1.21	0.99
MA3VMU		16.60	-0.23	-0.19	17.20	-0.89	-0.73
MDLFKN		16.00	-0.83	-0.70	18.00	-0.09	-0.07
MEJQGR		17.70	0.87	0.73	19.80	1.71	1.40
MN3YME		17.20	0.37	0.31	18.40	0.31	0.26
MV2UU7		17.00	0.17	0.14	17.00	-1.09	-0.89
NLV99P		16.00	-0.83	-0.70	18.00	-0.09	-0.07
PJLDRD		17.80	0.97	0.81	17.10	-0.99	-0.81
PNWUCF		14.35	-2.48	-2.08	16.30	-1.79	-1.46
QACMZZ		17.90	1.07	0.90	18.80	0.71	0.58
QH383T		16.90	0.07	0.06	17.70	-0.39	-0.32
QT9ZRM		18.00	1.17	0.98	18.00	-0.09	-0.07
R2UMVN		19.30	2.47	2.07	19.60	1.51	1.24
RAT6GR		16.00	-0.83	-0.70	18.50	0.41	0.34
RX28X3		17.10	0.27	0.23	17.80	-0.29	-0.24
RXW7G9		16.70	-0.13	-0.11	18.90	0.81	0.66
T6PTUQ		16.17	-0.66	-0.55	17.25	-0.84	-0.69
TAKFRK		17.10	0.27	0.23	17.80	-0.29	-0.24
TCBHYU		16.50	-0.33	-0.28	16.00	-2.09	-1.71
TDKRMK		18.00	1.17	0.98	20.00	1.91	1.57
TLJCR2		18.60	1.77	1.48	18.80	0.71	0.58
U8A8TK		16.60	-0.23	-0.19	19.10	1.01	0.83
VA4W7E	*	16.00	-0.83	-0.70	15.30	-2.79	-2.28
VDYTQY		17.40	0.57	0.48	19.60	1.51	1.24
VNFNFD		16.50	-0.33	-0.28	17.70	-0.39	-0.32
VX4E4Q		16.40	-0.43	-0.36	17.80	-0.29	-0.24
WCYQ2F		19.37	2.54	2.13	19.09	1.00	0.82
WVVK4J		16.00	-0.83	-0.70	17.00	-1.09	-0.89
X2YY9L		16.00	-0.83	-0.70	16.70	-1.39	-1.14
X6DJAF		18.35	1.52	1.28	19.00	0.91	0.75
XACCC7		16.00	-0.83	-0.70	19.00	0.91	0.75
XAR7YE		18.00	1.17	0.98	19.00	0.91	0.75
XCCACH		16.00	-0.83	-0.70	18.00	-0.09	-0.07
XGBLDA		17.70	0.87	0.73	18.20	0.11	0.09
XJZLXY		17.70	0.87	0.73	18.40	0.31	0.26
XQF4WM		15.70	-1.13	-0.95	17.05	-1.04	-0.85
Y429QG	*	13.50	-3.33	-2.79	15.50	-2.59	-2.12



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1123**

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

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
YJR7X4		15.60	-1.23	-1.03	17.50	-0.59	-0.48
YMDVHG		16.00	-0.83	-0.70	15.40	-2.69	-2.20
ZGMVNL		16.30	-0.53	-0.44	17.80	-0.29	-0.24
ZK2KWW		16.00	-0.83	-0.70	17.00	-1.09	-0.89

**Summary Statistics**

	Sample P77		Sample P78	
<b>Grand Means</b>	16.83	Percent	18.09	Percent
<b>Stnd Dev Btwn Labs</b>	1.19	Percent	1.22	Percent

Samples P77, P78 : AISI 4340 (E), AISI 4340 (F)

Statistics based on 94 of 98 reporting participants

**Comments on Assigned Data Flags for Test #1123**

- 4R6XZW (X) - Data for sample P77 are high.
- 4Y9ACF (X) - Data for both samples are high.
- 6ZJXKZ (X) - Data for sample P78 are high.
- FZ3FUN (X) - Data for sample P77 are high.







# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1124

### Reduction of Area: Lab-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2264YZ		49.30	-3.57	-1.78	53.20	0.18	0.12
2P9ZU8		51.00	-1.87	-0.93	54.00	0.98	0.66
2XLGBZ		51.90	-0.97	-0.48	52.10	-0.92	-0.61
32GNFU		54.40	1.53	0.76	53.80	0.78	0.52
3VT499		54.90	2.03	1.01	52.60	-0.42	-0.28
3YWJXY	X	52.63	-0.24	-0.12	46.85	-6.17	-4.13
49JUVX		49.00	-3.87	-1.93	52.00	-1.02	-0.68
4R6XZW		52.30	-0.57	-0.29	50.40	-2.62	-1.75
4Y9ACF		52.84	-0.03	-0.02	52.69	-0.33	-0.22
4Z3XVC		51.30	-1.57	-0.78	53.20	0.18	0.12
668BRZ		54.02	1.15	0.57	53.55	0.53	0.36
6P29RL		55.60	2.73	1.36	54.60	1.58	1.06
6ZJXKZ	X	55.30	2.43	1.21	67.90	14.88	9.97
7MMFZQ		52.90	0.03	0.01	51.60	-1.42	-0.95
7QQBJU		53.00	0.13	0.06	53.00	-0.02	-0.01
7YH3W9	X	46.60	-6.27	-3.13	47.00	-6.02	-4.03
8AGJE4		50.80	-2.07	-1.03	49.40	-3.62	-2.42
8BWUKN		55.00	2.13	1.06	54.00	0.98	0.66
8E9FV2		50.44	-2.43	-1.21	55.11	2.09	1.40
8H9RQ2		52.30	-0.57	-0.29	53.30	0.28	0.19
8PAAJD		51.00	-1.87	-0.93	51.00	-2.02	-1.35
8REBAW		53.60	0.73	0.36	50.70	-2.32	-1.55
8UADGR		53.00	0.13	0.06	53.00	-0.02	-0.01
93PDZM		54.00	1.13	0.56	54.00	0.98	0.66
93TBEA		55.00	2.13	1.06	53.00	-0.02	-0.01
9ENHCE		55.20	2.33	1.16	55.50	2.48	1.66
9JEBAV		54.00	1.13	0.56	53.00	-0.02	-0.01
BBG2VM		54.10	1.23	0.61	54.40	1.38	0.93
BWZXJZ		54.00	1.13	0.56	56.60	3.58	2.40
CDHLK2		52.20	-0.67	-0.34	51.70	-1.32	-0.88
CFACGK		52.10	-0.77	-0.38	52.90	-0.12	-0.08
CM98PZ		50.60	-2.27	-1.13	52.10	-0.92	-0.61
CX2WZ7		52.90	0.03	0.01	52.40	-0.62	-0.41
D6KYZL		55.50	2.63	1.31	54.20	1.18	0.79
DB96F3		52.50	-0.37	-0.19	50.90	-2.12	-1.42
EUKAKQ		56.00	3.13	1.56	54.00	0.98	0.66
EYD7C4		51.60	-1.27	-0.63	52.00	-1.02	-0.68
F4GU6V		51.50	-1.37	-0.69	52.56	-0.46	-0.31
FHFLZ8		54.40	1.53	0.76	54.50	1.48	0.99
FZ3FUN		53.30	0.43	0.21	51.20	-1.82	-1.22
GA6X6Q		54.20	1.33	0.66	52.80	-0.22	-0.15
GTYD8H	X	56.64	3.77	1.88	49.22	-3.80	-2.55
HA3PDJ		51.00	-1.87	-0.93	51.00	-2.02	-1.35
HBFEJG		54.80	1.93	0.96	52.70	-0.32	-0.21
HLUEAH		52.55	-0.32	-0.16	53.92	0.90	0.60
HQNHWW		50.70	-2.17	-1.08	52.10	-0.92	-0.61
HYLZFD		52.00	-0.87	-0.43	53.90	0.88	0.59



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1124

### Reduction of Area: Lab-Machined Round Steel ASTM E8

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
JNJ6UM		56.10	3.23	1.61	54.80	1.78	1.19
K4QX6Q		52.50	-0.37	-0.19	54.00	0.98	0.66
K7RADC	X	40.70	-12.17	-6.08	38.37	-14.65	-9.81
KU4D3K		56.20	3.33	1.66	54.40	1.38	0.93
KVYV4L		56.00	3.13	1.56	54.00	0.98	0.66
L3AVJG	X	59.80	6.93	3.46	56.30	3.28	2.20
L6DYKY		49.53	-3.34	-1.67	51.42	-1.60	-1.07
LHY2RA		51.00	-1.87	-0.93	53.20	0.18	0.12
LLYCMA		51.30	-1.57	-0.78	52.90	-0.12	-0.08
LUENAN		54.00	1.13	0.56	52.00	-1.02	-0.68
M7777M		52.46	-0.41	-0.21	56.27	3.25	2.18
MA3VMU		55.40	2.53	1.26	52.50	-0.52	-0.35
MDLFKN		52.00	-0.87	-0.43	53.00	-0.02	-0.01
MEJQGR		50.60	-2.27	-1.13	53.10	0.08	0.06
MN3YME	*	54.10	1.23	0.61	49.90	-3.12	-2.09
MV2UU7		53.70	0.83	0.41	52.50	-0.52	-0.35
NLV99P		48.00	-4.87	-2.43	51.00	-2.02	-1.35
PNWUCF		49.47	-3.40	-1.70	53.93	0.92	0.61
QACMZZ		53.40	0.53	0.26	53.40	0.38	0.26
QH383T		53.60	0.73	0.36	54.70	1.68	1.13
QT9ZRM		52.00	-0.87	-0.43	54.00	0.98	0.66
R2UMVN		53.30	0.43	0.21	53.60	0.58	0.39
RAT6GR		55.20	2.33	1.16	54.40	1.38	0.93
RX28X3		53.50	0.63	0.31	52.60	-0.42	-0.28
RXW7G9		49.70	-3.17	-1.58	52.60	-0.42	-0.28
T6PTUQ		49.16	-3.71	-1.85	51.87	-1.15	-0.77
TAKFRK		55.40	2.53	1.26	54.50	1.48	0.99
TCBHYU	X	54.20	1.33	0.66	41.30	-11.72	-7.85
TDKRMK		52.90	0.03	0.01	51.40	-1.62	-1.08
TLJCR2		54.00	1.13	0.56	54.00	0.98	0.66
U8A8TK		53.49	0.62	0.31	55.64	2.63	1.76
VA4W7E		53.60	0.73	0.36	51.70	-1.32	-0.88
VDYTQY		54.18	1.31	0.65	53.79	0.77	0.52
VNFNFD		53.70	0.83	0.41	54.10	1.08	0.73
VX4E4Q		49.30	-3.57	-1.78	53.30	0.28	0.19
WCYQ2F	*	58.73	5.86	2.93	55.33	2.31	1.55
WVVK4J		53.00	0.13	0.06	55.10	2.08	1.40
X2YY9L		55.30	2.43	1.21	54.20	1.18	0.79
X6DJAF		55.50	2.63	1.31	53.30	0.28	0.19
XACCC7		51.00	-1.87	-0.93	54.00	0.98	0.66
XAR7YE		53.00	0.13	0.06	50.00	-3.02	-2.02
XCCACH		49.60	-3.27	-1.63	53.40	0.38	0.26
XGBLDA		53.40	0.53	0.26	53.70	0.68	0.46
XJZLXY		55.00	2.13	1.06	52.20	-0.82	-0.55
XQF4WM		52.32	-0.55	-0.27	51.78	-1.24	-0.83
Y429QG		50.80	-2.07	-1.03	50.80	-2.22	-1.49
YJR7X4		51.85	-1.02	-0.51	53.74	0.72	0.48



**Fasteners and Metals Interlaboratory Testing Program  
Analysis 1124**

**Cycle 135  
3rd Qtr 2021**

**Reduction of Area: Lab-Machined Round Steel  
ASTM E8**

WebCode	Data Flag	Sample P77			Sample P78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
YMDVHG	*	52.82	-0.05	-0.03	48.69	-4.33	-2.90
ZGMVNL		52.90	0.03	0.01	53.80	0.78	0.52
ZK2KWW		51.60	-1.27	-0.63	52.40	-0.62	-0.41

**Summary Statistics**

	Sample P77		Sample P78	
<b>Grand Means</b>	52.87	Percent	53.02	Percent
<b>Stnd Dev Btwn Labs</b>	2.00	Percent	1.49	Percent

Samples P77, P78 : AISI 4340 (E), AISI 4340 (F)

*Statistics based on 90 of 97 reporting participants*

**Comments on Assigned Data Flags for Test #1124**

- 3YWJXY (X) - Data for sample P78 are low.
- 6ZJXKZ (X) - Data for sample P78 are high.
- 7YH3W9 (X) - Data for both samples are low.
- GTYD8H (X) - Inconsistent in testing between samples.
- K7RADC (X) - Data for both samples are low.
- L3AVJG (X) - Data for sample P77 are high.
- TCBHYU (X) - Data for sample P78 are low.



Analysis 1124

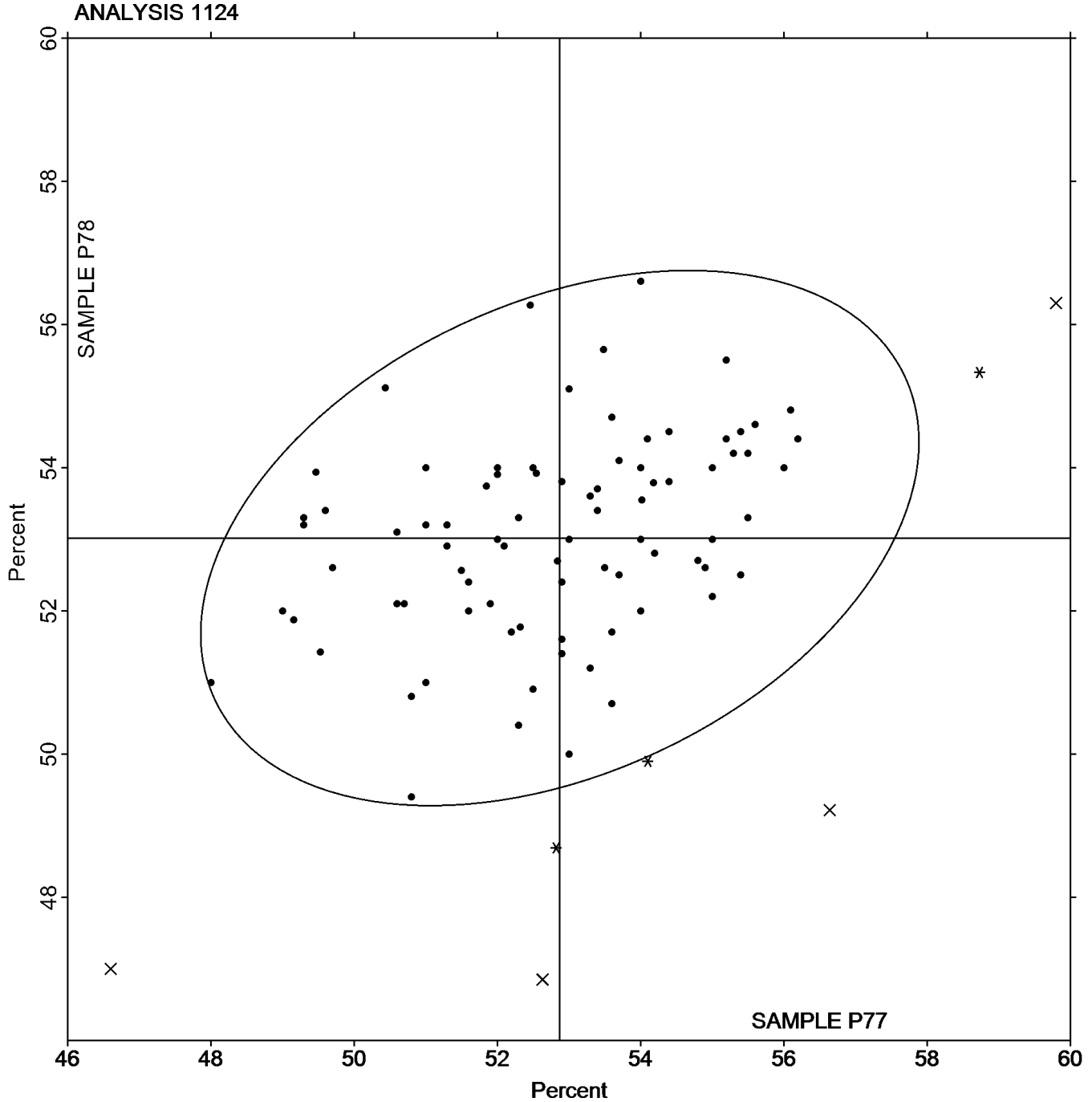
Reduction of Area: Lab-Machined Round Steel  
ASTM E8

SAMPLE P77

52.87 Percent

SAMPLE P78

53.02 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1301

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N77			Sample N78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DUDTE		94.50	0.42	0.95	93.50	0.05	0.10
2F2474		93.92	-0.16	-0.35	93.18	-0.27	-0.61
2TBFEFW		94.26	0.18	0.41	93.64	0.19	0.41
32GNFU		93.52	-0.56	-1.25	93.12	-0.33	-0.74
3VT499		95.00	0.92	2.07	94.48	1.03	2.28
44MBQD		93.94	-0.14	-0.31	93.32	-0.13	-0.30
4WMYG3		94.80	0.72	1.62	93.88	0.43	0.95
4Z3XVC		94.44	0.36	0.81	94.18	0.73	1.61
668BRZ		94.42	0.34	0.77	93.96	0.51	1.12
6EETND		93.84	-0.24	-0.53	93.16	-0.29	-0.65
6P29RL		93.60	-0.48	-1.07	93.04	-0.41	-0.92
6PX8QF		93.52	-0.56	-1.25	93.50	0.05	0.10
6XVCX4	X	13.84	-80.24	-180.11	12.98	-80.47	-178.38
7VH9GX		94.20	0.12	0.27	93.82	0.37	0.81
7VKCYA	X	93.06	-1.02	-2.28	93.60	0.15	0.33
84DNP3		94.64	0.56	1.26	94.02	0.57	1.26
8AGJE4		93.48	-0.60	-1.34	93.14	-0.31	-0.69
8BWUKN		93.46	-0.62	-1.39	92.64	-0.81	-1.80
8E9FV2		93.80	-0.28	-0.62	92.92	-0.53	-1.18
8J76P9		93.78	-0.30	-0.67	93.08	-0.37	-0.83
9BNBT3	X	95.31	1.23	2.75	93.54	0.08	0.18
9EAYRG		93.20	-0.88	-1.97	92.96	-0.49	-1.09
9GUXRX	X	85.00	-9.08	-20.38	83.00	-10.45	-23.17
9PBCU3		94.01	-0.07	-0.16	93.17	-0.29	-0.63
ADBP2R		95.10	1.02	2.29	94.48	1.03	2.28
AQDDV8		93.68	-0.40	-0.89	93.54	0.09	0.19
AUXTD8		94.72	0.64	1.44	94.32	0.87	1.92
AXAD7T		94.76	0.68	1.53	93.94	0.49	1.08
AYC986	X	95.90	1.82	4.09	95.10	1.65	3.65
B422ZJ		93.64	-0.44	-0.98	93.42	-0.03	-0.07
BD6UVQ		93.50	-0.58	-1.30	93.02	-0.43	-0.96
BEVQ6X		93.66	-0.42	-0.94	93.14	-0.31	-0.69
BQ8ATF		93.84	-0.24	-0.53	93.50	0.05	0.10
BUBVCQ		93.61	-0.47	-1.06	93.16	-0.29	-0.65
C8T7VU		94.50	0.42	0.95	94.06	0.61	1.34
CBEECN		94.52	0.44	0.99	93.28	-0.17	-0.38
CBY68T	*	94.36	0.28	0.64	93.01	-0.45	-0.99
CJ67C2		93.73	-0.35	-0.78	93.21	-0.24	-0.54
D4BYXZ		94.84	0.76	1.71	94.30	0.85	1.88
D6HD67	*	93.24	-0.84	-1.88	93.20	-0.25	-0.56
D6KYZL		93.92	-0.16	-0.35	93.12	-0.33	-0.74
D7Z84U		93.92	-0.16	-0.35	93.56	0.11	0.24
D9HMB2		94.14	0.06	0.14	93.52	0.07	0.15
DK4ECX		93.52	-0.56	-1.25	93.00	-0.45	-1.00
DNGBM2		94.60	0.52	1.17	94.00	0.55	1.21
DNYP7R		93.66	-0.42	-0.94	93.16	-0.29	-0.65
EUFD67		93.88	-0.20	-0.44	93.74	0.29	0.64



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1301

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N77			Sample N78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
F9DUHC		94.24	0.16	0.36	93.44	-0.01	-0.03
FHPYPB		94.30	0.22	0.50	93.98	0.53	1.17
FKRD22		93.82	-0.26	-0.58	92.66	-0.79	-1.76
FLXYN2		94.43	0.35	0.79	94.13	0.67	1.50
FZ3FUN		93.68	-0.40	-0.89	93.14	-0.31	-0.69
FZGJ9V		93.86	-0.22	-0.49	92.92	-0.53	-1.18
GNPT6N		94.14	0.06	0.14	93.44	-0.01	-0.03
GWEDFN	X	93.49	-0.59	-1.32	91.44	-2.02	-4.47
H6QN9E	*	93.30	-0.78	-1.75	92.30	-1.15	-2.56
HA3PDJ		93.56	-0.52	-1.16	93.00	-0.45	-1.00
HBFEJG	X	95.80	1.72	3.87	94.80	1.35	2.98
HC8KQU		93.54	-0.54	-1.21	92.66	-0.79	-1.76
HK7XYB		93.68	-0.40	-0.89	93.04	-0.41	-0.92
HKEQFP		94.49	0.41	0.93	93.83	0.38	0.83
HNE3CP		94.38	0.30	0.68	93.74	0.29	0.64
HPEBRG		94.60	0.52	1.17	93.94	0.49	1.08
HQNHVV		94.72	0.64	1.44	93.98	0.53	1.17
HYJPNW		94.76	0.68	1.53	94.30	0.85	1.88
HYLZFD		94.20	0.12	0.27	93.58	0.13	0.28
HZHCG9		93.96	-0.12	-0.26	93.50	0.05	0.10
JAXRFT		94.02	-0.06	-0.13	93.34	-0.11	-0.25
JEWY4B		94.82	0.74	1.67	94.08	0.63	1.39
JPB49L		94.28	0.20	0.45	93.68	0.23	0.50
JVFE8M		94.56	0.48	1.08	93.78	0.33	0.72
JWVE42		94.46	0.38	0.86	93.48	0.03	0.06
KGMLM4		94.16	0.08	0.18	93.40	-0.05	-0.12
KVYV4L		94.00	-0.08	-0.17	93.04	-0.41	-0.92
LAB38W		94.68	0.60	1.35	93.70	0.25	0.55
LBG6XG		93.72	-0.36	-0.80	93.46	0.01	0.01
LGBYZN		94.04	-0.04	-0.08	93.48	0.03	0.06
LGD7HN		94.42	0.34	0.77	93.38	-0.07	-0.16
LUENAN	X	92.40	-1.68	-3.77	92.70	-0.75	-1.67
M46MH9		94.00	-0.08	-0.17	93.52	0.07	0.15
MA3VMU		94.16	0.08	0.18	93.50	0.05	0.10
MDLFGN		94.26	0.18	0.41	93.66	0.21	0.46
MJP4Y6		94.54	0.46	1.04	93.72	0.27	0.59
MV2UU7		93.66	-0.42	-0.94	93.20	-0.25	-0.56
NEDXVN		94.30	0.22	0.50	93.88	0.43	0.95
NEFZWA	X	92.98	-1.10	-2.46	93.18	-0.27	-0.61
NLWCQ8		94.28	0.20	0.45	93.56	0.11	0.24
P7CHQW		94.04	-0.04	-0.08	93.06	-0.39	-0.87
PDWQZE		93.92	-0.16	-0.35	93.38	-0.07	-0.16
PYFYUD		94.50	0.42	0.95	93.62	0.17	0.37
QACMZZ		94.20	0.12	0.27	93.26	-0.19	-0.43
QJ2DJM		94.40	0.32	0.72	93.68	0.23	0.50
QKWVKN		94.04	-0.04	-0.08	93.40	-0.05	-0.12
QP6CZ4		93.44	-0.64	-1.43	93.06	-0.39	-0.87



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1301

Rockwell Hardness: C & B Scales  
ASTM E18

WebCode	Data Flag	Sample N77			Sample N78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QUJW2X		94.00	-0.08	-0.17	94.00	0.55	1.21
QVX9XG	X	96.04	1.96	4.40	95.72	2.27	5.02
R7M2NY		94.46	0.38	0.86	94.18	0.73	1.61
RBLTYM	X	95.96	1.88	4.22	95.16	1.71	3.78
RFHHKZ		93.68	-0.40	-0.89	92.86	-0.59	-1.32
RX28X3		93.98	-0.10	-0.22	93.34	-0.11	-0.25
RXW7G9		94.44	0.36	0.81	93.50	0.05	0.10
TCBHYU		94.00	-0.08	-0.17	93.00	-0.45	-1.00
TUWX8W	X	93.24	-0.84	-1.88	93.58	0.13	0.28
U2C4C3		94.22	0.14	0.32	93.52	0.07	0.15
UQQY63		94.38	0.30	0.68	93.52	0.07	0.15
UTVPAW		94.54	0.46	1.04	93.98	0.53	1.17
UWER9P		93.80	-0.28	-0.62	93.12	-0.33	-0.74
UWKUBG		94.20	0.12	0.27	93.52	0.07	0.15
V9MPYB		94.22	0.14	0.32	93.64	0.19	0.41
VA4W7E		93.94	-0.14	-0.31	93.22	-0.23	-0.52
W8LQ4N		93.80	-0.28	-0.62	92.88	-0.57	-1.27
WJZD7F		94.44	0.36	0.81	93.80	0.35	0.77
WVVK4J	*	93.66	-0.42	-0.94	92.46	-0.99	-2.20
X2YY9L		93.74	-0.34	-0.76	92.80	-0.65	-1.45
X467RE		94.06	-0.02	-0.04	93.74	0.29	0.64
X6DJAF		93.64	-0.44	-0.98	93.12	-0.33	-0.74
XBJRJC		93.10	-0.98	-2.19	92.52	-0.93	-2.07
XF8HHR		94.06	-0.02	-0.04	93.62	0.17	0.37
XFJJQU	*	93.36	-0.72	-1.61	93.38	-0.07	-0.16
XJAL9U		94.82	0.74	1.67	94.14	0.69	1.52
XQF4WM		94.30	0.22	0.50	93.68	0.23	0.50
Y8GH2Z	*	92.88	-1.20	-2.69	92.62	-0.83	-1.85
YEZJ7X	X	92.12	-1.96	-4.39	93.04	-0.41	-0.92
YG4WLG		94.04	-0.04	-0.08	93.22	-0.23	-0.52
Z73NKQ		94.06	-0.02	-0.04	93.54	0.09	0.19
ZFQDN7		94.88	0.80	1.80	94.18	0.73	1.61
ZGMVNL		93.94	-0.14	-0.31	93.30	-0.15	-0.34

### Summary Statistics

	Sample N77		Sample N78	
<b>Grand Means</b>	94.08	HRB	93.45	HRB
<b>Std Dev Btrwn Labs</b>	0.45	HRB	0.45	HRB

Samples N77, N78 : Steel, Steel

Statistics based on 114 of 127 reporting participants





**Analysis 1301**

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

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**Comments on Assigned Data Flags for Test #1301**

- 6XVCX4 (X) - Extreme data. Lab may have reported HRC instead of HRB.
- 7VKCYA (X) - Inconsistent in testing between samples.
- 9BNBT3 (X) - Inconsistent in testing between samples.
- 9GUXRX (X) - Data for both samples are low. Possible Systematic Error.
- AYC986 (X) - Data for both samples are high. Possible Systematic Error.
- GWEDFN (X) - Data for sample N78 are low. Inconsistent within the determinations of sample N78.
- HBFEJG (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample N78.
- LUENAN (X) - Data for sample N77 are low.
- NEFZWA (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- QVX9XG (X) - Data for both samples are high. Possible Systematic Error.
- RBLTYM (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample N78.
- TUWX8W (X) - Inconsistent in testing between samples.
- YEZJ7X (X) - Data for sample N77 are low. Inconsistent within the determinations of both samples.



Analysis 1301

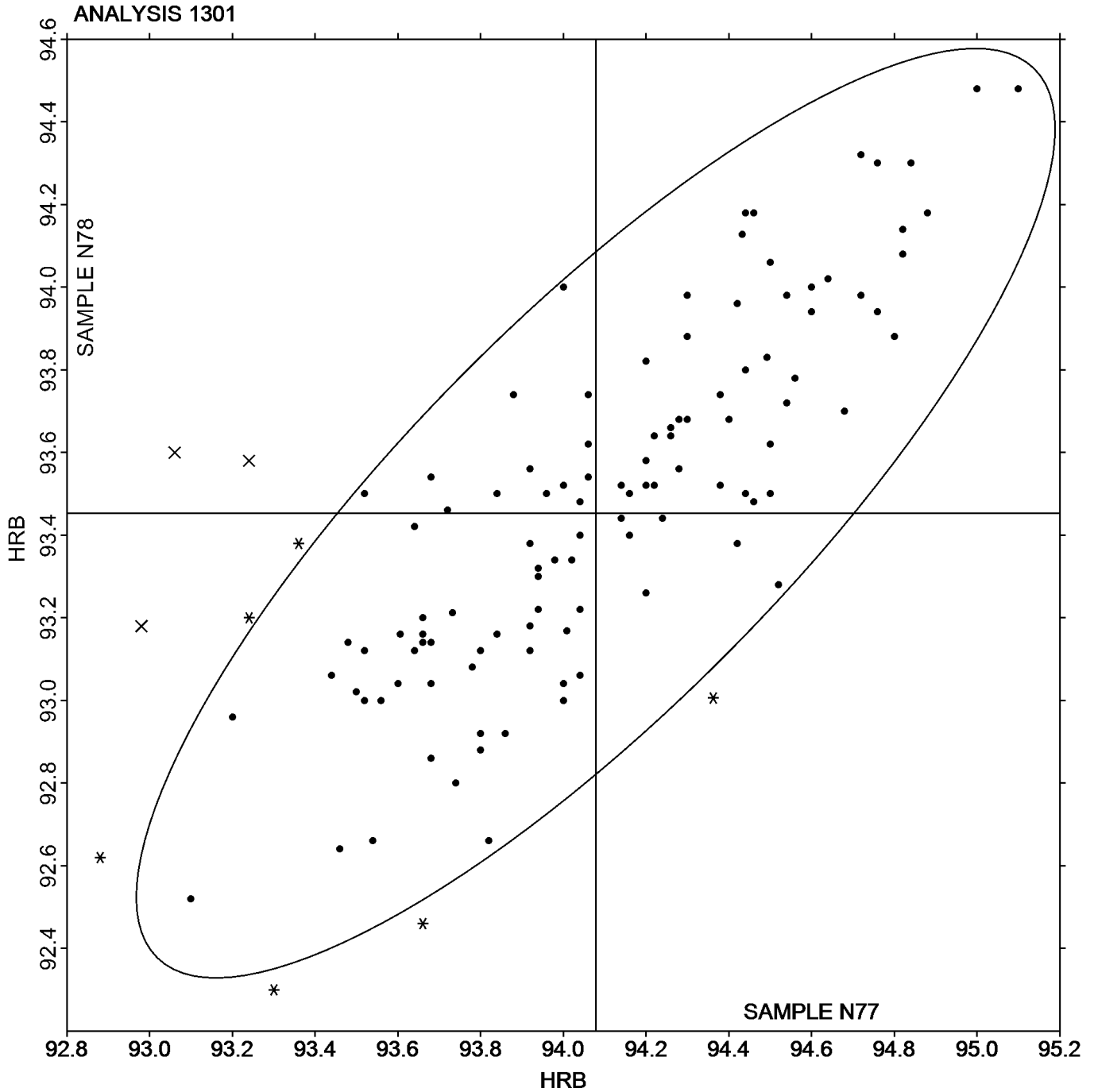
Rockwell Hardness: C & B Scales  
ASTM E18

SAMPLE N77

SAMPLE N78

94.08 HRB

93.45 HRB





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1302

Rockwell Hardness: B Scale  
ASTM E18

WebCode	Data Flag	Sample N77			Sample N78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
23VHTX		95.30	0.76	1.46	94.38	0.54	1.06
27VTNX		94.84	0.30	0.58	93.62	-0.22	-0.43
3J4ZBA		94.14	-0.40	-0.76	93.64	-0.20	-0.39
3T3ETF		94.72	0.18	0.35	94.14	0.30	0.59
4GNBV3		94.64	0.10	0.20	94.04	0.20	0.40
4RBYHP		93.70	-0.84	-1.60	93.08	-0.76	-1.49
4WMYG3		94.96	0.42	0.81	94.64	0.80	1.57
67NT4Z		94.84	0.30	0.58	94.26	0.42	0.83
6Y6LNF		94.66	0.12	0.24	93.62	-0.22	-0.43
74CVBX		93.68	-0.86	-1.63	93.16	-0.68	-1.33
8KHCRM		94.00	-0.54	-1.02	92.90	-0.94	-1.84
8REBAW		95.00	0.46	0.88	94.46	0.62	1.22
8VZN2T		95.56	1.02	1.95	94.28	0.44	0.87
93PDZM		93.40	-1.14	-2.17	92.60	-1.24	-2.43
9Q3KU7		95.08	0.54	1.04	94.46	0.62	1.22
A7PGBR		94.84	0.30	0.58	93.94	0.10	0.20
AH7GCA		94.84	0.30	0.58	93.86	0.02	0.04
APLPM6		94.46	-0.08	-0.15	93.86	0.02	0.04
B8E3GN		94.60	0.06	0.12	93.86	0.02	0.04
BBG2VM		94.38	-0.16	-0.30	93.80	-0.04	-0.07
CCVN8A		94.88	0.34	0.66	94.20	0.36	0.71
CEEP73		94.52	-0.02	-0.03	94.04	0.20	0.40
D6HD67		94.92	0.38	0.73	94.16	0.32	0.63
D9QCQZ		94.44	-0.10	-0.18	93.48	-0.36	-0.70
DAETZ9	*	95.78	1.24	2.37	94.38	0.54	1.06
ECJGJP		94.50	-0.04	-0.07	93.26	-0.58	-1.13
ERUZFW		95.40	0.86	1.65	94.98	1.14	2.24
EXZN8C	*	93.52	-1.02	-1.94	93.74	-0.10	-0.19
F9DUHC		94.34	-0.20	-0.37	93.72	-0.12	-0.23
FCXK7V	*	94.40	-0.14	-0.26	94.60	0.76	1.49
FLHLZ6		94.64	0.10	0.20	93.58	-0.26	-0.51
FMUKRL	*	93.68	-0.86	-1.63	93.80	-0.04	-0.07
GVJRMW		94.30	-0.24	-0.45	93.82	-0.02	-0.04
GXTUG9		94.42	-0.12	-0.22	94.06	0.22	0.43
H2CZZ4		94.94	0.40	0.77	94.48	0.64	1.26
H4YQ29		95.12	0.58	1.11	94.28	0.44	0.87
H9NVHX		94.80	0.26	0.50	93.80	-0.04	-0.07
HC8KQU	X	93.36	-1.18	-2.24	93.90	0.06	0.12
HLCE7T		95.00	0.46	0.88	93.80	-0.04	-0.07
HLUEAH		93.81	-0.73	-1.39	92.99	-0.85	-1.67
HZD42T	X	97.00	2.46	4.70	96.00	2.16	4.24
K7BL9G		94.88	0.34	0.66	93.92	0.08	0.16
LDQNZ4		95.18	0.64	1.23	94.66	0.82	1.61
LEMX6E		94.86	0.32	0.62	94.20	0.36	0.71
LUENAN		93.66	-0.88	-1.67	92.94	-0.90	-1.76
M7777M		94.00	-0.54	-1.02	92.90	-0.94	-1.84
M9WVLF		93.92	-0.62	-1.18	92.88	-0.96	-1.88



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1302

Rockwell Hardness: B Scale  
ASTM E18

WebCode	Data Flag	Sample N77			Sample N78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MCUBDB		94.34	-0.20	-0.37	93.82	-0.02	-0.04
MFCPKH		94.00	-0.54	-1.02	94.00	0.16	0.32
MJA6Y8		94.90	0.36	0.69	94.14	0.30	0.59
MUFT9X		93.58	-0.96	-1.82	92.84	-1.00	-1.96
NC86UH		93.68	-0.86	-1.63	92.70	-1.14	-2.23
NKH8FJ		94.74	0.20	0.39	93.58	-0.26	-0.51
Q84XFX		94.76	0.22	0.43	94.10	0.26	0.51
QH383T		94.78	0.24	0.46	93.90	0.06	0.12
RAT6GR		94.86	0.32	0.62	94.24	0.40	0.79
RMEDFD		94.46	-0.08	-0.15	93.62	-0.22	-0.43
RRCUUT		94.57	0.03	0.06	93.75	-0.09	-0.18
RX28X3		94.50	-0.04	-0.07	93.86	0.02	0.04
TDKRMK		95.06	0.52	1.00	94.00	0.16	0.32
TPY2HK		94.44	-0.10	-0.18	93.84	0.00	0.00
UAKZWY		95.00	0.46	0.88	94.20	0.36	0.71
UJ9VVF		94.84	0.30	0.58	93.96	0.12	0.24
VDYTQY		93.80	-0.74	-1.40	93.54	-0.30	-0.58
WZMVVA		94.38	-0.16	-0.30	93.84	0.00	0.00
XDWMJ4		95.02	0.48	0.92	94.72	0.88	1.73
XMZV7F		94.60	0.06	0.12	93.70	-0.14	-0.27
XQWMUJ		95.10	0.56	1.07	94.30	0.46	0.91
Y429QG		94.10	-0.44	-0.83	93.72	-0.12	-0.23
YPZFDD		93.94	-0.60	-1.14	93.60	-0.24	-0.47
YXDJAD		94.72	0.18	0.35	94.04	0.20	0.40
ZR6DFT		93.84	-0.70	-1.33	93.40	-0.44	-0.86

### Summary Statistics

	Sample N77		Sample N78	
<b>Grand Means</b>	94.54	HRB	93.84	HRB
<b>Std Dev Btrwn Labs</b>	0.52	HRB	0.51	HRB

Samples N77, N78 : Steel, Steel

Statistics based on 70 of 72 reporting participants

### Comments on Assigned Data Flags for Test #1302

HC8KQU (X) - Inconsistent in testing between samples.

HZD42T (X) - Data for both samples are high. Possible Systematic Error.



Analysis 1302

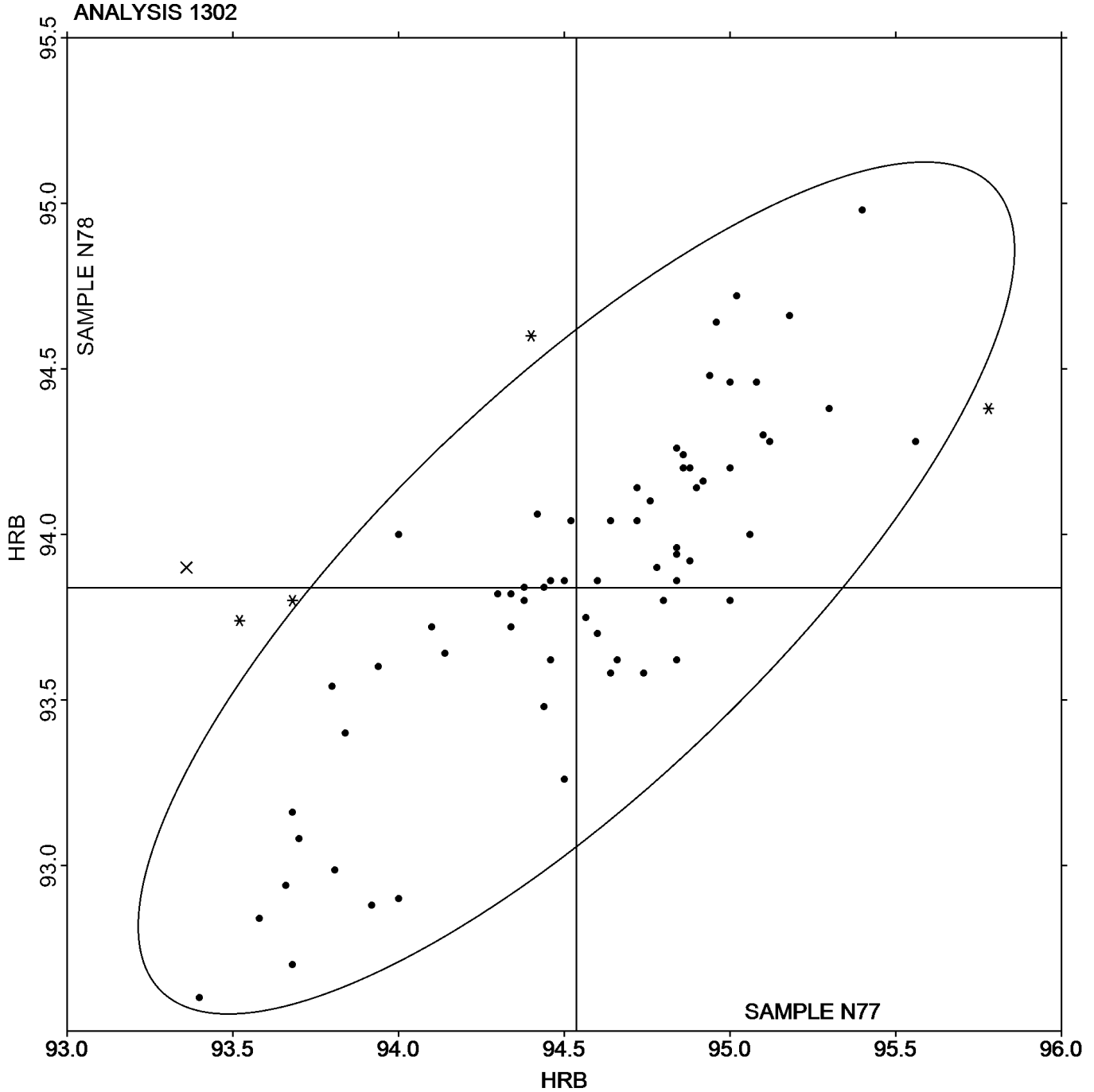
Rockwell Hardness: B Scale  
ASTM E18

SAMPLE N77

SAMPLE N78

94.54 HRB

93.84 HRB





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1321

Microhardness: Knoop Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		463.00	29.01	2.06	503.67	29.64	2.21
2P9ZU8	X	534.20	100.21	7.12	582.80	108.77	8.12
32GNFU		425.72	-8.27	-0.59	459.94	-14.09	-1.05
3KWCUB		462.60	28.61	2.03	497.20	23.17	1.73
3VWGZB	*	436.00	2.01	0.14	495.20	21.17	1.58
44MBQD		423.20	-10.79	-0.77	453.20	-20.83	-1.55
4WMYG3		448.80	14.81	1.05	487.80	13.77	1.03
4Y9ACF		428.26	-5.73	-0.41	470.66	-3.37	-0.25
67PL4T		444.00	10.01	0.71	485.40	11.37	0.85
6PX8QF		431.20	-2.79	-0.20	462.00	-12.03	-0.90
7VH9GX		436.90	2.91	0.21	477.22	3.19	0.24
7VKCYA		423.40	-10.59	-0.75	455.40	-18.63	-1.39
7XRUX7		436.20	2.21	0.16	468.00	-6.03	-0.45
7YH3W9		433.00	-0.99	-0.07	471.40	-2.63	-0.20
9CFEDW		418.20	-15.79	-1.12	457.80	-16.23	-1.21
9E632D		408.00	-25.99	-1.85	460.80	-13.23	-0.99
9P9WBB		435.60	1.61	0.11	473.40	-0.63	-0.05
ADBP2R		456.80	22.81	1.62	482.40	8.37	0.62
APLPM6		430.60	-3.39	-0.24	481.00	6.97	0.52
AYC986	X	457.24	23.25	1.65	516.16	42.13	3.14
B8E3GN		435.40	1.41	0.10	482.80	8.77	0.65
BCTH9Z		459.60	25.61	1.82	493.20	19.17	1.43
CJMBUY		417.60	-16.39	-1.16	450.80	-23.23	-1.73
CR6GTR	*	397.58	-36.41	-2.59	442.92	-31.11	-2.32
D4BYXZ		439.40	5.41	0.38	495.00	20.97	1.57
D7Z84U		426.60	-7.39	-0.52	468.60	-5.43	-0.41
D9HMB2		411.80	-22.19	-1.58	456.20	-17.83	-1.33
DWQ9KZ		439.80	5.81	0.41	476.40	2.37	0.18
E2ZC27		426.00	-7.99	-0.57	464.00	-10.03	-0.75
E3VWMK		417.70	-16.29	-1.16	473.60	-0.43	-0.03
E7E7H4		427.80	-6.19	-0.44	458.00	-16.03	-1.20
EUH6WM		408.80	-25.19	-1.79	450.60	-23.43	-1.75
F6Z2LQ		425.00	-8.99	-0.64	464.40	-9.63	-0.72
FDVWPG		430.20	-3.79	-0.27	469.20	-4.83	-0.36
FFGL89		437.00	3.01	0.21	474.80	0.77	0.06
FHPYPB		432.80	-1.19	-0.08	472.40	-1.63	-0.12
FKRD22		449.18	15.19	1.08	482.66	8.63	0.64
FZ3FUN		433.60	-0.39	-0.03	474.40	0.37	0.03
FZGJ9V		426.60	-7.39	-0.52	463.20	-10.83	-0.81
G4JJ6L		416.77	-17.21	-1.22	467.66	-6.37	-0.48
G4KV4F		433.60	-0.39	-0.03	481.80	7.77	0.58
GEYNX4		430.20	-3.79	-0.27	455.60	-18.43	-1.38
GR2RA3		420.40	-13.59	-0.97	462.20	-11.83	-0.88
GVJRMW		443.20	9.21	0.65	484.40	10.37	0.77
HBFEJG		436.00	2.01	0.14	472.40	-1.63	-0.12
HC8KQU		440.20	6.21	0.44	479.20	5.17	0.39
HKEQFP		450.80	16.81	1.19	489.80	15.77	1.18



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1321

Microhardness: Knoop Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
HNE3CP		439.20	5.21	0.37	483.00	8.97	0.67
HZHCG9		433.40	-0.59	-0.04	470.40	-3.63	-0.27
JDFW6P		434.14	0.15	0.01	475.96	1.93	0.14
JEWY4B		420.34	-13.65	-0.97	464.49	-9.54	-0.71
JUYRHX		423.00	-10.99	-0.78	480.00	5.97	0.45
KKRF2U	X	494.50	60.51	4.30	523.52	49.49	3.69
KLPQWW		442.00	8.01	0.57	474.40	0.37	0.03
KQLHW8		433.36	-0.63	-0.04	463.46	-10.57	-0.79
LAB38W	*	470.40	36.41	2.59	493.00	18.97	1.42
LD6JGY	X	128.68	-305.31	-21.69	124.02	-350.01	-26.13
LGD7HN		434.40	0.41	0.03	473.00	-1.03	-0.08
LHZQ3Y		429.60	-4.39	-0.31	476.60	2.57	0.19
M34HGZ		424.00	-9.99	-0.71	462.20	-11.83	-0.88
MFCPKH		413.00	-20.99	-1.49	464.00	-10.03	-0.75
MV2UU7		456.40	22.41	1.59	482.40	8.37	0.62
NCUUF6		423.40	-10.59	-0.75	463.00	-11.03	-0.82
NEDXVN		418.08	-15.91	-1.13	467.24	-6.79	-0.51
NLWCQ8		423.72	-10.26	-0.73	463.66	-10.37	-0.77
P7CHQW		456.78	22.79	1.62	496.73	22.70	1.69
PAHFL4		425.80	-8.19	-0.58	459.80	-14.23	-1.06
PYFYUD		457.46	23.47	1.67	488.48	14.45	1.08
QACMZZ	*	401.20	-32.79	-2.33	455.20	-18.83	-1.41
QDTUKU		430.80	-3.19	-0.23	486.00	11.97	0.89
QKWVKN		448.00	14.01	1.00	471.20	-2.83	-0.21
QUJW2X		454.40	20.41	1.45	489.40	15.37	1.15
QVX9XG		451.20	17.21	1.22	498.40	24.37	1.82
R7M2NY		440.20	6.21	0.44	469.60	-4.43	-0.33
RB2CJK		421.66	-12.33	-0.88	463.88	-10.15	-0.76
RVQGH7		459.98	25.99	1.85	506.14	32.11	2.40
TDKRMK		449.80	15.81	1.12	491.40	17.37	1.30
TLJCR2		435.60	1.61	0.11	484.40	10.37	0.77
TUWX8W		426.44	-7.55	-0.54	479.84	5.81	0.43
U2C4C3		422.96	-11.03	-0.78	455.04	-18.99	-1.42
U3J3DH		432.60	-1.39	-0.10	463.40	-10.63	-0.79
UWER9P		429.40	-4.59	-0.33	460.20	-13.83	-1.03
VA4W7E		446.20	12.21	0.87	482.40	8.37	0.62
VDYTQY		423.60	-10.39	-0.74	468.40	-5.63	-0.42
W8LQ4N		446.66	12.67	0.90	484.22	10.19	0.76
WYTPGJ		432.30	-1.69	-0.12	477.92	3.89	0.29
WZMVVA		428.92	-5.07	-0.36	468.48	-5.55	-0.41
X467RE		442.20	8.21	0.58	486.60	12.57	0.94
X6WH9Y		433.60	-0.39	-0.03	477.60	3.57	0.27
XCCACH		431.80	-2.19	-0.16	473.20	-0.83	-0.06
XQF4WM		434.80	0.81	0.06	462.80	-11.23	-0.84
YHKRRX		437.00	3.01	0.21	490.60	16.57	1.24
YXDJAD		429.40	-4.59	-0.33	470.20	-3.83	-0.29
ZGMVNL		454.40	20.41	1.45	495.60	21.57	1.61



Summary Statistics

	<u>Sample S77</u>		<u>Sample S78</u>	
<b>Grand Means</b>	433.99	HK 500 gf	474.03	HK 500 gf
<b>Stnd Dev Btwn Labs</b>	14.07	HK 500 gf	13.40	HK 500 gf

Samples S77, S78 : Steel, Steel

Statistics based on 90 of 94 reporting participants

**Comments on Assigned Data Flags for Test #1321**

- 2P9ZU8 (X) - Data for both samples are high. Possible Systematic Error.
- AYC986 (X) - Data for sample S78 are high.
- KKRF2U (X) - Data for both samples are high. Possible Systematic Error.
- LD6JGY (X) - Extreme data.





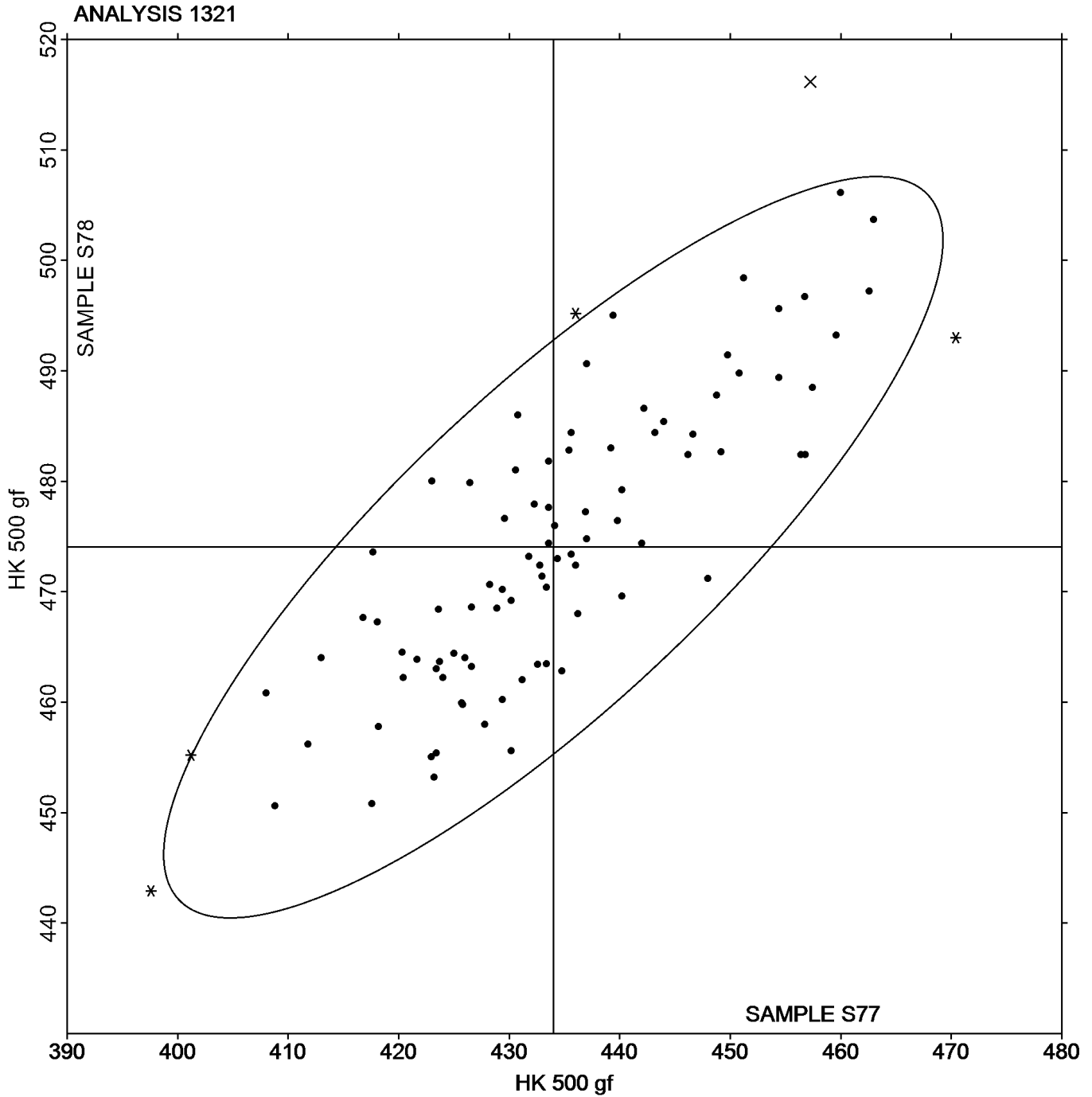
Analysis 1321

Microhardness: Knoop Indenters (500 gf)

ASTM E384

SAMPLE S77  
433.99 HK 500 gf

SAMPLE S78  
474.03 HK 500 gf





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1322

Microhardness: Knoop Indenters (200 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		467.67	21.04	1.26	512.33	23.85	1.42
2P9ZU8	X	526.80	80.17	4.79	587.40	98.92	5.91
32GNFU		448.48	1.85	0.11	485.56	-2.92	-0.17
3VWGZB		462.00	15.37	0.92	509.80	21.32	1.27
44MBQD		430.20	-16.43	-0.98	459.80	-28.68	-1.71
4WMYG3		461.00	14.37	0.86	484.60	-3.88	-0.23
67PL4T		452.60	5.97	0.36	499.60	11.12	0.66
7VKCYA		434.20	-12.43	-0.74	482.80	-5.68	-0.34
7YH3W9		447.40	0.77	0.05	481.20	-7.28	-0.43
9E632D		438.00	-8.63	-0.51	465.00	-23.48	-1.40
ADBP2R		443.00	-3.63	-0.22	502.00	13.52	0.81
APLPM6		431.00	-15.63	-0.93	482.40	-6.08	-0.36
AYC986		435.42	-11.21	-0.67	494.84	6.36	0.38
B8E3GN		461.60	14.97	0.89	492.80	4.32	0.26
D9HMB2		434.80	-11.83	-0.71	479.40	-9.08	-0.54
DWQ9KZ		454.80	8.17	0.49	500.75	12.27	0.73
E7E7H4		434.40	-12.23	-0.73	470.80	-17.68	-1.06
EUH6WM		427.80	-18.83	-1.12	478.60	-9.88	-0.59
F6Z2LQ		462.80	16.17	0.97	497.00	8.52	0.51
FHPYPB		446.40	-0.23	-0.01	483.00	-5.48	-0.33
FKRD22		463.74	17.11	1.02	489.00	0.52	0.03
FZ3FUN		441.60	-5.03	-0.30	474.60	-13.88	-0.83
FZGJ9V		428.40	-18.23	-1.09	468.80	-19.68	-1.18
G4JJ6L		427.33	-19.29	-1.15	473.61	-14.87	-0.89
G4KV4F		448.60	1.97	0.12	504.60	16.12	0.96
GVJRMW		457.00	10.37	0.62	495.20	6.72	0.40
HBFEJG		452.20	5.57	0.33	486.20	-2.28	-0.14
HC8KQU		459.00	12.37	0.74	519.40	30.92	1.85
HKEQFP		461.00	14.37	0.86	496.00	7.52	0.45
HNE3CP		453.60	6.97	0.42	497.20	8.72	0.52
HZHCG9		443.60	-3.03	-0.18	479.80	-8.68	-0.52
JDFW6P		445.20	-1.43	-0.09	495.70	7.22	0.43
JUYRHX		425.60	-21.03	-1.26	485.80	-2.68	-0.16
KKRF2U	*	495.70	49.07	2.93	526.12	37.64	2.25
KLPQWW		453.00	6.37	0.38	509.60	21.12	1.26
KQLHW8		428.32	-18.31	-1.09	463.32	-25.16	-1.50
LAB38W		471.00	24.37	1.46	503.60	15.12	0.90
LD6JGY	X	80.02	-366.61	-21.89	76.56	-411.92	-24.59
LGD7HN		436.00	-10.63	-0.63	473.20	-15.28	-0.91
M34HGZ		434.80	-11.83	-0.71	465.80	-22.68	-1.35
MFCPKH		411.00	-35.63	-2.13	466.00	-22.48	-1.34
MV2UU7		442.80	-3.83	-0.23	492.20	3.72	0.22
NCUUF6		425.00	-21.63	-1.29	454.20	-34.28	-2.05
NEDXVN		412.52	-34.11	-2.04	468.36	-20.12	-1.20
P7CHQW		466.19	19.57	1.17	511.71	23.22	1.39
PAHFL4		415.80	-30.83	-1.84	461.20	-27.28	-1.63
QDTUKU		456.40	9.77	0.58	488.40	-0.08	0.00



**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1322**

**Microhardness: Knoop Indenters (200 gf)**  
**ASTM E384**

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
QKWVKN		454.60	7.97	0.48	486.80	-1.68	-0.10
QUJW2X	*	485.60	38.97	2.33	531.60	43.12	2.57
QVX9XG		426.60	-20.03	-1.20	475.00	-13.48	-0.80
R7M2NY		451.80	5.17	0.31	482.00	-6.48	-0.39
RB2CJK		446.24	-0.39	-0.02	501.56	13.08	0.78
TLJCR2		465.80	19.17	1.14	506.20	17.72	1.06
U3J3DH		447.40	0.77	0.05	490.20	1.72	0.10
VA4W7E		452.60	5.97	0.36	489.80	1.32	0.08
VDYTQY		441.60	-5.03	-0.30	479.00	-9.48	-0.57
WYTPGJ		447.90	1.27	0.08	490.00	1.52	0.09
WZMVVA		450.20	3.57	0.21	482.32	-6.16	-0.37
X6WH9Y		435.40	-11.23	-0.67	488.00	-0.48	-0.03
XCCACH		436.60	-10.03	-0.60	480.80	-7.68	-0.46
YHKRRX		450.40	3.77	0.23	495.40	6.92	0.41
ZGMVNL		475.80	29.17	1.74	518.40	29.92	1.79

**Summary Statistics**

	Sample S77		Sample S78	
<b>Grand Means</b>	446.63	HK 200 gf	488.48	HK 200 gf
<b>Stnd Dev Btwn Labs</b>	16.75	HK 200 gf	16.75	HK 200 gf

Samples S77, S78 : Steel, Steel

Statistics based on 60 of 62 reporting participants

**Comments on Assigned Data Flags for Test #1322**

2P9ZU8 (X) - Data for both samples are high. Possible Systematic Error.

LD6JGY (X) - Extreme data.



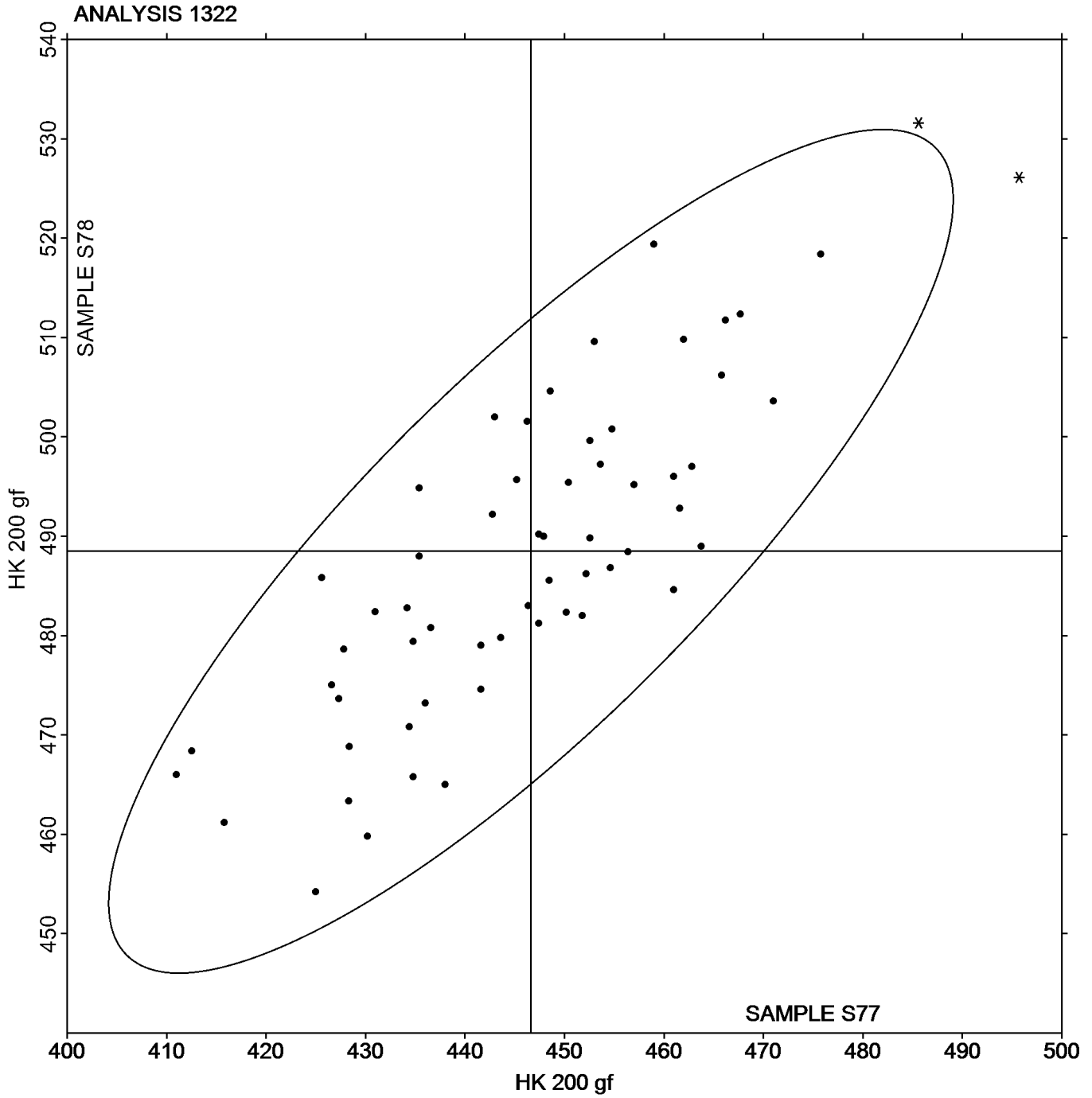
Analysis 1322

Microhardness: Knoop Indenters (200 gf)

ASTM E384

SAMPLE S77  
446.63 HK 200 gf

SAMPLE S78  
488.48 HK 200 gf





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1323

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2DF2XF		438.00	23.20	2.10	469.00	12.68	1.15
2P9ZU8		417.20	2.40	0.22	457.60	1.28	0.12
2WP4N8		409.80	-5.00	-0.45	447.40	-8.92	-0.81
32GNFU		402.98	-11.82	-1.07	449.58	-6.74	-0.61
3J4ZBA		410.00	-4.80	-0.43	454.60	-1.72	-0.16
3KWCUB		439.40	24.60	2.22	471.00	14.68	1.33
3RREU2		428.63	13.84	1.25	476.63	20.32	1.84
3VWGZB		401.20	-13.60	-1.23	446.40	-9.92	-0.90
44MBQD		403.80	-11.00	-0.99	443.00	-13.32	-1.20
4RBYHP		412.00	-2.80	-0.25	447.00	-9.32	-0.84
4RRWAB		408.60	-6.20	-0.56	445.40	-10.92	-0.99
4WMYG3		428.20	13.40	1.21	468.80	12.48	1.13
4XGWK3		428.50	13.70	1.24	463.25	6.93	0.63
4Y9ACF		404.92	-9.88	-0.89	448.28	-8.04	-0.73
4YQQG3		401.80	-13.00	-1.17	461.20	4.88	0.44
4ZJQKT	X	446.80	32.00	2.89	392.00	-64.32	-5.82
4ZZ4C7	X	415.60	0.80	0.07	255.80	-200.52	-18.14
62WEN6		433.60	18.80	1.70	474.60	18.28	1.65
67PL4T		420.40	5.60	0.51	465.60	9.28	0.84
6EETND		415.22	0.42	0.04	451.14	-5.18	-0.47
6PX8QF		422.80	8.00	0.72	449.00	-7.32	-0.66
6XTXZA		409.00	-5.80	-0.52	447.20	-9.12	-0.82
74CVBX		411.04	-3.76	-0.34	449.60	-6.72	-0.61
7G8MYT		425.40	10.60	0.96	473.20	16.88	1.53
7NKGBP		423.00	8.20	0.74	475.80	19.48	1.76
7RN8JP		425.60	10.80	0.98	464.20	7.88	0.71
7VH9GX		411.26	-3.54	-0.32	452.72	-3.60	-0.33
7VKCYA		412.00	-2.80	-0.25	445.80	-10.52	-0.95
7YH3W9		416.80	2.00	0.18	460.60	4.28	0.39
8DWJMB		420.22	5.42	0.49	458.66	2.34	0.21
8HBQXA		414.60	-0.20	-0.02	452.40	-3.92	-0.35
8YC8Q9		433.58	18.78	1.70	468.86	12.54	1.13
9E632D	*	400.00	-14.80	-1.34	427.00	-29.32	-2.65
9P9WBB		402.80	-12.00	-1.08	455.80	-0.52	-0.05
9PBCU3		420.20	5.40	0.49	467.12	10.80	0.98
ABGA3F		423.20	8.40	0.76	450.20	-6.12	-0.55
ADBP2R		411.60	-3.20	-0.29	462.00	5.68	0.51
AKB933		401.60	-13.20	-1.19	447.20	-9.12	-0.82
APLPM6		418.00	3.20	0.29	462.80	6.48	0.59
AQBQC8		429.80	15.00	1.36	461.50	5.18	0.47
B8E3GN		412.20	-2.60	-0.23	458.00	1.68	0.15
BCBPEH		418.20	3.40	0.31	462.80	6.48	0.59
BCTH9Z		412.40	-2.40	-0.22	448.00	-8.32	-0.75
BFTU6Z		404.00	-10.80	-0.98	447.60	-8.72	-0.79
C3VEAV		427.20	12.40	1.12	472.60	16.28	1.47
C8HRKK		424.00	9.20	0.83	460.00	3.68	0.33
CR6GTR		399.10	-15.70	-1.42	443.04	-13.28	-1.20



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1323

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
D7Z84U		406.60	-8.20	-0.74	453.60	-2.72	-0.25
D92DHZ		401.26	-13.54	-1.22	441.28	-15.04	-1.36
D9HMB2		402.60	-12.20	-1.10	438.60	-17.72	-1.60
D9QCQZ		415.60	0.80	0.07	445.00	-11.32	-1.02
DWQ9KZ		422.00	7.20	0.65	460.60	4.28	0.39
E3VWMK		399.32	-15.48	-1.40	440.70	-15.62	-1.41
E7E7H4		413.80	-1.00	-0.09	450.40	-5.92	-0.54
EJX983		397.20	-17.60	-1.59	439.60	-16.72	-1.51
EUH6WM		407.60	-7.20	-0.65	456.60	0.28	0.03
EXHBFY		402.80	-12.00	-1.08	446.80	-9.52	-0.86
EXZN8C		404.60	-10.20	-0.92	451.60	-4.72	-0.43
F6Z2LQ		406.80	-8.00	-0.72	444.20	-12.12	-1.10
FDVWPG		412.60	-2.20	-0.20	455.40	-0.92	-0.08
FFGL89		420.40	5.60	0.51	458.60	2.28	0.21
FHFLZ8		414.00	-0.80	-0.07	463.40	7.08	0.64
FHPYPB		420.20	5.40	0.49	450.60	-5.72	-0.52
FKRD22		416.72	1.92	0.17	470.38	14.06	1.27
FZ3FUN		422.40	7.60	0.69	455.80	-0.52	-0.05
FZGJ9V		413.40	-1.40	-0.13	447.20	-9.12	-0.82
G4JJ6L		402.72	-12.07	-1.09	449.20	-7.12	-0.64
G4KV4F		397.80	-17.00	-1.54	452.80	-3.52	-0.32
GEFMDL		426.63	11.83	1.07	472.58	16.27	1.47
GMDZ4U		425.20	10.40	0.94	465.00	8.68	0.79
GVJRMW		415.20	0.40	0.04	459.00	2.68	0.24
H6QN9E		401.96	-12.84	-1.16	451.60	-4.72	-0.43
HBFEJG	*	412.80	-2.00	-0.18	434.20	-22.12	-2.00
HC8KQU		429.80	15.00	1.36	477.40	21.08	1.91
HKEQFP		429.80	15.00	1.36	471.80	15.48	1.40
HNE3CP		402.40	-12.40	-1.12	446.20	-10.12	-0.92
HQNHVV		434.40	19.60	1.77	471.40	15.08	1.36
HZHCG9		416.20	1.40	0.13	457.40	1.08	0.10
JDFW6P		409.38	-5.42	-0.49	453.20	-3.12	-0.28
JEWY4B		407.93	-6.86	-0.62	449.62	-6.69	-0.61
JPUWYX		401.70	-13.10	-1.18	448.26	-8.06	-0.73
JUYRHX		411.60	-3.20	-0.29	471.20	14.88	1.35
KGMLM4		420.54	5.74	0.52	471.16	14.84	1.34
KKRF2U		432.26	17.46	1.58	467.96	11.64	1.05
KVYV4L	*	438.00	23.20	2.10	457.60	1.28	0.12
LAB38W		426.00	11.20	1.01	467.60	11.28	1.02
LG7H2P		418.22	3.42	0.31	460.84	4.52	0.41
LGD7HN		414.60	-0.20	-0.02	451.20	-5.12	-0.46
LJVQ8K		418.40	3.60	0.33	461.80	5.48	0.50
LL34TR		420.40	5.60	0.51	456.00	-0.32	-0.03
LL6JWX		402.00	-12.80	-1.16	440.20	-16.12	-1.46
LUENAN		427.00	12.20	1.10	463.20	6.88	0.62
LYNART		427.64	12.84	1.16	463.64	7.32	0.66
M34HGZ	*	400.00	-14.80	-1.34	427.00	-29.32	-2.65



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1323

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
MFCPKH		398.00	-16.80	-1.52	449.00	-7.32	-0.66
MV2UU7		424.00	9.20	0.83	462.80	6.48	0.59
NCUUF6		400.00	-14.80	-1.34	430.80	-25.52	-2.31
NLWCQ8		404.47	-10.33	-0.93	442.09	-14.22	-1.29
P7CHQW		408.59	-6.21	-0.56	468.55	12.24	1.11
PAHFL4		410.40	-4.40	-0.40	451.00	-5.32	-0.48
PYFYUD	*	434.74	19.94	1.80	454.22	-2.10	-0.19
QACMZZ		390.20	-24.60	-2.22	439.80	-16.52	-1.49
QDTUKU		418.00	3.20	0.29	466.20	9.88	0.89
QKWVKN		425.80	11.00	0.99	454.40	-1.92	-0.17
QUJW2X		412.80	-2.00	-0.18	459.60	3.28	0.30
QVX9XG		406.20	-8.60	-0.78	450.00	-6.32	-0.57
R7M2NY		411.20	-3.60	-0.33	453.40	-2.92	-0.26
RVQGH7		405.86	-8.94	-0.81	451.82	-4.50	-0.41
TA3EZC		398.00	-16.80	-1.52	447.60	-8.72	-0.79
TDKRMK		411.20	-3.60	-0.33	452.00	-4.32	-0.39
TFBTVU		429.80	15.00	1.36	465.60	9.28	0.84
TFEF7F		414.38	-0.42	-0.04	458.82	2.50	0.23
TLJCR2		428.20	13.40	1.21	466.80	10.48	0.95
TTZKJ4		418.98	4.18	0.38	465.98	9.66	0.87
TVKLC6		420.00	5.20	0.47	461.00	4.68	0.42
U3J3DH		400.20	-14.60	-1.32	459.80	3.48	0.32
UM8L8F		398.20	-16.60	-1.50	441.40	-14.92	-1.35
UWER9P		422.00	7.20	0.65	453.00	-3.32	-0.30
V8PNND		411.76	-3.04	-0.27	457.58	1.26	0.11
VA4W7E		420.46	5.66	0.51	467.84	11.52	1.04
VDYTQY		410.60	-4.20	-0.38	449.80	-6.52	-0.59
VKH6GK		438.22	23.42	2.12	470.50	14.18	1.28
VPN7RA		429.14	14.34	1.30	462.34	6.02	0.54
WVVK4J		418.64	3.84	0.35	465.46	9.14	0.83
WYTPGJ		411.02	-3.78	-0.34	448.14	-8.18	-0.74
WZMVVA		399.42	-15.38	-1.39	438.98	-17.34	-1.57
X467RE		407.80	-7.00	-0.63	455.00	-1.32	-0.12
X6WH9Y		399.40	-15.40	-1.39	446.60	-9.72	-0.88
XCCACH	*	403.00	-11.80	-1.07	467.60	11.28	1.02
XJAL9U		405.36	-9.44	-0.85	452.14	-4.18	-0.38
XJZLXY		426.30	11.50	1.04	468.34	12.02	1.09
XQF4WM		414.00	-0.80	-0.07	451.60	-4.72	-0.43
XXL22Y		436.60	21.80	1.97	473.20	16.88	1.53
YG4WLG		400.80	-14.00	-1.26	450.00	-6.32	-0.57
YHKRRX		403.40	-11.40	-1.03	433.00	-23.32	-2.11
YU93TA		414.62	-0.18	-0.02	463.36	7.04	0.64
Z4E6TZ	*	438.71	23.92	2.16	486.83	30.52	2.76
Z73NKQ		414.60	-0.20	-0.02	450.62	-5.70	-0.52
ZDKCL3		414.46	-0.34	-0.03	461.46	5.14	0.47
ZFQDN7		412.84	-1.96	-0.18	455.00	-1.32	-0.12
ZGMVNL		418.60	3.80	0.34	475.20	18.88	1.71



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1323

Microhardness: Vickers Indenters (500 gf)  
ASTM E384

WebCode	Data Flag	Sample S77			Sample S78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
ZLFZBY		415.20	0.40	0.04	464.20	7.88	0.71
ZU438Z		426.00	11.20	1.01	466.60	10.28	0.93

### Summary Statistics

	Sample S77		Sample S78	
<b>Grand Means</b>	414.80	HV 500 gf	456.32	HV 500 gf
<b>Stnd Dev Btwn Labs</b>	11.07	HV 500 gf	11.05	HV 500 gf

Samples S77, S78 : Steel, Steel

Statistics based on 141 of 143 reporting participants

### Comments on Assigned Data Flags for Test #1323

- 4ZJQKT (X) - Data for sample S77 are high and data for sample S78 are low. Inconsistent in testing between samples. Inconsistent within the determinations of sample S78.
- 4ZZ4C7 (X) - Data for sample S78 are low.





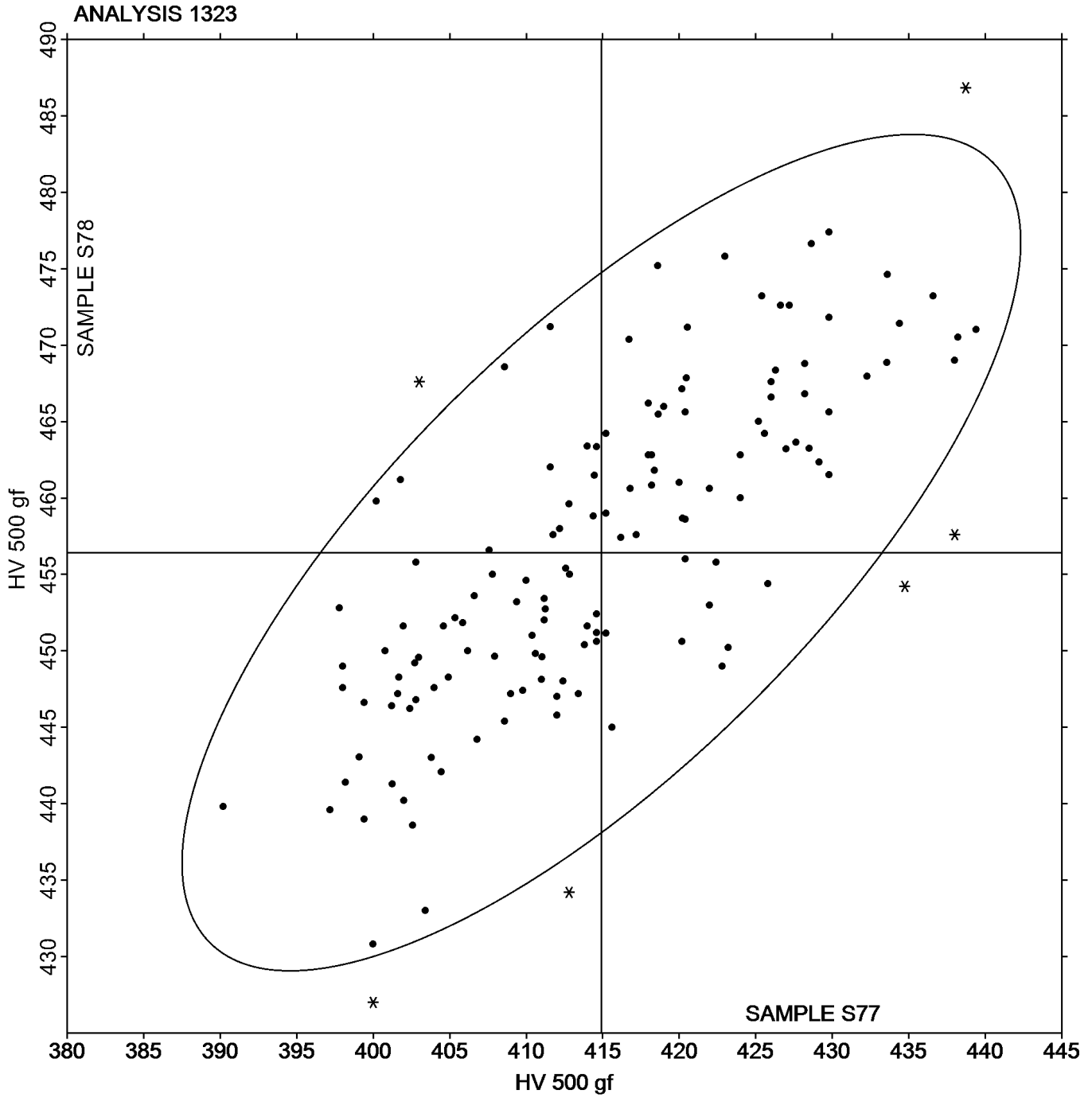
Analysis 1323

Microhardness: Vickers Indenters (500 gf)

ASTM E384

SAMPLE S77  
414.80 HV 500 gf

SAMPLE S78  
456.32 HV 500 gf





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1341

Brinell Hardness  
ASTM E10

WebCode	Data Flag	Sample D77			Sample D78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2F2474		296.06	1.37	0.28	350.84	0.49	0.07
2XLGBZ		302.00	7.31	1.50	363.00	12.65	1.73
32GNFU		297.20	2.51	0.51	355.80	5.45	0.74
3J4ZBA		294.20	-0.49	-0.10	348.20	-2.15	-0.29
3P49M4		297.00	2.31	0.47	345.00	-5.35	-0.73
4WMYG3		300.60	5.91	1.21	346.60	-3.75	-0.51
4Z3XVC		294.00	-0.69	-0.14	343.40	-6.95	-0.95
62WEN6		290.57	-4.13	-0.85	353.79	3.44	0.47
668BRZ		291.20	-3.49	-0.72	341.40	-8.95	-1.22
6KMMR3		291.15	-3.55	-0.73	349.53	-0.82	-0.11
6P29RL		294.88	0.19	0.04	350.38	0.03	0.00
7266W8		289.80	-4.89	-1.00	336.40	-13.95	-1.90
7VH9GX		294.22	-0.47	-0.10	356.54	6.19	0.85
8AGJE4		301.00	6.31	1.29	357.60	7.25	0.99
8DWJMB		296.60	1.91	0.39	335.80	-14.55	-1.99
8E9FV2		294.00	-0.69	-0.14	351.20	0.85	0.12
8PAAJD		295.40	0.71	0.15	357.20	6.85	0.94
8REBAW		297.40	2.71	0.56	353.60	3.25	0.44
9NTJNY		296.00	1.31	0.27	349.00	-1.35	-0.18
9ZNR82		302.00	7.31	1.50	363.00	12.65	1.73
ANWAJN		301.60	6.91	1.42	348.40	-1.95	-0.27
B27QDV		290.60	-4.09	-0.84	346.60	-3.75	-0.51
BWZXJZ	*	302.00	7.31	1.50	341.00	-9.35	-1.28
C33G4B		293.00	-1.69	-0.35	352.00	1.65	0.23
CDHLK2		295.00	0.31	0.06	344.20	-6.15	-0.84
D7Z84U		290.00	-4.69	-0.96	356.00	5.65	0.77
D9HMB2		292.80	-1.89	-0.39	348.00	-2.35	-0.32
DNYP7R		289.40	-5.29	-1.09	339.20	-11.15	-1.52
EUKAKQ		295.80	1.11	0.23	360.50	10.15	1.39
F4GU6V		298.60	3.91	0.80	352.40	2.05	0.28
FHFLZ8		285.00	-9.69	-1.99	345.40	-4.95	-0.68
FHPYPB		296.20	1.51	0.31	354.80	4.45	0.61
FZ3FUN		305.20	10.51	2.16	351.60	1.25	0.17
GEFMDL		297.20	2.51	0.51	359.60	9.25	1.26
GJX9FM		302.00	7.31	1.50	363.00	12.65	1.73
GNPT6N		286.60	-8.09	-1.66	346.20	-4.15	-0.57
GVJRMW		289.60	-5.09	-1.04	354.60	4.25	0.58
H6QN9E		293.58	-1.11	-0.23	346.42	-3.93	-0.54
HBFEJG		286.80	-7.89	-1.62	342.00	-8.35	-1.14
HKEQFP		289.20	-5.49	-1.13	348.00	-2.35	-0.32
HLUEAH		291.40	-3.29	-0.68	335.60	-14.75	-2.01
HYLZFD		291.40	-3.29	-0.68	349.80	-0.55	-0.07
JDFW6P		290.00	-4.69	-0.96	348.40	-1.95	-0.27
JWVE42		296.60	1.91	0.39	357.60	7.25	0.99
KU4D3K		293.00	-1.69	-0.35	363.00	12.65	1.73
LAB38W		292.20	-2.49	-0.51	352.80	2.45	0.33
LBG6XG		290.80	-3.89	-0.80	351.20	0.85	0.12



**Fasteners and Metals Interlaboratory Testing Program**  
**Analysis 1341**  
**Brinell Hardness**  
**ASTM E10**

**Cycle 135**  
**3rd Qtr 2021**

WebCode	Data Flag	Sample D77			Sample D78		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
LJVQ8K		287.20	-7.49	-1.54	347.60	-2.75	-0.38
LK2F42		300.88	6.19	1.27	361.30	10.95	1.50
LUENAN	*	308.12	13.43	2.75	358.36	8.01	1.09
MDLFKN		292.40	-2.29	-0.47	354.20	3.85	0.53
MEJQGR	*	301.40	6.71	1.38	369.00	18.65	2.55
MPJEEF		292.20	-2.49	-0.51	348.60	-1.75	-0.24
NKH8FJ	X	285.00	-9.69	-1.99	321.00	-29.35	-4.01
P7CHQW		299.50	4.81	0.99	353.38	3.03	0.41
PJLDRD		298.60	3.91	0.80	353.80	3.45	0.47
PZRD4M	*	294.00	-0.69	-0.14	333.00	-17.35	-2.37
QACMZZ	*	281.40	-13.29	-2.73	348.80	-1.55	-0.21
QH383T		297.20	2.51	0.51	362.20	11.85	1.62
QUJW2X		301.20	6.51	1.33	359.00	8.65	1.18
QVX9XG		293.40	-1.29	-0.27	357.60	7.25	0.99
R7M2NY		295.00	0.31	0.06	350.00	-0.35	-0.05
RAT6GR		293.20	-1.49	-0.31	348.20	-2.15	-0.29
RX28X3		296.00	1.31	0.27	352.00	1.65	0.23
T6PTUQ		291.30	-3.39	-0.70	351.20	0.86	0.12
TCBHYU		295.00	0.31	0.06	354.80	4.45	0.61
TDKRMK		296.80	2.11	0.43	354.40	4.05	0.55
TTZKJ4		295.20	0.51	0.10	340.60	-9.75	-1.33
TVKLC6		290.20	-4.49	-0.92	343.80	-6.55	-0.89
UM8L8F	X	272.40	-22.29	-4.57	321.00	-29.35	-4.01
UWER9P		297.00	2.31	0.47	353.60	3.25	0.44
VA4W7E		294.80	0.11	0.02	345.40	-4.95	-0.68
VDYTQY		293.00	-1.69	-0.35	341.40	-8.95	-1.22
VMK26U		294.80	0.11	0.02	345.20	-5.15	-0.70
VNFNFD		298.40	3.71	0.76	357.20	6.85	0.94
W8LQ4N		286.10	-8.59	-1.76	342.80	-7.54	-1.03
WYDNRG		292.00	-2.69	-0.55	347.20	-3.15	-0.43
X2YY9L		296.20	1.51	0.31	359.00	8.65	1.18
XAR7YE		293.00	-1.69	-0.35	343.00	-7.35	-1.00
XDWMJ4		295.80	1.11	0.23	343.00	-7.35	-1.00
XFJJQU		302.00	7.31	1.50	363.00	12.65	1.73
XG3M8E		302.40	7.71	1.58	355.20	4.85	0.66
XJAL9U	*	302.00	7.31	1.50	341.00	-9.35	-1.28
XQF4WM		293.40	-1.29	-0.27	349.20	-1.15	-0.16
Y429QG		284.90	-9.79	-2.01	340.90	-9.45	-1.29
Y8GH2Z		289.84	-4.85	-1.00	340.90	-9.45	-1.29
Z987TU		293.00	-1.69	-0.35	346.40	-3.95	-0.54
ZF7TME		297.20	2.51	0.51	350.00	-0.35	-0.05
ZGMVNL		291.40	-3.29	-0.68	347.40	-2.95	-0.40



Analysis 1341

Brinell Hardness  
ASTM E10

Summary Statistics

	<u>Sample D77</u>		<u>Sample D78</u>	
<b>Grand Means</b>	294.69	HBW	350.35	HBW
<b>Std Dev Btwn Labs</b>	4.87	HBW	7.32	HBW

Samples D77, D78 : Steel, Steel

Statistics based on 87 of 89 reporting participants

Samples D77, D78 are hardness test blocks made from steel. The blocks are heat treated to hardness levels specified by CTS.

**Comments on Assigned Data Flags for Test #1341**

NKH8FJ (X) - Data for sample D78 are low.

UM8L8F (X) - Data for both samples are low. Inconsistent within the determinations of sample D77.

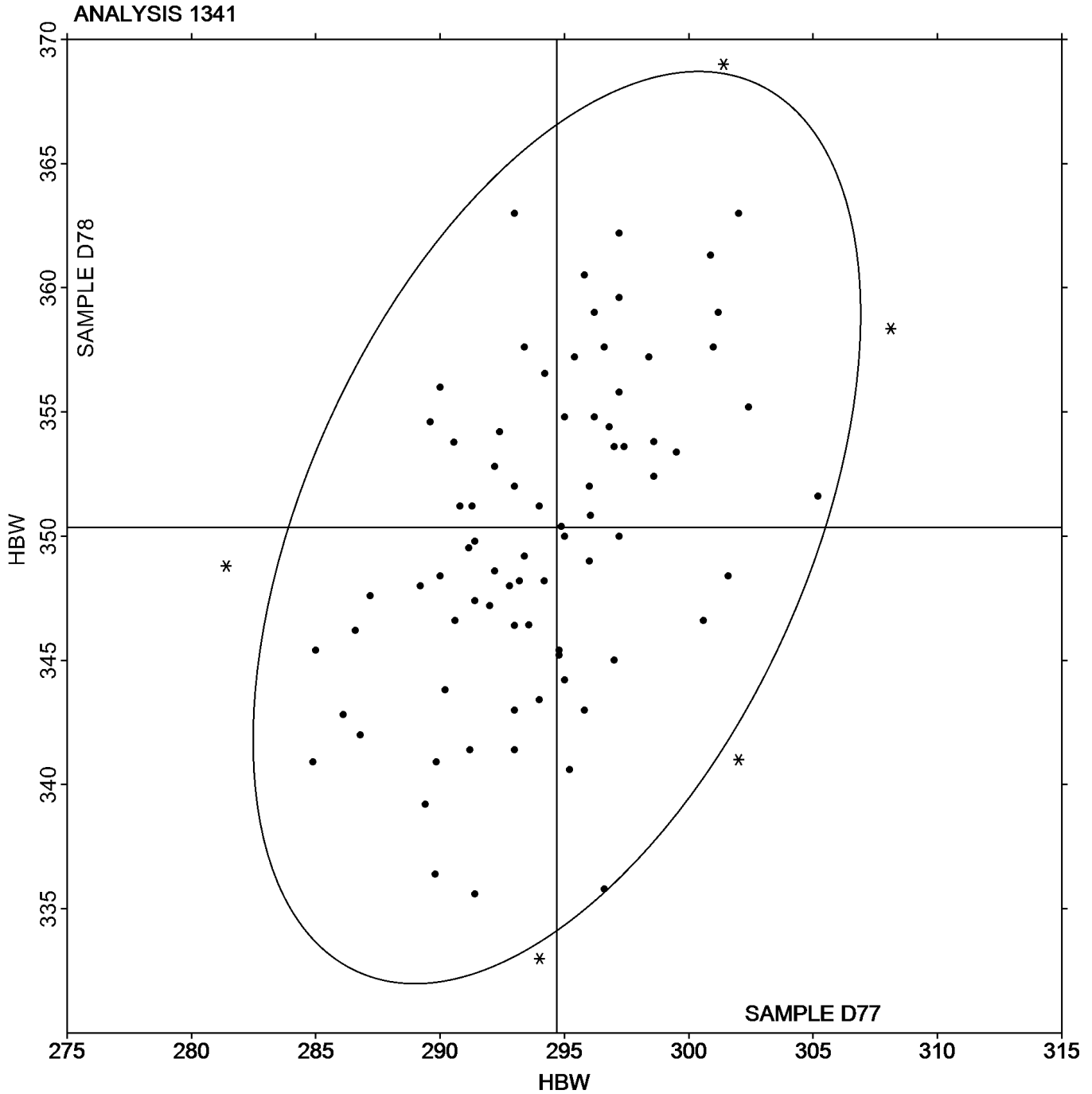


Analysis 1341

Brinell Hardness  
ASTM E10

SAMPLE D77  
294.69 HBW

SAMPLE D78  
350.35 HBW





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1421**

**Alpha Case Depth**  
**ASTM E3, E407**

WebCode	Data Flag	Sample W75			Sample W76		
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV
2F2474		0.000304	0.000012	0.24	0.000292	-0.000007	-0.14
4G9PLZ		0.000400	0.000108	2.12	0.000400	0.000102	2.23
67PL4T		0.000280	-0.000012	-0.23	0.000280	-0.000018	-0.40
727PHA		0.000220	-0.000072	-1.41	0.000200	-0.000098	-2.15
74CVBX		0.000342	0.000050	0.98	0.000368	0.000070	1.53
88QWPF		0.000281	-0.000011	-0.21	0.000321	0.000023	0.49
9CFEDW		0.000260	-0.000032	-0.62	0.000331	0.000033	0.72
APLPM6		0.000266	-0.000026	-0.51	0.000230	-0.000068	-1.49
CR6GTR		0.000262	-0.000030	-0.59	0.000254	-0.000044	-0.97
E2ZC27		0.000290	-0.000002	-0.04	0.000278	-0.000020	-0.44
F474HQ	X	0.000623	0.000331	6.49	0.000655	0.000357	7.80
FAUX9W		0.000282	-0.000010	-0.20	0.000367	0.000068	1.49
GEFMDL		0.000279	-0.000012	-0.24	0.000277	-0.000021	-0.46
GR2RA3		0.000352	0.000060	1.18	0.000304	0.000006	0.13
HBF64E		0.000284	-0.000008	-0.15	0.000276	-0.000022	-0.48
LD6JGY		0.000200	-0.000092	-1.80	0.000257	-0.000041	-0.90
LHZQ3Y		0.000337	0.000045	0.88	0.000275	-0.000023	-0.50
LYR4LF		0.000342	0.000050	0.98	0.000326	0.000028	0.61
MV2UU7		0.000300	0.000008	0.16	0.000300	0.000002	0.04
Q3VKNR		0.000368	0.000076	1.49	0.000320	0.000022	0.48
RB2CJK		0.000192	-0.000100	-1.96	0.000288	-0.000010	-0.22
UWER9P		0.000267	-0.000025	-0.48	0.000267	-0.000031	-0.68
YG4WLG		0.000328	0.000036	0.71	0.000342	0.000044	0.96
ZGMVNL		0.000276	-0.000016	-0.31	0.000306	0.000008	0.17

Summary Statistics				
	Sample W75		Sample W76	
<b>Grand Means</b>	0.000292	inches	0.000298	inches
<b>Stnd Dev Brwn Labs</b>	0.000051	inches	0.000046	inches

Samples W75, W76 : Ti-6Al-4V, Ti-6Al-4V

Statistics based on 23 of 24 reporting participants

**Comments on Assigned Data Flags for Test #1421**

F474HQ (X) - Data for both samples are high.

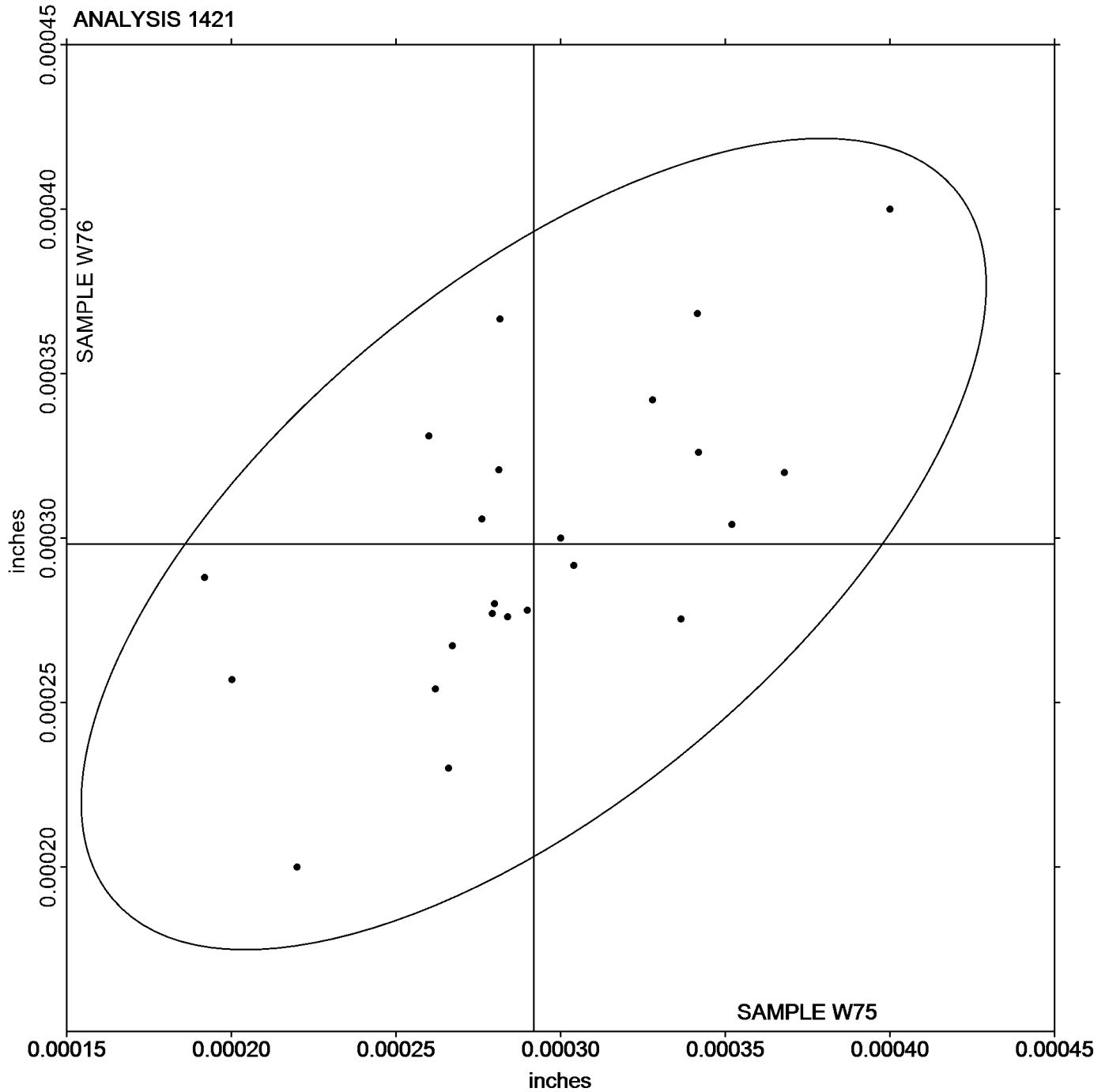


Analysis 1421

Alpha Case Depth  
ASTM E3, E407

SAMPLE W75  
0.00029 inches

SAMPLE W76  
0.00030 inches





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1520**

**Titanium-based Alloy, TITANIUM (Ti)**  
**TITANIUM (Ti)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
GEFMDL		89.50	0.15	0.75	89.07	0.28	1.07	OE
GR2RA3	X	94.87	5.51	27.82	13.47	-75.32	-287.31	XX
JMQ8QM		89.06	-0.29	-1.47	88.44	-0.35	-1.34	IC
TRKD7A		89.45	0.10	0.49	88.79	0.00	0.01	IC
VDYTQY		89.40	0.04	0.23	88.85	0.07	0.26	IC

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	89.35	Percent	88.79	Percent
<b>Stnd Dev Btwn Labs</b>	0.20	Percent	0.26	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 4 of 5 reporting participants

**Key to Method Codes Reported by Participants**

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

**Comments on Assigned Data Flags for Test #1520**

GR2RA3 (X) - Extreme data.





Analysis 1520

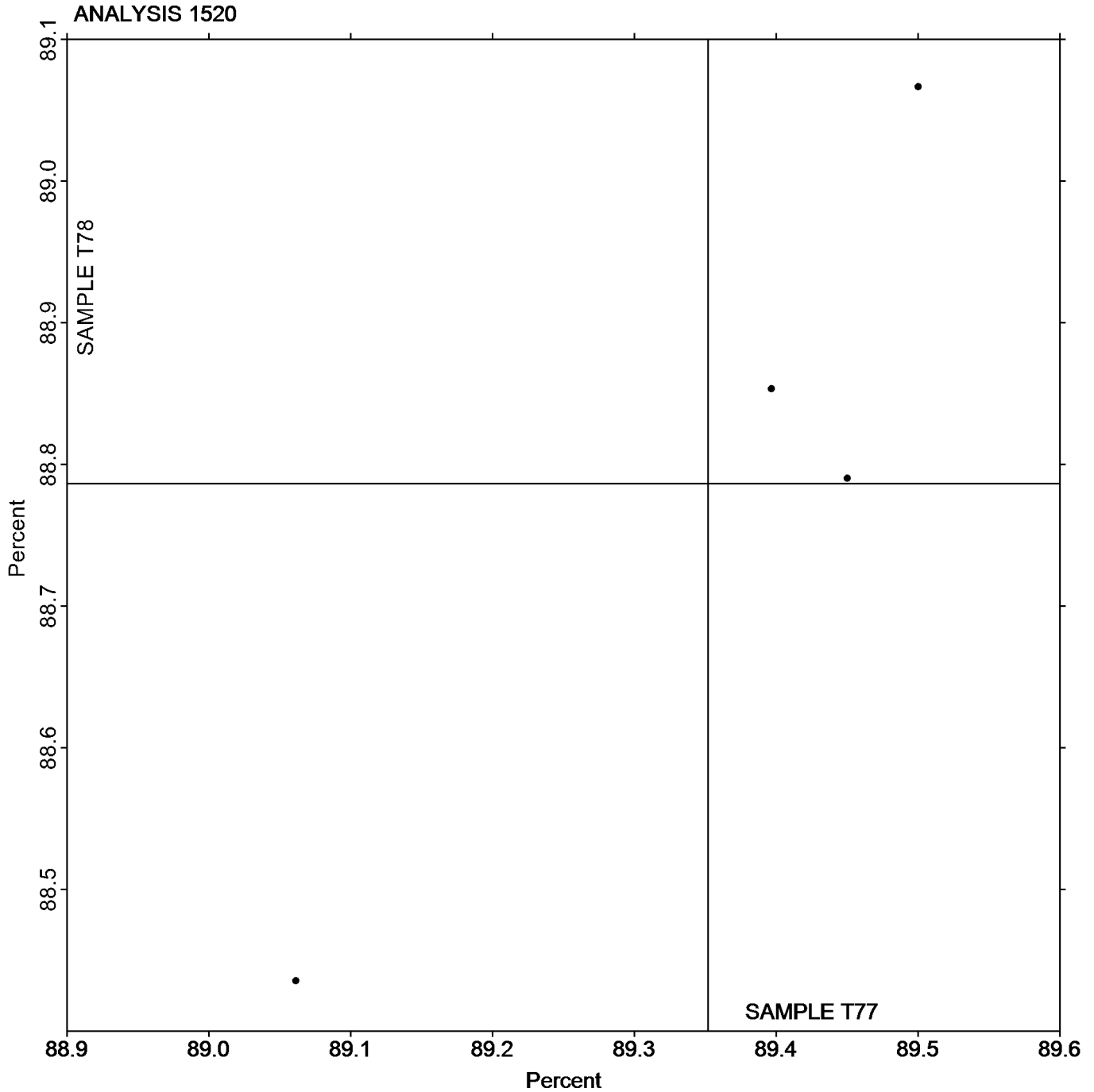
Titanium-based Alloy, TITANIUM (Ti)  
TITANIUM (Ti)

SAMPLE T77

89.35 Percent

SAMPLE T78

88.79 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1521**

**Titanium-based Alloy, HYDROGEN (H)**  
**HYDROGEN (H)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
4G9PLZ		0.00747	0.00055	0.44	0.00477	0.00276	1.93	CO
F6Z2LQ		0.00775	0.00084	0.66	0.00158	-0.00042	-0.29	IR
FAUX9W		0.00713	0.00022	0.17	0.00153	-0.00047	-0.33	XX
GEFMDL		0.00891	0.00200	1.58	0.000061	-0.00194	-1.36	IR
JMQ8QM		0.00560	-0.00131	-1.04	0.00263	0.00063	0.44	XX
LHZQ3Y		0.00619	-0.00072	-0.57	0.00164	-0.00036	-0.25	CI
UWER9P		0.00513	-0.00178	-1.40	0.00127	-0.00074	-0.51	OE
VDYTQY		0.00810	0.00119	0.94	0.00357	0.00156	1.09	CI
ZR2YKJ		0.00593	-0.00098	-0.77	0.000967	-0.00104	-0.72	CO

Summary Statistics				
	Sample T77		Sample T78	
<b>Grand Means</b>	0.00691	Percent	0.00200	Percent
<b>Stnd Dev Btrwn Labs</b>	0.00127	Percent	0.00143	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 9 of 9 reporting participants

**Key to Method Codes Reported by Participants**

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

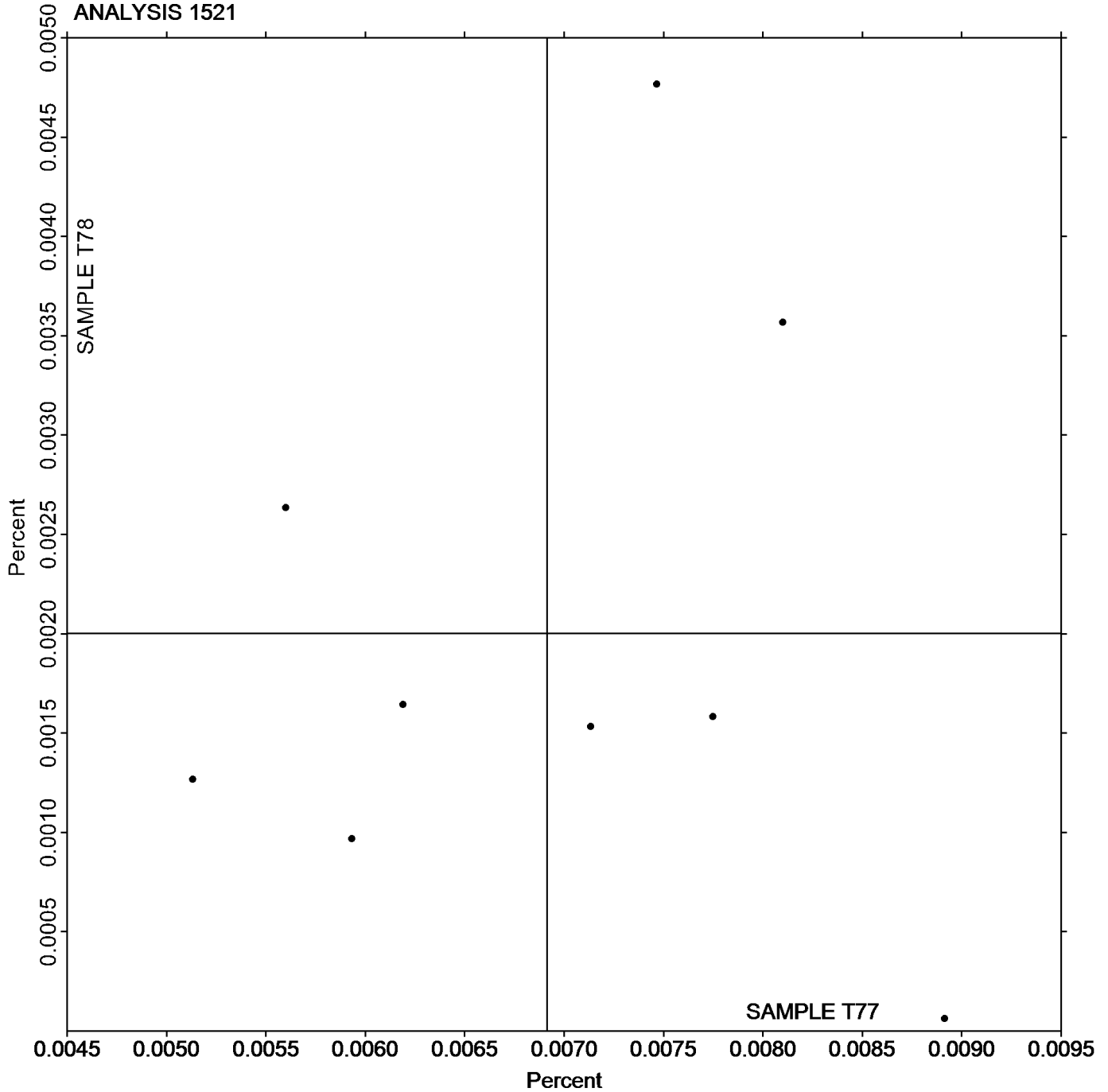


Analysis 1521

Titanium-based Alloy, HYDROGEN (H)  
HYDROGEN (H)

SAMPLE T77  
0.00691 Percent

SAMPLE T78  
0.00200 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1522**

**Titanium-based Alloy, OXYGEN (O)**  
**OXYGEN (O)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
FAUX9W		0.1807	-0.0083	-0.76	0.1877	0.0126	1.45	XX
GEFMDL		0.2074	0.0184	1.69	0.1675	-0.0077	-0.88	CI
JMQ8QM		0.2002	0.0113	1.03	0.1824	0.0073	0.84	XX
LHZQ3Y		0.1910	0.0021	0.19	0.1827	0.0076	0.87	CI
TRKD7A		0.1767	-0.0123	-1.13	0.1623	-0.0128	-1.47	CO
UWER9P		0.1817	-0.0073	-0.67	0.1740	-0.0011	-0.13	OE
VDYTQY		0.1933	0.0044	0.40	0.1690	-0.0061	-0.70	CI
ZR2YKJ		0.1807	-0.0083	-0.76	0.1753	0.0002	0.03	CO

Summary Statistics				
	Sample T77		Sample T78	
<b>Grand Means</b>	0.1889	Percent	0.1751	Percent
<b>Stnd Dev Brwn Labs</b>	0.0109	Percent	0.0087	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 8 of 8 reporting participants

**Key to Method Codes Reported by Participants**

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

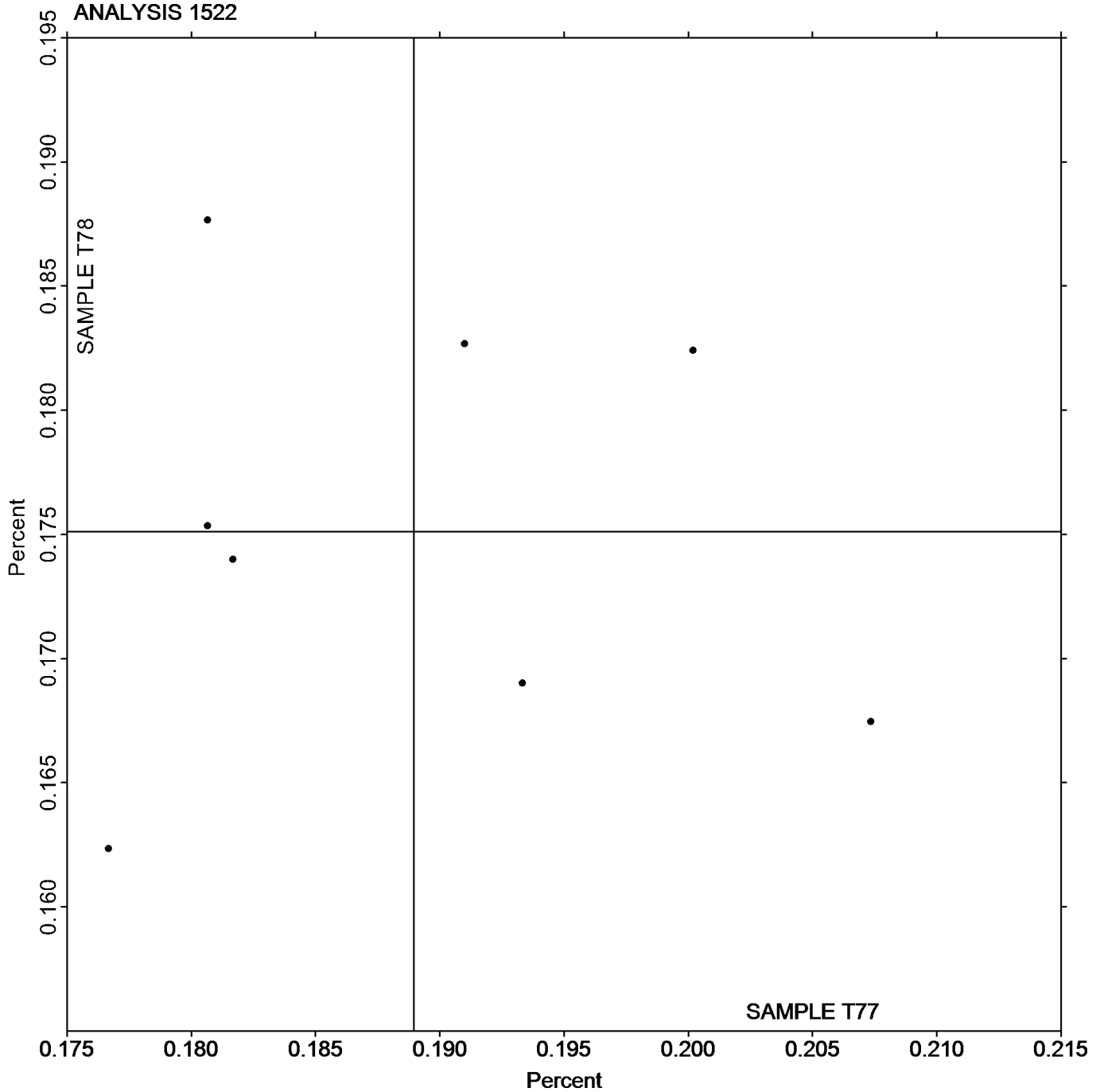


Analysis 1522

Titanium-based Alloy, OXYGEN (O)  
OXYGEN (O)

SAMPLE T77  
0.1889 Percent

SAMPLE T78  
0.1751 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1523**

**Titanium-based Alloy, NITROGEN (N)**  
**NITROGEN (N)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
GEFMDL		0.0130	0.00479	1.48	0.0303	0.0089	1.02	CI
JMQ8QM		0.00660	-0.00164	-0.51	0.0145	-0.0069	-0.79	XX
TRKD7A		0.00373	-0.00450	-1.39	0.00747	-0.0140	-1.61	XX
UWER9P		0.00773	-0.00050	-0.16	0.0238	0.0024	0.27	OE
VDYTQY		0.0107	0.00243	0.75	0.0277	0.0062	0.72	CI
ZR2YKJ		0.00767	-0.00057	-0.18	0.0248	0.0034	0.39	CO

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	0.00824	Percent	0.0214	Percent
<b>Stnd Dev Btwn Labs</b>	0.00324	Percent	0.0087	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 6 of 6 reporting participants

**Key to Method Codes Reported by Participants**

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



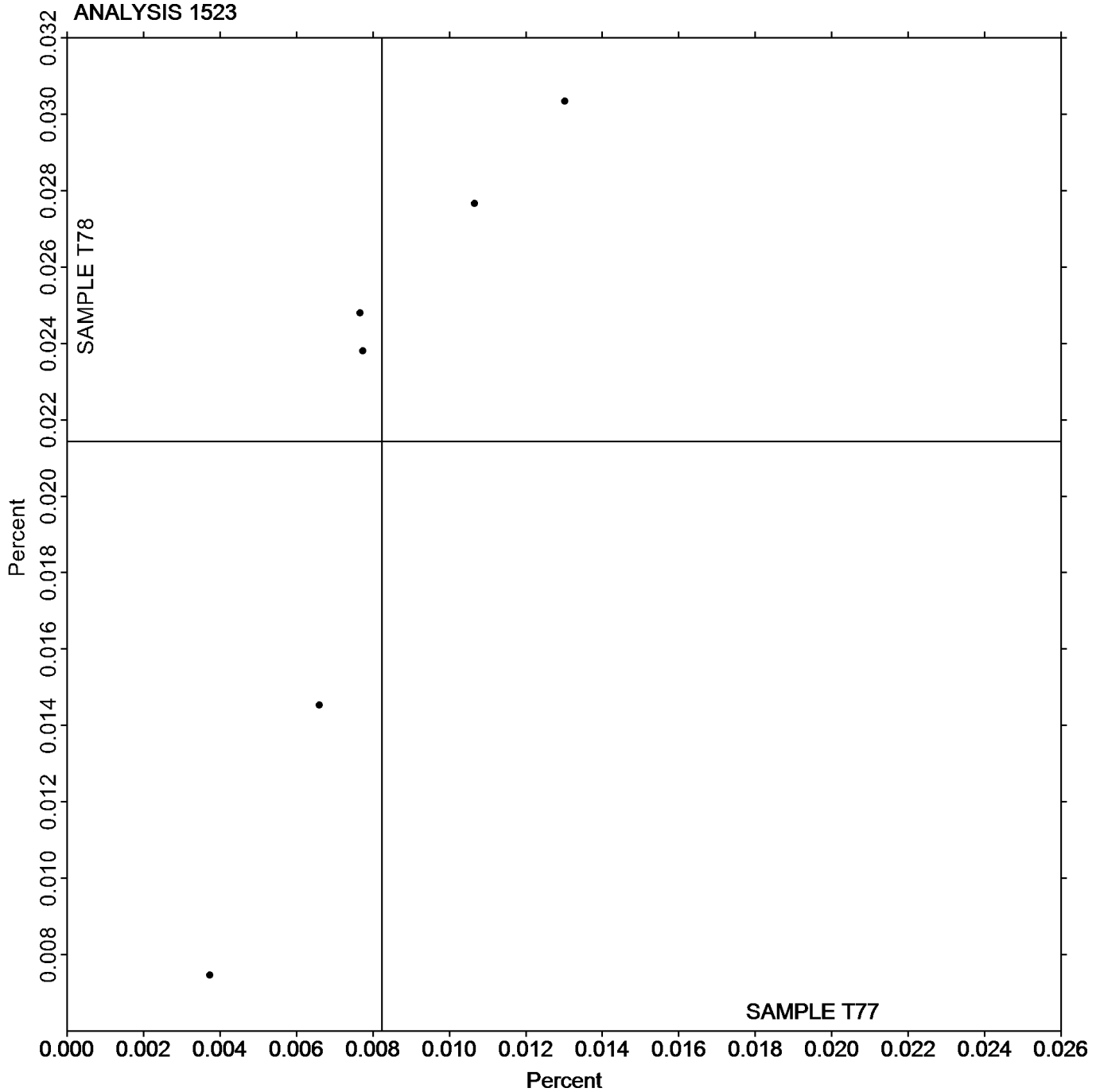
Analysis 1523

Titanium-based Alloy, NITROGEN (N)

NITROGEN (N)

SAMPLE T77  
0.00824 Percent

SAMPLE T78  
0.0214 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1524**

**Titanium-based Alloy, ALUMINUM (Al)**  
**ALUMINUM (Al)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
8BWUKN		6.370	0.088	0.94	6.570	-0.005	-0.06	OE
GEFMDL		6.103	-0.178	-1.89	6.450	-0.125	-1.31	OE
JMQ8QM		6.375	0.093	0.98	6.706	0.131	1.37	IC
TRKD7A		6.290	0.009	0.09	6.700	0.125	1.31	IC
UWER9P		6.307	0.025	0.26	6.542	-0.034	-0.35	OE
VDYTQY		6.220	-0.062	-0.65	6.510	-0.065	-0.68	IC
ZR2YKJ		6.307	0.025	0.27	6.549	-0.026	-0.28	IC

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	6.282	Percent	6.575	Percent
<b>Stnd Dev Btwn Labs</b>	0.094	Percent	0.095	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 7 of 7 reporting participants

**Key to Method Codes Reported by Participants**

IC Spectrometry - Inductively Coupled Plasma (ICP)      OE Spectrometry - Optical Emission (OES)





Analysis 1524

Titanium-based Alloy, ALUMINUM (Al)

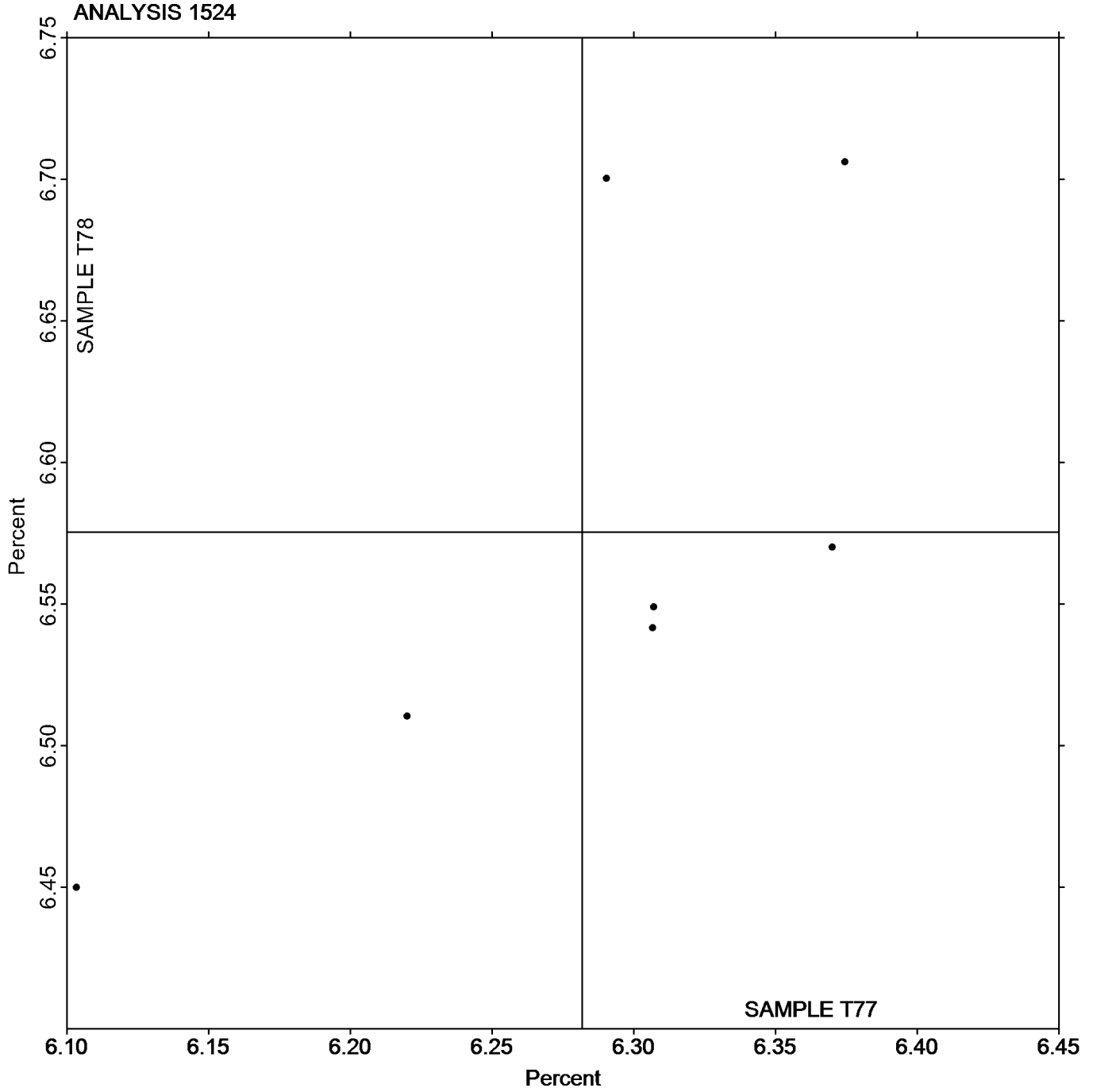
ALUMINUM (Al)

SAMPLE T77

6.282 Percent

SAMPLE T78

6.575 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1525**

**Titanium-based Alloy, VANADIUM (V)**  
**VANADIUM (V)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
8BWUKN		4.020	-0.040	-0.70	4.220	-0.016	-0.24	OE
GEFMDL		4.067	0.006	0.11	4.257	0.021	0.32	OE
JMQ8QM		4.172	0.111	1.92	4.355	0.120	1.85	IC
TRKD7A		4.099	0.039	0.67	4.259	0.023	0.36	IC
UWER9P		4.017	-0.044	-0.75	4.204	-0.032	-0.49	OE
VDYTQY		4.030	-0.030	-0.52	4.147	-0.089	-1.37	IC
ZR2YKJ		4.018	-0.042	-0.73	4.208	-0.028	-0.43	IC

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	4.060	Percent	4.236	Percent
<b>Stnd Dev Btwn Labs</b>	0.058	Percent	0.065	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 7 of 7 reporting participants

**Key to Method Codes Reported by Participants**

IC Spectrometry - Inductively Coupled Plasma (ICP)      OE Spectrometry - Optical Emission (OES)



Analysis 1525

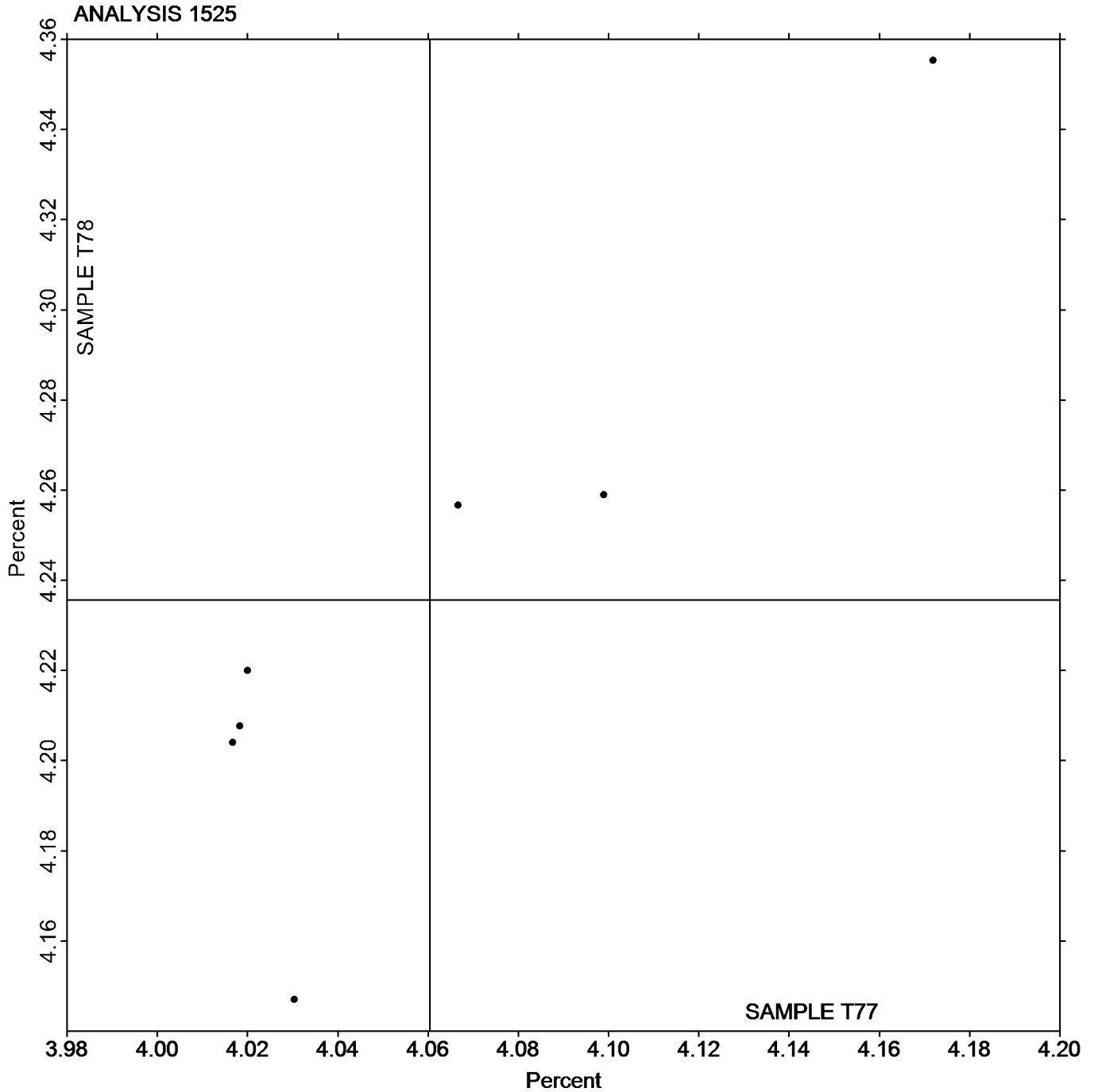
Titanium-based Alloy, VANADIUM (V)  
VANADIUM (V)

SAMPLE T77

4.060 Percent

SAMPLE T78

4.236 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1526**

**Titanium-based Alloy, IRON (Fe)**  
**IRON (Fe)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
8BWUKN		0.1500	0.0068	0.71	0.2100	0.0145	1.09	OE
GEFMDL		0.1470	0.0038	0.40	0.2000	0.0045	0.34	OE
JMQ8QM		0.1536	0.0104	1.09	0.1984	0.0029	0.22	IC
TRKD7A		0.1357	-0.0076	-0.80	0.1710	-0.0245	-1.85	IC
UWER9P		0.1257	-0.0176	-1.85	0.1850	-0.0105	-0.79	OE
VDYTQY		0.1453	0.0021	0.22	0.1990	0.0035	0.26	IC
ZR2YKJ		0.1453	0.0021	0.22	0.2053	0.0098	0.74	IC

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	0.1432	Percent	0.1955	Percent
<b>Stnd Dev Btwn Labs</b>	0.0095	Percent	0.0133	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 7 of 7 reporting participants

**Key to Method Codes Reported by Participants**

IC Spectrometry - Inductively Coupled Plasma (ICP)      OE Spectrometry - Optical Emission (OES)



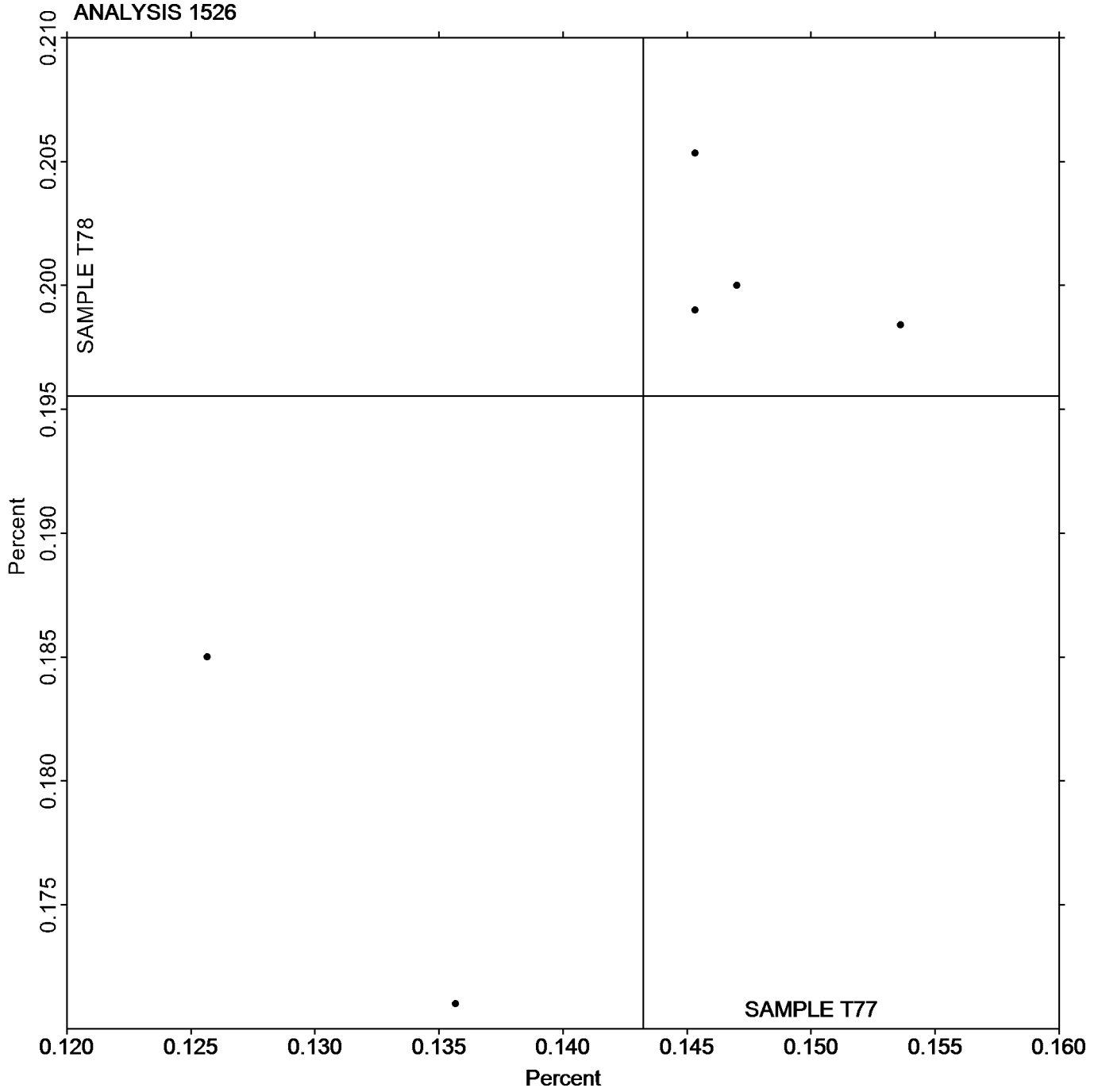
Analysis 1526

Titanium-based Alloy, IRON (Fe)

IRON (Fe)

SAMPLE T77  
0.1432 Percent

SAMPLE T78  
0.1955 Percent





**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**  
**3rd Qtr 2021**

**Analysis 1527**

**Titanium-based Alloy, CARBON (C)**  
**CARBON (C)**

WebCode	Data Flag	Sample T77			Sample T78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
8BWUKN		0.0100	-0.0008	-0.37	0.0500	0.0049	1.00	OE
JMQ8QM		0.0115	0.0007	0.31	0.0370	-0.0081	-1.65	CO
UWER9P		0.00910	-0.0017	-0.79	0.0455	0.0004	0.08	CO
VDYTQY		0.0143	0.0035	1.60	0.0477	0.0026	0.52	XX
ZR2YKJ		0.00917	-0.0017	-0.76	0.0453	0.0002	0.04	CO

**Summary Statistics**

	Sample T77		Sample T78	
<b>Grand Means</b>	0.0108	Percent	0.0451	Percent
<b>Std Dev Btwn Labs</b>	0.0022	Percent	0.0049	Percent

Samples T77, T78 : Ti 6-4 (Gr. 5), Ti 6-4 (Gr. 5)

Statistics based on 5 of 5 reporting participants

**Key to Method Codes Reported by Participants**

- CO Combustion
- OE Spectrometry - Optical Emission (OES)
- XX Please Indicate Method Used for Current Element

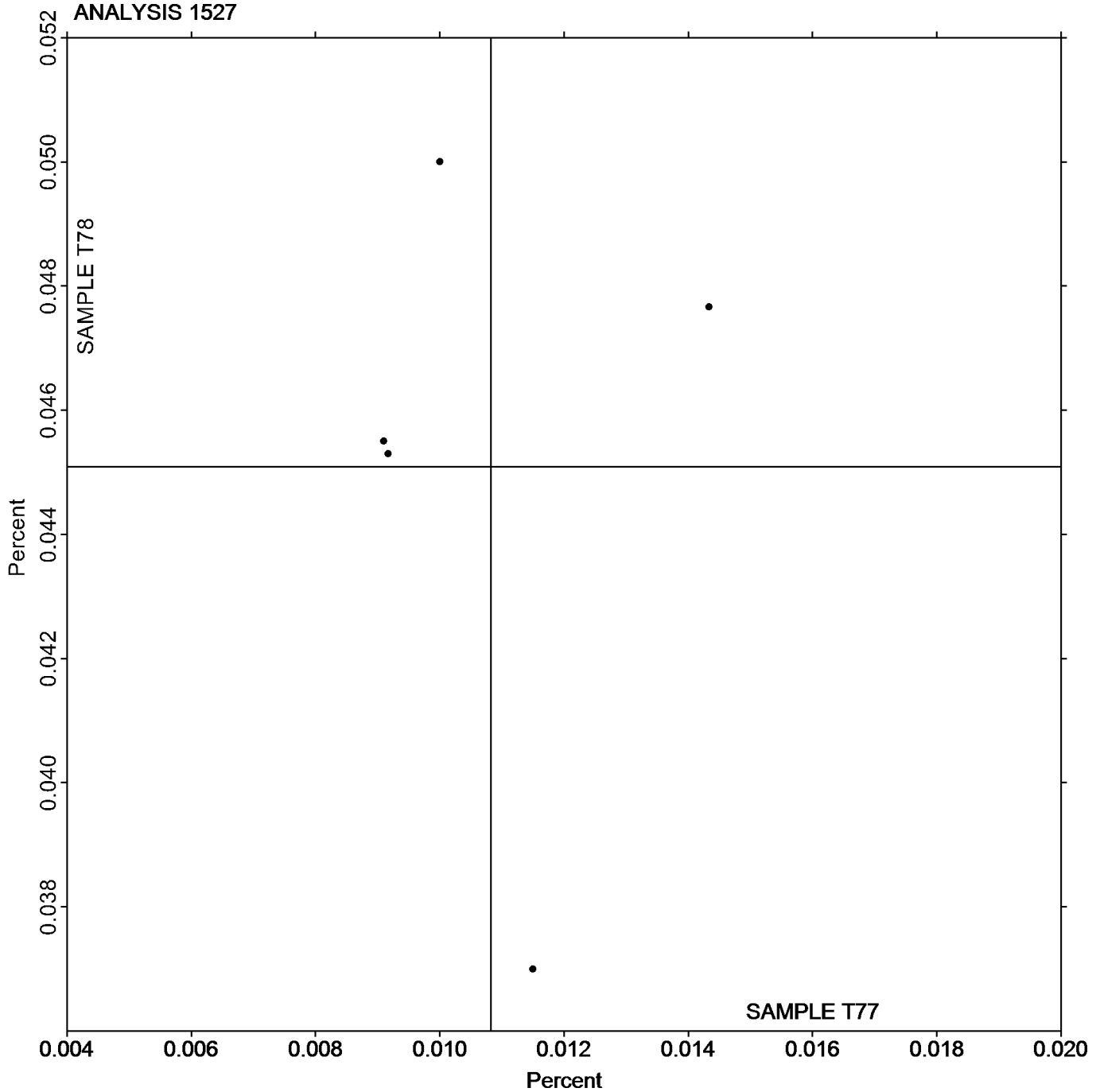


Analysis 1527

Titanium-based Alloy, CARBON (C)  
CARBON (C)

SAMPLE T77  
0.0108 Percent

SAMPLE T78  
0.0451 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1600

Carbon & Low Alloy Steel, CARBON (C)  
CARBON (C)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.4210	-0.0027	-0.32	0.4193	0.0136	1.46	OE
2P9ZU8	X	0.3903	-0.0334	-3.94	0.3893	-0.0164	-1.76	CO
2QJX4H		0.4253	0.0016	0.19	0.3963	-0.0094	-1.00	OE
2QLG4E		0.4247	0.0010	0.11	0.4047	-0.0010	-0.11	OE
2QYBGT		0.4239	0.0002	0.02	0.4071	0.0014	0.15	OE
2WP4N8		0.4093	-0.0144	-1.70	0.3857	-0.0200	-2.15	OE
387K6Z		0.4345	0.0108	1.27	0.4159	0.0102	1.10	OE
3J4ZBA		0.4230	-0.0007	-0.08	0.4050	-0.0007	-0.07	OE
3PMVMR		0.4147	-0.0090	-1.07	0.4043	-0.0014	-0.15	OE
3T3QKV	X	0.4360	0.0123	1.45	0.3920	-0.0137	-1.47	CI
3YWJXY		0.4167	-0.0070	-0.83	0.4117	0.0060	0.64	OE
43TM9H		0.4139	-0.0098	-1.16	0.3984	-0.0073	-0.79	OE
4VQFP9		0.4190	-0.0047	-0.55	0.4001	-0.0056	-0.60	OE
4WMYG3		0.4267	0.0030	0.35	0.4100	0.0043	0.46	XX
4Z8W6T		0.4230	-0.0007	-0.08	0.3993	-0.0064	-0.68	CO
4ZZ4C7		0.4190	-0.0047	-0.56	0.4023	-0.0034	-0.36	OE
62WEN6		0.4137	-0.0100	-1.19	0.3997	-0.0060	-0.65	OE
6AK4UM		0.4283	0.0046	0.54	0.4080	0.0023	0.25	OE
6LWBWE		0.4337	0.0100	1.17	0.4093	0.0036	0.39	OE
6N7RAX		0.4260	0.0023	0.27	0.4063	0.0006	0.07	DR
6XTXZA		0.4102	-0.0135	-1.60	0.3855	-0.0202	-2.16	CI
7G8MYT		0.4200	-0.0037	-0.44	0.3963	-0.0094	-1.00	OE
7NKGBP		0.4197	-0.0040	-0.48	0.4020	-0.0037	-0.40	OE
8AGJE4		0.4142	-0.0095	-1.12	0.3855	-0.0202	-2.17	OE
8BWUKN	X	0.4100	-0.0137	-1.62	0.2000	-0.2057	-22.07	CO
8JGQ2A		0.4243	0.0006	0.07	0.4073	0.0016	0.18	IR
8MLVU3		0.4270	0.0033	0.39	0.4057	0.0000	0.00	CI
8PAAJD		0.4173	-0.0064	-0.75	0.4003	-0.0054	-0.58	XX
8RVR6P		0.4333	0.0096	1.13	0.4074	0.0017	0.18	XX
8XN3P3		0.4230	-0.0007	-0.08	0.4073	0.0016	0.18	XX
9NTJNY		0.4237	0.0000	-0.01	0.4013	-0.0044	-0.47	XX
9Q3KU7		0.4150	-0.0087	-1.03	0.3960	-0.0097	-1.04	OE
9W4WP3		0.4117	-0.0120	-1.42	0.3921	-0.0136	-1.46	CI
9Z8R97		0.4283	0.0046	0.54	0.3990	-0.0067	-0.72	OE
9ZNR82		0.4201	-0.0036	-0.43	0.4119	0.0062	0.67	OE
ADBP2R		0.4300	0.0063	0.74	0.3997	-0.0060	-0.65	GD
AGMATQ		0.4253	0.0016	0.19	0.4097	0.0040	0.43	OE
AJWQWB		0.4223	-0.0014	-0.16	0.4090	0.0033	0.35	OE
AZNF8	*	0.4485	0.0248	2.92	0.4267	0.0210	2.25	OE
B422ZJ		0.4283	0.0046	0.54	0.3963	-0.0094	-1.00	OE
B8E3GN		0.4192	-0.0045	-0.53	0.3895	-0.0162	-1.74	OE
BBG2VM		0.4137	-0.0100	-1.19	0.3943	-0.0114	-1.22	OE
BFTU6Z		0.4247	0.0010	0.11	0.4090	0.0033	0.35	OE
BQ8ATF	*	0.4067	-0.0170	-2.01	0.4100	0.0043	0.46	OE
C973WT		0.4203	-0.0034	-0.40	0.4027	-0.0030	-0.33	OE
CBEECN		0.4294	0.0057	0.67	0.4045	-0.0012	-0.13	XX
CC6NWN		0.4257	0.0020	0.23	0.4193	0.0136	1.46	OE





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1600

Carbon & Low Alloy Steel, CARBON (C)  
CARBON (C)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73		0.4333	0.0096	1.14	0.4167	0.0110	1.18	GD
CM98PZ		0.4317	0.0080	0.94	0.4127	0.0070	0.75	CI
CPA6MQ	X	0.3977	-0.0260	-3.07	0.3740	-0.0317	-3.40	OE
CX9XB8	X	0.4097	-0.0140	-1.66	0.3673	-0.0384	-4.12	CI
D7Z84U		0.4190	-0.0047	-0.56	0.4037	-0.0020	-0.22	OE
EL8LXX		0.4443	0.0206	2.43	0.4227	0.0170	1.82	XX
EUGM9J		0.4067	-0.0170	-2.01	0.3930	-0.0127	-1.36	OE
EVULCL		0.4123	-0.0114	-1.34	0.3897	-0.0160	-1.72	OE
EXZN8C		0.4247	0.0010	0.11	0.3910	-0.0147	-1.58	GD
F4GU6V		0.4047	-0.0190	-2.25	0.3940	-0.0117	-1.26	OE
FLHLZ6	X	0.4052	-0.0186	-2.19	0.4166	0.0109	1.17	OE
FZ3FUN		0.4410	0.0173	2.04	0.4160	0.0103	1.11	GD
G4Y3Q4	X	0.3820	-0.0417	-4.92	0.3637	-0.0420	-4.51	OE
GBCYMX		0.4263	0.0026	0.31	0.4120	0.0063	0.68	OE
GEFMDL		0.4323	0.0086	1.02	0.4137	0.0080	0.86	OE
GTYD8H		0.4283	0.0046	0.54	0.4173	0.0116	1.25	OE
H2CZZ4		0.4237	0.0000	-0.01	0.4057	0.0000	0.00	CI
H6QN9E		0.4243	0.0006	0.07	0.4127	0.0070	0.75	OE
H9NVHX		0.4300	0.0063	0.74	0.4150	0.0093	1.00	OE
HV243G		0.4203	-0.0034	-0.40	0.4128	0.0071	0.76	OE
JAXRFT		0.4130	-0.0107	-1.26	0.3960	-0.0097	-1.04	GD
JKHDTW		0.4131	-0.0106	-1.25	0.3951	-0.0106	-1.14	OE
JMQ8QM	X	0.3875	-0.0362	-4.27	0.3680	-0.0377	-4.04	CO
K7BL9G		0.4312	0.0075	0.89	0.4072	0.0015	0.16	WD
K7RADC		0.4316	0.0079	0.93	0.4214	0.0157	1.69	GD
K8JW2E		0.4269	0.0032	0.38	0.4141	0.0084	0.91	OE
KGR7TD		0.4233	-0.0004	-0.05	0.4087	0.0030	0.32	CI
L2XLMW		0.4200	-0.0037	-0.44	0.3985	-0.0072	-0.78	OE
L3AVJG		0.4367	0.0130	1.53	0.4176	0.0119	1.28	OE
LDQNZ4		0.4143	-0.0094	-1.11	0.4003	-0.0054	-0.58	OE
LEKCHY		0.4413	0.0176	2.08	0.4213	0.0156	1.68	XX
LFGNA9		0.4251	0.0014	0.17	0.4071	0.0014	0.15	OE
LG7H2P		0.4160	-0.0077	-0.91	0.3957	-0.0100	-1.08	OE
LGD7HN		0.4300	0.0063	0.74	0.4183	0.0126	1.36	OE
LL34TR	X	0.4158	-0.0079	-0.93	0.3796	-0.0261	-2.80	CI
LLZ3XY	X	0.3815	-0.0422	-4.98	0.3856	-0.0201	-2.16	DR
MFCBWJ		0.4150	-0.0087	-1.03	0.3893	-0.0164	-1.76	XX
MFCPKH		0.4210	-0.0027	-0.32	0.4040	-0.0017	-0.18	OE
MN3YME		0.4180	-0.0057	-0.67	0.3933	-0.0124	-1.33	CO
NEDXVN		0.4120	-0.0117	-1.38	0.3953	-0.0104	-1.11	OE
NEFZWA		0.4088	-0.0149	-1.76	0.3879	-0.0178	-1.91	OE
NEUPVF		0.4243	0.0006	0.07	0.4027	-0.0030	-0.33	CI
NLV99P		0.4209	-0.0028	-0.33	0.4097	0.0040	0.43	OE
P7CHQW		0.4260	0.0023	0.27	0.4060	0.0003	0.03	GD
PDC2TR		0.4259	0.0022	0.26	0.4082	0.0025	0.26	OE
PNWUCF		0.4140	-0.0097	-1.15	0.4013	-0.0044	-0.47	OE
PNYUNW	*	0.4300	0.0063	0.74	0.3867	-0.0190	-2.04	AE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1600

Carbon & Low Alloy Steel, CARBON (C)  
CARBON (C)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
Q7T4QQ		0.4263	0.0026	0.31	0.4117	0.0060	0.64	CI
QACMZZ		0.4290	0.0053	0.62	0.4083	0.0026	0.28	CO
QB6FWJ		0.4270	0.0033	0.39	0.4140	0.0083	0.89	CO
QDXBHT		0.4151	-0.0086	-1.02	0.4012	-0.0045	-0.48	OE
QEP2DT		0.4297	0.0060	0.70	0.4170	0.0113	1.21	CI
QKV22H		0.4210	-0.0027	-0.32	0.4050	-0.0007	-0.07	OE
QP6CZ4		0.4285	0.0047	0.56	0.4101	0.0044	0.48	OE
QT9ZRM	*	0.4353	0.0116	1.37	0.3907	-0.0150	-1.61	OE
QVX9XG		0.4220	-0.0017	-0.20	0.4043	-0.0014	-0.15	CO
RENWPN		0.4210	-0.0027	-0.32	0.4100	0.0043	0.46	OE
RQ9X24		0.4267	0.0030	0.35	0.4100	0.0043	0.46	CI
T2MCJW		0.4249	0.0012	0.14	0.4050	-0.0007	-0.07	OE
T6PTUQ		0.4187	-0.0050	-0.60	0.3933	-0.0124	-1.33	CO
TCBHYU		0.4137	-0.0100	-1.19	0.4007	-0.0050	-0.54	GD
TCELEL		0.4243	0.0006	0.07	0.4013	-0.0044	-0.47	OE
TEJ78R		0.4227	-0.0010	-0.12	0.4030	-0.0027	-0.29	CI
TPY2HK		0.4363	0.0126	1.49	0.4273	0.0216	2.32	OE
TR4NXB		0.4399	0.0162	1.91	0.4194	0.0137	1.47	OE
TRKD7A		0.4253	0.0016	0.19	0.4063	0.0006	0.07	CI
TXM2NW		0.4161	-0.0076	-0.90	0.4103	0.0046	0.49	OE
UAKZWY		0.4133	-0.0104	-1.23	0.3997	-0.0060	-0.65	OE
UD8D2W		0.4323	0.0086	1.02	0.4023	-0.0034	-0.36	OE
UDHXCD		0.4353	0.0116	1.37	0.4143	0.0086	0.93	IR
UJ9VVF		0.4292	0.0055	0.65	0.4120	0.0063	0.68	OE
UTVPAW		0.4357	0.0120	1.41	0.4213	0.0156	1.68	OE
UWER9P		0.4187	-0.0050	-0.60	0.4187	0.0130	1.39	CO
V6HVM8		0.4250	0.0013	0.16	0.3968	-0.0089	-0.95	OE
VA4W7E		0.4077	-0.0160	-1.89	0.3930	-0.0127	-1.36	XX
VC67U2		0.4243	0.0006	0.07	0.4123	0.0066	0.71	OE
VDYTQY		0.4207	-0.0030	-0.36	0.4123	0.0066	0.71	OE
VF66H9		0.4167	-0.0070	-0.83	0.3943	-0.0114	-1.22	CI
VJ493M		0.4204	-0.0033	-0.39	0.3999	-0.0058	-0.63	CI
VMK26U		0.4227	-0.0010	-0.12	0.4037	-0.0020	-0.22	OE
VYZQ87		0.4202	-0.0035	-0.41	0.4057	0.0000	0.00	OE
W6JEH2		0.4245	0.0008	0.10	0.4120	0.0063	0.68	AE
W8LZPT		0.4217	-0.0020	-0.23	0.4054	-0.0003	-0.03	CO
WB8P2J		0.4237	0.0000	-0.01	0.4043	-0.0014	-0.15	OE
WH9BJZ		0.4463	0.0226	2.67	0.4270	0.0213	2.29	XX
WJFGEU		0.4253	0.0016	0.19	0.4060	0.0003	0.03	CI
X467RE		0.4133	-0.0104	-1.23	0.4057	0.0000	0.00	CO
XAR7YE		0.4283	0.0046	0.54	0.4080	0.0023	0.25	OE
XGBLDA		0.4247	0.0010	0.11	0.4063	0.0006	0.06	CI
XJ2EW8		0.4430	0.0193	2.28	0.4290	0.0233	2.50	GD
XMZV7F		0.4343	0.0106	1.25	0.4070	0.0013	0.14	OE
XQG8YQ		0.4233	-0.0004	-0.05	0.4000	-0.0057	-0.61	OE
XXL22Y		0.4154	-0.0084	-0.99	0.4032	-0.0025	-0.27	OE
Y8GH2Z		0.4461	0.0224	2.64	0.4191	0.0134	1.44	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1600

Carbon & Low Alloy Steel, CARBON (C)  
CARBON (C)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YEZJ7X		0.4190	-0.0047	-0.56	0.3962	-0.0095	-1.02	OE
YKN2NF		0.4339	0.0102	1.20	0.4193	0.0136	1.46	OE
YQA4KK		0.4290	0.0053	0.62	0.4080	0.0023	0.25	OE
YY9JGK		0.4169	-0.0068	-0.81	0.3928	-0.0129	-1.38	CI
ZFQDN7		0.4133	-0.0104	-1.23	0.3967	-0.0090	-0.97	OE
ZKLCR3		0.4224	-0.0013	-0.16	0.4032	-0.0025	-0.26	CI

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.4237	Percent	0.4057	Percent
<b>Stnd Dev Btwn Labs</b>	0.0085	Percent	0.0093	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 134 of 147 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1600

- 2P9ZU8 (X) - Data for sample L77 are low.
- 3T3QKV (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.
- 8BWUKN (X) - Data for sample L78 are low.
- CPA6MQ (X) - Data for both samples are low. Possible Systematic Error.
- CX9XB8 (X) - Data for sample L78 are low.
- FLHLZ6 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L78.
- G4Y3Q4 (X) - Data for both samples are low. Possible Systematic Error.
- JMQ8QM (X) - Data for both samples are low. Possible Systematic Error.
- LL34TR (X) - Data for sample L78 are low. Inconsistent within the determinations of sample L78.
- LLZ3XY (X) - Data for sample L77 are low.

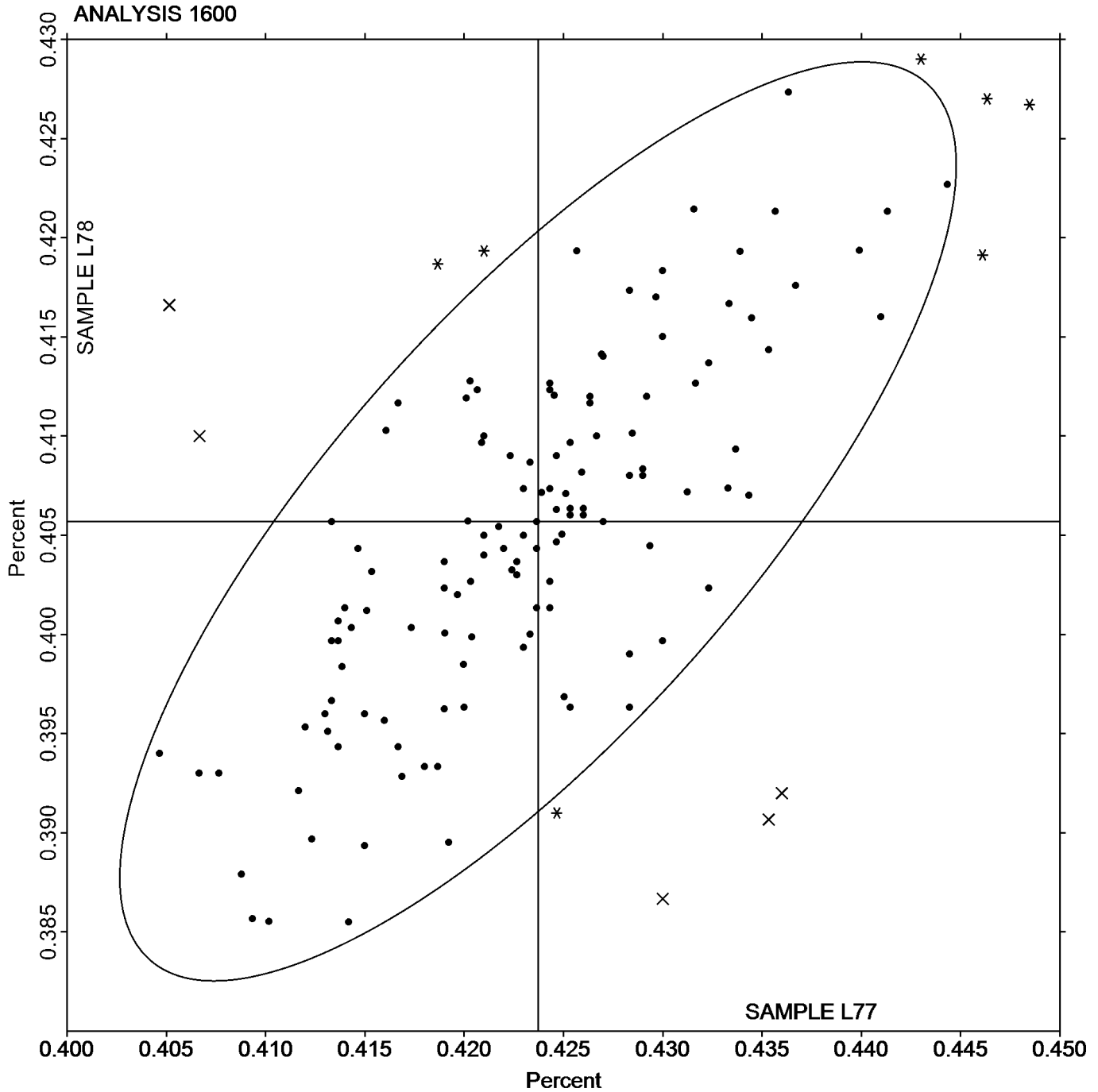


Analysis 1600

Carbon & Low Alloy Steel, CARBON (C)  
CARBON (C)

SAMPLE L77  
0.4237 Percent

SAMPLE L78  
0.4057 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1601

Carbon & Low Alloy Steel, MANGANESE (Mn)  
MANGANESE (Mn)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.8460	0.0125	1.25	0.8970	0.0236	2.33	OE
2P9ZU8		0.8527	0.0192	1.91	0.8893	0.0160	1.58	WD
2QJX4H		0.8387	0.0052	0.52	0.8800	0.0066	0.65	OE
2QLG4E		0.8397	0.0062	0.62	0.8773	0.0040	0.39	OE
2QYBGT		0.8118	-0.0216	-2.15	0.8551	-0.0183	-1.81	OE
2WP4N8		0.8357	0.0022	0.22	0.8820	0.0086	0.85	IC
387K6Z		0.8416	0.0081	0.81	0.8794	0.0060	0.59	OE
3J4ZBA		0.8217	-0.0118	-1.18	0.8610	-0.0124	-1.22	OE
3PMVMR		0.8427	0.0092	0.92	0.8763	0.0030	0.29	OE
3T3QKV		0.8160	-0.0175	-1.74	0.8577	-0.0157	-1.55	AE
3YWJXY		0.8486	0.0152	1.51	0.8795	0.0061	0.60	OE
43TM9H		0.8292	-0.0043	-0.43	0.8679	-0.0055	-0.54	OE
4VQFP9		0.8267	-0.0068	-0.67	0.8701	-0.0032	-0.32	OE
4WMYG3		0.8400	0.0065	0.65	0.8800	0.0066	0.65	XX
4Z8W6T		0.8300	-0.0035	-0.35	0.8807	0.0073	0.72	OE
4ZZ4C7	X	0.7927	-0.0408	-4.06	0.8357	-0.0377	-3.72	OE
62WEN6		0.8323	-0.0011	-0.11	0.8720	-0.0014	-0.14	OE
6AK4UM		0.8493	0.0159	1.58	0.8847	0.0113	1.11	OE
6LWBWE		0.8437	0.0102	1.02	0.8847	0.0113	1.11	OE
6N7RAX		0.8537	0.0202	2.01	0.8863	0.0130	1.28	DR
6XTXZA		0.8333	-0.0001	-0.01	0.8700	-0.0034	-0.33	IC
7G8MYT		0.8150	-0.0185	-1.84	0.8583	-0.0150	-1.49	OE
7NKGBP		0.8320	-0.0015	-0.15	0.8700	-0.0034	-0.33	OE
8AGJE4		0.8136	-0.0198	-1.98	0.8476	-0.0257	-2.54	OE
8BWUKN	X	0.8300	-0.0035	-0.35	0.9200	0.0466	4.60	OE
8JGQ2A		0.8410	0.0075	0.75	0.8780	0.0046	0.46	AE
8MLVU3		0.8397	0.0062	0.62	0.8767	0.0033	0.32	IC
8PAAJD		0.8317	-0.0018	-0.18	0.8683	-0.0050	-0.50	OE
8RVR6P		0.8413	0.0079	0.78	0.8793	0.0060	0.59	XX
8XN3P3		0.8333	-0.0001	-0.01	0.8767	0.0033	0.32	XX
9NTJNY		0.8437	0.0102	1.02	0.8853	0.0120	1.18	XX
9Q3KU7		0.8393	0.0059	0.58	0.8747	0.0013	0.13	OE
9W4WP3		0.8246	-0.0089	-0.89	0.8564	-0.0169	-1.67	IC
9Z8R97		0.8360	0.0025	0.25	0.8720	-0.0014	-0.14	OE
9ZNR82		0.8369	0.0034	0.34	0.8798	0.0064	0.64	OE
ADBP2R		0.8100	-0.0235	-2.34	0.8530	-0.0204	-2.01	GD
AGMATQ		0.8377	0.0042	0.42	0.8800	0.0066	0.65	OE
AJWQWB		0.8283	-0.0051	-0.51	0.8703	-0.0030	-0.30	OE
AZNFG8		0.8480	0.0145	1.45	0.8895	0.0161	1.59	OE
B422ZJ		0.8333	-0.0001	-0.01	0.8617	-0.0117	-1.16	OE
B8E3GN	X	0.8692	0.0357	3.56	0.9050	0.0317	3.13	OE
BBG2VM		0.8343	0.0009	0.09	0.8683	-0.0050	-0.50	OE
BFTU6Z		0.8230	-0.0105	-1.04	0.8657	-0.0077	-0.76	OE
BQ8ATF	X	0.8660	0.0325	3.24	0.9080	0.0346	3.42	OE
C973WT		0.8313	-0.0021	-0.21	0.8717	-0.0017	-0.17	OE
CBEECN		0.8378	0.0043	0.43	0.8747	0.0013	0.13	XX
CC6NWN		0.8287	-0.0048	-0.48	0.8780	0.0046	0.46	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1601

Carbon & Low Alloy Steel, MANGANESE (Mn)  
MANGANESE (Mn)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73		0.8167	-0.0168	-1.67	0.8567	-0.0167	-1.65	GD
CM98PZ		0.8497	0.0162	1.61	0.8830	0.0096	0.95	IC
CPA6MQ		0.8170	-0.0165	-1.64	0.8560	-0.0174	-1.72	XX
CX9XB8		0.8300	-0.0035	-0.35	0.8733	0.0000	0.00	WD
D7Z84U		0.8410	0.0075	0.75	0.8753	0.0020	0.19	OE
EL8LXX		0.8430	0.0095	0.95	0.8857	0.0123	1.21	XX
EUGM9J		0.8403	0.0069	0.68	0.8797	0.0063	0.62	OE
EVULCL		0.8333	-0.0001	-0.01	0.8640	-0.0094	-0.93	OE
EXZN8C		0.8150	-0.0185	-1.84	0.8577	-0.0157	-1.55	GD
F4GU6V	*	0.8033	-0.0301	-3.00	0.8500	-0.0234	-2.31	OE
FLHLZ6		0.8365	0.0030	0.30	0.8887	0.0153	1.51	OE
FZ3FUN		0.8390	0.0055	0.55	0.8680	-0.0054	-0.53	GD
G4Y3Q4		0.8293	-0.0041	-0.41	0.8653	-0.0080	-0.79	OE
GBCYMX		0.8340	0.0005	0.05	0.8723	-0.0010	-0.10	OE
GEFMDL		0.8317	-0.0018	-0.18	0.8680	-0.0054	-0.53	OE
GTYD8H		0.8520	0.0185	1.84	0.8929	0.0195	1.92	OE
H2CZZ4		0.8213	-0.0122	-1.22	0.8549	-0.0184	-1.82	OE
H6QN9E		0.8322	-0.0013	-0.13	0.8829	0.0095	0.94	OE
H9NVHX		0.8280	-0.0055	-0.54	0.8710	-0.0024	-0.23	OE
HV243G		0.8287	-0.0048	-0.48	0.8753	0.0020	0.19	OE
JAXRFT		0.8390	0.0055	0.55	0.8837	0.0103	1.02	GD
JKHDTW		0.8314	-0.0020	-0.20	0.8720	-0.0014	-0.14	OE
JMQ8QM		0.8322	-0.0012	-0.12	0.8815	0.0082	0.81	IC
K7BL9G		0.8254	-0.0081	-0.80	0.8673	-0.0060	-0.60	WD
K7RADC		0.8439	0.0105	1.04	0.8791	0.0057	0.57	GD
K8JW2E		0.8222	-0.0113	-1.13	0.8700	-0.0034	-0.33	OE
KGR7TD		0.8410	0.0075	0.75	0.8803	0.0070	0.69	IC
L2XLMW		0.8350	0.0015	0.15	0.8760	0.0026	0.26	IC
L3AVJG		0.8187	-0.0148	-1.47	0.8604	-0.0130	-1.28	OE
LDQNZ4		0.8150	-0.0185	-1.84	0.8523	-0.0210	-2.08	OE
LEKCHY		0.8337	0.0002	0.02	0.8687	-0.0047	-0.47	XX
LFGNA9		0.8325	-0.0010	-0.10	0.8711	-0.0022	-0.22	OE
LG7H2P		0.8277	-0.0058	-0.58	0.8693	-0.0040	-0.40	OE
LGD7HN		0.8483	0.0149	1.48	0.8927	0.0193	1.90	OE
LLZ3XY	X	0.7933	-0.0401	-4.00	0.8333	-0.0400	-3.96	DR
MFCBWJ		0.8560	0.0225	2.24	0.8993	0.0260	2.56	XX
MFCPKH		0.8300	-0.0035	-0.35	0.8730	-0.0004	-0.04	OE
MN3YME		0.8200	-0.0135	-1.34	0.8600	-0.0134	-1.32	OE
NEDXVN		0.8293	-0.0041	-0.41	0.8630	-0.0104	-1.03	OE
NEFZWA		0.8283	-0.0051	-0.51	0.8767	0.0033	0.32	OE
NEUPVF		0.8422	0.0087	0.87	0.8806	0.0073	0.72	IC
NLV99P		0.8342	0.0008	0.08	0.8825	0.0092	0.91	OE
P7CHQW		0.8520	0.0185	1.85	0.8960	0.0226	2.23	GD
PDC2TR		0.8336	0.0002	0.02	0.8679	-0.0055	-0.54	XX
PNWUCF	X	0.8547	0.0212	2.11	0.8710	-0.0024	-0.23	OE
PNYUNW	X	0.8700	0.0365	3.64	0.9033	0.0300	2.96	AE
Q7T4QQ		0.8437	0.0102	1.02	0.8790	0.0056	0.56	IC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1601

Carbon & Low Alloy Steel, MANGANESE (Mn)  
MANGANESE (Mn)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QACMZZ		0.8460	0.0125	1.25	0.8850	0.0116	1.15	OE
QB6FWJ		0.8367	0.0032	0.32	0.8767	0.0033	0.32	OE
QDXBHT		0.8306	-0.0028	-0.28	0.8718	-0.0016	-0.16	OE
QEP2DT		0.8347	0.0012	0.12	0.8743	0.0010	0.09	IC
QKV22H		0.8420	0.0085	0.85	0.8860	0.0126	1.25	OE
QP6CZ4		0.8323	-0.0012	-0.12	0.8709	-0.0025	-0.25	XX
QT9ZRM	X	0.8900	0.0565	5.63	0.9023	0.0290	2.86	OE
QVX9XG		0.8250	-0.0085	-0.84	0.8713	-0.0020	-0.20	OE
RENWPN		0.8280	-0.0055	-0.54	0.8710	-0.0024	-0.23	OE
RQ9X24		0.8333	-0.0001	-0.01	0.8700	-0.0034	-0.33	OE
T2MCJW	*	0.8193	-0.0142	-1.41	0.8841	0.0107	1.06	XX
T6PTUQ	X	0.8263	-0.0071	-0.71	0.8930	0.0196	1.94	OE
TCBHYU		0.8223	-0.0111	-1.11	0.8637	-0.0097	-0.96	GD
TCELEL		0.8343	0.0009	0.09	0.8793	0.0060	0.59	OE
TEJ78R		0.8510	0.0175	1.75	0.8867	0.0133	1.31	IC
TPY2HK		0.8257	-0.0078	-0.78	0.8720	-0.0014	-0.14	OE
TR4NXB		0.8270	-0.0065	-0.64	0.8719	-0.0015	-0.15	OE
TRKD7A		0.8430	0.0095	0.95	0.8833	0.0100	0.98	IC
TXM2NW	X	0.8936	0.0601	5.99	0.9152	0.0418	4.13	OE
UAKZWY		0.8290	-0.0045	-0.44	0.8683	-0.0050	-0.50	OE
UD8D2W	X	0.7323	-0.1011	-10.07	0.7627	-0.1107	-10.93	OE
UDHXCD		0.8160	-0.0175	-1.74	0.8543	-0.0190	-1.88	IC
UJ9VVF		0.8414	0.0079	0.79	0.8760	0.0026	0.26	OE
UTVPAW		0.8343	0.0009	0.09	0.8750	0.0016	0.16	OE
UWER9P		0.8320	-0.0015	-0.15	0.8847	0.0113	1.11	OE
V6HVM8		0.8330	-0.0005	-0.05	0.8672	-0.0061	-0.61	OE
VA4W7E	X	0.7930	-0.0405	-4.03	0.8400	-0.0334	-3.30	XX
VC67U2		0.8303	-0.0031	-0.31	0.8737	0.0003	0.03	OE
VDYTQY		0.8367	0.0032	0.32	0.8780	0.0046	0.46	OE
VF66H9		0.8403	0.0069	0.68	0.8760	0.0026	0.26	IC
VJ493M		0.8373	0.0039	0.39	0.8730	-0.0004	-0.04	WD
VJ6LLU		0.8433	0.0099	0.98	0.8790	0.0056	0.56	OE
VMK26U	X	0.8160	-0.0175	-1.74	0.8393	-0.0340	-3.36	OE
VYZQ87		0.8309	-0.0025	-0.25	0.8751	0.0017	0.17	OE
W6JEH2		0.8367	0.0032	0.32	0.8755	0.0022	0.21	AE
W8LZPT		0.8505	0.0171	1.70	0.8804	0.0071	0.70	IC
WB8P2J		0.8380	0.0045	0.45	0.8770	0.0036	0.36	OE
WH9BJZ	X	0.8823	0.0489	4.87	0.9200	0.0466	4.60	XX
WJFGEU		0.8427	0.0092	0.92	0.8760	0.0026	0.26	IC
X467RE		0.8367	0.0032	0.32	0.8737	0.0003	0.03	OE
XAR7YE		0.8240	-0.0095	-0.94	0.8739	0.0006	0.05	OE
XGBLDA		0.8377	0.0042	0.42	0.8730	-0.0004	-0.04	WD
XJ2EW8	*	0.8303	-0.0031	-0.31	0.8933	0.0200	1.97	GD
XMZV7F		0.8450	0.0115	1.15	0.8860	0.0126	1.25	OE
XQG8YQ		0.8243	-0.0091	-0.91	0.8663	-0.0070	-0.70	OE
XXL22Y		0.8226	-0.0109	-1.08	0.8587	-0.0147	-1.45	OE
Y8GH2Z		0.8250	-0.0085	-0.84	0.8597	-0.0137	-1.35	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
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## Analysis 1601

Carbon & Low Alloy Steel, MANGANESE (Mn)  
MANGANESE (Mn)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YEZJ7X		0.8342	0.0008	0.08	0.8663	-0.0071	-0.70	OE
YKN2NF		0.8238	-0.0097	-0.96	0.8644	-0.0090	-0.89	OE
YQA4KK	X	0.7600	-0.0735	-7.32	0.8500	-0.0234	-2.31	OE
YY9JGK		0.8295	-0.0040	-0.39	0.8710	-0.0024	-0.23	OE
ZFQDN7		0.8200	-0.0135	-1.34	0.8567	-0.0167	-1.65	OE
ZKLCR3		0.8323	-0.0011	-0.11	0.8763	0.0030	0.29	OE

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.8335	Percent	0.8734	Percent
<b>Std Dev Btwn Labs</b>	0.0100	Percent	0.0101	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 130 of 147 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1601

- 4ZZ4C7 (X) - Data for both samples are low. Possible Systematic Error.
- 8BWUKN (X) - Data for sample L78 are high.
- B8E3GN (X) - Data for both samples are high. Possible Systematic Error.
- BQ8ATF (X) - Data for both samples are high. Possible Systematic Error.
- LL33XY (X) - Data for both samples are low. Possible Systematic Error.
- PNWUCF (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- PNYUNW (X) - Data for both samples are high. Possible Systematic Error.
- QT9ZRM (X) - Data for both samples are high. Possible Systematic Error.
- T6PTUQ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- TXM2NW (X) - Data for both samples are high. Possible Systematic Error.
- UD8D2W (X) - Data for both samples are low. Possible Systematic Error.
- VA4W7E (X) - Data for both samples are low. Possible Systematic Error.
- VMK26U (X) - Data for sample L78 are low.
- WH9BJZ (X) - Data for both samples are high. Possible Systematic Error.
- YQA4KK (X) - Data for sample L77 are low.







# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1602

Carbon & Low Alloy Steel, PHOSPHORUS (P)  
PHOSPHORUS (P)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF	X	0.0137	0.00477	5.12	0.0221	0.0067	5.60	OE
2P9ZU8		0.00800	-0.00096	-1.03	0.0147	-0.0007	-0.57	WD
2QJX4H		0.00773	-0.00123	-1.32	0.0150	-0.0004	-0.32	OE
2QLG4E		0.00897	0.00001	0.01	0.0155	0.0001	0.10	OE
2QYBGT		0.00823	-0.00073	-0.78	0.0151	-0.0003	-0.21	OE
2WP4N8		0.00897	0.00001	0.01	0.0150	-0.0004	-0.32	IC
387K6Z		0.00805	-0.00091	-0.97	0.0147	-0.0007	-0.56	OE
3J4ZBA		0.00913	0.00017	0.19	0.0160	0.0006	0.54	OE
3PMVMR		0.00960	0.00064	0.69	0.0160	0.0006	0.54	OE
3T3QKV		0.00850	-0.00046	-0.49	0.0158	0.0004	0.37	AE
3YWJXY	X	0.0170	0.00807	8.67	0.0247	0.0094	7.83	OE
43TM9H		0.00927	0.00031	0.33	0.0153	0.0000	-0.02	OE
4VQFP9		0.00880	-0.00016	-0.17	0.0151	-0.0002	-0.18	OE
4WMYG3		0.0100	0.00104	1.12	0.0163	0.0010	0.82	XX
4Z8W6T		0.00933	0.00037	0.40	0.0170	0.0016	1.38	OE
4ZZ4C7	X	0.0132	0.00421	4.52	0.0186	0.0033	2.74	OE
62WEN6		0.00843	-0.00053	-0.56	0.0171	0.0017	1.46	OE
6AK4UM		0.00927	0.00031	0.33	0.0150	-0.0004	-0.29	OE
6LWBWE		0.00867	-0.00029	-0.31	0.0150	-0.0004	-0.29	OE
6N7RAX		0.00940	0.00044	0.47	0.0151	-0.0003	-0.21	DR
6XTXZA		0.00920	0.00024	0.26	0.0140	-0.0014	-1.13	IC
7G8MYT		0.00950	0.00054	0.58	0.0138	-0.0015	-1.27	OE
7NKGBP	X	0.00947	0.00051	0.54	0.0187	0.0033	2.77	OE
8AGJE4		0.00780	-0.00116	-1.24	0.0134	-0.0020	-1.63	OE
8BWUKN		0.0100	0.00104	1.12	0.0160	0.0006	0.54	OE
8JGQ2A		0.00893	-0.00003	-0.03	0.0152	-0.0001	-0.10	AE
8MLVU3		0.00870	-0.00026	-0.28	0.0148	-0.0005	-0.43	IC
8PAAJD		0.00917	0.00021	0.22	0.0153	-0.0001	-0.04	XX
8RVR6P		0.0107	0.00171	1.83	0.0180	0.0026	2.21	XX
8XN3P3		0.00700	-0.00196	-2.10	0.0137	-0.0017	-1.41	XX
9NTJNY		0.00767	-0.00129	-1.39	0.0139	-0.0015	-1.21	OE
9Q3KU7		0.0113	0.00237	2.55	0.0164	0.0010	0.87	OE
9W4WP3		0.00943	0.00047	0.51	0.0170	0.0016	1.38	OE
9Z8R97		0.0102	0.00124	1.33	0.0171	0.0017	1.46	OE
9ZNR82		0.00959	0.00063	0.68	0.0180	0.0027	2.24	OE
ADBP2R		0.0103	0.00137	1.47	0.0163	0.0010	0.82	GD
AGMATQ		0.00880	-0.00016	-0.17	0.0154	0.0000	0.01	OE
AJWQWB		0.00840	-0.00056	-0.60	0.0149	-0.0004	-0.35	OE
AZNF8		0.00992	0.00096	1.03	0.0172	0.0018	1.53	OE
B422ZJ		0.0101	0.00111	1.19	0.0154	0.0000	0.04	OE
B8E3GN		0.00820	-0.00076	-0.81	0.0142	-0.0012	-0.99	OE
BBG2VM		0.0106	0.00164	1.76	0.0177	0.0023	1.93	OE
BFTU6Z		0.00993	0.00097	1.05	0.0143	-0.0010	-0.85	OE
BQ8ATF	X	0.00600	-0.00296	-3.18	0.0110	-0.0044	-3.63	OE
C973WT		0.00930	0.00034	0.37	0.0146	-0.0008	-0.66	OE
CBEECN		0.00907	0.00011	0.12	0.0167	0.0013	1.13	XX
CC6NWN		0.00923	0.00027	0.29	0.0163	0.0009	0.79	OE



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## Analysis 1602

Carbon & Low Alloy Steel, PHOSPHORUS (P)  
PHOSPHORUS (P)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73		0.00833	-0.00063	-0.67	0.0150	-0.0004	-0.29	GD
CM98PZ		0.00993	0.00097	1.05	0.0157	0.0004	0.32	IC
CPA6MQ		0.00760	-0.00136	-1.46	0.0149	-0.0004	-0.35	XX
CX9XB8		0.00800	-0.00096	-1.03	0.0150	-0.0004	-0.29	WD
D7Z84U		0.00817	-0.00079	-0.85	0.0139	-0.0014	-1.18	OE
EL8LXX		0.00833	-0.00063	-0.67	0.0150	-0.0004	-0.29	XX
EUGM9J		0.00977	0.00081	0.87	0.0162	0.0008	0.71	OE
EVULCL		0.00880	-0.00016	-0.17	0.0150	-0.0003	-0.27	OE
EXZN8C	X	0.0110	0.00201	2.15	0.0153	0.0000	-0.02	GD
F4GU6V	X	0.0133	0.00437	4.69	0.0177	0.0023	1.93	OE
FLHLZ6		0.00820	-0.00076	-0.81	0.0160	0.0006	0.54	OE
FZ3FUN		0.0100	0.00104	1.12	0.0150	-0.0004	-0.29	GD
G4Y3Q4	X	0.00610	-0.00286	-3.07	0.0100	-0.0053	-4.44	OE
GBCYMX		0.00890	-0.00006	-0.06	0.0158	0.0004	0.37	OE
GEFMDL	X	0.0115	0.00257	2.76	0.0194	0.0040	3.38	OE
GTYD8H		0.00883	-0.00013	-0.14	0.0149	-0.0005	-0.38	OE
H2CZZ4	X	0.00623	-0.00273	-2.93	0.0149	-0.0005	-0.38	OE
H6QN9E		0.00833	-0.00063	-0.67	0.0150	-0.0004	-0.32	OE
H9NVHX		0.00800	-0.00096	-1.03	0.0137	-0.0017	-1.41	OE
HV243G		0.00833	-0.00063	-0.67	0.0147	-0.0007	-0.57	OE
JAXRFT		0.00847	-0.00049	-0.53	0.0150	-0.0004	-0.29	GD
JKHDTW		0.00890	-0.00006	-0.06	0.0155	0.0001	0.12	OE
JMQ8QM		0.00793	-0.00103	-1.10	0.0131	-0.0023	-1.88	IC
K7BL9G		0.00813	-0.00083	-0.89	0.0141	-0.0012	-1.02	WD
K7RADC		0.00874	-0.00022	-0.23	0.0149	-0.0004	-0.37	GD
K8JW2E		0.00897	0.00001	0.01	0.0152	-0.0001	-0.10	OE
KGR7TD		0.00907	0.00011	0.12	0.0161	0.0007	0.60	IC
L2XLMW		0.00767	-0.00129	-1.39	0.0137	-0.0017	-1.41	IC
L3AVJG	*	0.00895	-0.00001	-0.01	0.0183	0.0029	2.43	OE
LDQNZ4		0.00900	0.00004	0.04	0.0150	-0.0004	-0.29	OE
LEKCHY		0.00907	0.00011	0.12	0.0157	0.0004	0.32	XX
LFGNA9		0.00972	0.00076	0.82	0.0162	0.0008	0.70	OE
LG7H2P		0.00763	-0.00133	-1.42	0.0147	-0.0007	-0.57	OE
LGD7HN	X	0.0121	0.00311	3.34	0.0190	0.0036	3.02	OE
LLZ3XY		0.00957	0.00061	0.65	0.0168	0.0014	1.21	DR
MFCBWJ	*	0.0117	0.00271	2.91	0.0173	0.0020	1.65	XX
MFCPKH		0.00920	0.00024	0.26	0.0163	0.0009	0.79	OE
MN3YME	*	0.0100	0.00104	1.12	0.0130	-0.0024	-1.96	OE
NEDXVN		0.00970	0.00074	0.80	0.0172	0.0018	1.51	OE
NEFZWA		0.00733	-0.00163	-1.75	0.0130	-0.0024	-1.96	OE
NEUPVF		0.00787	-0.00109	-1.17	0.0136	-0.0017	-1.43	IC
NLV99P		0.00862	-0.00034	-0.36	0.0147	-0.0006	-0.52	OE
P7CHQW		0.00850	-0.00046	-0.49	0.0144	-0.0010	-0.79	GD
PDC2TR		0.00910	0.00014	0.15	0.0144	-0.0010	-0.82	XX
PNWUCF	*	0.0118	0.00287	3.08	0.0180	0.0027	2.24	OE
PNYUNW	X	0.0215	0.01251	13.42	0.0237	0.0084	7.00	AE
Q7T4QQ		0.00900	0.00004	0.04	0.0160	0.0006	0.54	IC



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1602

Carbon & Low Alloy Steel, PHOSPHORUS (P)  
PHOSPHORUS (P)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QACMZZ		0.00910	0.00014	0.15	0.0162	0.0008	0.71	OE
QB6FWJ		0.00863	-0.00033	-0.35	0.0152	-0.0002	-0.15	OE
QDXBHT		0.00930	0.00034	0.37	0.0158	0.0004	0.37	OE
QEP2DT		0.00827	-0.00069	-0.74	0.0142	-0.0011	-0.93	IC
QKV22H		0.00847	-0.00049	-0.53	0.0147	-0.0007	-0.57	OE
QP6CZ4		0.00960	0.00064	0.68	0.0158	0.0005	0.41	XX
QT9ZRM		0.00870	-0.00026	-0.28	0.0140	-0.0014	-1.13	OE
QVX9XG		0.00747	-0.00149	-1.60	0.0141	-0.0013	-1.07	OE
RENWPN		0.00900	0.00004	0.04	0.0160	0.0006	0.54	OE
RQ9X24		0.00900	0.00004	0.04	0.0163	0.0010	0.82	OE
T2MCJW		0.0102	0.00121	1.30	0.0167	0.0013	1.10	XX
T6PTUQ		0.0100	0.00104	1.12	0.0170	0.0016	1.38	XX
TCBHYU		0.0110	0.00204	2.19	0.0170	0.0016	1.38	GD
TCELEL		0.00830	-0.00066	-0.71	0.0138	-0.0015	-1.27	OE
TEJ78R		0.00827	-0.00069	-0.74	0.0141	-0.0013	-1.07	CL
TPY2HK		0.00837	-0.00059	-0.64	0.0157	0.0003	0.29	OE
TR4NXB		0.00803	-0.00093	-0.99	0.0147	-0.0006	-0.52	OE
TRKD7A		0.00733	-0.00163	-1.75	0.0133	-0.0021	-1.71	IC
TXM2NW	*	0.00643	-0.00253	-2.71	0.0119	-0.0035	-2.91	OE
UAKZWY		0.00790	-0.00106	-1.14	0.0149	-0.0005	-0.38	OE
UD8D2W		0.00990	0.00094	1.01	0.0158	0.0005	0.40	OE
UDHXCD		0.00800	-0.00096	-1.03	0.0130	-0.0024	-1.96	IC
UJ9VVF		0.00950	0.00054	0.58	0.0171	0.0017	1.46	OE
UTVPAW		0.00917	0.00021	0.22	0.0153	-0.0001	-0.04	OE
UWER9P		0.00940	0.00044	0.47	0.0160	0.0006	0.54	OE
V6HVM8		0.00873	-0.00023	-0.24	0.0152	-0.0002	-0.15	OE
VA4W7E	*	0.0108	0.00181	1.94	0.0141	-0.0013	-1.04	XX
VC67U2		0.00900	0.00004	0.04	0.0155	0.0001	0.12	OE
VDYTQY		0.00940	0.00044	0.47	0.0160	0.0006	0.54	OE
VF66H9		0.00813	-0.00083	-0.89	0.0140	-0.0014	-1.13	IC
VJ493M		0.00890	-0.00006	-0.06	0.0150	-0.0003	-0.27	WD
VJ6LLU		0.00765	-0.00131	-1.41	0.0134	-0.0020	-1.67	OE
VMK26U		0.00800	-0.00096	-1.03	0.0160	0.0006	0.54	OE
VYZQ87		0.00930	0.00034	0.37	0.0159	0.0005	0.43	OE
W6JEH2		0.00920	0.00024	0.26	0.0154	0.0000	0.01	AE
W8LZPT		0.00920	0.00024	0.26	0.0149	-0.0005	-0.41	IC
WB8P2J		0.00867	-0.00029	-0.31	0.0153	0.0000	-0.02	OE
WH9BJZ		0.0100	0.00104	1.12	0.0157	0.0003	0.26	XX
WJFGEU		0.00843	-0.00053	-0.56	0.0148	-0.0006	-0.46	IC
X467RE		0.0104	0.00144	1.55	0.0165	0.0011	0.93	OE
XAR7YE		0.00733	-0.00163	-1.75	0.0125	-0.0028	-2.35	OE
XGBLDA		0.00927	0.00031	0.33	0.0156	0.0002	0.21	WD
XJ2EW8		0.0104	0.00144	1.55	0.0183	0.0029	2.43	GD
XMZV7F		0.00800	-0.00096	-1.03	0.0153	0.0000	-0.02	OE
XQG8YQ		0.00900	0.00004	0.04	0.0160	0.0006	0.54	OE
XXL22Y		0.00930	0.00034	0.37	0.0153	0.0000	-0.03	OE
Y8GH2Z		0.00900	0.00004	0.04	0.0147	-0.0007	-0.57	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1602

Carbon & Low Alloy Steel, PHOSPHORUS (P)  
PHOSPHORUS (P)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YEZJ7X		0.00920	0.00024	0.26	0.0155	0.0001	0.12	OE
YKN2NF		0.00883	-0.00013	-0.14	0.0163	0.0009	0.76	OE
YQA4KK		0.0100	0.00104	1.12	0.0150	-0.0004	-0.29	OE
YY9JGK		0.00868	-0.00028	-0.30	0.0154	0.0001	0.05	OE
ZFQDN7		0.0107	0.00171	1.83	0.0177	0.0024	1.99	OE
ZKLCR3		0.0100	0.00104	1.12	0.0167	0.0014	1.15	OE

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.00896	Percent	0.0154	Percent
<b>Stnd Dev Btwn Labs</b>	0.00093	Percent	0.0012	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 132 of 147 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1602

- 2DF2XF (X) - Data for both samples are high. Inconsistent within the determinations of both samples.
- 3YWJXY (X) - Data for both samples are high.
- 4ZZ4C7 (X) - Data for sample L77 are high.
- 7NKGBP (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L78.
- BQ8ATF (X) - Data for both samples are low.
- EXZN8C (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L78.
- F4GU6V (X) - Data for sample L77 are high.
- G4Y3Q4 (X) - Data for both samples are low.
- GEFMDL (X) - Data for sample L78 are high.
- H2CZZ4 (X) - Data for sample L77 are low. Inconsistent within the determinations of sample L77.
- LGD7HN (X) - Data for both samples are high. Inconsistent within the determinations of sample L77.
- PNYUNW (X) - Data for both samples are high. Inconsistent within the determinations of sample L77.

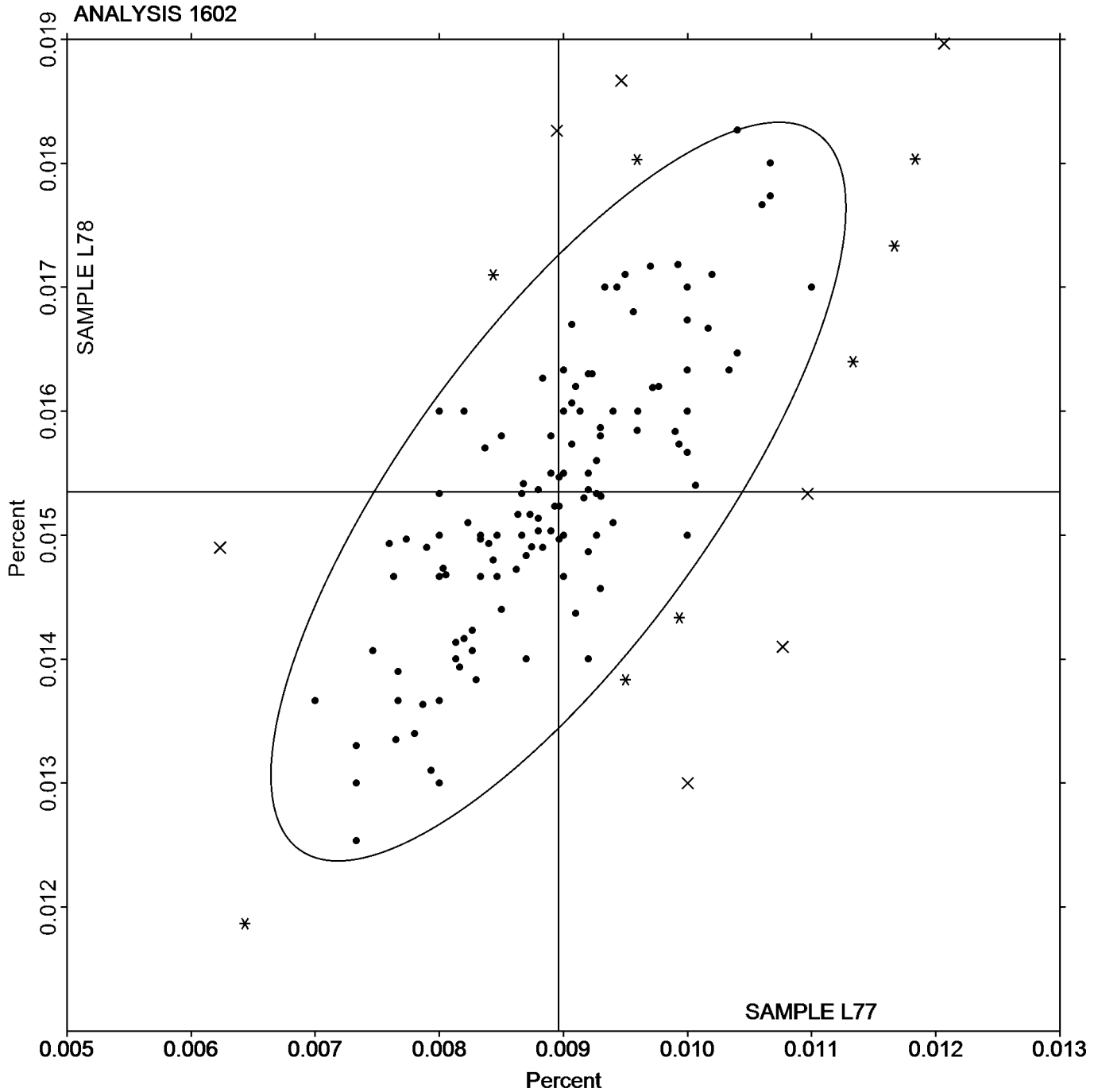


Analysis 1602

Carbon & Low Alloy Steel, PHOSPHORUS (P)  
PHOSPHORUS (P)

SAMPLE L77  
0.00896 Percent

SAMPLE L78  
0.0154 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1603

Carbon & Low Alloy Steel, SULFUR (S)  
SULFUR (S)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF	*	0.00860	-0.00140	-1.13	0.0111	0.0003	0.24	OE
2P9ZU8	X	0.0133	0.00334	2.69	0.0170	0.0062	5.00	WD
2QJX4H		0.00990	-0.00010	-0.08	0.0103	-0.0006	-0.47	OE
2QLG4E		0.00953	-0.00046	-0.37	0.0112	0.0004	0.29	OE
2QYBGT		0.00983	-0.00016	-0.13	0.0105	-0.0003	-0.28	OE
2WP4N8		0.00900	-0.00100	-0.80	0.0101	-0.0007	-0.60	OE
387K6Z		0.00960	-0.00040	-0.32	0.0104	-0.0005	-0.40	OE
3J4ZBA		0.0116	0.00157	1.26	0.0127	0.0019	1.54	OE
3PMVMR		0.00870	-0.00130	-1.05	0.00977	-0.0011	-0.87	OE
3T3QKV		0.00920	-0.00080	-0.64	0.0102	-0.0006	-0.50	CI
3YWJXY		0.00987	-0.00013	-0.11	0.0108	0.0000	-0.01	OE
43TM9H		0.00987	-0.00013	-0.11	0.0108	0.0000	-0.01	OE
4VQFP9		0.00963	-0.00036	-0.29	0.0101	-0.0007	-0.60	OE
4WMYG3		0.0113	0.00134	1.08	0.0117	0.0008	0.67	XX
4Z8W6T		0.0120	0.00200	1.61	0.0120	0.0012	0.94	OE
4ZZ4C7	X	0.0139	0.00394	3.17	0.0150	0.0042	3.40	OE
62WEN6		0.00993	-0.00006	-0.05	0.0111	0.0002	0.18	OE
6AK4UM		0.0105	0.00047	0.38	0.0108	-0.0001	-0.06	OE
6LWBWE		0.00933	-0.00066	-0.54	0.0110	0.0002	0.13	OE
6N7RAX		0.0111	0.00114	0.92	0.0110	0.0002	0.13	DR
6XTXZA		0.00880	-0.00120	-0.97	0.00980	-0.0010	-0.85	CI
7G8MYT		0.0117	0.00167	1.35	0.0114	0.0006	0.48	OE
7NKGBP		0.0123	0.00234	1.88	0.0133	0.0025	2.02	OE
8AGJE4		0.00873	-0.00126	-1.02	0.00943	-0.0014	-1.14	OE
8BWUKN	*	0.0120	0.00200	1.61	0.0100	-0.0008	-0.68	OE
8JGQ2A		0.00943	-0.00056	-0.46	0.0109	0.0001	0.07	IR
8MLVU3		0.0106	0.00057	0.46	0.0113	0.0005	0.40	CI
8PAAJD		0.00907	-0.00093	-0.75	0.00940	-0.0014	-1.17	XX
8RVR6P		0.00960	-0.00040	-0.32	0.0109	0.0001	0.05	XX
8XN3P3		0.0110	0.00100	0.81	0.0130	0.0022	1.75	XX
9NTJNY		0.00933	-0.00066	-0.54	0.00953	-0.0013	-1.06	CO
9Q3KU7	X	0.0135	0.00354	2.85	0.0152	0.0044	3.57	OE
9W4WP3		0.0102	0.00020	0.16	0.0110	0.0002	0.13	CI
9Z8R97		0.00890	-0.00110	-0.89	0.00990	-0.0009	-0.77	OE
9ZNR82		0.0111	0.00110	0.89	0.0115	0.0007	0.57	OE
ADBP2R		0.0103	0.00034	0.27	0.0113	0.0005	0.40	GD
AGMATQ		0.00983	-0.00016	-0.13	0.0109	0.0001	0.07	OE
AJWQWB		0.00963	-0.00036	-0.29	0.0102	-0.0006	-0.52	CI
AZNFG8		0.0111	0.00111	0.89	0.0123	0.0015	1.19	OE
B422ZJ		0.0101	0.00007	0.06	0.0104	-0.0005	-0.39	OE
B8E3GN		0.00873	-0.00126	-1.02	0.00897	-0.0019	-1.52	OE
BBG2VM		0.0119	0.00194	1.56	0.0119	0.0010	0.83	OE
BFTU6Z		0.00843	-0.00156	-1.26	0.00910	-0.0017	-1.42	OE
BQ8ATF	X	0.00900	-0.00100	-0.80	0.00767	-0.0032	-2.58	OE
C973WT		0.0106	0.00064	0.51	0.0112	0.0004	0.29	OE
CBEECN		0.0103	0.00034	0.27	0.0119	0.0010	0.83	XX
CC6NWN		0.0103	0.00030	0.24	0.0116	0.0007	0.59	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1603

Carbon & Low Alloy Steel, SULFUR (S)  
SULFUR (S)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73		0.00900	-0.00100	-0.80	0.00900	-0.0018	-1.50	GD
CM98PZ		0.00930	-0.00070	-0.56	0.0100	-0.0008	-0.66	CI
CPA6MQ		0.00877	-0.00123	-0.99	0.00954	-0.0013	-1.06	XX
CX9XB8		0.00887	-0.00113	-0.91	0.0104	-0.0004	-0.36	CI
D7Z84U		0.0121	0.00210	1.69	0.0123	0.0015	1.21	OE
EL8LXX		0.0120	0.00200	1.61	0.0127	0.0018	1.48	XX
EUGM9J		0.00987	-0.00013	-0.11	0.0111	0.0003	0.21	OE
EVULCL		0.00970	-0.00030	-0.24	0.00953	-0.0013	-1.06	OE
EXZN8C		0.00947	-0.00053	-0.43	0.00893	-0.0019	-1.55	GD
F4GU6V		0.0123	0.00234	1.88	0.0130	0.0022	1.75	OE
FLHLZ6	*	0.00820	-0.00180	-1.45	0.0106	-0.0002	-0.20	OE
FZ3FUN		0.0110	0.00100	0.81	0.0110	0.0002	0.13	GD
G4Y3Q4		0.0100	0.00000	0.00	0.0104	-0.0004	-0.33	OE
GBCYMX		0.00997	-0.00003	-0.03	0.0103	-0.0006	-0.47	OE
GEFMDL		0.0111	0.00107	0.86	0.0127	0.0019	1.51	OE
GTYD8H		0.0105	0.00047	0.38	0.0113	0.0005	0.40	OE
H2CZZ4		0.00989	-0.00011	-0.09	0.0107	-0.0001	-0.12	CI
H6QN9E		0.00897	-0.00103	-0.83	0.0106	-0.0002	-0.17	OE
H9NVHX		0.00767	-0.00233	-1.88	0.00867	-0.0022	-1.77	OE
HV243G		0.0116	0.00160	1.29	0.0120	0.0012	0.94	OE
JAXRFT		0.0102	0.00017	0.14	0.0108	0.0000	-0.03	GD
JKHDTW		0.0102	0.00020	0.16	0.0108	0.0000	-0.01	OE
JMQ8QM		0.00810	-0.00190	-1.53	0.00887	-0.0020	-1.60	CO
K7BL9G		0.0104	0.00037	0.30	0.0112	0.0004	0.29	WD
K7RADC		0.0104	0.00040	0.32	0.0110	0.0002	0.15	XX
K8JW2E		0.0102	0.00017	0.14	0.0118	0.0009	0.75	OE
KGR7TD		0.0102	0.00024	0.19	0.00997	-0.0009	-0.71	CI
L2XLMW		0.00913	-0.00086	-0.70	0.0100	-0.0008	-0.68	OE
L3AVJG		0.0101	0.00014	0.11	0.0106	-0.0002	-0.20	OE
LDQNZ4		0.0113	0.00134	1.08	0.0117	0.0008	0.67	OE
LEKCHY		0.00913	-0.00086	-0.70	0.00970	-0.0011	-0.93	XX
LFGNA9		0.0111	0.00112	0.90	0.0119	0.0010	0.84	OE
LG7H2P		0.00870	-0.00130	-1.05	0.0105	-0.0003	-0.28	OE
LGD7HN		0.0106	0.00064	0.51	0.0112	0.0004	0.29	OE
LLZ3XY		0.0117	0.00170	1.37	0.0129	0.0020	1.64	DR
MFCBWJ		0.0127	0.00267	2.15	0.0133	0.0025	2.02	XX
MFCPKH	X	0.00610	-0.00390	-3.14	0.00690	-0.0039	-3.20	OE
MN3YME		0.00866	-0.00134	-1.08	0.00972	-0.0011	-0.91	CO
NEDXVN		0.00657	-0.00343	-2.77	0.00757	-0.0033	-2.66	OE
NEFZWA		0.0106	0.00060	0.49	0.0103	-0.0005	-0.41	OE
NEUPVF		0.00977	-0.00023	-0.19	0.0105	-0.0004	-0.31	CI
NLV99P		0.00966	-0.00033	-0.27	0.0104	-0.0005	-0.37	OE
P7CHQW		0.00941	-0.00058	-0.47	0.0105	-0.0003	-0.28	GD
PDC2TR		0.0116	0.00164	1.32	0.0115	0.0007	0.53	XX
PNWUCF	X	0.00990	-0.00010	-0.08	0.0126	0.0017	1.40	XX
PNYUNW	X	0.0185	0.00854	6.88	0.0199	0.0091	7.35	AE
Q7T4QQ		0.00967	-0.00033	-0.27	0.0100	-0.0008	-0.68	CI





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1603

Carbon & Low Alloy Steel, SULFUR (S)  
SULFUR (S)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QACMZZ		0.00843	-0.00156	-1.26	0.00980	-0.0010	-0.85	CO
QB6FWJ		0.0104	0.00037	0.30	0.0121	0.0013	1.05	CO
QDXBHT		0.0100	0.00004	0.03	0.0108	0.0000	-0.01	OE
QEP2DT		0.00937	-0.00063	-0.51	0.0103	-0.0005	-0.44	CI
QKV22H		0.00853	-0.00146	-1.18	0.00967	-0.0012	-0.96	OE
QP6CZ4		0.0122	0.00218	1.76	0.0126	0.0017	1.42	XX
QT9ZRM		0.00963	-0.00036	-0.29	0.00993	-0.0009	-0.74	OE
QVX9XG		0.00960	-0.00040	-0.32	0.00987	-0.0010	-0.79	CO
RENWPN		0.0110	0.00100	0.81	0.0120	0.0012	0.94	OE
RQ9X24		0.0100	0.00000	0.00	0.0103	-0.0005	-0.41	CI
T2MCJW		0.0106	0.00057	0.46	0.0114	0.0005	0.43	XX
T6PTUQ		0.0100	0.00000	0.00	0.0113	0.0005	0.40	CO
TCBHYU		0.00967	-0.00033	-0.27	0.0107	-0.0002	-0.14	GD
TCELEL		0.0113	0.00134	1.08	0.0117	0.0008	0.67	OE
TEJ78R		0.00950	-0.00050	-0.40	0.0103	-0.0006	-0.47	CI
TPY2HK		0.0120	0.00204	1.64	0.0140	0.0032	2.59	OE
TR4NXB		0.0106	0.00057	0.46	0.0121	0.0012	0.99	OE
TRKD7A		0.00890	-0.00110	-0.89	0.0101	-0.0007	-0.60	CI
TXM2NW		0.00883	-0.00116	-0.94	0.0112	0.0004	0.29	OE
UAKZWY		0.00767	-0.00233	-1.88	0.00920	-0.0016	-1.33	OE
UD8D2W		0.0106	0.00064	0.51	0.0115	0.0007	0.56	OE
UDHXCD		0.00823	-0.00176	-1.42	0.00903	-0.0018	-1.47	IC
UJ9VVF		0.00670	-0.00330	-2.66	0.00750	-0.0033	-2.71	OE
UTVPAW		0.00850	-0.00150	-1.21	0.00870	-0.0021	-1.74	OE
UWER9P		0.00973	-0.00026	-0.21	0.0114	0.0005	0.43	OE
V6HVM8		0.0105	0.00054	0.43	0.0119	0.0011	0.86	OE
VA4W7E		0.00907	-0.00093	-0.75	0.0101	-0.0008	-0.63	XX
VC67U2		0.0100	0.00004	0.03	0.0110	0.0001	0.10	OE
VDYTQY		0.0100	0.00004	0.03	0.0109	0.0001	0.05	OE
VF66H9		0.00763	-0.00236	-1.91	0.00847	-0.0024	-1.93	CI
VJ493M		0.00923	-0.00076	-0.62	0.0103	-0.0005	-0.41	CI
VMK26U		0.00800	-0.00200	-1.61	0.00933	-0.0015	-1.23	OE
VYZQ87		0.00930	-0.00070	-0.56	0.00990	-0.0009	-0.77	OE
W6JEH2		0.00967	-0.00033	-0.27	0.0100	-0.0008	-0.66	AE
W8LZPT		0.00943	-0.00056	-0.46	0.0106	-0.0002	-0.20	CO
WB8P2J		0.0103	0.00034	0.27	0.0113	0.0005	0.40	OE
WH9BJZ		0.0123	0.00234	1.88	0.0130	0.0022	1.75	XX
WJFGU		0.00997	-0.00003	-0.03	0.0108	-0.0001	-0.06	CI
X467RE		0.00963	-0.00036	-0.29	0.0114	0.0006	0.45	CO
XAR7YE		0.00900	-0.00100	-0.80	0.0100	-0.0008	-0.68	OE
XGBLDA		0.0100	0.00004	0.03	0.0110	0.0002	0.15	CI
XJ2EW8		0.0107	0.00070	0.57	0.0115	0.0007	0.53	GD
XMZV7F		0.0106	0.00060	0.49	0.0103	-0.0006	-0.47	OE
XQG8YQ		0.0103	0.00034	0.27	0.0117	0.0008	0.67	OE
XXL22Y		0.0106	0.00056	0.45	0.0111	0.0003	0.24	OE
Y8GH2Z		0.0109	0.00090	0.73	0.0115	0.0007	0.53	OE
YEZJ7X	*	0.0137	0.00374	3.01	0.0145	0.0037	3.00	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1603

Carbon & Low Alloy Steel, SULFUR (S)  
SULFUR (S)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YKN2NF		0.0133	0.00334	2.69	0.0135	0.0027	2.16	OE
YQA4KK		0.0120	0.00200	1.61	0.0140	0.0032	2.56	OE
YY9JGK		0.00909	-0.00091	-0.74	0.00998	-0.0009	-0.70	CI
ZFQDN7		0.0114	0.00137	1.10	0.0122	0.0014	1.13	OE
ZKLCR3		0.00893	-0.00106	-0.86	0.0101	-0.0007	-0.58	CI

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.01000	Percent	0.0108	Percent
<b>Std Dev Btwn Labs</b>	0.00124	Percent	0.0012	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 138 of 146 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	CI	Combustion / IR
CO	Combustion	DR	Spectrometry - Direct Reading OE (DROES)
GD	Spectrometry - Glow Discharge (GDS)	IC	Spectrometry - Inductively Coupled Plasma (ICP)
IR	IR (Absorption / Detection)	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 #1603

- 2P9ZU8 (X) - Data for sample L78 are high. Inconsistent within the determinations of sample L78.
- 4ZZ4C7 (X) - Data for both samples are high. Possible Systematic Error.
- 9Q3KU7 (X) - Data for both samples are high. Possible Systematic Error.
- BQ8ATF (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.
- MFCPKH (X) - Data for both samples are low. Possible Systematic Error.
- PNWUCF (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.
- PNYUNW (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L78.

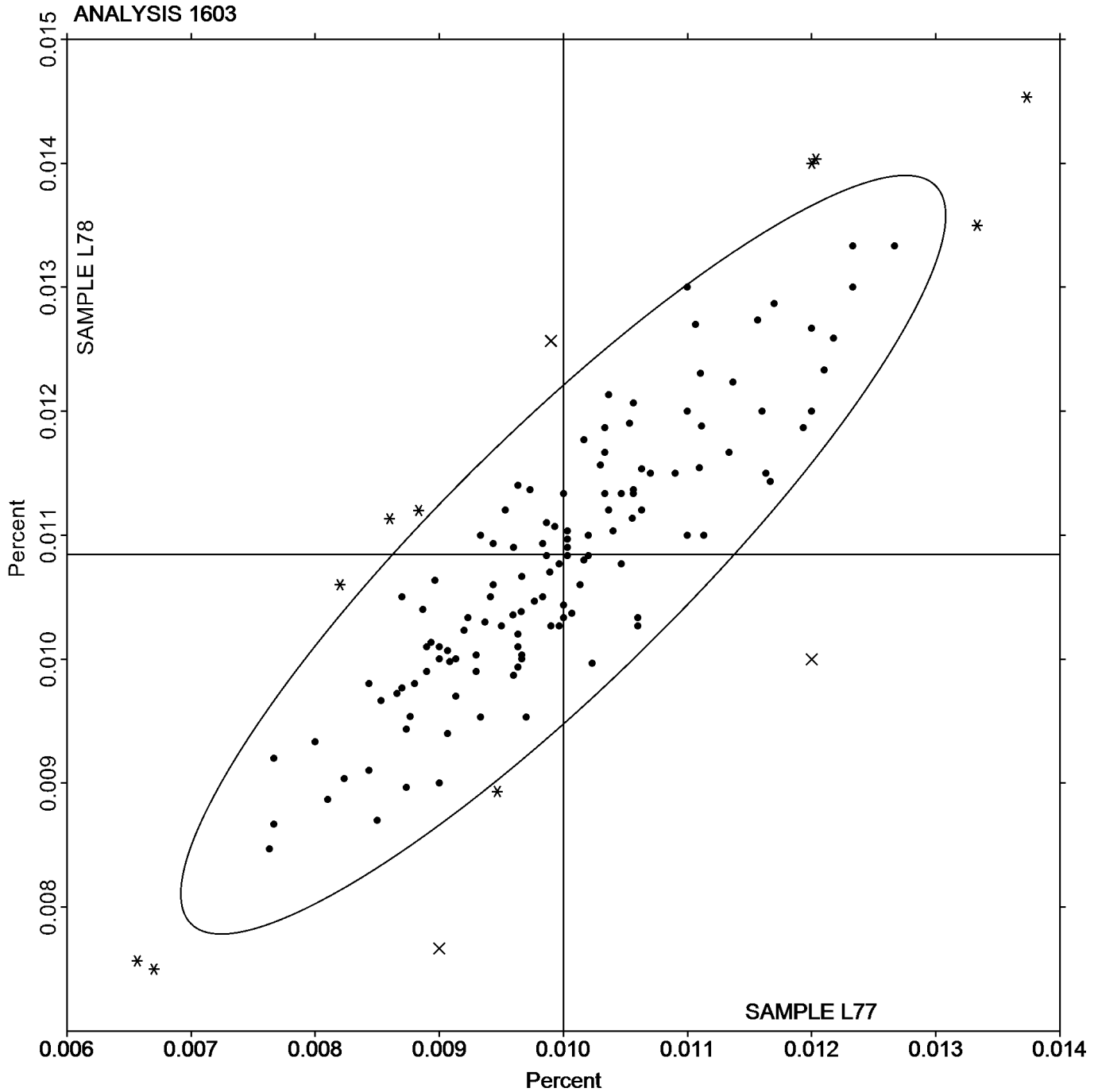


Analysis 1603

Carbon & Low Alloy Steel, SULFUR (S)  
SULFUR (S)

SAMPLE L77  
0.01000 Percent

SAMPLE L78  
0.0108 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1604

Carbon & Low Alloy Steel, SILICON (Si)  
SILICON (Si)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.2733	0.0117	1.95	0.2730	0.0139	2.30	OE
2P9ZU8	X	0.1600	-0.1016	-16.90	0.2463	-0.0127	-2.11	WD
2QJX4H		0.2687	0.0071	1.17	0.2620	0.0029	0.48	OE
2QLG4E		0.2603	-0.0013	-0.21	0.2597	0.0006	0.10	OE
2QYBGT		0.2593	-0.0023	-0.38	0.2577	-0.0014	-0.23	OE
2WP4N8		0.2653	0.0037	0.62	0.2573	-0.0017	-0.29	IC
387K6Z		0.2483	-0.0133	-2.21	0.2452	-0.0139	-2.30	OE
3J4ZBA		0.2687	0.0071	1.17	0.2653	0.0063	1.04	OE
3PMVMR		0.2647	0.0031	0.51	0.2617	0.0026	0.43	OE
3T3QKV		0.2487	-0.0129	-2.15	0.2483	-0.0107	-1.78	AE
3YWJXY		0.2576	-0.0040	-0.66	0.2574	-0.0016	-0.27	OE
43TM9H		0.2585	-0.0031	-0.52	0.2566	-0.0024	-0.40	OE
4VQFP9		0.2559	-0.0057	-0.94	0.2549	-0.0042	-0.70	OE
4WMYG3		0.2600	-0.0016	-0.27	0.2600	0.0009	0.15	XX
4Z8W6T		0.2570	-0.0046	-0.77	0.2577	-0.0014	-0.23	OE
4ZZ4C7	X	0.2877	0.0261	4.33	0.2813	0.0223	3.68	OE
62WEN6		0.2720	0.0104	1.73	0.2677	0.0086	1.42	OE
6AK4UM		0.2603	-0.0013	-0.21	0.2563	-0.0027	-0.45	OE
6LWBWE		0.2573	-0.0043	-0.71	0.2560	-0.0031	-0.51	OE
6N7RAX		0.2610	-0.0006	-0.10	0.2553	-0.0037	-0.62	DR
6XTXZA		0.2704	0.0088	1.46	0.2703	0.0112	1.86	GR
7G8MYT		0.2540	-0.0076	-1.26	0.2463	-0.0127	-2.11	OE
7NKGBP		0.2603	-0.0013	-0.21	0.2563	-0.0027	-0.45	OE
8AGJE4		0.2684	0.0068	1.12	0.2627	0.0037	0.61	OE
8BWUKN		0.2700	0.0084	1.40	0.2700	0.0109	1.81	OE
8JGQ2A		0.2600	-0.0016	-0.27	0.2603	0.0013	0.21	AE
8MLVU3		0.2590	-0.0026	-0.43	0.2563	-0.0027	-0.45	IC
8PAAJD		0.2630	0.0014	0.23	0.2643	0.0053	0.87	XX
8RVR6P	X	0.2210	-0.0406	-6.75	0.2123	-0.0467	-7.73	XX
8XN3P3		0.2617	0.0001	0.01	0.2623	0.0033	0.54	XX
9NTJNY		0.2577	-0.0039	-0.65	0.2560	-0.0031	-0.51	OE
9Q3KU7		0.2773	0.0157	2.62	0.2747	0.0156	2.58	OE
9W4WP3		0.2588	-0.0028	-0.47	0.2525	-0.0066	-1.09	IC
9Z8R97		0.2627	0.0011	0.18	0.2587	-0.0004	-0.07	OE
9ZNR82		0.2691	0.0075	1.24	0.2649	0.0059	0.97	OE
ADBP2R	*	0.2587	-0.0029	-0.49	0.2473	-0.0117	-1.94	GD
AGMATQ		0.2590	-0.0026	-0.43	0.2597	0.0006	0.10	OE
AJWQWB		0.2570	-0.0046	-0.77	0.2553	-0.0037	-0.62	OE
AZNFG8		0.2681	0.0065	1.08	0.2634	0.0043	0.71	OE
B422ZJ		0.2580	-0.0036	-0.60	0.2527	-0.0064	-1.06	OE
B8E3GN	X	0.2612	-0.0004	-0.06	0.2488	-0.0103	-1.71	OE
BBG2VM		0.2627	0.0011	0.18	0.2593	0.0003	0.04	OE
BFTU6Z		0.2603	-0.0013	-0.21	0.2573	-0.0017	-0.29	OE
BQ8ATF	X	0.2550	-0.0066	-1.10	0.2200	-0.0391	-6.46	OE
C973WT		0.2630	0.0014	0.23	0.2577	-0.0014	-0.23	OE
CBEECN		0.2581	-0.0035	-0.58	0.2555	-0.0035	-0.59	XX
CC6NWN		0.2537	-0.0079	-1.32	0.2543	-0.0047	-0.78	OE



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1604

Carbon & Low Alloy Steel, SILICON (Si)  
SILICON (Si)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73		0.2700	0.0084	1.40	0.2700	0.0109	1.81	GD
CM98PZ		0.2723	0.0107	1.78	0.2680	0.0089	1.48	IC
CPA6MQ		0.2647	0.0031	0.51	0.2610	0.0019	0.32	XX
CX9XB8		0.2600	-0.0016	-0.27	0.2600	0.0009	0.15	WD
D7Z84U		0.2663	0.0047	0.79	0.2610	0.0019	0.32	OE
EL8LXX		0.2570	-0.0046	-0.77	0.2533	-0.0057	-0.95	XX
EUGM9J		0.2597	-0.0019	-0.32	0.2570	-0.0021	-0.34	OE
EVULCL		0.2553	-0.0063	-1.04	0.2517	-0.0074	-1.23	OE
EXZN8C	X	0.2797	0.0181	3.00	0.2710	0.0119	1.97	GD
F4GU6V	X	0.2420	-0.0196	-3.26	0.2457	-0.0134	-2.22	OE
FLHLZ6		0.2641	0.0024	0.41	0.2656	0.0065	1.08	OE
FZ3FUN		0.2630	0.0014	0.23	0.2620	0.0029	0.48	GD
G4Y3Q4		0.2600	-0.0016	-0.27	0.2573	-0.0017	-0.29	OE
GBCYMX		0.2653	0.0037	0.62	0.2613	0.0023	0.37	OE
GEFMDL		0.2533	-0.0083	-1.38	0.2513	-0.0077	-1.28	OE
GTYD8H		0.2648	0.0032	0.53	0.2622	0.0032	0.52	OE
H2CZZ4		0.2582	-0.0034	-0.57	0.2534	-0.0057	-0.94	OE
H6QN9E		0.2573	-0.0043	-0.72	0.2588	-0.0002	-0.04	OE
H9NVHX		0.2500	-0.0116	-1.93	0.2497	-0.0094	-1.56	OE
HV243G		0.2493	-0.0123	-2.04	0.2470	-0.0121	-2.00	OE
JAXRFT		0.2587	-0.0029	-0.49	0.2553	-0.0037	-0.62	GD
JKHDTW		0.2613	-0.0003	-0.05	0.2599	0.0008	0.13	OE
JMQ8QM		0.2757	0.0141	2.34	0.2749	0.0158	2.61	IC
K7BL9G	*	0.2595	-0.0021	-0.36	0.2495	-0.0096	-1.58	WD
K7RADC		0.2670	0.0054	0.90	0.2606	0.0015	0.25	GD
K8JW2E		0.2597	-0.0019	-0.32	0.2607	0.0016	0.26	OE
KGR7TD		0.2613	-0.0003	-0.05	0.2587	-0.0004	-0.07	IC
L2XLMW		0.2603	-0.0013	-0.21	0.2567	-0.0024	-0.40	IC
L3AVJG		0.2648	0.0032	0.54	0.2657	0.0066	1.09	OE
LDQNZ4		0.2573	-0.0043	-0.71	0.2557	-0.0034	-0.56	OE
LEKCHY		0.2780	0.0164	2.73	0.2740	0.0149	2.47	XX
LFGNA9		0.2678	0.0062	1.03	0.2661	0.0070	1.15	OE
LG7H2P		0.2627	0.0011	0.18	0.2607	0.0016	0.26	OE
LGD7HN		0.2690	0.0074	1.23	0.2703	0.0113	1.86	OE
LLZ3XY	X	0.2427	-0.0189	-3.14	0.2443	-0.0148	-2.44	DR
MFCBWJ		0.2573	-0.0043	-0.71	0.2547	-0.0044	-0.73	XX
MFCPKH		0.2540	-0.0076	-1.26	0.2530	-0.0061	-1.00	OE
MN3YME		0.2630	0.0014	0.23	0.2600	0.0009	0.15	OE
NEDXVN		0.2590	-0.0026	-0.43	0.2550	-0.0041	-0.67	OE
NEUPVF		0.2613	-0.0003	-0.05	0.2590	-0.0001	-0.01	IC
NLV99P		0.2579	-0.0037	-0.61	0.2585	-0.0005	-0.09	OE
P7CHQW		0.2660	0.0044	0.73	0.2570	-0.0021	-0.34	GD
PDC2TR		0.2667	0.0051	0.85	0.2620	0.0030	0.49	XX
PNWUCF	X	0.2817	0.0201	3.34	0.2760	0.0169	2.80	OE
PNYUNW		0.2643	0.0027	0.45	0.2593	0.0003	0.04	AE
Q7T4QQ		0.2610	-0.0006	-0.10	0.2583	-0.0007	-0.12	IC
QACMZZ		0.2710	0.0094	1.56	0.2670	0.0079	1.31	OE



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1604

Carbon & Low Alloy Steel, SILICON (Si)  
SILICON (Si)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QB6FWJ		0.2543	-0.0073	-1.21	0.2520	-0.0071	-1.17	OE
QDXBHT		0.2581	-0.0035	-0.58	0.2570	-0.0021	-0.35	OE
QEP2DT		0.2590	-0.0026	-0.43	0.2560	-0.0031	-0.51	IC
QKV22H		0.2623	0.0007	0.12	0.2590	-0.0001	-0.01	OE
QP6CZ4		0.2646	0.0030	0.49	0.2626	0.0035	0.58	XX
QT9ZRM		0.2607	-0.0009	-0.16	0.2540	-0.0051	-0.84	OE
QVX9XG		0.2503	-0.0113	-1.87	0.2500	-0.0091	-1.50	OE
RENWPN		0.2590	-0.0026	-0.43	0.2590	-0.0001	-0.01	OE
RQ9X24		0.2600	-0.0016	-0.27	0.2600	0.0009	0.15	OE
T2MCJW		0.2618	0.0002	0.03	0.2568	-0.0023	-0.38	XX
T6PTUQ		0.2530	-0.0086	-1.43	0.2517	-0.0074	-1.23	XX
TCBHYU		0.2710	0.0094	1.56	0.2727	0.0136	2.25	GD
TCELEL		0.2583	-0.0033	-0.54	0.2550	-0.0041	-0.67	OE
TEJ78R		0.2607	-0.0009	-0.16	0.2543	-0.0047	-0.78	CL
TPY2HK		0.2613	-0.0003	-0.05	0.2597	0.0006	0.10	OE
TR4NXB		0.2600	-0.0016	-0.27	0.2577	-0.0014	-0.23	OE
TRKD7A		0.2630	0.0014	0.23	0.2600	0.0009	0.15	IC
TXM2NW		0.2543	-0.0073	-1.21	0.2570	-0.0020	-0.34	OE
UAKZWY		0.2617	0.0001	0.01	0.2597	0.0006	0.10	OE
UD8D2W		0.2653	0.0037	0.62	0.2620	0.0029	0.48	OE
UDHXCD		0.2597	-0.0019	-0.32	0.2583	-0.0007	-0.12	IC
UJ9VVF		0.2634	0.0018	0.30	0.2616	0.0025	0.42	OE
UTVPAW		0.2700	0.0084	1.40	0.2653	0.0063	1.04	OE
UWER9P		0.2593	-0.0023	-0.38	0.2600	0.0009	0.15	OE
V6HVM8		0.2564	-0.0052	-0.87	0.2521	-0.0070	-1.16	OE
VA4W7E	*	0.2780	0.0164	2.73	0.2747	0.0156	2.58	XX
VC67U2		0.2640	0.0024	0.40	0.2610	0.0019	0.32	OE
VDYTQY		0.2573	-0.0043	-0.71	0.2563	-0.0027	-0.45	OE
VF66H9	X	0.2093	-0.0523	-8.69	0.2380	-0.0211	-3.49	XX
VJ493M		0.2610	-0.0006	-0.10	0.2560	-0.0031	-0.51	OE
VJ6LLU		0.2723	0.0107	1.78	0.2677	0.0086	1.42	OE
VMK26U		0.2507	-0.0109	-1.82	0.2487	-0.0104	-1.72	OE
VYZQ87		0.2669	0.0053	0.87	0.2620	0.0029	0.48	OE
W6JEH2		0.2656	0.0040	0.66	0.2601	0.0011	0.17	AE
W8LZPT		0.2598	-0.0018	-0.31	0.2540	-0.0051	-0.85	IC
WB8P2J		0.2617	0.0001	0.01	0.2587	-0.0004	-0.07	OE
WH9BJZ		0.2637	0.0021	0.34	0.2590	-0.0001	-0.01	XX
WJFGEU		0.2630	0.0014	0.23	0.2577	-0.0014	-0.23	IC
X467RE		0.2557	-0.0059	-0.99	0.2560	-0.0031	-0.51	OE
XAR7YE	X	0.2560	-0.0056	-0.93	0.2791	0.0200	3.31	OE
XGBLDA		0.2627	0.0011	0.18	0.2597	0.0006	0.10	WD
XJ2EW8		0.2697	0.0081	1.34	0.2703	0.0113	1.86	GD
XMZV7F		0.2563	-0.0053	-0.88	0.2563	-0.0027	-0.45	OE
XQG8YQ		0.2527	-0.0089	-1.49	0.2467	-0.0124	-2.05	OE
XXL22Y		0.2618	0.0002	0.04	0.2613	0.0022	0.36	OE
Y8GH2Z		0.2610	-0.0006	-0.10	0.2560	-0.0031	-0.51	OE
YKN2NF		0.2482	-0.0134	-2.22	0.2464	-0.0126	-2.09	OE



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1604

Carbon & Low Alloy Steel, SILICON (Si)  
SILICON (Si)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YQA4KK	X	0.2610	-0.0006	-0.10	0.2900	0.0309	5.12	OE
YY9JGK		0.2601	-0.0015	-0.25	0.2573	-0.0018	-0.30	OE
ZFQDN7		0.2633	0.0017	0.29	0.2600	0.0009	0.15	OE
ZKLCR3		0.2623	0.0007	0.12	0.2630	0.0039	0.65	OE

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.2616	Percent	0.2591	Percent
<b>Stnd Dev Btwn Labs</b>	0.0060	Percent	0.0060	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 131 of 145 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	CL	Colorimetry
DR	Spectrometry - Direct Reading OE (DROES)	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 #1604

2P9ZU8 (X) - Data for sample L77 are low. Inconsistent within the determinations of sample L78.

4ZZ4C7 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L77.

8RVR6P (X) - Data for both samples are low. Possible Systematic Error.

B8E3GN (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

BQ8ATF (X) - Data for sample L78 are low.

EXZN8C (X) - Data for sample L77 are high.

F4GU6V (X) - Data for sample L77 are low. Inconsistent within the determinations of both samples.

LLZ3XY (X) - Data for sample L77 are low.

PNWUCF (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L78.

VF66H9 (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample L78.

XAR7YE (X) - Data for sample L78 are high.

YQA4KK (X) - Data for sample L78 are high.

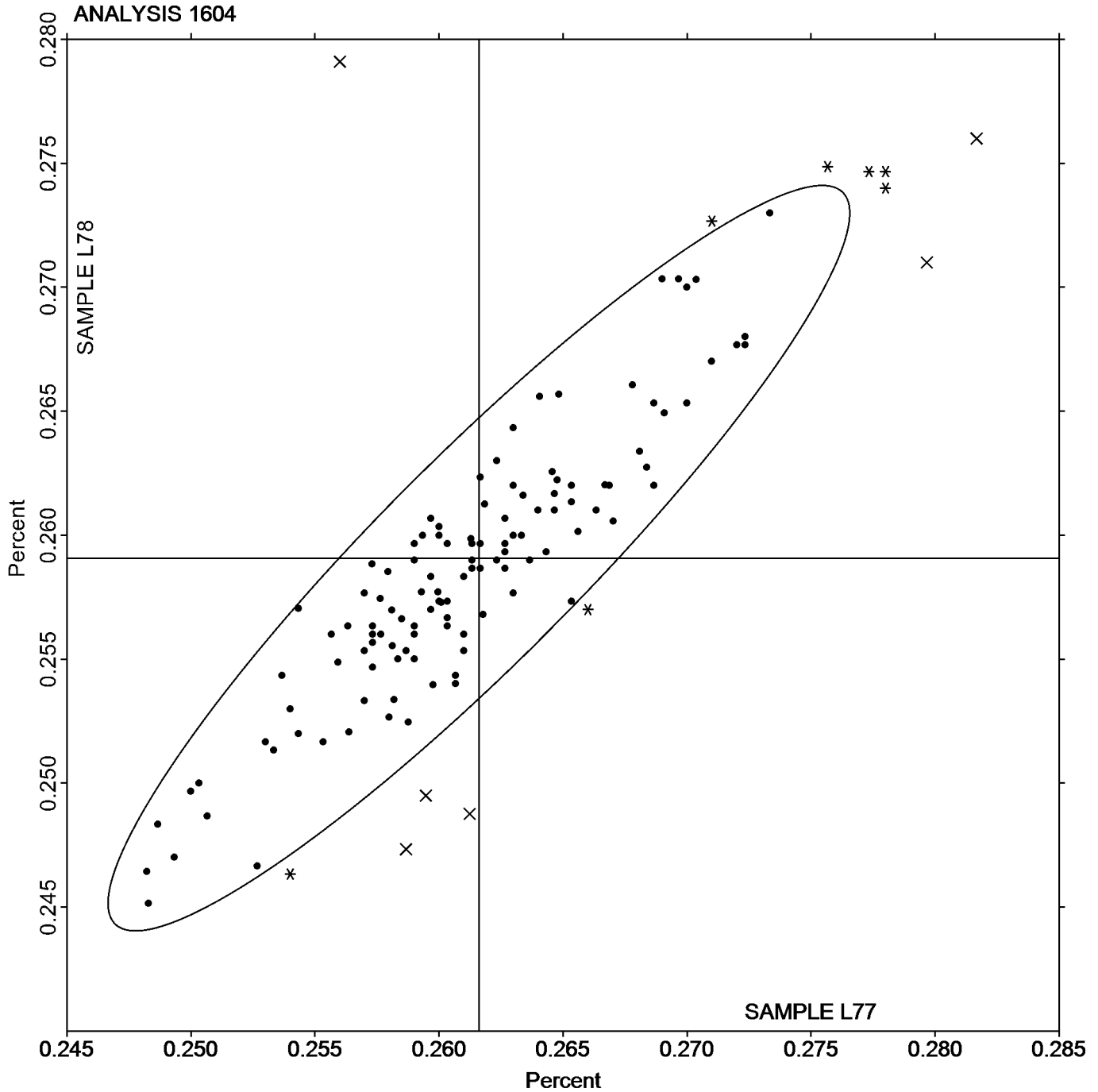


Analysis 1604

Carbon & Low Alloy Steel, SILICON (Si)  
SILICON (Si)

SAMPLE L77  
0.2616 Percent

SAMPLE L78  
0.2591 Percent







# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1605

Carbon & Low Alloy Steel, MOLYBDENUM (Mo)  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.2043	-0.0055	-1.23	0.1967	-0.0026	-0.58	OE
2P9ZU8		0.2190	0.0092	2.05	0.2053	0.0060	1.34	WD
2QJX4H		0.2137	0.0038	0.86	0.2023	0.0030	0.68	OE
2QLG4E		0.2113	0.0015	0.34	0.2010	0.0017	0.38	OE
2QYBGT	*	0.2006	-0.0092	-2.06	0.1971	-0.0022	-0.48	OE
2WP4N8		0.2110	0.0012	0.26	0.2020	0.0027	0.60	IC
387K6Z		0.2069	-0.0029	-0.66	0.1957	-0.0036	-0.80	OE
3J4ZBA		0.2154	0.0056	1.25	0.2040	0.0047	1.04	OE
3PMVMR		0.2117	0.0018	0.41	0.2037	0.0044	0.97	OE
3T3QKV		0.2082	-0.0017	-0.37	0.1989	-0.0004	-0.08	AE
3YWJXY		0.2155	0.0057	1.28	0.2065	0.0072	1.60	OE
43TM9H	*	0.2099	0.0000	0.01	0.2053	0.0060	1.33	OE
4VQFP9		0.2081	-0.0017	-0.38	0.1982	-0.0011	-0.23	OE
4WMYG3		0.2100	0.0002	0.04	0.2000	0.0007	0.16	XX
4Z8W6T		0.2050	-0.0048	-1.08	0.1980	-0.0013	-0.29	OE
4ZZ4C7	*	0.2197	0.0098	2.20	0.2027	0.0034	0.75	OE
62WEN6		0.2087	-0.0012	-0.26	0.1983	-0.0010	-0.21	OE
6AK4UM		0.2120	0.0022	0.48	0.1973	-0.0020	-0.43	OE
6LWBWE		0.2070	-0.0028	-0.63	0.1963	-0.0030	-0.66	OE
6XTXZA		0.2111	0.0012	0.28	0.1997	0.0004	0.08	IC
7G8MYT		0.2003	-0.0095	-2.12	0.1897	-0.0096	-2.14	OE
7NKGBP		0.2047	-0.0052	-1.15	0.1933	-0.0060	-1.32	OE
8AGJE4		0.2069	-0.0029	-0.66	0.1932	-0.0061	-1.36	OE
8BWUKN		0.2100	0.0002	0.04	0.2000	0.0007	0.16	OE
8JGQ2A		0.2110	0.0012	0.26	0.2003	0.0010	0.23	AE
8MLVU3		0.2137	0.0038	0.86	0.2003	0.0010	0.23	IC
8PAAJD		0.2110	0.0012	0.26	0.2003	0.0010	0.23	XX
8RVR6P		0.2127	0.0028	0.63	0.2003	0.0010	0.23	XX
8XN3P3		0.2060	-0.0038	-0.86	0.1983	-0.0010	-0.21	XX
9NTJNY		0.2097	-0.0002	-0.04	0.1990	-0.0003	-0.06	OE
9Q3KU7		0.2103	0.0005	0.11	0.2030	0.0037	0.83	OE
9W4WP3		0.2147	0.0049	1.09	0.2046	0.0053	1.17	OE
9Z8R97		0.2083	-0.0015	-0.33	0.1963	-0.0030	-0.66	OE
9ZNR82	X	0.2219	0.0121	2.71	0.2141	0.0148	3.29	OE
ADBP2R	X	0.1897	-0.0202	-4.51	0.1870	-0.0123	-2.73	GD
AGMATQ		0.2117	0.0018	0.41	0.2017	0.0024	0.53	OE
AJWQWB		0.2077	-0.0022	-0.48	0.1987	-0.0006	-0.14	OE
AZNFG8		0.2136	0.0037	0.84	0.2029	0.0036	0.81	OE
B422ZJ		0.2009	-0.0090	-2.00	0.1885	-0.0108	-2.40	XX
B8E3GN	X	0.1989	-0.0109	-2.44	0.1811	-0.0182	-4.05	OE
BBG2VM		0.2023	-0.0075	-1.68	0.1903	-0.0090	-1.99	OE
BFTU6Z		0.2107	0.0008	0.19	0.1983	-0.0010	-0.21	OE
C973WT		0.2167	0.0068	1.53	0.2057	0.0064	1.42	OE
CBEECN		0.2098	0.0000	-0.01	0.1996	0.0003	0.07	XX
CC6NWN		0.2107	0.0008	0.19	0.2013	0.0020	0.45	OE
CEEP73	X	0.2000	-0.0098	-2.20	0.2133	0.0140	3.12	GD
CM98PZ		0.2057	-0.0042	-0.93	0.1940	-0.0053	-1.17	IC



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1605

Carbon & Low Alloy Steel, MOLYBDENUM (Mo)  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CPA6MQ		0.1993	-0.0105	-2.35	0.1870	-0.0123	-2.73	XX
CX9XB8		0.2100	0.0002	0.04	0.2000	0.0007	0.16	WD
D7Z84U		0.2173	0.0075	1.68	0.2053	0.0060	1.34	OE
EL8LXX		0.2187	0.0088	1.98	0.2060	0.0067	1.49	XX
EUGM9J		0.2150	0.0052	1.16	0.2027	0.0034	0.75	OE
EVULCL		0.2140	0.0042	0.93	0.2003	0.0010	0.23	OE
F4GU6V		0.2083	-0.0015	-0.33	0.1990	-0.0003	-0.06	OE
FLHLZ6		0.2081	-0.0017	-0.39	0.2001	0.0008	0.18	OE
FZ3FUN		0.2070	-0.0028	-0.63	0.1960	-0.0033	-0.73	GD
G4Y3Q4		0.2010	-0.0088	-1.97	0.1893	-0.0100	-2.21	OE
GBCYMX		0.2200	0.0102	2.27	0.2080	0.0087	1.94	OE
GEFMDL		0.2127	0.0028	0.63	0.2030	0.0037	0.83	OE
GTYD8H		0.2109	0.0010	0.23	0.2020	0.0027	0.60	OE
H2CZZ4		0.2084	-0.0014	-0.31	0.1961	-0.0032	-0.70	OE
H6QN9E		0.2107	0.0009	0.19	0.2005	0.0012	0.28	OE
H9NVHX		0.2207	0.0108	2.42	0.2107	0.0114	2.53	OE
HV243G		0.2033	-0.0065	-1.45	0.1950	-0.0043	-0.95	OE
JAXRFT		0.2023	-0.0075	-1.68	0.1910	-0.0083	-1.84	GD
JKHDTW		0.2115	0.0017	0.37	0.2011	0.0018	0.40	OE
JMQ8QM		0.2135	0.0037	0.82	0.2034	0.0041	0.91	IC
K7BL9G		0.2063	-0.0035	-0.79	0.1968	-0.0025	-0.54	WD
K8JW2E		0.2063	-0.0035	-0.79	0.1963	-0.0030	-0.66	OE
KGR7TD		0.2153	0.0055	1.23	0.2047	0.0054	1.20	IC
L2XLMW		0.2093	-0.0005	-0.11	0.2003	0.0010	0.23	IC
L3AVJG		0.2072	-0.0026	-0.58	0.1991	-0.0002	-0.05	OE
LDQNZ4		0.2137	0.0038	0.86	0.2023	0.0030	0.68	OE
LEKCHY		0.2013	-0.0085	-1.90	0.1907	-0.0086	-1.92	XX
LFGNA9		0.2165	0.0066	1.49	0.2030	0.0037	0.82	OE
LG7H2P		0.2170	0.0072	1.60	0.2060	0.0067	1.49	OE
LGD7HN		0.2077	-0.0022	-0.48	0.1993	0.0000	0.01	OE
LLZ3XY	X	0.2265	0.0167	3.73	0.2171	0.0178	3.95	DR
MFCBWJ		0.2073	-0.0025	-0.56	0.1970	-0.0023	-0.51	XX
MFCPKH		0.2080	-0.0018	-0.41	0.1990	-0.0003	-0.06	OE
MN3YME		0.2097	-0.0002	-0.04	0.1957	-0.0036	-0.80	OE
NEDXVN		0.2073	-0.0025	-0.56	0.2000	0.0007	0.16	OE
NEFZWA		0.2133	0.0035	0.78	0.2013	0.0020	0.45	OE
NEUPVF		0.2091	-0.0007	-0.16	0.1989	-0.0004	-0.09	IC
NLV99P		0.2087	-0.0011	-0.25	0.1990	-0.0003	-0.07	XX
P7CHQW		0.2080	-0.0018	-0.41	0.1980	-0.0013	-0.29	GD
PDC2TR		0.2036	-0.0063	-1.40	0.1918	-0.0075	-1.67	XX
PNWUCF	*	0.2107	0.0008	0.19	0.2047	0.0054	1.20	OE
PNYUNW		0.2103	0.0005	0.11	0.1987	-0.0006	-0.14	AE
Q7T4QQ		0.2073	-0.0025	-0.56	0.1960	-0.0033	-0.73	IC
QACMZZ	X	0.2240	0.0142	3.17	0.2110	0.0117	2.60	OE
QB6FWJ		0.2124	0.0026	0.57	0.2012	0.0019	0.43	OE
QDXBHT		0.2110	0.0011	0.25	0.2006	0.0013	0.28	OE
QEP2DT		0.2110	0.0012	0.26	0.2003	0.0010	0.23	IC



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1605

Carbon & Low Alloy Steel, MOLYBDENUM (Mo)  
MOLYBDENUM (Mo)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QKV22H		0.2140	0.0042	0.93	0.2050	0.0057	1.27	OE
QP6CZ4		0.2146	0.0048	1.08	0.2063	0.0070	1.56	XX
QT9ZRM		0.2033	-0.0065	-1.45	0.1893	-0.0100	-2.21	OE
QVX9XG		0.2067	-0.0032	-0.71	0.1980	-0.0013	-0.29	OE
RENWPN		0.2110	0.0012	0.26	0.2010	0.0017	0.38	OE
RQ9X24		0.2100	0.0002	0.04	0.2000	0.0007	0.16	OE
T2MCJW		0.2068	-0.0030	-0.68	0.1992	-0.0001	-0.03	XX
T6PTUQ		0.2110	0.0012	0.26	0.2057	0.0064	1.42	XX
TCBHYU		0.2020	-0.0078	-1.75	0.1917	-0.0076	-1.69	GD
TCELEL		0.2120	0.0022	0.48	0.1983	-0.0010	-0.21	OE
TEJ78R		0.2150	0.0052	1.16	0.2030	0.0037	0.83	IC
TPY2HK		0.2107	0.0008	0.19	0.2010	0.0017	0.38	OE
TR4NXB		0.2074	-0.0024	-0.54	0.1981	-0.0012	-0.26	OE
TRKD7A		0.2070	-0.0028	-0.63	0.1970	-0.0023	-0.51	IC
TXM2NW	X	0.1942	-0.0156	-3.50	0.1876	-0.0117	-2.60	OE
UAKZWY		0.2080	-0.0018	-0.41	0.1973	-0.0020	-0.43	OE
UD8D2W	X	0.2337	0.0238	5.33	0.2203	0.0210	4.68	OE
UDHXCD	X	0.1997	-0.0102	-2.27	0.1977	-0.0016	-0.36	IC
UJ9VVF		0.2144	0.0046	1.02	0.2038	0.0045	1.00	OE
UTVPAW		0.2120	0.0022	0.48	0.2003	0.0010	0.23	OE
UWER9P		0.2083	-0.0015	-0.33	0.2007	0.0014	0.31	OE
V6HVM8		0.2044	-0.0055	-1.22	0.1919	-0.0074	-1.65	OE
VA4W7E	X	0.1997	-0.0102	-2.27	0.1943	-0.0050	-1.10	XX
VC67U2		0.2033	-0.0065	-1.45	0.1947	-0.0046	-1.03	OE
VDYTQY		0.2083	-0.0015	-0.33	0.2000	0.0007	0.16	OE
VF66H9		0.2177	0.0078	1.75	0.2073	0.0080	1.79	IC
VJ493M		0.2122	0.0024	0.53	0.2004	0.0011	0.25	WD
VMK26U		0.2050	-0.0048	-1.08	0.1917	-0.0076	-1.69	OE
VYZQ87		0.2086	-0.0013	-0.28	0.1979	-0.0014	-0.31	OE
W6JEH2		0.2119	0.0021	0.46	0.2001	0.0008	0.17	AE
W8LZPT		0.2196	0.0097	2.18	0.2075	0.0082	1.83	IC
WH9BJZ		0.2157	0.0058	1.30	0.2057	0.0064	1.42	XX
WJFGEU		0.2083	-0.0015	-0.33	0.1960	-0.0033	-0.73	IC
X467RE		0.2123	0.0025	0.56	0.2007	0.0014	0.31	OE
XAR7YE		0.2107	0.0008	0.19	0.2003	0.0010	0.22	OE
XGBLDA		0.2109	0.0011	0.24	0.2002	0.0009	0.20	WD
XJ2EW8		0.2107	0.0008	0.19	0.1970	-0.0023	-0.51	GD
XMZV7F		0.2060	-0.0038	-0.86	0.1950	-0.0043	-0.95	OE
XQG8YQ		0.2063	-0.0035	-0.78	0.1953	-0.0040	-0.88	OE
XXL22Y		0.2050	-0.0048	-1.07	0.1958	-0.0035	-0.79	OE
Y8GH2Z		0.2143	0.0045	1.01	0.2000	0.0007	0.16	OE
YEZJ7X		0.2189	0.0090	2.02	0.2067	0.0074	1.65	OE
YKN2NF		0.2014	-0.0084	-1.89	0.1913	-0.0080	-1.78	OE
YQA4KK		0.2060	-0.0038	-0.86	0.2000	0.0007	0.16	OE
YY9JGK		0.2095	-0.0003	-0.07	0.1974	-0.0019	-0.43	OE
ZFQDN7		0.2067	-0.0032	-0.71	0.1967	-0.0026	-0.58	OE
ZKLCR3		0.2117	0.0018	0.41	0.2027	0.0034	0.75	OE



# Fasteners and Metals Interlaboratory Testing Program

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## Analysis 1605

Carbon & Low Alloy Steel, MOLYBDENUM (Mo)  
MOLYBDENUM (Mo)

### Summary Statistics

	<u>Sample L77</u>		<u>Sample L78</u>	
<b>Grand Means</b>	0.2098	Percent	0.1993	Percent
<b>Std Dev Btwn Labs</b>	0.0045	Percent	0.0045	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 128 of 141 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1605

9ZNR82 (X) - Data for sample L78 are high.

ADBP2R (X) - Data for sample L77 are low.

B8E3GN (X) - Data for sample L78 are low.

CEEP73 (X) - Data for sample L78 are high. Inconsistent within the determinations of sample L78.

LLZ3XY (X) - Data for both samples are high. Possible Systematic Error.

QACMZZ (X) - Data for sample L77 are high.

TXM2NW (X) - Data for sample L77 are low.

UD8D2W (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L78.

UDHXCD (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

VA4W7E (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L78.

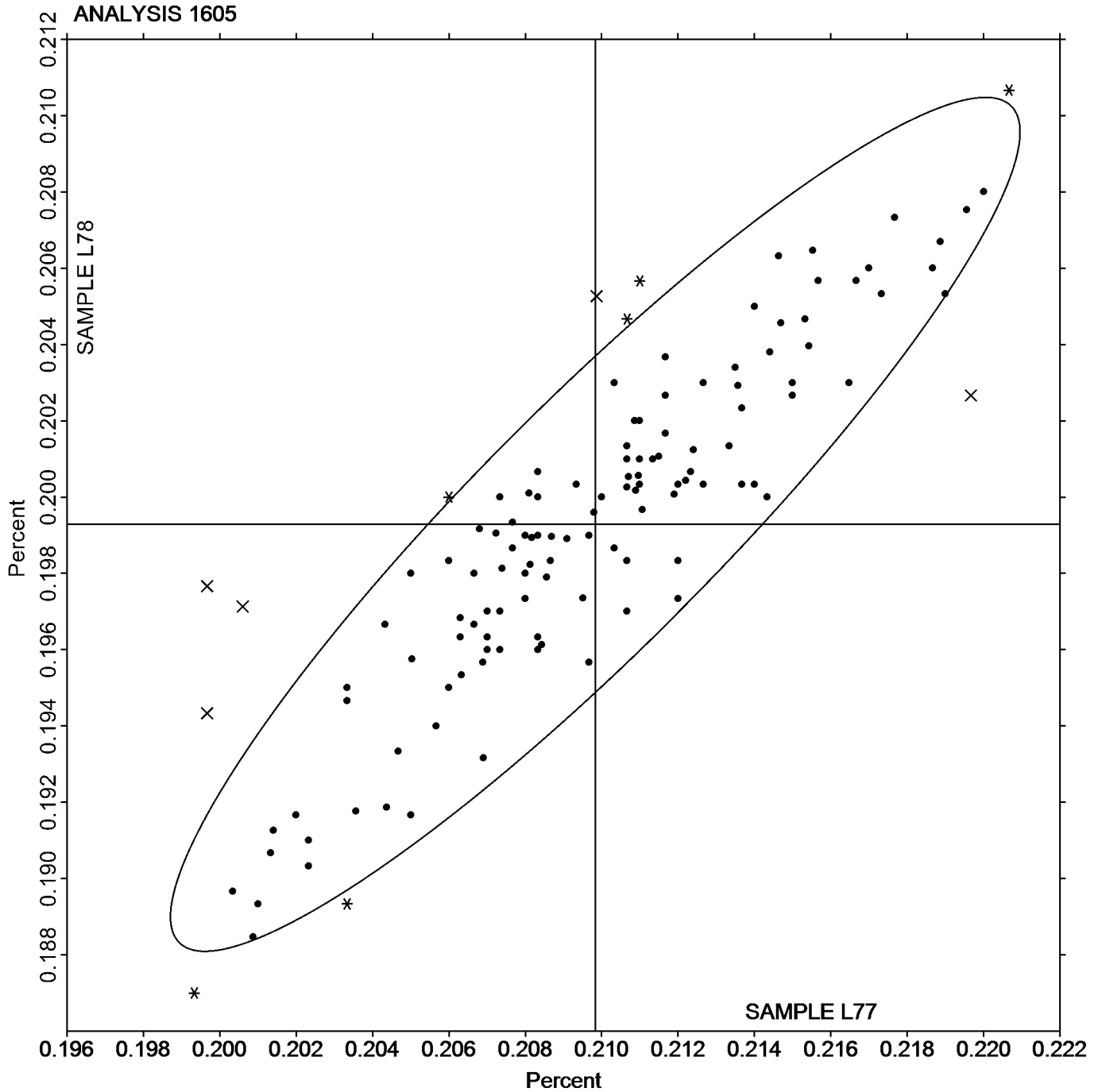


Analysis 1605

Carbon & Low Alloy Steel, MOLYBDENUM (Mo)  
MOLYBDENUM (Mo)

SAMPLE L77  
0.2098 Percent

SAMPLE L78  
0.1993 Percent





# Fasteners and Metals Interlaboratory Testing Program

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3rd Qtr 2021

## Analysis 1606

Carbon & Low Alloy Steel, NICKEL (Ni)  
NICKEL (Ni)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.4253	-0.0149	-1.62	0.3860	-0.0101	-1.23	OE
2P9ZU8		0.4370	-0.0033	-0.35	0.3910	-0.0051	-0.62	WD
2QJX4H		0.4330	-0.0073	-0.79	0.3847	-0.0115	-1.39	OE
2QLG4E		0.4430	0.0027	0.30	0.3990	0.0029	0.35	OE
2QYBGT		0.4243	-0.0160	-1.73	0.3868	-0.0093	-1.13	OE
2WP4N8	*	0.4450	0.0047	0.51	0.4110	0.0149	1.80	IC
387K6Z		0.4442	0.0040	0.43	0.3959	-0.0002	-0.03	OE
3J4ZBA		0.4510	0.0107	1.16	0.4073	0.0112	1.35	OE
3PMVMR		0.4360	-0.0043	-0.46	0.3920	-0.0041	-0.50	OE
3T3QKV		0.4320	-0.0083	-0.89	0.3947	-0.0015	-0.18	AE
3YWJXY		0.4274	-0.0128	-1.39	0.3832	-0.0130	-1.57	OE
43TM9H		0.4412	0.0009	0.10	0.3953	-0.0008	-0.10	OE
4VQFP9		0.4392	-0.0011	-0.11	0.3963	0.0002	0.02	OE
4WMYG3		0.4500	0.0097	1.06	0.4067	0.0105	1.27	XX
4Z8W6T		0.4380	-0.0023	-0.24	0.3983	0.0022	0.27	OE
4ZZ4C7	X	0.4967	0.0564	6.11	0.4303	0.0342	4.14	OE
62WEN6		0.4457	0.0054	0.59	0.4013	0.0052	0.63	OE
6AK4UM		0.4487	0.0084	0.91	0.4007	0.0045	0.55	OE
6LWBWE		0.4470	0.0067	0.73	0.4030	0.0069	0.83	OE
6XTXZA		0.4401	-0.0001	-0.01	0.3946	-0.0015	-0.18	IC
7G8MYT	X	0.3933	-0.0469	-5.08	0.3513	-0.0448	-5.42	OE
7NKGBP		0.4447	0.0044	0.48	0.3950	-0.0011	-0.14	OE
8AGJE4		0.4466	0.0063	0.68	0.3986	0.0025	0.30	OE
8BWUKN		0.4500	0.0097	1.06	0.4000	0.0039	0.47	OE
8JGQ2A		0.4420	0.0017	0.19	0.3983	0.0022	0.27	AE
8MLVU3		0.4490	0.0087	0.95	0.4057	0.0095	1.15	IC
8PAAJD		0.4383	-0.0019	-0.21	0.3947	-0.0015	-0.18	XX
8RVR6P		0.4327	-0.0076	-0.82	0.3860	-0.0101	-1.23	XX
8XN3P3		0.4527	0.0124	1.34	0.4107	0.0145	1.76	XX
9NTJNY		0.4307	-0.0096	-1.04	0.3870	-0.0091	-1.11	OE
9Q3KU7	X	0.6767	0.2364	25.62	0.6917	0.2955	35.77	OE
9W4WP3		0.4448	0.0045	0.49	0.3973	0.0012	0.14	IC
9Z8R97		0.4463	0.0061	0.66	0.3987	0.0025	0.31	OE
9ZNR82	X	0.4523	0.0121	1.31	0.0400	-0.3562	-43.11	OE
ADBP2R		0.4467	0.0064	0.69	0.3987	0.0025	0.31	GD
AGMATQ		0.4367	-0.0036	-0.39	0.3953	-0.0008	-0.10	OE
AJWQWB		0.4430	0.0027	0.30	0.4010	0.0049	0.59	OE
AZNFG8		0.4487	0.0084	0.91	0.3997	0.0036	0.44	OE
B422ZJ		0.4427	0.0024	0.26	0.3963	0.0002	0.02	OE
B8E3GN		0.4392	-0.0011	-0.11	0.3881	-0.0080	-0.97	OE
BBG2VM		0.4273	-0.0129	-1.40	0.3827	-0.0135	-1.63	OE
BFTU6Z		0.4263	-0.0139	-1.51	0.3860	-0.0101	-1.23	OE
BQ8ATF	*	0.4180	-0.0223	-2.41	0.4120	0.0159	1.92	OE
C973WT		0.4447	0.0044	0.48	0.3977	0.0015	0.18	OE
CBEECN		0.4413	0.0010	0.11	0.3950	-0.0012	-0.14	XX
CC6NWN		0.4440	0.0037	0.41	0.4027	0.0065	0.79	OE
CEEP73	X	0.4600	0.0197	2.14	0.4200	0.0239	2.89	GD



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1606

Carbon & Low Alloy Steel, NICKEL (Ni)  
NICKEL (Ni)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CM98PZ		0.4403	0.0001	0.01	0.3943	-0.0018	-0.22	IC
CPA6MQ		0.4350	-0.0053	-0.57	0.3920	-0.0041	-0.50	XX
CX9XB8		0.4400	-0.0003	-0.03	0.4000	0.0039	0.47	WD
D7Z84U		0.4173	-0.0229	-2.48	0.3750	-0.0211	-2.56	OE
EL8LXX	X	0.4760	0.0357	3.87	0.4283	0.0322	3.90	XX
EUGM9J		0.4437	0.0034	0.37	0.3987	0.0025	0.31	OE
EVULCL		0.4450	0.0047	0.51	0.3987	0.0025	0.31	OE
F4GU6V	X	0.4253	-0.0149	-1.62	0.3980	0.0019	0.23	OE
FLHLZ6	*	0.4137	-0.0266	-2.88	0.3764	-0.0197	-2.39	OE
FZ3FUN		0.4460	0.0057	0.62	0.3980	0.0019	0.23	GD
G4Y3Q4		0.4547	0.0144	1.56	0.4067	0.0105	1.27	OE
GBCYMX		0.4523	0.0121	1.31	0.4080	0.0119	1.44	OE
GEFMDL		0.4427	0.0024	0.26	0.3990	0.0029	0.35	OE
GTYD8H		0.4319	-0.0084	-0.91	0.3850	-0.0111	-1.35	OE
H2CZZ4		0.4424	0.0021	0.23	0.3982	0.0021	0.25	OE
H6QN9E		0.4405	0.0002	0.02	0.3969	0.0008	0.09	OE
H9NVHX		0.4413	0.0011	0.12	0.3987	0.0025	0.31	OE
HV243G		0.4383	-0.0019	-0.21	0.4003	0.0042	0.51	OE
JAXRFT		0.4413	0.0011	0.12	0.3973	0.0012	0.14	GD
JKHDTW		0.4433	0.0030	0.33	0.4017	0.0055	0.67	OE
JMQ8QM		0.4484	0.0082	0.89	0.4078	0.0116	1.41	IC
K7BL9G		0.4191	-0.0211	-2.29	0.3771	-0.0190	-2.30	WD
K7RADC		0.4430	0.0028	0.30	0.4000	0.0039	0.47	GD
K8JW2E		0.4321	-0.0081	-0.88	0.3901	-0.0060	-0.73	OE
KGR7TD		0.4487	0.0084	0.91	0.4040	0.0079	0.95	IC
L2XLMW		0.4377	-0.0026	-0.28	0.3947	-0.0015	-0.18	IC
L3AVJG	*	0.4356	-0.0046	-0.50	0.4061	0.0099	1.20	OE
LDQNZ4		0.4483	0.0081	0.88	0.4050	0.0089	1.07	OE
LEKCHY		0.4353	-0.0049	-0.53	0.3917	-0.0045	-0.54	XX
LFGNA9		0.4402	-0.0001	-0.01	0.3972	0.0010	0.12	OE
LG7H2P		0.4240	-0.0163	-1.76	0.3883	-0.0078	-0.95	OE
LGD7HN	*	0.4560	0.0157	1.71	0.4033	0.0072	0.87	OE
LLZ3XY		0.4326	-0.0077	-0.83	0.3915	-0.0046	-0.56	DR
MFCBWJ		0.4310	-0.0093	-1.00	0.3880	-0.0081	-0.99	XX
MFCPKH		0.4550	0.0147	1.60	0.4080	0.0119	1.44	OE
MN3YME		0.4480	0.0077	0.84	0.3957	-0.0005	-0.06	OE
NEDXVN		0.4370	-0.0033	-0.35	0.3913	-0.0048	-0.58	OE
NEUPVF		0.4410	0.0007	0.08	0.3969	0.0008	0.10	IC
NLV99P		0.4367	-0.0036	-0.39	0.3904	-0.0057	-0.69	OE
P7CHQW		0.4200	-0.0203	-2.19	0.3760	-0.0201	-2.44	GD
PDC2TR		0.4440	0.0037	0.41	0.3993	0.0032	0.39	XX
PNWUCF	*	0.4317	-0.0086	-0.93	0.3823	-0.0138	-1.67	OE
PNYUNW		0.4400	-0.0003	-0.03	0.3967	0.0005	0.06	AE
Q7T4QQ		0.4370	-0.0033	-0.35	0.3917	-0.0045	-0.54	IC
QACMZZ		0.4440	0.0037	0.41	0.4010	0.0049	0.59	OE
QB6FWJ		0.4481	0.0078	0.85	0.4043	0.0082	0.99	OE
QDXBHT		0.4422	0.0020	0.21	0.3967	0.0006	0.07	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1606

Carbon & Low Alloy Steel, NICKEL (Ni)  
NICKEL (Ni)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QEP2DT		0.4337	-0.0066	-0.71	0.3900	-0.0061	-0.74	IC
QKV22H		0.4643	0.0241	2.61	0.4167	0.0205	2.48	OE
QP6CZ4		0.4407	0.0005	0.05	0.3985	0.0024	0.29	XX
QT9ZRM		0.4253	-0.0149	-1.62	0.3773	-0.0188	-2.28	OE
QVX9XG		0.4267	-0.0136	-1.47	0.3870	-0.0091	-1.11	OE
RENWPN		0.4420	0.0017	0.19	0.4020	0.0059	0.71	OE
RQ9X24		0.4400	-0.0003	-0.03	0.3967	0.0005	0.06	OE
T2MCJW		0.4532	0.0129	1.40	0.4133	0.0172	2.08	XX
T6PTUQ	X	0.4267	-0.0136	-1.47	0.3960	-0.0001	-0.02	XX
TCBHYU		0.4643	0.0241	2.61	0.4173	0.0212	2.57	GD
TCELEL		0.4413	0.0011	0.12	0.3990	0.0029	0.35	OE
TEJ78R		0.4407	0.0004	0.04	0.3960	-0.0001	-0.02	IC
TPY2HK		0.4387	-0.0016	-0.17	0.3987	0.0025	0.31	OE
TR4NXB		0.4377	-0.0025	-0.27	0.3960	-0.0001	-0.01	OE
TRKD7A		0.4237	-0.0166	-1.80	0.3830	-0.0131	-1.59	IC
TXM2NW		0.4412	0.0009	0.10	0.3983	0.0022	0.27	OE
UAKZWY	X	0.4390	-0.0013	-0.14	0.4287	0.0325	3.94	OE
UD8D2W		0.4370	-0.0033	-0.35	0.3900	-0.0061	-0.74	OE
UDHXCD		0.4380	-0.0023	-0.24	0.3967	0.0005	0.06	IC
UJ9VVF		0.4433	0.0030	0.33	0.4005	0.0044	0.53	OE
UTVPAW		0.4583	0.0181	1.96	0.4090	0.0129	1.56	OE
UWER9P		0.4407	0.0004	0.04	0.4027	0.0065	0.79	OE
V6HVM8		0.4396	-0.0007	-0.07	0.3947	-0.0014	-0.17	OE
VA4W7E		0.4187	-0.0216	-2.34	0.3810	-0.0151	-1.83	XX
VC67U2		0.4327	-0.0076	-0.82	0.3887	-0.0075	-0.90	OE
VDYTQY		0.4370	-0.0033	-0.35	0.3943	-0.0018	-0.22	OE
VF66H9		0.4303	-0.0099	-1.08	0.3910	-0.0051	-0.62	IC
VJ493M		0.4360	-0.0043	-0.46	0.3913	-0.0048	-0.58	OE
VJ6LLU		0.4283	-0.0119	-1.29	0.3850	-0.0111	-1.35	OE
VMK26U		0.4503	0.0101	1.09	0.4037	0.0075	0.91	OE
VYZQ87		0.4520	0.0117	1.27	0.4055	0.0094	1.13	OE
W6JEH2		0.4547	0.0144	1.57	0.4101	0.0139	1.69	AE
W8LZPT		0.4378	-0.0024	-0.26	0.3945	-0.0017	-0.20	IC
WH9BJZ		0.4317	-0.0086	-0.93	0.3880	-0.0081	-0.99	XX
WJFGEU		0.4453	0.0051	0.55	0.3970	0.0009	0.10	IC
X467RE		0.4437	0.0034	0.37	0.3957	-0.0005	-0.06	OE
XAR7YE	*	0.4347	-0.0056	-0.61	0.4017	0.0056	0.68	OE
XGBLDA		0.4457	0.0054	0.59	0.3972	0.0011	0.13	WD
XJ2EW8		0.4433	0.0031	0.33	0.4000	0.0039	0.47	GD
XQG8YQ		0.4530	0.0127	1.38	0.4070	0.0109	1.31	OE
XXL22Y		0.4401	-0.0002	-0.02	0.3937	-0.0025	-0.30	OE
Y8GH2Z		0.4563	0.0161	1.74	0.4140	0.0179	2.16	OE
YKN2NF		0.4337	-0.0065	-0.71	0.3916	-0.0046	-0.55	OE
YQA4KK	*	0.4160	-0.0243	-2.63	0.3850	-0.0111	-1.35	OE
YY9JGK		0.4439	0.0036	0.39	0.4004	0.0042	0.51	OE
ZFQDN7		0.4333	-0.0069	-0.75	0.3890	-0.0071	-0.86	OE
ZKLCR3		0.4420	0.0017	0.19	0.4020	0.0059	0.71	OE





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1606

Carbon & Low Alloy Steel, NICKEL (Ni)  
NICKEL (Ni)

### Summary Statistics

	<u>Sample L77</u>		<u>Sample L78</u>	
<b>Grand Means</b>	0.4403	Percent	0.3961	Percent
<b>Std Dev Btwn Labs</b>	0.0092	Percent	0.0083	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 127 of 141 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1606

- 4ZZ4C7 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L78.
- 7G8MYT (X) - Data for both samples are low. Possible Systematic Error. Inconsistent within the determinations of sample L77.
- 9Q3KU7 (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L78.
- 9ZNR82 (X) - Data for sample L78 are off by a factor of ten.
- CEEP73 (X) - Data for sample L78 are high.
- EL8LXX (X) - Data for both samples are high. Possible Systematic Error.
- F4GU6V (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.
- T6PTUQ (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L78.
- UAKZWY (X) - Data for sample L78 are high. Inconsistent within the determinations of sample L78.



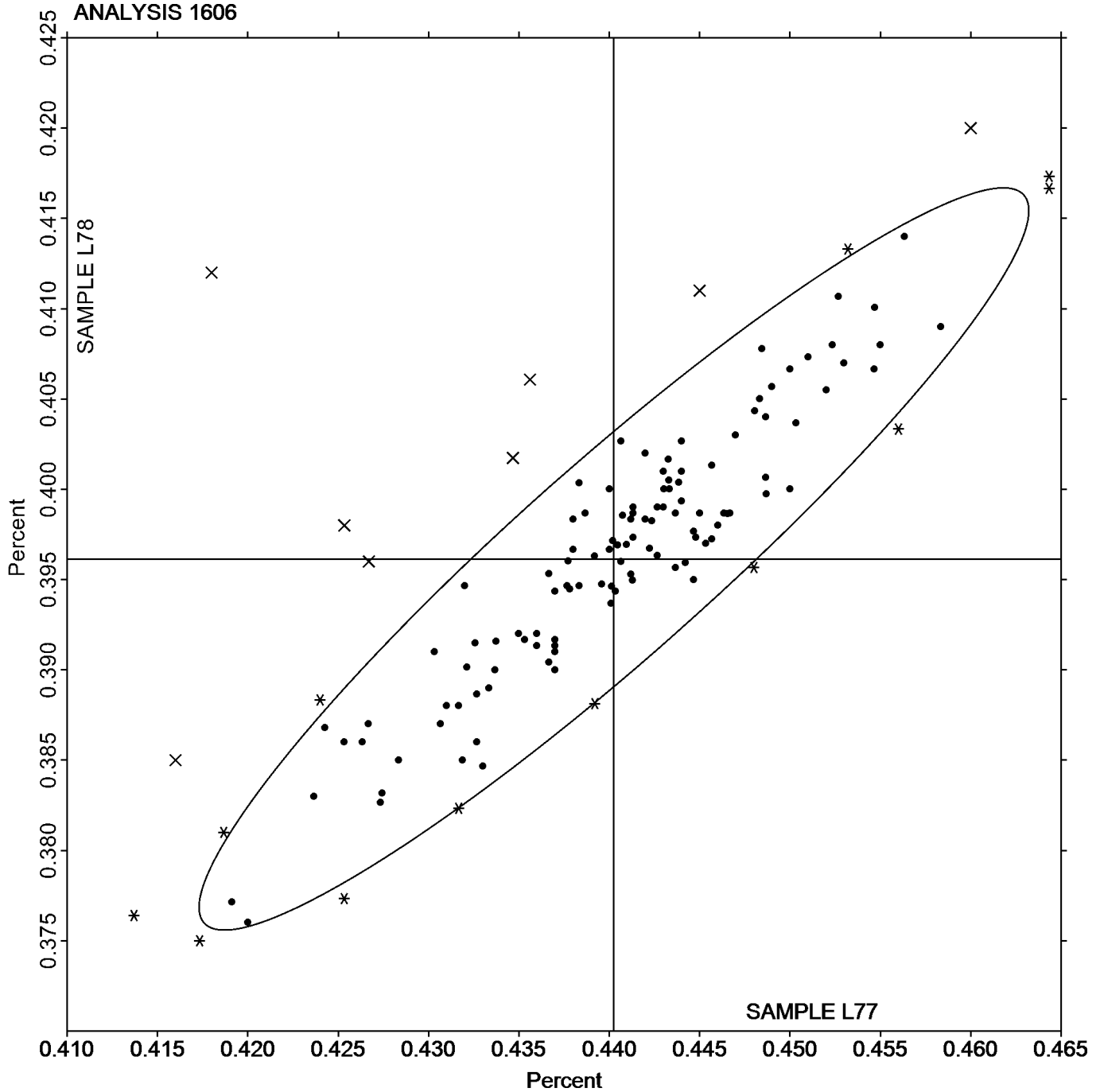
Analysis 1606

Carbon & Low Alloy Steel, NICKEL (Ni)

NICKEL (Ni)

SAMPLE L77  
0.4403 Percent

SAMPLE L78  
0.3961 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1607

Carbon & Low Alloy Steel, CHROMIUM (Cr)  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.4973	0.0031	0.33	0.4920	0.0074	0.84	OE
2P9ZU8		0.5017	0.0074	0.79	0.4893	0.0047	0.53	WD
2QJX4H		0.5027	0.0084	0.89	0.4953	0.0107	1.21	OE
2QLG4E		0.4990	0.0048	0.51	0.4867	0.0020	0.23	OE
2QYBGT		0.5021	0.0078	0.83	0.4965	0.0119	1.35	OE
2WP4N8		0.4933	-0.0009	-0.09	0.4873	0.0027	0.31	IC
387K6Z		0.5119	0.0176	1.87	0.5009	0.0162	1.84	OE
3J4ZBA		0.4743	-0.0199	-2.11	0.4689	-0.0157	-1.78	OE
3PMVMR		0.4937	-0.0006	-0.06	0.4803	-0.0043	-0.49	OE
3T3QKV		0.4880	-0.0062	-0.66	0.4827	-0.0020	-0.22	AE
3YWJXY		0.4865	-0.0077	-0.82	0.4762	-0.0084	-0.95	OE
43TM9H		0.4922	-0.0020	-0.21	0.4838	-0.0008	-0.09	OE
4VQFP9		0.4901	-0.0041	-0.43	0.4799	-0.0047	-0.53	OE
4WMYG3		0.5067	0.0124	1.32	0.4967	0.0120	1.36	XX
4Z8W6T		0.4883	-0.0059	-0.62	0.4813	-0.0033	-0.37	OE
4ZZ4C7		0.4773	-0.0169	-1.79	0.4723	-0.0123	-1.39	OE
62WEN6		0.4897	-0.0046	-0.48	0.4797	-0.0050	-0.56	OE
6AK4UM		0.5040	0.0098	1.04	0.4890	0.0044	0.50	OE
6LWBWE		0.4950	0.0008	0.08	0.4823	-0.0023	-0.26	OE
6N7RAX		0.4940	-0.0002	-0.02	0.4820	-0.0026	-0.30	DR
6XTXZA		0.4914	-0.0029	-0.30	0.4819	-0.0027	-0.30	IC
7G8MYT		0.4787	-0.0156	-1.65	0.4697	-0.0150	-1.69	OE
7NKGBP		0.4820	-0.0122	-1.30	0.4783	-0.0063	-0.71	OE
8AGJE4		0.4836	-0.0106	-1.13	0.4694	-0.0152	-1.72	OE
8BWUKN		0.5000	0.0058	0.61	0.4900	0.0054	0.61	OE
8JGQ2A		0.4990	0.0048	0.51	0.4883	0.0037	0.42	AE
8MLVU3		0.4917	-0.0026	-0.27	0.4793	-0.0053	-0.60	IC
8PAAJD		0.4940	-0.0002	-0.02	0.4843	-0.0003	-0.03	XX
8RVR6P		0.4983	0.0041	0.44	0.4877	0.0030	0.35	XX
8XN3P3		0.4827	-0.0116	-1.22	0.4717	-0.0130	-1.47	XX
9NTJNY		0.4830	-0.0112	-1.19	0.4717	-0.0130	-1.47	OE
9Q3KU7		0.5003	0.0061	0.65	0.4953	0.0107	1.21	OE
9W4WP3		0.4831	-0.0111	-1.18	0.4780	-0.0066	-0.75	OE
9Z8R97		0.4967	0.0024	0.26	0.4837	-0.0010	-0.11	OE
9ZNR82	*	0.4975	0.0033	0.35	0.4744	-0.0102	-1.15	OE
ADBP2R		0.5083	0.0141	1.50	0.4977	0.0130	1.48	GD
AGMATQ		0.4843	-0.0099	-1.05	0.4757	-0.0090	-1.01	OE
AJWQWB		0.5097	0.0154	1.64	0.4950	0.0104	1.18	IC
AZNFG8		0.4941	-0.0001	-0.02	0.4757	-0.0089	-1.01	OE
B422ZJ		0.4903	-0.0039	-0.41	0.4760	-0.0086	-0.98	OE
B8E3GN		0.4756	-0.0186	-1.97	0.4641	-0.0205	-2.32	OE
BBG2VM		0.4923	-0.0019	-0.20	0.4807	-0.0040	-0.45	OE
BFTU6Z	X	0.5243	0.0301	3.19	0.5157	0.0310	3.52	OE
BQ8ATF	X	0.4610	-0.0332	-3.52	0.4480	-0.0366	-4.15	OE
C973WT		0.5020	0.0078	0.82	0.4937	0.0090	1.02	OE
CBEECN		0.4930	-0.0013	-0.13	0.4803	-0.0043	-0.49	XX
CC6NWN		0.4937	-0.0006	-0.06	0.4870	0.0024	0.27	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1607

Carbon & Low Alloy Steel, CHROMIUM (Cr)  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CEEP73	X	0.5500	0.0558	5.91	0.5600	0.0754	8.54	GD
CM98PZ		0.5007	0.0064	0.68	0.4870	0.0024	0.27	IC
CPA6MQ		0.4923	-0.0019	-0.20	0.4833	-0.0013	-0.15	XX
CX9XB8		0.4900	-0.0042	-0.45	0.4800	-0.0046	-0.52	WD
D7Z84U		0.5197	0.0254	2.70	0.5047	0.0200	2.27	OE
EL8LXX		0.5010	0.0068	0.72	0.4910	0.0064	0.72	XX
EUGM9J		0.4977	0.0034	0.36	0.4873	0.0027	0.31	OE
EVULCL		0.5040	0.0098	1.04	0.4913	0.0067	0.76	OE
F4GU6V		0.4787	-0.0156	-1.65	0.4720	-0.0126	-1.43	OE
FLHLZ6		0.4905	-0.0038	-0.40	0.4892	0.0045	0.51	OE
FZ3FUN	*	0.4990	0.0048	0.51	0.4780	-0.0066	-0.75	GD
G4Y3Q4	X	0.5453	0.0511	5.42	0.5310	0.0464	5.25	OE
GBCYMX		0.4977	0.0034	0.36	0.4860	0.0014	0.16	OE
GEFMDL		0.5060	0.0118	1.25	0.4937	0.0090	1.02	OE
GTYD8H		0.4876	-0.0067	-0.71	0.4798	-0.0048	-0.54	OE
H2CZZ4		0.4899	-0.0043	-0.46	0.4792	-0.0054	-0.61	OE
H6QN9E		0.4860	-0.0082	-0.87	0.4780	-0.0066	-0.75	OE
H9NVHX		0.5073	0.0131	1.39	0.4983	0.0137	1.55	OE
HV243G		0.4873	-0.0069	-0.73	0.4793	-0.0053	-0.60	OE
JAXRFT		0.5020	0.0078	0.82	0.4867	0.0020	0.23	GD
JKHDTW		0.4953	0.0010	0.11	0.4846	0.0000	0.00	OE
JMQ8QM		0.4792	-0.0150	-1.59	0.4745	-0.0101	-1.15	IC
K7BL9G		0.4911	-0.0031	-0.33	0.4808	-0.0038	-0.43	WD
K7RADC		0.4879	-0.0063	-0.67	0.4765	-0.0082	-0.92	GD
K8JW2E		0.4802	-0.0140	-1.49	0.4738	-0.0108	-1.22	OE
KGR7TD		0.4993	0.0051	0.54	0.4890	0.0044	0.50	IC
L2XLMW		0.4980	0.0038	0.40	0.4923	0.0077	0.87	IC
L3AVJG		0.4796	-0.0146	-1.55	0.4718	-0.0129	-1.46	XX
LDQNZ4		0.5033	0.0091	0.97	0.4927	0.0080	0.91	OE
LEKCHY		0.4920	-0.0022	-0.24	0.4807	-0.0040	-0.45	XX
LFGNA9		0.4970	0.0028	0.29	0.4863	0.0017	0.19	OE
LG7H2P		0.4853	-0.0089	-0.94	0.4777	-0.0070	-0.79	OE
LGD7HN		0.4990	0.0048	0.51	0.4917	0.0070	0.80	OE
LLZ3XY	X	0.4595	-0.0348	-3.68	0.4518	-0.0328	-3.72	DR
MFCBWJ		0.4950	0.0008	0.08	0.4893	0.0047	0.53	XX
MFCPKH		0.4810	-0.0132	-1.40	0.4730	-0.0116	-1.32	OE
MN3YME		0.4920	-0.0022	-0.24	0.4917	0.0070	0.80	OE
NEDXVN		0.4993	0.0051	0.54	0.4943	0.0097	1.10	OE
NEFZWA		0.5030	0.0088	0.93	0.4953	0.0107	1.21	OE
NEUPVF		0.5022	0.0080	0.85	0.4912	0.0066	0.75	IC
NLV99P		0.4850	-0.0092	-0.97	0.4774	-0.0072	-0.82	OE
P7CHQW		0.5060	0.0118	1.25	0.4970	0.0124	1.40	GD
PDC2TR		0.4847	-0.0095	-1.01	0.4778	-0.0069	-0.78	XX
PNWUCF	X	0.5050	0.0108	1.14	0.4847	0.0000	0.01	OE
PNYUNW		0.5100	0.0158	1.67	0.5000	0.0154	1.74	AE
Q7T4QQ		0.5003	0.0061	0.65	0.4880	0.0034	0.38	IC
QACMZZ		0.4950	0.0008	0.08	0.4840	-0.0006	-0.07	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1607

Carbon & Low Alloy Steel, CHROMIUM (Cr)  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QB6FWJ		0.4807	-0.0135	-1.43	0.4697	-0.0149	-1.69	OE
QDXBHT		0.4908	-0.0035	-0.37	0.4837	-0.0009	-0.10	OE
QEP2DT		0.4950	0.0008	0.08	0.4843	-0.0003	-0.03	XX
QKV22H		0.5040	0.0098	1.04	0.4917	0.0070	0.80	OE
QP6CZ4		0.4984	0.0042	0.44	0.4873	0.0027	0.31	XX
QT9ZRM		0.5087	0.0144	1.53	0.4923	0.0077	0.87	OE
QVX9XG		0.4817	-0.0126	-1.33	0.4747	-0.0100	-1.13	OE
RENWPN		0.4970	0.0028	0.29	0.4880	0.0034	0.38	OE
RQ9X24		0.4933	-0.0009	-0.09	0.4867	0.0020	0.23	OE
T2MCJW	X	0.4646	-0.0296	-3.14	0.4713	-0.0133	-1.51	XX
T6PTUQ		0.4980	0.0038	0.40	0.4910	0.0064	0.72	XX
TCBHYU		0.4813	-0.0129	-1.37	0.4727	-0.0120	-1.35	GD
TCELEL		0.4927	-0.0016	-0.17	0.4830	-0.0016	-0.18	OE
TEJ78R		0.5027	0.0084	0.89	0.4920	0.0074	0.84	IC
TPY2HK		0.5000	0.0058	0.61	0.4933	0.0087	0.99	OE
TR4NXB		0.4895	-0.0047	-0.50	0.4820	-0.0026	-0.29	OE
TRKD7A		0.4920	-0.0022	-0.24	0.4733	-0.0113	-1.28	IC
TXM2NW		0.4877	-0.0066	-0.69	0.4860	0.0014	0.16	OE
UAKZWY		0.5033	0.0091	0.97	0.4933	0.0087	0.99	XX
UD8D2W	X	0.4817	-0.0126	-1.33	0.4613	-0.0233	-2.64	OE
UDHXCD		0.5047	0.0104	1.11	0.4950	0.0104	1.18	IC
UJ9VVF		0.4798	-0.0144	-1.53	0.4695	-0.0151	-1.71	OE
UTVPAW		0.4927	-0.0016	-0.17	0.4847	0.0000	0.01	OE
UWER9P		0.4897	-0.0046	-0.48	0.4860	0.0014	0.16	OE
V6HVM8		0.4859	-0.0084	-0.89	0.4733	-0.0113	-1.28	OE
VA4W7E		0.4730	-0.0212	-2.25	0.4687	-0.0160	-1.81	XX
VC67U2		0.4937	-0.0006	-0.06	0.4837	-0.0010	-0.11	OE
VDYTQY		0.4837	-0.0106	-1.12	0.4743	-0.0103	-1.16	OE
VF66H9		0.5073	0.0131	1.39	0.4973	0.0127	1.44	IC
VJ493M		0.5007	0.0064	0.68	0.4917	0.0070	0.80	OE
VJ6LLU		0.5110	0.0168	1.78	0.5000	0.0154	1.74	XX
VMK26U		0.5040	0.0098	1.04	0.4863	0.0017	0.19	OE
VYZQ87		0.4944	0.0002	0.02	0.4866	0.0020	0.23	OE
W6JEH2		0.5059	0.0117	1.24	0.4953	0.0107	1.21	AE
W8LZPT		0.4886	-0.0056	-0.60	0.4773	-0.0074	-0.83	IC
WH9BJZ		0.5007	0.0064	0.68	0.4930	0.0084	0.95	XX
WJFGEU		0.5077	0.0134	1.42	0.4927	0.0080	0.91	IC
X467RE		0.5023	0.0081	0.86	0.4860	0.0014	0.16	OE
XAR7YE	*	0.4847	-0.0096	-1.01	0.5016	0.0170	1.92	OE
XGBLDA		0.4947	0.0004	0.05	0.4846	0.0000	0.00	WD
XJ2EW8		0.5127	0.0184	1.95	0.5063	0.0217	2.46	GD
XMZV7F		0.4980	0.0038	0.40	0.4877	0.0030	0.35	OE
XQG8YQ		0.4817	-0.0126	-1.33	0.4723	-0.0123	-1.39	OE
XXL22Y		0.4960	0.0018	0.19	0.4869	0.0023	0.26	OE
Y8GH2Z		0.5013	0.0071	0.75	0.4893	0.0047	0.53	OE
YEZJ7X		0.5118	0.0176	1.86	0.4974	0.0128	1.45	OE
YKN2NF		0.4816	-0.0126	-1.33	0.4691	-0.0155	-1.76	XX



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1607

Carbon & Low Alloy Steel, CHROMIUM (Cr)  
CHROMIUM (Cr)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
YQA4KK		0.4920	-0.0022	-0.24	0.4880	0.0034	0.38	OE
YY9JGK		0.4978	0.0036	0.38	0.4887	0.0041	0.46	OE
ZFQDN7		0.4733	-0.0209	-2.21	0.4633	-0.0213	-2.41	OE
ZKLCR3		0.4880	-0.0062	-0.66	0.4820	-0.0026	-0.30	OE

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.4942	Percent	0.4846	Percent
<b>Stnd Dev Btwn Labs</b>	0.0094	Percent	0.0088	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 134 of 145 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1607

- BFTU6Z (X) - Data for both samples are high. Possible Systematic Error.
- BQ8ATF (X) - Data for both samples are low. Possible Systematic Error.
- CEEP73 (X) - Data for both samples are high. Possible Systematic Error.
- G4Y3Q4 (X) - Data for both samples are high. Possible Systematic Error.
- LLZ3XY (X) - Data for both samples are low. Possible Systematic Error.
- PNWUCF (X) - Inconsistent in testing between samples. Inconsistent within the determinations of both samples.
- T2MCJW (X) - Data for sample L77 are low.
- UD8D2W (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.



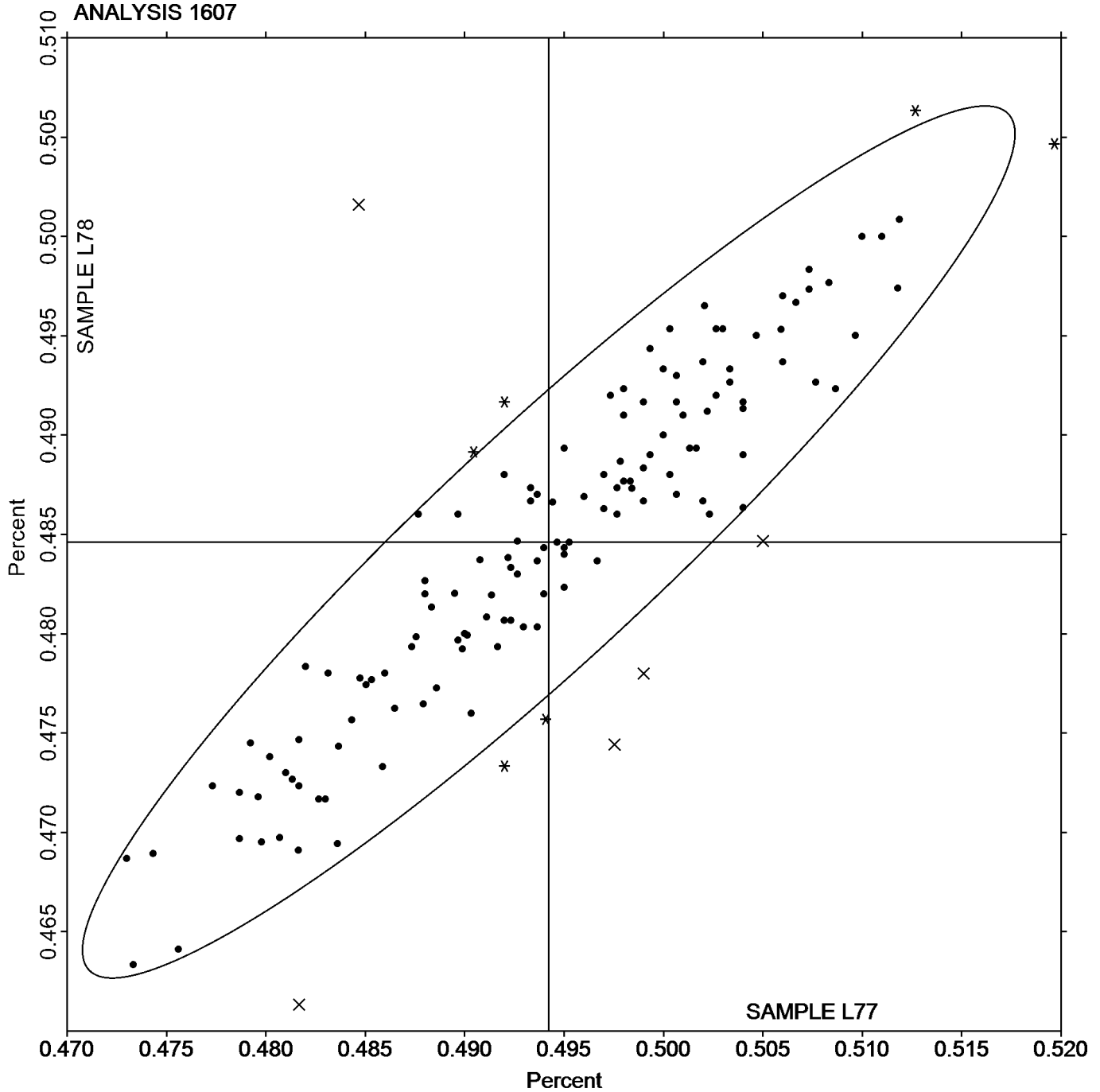
Analysis 1607

Carbon & Low Alloy Steel, CHROMIUM (Cr)

CHROMIUM (Cr)

SAMPLE L77  
0.4942 Percent

SAMPLE L78  
0.4846 Percent





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1608

Carbon & Low Alloy Steel, COPPER (Cu)  
COPPER (Cu)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2DF2XF		0.0928	-0.0036	-1.38	0.1683	-0.0070	-2.00	OE
2P9ZU8	*	0.1037	0.0073	2.82	0.1803	0.0050	1.45	WD
2QJX4H		0.0981	0.0017	0.67	0.1777	0.0024	0.68	OE
2QLG4E		0.0973	0.0010	0.38	0.1770	0.0017	0.49	OE
2QYBGT	X	0.0808	-0.0155	-5.99	0.1741	-0.0012	-0.33	OE
2WP4N8		0.0997	0.0033	1.28	0.1747	-0.0006	-0.18	IC
387K6Z	X	0.1041	0.0078	3.00	0.1896	0.0143	4.10	OE
3J4ZBA	X	0.0890	-0.0073	-2.83	0.1777	0.0024	0.68	OE
3PMVMR		0.0973	0.0010	0.38	0.1770	0.0017	0.49	OE
3T3QKV		0.0943	-0.0020	-0.77	0.1757	0.0004	0.11	AE
3YWJXY		0.0967	0.0003	0.13	0.1770	0.0017	0.49	OE
43TM9H		0.0985	0.0022	0.83	0.1737	-0.0016	-0.47	OE
4VQFP9		0.0933	-0.0030	-1.16	0.1775	0.0022	0.63	OE
4WMYG3		0.0933	-0.0030	-1.16	0.1700	-0.0053	-1.52	XX
4Z8W6T		0.0967	0.0003	0.13	0.1790	0.0037	1.06	OE
4ZZ4C7		0.0962	-0.0001	-0.05	0.1787	0.0034	0.97	OE
62WEN6		0.0972	0.0009	0.35	0.1730	-0.0023	-0.66	OE
6AK4UM		0.0980	0.0017	0.64	0.1767	0.0014	0.39	OE
6LWBWE		0.0993	0.0030	1.15	0.1763	0.0010	0.30	OE
6XTXZA		0.0954	-0.0010	-0.37	0.1757	0.0004	0.11	IC
7G8MYT		0.0977	0.0013	0.51	0.1730	-0.0023	-0.66	OE
7NKGBP		0.0983	0.0020	0.77	0.1773	0.0020	0.58	OE
8AGJE4		0.0949	-0.0015	-0.57	0.1711	-0.0042	-1.21	OE
8BWUKN	*	0.0900	-0.0063	-2.44	0.1800	0.0047	1.35	OE
8JGQ2A		0.0970	0.0007	0.26	0.1767	0.0014	0.39	AE
8MLVU3		0.0980	0.0017	0.64	0.1780	0.0027	0.78	IC
8PAAJD		0.0940	-0.0023	-0.90	0.1740	-0.0013	-0.37	XX
8RVR6P		0.0923	-0.0040	-1.54	0.1730	-0.0023	-0.66	XX
8XN3P3	X	0.0860	-0.0103	-3.98	0.1553	-0.0200	-5.74	XX
9NTJNY		0.0933	-0.0030	-1.16	0.1720	-0.0033	-0.95	OE
9Q3KU7		0.1023	0.0060	2.31	0.1800	0.0047	1.35	OE
9W4WP3		0.0967	0.0003	0.13	0.1755	0.0002	0.06	IC
9Z8R97	X	0.0856	-0.0108	-4.15	0.1481	-0.0272	-7.82	OE
9ZNR82	X	0.0955	-0.0008	-0.31	0.0171	-0.1582	-45.46	OE
ADBP2R		0.0953	-0.0010	-0.39	0.1750	-0.0003	-0.09	GD
AGMATQ		0.0950	-0.0013	-0.52	0.1763	0.0010	0.30	OE
AJWQWB		0.0963	0.0000	0.00	0.1747	-0.0006	-0.18	OE
AZNFG8		0.0901	-0.0062	-2.38	0.1698	-0.0055	-1.57	OE
B422ZJ		0.0970	0.0007	0.26	0.1740	-0.0013	-0.37	AE
B8E3GN	*	0.0907	-0.0057	-2.18	0.1666	-0.0087	-2.51	OE
BBG2VM		0.0950	-0.0013	-0.52	0.1703	-0.0050	-1.43	OE
BFTU6Z		0.0987	0.0023	0.90	0.1723	-0.0030	-0.85	OE
BQ8ATF	X	0.1200	0.0237	9.12	0.1140	-0.0613	-17.61	OE
C973WT		0.0950	-0.0013	-0.52	0.1740	-0.0013	-0.37	OE
CBEECN		0.0967	0.0003	0.13	0.1784	0.0031	0.89	XX
CC6NWN		0.0977	0.0013	0.51	0.1833	0.0080	2.31	OE
CEEP73	X	0.1000	0.0037	1.41	0.1900	0.0147	4.22	GD





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1608

Carbon & Low Alloy Steel, COPPER (Cu)  
COPPER (Cu)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
CM98PZ		0.0953	-0.0010	-0.39	0.1733	-0.0020	-0.56	IC
CPA6MQ		0.0980	0.0016	0.63	0.1703	-0.0050	-1.43	XX
CX9XB8		0.1000	0.0037	1.41	0.1733	-0.0020	-0.56	WD
D7Z84U		0.0963	-0.0001	-0.03	0.1767	0.0014	0.39	OE
EL8LXX	X	0.1057	0.0093	3.59	0.1887	0.0134	3.84	XX
EUGM9J		0.0965	0.0001	0.05	0.1723	-0.0030	-0.85	OE
EVULCL		0.0973	0.0010	0.38	0.1767	0.0014	0.39	OE
F4GU6V		0.1010	0.0047	1.80	0.1837	0.0084	2.40	OE
FLHLZ6	X	0.0899	-0.0065	-2.50	0.1783	0.0030	0.85	OE
FZ3FUN		0.0930	-0.0033	-1.29	0.1660	-0.0093	-2.67	GD
G4Y3Q4		0.0960	-0.0003	-0.12	0.1740	-0.0013	-0.37	OE
GBCYMX		0.0957	-0.0007	-0.26	0.1793	0.0040	1.16	OE
GEFMDL		0.0989	0.0026	0.99	0.1777	0.0024	0.68	OE
GTYD8H		0.0996	0.0032	1.24	0.1787	0.0034	0.97	OE
H2CZZ4		0.0944	-0.0019	-0.73	0.1741	-0.0012	-0.34	OE
H6QN9E		0.0942	-0.0021	-0.82	0.1775	0.0022	0.64	OE
H9NVHX		0.0997	0.0033	1.28	0.1813	0.0060	1.73	OE
HV243G		0.0967	0.0003	0.13	0.1787	0.0034	0.97	OE
JAXRFT		0.0972	0.0008	0.32	0.1733	-0.0020	-0.56	GD
JKHDTW		0.0908	-0.0056	-2.15	0.1751	-0.0002	-0.06	OE
JMQ8QM		0.0979	0.0015	0.59	0.1801	0.0048	1.39	IC
K7BL9G	X	0.1040	0.0077	2.95	0.1757	0.0004	0.13	WD
K7RADC		0.0964	0.0001	0.02	0.1736	-0.0017	-0.48	XX
K8JW2E		0.0976	0.0013	0.49	0.1784	0.0031	0.90	XX
KGR7TD		0.0980	0.0017	0.64	0.1760	0.0007	0.20	IC
L2XLMW		0.0977	0.0013	0.51	0.1780	0.0027	0.78	IC
L3AVJG		0.0961	-0.0003	-0.10	0.1782	0.0029	0.84	OE
LDQNZ4		0.0970	0.0007	0.26	0.1733	-0.0020	-0.56	OE
LEKCHY		0.0907	-0.0057	-2.18	0.1717	-0.0036	-1.04	XX
LFGNA9		0.0958	-0.0005	-0.19	0.1733	-0.0020	-0.57	OE
LG7H2P		0.0979	0.0015	0.59	0.1760	0.0007	0.20	OE
LLZ3XY	X	0.0882	-0.0081	-3.12	0.1610	-0.0143	-4.11	DR
MFCBWJ		0.0960	-0.0003	-0.13	0.1750	-0.0003	-0.09	XX
MFCPKH		0.0940	-0.0023	-0.90	0.1710	-0.0043	-1.23	OE
MN3YME		0.0900	-0.0063	-2.44	0.1737	-0.0016	-0.47	OE
NEDXVN		0.0981	0.0018	0.69	0.1757	0.0004	0.11	OE
NEFZWA		0.0923	-0.0040	-1.54	0.1713	-0.0040	-1.14	OE
NEUPVF		0.0967	0.0004	0.15	0.1765	0.0012	0.35	IC
NLV99P		0.0962	-0.0001	-0.06	0.1752	-0.0001	-0.03	OE
P7CHQW		0.0935	-0.0028	-1.09	0.1720	-0.0033	-0.95	GD
PDC2TR		0.0982	0.0019	0.73	0.1753	0.0000	-0.01	XX
PNWUCF		0.0953	-0.0011	-0.41	0.1723	-0.0030	-0.85	XX
PNYUNW		0.0940	-0.0023	-0.90	0.1717	-0.0036	-1.04	AE
Q7T4QQ		0.0967	0.0003	0.13	0.1750	-0.0003	-0.09	IC
QACMZZ		0.0970	0.0007	0.26	0.1760	0.0007	0.20	OE
QB6FWJ		0.0990	0.0026	1.01	0.1731	-0.0022	-0.64	OE
QDXBHT		0.0983	0.0020	0.77	0.1731	-0.0022	-0.63	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1608

Carbon & Low Alloy Steel, COPPER (Cu)  
COPPER (Cu)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
QEP2DT		0.0944	-0.0019	-0.75	0.1723	-0.0030	-0.85	IC
QKV22H		0.0960	-0.0003	-0.13	0.1770	0.0017	0.49	OE
QP6CZ4		0.0964	0.0000	0.02	0.1766	0.0013	0.37	XX
QT9ZRM	X	0.0673	-0.0290	-11.17	0.1270	-0.0483	-13.88	OE
QVX9XG		0.0950	-0.0013	-0.52	0.1760	0.0007	0.20	OE
RENWPN		0.0953	-0.0010	-0.39	0.1750	-0.0003	-0.09	XX
RQ9X24		0.0967	0.0003	0.13	0.1800	0.0047	1.35	OE
T2MCJW		0.0933	-0.0030	-1.17	0.1702	-0.0051	-1.46	XX
T6PTUQ		0.0983	0.0020	0.77	0.1713	-0.0040	-1.14	XX
TCBHYU		0.0980	0.0017	0.64	0.1837	0.0084	2.40	GD
TCELEL		0.0960	-0.0003	-0.13	0.1767	0.0014	0.39	OE
TEJ78R		0.0979	0.0016	0.60	0.1773	0.0020	0.58	IC
TPY2HK		0.1027	0.0063	2.44	0.1810	0.0057	1.64	OE
TR4NXB	*	0.0999	0.0036	1.37	0.1666	-0.0087	-2.49	OE
TRKD7A		0.0957	-0.0007	-0.26	0.1723	-0.0030	-0.85	IC
TXM2NW		0.1016	0.0052	2.01	0.1846	0.0093	2.67	OE
UAKZWY		0.1010	0.0047	1.80	0.1790	0.0037	1.06	XX
UD8D2W	X	0.1097	0.0133	5.14	0.2023	0.0270	7.77	OE
UDHXCD		0.0937	-0.0027	-1.03	0.1720	-0.0033	-0.95	IC
UJ9VVF		0.1002	0.0039	1.49	0.1762	0.0009	0.26	OE
UTVPAW	X	0.1050	0.0087	3.34	0.1923	0.0170	4.89	OE
UWER9P		0.0940	-0.0023	-0.90	0.1733	-0.0020	-0.56	CO
V6HVM8		0.0966	0.0002	0.09	0.1750	-0.0003	-0.10	OE
VA4W7E		0.0960	-0.0003	-0.13	0.1813	0.0060	1.73	XX
VC67U2		0.0966	0.0003	0.10	0.1753	0.0000	0.01	OE
VDYTQY		0.0930	-0.0033	-1.29	0.1743	-0.0010	-0.28	OE
VF66H9		0.0971	0.0007	0.28	0.1773	0.0020	0.58	IC
VJ493M		0.0990	0.0027	1.03	0.1760	0.0007	0.20	WD
VMK26U		0.0933	-0.0030	-1.16	0.1713	-0.0040	-1.14	OE
VYZQ87		0.0936	-0.0027	-1.05	0.1753	0.0000	0.00	OE
W6JEH2		0.0974	0.0011	0.42	0.1713	-0.0040	-1.14	AE
W8LZPT		0.0971	0.0008	0.29	0.1755	0.0002	0.07	IC
WH9BJZ		0.0983	0.0020	0.77	0.1773	0.0020	0.58	XX
WJFGEU		0.0967	0.0003	0.13	0.1770	0.0017	0.49	IC
X467RE	X	0.0827	-0.0137	-5.27	0.1740	-0.0013	-0.37	OE
XAR7YE	X	0.0960	-0.0003	-0.13	0.1875	0.0122	3.52	OE
XGBLDA		0.0992	0.0029	1.12	0.1761	0.0008	0.24	WD
XJ2EW8		0.0986	0.0022	0.86	0.1813	0.0060	1.73	GD
XMZV7F		0.0910	-0.0053	-2.06	0.1673	-0.0080	-2.29	OE
XQG8YQ		0.0927	-0.0037	-1.41	0.1760	0.0007	0.20	OE
XXL22Y		0.0939	-0.0025	-0.96	0.1716	-0.0037	-1.07	OE
Y8GH2Z		0.0943	-0.0020	-0.77	0.1793	0.0040	1.16	OE
YEZJ7X		0.0946	-0.0017	-0.66	0.1703	-0.0050	-1.45	OE
YKN2NF	X	0.0992	0.0029	1.12	0.1550	-0.0203	-5.82	OE
YQA4KK	X	0.0880	-0.0083	-3.21	0.1780	0.0027	0.78	OE
YY9JGK		0.0988	0.0025	0.95	0.1752	-0.0001	-0.04	OE
ZFQDN7		0.0980	0.0017	0.64	0.1767	0.0014	0.39	OE



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1608

Carbon & Low Alloy Steel, COPPER (Cu)  
COPPER (Cu)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
ZKLCR3		0.0943	-0.0020	-0.77	0.1743	-0.0010	-0.28	OE

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.0963	Percent	0.1753	Percent
<b>Stnd Dev Btrwn Labs</b>	0.0026	Percent	0.0035	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 121 of 142 reporting participants

### Key to Method Codes Reported by Participants

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

### Comments on Assigned Data Flags for Test #1608

- 2QYBGT (X) - Data for sample L77 are low.
- 387K6Z (X) - Data for both samples are high.
- 3J4ZBA (X) - Data for sample L77 are low.
- 8XN3P3 (X) - Data for both samples are low.
- 9Z8R97 (X) - Data for both samples are low.
- 9ZNR82 (X) - Data for sample L78 off by factor of ten.
- BQ8ATF (X) - Data for sample L77 are high and data for sample L78 are low.
- CEEP73 (X) - Data for sample L78 are high.
- EL8LXX (X) - Data for both samples are high.
- FLHLZ6 (X) - Inconsistent in testing between samples. Inconsistent within the determinations of sample L77.
- K7BL9G (X) - Data for sample L77 are high.
- LLZ3XY (X) - Data for both samples are low.
- QT9ZRM (X) - Data for both samples are low.
- UD8D2W (X) - Data for both samples are high.
- UTVPAW (X) - Data for both samples are high.
- X467RE (X) - Data for sample L77 are low.
- XAR7YE (X) - Data for sample L78 are high.
- YKN2NF (X) - Data for sample L78 are low. Inconsistent within the determinations of sample L78.
- YQA4KK (X) - Data for sample L77 are low.





# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1612

Carbon & Low Alloy Steel, NITROGEN (N)  
NITROGEN (N)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
2QLG4E		0.00773	0.00025	0.57	0.00663	0.00022	0.44	OE
2WP4N8		0.00730	-0.00018	-0.41	0.00627	-0.00015	-0.30	OE
3J4ZBA		0.00697	-0.00051	-1.16	0.00597	-0.00044	-0.90	XX
3PMVMR	*	0.00677	-0.00072	-1.63	0.00640	-0.00002	-0.03	OE
3T3QKV		0.00753	0.00005	0.12	0.00583	-0.00058	-1.19	CI
4WMYG3		0.00737	-0.00012	-0.26	0.00613	-0.00028	-0.58	XX
4Z8W6T	X	0.00627	-0.00122	-2.76	0.00683	0.00042	0.85	CO
4ZZ4C7	X	0.0341	0.02665	60.63	0.0335	0.02712	55.16	OE
6LWBWE		0.00767	0.00018	0.42	0.00657	0.00015	0.31	XX
6XTXZA		0.00770	0.00022	0.50	0.00647	0.00005	0.10	CI
7NKGBP	X	0.00377	-0.00372	-8.45	0.00237	-0.00405	-8.24	XX
8AGJE4	*	0.00853	0.00105	2.39	0.00690	0.00048	0.98	OE
8JGQ2A		0.00770	0.00022	0.50	0.00667	0.00025	0.51	XX
8MLVU3		0.00823	0.00075	1.71	0.00700	0.00058	1.19	XX
8PAAJD		0.00710	-0.00038	-0.87	0.00587	-0.00055	-1.12	XX
9NTJNY		0.00697	-0.00052	-1.17	0.00540	-0.00102	-2.07	CO
9W4WP3		0.00763	0.00015	0.34	0.00663	0.00022	0.44	CO
AGMATQ		0.00693	-0.00055	-1.25	0.00593	-0.00048	-0.98	OE
AJWQWB		0.00767	0.00018	0.42	0.00650	0.00008	0.17	XX
B422ZJ	X	0.00410	-0.00338	-7.69	0.00343	-0.00298	-6.07	OE
BBG2VM	X	0.0159	0.00845	19.23	0.0145	0.00805	16.37	OE
CC6NWN		0.00777	0.00028	0.65	0.00713	0.00072	1.46	OE
CX9XB8		0.00757	0.00008	0.19	0.00647	0.00005	0.10	XX
D7Z84U		0.00750	0.00002	0.04	0.00730	0.00088	1.80	OE
EUGM9J		0.00680	-0.00068	-1.55	0.00577	-0.00065	-1.32	OE
EVULCL		0.00783	0.00035	0.80	0.00647	0.00005	0.10	OE
F4GU6V	X	0.00850	0.00102	2.32	0.00863	0.00222	4.51	OE
FLHLZ6	X	0.00595	-0.00153	-3.48	0.00580	-0.00062	-1.25	OE
G4Y3Q4		0.00797	0.00048	1.10	0.00713	0.00072	1.46	OE
GEFMDL		0.00810	0.00062	1.41	0.00743	0.00102	2.07	OE
GTYD8H	X	0.00380	-0.00368	-8.38	0.00373	-0.00268	-5.46	OE
H6QN9E	X	0.0102	0.00268	6.11	0.00843	0.00202	4.10	OE
JKHDTW		0.00700	-0.00048	-1.10	0.00597	-0.00045	-0.91	OE
JMQ8QM		0.00707	-0.00042	-0.94	0.00617	-0.00025	-0.51	XX
K8JW2E		0.00730	-0.00018	-0.41	0.00640	-0.00002	-0.03	CI
KGR7TD		0.00730	-0.00018	-0.41	0.00640	-0.00002	-0.03	XX
L3AVJG	X	0.00457	-0.00292	-6.63	0.00263	-0.00378	-7.69	XX
LFGNA9		0.00742	-0.00007	-0.15	0.00615	-0.00027	-0.55	CO
LLZ3XY	X	0.0102	0.00272	6.18	0.0114	0.00495	10.07	DR
MFCPKH		0.00720	-0.00028	-0.64	0.00650	0.00008	0.17	OE
MN3YME	X	0.00268	-0.00480	-10.92	0.00153	-0.00488	-9.93	CO
NEUPVF		0.00720	-0.00028	-0.64	0.00593	-0.00048	-0.98	IR
Q7T4QQ		0.00800	0.00052	1.18	0.00700	0.00058	1.19	XX
QB6FWJ	X	0.00907	0.00158	3.61	0.00727	0.00085	1.73	CI
QEP2DT		0.00760	0.00012	0.27	0.00647	0.00005	0.10	XX
QT9ZRM	X	0.0462	0.03868	88.00	0.0523	0.04592	93.40	OE
QVX9XG		0.00683	-0.00065	-1.48	0.00567	-0.00075	-1.52	CO



# Fasteners and Metals Interlaboratory Testing Program

Cycle 135  
3rd Qtr 2021

## Analysis 1612

Carbon & Low Alloy Steel, NITROGEN (N)  
NITROGEN (N)

WebCode	Data Flag	Sample L77			Sample L78			Method
		Lab Mean	Diff. from Grand Mean	CPV	Lab Mean	Diff. from Grand Mean	CPV	
RENWPN		0.00800	0.00052	1.18	0.00700	0.00058	1.19	OE
RQ9X24		0.00757	0.00008	0.19	0.00647	0.00005	0.10	XX
T6PTUQ		0.00747	-0.00002	-0.03	0.00610	-0.00032	-0.64	CO
TEJ78R		0.00760	0.00012	0.27	0.00647	0.00005	0.10	XX
TRKD7A		0.00780	0.00032	0.72	0.00647	0.00005	0.10	CO
TXM2NW	X	0.00390	-0.00358	-8.15	0.00830	0.00188	3.83	OE
UD8D2W	X	0.0314	0.02392	54.41	0.0300	0.02355	47.90	OE
UDHXCD		0.00780	0.00032	0.72	0.00700	0.00058	1.19	IC
UWER9P		0.00803	0.00055	1.25	0.00727	0.00085	1.73	OE
VC67U2		0.00657	-0.00092	-2.08	0.00607	-0.00035	-0.71	OE
VJ493M		0.00780	0.00032	0.72	0.00673	0.00032	0.64	CO
VMK26U		0.00737	-0.00012	-0.26	0.00607	-0.00035	-0.71	CO
VYZQ87		0.00697	-0.00052	-1.17	0.00593	-0.00048	-0.98	OE
W6JEH2		0.00693	-0.00055	-1.25	0.00597	-0.00045	-0.91	AE
W8LZPT		0.00713	-0.00035	-0.79	0.00557	-0.00085	-1.73	XX
WJFGEU		0.00753	0.00005	0.12	0.00657	0.00015	0.31	CO
X467RE		0.00680	-0.00068	-1.55	0.00570	-0.00072	-1.46	OE
XAR7YE		0.00843	0.00095	2.16	0.00720	0.00078	1.59	CO
XGBLDA		0.00784	0.00036	0.81	0.00683	0.00042	0.85	CO
XMZV7F		0.00717	-0.00032	-0.72	0.00573	-0.00068	-1.39	OE
XQG8YQ		0.00757	0.00008	0.19	0.00637	-0.00005	-0.10	CO
YY9JGK		0.00759	0.00011	0.25	0.00652	0.00011	0.22	CO
ZKLCR3		0.00780	0.00032	0.72	0.00693	0.00052	1.05	CO

### Summary Statistics

	Sample L77		Sample L78	
<b>Grand Means</b>	0.00748	Percent	0.00642	Percent
<b>Stnd Dev Btwn Labs</b>	0.00044	Percent	0.00049	Percent

Samples L77, L78 : AISI 8740, AISI 8740

Statistics based on 54 of 70 reporting participants

### Key to Method Codes Reported by Participants

AE	Spectrometry - Atomic Emission (AES)	CI	Combustion / IR
CO	Combustion	DR	Spectrometry - Direct Reading OE (DROES)
IC	Spectrometry - Inductively Coupled Plasma (ICP)	IR	IR (Absorption / Detection)
OE	Spectrometry - Optical Emission (OES)	XX	Please Indicate Method Used for Current Element



**Analysis 1612**

**Carbon & Low Alloy Steel, NITROGEN (N)**  
**NITROGEN (N)**

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**Comments on Assigned Data Flags for Test #1612**

- 4Z8W6T (X) - Data for sample L77 are low.
- 4ZZ4C7 (X) - Extreme data.
- 7NKGBP (X) - Data for both samples are low. Possible Systematic Error.
- B422ZJ (X) - Data for both samples are low. Possible Systematic Error.
- BBG2VM (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L77.
- F4GU6V (X) - Data for sample L78 are high. Inconsistent within the determinations of both samples.
- FLHLZ6 (X) - Data for sample L77 are low. Inconsistent within the determinations of sample L77.
- GTYD8H (X) - Data for both samples are low. Possible Systematic Error.
- H6QN9E (X) - Data for both samples are high. Possible Systematic Error.
- L3AVJG (X) - Data for both samples are low. Possible Systematic Error.
- LLZ3XY (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of both samples.
- MN3YME (X) - Data for both samples are low. Possible Systematic Error.
- QB6FWJ (X) - Data for sample L77 are high.
- QT9ZRM (X) - Extreme data.
- TXM2NW (X) - Data for sample L77 are low and data for sample L78 are high. Inconsistent in testing between samples.
- UD8D2W (X) - Data for both samples are high. Possible Systematic Error. Inconsistent within the determinations of sample L77.

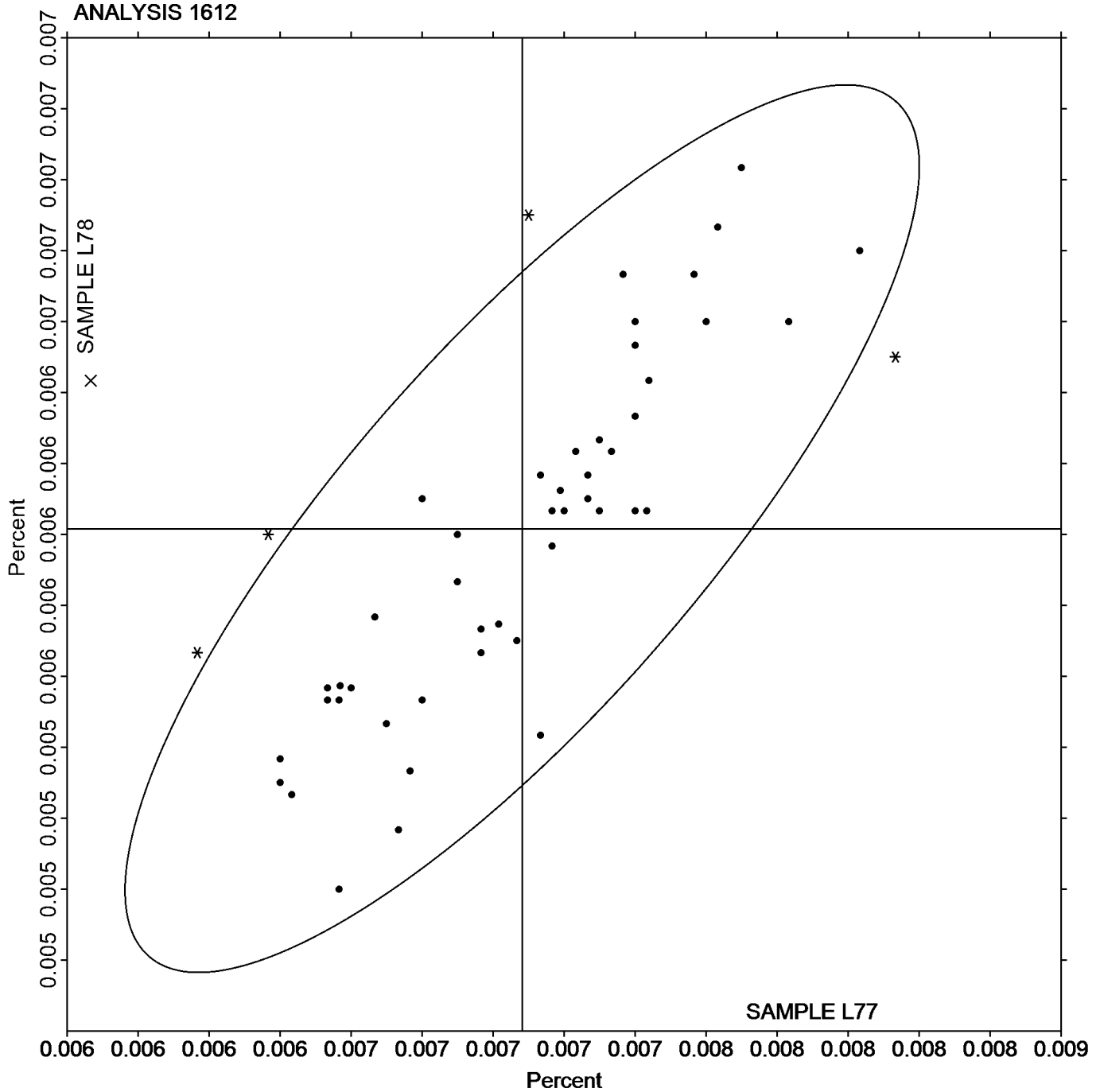


Analysis 1612

Carbon & Low Alloy Steel, NITROGEN (N)  
NITROGEN (N)

SAMPLE L77  
0.00748 Percent

SAMPLE L78  
0.00642 Percent







**Fasteners and Metals Interlaboratory Testing Program**

**Cycle 135**

**Analysis 1612**

**3rd Qtr 2021**

**Carbon & Low Alloy Steel, NITROGEN (N)  
NITROGEN (N)**

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-End of Report-