



Fasteners & Metals Testing Program

Summary Report Cycle 112, 4th Quarter - 2015

Collaborative Testing Services, Inc.

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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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Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 115

Fastener Wedge Tensile (10 deg) - ksi
ASTM F606

| WebCode | Data Flag | Sample X31 | | | Sample X32 | | | Instr Code |
|---------|-----------|------------|-----------------------|---------|------------|-----------------------|---------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2DYC3Q | | 168.97 | -0.84 | -0.56 | 169.55 | -0.81 | -0.47 | ZZ |
| 322YWQ | | 171.69 | 1.87 | 1.24 | 170.75 | 0.38 | 0.22 | ZZ |
| 392YRL | | 169.68 | -0.13 | -0.09 | 170.36 | -0.01 | 0.00 | ZZ |
| 39YK8Y | | 167.53 | -2.28 | -1.51 | 168.97 | -1.40 | -0.81 | ZZ |
| 3NDNVE | | 171.00 | 1.19 | 0.79 | 170.42 | 0.06 | 0.03 | ZZ |
| 4QFVNR | | 170.82 | 1.00 | 0.66 | 170.87 | 0.50 | 0.29 | ZZ |
| 68H33J | | 169.71 | -0.10 | -0.07 | 169.14 | -1.22 | -0.70 | ZZ |
| 7HF77D | | 168.60 | -1.21 | -0.80 | 169.68 | -0.69 | -0.40 | ZZ |
| 7MRD7W | | 170.50 | 0.69 | 0.46 | 170.89 | 0.53 | 0.31 | ZZ |
| 87X7MP | X | 13,687 | 13,516.85 | 8,941.4 | 13,127 | 12,956.30 | 7,473.8 | ZZ |
| 8BQC4D | | 171.37 | 1.55 | 1.03 | 173.13 | 2.77 | 1.60 | ZZ |
| 8PW2M9 | | 167.20 | -2.62 | -1.73 | 168.57 | -1.79 | -1.03 | ZZ |
| 9XG27P | | 172.02 | 2.21 | 1.46 | 171.54 | 1.18 | 0.68 | ZZ |
| A48LWC | | 169.91 | 0.10 | 0.07 | 172.28 | 1.92 | 1.11 | ZZ |
| ACTWW6 | | 169.29 | -0.52 | -0.35 | 171.57 | 1.21 | 0.70 | ZZ |
| AFJTVW | | 167.23 | -2.58 | -1.71 | 167.67 | -2.70 | -1.56 | ZZ |
| AMV6NN | | 171.08 | 1.27 | 0.84 | 171.21 | 0.85 | 0.49 | ZZ |
| APKKUP | | 169.31 | -0.50 | -0.33 | 171.97 | 1.61 | 0.93 | ZZ |
| AW78AP | | 171.10 | 1.28 | 0.85 | 174.19 | 3.83 | 2.21 | ZZ |
| B34L9V | | 168.57 | -1.25 | -0.82 | 170.13 | -0.23 | -0.13 | ZZ |
| B38VfV | | 170.48 | 0.66 | 0.44 | 169.67 | -0.70 | -0.40 | ZZ |
| C3Z32K | X | 8.633 | -161.18 | -106.62 | 8.640 | -161.72 | -93.29 | ZZ |
| C6RA83 | | 167.43 | -2.38 | -1.57 | 169.03 | -1.33 | -0.77 | ZZ |
| CK7H7K | * | 166.90 | -2.91 | -1.93 | 165.97 | -4.40 | -2.54 | ZZ |
| CWY2MC | X | 118.36 | -51.46 | -34.04 | 118.96 | -51.40 | -29.65 | ZZ |
| D6LE22 | | 168.71 | -1.10 | -0.73 | 170.10 | -0.27 | -0.15 | ZZ |
| DNEANX | | 170.67 | 0.85 | 0.56 | 171.83 | 1.47 | 0.85 | ZZ |
| EJJTYA | | 167.67 | -2.15 | -1.42 | 168.33 | -2.03 | -1.17 | ZZ |
| ENAA23 | | 173.20 | 3.39 | 2.24 | 172.70 | 2.34 | 1.35 | ZZ |
| EVWTV4 | | 169.13 | -0.68 | -0.45 | 169.73 | -0.63 | -0.36 | ZZ |
| EVZDJ7 | | 171.60 | 1.79 | 1.18 | 170.37 | 0.00 | 0.00 | ZZ |
| EWBDF2 | | 169.93 | 0.12 | 0.08 | 170.67 | 0.30 | 0.17 | ZZ |
| EX2JWR | | 169.73 | -0.08 | -0.05 | 171.30 | 0.94 | 0.54 | ZZ |
| FBMBX7 | | 173.20 | 3.39 | 2.24 | 172.08 | 1.72 | 0.99 | ZZ |
| FYAZKP | | 168.60 | -1.21 | -0.80 | 169.17 | -1.20 | -0.69 | ZZ |
| G9BXTA | | 170.40 | 0.59 | 0.39 | 170.17 | -0.20 | -0.11 | ZZ |
| GFAA2Z | | 168.90 | -0.91 | -0.60 | 169.43 | -0.93 | -0.54 | ZZ |
| GJ9X7E | | 171.10 | 1.29 | 0.85 | 171.93 | 1.57 | 0.91 | ZZ |
| HEGQN7 | | 168.71 | -1.10 | -0.73 | 170.60 | 0.24 | 0.14 | ZZ |
| HQADU2 | | 171.73 | 1.92 | 1.27 | 169.50 | -0.86 | -0.50 | ZZ |
| J32FBZ | X | 170.30 | 0.49 | 0.32 | 152.40 | -17.96 | -10.36 | ZZ |
| JWPHTE | | 168.67 | -1.15 | -0.76 | 171.67 | 1.30 | 0.75 | ZZ |
| LARLEK | | 168.46 | -1.36 | -0.90 | 168.72 | -1.64 | -0.95 | ZZ |
| LH33QR | | 170.63 | 0.82 | 0.54 | 171.47 | 1.10 | 0.64 | ZZ |
| M8LH7V | * | 172.90 | 3.09 | 2.04 | 168.50 | -1.86 | -1.08 | ZZ |
| MFGK97 | | 168.67 | -1.15 | -0.76 | 167.97 | -2.40 | -1.38 | ZZ |
| MQRY6D | | 168.73 | -1.09 | -0.72 | 169.41 | -0.96 | -0.55 | ZZ |
| NXP3UV | | 169.13 | -0.68 | -0.45 | 170.47 | 0.10 | 0.06 | ZZ |
| QHRTM9 | X | 171.22 | 1.40 | 0.93 | 179.19 | 8.83 | 5.09 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 115

Fastener Wedge Tensile (10 deg) - ksi
ASTM F606

| WebCode | Data Flag | Sample X31 | | | Sample X32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QUJCD8 | | 168.10 | -1.71 | -1.13 | 172.70 | 2.34 | 1.35 | ZZ |
| QZAX8E | | 168.50 | -1.31 | -0.87 | 166.60 | -3.76 | -2.17 | ZZ |
| RB642D | | 171.49 | 1.68 | 1.11 | 168.51 | -1.86 | -1.07 | ZZ |
| RP488P | * | 167.10 | -2.71 | -1.80 | 165.33 | -5.03 | -2.90 | ZZ |
| RQX3JZ | | 170.33 | 0.52 | 0.34 | 171.77 | 1.40 | 0.81 | ZZ |
| RV843H | | 170.90 | 1.09 | 0.72 | 168.97 | -1.39 | -0.80 | ZZ |
| T34H4A | | 170.73 | 0.92 | 0.61 | 170.36 | -0.01 | 0.00 | ZZ |
| TEYTAV | X | 173.96 | 4.14 | 2.74 | 176.24 | 5.88 | 3.39 | ZZ |
| TG73P8 | | 171.57 | 1.75 | 1.16 | 169.50 | -0.86 | -0.50 | ZZ |
| U4C3BB | | 169.57 | -0.25 | -0.16 | 170.23 | -0.13 | -0.08 | ZZ |
| U97YXF | | 170.61 | 0.80 | 0.53 | 170.66 | 0.30 | 0.17 | ZZ |
| UV47VJ | | 170.92 | 1.11 | 0.73 | 170.93 | 0.57 | 0.33 | ZZ |
| VDGAQA | | 168.83 | -0.98 | -0.65 | 169.90 | -0.46 | -0.27 | ZZ |
| VTQACY | | 170.17 | 0.35 | 0.23 | 170.23 | -0.13 | -0.08 | ZZ |
| W8998R | | 170.31 | 0.50 | 0.33 | 171.08 | 0.72 | 0.41 | ZZ |
| WKWBPJ | | 167.96 | -1.86 | -1.23 | 171.61 | 1.25 | 0.72 | ZZ |
| WWN7EY | | 169.85 | 0.04 | 0.02 | 170.79 | 0.42 | 0.24 | ZZ |
| WZ7YYE | | 171.69 | 1.88 | 1.24 | 173.18 | 2.82 | 1.62 | ZZ |
| XUY2GK | | 169.70 | -0.12 | -0.08 | 170.47 | 0.11 | 0.06 | ZZ |
| YR7J26 | | 169.38 | -0.43 | -0.28 | 173.52 | 3.15 | 1.82 | ZZ |
| ZLWHHM | | 169.49 | -0.32 | -0.21 | 173.27 | 2.91 | 1.68 | ZZ |

Summary Statistics

| | <u>Sample X31</u> | | <u>Sample X32</u> | |
|-------------------|-------------------|-----|-------------------|-----|
| Grand Means | 169.81 | ksi | 170.36 | ksi |
| Std Dev Btwn Labs | 1.51 | ksi | 1.73 | ksi |

Samples X31 , X32 : Fastener sizes: 3/8-16 x 2, 3/8-16 x 2 3/4

Statistics based on 64 of 70 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 115

Fastener Wedge Tensile (10 deg) - ksi
ASTM F606

Comments on assigned Data Flags for Analysis #115

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|---------------------------------|
| 87X7MP | X | Extreme Data. |
| C3Z32K | X | Data for both samples are low. |
| CWY2MC | X | Data for both samples are low. |
| J32FBZ | X | Data for sample X32 are low. |
| QHRTM9 | X | Data for sample X32 are high. |
| TEYTAV | X | Data for both samples are high. |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 115

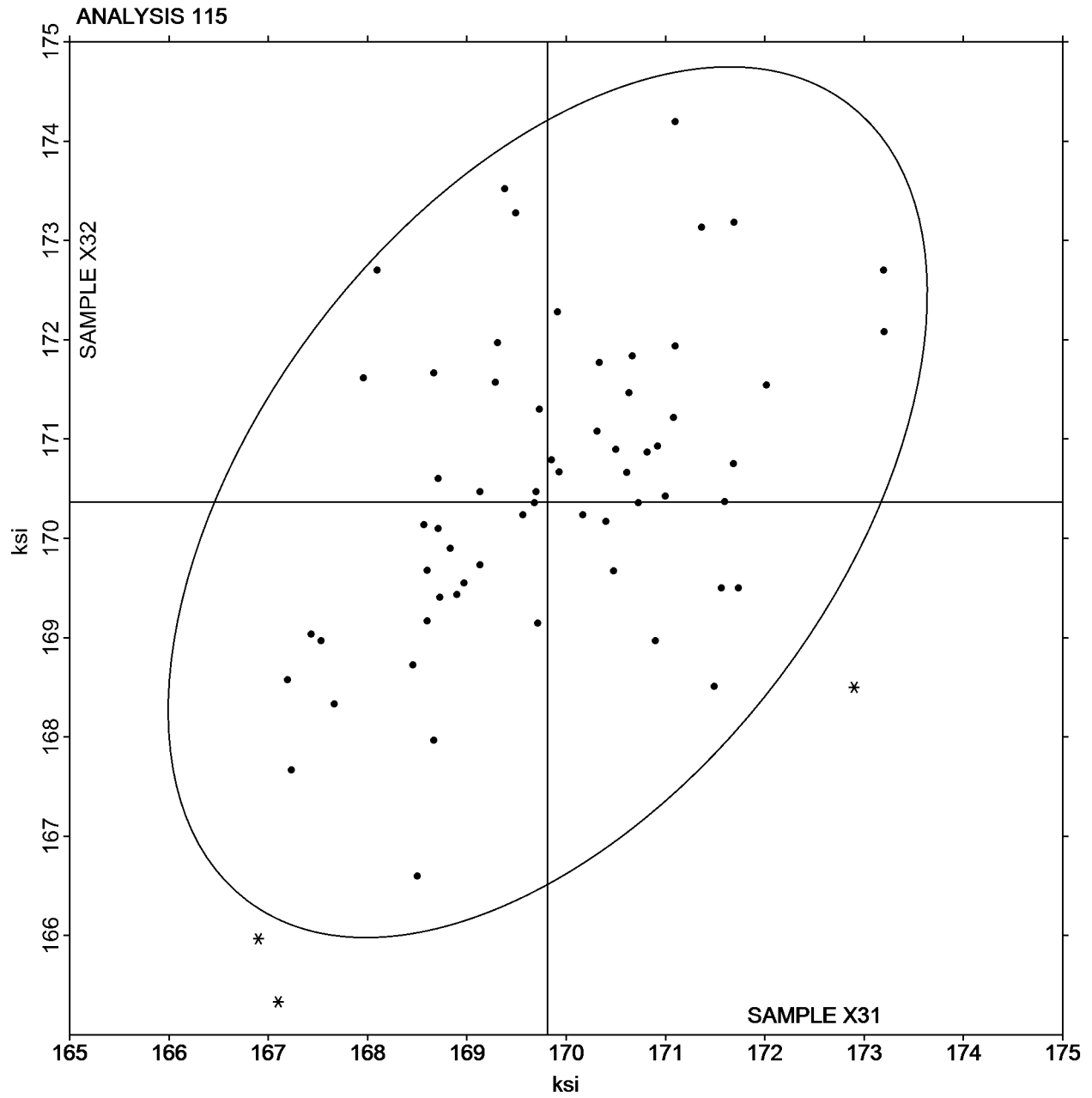
Fastener Wedge Tensile (10 deg) - ksi
ASTM F606

SAMPLE X31

169.81 ksi

SAMPLE X32

170.36 ksi



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 116

Fastener Axial Tensile - ksi
ASTM F606

| WebCode | Data Flag | Sample Q31 | | | Sample Q32 | | | Instr Code |
|---------|-----------|------------|-----------------------|---------|------------|-----------------------|---------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2DYC3Q | | 168.19 | -1.47 | -1.04 | 168.59 | -2.74 | -1.46 | ZZ |
| 2Z8U3R | | 170.20 | 0.54 | 0.38 | 173.75 | 2.42 | 1.29 | ZZ |
| 322YWQ | | 172.23 | 2.58 | 1.82 | 174.22 | 2.88 | 1.54 | ZZ |
| 392YRL | | 170.23 | 0.57 | 0.40 | 175.11 | 3.78 | 2.01 | ZZ |
| 3NDNVE | | 172.26 | 2.60 | 1.84 | 169.55 | -1.78 | -0.95 | ZZ |
| 3PMM2G | | 170.67 | 1.01 | 0.71 | 173.33 | 2.00 | 1.07 | ZZ |
| 3RBEQT | | 171.02 | 1.36 | 0.96 | 170.35 | -0.98 | -0.52 | ZZ |
| 4NB86V | | 171.47 | 1.81 | 1.28 | 171.14 | -0.20 | -0.10 | ZZ |
| 4QFVNR | | 168.88 | -0.77 | -0.55 | 172.85 | 1.52 | 0.81 | ZZ |
| 68H33J | | 168.95 | -0.70 | -0.50 | 168.58 | -2.76 | -1.47 | ZZ |
| 6A34X7 | | 168.27 | -1.39 | -0.98 | 171.50 | 0.17 | 0.09 | ZZ |
| 6LZXHF | X | 123.63 | -46.03 | -32.50 | 123.42 | -47.91 | -25.53 | ZZ |
| 7HF77D | | 167.87 | -1.78 | -1.26 | 169.21 | -2.12 | -1.13 | ZZ |
| 7MRD7W | | 172.10 | 2.44 | 1.72 | 174.64 | 3.31 | 1.76 | ZZ |
| 7U8WPW | | 169.30 | -0.36 | -0.25 | 170.27 | -1.06 | -0.57 | ZZ |
| 87X7MP | X | 13,440 | 13,270.34 | 9,369.6 | 13,567 | 13,395.34 | 7,137.2 | ZZ |
| 8NVEGU | X | 173.19 | 3.54 | 2.50 | 177.09 | 5.75 | 3.07 | ZZ |
| 9BMUX2 | | 169.84 | 0.19 | 0.13 | 172.22 | 0.89 | 0.48 | ZZ |
| 9XG27P | | 170.78 | 1.13 | 0.80 | 170.54 | -0.79 | -0.42 | ZZ |
| A48LWC | | 169.05 | -0.60 | -0.43 | 173.57 | 2.24 | 1.19 | ZZ |
| ACTWW6 | | 167.53 | -2.13 | -1.50 | 173.98 | 2.65 | 1.41 | ZZ |
| AFJTVW | | 168.17 | -1.49 | -1.05 | 172.23 | 0.90 | 0.48 | ZZ |
| AMV6NN | | 169.09 | -0.57 | -0.40 | 172.15 | 0.82 | 0.43 | ZZ |
| AUX73W | | 168.20 | -1.45 | -1.03 | 172.71 | 1.38 | 0.74 | ZZ |
| AW78AP | | 171.58 | 1.93 | 1.36 | 170.66 | -0.67 | -0.36 | ZZ |
| B34L9V | | 168.70 | -0.96 | -0.68 | 170.07 | -1.26 | -0.67 | ZZ |
| C3Z32K | X | 8.715 | -160.94 | -113.63 | 8.687 | -162.64 | -86.66 | ZZ |
| C4WUV6 | | 170.08 | 0.43 | 0.30 | 171.09 | -0.24 | -0.13 | ZZ |
| C6RA83 | | 167.97 | -1.69 | -1.19 | 172.33 | 1.00 | 0.53 | ZZ |
| CK7H7K | | 168.80 | -0.86 | -0.60 | 170.73 | -0.60 | -0.32 | ZZ |
| CNJ8LN | | 170.20 | 0.54 | 0.38 | 170.10 | -1.23 | -0.66 | ZZ |
| CWY2MC | X | 116.85 | -52.81 | -37.29 | 117.45 | -53.88 | -28.71 | ZZ |
| D3YPRW | | 169.60 | -0.06 | -0.04 | 173.53 | 2.20 | 1.17 | ZZ |
| D6LE22 | | 168.90 | -0.75 | -0.53 | 169.28 | -2.05 | -1.09 | ZZ |
| DNEANX | | 171.07 | 1.41 | 1.00 | 171.60 | 0.27 | 0.14 | ZZ |
| EJJTYA | | 168.67 | -0.99 | -0.70 | 168.00 | -3.33 | -1.78 | ZZ |
| EVWTV4 | | 169.90 | 0.24 | 0.17 | 173.30 | 1.97 | 1.05 | ZZ |
| EVZDJ7 | | 169.70 | 0.04 | 0.03 | 171.73 | 0.40 | 0.21 | ZZ |
| EWBDF2 | | 169.80 | 0.14 | 0.10 | 171.17 | -0.16 | -0.09 | ZZ |
| EX2JWR | | 172.03 | 2.38 | 1.68 | 172.73 | 1.40 | 0.75 | ZZ |
| F6XXWJ | | 168.33 | -1.32 | -0.93 | 168.83 | -2.50 | -1.33 | ZZ |
| FBMBX7 | X | 174.74 | 5.08 | 3.59 | 174.86 | 3.53 | 1.88 | ZZ |
| FJZ7Y8 | | 169.23 | -0.42 | -0.30 | 170.70 | -0.63 | -0.34 | ZZ |
| FUE9CR | | 167.87 | -1.78 | -1.26 | 172.35 | 1.02 | 0.54 | ZZ |
| FXG67T | | 166.63 | -3.02 | -2.13 | 170.43 | -0.90 | -0.48 | ZZ |
| FYAZKP | | 170.30 | 0.64 | 0.45 | 172.23 | 0.90 | 0.48 | ZZ |
| FZ4QNH | | 170.65 | 1.00 | 0.70 | 172.20 | 0.87 | 0.46 | ZZ |
| G4HZ3X | X | 182.85 | 13.19 | 9.31 | 181.91 | 10.57 | 5.63 | ZZ |
| G9BXTA | | 169.67 | 0.01 | 0.01 | 171.70 | 0.37 | 0.20 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 116

Fastener Axial Tensile - ksi
ASTM F606

| WebCode | Data Flag | Sample Q31 | | | Sample Q32 | | | Instr Code |
|---------|-----------|------------|-----------------------|---------|------------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| GFAA2Z | | 169.40 | -0.26 | -0.18 | 169.13 | -2.20 | -1.17 | ZZ |
| GK3DTJ | | 170.04 | 0.39 | 0.27 | 170.42 | -0.91 | -0.49 | ZZ |
| HEGQN7 | | 169.40 | -0.26 | -0.18 | 172.97 | 1.64 | 0.87 | ZZ |
| HZCRDE | | 169.99 | 0.34 | 0.24 | 175.56 | 4.23 | 2.25 | ZZ |
| JC4QUH | | 169.76 | 0.10 | 0.07 | 170.81 | -0.52 | -0.28 | ZZ |
| JWPHTE | | 169.67 | 0.01 | 0.01 | 172.33 | 1.00 | 0.53 | ZZ |
| JWTXAL | | 170.13 | 0.48 | 0.34 | 168.00 | -3.33 | -1.78 | ZZ |
| L6FNP | X | 195.09 | 25.43 | 17.96 | 172.62 | 1.29 | 0.69 | ZZ |
| L6V7GX | | 169.73 | 0.07 | 0.05 | 168.86 | -2.47 | -1.32 | ZZ |
| LT7ZY2 | | 172.24 | 2.58 | 1.83 | 171.48 | 0.15 | 0.08 | ZZ |
| LYA9TA | | 170.00 | 0.34 | 0.24 | 171.00 | -0.33 | -0.18 | ZZ |
| M2W3CW | | 169.89 | 0.24 | 0.17 | 172.47 | 1.14 | 0.61 | ZZ |
| M7J2GB | | 169.74 | 0.09 | 0.06 | 172.89 | 1.55 | 0.83 | ZZ |
| MFGK97 | | 170.40 | 0.74 | 0.53 | 169.97 | -1.36 | -0.73 | ZZ |
| MUWHD8 | * | 166.00 | -3.66 | -2.58 | 170.00 | -1.33 | -0.71 | ZZ |
| NXP3UV | | 166.67 | -2.99 | -2.11 | 169.37 | -1.96 | -1.05 | ZZ |
| NXUJTU | | 172.87 | 3.22 | 2.27 | 174.11 | 2.78 | 1.48 | ZZ |
| PVDX8X | M | 12,982 | 12,812.01 | 9,046.0 | No Data Reported | | | ZZ |
| QQJCZV | | 169.60 | -0.06 | -0.04 | 168.27 | -3.06 | -1.63 | ZZ |
| QTNP23 | | 170.74 | 1.08 | 0.76 | 168.46 | -2.87 | -1.53 | ZZ |
| QUJCD8 | | 168.27 | -1.39 | -0.98 | 171.27 | -0.06 | -0.03 | ZZ |
| RQX3JZ | | 168.00 | -1.66 | -1.17 | 170.70 | -0.63 | -0.34 | ZZ |
| RV843H | | 169.78 | 0.12 | 0.09 | 172.34 | 1.01 | 0.54 | ZZ |
| T34H4A | | 171.66 | 2.01 | 1.42 | 173.70 | 2.37 | 1.26 | ZZ |
| TEYTAV | X | 174.99 | 5.33 | 3.76 | 179.11 | 7.78 | 4.14 | ZZ |
| TFA97H | | 170.52 | 0.87 | 0.61 | 168.56 | -2.78 | -1.48 | ZZ |
| TG73P8 | | 170.77 | 1.11 | 0.78 | 172.70 | 1.37 | 0.73 | ZZ |
| U4C3BB | | 169.20 | -0.46 | -0.32 | 169.53 | -1.80 | -0.96 | ZZ |
| UVMA4K | | 167.48 | -2.17 | -1.53 | 173.15 | 1.82 | 0.97 | ZZ |
| VTQACY | | 169.67 | 0.01 | 0.01 | 174.00 | 2.67 | 1.42 | ZZ |
| W86XY2 | | 170.50 | 0.84 | 0.60 | 168.23 | -3.10 | -1.65 | ZZ |
| W8998R | | 171.61 | 1.96 | 1.38 | 171.39 | 0.06 | 0.03 | ZZ |
| WZ7YYE | | 170.04 | 0.39 | 0.27 | 173.33 | 2.00 | 1.06 | ZZ |
| X2YJWX | | 169.78 | 0.12 | 0.09 | 171.75 | 0.42 | 0.22 | ZZ |
| XEKV98 | | 168.53 | -1.12 | -0.79 | 172.86 | 1.52 | 0.81 | ZZ |
| XUY2GK | | 168.44 | -1.22 | -0.86 | 169.79 | -1.54 | -0.82 | ZZ |
| Y2RT2Y | | 166.64 | -3.02 | -2.13 | 169.36 | -1.97 | -1.05 | ZZ |
| YR7J26 | | 169.88 | 0.22 | 0.15 | 168.92 | -2.42 | -1.29 | ZZ |
| Z4CZ38 | | 171.19 | 1.54 | 1.09 | 169.41 | -1.93 | -1.03 | ZZ |
| ZLWHHM | | 170.60 | 0.95 | 0.67 | 172.85 | 1.52 | 0.81 | ZZ |

Summary Statistics

| | Sample Q31 | | Sample Q32 | |
|-------------------|------------|-----|------------|-----|
| Grand Means | 169.66 | ksi | 171.33 | ksi |
| Std Dev Btwn Labs | 1.42 | ksi | 1.88 | ksi |

Samples Q31 , Q32 : Fastener sizes: 3/8-16 x 2, 3/8-16 x 2

Statistics based on 79 of 89 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 116

Fastener Axial Tensile - ksi
ASTM F606

Comments on assigned Data Flags for Analysis #116

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|---|
| 6LZXHF | X | Data for both samples are low. |
| 87X7MP | X | Data for both samples are high. Inconsistent within the determinations of both samples. |
| 8NVEGU | X | Data for sample Q32 are high. |
| C3Z32K | X | Data for both samples are low. |
| CWY2MC | X | Data for both samples are low. |
| FBMBX7 | X | Data for sample Q31 are high. |
| G4HZ3X | X | Data for both samples are high. |
| L6FPNP | X | Data for sample Q31 are high. |
| PVDX8X | M | Laboratory did not submit data for sample Q32. Extreme Data for Sample Q31. |
| TEYTAV | X | Data for both samples are high. |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 116

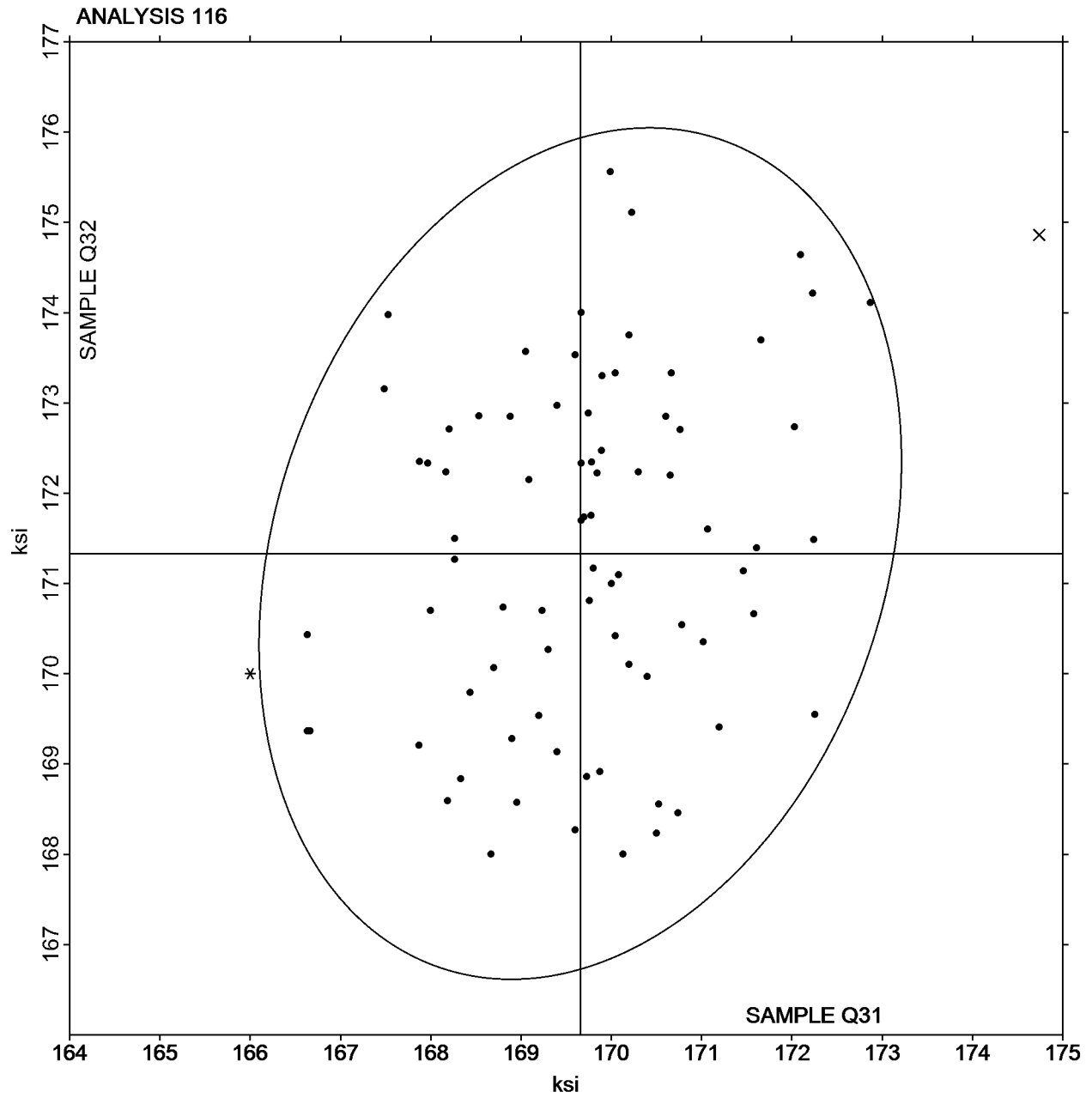
Fastener Axial Tensile - ksi
ASTM F606

SAMPLE Q31

169.66 ksi

SAMPLE Q32

171.33 ksi



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 120

Rockwell Hardness (C Scale) - HRC

ASTM E18

| WebCode | Data Flag | Sample E31 | | | Sample E32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 23W49L | | 58.50 | 0.36 | 0.85 | 53.60 | 0.59 | 1.26 | ZZ |
| 3FE9WU | | 57.88 | -0.26 | -0.61 | 52.82 | -0.19 | -0.40 | ZZ |
| 44368Q | X | 58.10 | -0.04 | -0.09 | 53.80 | 0.79 | 1.69 | ZZ |
| 46ETTB | | 58.42 | 0.28 | 0.66 | 53.18 | 0.17 | 0.36 | ZZ |
| 69X3L9 | | 58.00 | -0.14 | -0.33 | 52.68 | -0.33 | -0.70 | ZZ |
| 6A34X7 | | 58.68 | 0.54 | 1.28 | 53.40 | 0.39 | 0.83 | ZZ |
| 6EFRTW | | 57.92 | -0.22 | -0.52 | 52.88 | -0.13 | -0.28 | ZZ |
| 6EJCJK | | 57.62 | -0.52 | -1.22 | 52.58 | -0.43 | -0.92 | ZZ |
| 6GPKZH | | 57.62 | -0.52 | -1.22 | 52.30 | -0.71 | -1.51 | ZZ |
| 6J9NHM | X | 55.90 | -2.24 | -5.28 | 49.48 | -3.53 | -7.52 | ZZ |
| 6W4TWE | X | 55.36 | -2.78 | -6.56 | 52.46 | -0.55 | -1.17 | ZZ |
| 734RPF | | 58.10 | -0.04 | -0.09 | 52.90 | -0.11 | -0.23 | ZZ |
| 7PAM7H | | 58.42 | 0.28 | 0.66 | 53.24 | 0.23 | 0.49 | ZZ |
| 827NL8 | | 58.00 | -0.14 | -0.33 | 52.44 | -0.57 | -1.21 | ZZ |
| 82NR47 | | 58.46 | 0.32 | 0.76 | 53.30 | 0.29 | 0.62 | ZZ |
| 83YUP4 | | 58.20 | 0.06 | 0.15 | 53.36 | 0.35 | 0.75 | ZZ |
| 8BAWB6 | | 58.14 | 0.01 | 0.01 | 52.64 | -0.37 | -0.79 | ZZ |
| 8BQC4D | | 58.10 | -0.04 | -0.09 | 53.14 | 0.13 | 0.28 | ZZ |
| 8H9MBL | | 58.44 | 0.30 | 0.71 | 53.24 | 0.23 | 0.49 | ZZ |
| 9EM7T2 | X | 57.20 | -0.94 | -2.22 | 51.00 | -2.01 | -4.28 | ZZ |
| 9Z86UP | | 58.38 | 0.24 | 0.57 | 53.36 | 0.35 | 0.75 | ZZ |
| AFJTVW | | 58.18 | 0.04 | 0.10 | 53.18 | 0.17 | 0.36 | ZZ |
| APKKUP | | 58.30 | 0.16 | 0.38 | 53.30 | 0.29 | 0.62 | ZZ |
| AQBNHQ | | 58.48 | 0.34 | 0.81 | 53.40 | 0.39 | 0.83 | ZZ |
| AQEZQG | | 57.76 | -0.38 | -0.89 | 52.36 | -0.65 | -1.38 | ZZ |
| AZLQ4R | | 58.72 | 0.58 | 1.37 | 53.24 | 0.23 | 0.49 | ZZ |
| BBETKQ | | 57.92 | -0.22 | -0.52 | 52.66 | -0.35 | -0.74 | ZZ |
| BW2C4N | * | 57.06 | -1.08 | -2.55 | 52.20 | -0.81 | -1.73 | ZZ |
| BY7QMM | | 58.10 | -0.04 | -0.09 | 53.20 | 0.19 | 0.41 | ZZ |
| C4UT6D | | 58.34 | 0.20 | 0.48 | 53.30 | 0.29 | 0.62 | ZZ |
| D3YPRW | | 58.22 | 0.08 | 0.19 | 52.70 | -0.31 | -0.66 | ZZ |
| DGDXRZ | | 58.36 | 0.22 | 0.52 | 53.46 | 0.45 | 0.96 | ZZ |
| DJQKCZ | | 58.20 | 0.06 | 0.15 | 53.54 | 0.53 | 1.13 | ZZ |
| DNEANX | | 57.80 | -0.34 | -0.80 | 52.28 | -0.73 | -1.55 | ZZ |
| DU4MPK | | 58.08 | -0.06 | -0.14 | 52.92 | -0.09 | -0.19 | ZZ |
| DY2YVJ | | 58.28 | 0.14 | 0.33 | 53.26 | 0.25 | 0.53 | ZZ |
| EFF482 | | 58.48 | 0.34 | 0.81 | 53.16 | 0.15 | 0.32 | ZZ |
| EKVEK6 | | 57.36 | -0.78 | -1.84 | 52.26 | -0.75 | -1.60 | ZZ |
| EREV2L | | 57.68 | -0.46 | -1.08 | 52.76 | -0.25 | -0.53 | ZZ |
| ETACDH | | 57.12 | -1.02 | -2.40 | 52.06 | -0.95 | -2.02 | ZZ |
| EUYU6H | | 58.00 | -0.14 | -0.33 | 53.10 | 0.09 | 0.19 | ZZ |
| EVZDJ7 | | 58.30 | 0.16 | 0.38 | 53.14 | 0.13 | 0.28 | ZZ |
| F7BE8B | | 58.68 | 0.54 | 1.28 | 53.44 | 0.43 | 0.92 | ZZ |
| FBMBX7 | | 58.10 | -0.04 | -0.09 | 53.10 | 0.09 | 0.19 | ZZ |
| FLXWUK | | 58.26 | 0.12 | 0.29 | 53.38 | 0.37 | 0.79 | ZZ |
| FZ4QNH | | 57.72 | -0.42 | -0.99 | 52.50 | -0.51 | -1.09 | ZZ |
| G3LKQ2 | | 58.68 | 0.54 | 1.28 | 53.46 | 0.45 | 0.96 | ZZ |
| G3ZVHE | | 58.51 | 0.37 | 0.88 | 53.56 | 0.55 | 1.16 | ZZ |
| GFAA2Z | | 58.10 | -0.04 | -0.09 | 53.00 | -0.01 | -0.02 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 120

Rockwell Hardness (C Scale) - HRC

ASTM E18

| WebCode | Data Flag | Sample E31 | | | Sample E32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| H6R3QH | | 58.26 | 0.12 | 0.29 | 53.22 | 0.21 | 0.45 | ZZ |
| HHWBH9 | * | 57.00 | -1.14 | -2.69 | 52.22 | -0.79 | -1.68 | ZZ |
| J32FBZ | | 58.44 | 0.30 | 0.71 | 53.40 | 0.39 | 0.83 | ZZ |
| J3D6NK | | 57.54 | -0.60 | -1.41 | 52.08 | -0.93 | -1.98 | ZZ |
| J96C7T | | 57.84 | -0.30 | -0.70 | 52.86 | -0.15 | -0.32 | ZZ |
| JACRDY | | 58.78 | 0.64 | 1.51 | 53.76 | 0.75 | 1.60 | ZZ |
| JFNTKN | | 58.42 | 0.28 | 0.66 | 53.39 | 0.38 | 0.81 | ZZ |
| JGJBMP | | 57.36 | -0.78 | -1.84 | 52.38 | -0.63 | -1.34 | ZZ |
| JJ8KXC | | 59.04 | 0.90 | 2.13 | 53.94 | 0.93 | 1.98 | ZZ |
| KFHMYK | | 58.12 | -0.02 | -0.04 | 52.82 | -0.19 | -0.40 | ZZ |
| L2WULX | | 58.88 | 0.74 | 1.75 | 53.68 | 0.67 | 1.43 | ZZ |
| LARLEK | | 58.00 | -0.14 | -0.33 | 53.06 | 0.05 | 0.11 | ZZ |
| LDPD3N | | 58.68 | 0.54 | 1.28 | 53.78 | 0.77 | 1.64 | ZZ |
| LW3XW7 | | 58.36 | 0.22 | 0.52 | 53.22 | 0.21 | 0.45 | ZZ |
| LYA9TA | | 59.00 | 0.86 | 2.03 | 54.00 | 0.99 | 2.11 | ZZ |
| MQRY6D | | 57.80 | -0.34 | -0.80 | 52.90 | -0.11 | -0.23 | ZZ |
| MY7YMV | | 57.66 | -0.48 | -1.13 | 52.98 | -0.03 | -0.06 | ZZ |
| NC9RPR | | 57.84 | -0.30 | -0.70 | 52.58 | -0.43 | -0.92 | ZZ |
| NTZPT9 | | 58.06 | -0.08 | -0.18 | 53.08 | 0.07 | 0.15 | ZZ |
| NZY4Q3 | | 58.68 | 0.54 | 1.28 | 53.44 | 0.43 | 0.92 | ZZ |
| P32CJJ | | 57.74 | -0.40 | -0.94 | 52.36 | -0.65 | -1.38 | ZZ |
| PVDX8X | | 57.70 | -0.44 | -1.03 | 52.10 | -0.91 | -1.94 | ZZ |
| QN9ELE | | 58.50 | 0.36 | 0.85 | 53.52 | 0.51 | 1.09 | ZZ |
| QWNX4R | | 58.88 | 0.74 | 1.75 | 53.76 | 0.75 | 1.60 | ZZ |
| R6E6Y3 | | 58.06 | -0.08 | -0.18 | 53.16 | 0.15 | 0.32 | ZZ |
| RQX3JZ | | 57.94 | -0.20 | -0.47 | 52.68 | -0.33 | -0.70 | ZZ |
| RWJZ9M | * | 58.82 | 0.68 | 1.61 | 53.24 | 0.23 | 0.49 | ZZ |
| TFU3UY | | 57.64 | -0.50 | -1.18 | 52.34 | -0.67 | -1.43 | ZZ |
| UA3E9R | | 58.10 | -0.04 | -0.09 | 53.34 | 0.33 | 0.70 | ZZ |
| V4N7EZ | | 58.00 | -0.14 | -0.33 | 53.00 | -0.01 | -0.02 | ZZ |
| VBR4AJ | * | 57.58 | -0.56 | -1.32 | 51.88 | -1.13 | -2.41 | ZZ |
| W3VMXK | | 58.34 | 0.20 | 0.48 | 53.24 | 0.23 | 0.49 | ZZ |
| W86XY2 | | 58.32 | 0.18 | 0.43 | 53.04 | 0.03 | 0.07 | ZZ |
| W8998R | | 58.22 | 0.08 | 0.19 | 52.66 | -0.35 | -0.74 | ZZ |
| WEL7PJ | | 58.22 | 0.08 | 0.19 | 53.18 | 0.17 | 0.36 | ZZ |
| WWN7EY | | 58.56 | 0.42 | 1.00 | 53.48 | 0.47 | 1.00 | ZZ |
| WZ7YYE | | 57.52 | -0.62 | -1.46 | 52.30 | -0.71 | -1.51 | ZZ |
| X2WUPE | | 58.40 | 0.26 | 0.62 | 53.00 | -0.01 | -0.02 | ZZ |
| X6XURX | | 57.92 | -0.22 | -0.52 | 52.50 | -0.51 | -1.09 | ZZ |
| XA8TKQ | | 58.24 | 0.10 | 0.24 | 53.18 | 0.17 | 0.36 | ZZ |
| XMGJ9J | | 57.98 | -0.16 | -0.37 | 52.98 | -0.03 | -0.06 | ZZ |
| YRRWPH | | 58.40 | 0.26 | 0.62 | 53.16 | 0.15 | 0.32 | ZZ |
| YV6UX6 | | 57.88 | -0.26 | -0.61 | 52.80 | -0.21 | -0.45 | ZZ |
| YYL7R2 | | 57.92 | -0.22 | -0.52 | 53.18 | 0.17 | 0.36 | ZZ |
| ZFN8ZT | X | 56.74 | -1.40 | -3.30 | 52.70 | -0.31 | -0.66 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 120
Rockwell Hardness (C Scale) - HRC
ASTM E18

Summary Statistics

| | <u>Sample E31</u> | | <u>Sample E32</u> | |
|-------------------|-------------------|-----|-------------------|-----|
| Grand Means | 58.14 | HRC | 53.01 | HRC |
| Std Dev Btwn Labs | 0.42 | HRC | 0.47 | HRC |

Samples E31 , E32 : Steel

Statistics based on 89 of 94 reporting participants

Comments on assigned Data Flags for Analysis #120

WebCode Flag Analyst Comment

44368Q X Inconsistent in testing between samples.

6J9NHM X Data for both samples are low. Possible Systematic error. Inconsistent within the determinations of sample E32.

6W4TWE X Data for sample E31 are low. Inconsistent in testing between samples.

9EM7T2 X Data for sample E32 are low. Inconsistent in testing between samples. Inconsistent within the determinations of both samples.

ZFN8ZT X Data for sample E31 are low. Inconsistent in testing between samples.

Cycle 112
4th Q, 2015

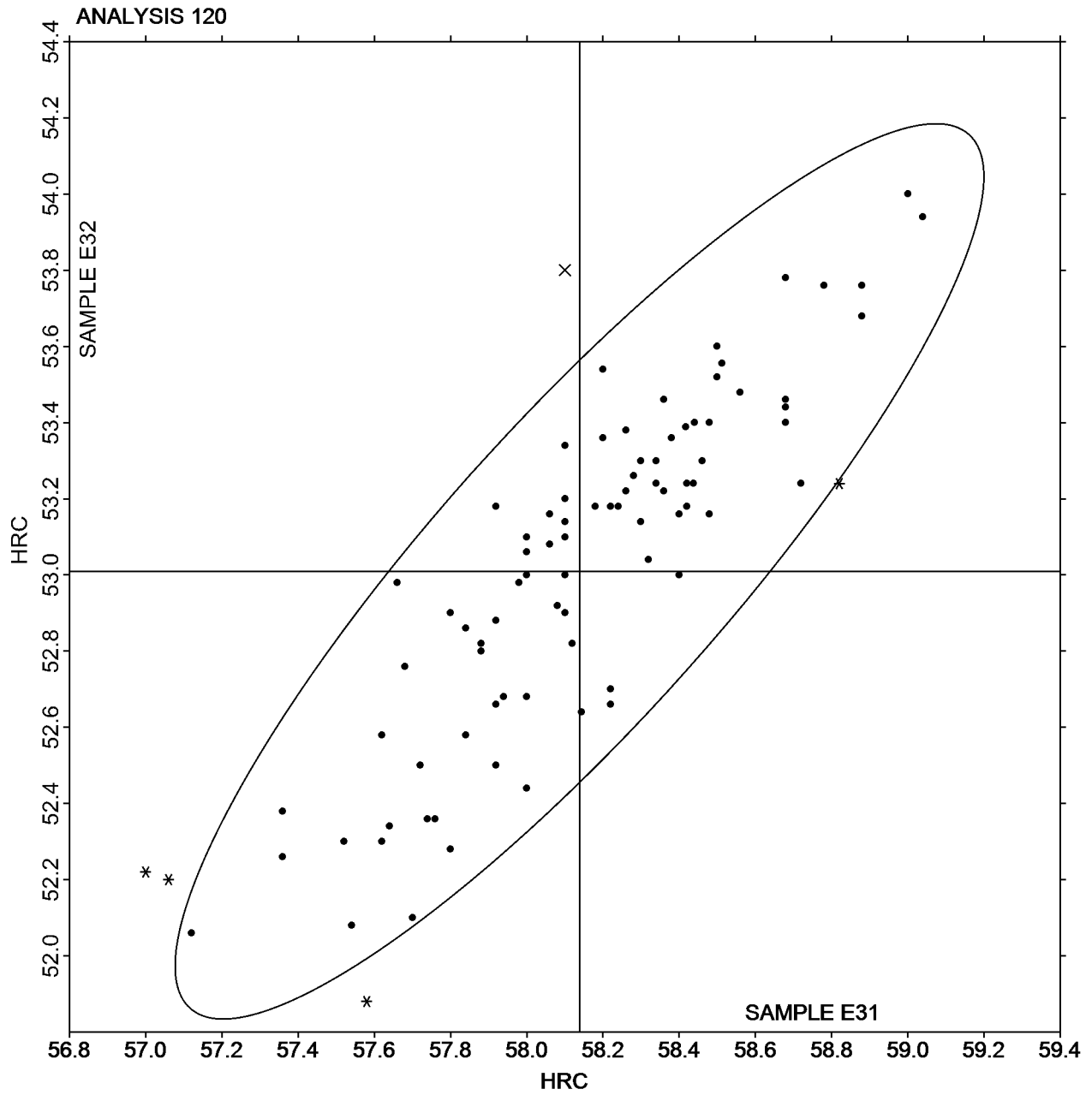
Interlaboratory Testing Program for Metals

Analysis 120

Rockwell Hardness (C Scale) - HRC
ASTM E18

SAMPLE E31
58.14 HRC

SAMPLE E32
53.01 HRC



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 125

Rockwell Hardness of Externally Threaded Fasteners - HRC
ASTM F606/F606M AND ASTM E18

| WebCode | Data Flag | Sample G31 | | | Sample G32 | | | Instr Code |
|---------|-----------|------------|-----------------------|--------|------------|-----------------------|--------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 23ZCPM | | 36.76 | 0.65 | 1.02 | 37.00 | 0.45 | 0.80 | ZZ |
| 2DYC3Q | | 35.76 | -0.34 | -0.54 | 36.03 | -0.53 | -0.94 | ZZ |
| 2ZBEQU | * | 34.79 | -1.31 | -2.07 | 36.26 | -0.30 | -0.53 | ZZ |
| 39YK8Y | | 35.84 | -0.26 | -0.41 | 36.07 | -0.48 | -0.86 | ZZ |
| 3H84J3 | | 36.48 | 0.37 | 0.59 | 37.23 | 0.68 | 1.21 | ZZ |
| 3NDNVE | | 35.71 | -0.40 | -0.63 | 35.82 | -0.73 | -1.31 | ZZ |
| 48NX9K | X | 33.52 | -2.59 | -4.07 | 31.89 | -4.67 | -8.33 | ZZ |
| 4QFVNR | | 36.46 | 0.36 | 0.56 | 36.46 | -0.10 | -0.17 | ZZ |
| 4R9Y2Y | | 36.19 | 0.08 | 0.13 | 35.94 | -0.62 | -1.10 | ZZ |
| 4YTV8A | | 36.41 | 0.31 | 0.48 | 36.69 | 0.14 | 0.25 | ZZ |
| 68FFL7 | | 36.04 | -0.07 | -0.11 | 36.48 | -0.07 | -0.13 | ZZ |
| 68H33J | | 36.66 | 0.55 | 0.87 | 37.01 | 0.46 | 0.82 | ZZ |
| 6LZXHF | | 35.68 | -0.43 | -0.67 | 36.28 | -0.28 | -0.50 | ZZ |
| 7HF77D | X | 35.94 | -0.17 | -0.27 | 34.75 | -1.80 | -3.22 | ZZ |
| 7JDGZV | | 36.26 | 0.16 | 0.24 | 36.75 | 0.20 | 0.35 | ZZ |
| 7MRD7W | * | 34.88 | -1.23 | -1.94 | 35.13 | -1.43 | -2.55 | ZZ |
| 7U8WPW | | 36.30 | 0.19 | 0.30 | 36.21 | -0.35 | -0.62 | ZZ |
| 87X7MP | | 37.08 | 0.97 | 1.53 | 36.93 | 0.38 | 0.68 | ZZ |
| 8BQC4D | | 36.68 | 0.57 | 0.90 | 37.23 | 0.67 | 1.20 | ZZ |
| 8PW2M9 | | 36.21 | 0.11 | 0.17 | 36.12 | -0.43 | -0.78 | ZZ |
| 8R2UEL | | 36.16 | 0.06 | 0.09 | 36.53 | -0.03 | -0.05 | ZZ |
| 9XG27P | | 36.43 | 0.32 | 0.51 | 36.46 | -0.10 | -0.17 | ZZ |
| A48LWC | | 36.58 | 0.47 | 0.74 | 37.14 | 0.59 | 1.06 | ZZ |
| ACTWW6 | | 36.87 | 0.76 | 1.20 | 37.46 | 0.90 | 1.61 | ZZ |
| AMV6NN | | 35.81 | -0.30 | -0.47 | 37.09 | 0.53 | 0.95 | ZZ |
| AW78AP | | 36.45 | 0.34 | 0.54 | 36.17 | -0.38 | -0.69 | ZZ |
| B38VfV | | 36.19 | 0.09 | 0.14 | 35.98 | -0.57 | -1.02 | ZZ |
| BDA349 | | 36.70 | 0.59 | 0.93 | 37.06 | 0.50 | 0.90 | ZZ |
| BR7H7M | | 35.69 | -0.42 | -0.66 | 36.69 | 0.14 | 0.25 | ZZ |
| C4WUV6 | | 37.05 | 0.94 | 1.48 | 37.66 | 1.10 | 1.97 | ZZ |
| C6RA83 | | 36.80 | 0.69 | 1.09 | 37.28 | 0.73 | 1.30 | ZZ |
| C6RCW8 | | 37.03 | 0.92 | 1.45 | 37.04 | 0.48 | 0.86 | ZZ |
| CK7H7K | | 36.88 | 0.77 | 1.22 | 37.02 | 0.47 | 0.83 | ZZ |
| CWY2MC | X | 27.84 | -8.26 | -13.00 | 25.89 | -10.67 | -19.04 | ZZ |
| DFQAFZ | X | 32.08 | -4.03 | -6.34 | 30.91 | -5.65 | -10.08 | ZZ |
| DVH8HV | | 36.51 | 0.41 | 0.64 | 36.81 | 0.25 | 0.45 | ZZ |
| EJJTYA | | 36.34 | 0.24 | 0.37 | 36.84 | 0.28 | 0.51 | ZZ |
| EVWTV4 | | 36.31 | 0.21 | 0.32 | 36.86 | 0.30 | 0.54 | ZZ |
| EVZDJ7 | | 36.58 | 0.47 | 0.74 | 36.61 | 0.06 | 0.11 | ZZ |
| EWBDF2 | | 36.01 | -0.09 | -0.15 | 37.06 | 0.51 | 0.91 | ZZ |
| EX2JWR | | 36.38 | 0.27 | 0.43 | 37.19 | 0.64 | 1.14 | ZZ |
| FHHDZH | | 35.68 | -0.43 | -0.67 | 36.67 | 0.12 | 0.21 | ZZ |
| FPKEEQ | | 37.14 | 1.04 | 1.63 | 37.47 | 0.92 | 1.63 | ZZ |
| FXG67T | | 35.63 | -0.48 | -0.75 | 36.18 | -0.38 | -0.68 | ZZ |
| G4HZ3X | | 36.27 | 0.16 | 0.25 | 36.76 | 0.20 | 0.36 | ZZ |
| G9BXTA | | 36.24 | 0.14 | 0.21 | 36.96 | 0.41 | 0.73 | ZZ |
| GJ9X7E | | 34.73 | -1.38 | -2.17 | 35.24 | -1.32 | -2.35 | ZZ |
| GWK2UX | | 36.43 | 0.32 | 0.50 | 37.01 | 0.46 | 0.82 | ZZ |
| HEGQN7 | | 36.00 | -0.11 | -0.17 | 36.94 | 0.38 | 0.69 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 125

Rockwell Hardness of Externally Threaded Fasteners - HRC
ASTM F606/F606M AND ASTM E18

| WebCode | Data Flag | Sample G31 | | | Sample G32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| HQADU2 | | 36.00 | -0.11 | -0.17 | 36.32 | -0.23 | -0.42 | ZZ |
| HZCRDE | | 36.26 | 0.16 | 0.24 | 37.08 | 0.52 | 0.93 | ZZ |
| J8TMT9 | | 37.01 | 0.90 | 1.41 | 37.66 | 1.10 | 1.97 | ZZ |
| JWPHTE | | 36.13 | 0.02 | 0.03 | 36.27 | -0.29 | -0.51 | ZZ |
| KAC6LD | | 35.98 | -0.13 | -0.21 | 36.09 | -0.46 | -0.82 | ZZ |
| L6FPNP | | 35.57 | -0.54 | -0.85 | 36.83 | 0.28 | 0.50 | ZZ |
| L93EYU | | 35.81 | -0.29 | -0.46 | 35.95 | -0.60 | -1.08 | ZZ |
| LH33QR | | 36.63 | 0.52 | 0.81 | 36.76 | 0.21 | 0.37 | ZZ |
| LT7ZY2 | | 36.92 | 0.81 | 1.28 | 37.38 | 0.82 | 1.47 | ZZ |
| LYA9TA | | 36.88 | 0.77 | 1.21 | 36.63 | 0.07 | 0.13 | ZZ |
| M2W3CW | | 36.01 | -0.10 | -0.16 | 36.25 | -0.30 | -0.54 | ZZ |
| M8LH7V | * | 34.69 | -1.41 | -2.22 | 36.22 | -0.33 | -0.60 | ZZ |
| MFGK97 | | 36.49 | 0.39 | 0.61 | 36.51 | -0.04 | -0.07 | ZZ |
| MUWH8 | * | 34.51 | -1.59 | -2.51 | 36.05 | -0.50 | -0.90 | ZZ |
| NXP3UV | | 36.61 | 0.50 | 0.79 | 36.78 | 0.23 | 0.41 | ZZ |
| NXUJTU | | 35.99 | -0.12 | -0.19 | 36.44 | -0.12 | -0.21 | ZZ |
| NZF9BL | * | 34.53 | -1.57 | -2.48 | 35.33 | -1.23 | -2.19 | ZZ |
| QHRTM9 | | 36.42 | 0.31 | 0.49 | 36.91 | 0.35 | 0.63 | ZZ |
| QKX4V6 | | 35.92 | -0.19 | -0.30 | 36.23 | -0.32 | -0.57 | ZZ |
| QUJCD8 | | 36.33 | 0.22 | 0.34 | 36.26 | -0.30 | -0.53 | ZZ |
| QVTE3Q | | 36.25 | 0.14 | 0.22 | 36.90 | 0.35 | 0.62 | ZZ |
| R6W3HU | | 37.13 | 1.02 | 1.61 | 37.43 | 0.88 | 1.57 | ZZ |
| RB642D | | 35.50 | -0.61 | -0.96 | 36.03 | -0.53 | -0.94 | ZZ |
| RP488P | | 36.04 | -0.07 | -0.11 | 36.42 | -0.13 | -0.24 | ZZ |
| RQX3JZ | | 35.78 | -0.33 | -0.52 | 35.59 | -0.96 | -1.71 | ZZ |
| T9BWXR | | 35.26 | -0.84 | -1.33 | 35.95 | -0.60 | -1.08 | ZZ |
| TEYTAV | X | 33.28 | -2.83 | -4.46 | 32.64 | -3.92 | -6.99 | ZZ |
| TFA97H | | 36.29 | 0.19 | 0.29 | 37.44 | 0.88 | 1.58 | ZZ |
| TG73P8 | | 36.49 | 0.38 | 0.60 | 36.77 | 0.22 | 0.38 | ZZ |
| U4C3BB | | 35.74 | -0.37 | -0.58 | 36.72 | 0.17 | 0.30 | ZZ |
| UVMA4K | | 35.97 | -0.14 | -0.22 | 35.96 | -0.60 | -1.07 | ZZ |
| UWXW2Y | | 35.73 | -0.38 | -0.60 | 35.88 | -0.68 | -1.21 | ZZ |
| V7FA32 | * | 34.75 | -1.36 | -2.14 | 36.25 | -0.30 | -0.54 | ZZ |
| VTQACY | | 35.42 | -0.69 | -1.08 | 35.89 | -0.67 | -1.19 | ZZ |
| WZ7YYE | | 36.01 | -0.09 | -0.15 | 36.41 | -0.15 | -0.26 | ZZ |
| X2YJWX | | 36.13 | 0.02 | 0.03 | 36.16 | -0.40 | -0.71 | ZZ |
| XHMKZF | | 36.08 | -0.03 | -0.05 | 36.70 | 0.15 | 0.26 | ZZ |
| XUY2GK | | 35.84 | -0.27 | -0.42 | 36.12 | -0.43 | -0.78 | ZZ |
| YR7J26 | | 36.63 | 0.52 | 0.81 | 36.74 | 0.19 | 0.34 | ZZ |
| ZECN3G | | 36.01 | -0.10 | -0.16 | 36.78 | 0.23 | 0.41 | ZZ |
| ZHVGEJ | | 36.26 | 0.15 | 0.23 | 36.65 | 0.10 | 0.17 | ZZ |
| ZLWHHM | * | 34.18 | -1.93 | -3.03 | 35.12 | -1.44 | -2.56 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 125

Rockwell Hardness of Externally Threaded Fasteners - HRC
ASTM F606/F606M AND ASTM E18

Summary Statistics

| | <u>Sample G31</u> | | <u>Sample G32</u> | |
|-------------------|-------------------|-----|-------------------|-----|
| Grand Means | 36.11 | HRC | 36.55 | HRC |
| Std Dev Btwn Labs | 0.64 | HRC | 0.56 | HRC |

Samples G31 , G32 : Fastener sizes: 1/2-20 x 2 1/2 , 1/2-20 x 1/4

Statistics based on 86 of 91 reporting participants

Comments on assigned Data Flags for Analysis #125

WebCode Flag Analyst Comment

| | | |
|---------------|---|---|
| 48NX9K | X | Data for both samples are low. Possible Systematic error. Inconsistent within the determinations of sample G32. |
| 7HF77D | X | Data for sample G32 are low. Inconsistent in testing between samples. Inconsistent within the determinations of sample G32. |
| CWY2MC | X | Data for both samples are low. Possible Systematic error. |
| DFQAFZ | X | Data for both samples are low. Possible Systematic error. Inconsistent within the determinations of both samples. |
| TEYTAV | X | Data for both samples are low. Possible Systematic error. |

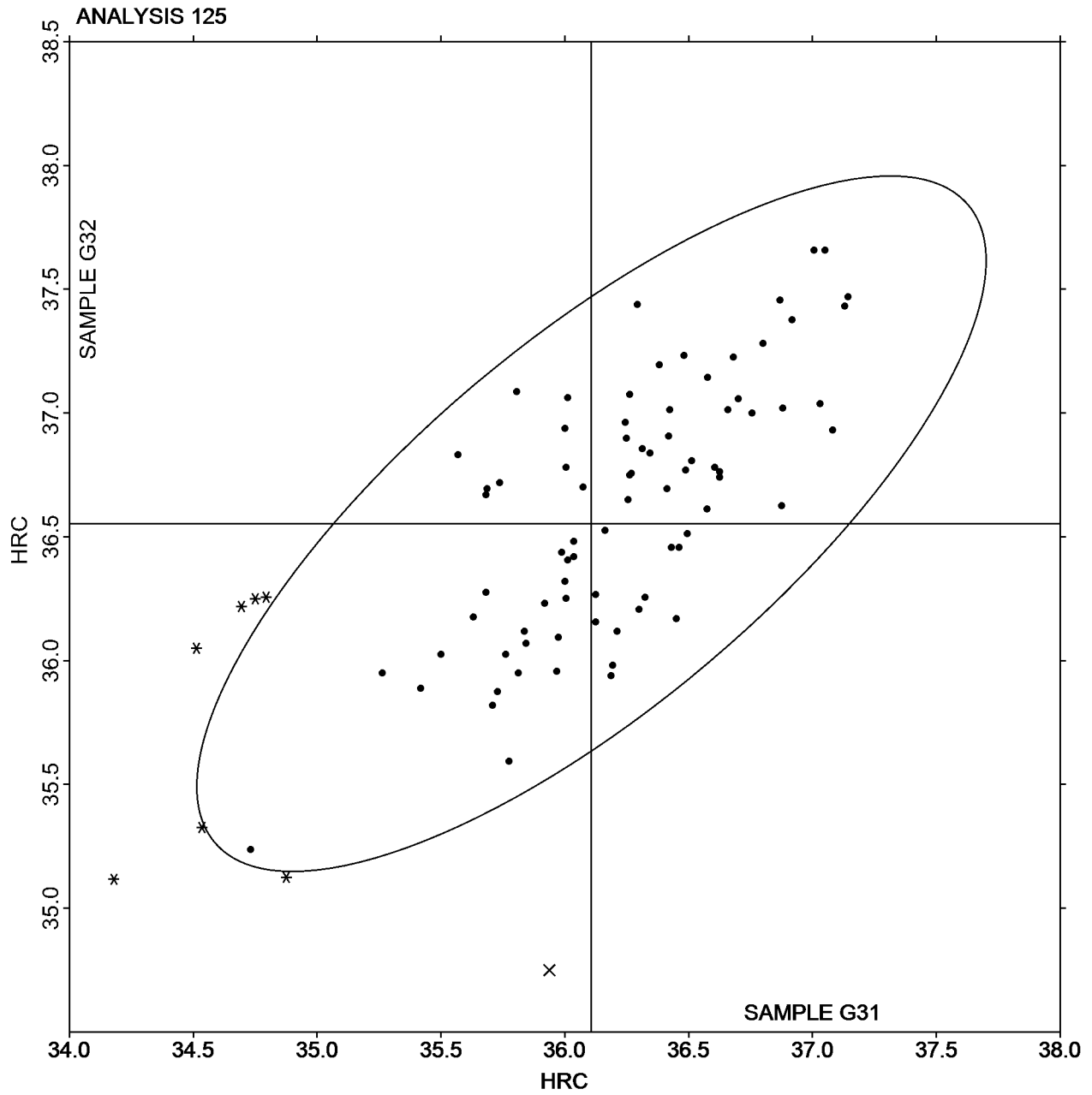
Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 125

Rockwell Hardness of Externally Threaded Fasteners - HRC
ASTM F606/F606M AND ASTM E18

SAMPLE G31
36.11 HRC

SAMPLE G32
36.55 HRC



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 126

Vickers Hardness of Externally Threaded Fasteners - HV
ASTM E384

| WebCode | Data Flag | Sample V31 | | | Sample V32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 36Z99D | | 353.94 | -3.19 | -0.69 | 357.75 | -6.35 | -1.18 | ZZ |
| 673VTV | | 350.56 | -6.57 | -1.41 | 362.46 | -1.64 | -0.31 | ZZ |
| 68H33J | | 359.19 | 2.06 | 0.44 | 372.69 | 8.58 | 1.60 | ZZ |
| 6BZ8YU | | 349.93 | -7.21 | -1.55 | 357.69 | -6.41 | -1.19 | ZZ |
| 7PDVNH | | 358.00 | 0.87 | 0.19 | 365.94 | 1.83 | 0.34 | ZZ |
| 8PW2M9 | | 350.44 | -6.69 | -1.44 | 352.19 | -11.92 | -2.22 | ZZ |
| 9YD68C | | 350.66 | -6.47 | -1.39 | 361.04 | -3.06 | -0.57 | ZZ |
| AMV6NN | | 361.25 | 4.12 | 0.88 | 366.56 | 2.46 | 0.46 | ZZ |
| EVUC7J | | 367.95 | 10.82 | 2.32 | 373.96 | 9.86 | 1.84 | ZZ |
| FHHDZH | | 351.03 | -6.10 | -1.31 | 371.14 | 7.04 | 1.31 | ZZ |
| H29BDU | | 361.75 | 4.62 | 0.99 | 367.38 | 3.27 | 0.61 | ZZ |
| L2WULX | | 357.06 | -0.07 | -0.01 | 365.19 | 1.08 | 0.20 | ZZ |
| LT7ZY2 | | 357.13 | -0.01 | 0.00 | 359.75 | -4.35 | -0.81 | ZZ |
| NQ8T7Y | | 355.69 | -1.44 | -0.31 | 366.88 | 2.77 | 0.52 | ZZ |
| NTZPT9 | | 357.90 | 0.77 | 0.17 | 368.78 | 4.67 | 0.87 | ZZ |
| PM64C6 | | 360.26 | 3.13 | 0.67 | 367.48 | 3.37 | 0.63 | ZZ |
| QKX4V6 | | 361.71 | 4.58 | 0.98 | 363.06 | -1.04 | -0.19 | ZZ |
| UD46V7 | | 363.55 | 6.42 | 1.38 | 357.51 | -6.59 | -1.23 | ZZ |
| UVMA4K | | 356.69 | -0.44 | -0.10 | 364.25 | 0.15 | 0.03 | ZZ |
| VTQACY | | 356.88 | -0.26 | -0.05 | 360.94 | -3.17 | -0.59 | ZZ |
| WZBJLG | | 355.44 | -1.69 | -0.36 | 364.19 | 0.08 | 0.02 | ZZ |
| XA8TKQ | | 360.28 | 3.15 | 0.68 | 368.40 | 4.29 | 0.80 | ZZ |
| YJV7YF | | 356.75 | -0.38 | -0.08 | 359.19 | -4.92 | -0.92 | ZZ |

Summary Statistics

| | Sample V31 | | Sample V32 | |
|-------------------|------------|----|------------|----|
| Grand Means | 357.13 | HV | 364.10 | HV |
| Std Dev Btwn Labs | 4.66 | HV | 5.37 | HV |

Samples V31 , V32 : Fastener sizes: 1/2-20 x 2 3/4 , 1/2-20 x 1/4

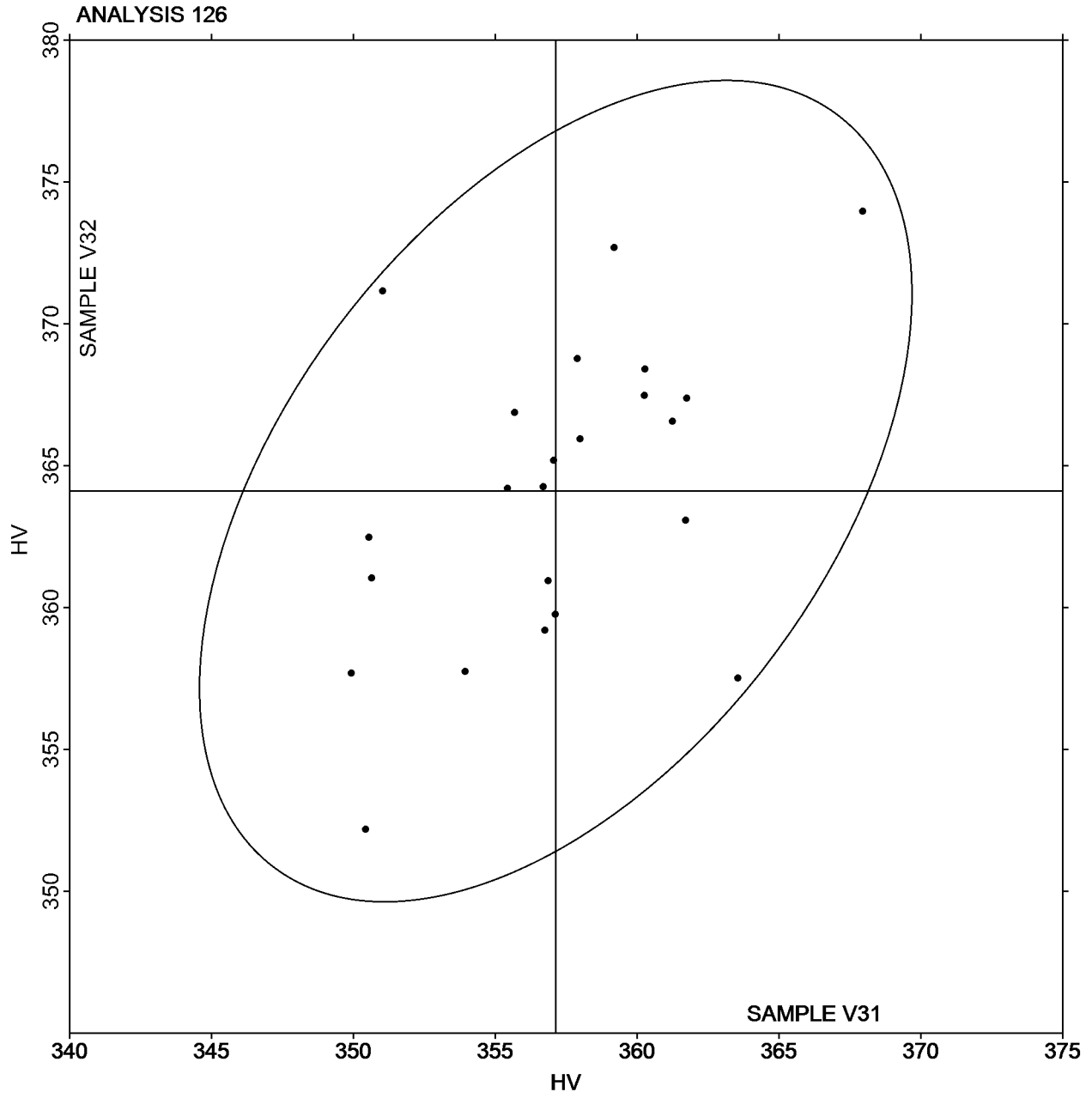
Statistics based on 23 of 23 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 126
Vickers Hardness of Externally Threaded Fasteners - HV
ASTM E384

SAMPLE V31
357.13 HV

SAMPLE V32
364.10 HV



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 127

Fastener Wedge Tensile (10 deg) Metric - MPa
ASTM F606M

| WebCode | Data Flag | Sample B31 | | | Sample B32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2KW2GA | | 1,161 | -10 | -0.94 | 1,115 | -20 | -1.71 | ZZ |
| 2ZBEQU | | 1,178 | 7 | 0.67 | 1,140 | 5 | 0.41 | ZZ |
| 3H84J3 | | 1,165 | -6 | -0.60 | 1,133 | -2 | -0.20 | ZZ |
| 4R9Y2Y | * | 1,179 | 8 | 0.79 | 1,167 | 32 | 2.64 | ZZ |
| 6BZ8YU | | 1,191 | 20 | 1.92 | 1,150 | 15 | 1.27 | ZZ |
| 7PDVNH | | 1,159 | -12 | -1.10 | 1,119 | -16 | -1.32 | ZZ |
| 82NR47 | | 1,186 | 15 | 1.47 | 1,151 | 16 | 1.36 | ZZ |
| 8PW2M9 | | 1,170 | -1 | -0.12 | 1,133 | -2 | -0.15 | ZZ |
| BR7H7M | | 1,169 | -2 | -0.17 | 1,136 | 1 | 0.06 | ZZ |
| CK7H7K | | 1,181 | 10 | 0.93 | 1,141 | 5 | 0.46 | ZZ |
| FHHDZH | | 1,165 | -6 | -0.54 | 1,133 | -3 | -0.22 | ZZ |
| FPKEEQ | | 1,180 | 9 | 0.83 | 1,139 | 4 | 0.32 | ZZ |
| LTN7XQ | | 1,179 | 8 | 0.75 | 1,131 | -4 | -0.33 | ZZ |
| M8LH7V | | 1,177 | 6 | 0.54 | 1,138 | 3 | 0.24 | ZZ |
| NXP3UV | * | 1,141 | -30 | -2.81 | 1,117 | -18 | -1.55 | ZZ |
| NZF9BL | | 1,165 | -6 | -0.60 | 1,129 | -6 | -0.51 | ZZ |
| PNFWFK | | 1,164 | -7 | -0.66 | 1,123 | -12 | -1.05 | ZZ |
| QKX4V6 | | 1,159 | -12 | -1.10 | 1,129 | -6 | -0.54 | ZZ |
| QVTE3Q | | 1,167 | -4 | -0.41 | 1,126 | -9 | -0.77 | ZZ |
| R6W3HU | | 1,181 | 10 | 0.91 | 1,143 | 8 | 0.64 | ZZ |
| T9BWXR | | 1,163 | -8 | -0.73 | 1,125 | -10 | -0.85 | ZZ |
| V7FA32 | | 1,171 | 0 | 0.00 | 1,132 | -3 | -0.29 | ZZ |
| VTQACY | | 1,181 | 10 | 0.98 | 1,153 | 18 | 1.52 | ZZ |
| WZBJLG | | 1,177 | 6 | 0.57 | 1,128 | -7 | -0.56 | ZZ |
| XHMKZF | | 1,168 | -3 | -0.31 | 1,142 | 6 | 0.53 | ZZ |
| ZECN3G | | 1,168 | -3 | -0.25 | 1,142 | 7 | 0.60 | ZZ |

Summary Statistics

| | Sample B31 | | Sample B32 | |
|-------------------|------------|-----|------------|-----|
| Grand Means | 1,171 | MPa | 1,135 | MPa |
| Std Dev Btwn Labs | 11 | MPa | 12 | MPa |

Samples B31 , B32 : Fastener sizes: M10 x 1.5 x 70, M10 x 1.5 x 80

Statistics based on 26 of 26 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 127

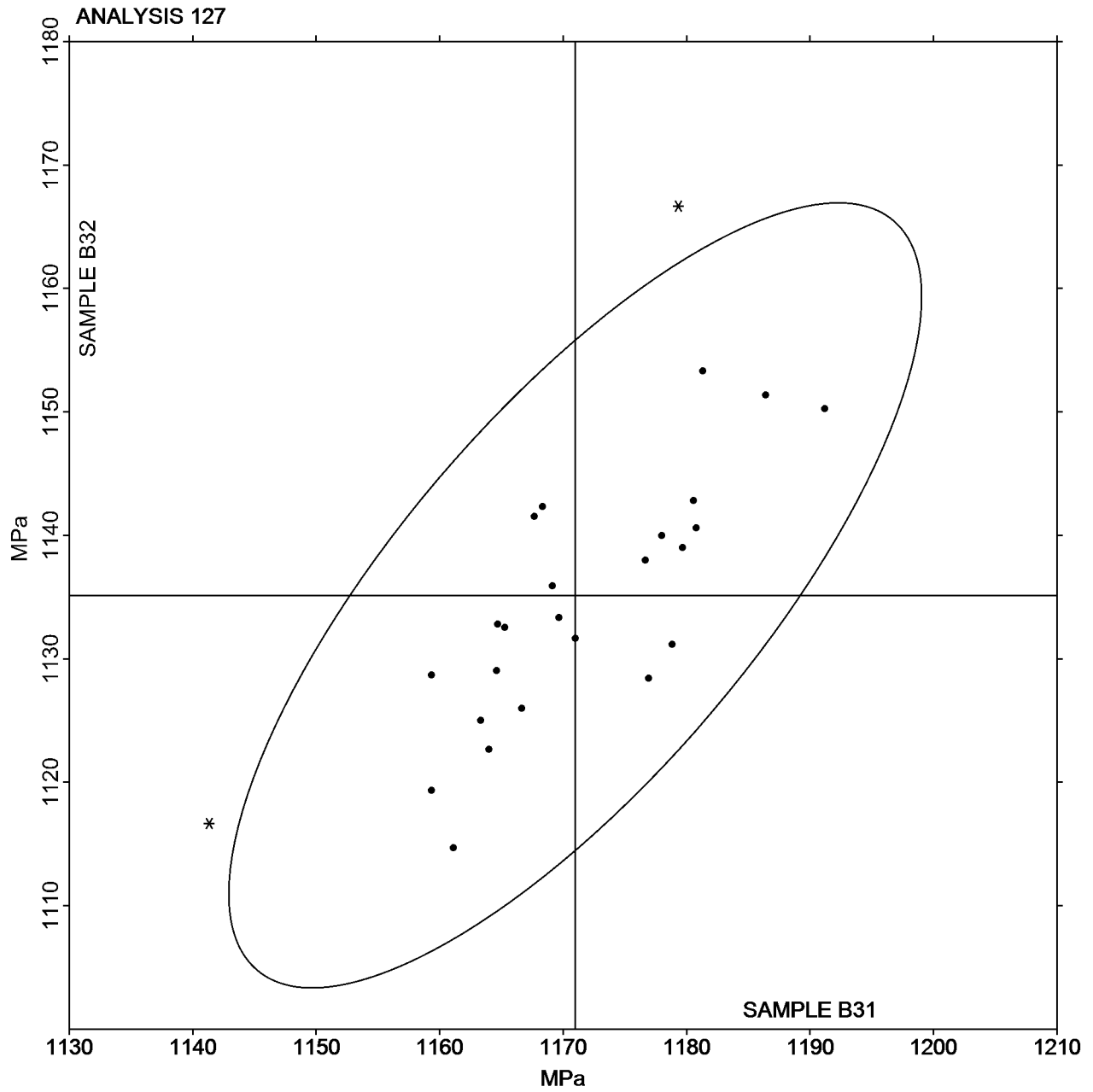
Fastener Wedge Tensile (10 deg) Metric - MPa
ASTM F606M

SAMPLE B31

1,171 MPa

SAMPLE B32

1,135 MPa



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 128

Fastener Axial Tensile Metric - MPa

ASTM F606M

| WebCode | Data Flag | Sample T31 | | | Sample T32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2KW2GA | | 1,113 | -10 | -0.92 | 1,117 | -15 | -1.39 | ZZ |
| 3FYTMV | | 1,112 | -12 | -1.04 | 1,116 | -16 | -1.54 | ZZ |
| 4YTV8A | | 1,114 | -9 | -0.84 | 1,134 | 2 | 0.17 | ZZ |
| 8PW2M9 | | 1,128 | 5 | 0.40 | 1,144 | 12 | 1.09 | ZZ |
| J8TMT9 | | 1,119 | -5 | -0.46 | 1,133 | 1 | 0.08 | ZZ |
| LTN7XQ | | 1,123 | -1 | -0.07 | 1,141 | 9 | 0.85 | ZZ |
| PJ372C | | 1,102 | -21 | -1.89 | 1,116 | -16 | -1.48 | ZZ |
| QKX4V6 | | 1,127 | 3 | 0.28 | 1,125 | -7 | -0.63 | ZZ |
| R6W3HU | | 1,135 | 11 | 0.98 | 1,134 | 2 | 0.21 | ZZ |
| T9BWXR | | 1,126 | 2 | 0.19 | 1,129 | -3 | -0.26 | ZZ |
| UWXW2Y | | 1,134 | 11 | 0.93 | 1,134 | 2 | 0.15 | ZZ |
| VTQACY | | 1,147 | 24 | 2.07 | 1,152 | 20 | 1.90 | ZZ |
| WZBJLG | | 1,129 | 5 | 0.43 | 1,135 | 3 | 0.26 | ZZ |
| X2YJWX | | 1,123 | -1 | -0.06 | 1,139 | 6 | 0.61 | ZZ |

Summary Statistics

| | <u>Sample T31</u> | | <u>Sample T32</u> | |
|-------------------|-------------------|-----|-------------------|-----|
| Grand Means | 1,124 | MPa | 1,132 | MPa |
| Std Dev Btwn Labs | 11 | MPa | 11 | MPa |

Samples T31 , T32 : Fastener sizes: M10 x 1.5 x 70, M10 x 1.5 x 80

Statistics based on 14 of 14 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 128

Fastener Axial Tensile Metric - MPa

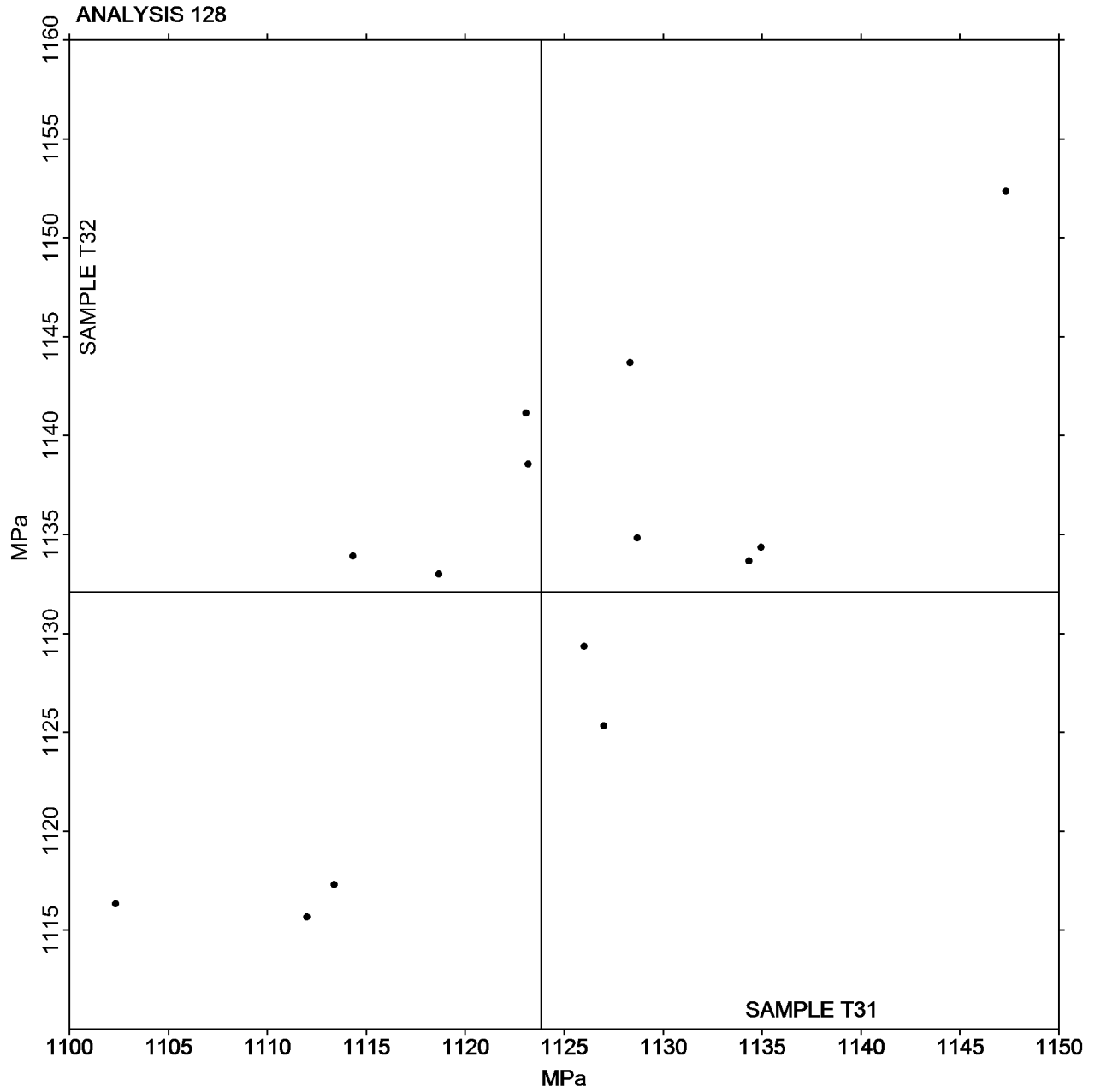
ASTM F606M

SAMPLE T31

1,124 MPa

SAMPLE T32

1,132 MPa



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 129

Fastener Double Shear - 1b
NASM 1312-13

| WebCode | Data Flag | Sample Z31 | | | Sample Z32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 4NB86V | | 22,583 | 938 | 2.18 | 22,725 | 1,033 | 2.40 | ZZ |
| 4R9Y2Y | | 21,685 | 40 | 0.09 | 21,801 | 108 | 0.25 | ZZ |
| 7U8WPW | | 21,530 | -115 | -0.27 | 21,893 | 201 | 0.47 | ZZ |
| A48LWC | | 21,900 | 255 | 0.59 | 21,733 | 41 | 0.09 | ZZ |
| C4WUV6 | | 21,970 | 325 | 0.75 | 22,224 | 531 | 1.23 | ZZ |
| C6RA83 | | 21,804 | 158 | 0.37 | 21,850 | 157 | 0.37 | ZZ |
| CNJ8LN | | 21,532 | -113 | -0.26 | 21,570 | -123 | -0.29 | ZZ |
| CVNYR | | 22,165 | 519 | 1.21 | 22,098 | 405 | 0.94 | ZZ |
| D3YPRW | | 21,805 | 159 | 0.37 | 21,698 | 5 | 0.01 | ZZ |
| G4HZ3X | | 21,930 | 285 | 0.66 | 21,850 | 157 | 0.37 | ZZ |
| GJ9X7E | | 21,788 | 142 | 0.33 | 21,725 | 33 | 0.08 | ZZ |
| J96C7T | | 21,320 | -325 | -0.76 | 21,279 | -414 | -0.96 | ZZ |
| JC4QUH | | 22,170 | 525 | 1.22 | 22,112 | 419 | 0.97 | ZZ |
| L6FPNP | | 21,825 | 180 | 0.42 | 22,063 | 371 | 0.86 | ZZ |
| L6V7GX | | 21,353 | -292 | -0.68 | 21,473 | -219 | -0.51 | ZZ |
| LYA9TA | | 21,120 | -525 | -1.22 | 21,422 | -270 | -0.63 | ZZ |
| M2W3CW | | 21,950 | 305 | 0.71 | 22,050 | 357 | 0.83 | ZZ |
| M7J2GB | | 21,821 | 175 | 0.41 | 21,601 | -92 | -0.21 | ZZ |
| MFGK97 | | 21,139 | -506 | -1.18 | 20,988 | -705 | -1.64 | ZZ |
| QZAX8E | | 21,449 | -197 | -0.46 | 21,455 | -237 | -0.55 | ZZ |
| UVMA4K | | 21,572 | -74 | -0.17 | 21,649 | -44 | -0.10 | ZZ |
| VFZDB2 | | 21,839 | 193 | 0.45 | 21,638 | -55 | -0.13 | ZZ |
| VTQACY | * | 20,414 | -1,231 | -2.86 | 20,425 | -1,268 | -2.95 | ZZ |
| W86XY2 | | 21,616 | -29 | -0.07 | 21,409 | -284 | -0.66 | ZZ |
| WKWBPJ | * | 21,067 | -579 | -1.34 | 21,600 | -93 | -0.22 | ZZ |
| X2YJWX | | 21,432 | -213 | -0.50 | 21,681 | -12 | -0.03 | ZZ |

Summary Statistics

| | Sample Z31 | | Sample Z32 | |
|-------------------|------------|----|------------|----|
| Grand Means | 21,645 | 1b | 21,693 | 1b |
| Std Dev Btwn Labs | 430 | 1b | 430 | 1b |

Samples Z31 , Z32 : Fastener size 3/8-16 x 2 1/4, 3/8-16 x 2 3/4

Statistics based on 26 of 26 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 129

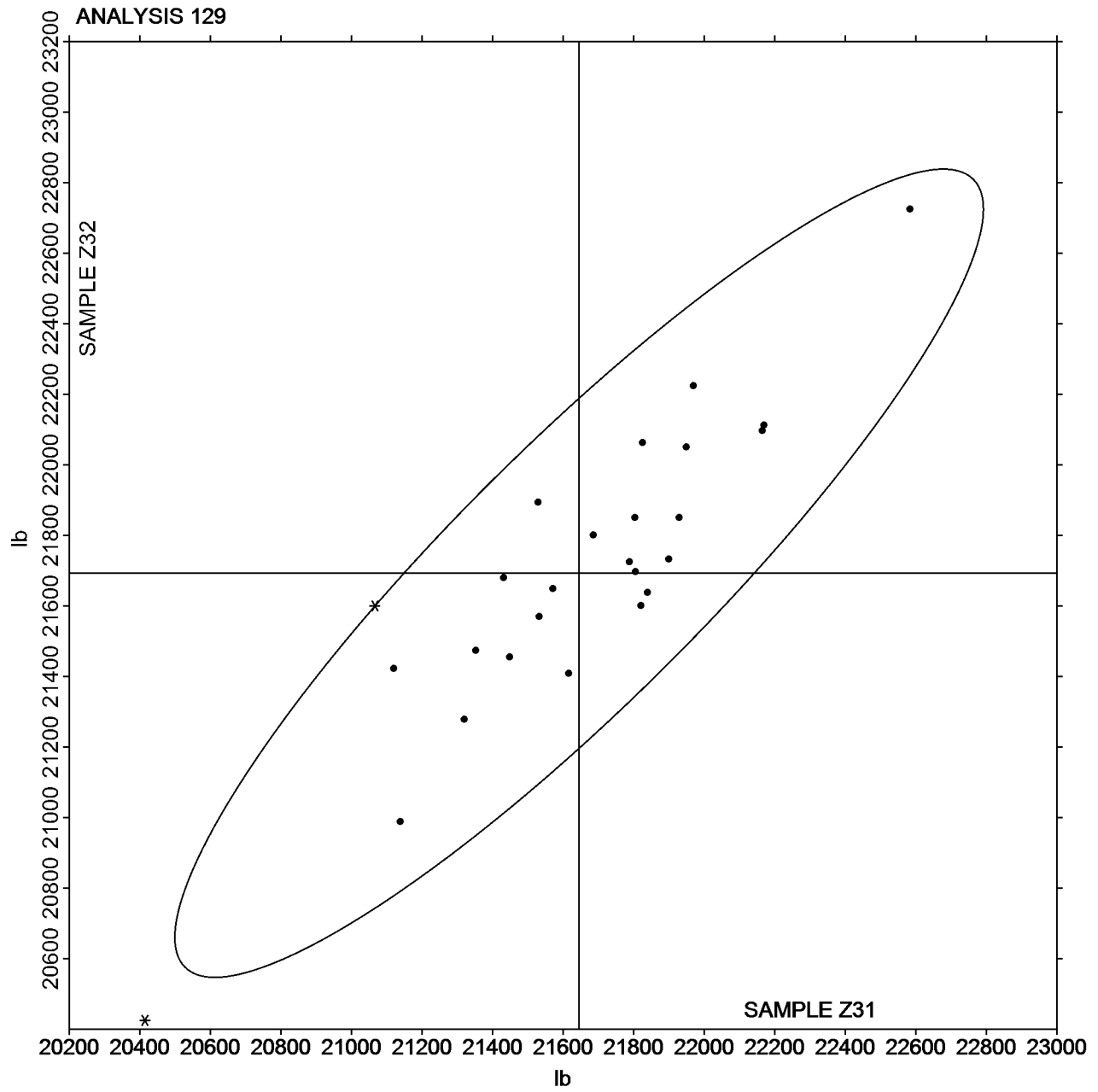
Fastener Double Shear - lb
NASM 1312-13

SAMPLE Z31

21,645 lb

SAMPLE Z32

21,693 lb



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 130

Tensile Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 272MGF | | 70.91 | -0.34 | -0.29 | 70.07 | 0.21 | 0.21 | ZZ |
| 3AU37E | | 71.60 | 0.34 | 0.29 | 70.17 | 0.31 | 0.31 | ZZ |
| 3H4G3P | | 72.60 | 1.35 | 1.13 | 70.40 | 0.55 | 0.55 | ZZ |
| 3PMM2G | | 71.79 | 0.54 | 0.45 | 71.94 | 2.09 | 2.08 | ZZ |
| 3RBEQT | | 70.78 | -0.48 | -0.40 | 69.96 | 0.10 | 0.10 | ZZ |
| 44368Q | | 71.07 | -0.18 | -0.15 | 68.75 | -1.11 | -1.11 | ZZ |
| 4C2K6B | | 73.40 | 2.15 | 1.80 | 69.33 | -0.52 | -0.52 | ZZ |
| 4H2AD3 | | 71.90 | 0.65 | 0.54 | 70.60 | 0.75 | 0.75 | ZZ |
| 4MHEAC | | 70.83 | -0.42 | -0.35 | 68.93 | -0.92 | -0.92 | ZZ |
| 4XEHE7 | | 72.40 | 1.15 | 0.96 | 70.00 | 0.15 | 0.15 | ZZ |
| 69X3L9 | | 69.80 | -1.45 | -1.22 | 68.40 | -1.45 | -1.45 | ZZ |
| 768KGT | | 71.67 | 0.42 | 0.35 | 70.59 | 0.73 | 0.73 | ZZ |
| 8BAWB6 | | 72.01 | 0.76 | 0.63 | 68.87 | -0.98 | -0.98 | ZZ |
| 9DYKBC | | 71.60 | 0.35 | 0.29 | 70.00 | 0.15 | 0.15 | ZZ |
| 9FHNTG | X | 73.20 | 1.94 | 1.63 | 66.92 | -2.94 | -2.93 | ZZ |
| 9HRNZA | | 72.21 | 0.95 | 0.80 | 70.24 | 0.39 | 0.39 | ZZ |
| 9RWVEA | * | 68.10 | -3.15 | -2.64 | 68.30 | -1.55 | -1.55 | ZZ |
| A3NNG6 | | 71.03 | -0.23 | -0.19 | 70.34 | 0.49 | 0.49 | ZZ |
| AKAEDJ | | 71.10 | -0.15 | -0.13 | 69.29 | -0.57 | -0.57 | ZZ |
| AQEZQG | | 69.90 | -1.35 | -1.13 | 71.00 | 1.15 | 1.15 | ZZ |
| AWNHPA | | 69.80 | -1.45 | -1.22 | 67.60 | -2.25 | -2.25 | ZZ |
| AY8JKV | | 68.71 | -2.54 | -2.13 | 68.97 | -0.89 | -0.88 | ZZ |
| B34L9V | | 73.50 | 2.25 | 1.88 | 69.50 | -0.35 | -0.35 | ZZ |
| B6UKNE | | 70.24 | -1.01 | -0.85 | 69.00 | -0.86 | -0.86 | ZZ |
| BBDY2K | | 69.56 | -1.69 | -1.42 | 70.43 | 0.57 | 0.57 | ZZ |
| BD7JF6 | | 72.87 | 1.62 | 1.35 | 70.92 | 1.06 | 1.06 | ZZ |
| BEHMLG | | 70.40 | -0.85 | -0.71 | 70.10 | 0.25 | 0.25 | ZZ |
| BF8VQB | | 72.04 | 0.79 | 0.66 | 70.20 | 0.35 | 0.35 | ZZ |
| BLY3AJ | | 71.05 | -0.21 | -0.17 | 69.97 | 0.11 | 0.11 | ZZ |
| BN3QTF | X | 75.30 | 4.05 | 3.39 | 69.98 | 0.13 | 0.13 | ZZ |
| BY8U2J | | 72.69 | 1.44 | 1.20 | 69.39 | -0.46 | -0.46 | ZZ |
| CBV64V | | 71.46 | 0.21 | 0.17 | 69.34 | -0.51 | -0.51 | ZZ |
| CNMPRY | | 70.50 | -0.75 | -0.63 | 69.40 | -0.45 | -0.45 | ZZ |
| CTGJPZ | | 69.60 | -1.65 | -1.38 | 69.45 | -0.40 | -0.40 | ZZ |
| D2K3FA | * | 71.40 | 0.15 | 0.12 | 72.40 | 2.55 | 2.55 | ZZ |
| DAVP2H | | 70.90 | -0.35 | -0.29 | 69.82 | -0.03 | -0.03 | ZZ |
| DFQAFZ | | 70.50 | -0.75 | -0.63 | 68.10 | -1.75 | -1.75 | ZZ |
| DQH68Z | | 69.50 | -1.75 | -1.47 | 70.50 | 0.65 | 0.65 | ZZ |
| DVYDTE | | 70.58 | -0.67 | -0.56 | 67.93 | -1.92 | -1.92 | ZZ |
| ECPW9X | | 70.41 | -0.84 | -0.71 | 69.47 | -0.38 | -0.38 | ZZ |
| EQZEXF | | 70.63 | -0.62 | -0.52 | 69.33 | -0.53 | -0.53 | ZZ |
| EYCN8U | | 72.46 | 1.21 | 1.01 | 70.62 | 0.77 | 0.77 | ZZ |
| F6XXWJ | | 70.40 | -0.85 | -0.71 | 69.60 | -0.25 | -0.25 | ZZ |
| FMFW42 | | 72.61 | 1.35 | 1.13 | 69.02 | -0.83 | -0.83 | ZZ |
| FN7ZT3 | | 69.18 | -2.07 | -1.73 | 68.17 | -1.69 | -1.69 | ZZ |
| FQTQU8 | | 71.96 | 0.71 | 0.59 | 71.36 | 1.51 | 1.51 | ZZ |
| FWQYP3 | | 72.46 | 1.21 | 1.01 | 68.63 | -1.22 | -1.22 | ZZ |
| FXG67T | | 70.70 | -0.55 | -0.46 | 68.80 | -1.05 | -1.05 | ZZ |
| FZ6T7Z | | 71.33 | 0.08 | 0.06 | 69.54 | -0.31 | -0.31 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 130

Tensile Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| G3LKQ2 | | 70.02 | -1.23 | -1.03 | 69.94 | 0.08 | 0.08 | ZZ |
| G9BXTA | | 69.70 | -1.55 | -1.30 | 70.80 | 0.95 | 0.95 | ZZ |
| GPKPUU | | 71.40 | 0.15 | 0.12 | 70.00 | 0.15 | 0.15 | ZZ |
| H29BDU | | 71.65 | 0.40 | 0.33 | 71.21 | 1.36 | 1.36 | ZZ |
| H2QB8J | | 71.16 | -0.09 | -0.08 | 69.18 | -0.68 | -0.68 | ZZ |
| HBXWKD | | 70.40 | -0.85 | -0.71 | 70.40 | 0.55 | 0.55 | ZZ |
| HLGDBY | | 70.61 | -0.64 | -0.54 | 70.05 | 0.20 | 0.20 | ZZ |
| HZCUZX | | 71.07 | -0.18 | -0.15 | 69.47 | -0.38 | -0.38 | ZZ |
| JGJBMP | | 71.30 | 0.05 | 0.04 | 69.10 | -0.75 | -0.75 | ZZ |
| JH8W6E | | 73.30 | 2.05 | 1.71 | 71.30 | 1.45 | 1.45 | ZZ |
| JK34ZD | | 71.21 | -0.04 | -0.03 | 69.01 | -0.84 | -0.84 | ZZ |
| JRWK23 | | 73.43 | 2.18 | 1.82 | 70.53 | 0.68 | 0.68 | ZZ |
| JTR444 | | 70.20 | -1.05 | -0.88 | 69.50 | -0.35 | -0.35 | ZZ |
| JWTXAL | | 70.66 | -0.59 | -0.50 | 68.87 | -0.98 | -0.98 | ZZ |
| K87N69 | | 71.50 | 0.25 | 0.21 | 70.60 | 0.75 | 0.75 | ZZ |
| KE8Z27 | | 71.30 | 0.05 | 0.04 | 68.80 | -1.05 | -1.05 | ZZ |
| L7RC9P | | 70.70 | -0.55 | -0.46 | 68.80 | -1.05 | -1.05 | ZZ |
| LGBVK9 | | 71.46 | 0.21 | 0.17 | 70.11 | 0.26 | 0.26 | ZZ |
| LXDNAG | | 72.20 | 0.95 | 0.79 | 69.70 | -0.15 | -0.15 | ZZ |
| MH2L28 | X | 76.81 | 5.56 | 4.65 | 72.15 | 2.30 | 2.30 | ZZ |
| MK8UH6 | | 69.90 | -1.35 | -1.13 | 69.00 | -0.85 | -0.85 | ZZ |
| MM7GK8 | | 70.47 | -0.78 | -0.65 | 69.12 | -0.74 | -0.74 | ZZ |
| N2A3PH | | 70.70 | -0.55 | -0.46 | 69.60 | -0.25 | -0.25 | ZZ |
| N7K6W8 | | 70.39 | -0.87 | -0.73 | 71.79 | 1.93 | 1.93 | ZZ |
| NHEKJM | | 69.07 | -2.18 | -1.83 | 70.06 | 0.21 | 0.21 | ZZ |
| NLYDXB | | 70.70 | -0.55 | -0.46 | 69.90 | 0.05 | 0.05 | ZZ |
| P4V8XF | | 71.50 | 0.25 | 0.21 | 70.10 | 0.25 | 0.25 | ZZ |
| P8BP34 | | 71.10 | -0.15 | -0.13 | 69.80 | -0.05 | -0.05 | ZZ |
| PNE9RE | | 70.70 | -0.55 | -0.46 | 68.50 | -1.35 | -1.35 | ZZ |
| PQ4HXA | | 71.00 | -0.25 | -0.21 | 69.00 | -0.85 | -0.85 | ZZ |
| Q9J68N | | 72.34 | 1.09 | 0.91 | 70.32 | 0.47 | 0.47 | ZZ |
| QE64D4 | | 73.37 | 2.12 | 1.78 | 71.62 | 1.76 | 1.76 | ZZ |
| QGTTLM | | 69.50 | -1.75 | -1.47 | 70.60 | 0.75 | 0.75 | ZZ |
| QYZNG3 | | 71.10 | -0.15 | -0.13 | 69.60 | -0.25 | -0.25 | ZZ |
| R2EU43 | | 72.20 | 0.95 | 0.79 | 71.11 | 1.26 | 1.26 | ZZ |
| R6ZCN9 | | 71.00 | -0.25 | -0.21 | 67.90 | -1.95 | -1.95 | ZZ |
| RRN9ZQ | | 73.10 | 1.85 | 1.55 | 71.10 | 1.25 | 1.25 | ZZ |
| TFU3UY | | 70.00 | -1.25 | -1.05 | 69.60 | -0.25 | -0.25 | ZZ |
| THYVKQ | | 73.50 | 2.25 | 1.88 | 70.00 | 0.15 | 0.15 | ZZ |
| TTZ66U | | 72.01 | 0.76 | 0.63 | 70.12 | 0.27 | 0.27 | ZZ |
| U3G9PY | | 71.04 | -0.21 | -0.17 | 69.00 | -0.85 | -0.85 | ZZ |
| UCP7AW | | 72.08 | 0.83 | 0.70 | 71.79 | 1.94 | 1.94 | ZZ |
| UR3ECL | | 72.30 | 1.05 | 0.88 | 71.20 | 1.35 | 1.35 | ZZ |
| VEUQ23 | | 70.40 | -0.85 | -0.71 | 68.81 | -1.04 | -1.04 | ZZ |
| VNYU9L | | 70.74 | -0.51 | -0.43 | 68.25 | -1.60 | -1.60 | ZZ |
| W6GCFC | | 71.80 | 0.55 | 0.46 | 69.80 | -0.05 | -0.05 | ZZ |
| W79GNQ | X | 68.50 | -2.75 | -2.30 | 66.50 | -3.35 | -3.35 | ZZ |
| X9X7LC | | 73.68 | 2.43 | 2.03 | 69.75 | -0.10 | -0.10 | ZZ |
| XEKV98 | | 73.00 | 1.75 | 1.46 | 72.00 | 2.15 | 2.15 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 130

Tensile Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| XKDNPG | | 70.74 | -0.52 | -0.43 | 70.87 | 1.01 | 1.01 | ZZ |
| XMGJ9J | | 70.78 | -0.47 | -0.40 | 70.20 | 0.34 | 0.34 | ZZ |
| XMV7J7 | * | 69.00 | -2.25 | -1.88 | 71.00 | 1.15 | 1.15 | ZZ |
| XVRP32 | | 73.10 | 1.85 | 1.55 | 69.40 | -0.45 | -0.45 | ZZ |
| Y38VAT | * | 70.10 | -1.15 | -0.96 | 72.00 | 2.15 | 2.15 | ZZ |
| Y4HV99 | | 71.80 | 0.55 | 0.46 | 69.90 | 0.05 | 0.05 | ZZ |
| Y4Y3HW | | 72.35 | 1.09 | 0.92 | 69.59 | -0.27 | -0.27 | ZZ |
| YDL4WK | | 73.70 | 2.45 | 2.05 | 70.20 | 0.35 | 0.35 | ZZ |
| YN86EF | | 71.36 | 0.11 | 0.09 | 69.18 | -0.67 | -0.67 | ZZ |
| YV2EFX | | 71.10 | -0.15 | -0.13 | 69.30 | -0.55 | -0.55 | ZZ |
| Z4CZ38 | | 73.40 | 2.15 | 1.80 | 71.50 | 1.65 | 1.65 | ZZ |
| ZZYZ6F | X | 75.00 | 3.75 | 3.14 | 73.30 | 3.45 | 3.44 | ZZ |

Summary Statistics

| | Sample F31 | | Sample F32 | |
|-------------------|------------|-----|------------|-----|
| Grand Means | 71.25 | ksi | 69.85 | ksi |
| Std Dev Btwn Labs | 1.20 | ksi | 1.00 | ksi |

Samples F31 , F32 : AISI 1010 - 16G , AISI 1010 - 14G

Statistics based on 105 of 110 reporting participants

Comments on assigned Data Flags for Analysis #130

WebCode Flag Analyst Comment

9FHNTG X Data for sample F32 are low.

BN3QTF X Data for sample F31 are high.

MH2L28 X Data for sample F31 are high.

W79GNQ X Data for sample F32 are low.

ZZYZ6F X Data for both samples are high.

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 130

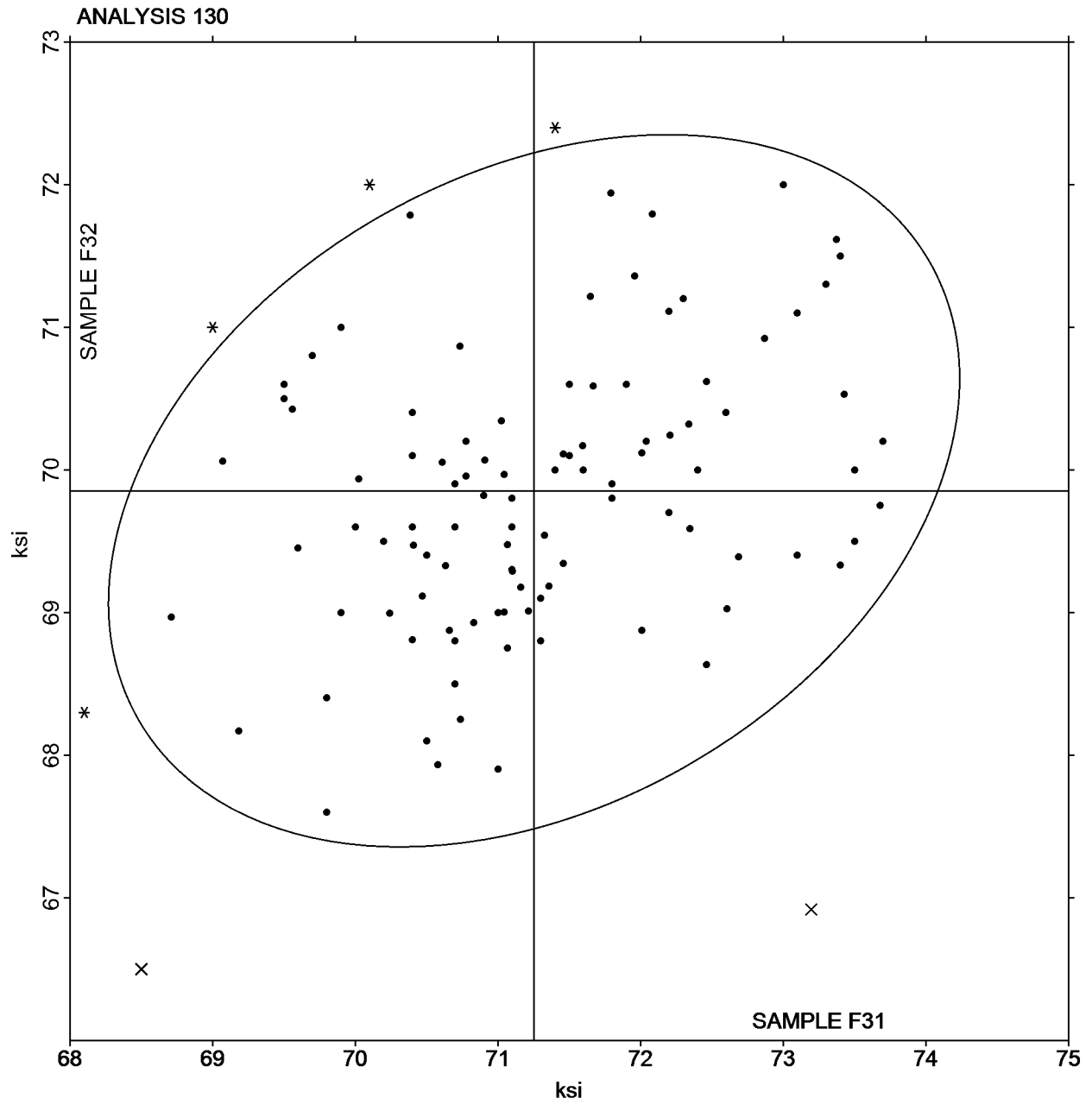
Tensile Strength (Flat Steel) - ksi
ASTM E8

SAMPLE F31

71.25 ksi

SAMPLE F32

69.85 ksi



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 131

Yield Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 272MGF | | 46.21 | -0.62 | -0.44 | 46.37 | -0.22 | -0.16 | ZZ |
| 3AU37E | | 46.85 | 0.02 | 0.01 | 46.14 | -0.45 | -0.33 | ZZ |
| 3H4G3P | | 48.10 | 1.27 | 0.90 | 48.50 | 1.91 | 1.41 | ZZ |
| 3PMM2G | | 49.60 | 2.77 | 1.96 | 49.75 | 3.16 | 2.32 | ZZ |
| 3RBEQT | | 46.24 | -0.59 | -0.42 | 46.70 | 0.11 | 0.08 | ZZ |
| 44368Q | | 45.40 | -1.43 | -1.01 | 44.96 | -1.63 | -1.20 | ZZ |
| 4C2K6B | | 47.50 | 0.67 | 0.47 | 45.06 | -1.53 | -1.12 | ZZ |
| 4H2AD3 | | 46.20 | -0.63 | -0.45 | 47.20 | 0.61 | 0.45 | ZZ |
| 4MHEAC | | 47.86 | 1.03 | 0.73 | 46.40 | -0.19 | -0.14 | ZZ |
| 4XEHE7 | | 46.90 | 0.07 | 0.05 | 46.40 | -0.19 | -0.14 | ZZ |
| 69X3L9 | | 45.90 | -0.93 | -0.66 | 45.00 | -1.59 | -1.17 | ZZ |
| 768KGT | | 47.81 | 0.98 | 0.69 | 46.93 | 0.34 | 0.25 | ZZ |
| 8BAWB6 | | 48.07 | 1.24 | 0.88 | 45.95 | -0.64 | -0.47 | ZZ |
| 9DYKBC | | 48.60 | 1.77 | 1.25 | 48.60 | 2.01 | 1.48 | ZZ |
| 9FHNTG | * | 48.60 | 1.77 | 1.25 | 44.76 | -1.83 | -1.34 | ZZ |
| 9HRNZA | | 47.46 | 0.63 | 0.44 | 47.06 | 0.47 | 0.35 | ZZ |
| 9RWVEA | | 45.00 | -1.83 | -1.30 | 46.00 | -0.59 | -0.43 | ZZ |
| A3NNG6 | | 46.60 | -0.23 | -0.16 | 46.86 | 0.27 | 0.20 | ZZ |
| AKAEDJ | | 44.95 | -1.88 | -1.33 | 45.02 | -1.57 | -1.15 | ZZ |
| AQEZQG | | 46.50 | -0.33 | -0.23 | 46.80 | 0.21 | 0.16 | ZZ |
| AWNHPA | | 45.40 | -1.43 | -1.01 | 44.90 | -1.69 | -1.24 | ZZ |
| AY8JKV | * | 45.89 | -0.94 | -0.67 | 49.06 | 2.47 | 1.82 | ZZ |
| B34L9V | | 48.40 | 1.57 | 1.11 | 46.30 | -0.29 | -0.21 | ZZ |
| B6UKNE | | 46.52 | -0.32 | -0.22 | 45.33 | -1.26 | -0.93 | ZZ |
| BBDY2K | | 46.15 | -0.69 | -0.49 | 48.55 | 1.96 | 1.44 | ZZ |
| BD7JF6 | | 48.56 | 1.73 | 1.22 | 48.55 | 1.96 | 1.44 | ZZ |
| BEHMLG | | 46.00 | -0.83 | -0.59 | 48.30 | 1.71 | 1.26 | ZZ |
| BF8VQB | | 45.51 | -1.32 | -0.93 | 45.42 | -1.17 | -0.86 | ZZ |
| BLY3AJ | | 45.62 | -1.21 | -0.86 | 47.24 | 0.65 | 0.48 | ZZ |
| BN3QTF | | 47.53 | 0.70 | 0.49 | 46.31 | -0.28 | -0.20 | ZZ |
| BY8U2J | | 47.60 | 0.77 | 0.54 | 46.09 | -0.49 | -0.36 | ZZ |
| CBV64V | | 46.82 | -0.01 | -0.01 | 46.91 | 0.32 | 0.23 | ZZ |
| CNMPRY | | 47.40 | 0.57 | 0.40 | 46.80 | 0.21 | 0.16 | ZZ |
| CTGJPZ | | 47.52 | 0.69 | 0.49 | 47.86 | 1.27 | 0.93 | ZZ |
| DAVP2H | | 48.69 | 1.86 | 1.31 | 46.13 | -0.46 | -0.34 | ZZ |
| DFQAFZ | | 46.40 | -0.43 | -0.31 | 46.50 | -0.09 | -0.07 | ZZ |
| DQH68Z | | 45.20 | -1.63 | -1.15 | 47.30 | 0.71 | 0.52 | ZZ |
| DVYDTE | | 46.58 | -0.26 | -0.18 | 46.34 | -0.25 | -0.18 | ZZ |
| ECPW9X | | 47.71 | 0.88 | 0.62 | 47.56 | 0.97 | 0.71 | ZZ |
| EQZEXF | | 47.28 | 0.45 | 0.32 | 46.85 | 0.26 | 0.19 | ZZ |
| EYCN8U | | 47.62 | 0.78 | 0.56 | 46.78 | 0.19 | 0.14 | ZZ |
| F6XXWJ | | 46.20 | -0.63 | -0.45 | 46.50 | -0.09 | -0.07 | ZZ |
| FMFW42 | | 47.33 | 0.49 | 0.35 | 45.99 | -0.60 | -0.44 | ZZ |
| FN7ZT3 | | 47.34 | 0.51 | 0.36 | 46.15 | -0.44 | -0.32 | ZZ |
| FWQYP3 | | 48.65 | 1.81 | 1.28 | 46.35 | -0.23 | -0.17 | ZZ |
| FXG67T | | 46.00 | -0.83 | -0.59 | 45.80 | -0.79 | -0.58 | ZZ |
| FZ6T7Z | | 47.08 | 0.25 | 0.18 | 45.73 | -0.86 | -0.64 | ZZ |
| G3LKQ2 | | 46.73 | -0.10 | -0.07 | 47.10 | 0.51 | 0.37 | ZZ |
| G9BXTA | * | 43.30 | -3.53 | -2.50 | 44.70 | -1.89 | -1.39 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 131

Yield Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| GPKPUU | | 45.90 | -0.93 | -0.66 | 45.30 | -1.29 | -0.95 | ZZ |
| H29BDU | | 49.31 | 2.48 | 1.75 | 49.75 | 3.16 | 2.32 | ZZ |
| H2QB8J | | 46.01 | -0.82 | -0.58 | 46.58 | -0.01 | -0.01 | ZZ |
| HBXWKD | | 47.00 | 0.17 | 0.12 | 48.00 | 1.41 | 1.04 | ZZ |
| HLGDBY | | 47.05 | 0.22 | 0.15 | 46.10 | -0.49 | -0.36 | ZZ |
| HZCUZX | | 45.69 | -1.14 | -0.81 | 45.54 | -1.05 | -0.77 | ZZ |
| JGJBMP | | 46.30 | -0.53 | -0.38 | 46.00 | -0.59 | -0.43 | ZZ |
| JH8W6E | | 50.20 | 3.37 | 2.38 | 49.20 | 2.61 | 1.92 | ZZ |
| JK34ZD | | 46.12 | -0.71 | -0.50 | 45.79 | -0.80 | -0.59 | ZZ |
| JTR444 | | 44.30 | -2.53 | -1.79 | 45.30 | -1.29 | -0.95 | ZZ |
| JWTXAL | | 46.11 | -0.72 | -0.51 | 47.10 | 0.51 | 0.37 | ZZ |
| K87N69 | | 46.90 | 0.07 | 0.05 | 47.70 | 1.11 | 0.82 | ZZ |
| KE8Z27 | | 48.10 | 1.27 | 0.90 | 45.30 | -1.29 | -0.95 | ZZ |
| L7RC9P | | 47.40 | 0.57 | 0.40 | 46.20 | -0.39 | -0.29 | ZZ |
| LGBVK9 | | 45.18 | -1.65 | -1.17 | 45.79 | -0.80 | -0.59 | ZZ |
| LXDNAG | | 46.70 | -0.13 | -0.09 | 45.90 | -0.69 | -0.51 | ZZ |
| MH2L28 | | 50.20 | 3.37 | 2.38 | 48.20 | 1.61 | 1.18 | ZZ |
| MK8UH6 | | 46.50 | -0.33 | -0.23 | 46.60 | 0.01 | 0.01 | ZZ |
| MM7GK8 | | 45.18 | -1.65 | -1.17 | 45.04 | -1.55 | -1.14 | ZZ |
| N2A3PH | * | 44.40 | -2.43 | -1.72 | 42.50 | -4.09 | -3.01 | ZZ |
| N7K6W8 | | 47.28 | 0.45 | 0.32 | 49.09 | 2.50 | 1.84 | ZZ |
| NHEKJM | | 47.97 | 1.14 | 0.81 | 49.10 | 2.51 | 1.85 | ZZ |
| NLYDXB | | 47.10 | 0.27 | 0.19 | 47.40 | 0.81 | 0.60 | ZZ |
| P4V8XF | | 45.10 | -1.73 | -1.22 | 45.50 | -1.09 | -0.80 | ZZ |
| P8BP34 | | 46.70 | -0.13 | -0.09 | 46.20 | -0.39 | -0.29 | ZZ |
| PNE9RE | * | 42.80 | -4.03 | -2.85 | 44.10 | -2.49 | -1.83 | ZZ |
| PQ4HXA | | 47.00 | 0.17 | 0.12 | 46.00 | -0.59 | -0.43 | ZZ |
| Q9J68N | | 45.83 | -1.00 | -0.71 | 46.50 | -0.09 | -0.07 | ZZ |
| QE64D4 | | 48.08 | 1.25 | 0.89 | 48.40 | 1.81 | 1.33 | ZZ |
| QGTTLM | | 46.50 | -0.33 | -0.23 | 48.10 | 1.51 | 1.11 | ZZ |
| QYZNG3 | | 46.40 | -0.43 | -0.31 | 45.90 | -0.69 | -0.51 | ZZ |
| R2EU43 | | 46.90 | 0.07 | 0.05 | 46.50 | -0.09 | -0.07 | ZZ |
| R6ZCN9 | | 46.20 | -0.63 | -0.45 | 45.20 | -1.39 | -1.02 | ZZ |
| RRN9ZQ | | 48.15 | 1.32 | 0.93 | 47.40 | 0.81 | 0.60 | ZZ |
| TFU3UY | | 45.30 | -1.53 | -1.08 | 46.00 | -0.59 | -0.43 | ZZ |
| THYVKQ | | 48.60 | 1.77 | 1.25 | 46.90 | 0.31 | 0.23 | ZZ |
| TTZ66U | * | 43.32 | -3.51 | -2.48 | 43.50 | -3.09 | -2.27 | ZZ |
| U3G9PY | | 44.73 | -2.10 | -1.48 | 44.64 | -1.95 | -1.43 | ZZ |
| UCP7AW | | 46.56 | -0.27 | -0.19 | 48.59 | 2.00 | 1.47 | ZZ |
| UR3ECL | | 48.10 | 1.27 | 0.90 | 47.10 | 0.51 | 0.38 | ZZ |
| VEUQ23 | | 45.62 | -1.21 | -0.86 | 43.84 | -2.75 | -2.02 | ZZ |
| VNYU9L | | 47.89 | 1.06 | 0.75 | 46.97 | 0.38 | 0.28 | ZZ |
| W6GCFC | | 47.00 | 0.17 | 0.12 | 46.50 | -0.09 | -0.07 | ZZ |
| W79GNQ | | 43.50 | -3.33 | -2.36 | 44.50 | -2.09 | -1.54 | ZZ |
| X9X7LC | | 50.19 | 3.36 | 2.37 | 48.03 | 1.44 | 1.06 | ZZ |
| XKDNPG | | 47.92 | 1.09 | 0.77 | 49.14 | 2.55 | 1.88 | ZZ |
| XMGJ9J | | 46.99 | 0.16 | 0.11 | 47.14 | 0.55 | 0.40 | ZZ |
| XMV7J7 | | 46.70 | -0.13 | -0.09 | 47.00 | 0.41 | 0.30 | ZZ |
| XVRP32 | | 47.50 | 0.67 | 0.47 | 45.70 | -0.89 | -0.65 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 131

Yield Strength (Flat Steel) - ksi
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|-------------------|-----------------------|-------|-------------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| Y38VAT | | 47.50 | 0.67 | 0.47 | 47.50 | 0.91 | 0.67 | ZZ |
| Y4HV99 | | 47.20 | 0.37 | 0.26 | 47.30 | 0.71 | 0.52 | ZZ |
| Y4Y3HW | | 47.52 | 0.69 | 0.49 | 45.76 | -0.83 | -0.61 | ZZ |
| YDL4WK | | 48.30 | 1.47 | 1.04 | 47.00 | 0.41 | 0.30 | ZZ |
| YN86EF | | 46.56 | -0.27 | -0.19 | 45.69 | -0.90 | -0.66 | ZZ |
| YV2EFX | | 46.30 | -0.53 | -0.38 | 46.20 | -0.39 | -0.29 | ZZ |
| Z4CZ38 | | 47.90 | 1.07 | 0.76 | 47.80 | 1.21 | 0.89 | ZZ |
| ZZYZ6F | | 49.00 | 2.17 | 1.53 | 48.50 | 1.91 | 1.41 | ZZ |

Summary Statistics

| | Sample F31 | | Sample F32 | |
|-------------------|-------------------|-----|-------------------|-----|
| Grand Means | 46.83 | ksi | 46.59 | ksi |
| Std Dev Btwn Labs | 1.41 | ksi | 1.36 | ksi |

Samples F31 , F32 : AISI 1010 - 16G , AISI 1010 - 14G

Statistics based on 106 of 106 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 131

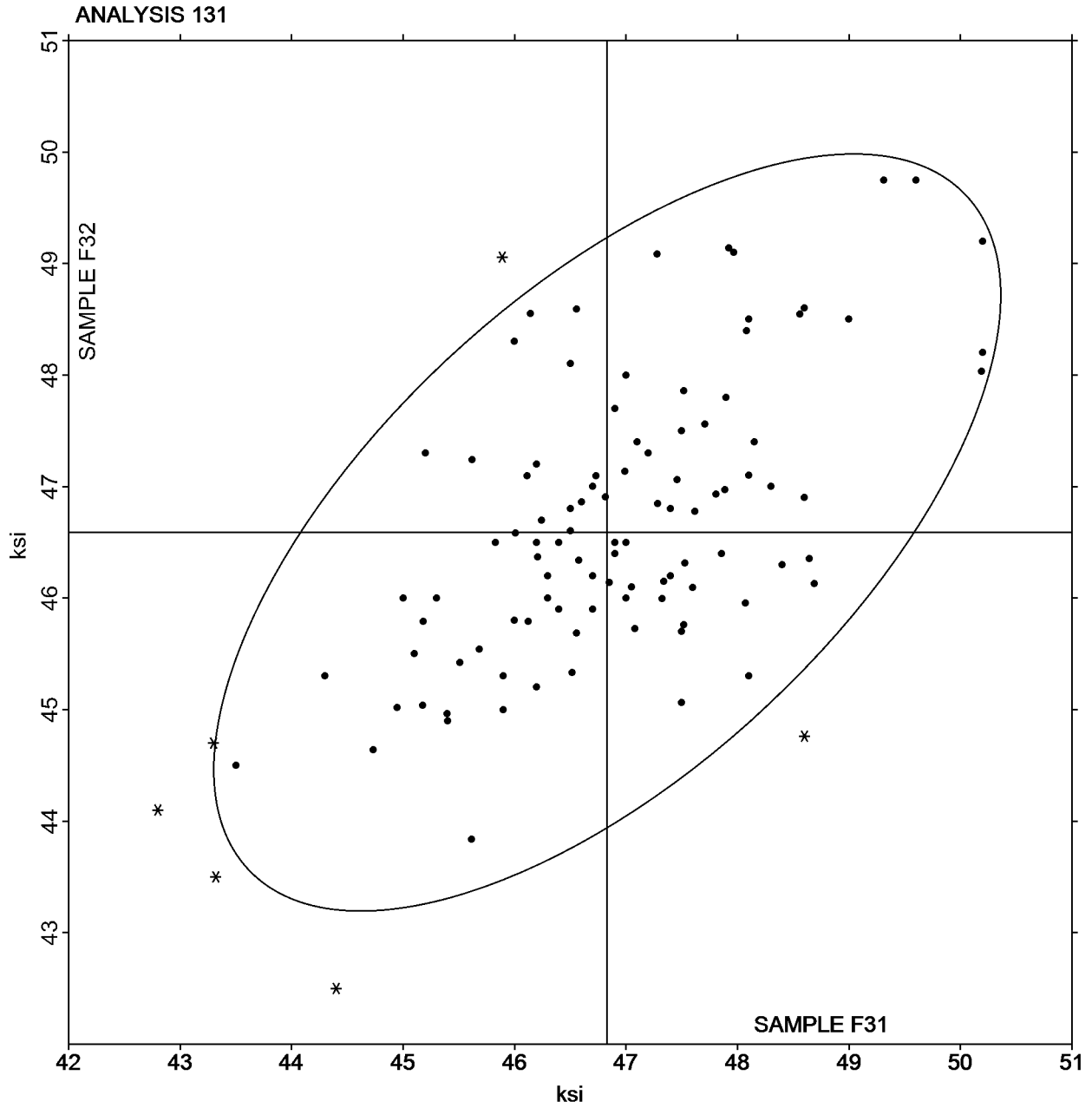
Yield Strength (Flat Steel) - ksi
ASTM E8

SAMPLE F31

46.83 ksi

SAMPLE F32

46.59 ksi



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 132

Elongation (Flat Steel) - Percent Increase
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 272MGF | | 27.90 | -0.64 | -0.32 | 27.50 | -0.65 | -0.34 | ZZ |
| 3AU37E | | 27.58 | -0.96 | -0.48 | 27.82 | -0.33 | -0.17 | ZZ |
| 3H4G3P | | 28.00 | -0.54 | -0.27 | 28.00 | -0.15 | -0.08 | ZZ |
| 3PMM2G | | 24.01 | -4.53 | -2.25 | 24.04 | -4.11 | -2.13 | ZZ |
| 3RBEQT | | 29.00 | 0.46 | 0.23 | 28.00 | -0.15 | -0.08 | ZZ |
| 44368Q | | 31.00 | 2.46 | 1.22 | 31.00 | 2.85 | 1.48 | ZZ |
| 4C2K6B | | 26.70 | -1.84 | -0.92 | 26.50 | -1.65 | -0.86 | ZZ |
| 4H2AD3 | | 29.40 | 0.86 | 0.43 | 29.80 | 1.65 | 0.86 | ZZ |
| 4MHEAC | | 29.70 | 1.16 | 0.58 | 29.40 | 1.25 | 0.65 | ZZ |
| 4XEHE7 | | 27.10 | -1.44 | -0.72 | 27.00 | -1.15 | -0.60 | ZZ |
| 69X3L9 | | 30.80 | 2.26 | 1.12 | 30.20 | 2.05 | 1.06 | ZZ |
| 768KGT | | 29.60 | 1.06 | 0.53 | 29.20 | 1.05 | 0.54 | ZZ |
| 8BAWB6 | | 25.50 | -3.04 | -1.51 | 27.00 | -1.15 | -0.60 | ZZ |
| 9DYKBC | | 27.00 | -1.54 | -0.77 | 26.00 | -2.15 | -1.12 | ZZ |
| 9FHNTG | X | 41.00 | 12.46 | 6.19 | 39.66 | 11.51 | 5.97 | ZZ |
| 9HRNZA | | 28.12 | -0.42 | -0.21 | 27.36 | -0.79 | -0.41 | ZZ |
| 9RWVEA | * | 25.30 | -3.24 | -1.61 | 23.50 | -4.65 | -2.41 | ZZ |
| A3NNG6 | | 27.80 | -0.74 | -0.37 | 26.60 | -1.55 | -0.80 | ZZ |
| AKAEDJ | | 29.87 | 1.33 | 0.66 | 28.69 | 0.54 | 0.28 | ZZ |
| AQEZQG | | 28.40 | -0.14 | -0.07 | 28.60 | 0.45 | 0.23 | ZZ |
| AWNHPA | | 30.50 | 1.96 | 0.97 | 30.00 | 1.85 | 0.96 | ZZ |
| AY8JKV | | 30.06 | 1.52 | 0.75 | 28.44 | 0.29 | 0.15 | ZZ |
| B34L9V | | 27.00 | -1.54 | -0.77 | 26.00 | -2.15 | -1.12 | ZZ |
| B6UKNE | | 30.50 | 1.96 | 0.97 | 30.00 | 1.85 | 0.96 | ZZ |
| BBDY2K | | 31.00 | 2.46 | 1.22 | 30.00 | 1.85 | 0.96 | ZZ |
| BD7JF6 | | 26.00 | -2.54 | -1.26 | 27.10 | -1.05 | -0.55 | ZZ |
| BEHMLG | | 31.50 | 2.96 | 1.47 | 28.90 | 0.75 | 0.39 | ZZ |
| BF8VQB | | 29.15 | 0.61 | 0.30 | 30.20 | 2.05 | 1.06 | ZZ |
| BLY3AJ | | 31.50 | 2.96 | 1.47 | 30.20 | 2.05 | 1.06 | ZZ |
| BN3QTF | | 24.69 | -3.85 | -1.91 | 24.17 | -3.98 | -2.07 | ZZ |
| BY8U2J | X | 29.10 | 0.56 | 0.28 | 34.20 | 6.05 | 3.14 | ZZ |
| CBV64V | | 26.60 | -1.94 | -0.96 | 25.30 | -2.85 | -1.48 | ZZ |
| CNMPRY | | 30.30 | 1.76 | 0.87 | 28.40 | 0.25 | 0.13 | ZZ |
| CTGJPZ | | 32.50 | 3.96 | 1.97 | 30.50 | 2.35 | 1.22 | ZZ |
| D2K3FA | * | 29.15 | 0.61 | 0.30 | 31.25 | 3.10 | 1.61 | ZZ |
| DAVP2H | * | 34.47 | 5.93 | 2.95 | 32.24 | 4.09 | 2.12 | ZZ |
| DFQAFZ | * | 34.00 | 5.46 | 2.71 | 33.00 | 4.85 | 2.52 | ZZ |
| DQH68Z | | 28.00 | -0.54 | -0.27 | 28.00 | -0.15 | -0.08 | ZZ |
| DVYDTE | | 25.68 | -2.86 | -1.42 | 25.57 | -2.58 | -1.34 | ZZ |
| ECPW9X | | 32.50 | 3.96 | 1.97 | 31.50 | 3.35 | 1.74 | ZZ |
| EQZEXF | | 29.00 | 0.46 | 0.23 | 29.00 | 0.85 | 0.44 | ZZ |
| EYCN8U | | 26.52 | -2.02 | -1.00 | 25.92 | -2.23 | -1.16 | ZZ |
| F6XXWJ | | 28.90 | 0.36 | 0.18 | 27.10 | -1.05 | -0.55 | ZZ |
| FMFW42 | | 28.90 | 0.36 | 0.18 | 29.00 | 0.85 | 0.44 | ZZ |
| FN7ZT3 | | 28.51 | -0.03 | -0.02 | 27.76 | -0.39 | -0.20 | ZZ |
| FQTQU8 | | 23.60 | -4.94 | -2.46 | 24.12 | -4.03 | -2.09 | ZZ |
| FWQYP3 | | 27.40 | -1.14 | -0.57 | 28.90 | 0.75 | 0.39 | ZZ |
| FXG67T | | 26.40 | -2.14 | -1.06 | 26.66 | -1.49 | -0.77 | ZZ |
| FZ6T7Z | | 29.30 | 0.76 | 0.38 | 29.40 | 1.25 | 0.65 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 132

Elongation (Flat Steel) - Percent Increase
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| G3LKQ2 | | 27.23 | -1.31 | -0.65 | 26.29 | -1.86 | -0.97 | ZZ |
| G9BXTA | | 26.50 | -2.04 | -1.01 | 26.00 | -2.15 | -1.12 | ZZ |
| GPKPUU | | 27.10 | -1.44 | -0.72 | 27.00 | -1.15 | -0.60 | ZZ |
| H29BDU | | 27.00 | -1.54 | -0.77 | 29.00 | 0.85 | 0.44 | ZZ |
| H2QB8J | | 29.98 | 1.44 | 0.72 | 28.28 | 0.13 | 0.07 | ZZ |
| HBXWKD | | 27.00 | -1.54 | -0.77 | 26.90 | -1.25 | -0.65 | ZZ |
| HLGDBY | | 27.28 | -1.26 | -0.63 | 27.12 | -1.03 | -0.53 | ZZ |
| HZCUZX | | 27.00 | -1.54 | -0.77 | 26.00 | -2.15 | -1.12 | ZZ |
| JGJBMP | | 27.50 | -1.04 | -0.52 | 28.50 | 0.35 | 0.18 | ZZ |
| JH8W6E | | 26.10 | -2.44 | -1.21 | 24.60 | -3.55 | -1.84 | ZZ |
| JK34ZD | | 28.00 | -0.54 | -0.27 | 26.70 | -1.45 | -0.75 | ZZ |
| JRWK23 | | 27.07 | -1.47 | -0.73 | 26.03 | -2.12 | -1.10 | ZZ |
| JTR444 | | 28.00 | -0.54 | -0.27 | 28.00 | -0.15 | -0.08 | ZZ |
| JWTXAL | | 29.00 | 0.46 | 0.23 | 28.00 | -0.15 | -0.08 | ZZ |
| K87N69 | | 28.50 | -0.04 | -0.02 | 27.70 | -0.45 | -0.23 | ZZ |
| KE8Z27 | | 26.30 | -2.24 | -1.11 | 28.40 | 0.25 | 0.13 | ZZ |
| L7RC9P | | 30.10 | 1.56 | 0.77 | 29.50 | 1.35 | 0.70 | ZZ |
| LGBVK9 | | 27.57 | -0.97 | -0.48 | 27.77 | -0.38 | -0.20 | ZZ |
| LXDNAG | | 27.40 | -1.14 | -0.57 | 27.30 | -0.85 | -0.44 | ZZ |
| MH2L28 | | 29.30 | 0.76 | 0.38 | 28.60 | 0.45 | 0.23 | ZZ |
| MK8UH6 | | 29.00 | 0.46 | 0.23 | 27.50 | -0.65 | -0.34 | ZZ |
| MM7GK8 | | 31.69 | 3.15 | 1.57 | 32.00 | 3.85 | 2.00 | ZZ |
| N2A3PH | | 29.00 | 0.46 | 0.23 | 29.00 | 0.85 | 0.44 | ZZ |
| N7K6W8 | | 27.00 | -1.54 | -0.77 | 25.40 | -2.75 | -1.43 | ZZ |
| NHEKJM | * | 32.50 | 3.96 | 1.97 | 29.50 | 1.35 | 0.70 | ZZ |
| NLYDXB | | 30.70 | 2.16 | 1.07 | 29.80 | 1.65 | 0.86 | ZZ |
| P4V8XF | | 29.10 | 0.56 | 0.28 | 28.20 | 0.05 | 0.03 | ZZ |
| P8BP34 | | 26.50 | -2.04 | -1.01 | 26.10 | -2.05 | -1.06 | ZZ |
| PNE9RE | X | 31.80 | 3.26 | 1.62 | 23.50 | -4.65 | -2.41 | ZZ |
| PQ4HXA | | 27.70 | -0.84 | -0.42 | 25.70 | -2.45 | -1.27 | ZZ |
| Q9J68N | | 26.20 | -2.34 | -1.16 | 25.79 | -2.36 | -1.22 | ZZ |
| QE64D4 | | 29.00 | 0.46 | 0.23 | 28.40 | 0.25 | 0.13 | ZZ |
| QGTTLM | * | 29.20 | 0.66 | 0.33 | 26.20 | -1.95 | -1.01 | ZZ |
| QYZNG3 | | 28.45 | -0.09 | -0.05 | 27.50 | -0.65 | -0.34 | ZZ |
| R2EU43 | | 28.30 | -0.24 | -0.12 | 28.60 | 0.45 | 0.23 | ZZ |
| R6ZCN9 | | 30.00 | 1.46 | 0.73 | 29.50 | 1.35 | 0.70 | ZZ |
| RRN9ZQ | | 25.30 | -3.24 | -1.61 | 25.50 | -2.65 | -1.38 | ZZ |
| TFU3UY | | 31.20 | 2.66 | 1.32 | 31.70 | 3.55 | 1.84 | ZZ |
| THYVKQ | | 26.80 | -1.74 | -0.87 | 26.90 | -1.25 | -0.65 | ZZ |
| TTZ66U | | 30.21 | 1.67 | 0.83 | 31.12 | 2.97 | 1.54 | ZZ |
| U3G9PY | | 30.06 | 1.52 | 0.76 | 28.59 | 0.44 | 0.23 | ZZ |
| UCP7AW | | 27.93 | -0.61 | -0.30 | 27.99 | -0.16 | -0.08 | ZZ |
| UR3ECL | | 29.00 | 0.46 | 0.23 | 30.00 | 1.85 | 0.96 | ZZ |
| VEUQ23 | | 28.90 | 0.36 | 0.18 | 30.50 | 2.35 | 1.22 | ZZ |
| VNYU9L | | 29.30 | 0.76 | 0.38 | 29.50 | 1.35 | 0.70 | ZZ |
| W6GCFC | | 30.10 | 1.56 | 0.77 | 31.10 | 2.95 | 1.53 | ZZ |
| W79GNQ | X | 32.60 | 4.06 | 2.02 | 35.80 | 7.65 | 3.97 | ZZ |
| X9X7LC | | 27.75 | -0.79 | -0.39 | 26.80 | -1.35 | -0.70 | ZZ |
| XKDNPG | | 30.40 | 1.86 | 0.92 | 30.60 | 2.45 | 1.27 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 132

Elongation (Flat Steel) - Percent Increase
ASTM E8

| WebCode | Data Flag | Sample F31 | | | Sample F32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| XMGJ9J | | 28.30 | -0.24 | -0.12 | 27.80 | -0.35 | -0.18 | ZZ |
| XMV7J7 | X | 26.50 | -2.04 | -1.01 | 29.60 | 1.45 | 0.75 | ZZ |
| XVRP32 | | 27.60 | -0.94 | -0.47 | 27.90 | -0.25 | -0.13 | ZZ |
| Y38VAT | | 26.60 | -1.94 | -0.96 | 27.40 | -0.75 | -0.39 | ZZ |
| Y4HV99 | | 29.60 | 1.06 | 0.53 | 28.40 | 0.25 | 0.13 | ZZ |
| Y4Y3HW | X | 29.10 | 0.56 | 0.28 | 32.70 | 4.55 | 2.36 | ZZ |
| YDL4WK | | 26.90 | -1.64 | -0.82 | 27.80 | -0.35 | -0.18 | ZZ |
| YN86EF | | 29.10 | 0.56 | 0.28 | 29.20 | 1.05 | 0.54 | ZZ |
| YV2EFX | | 32.10 | 3.56 | 1.77 | 30.60 | 2.45 | 1.27 | ZZ |
| Z4CZ38 | | 29.20 | 0.66 | 0.33 | 29.50 | 1.35 | 0.70 | ZZ |
| ZZYZ6F | | 28.70 | 0.16 | 0.08 | 28.90 | 0.75 | 0.39 | ZZ |

Summary Statistics

| | Sample F31 | | Sample F32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 28.54 | Percent | 28.15 | Percent |
| Std Dev Btwn Labs | 2.01 | Percent | 1.93 | Percent |

Samples F31 , F32 : AISI 1010 - 16G , AISI 1010 - 14G

Statistics based on 103 of 109 reporting participants

Comments on assigned Data Flags for Analysis #132

WebCode Flag Analyst Comment

9FHNTG X Data for both samples are high. Possible Systematic error.

BY8U2J X Data for sample F32 are high. Inconsistent in testing between samples.

PNE9RE X Inconsistent in testing between samples.

W79GNQ X Data for sample F32 are high. Inconsistent in testing between samples.

XMV7J7 X Inconsistent in testing between samples.

Y4Y3HW X Inconsistent in testing between samples.

Cycle 112
4th Q, 2015

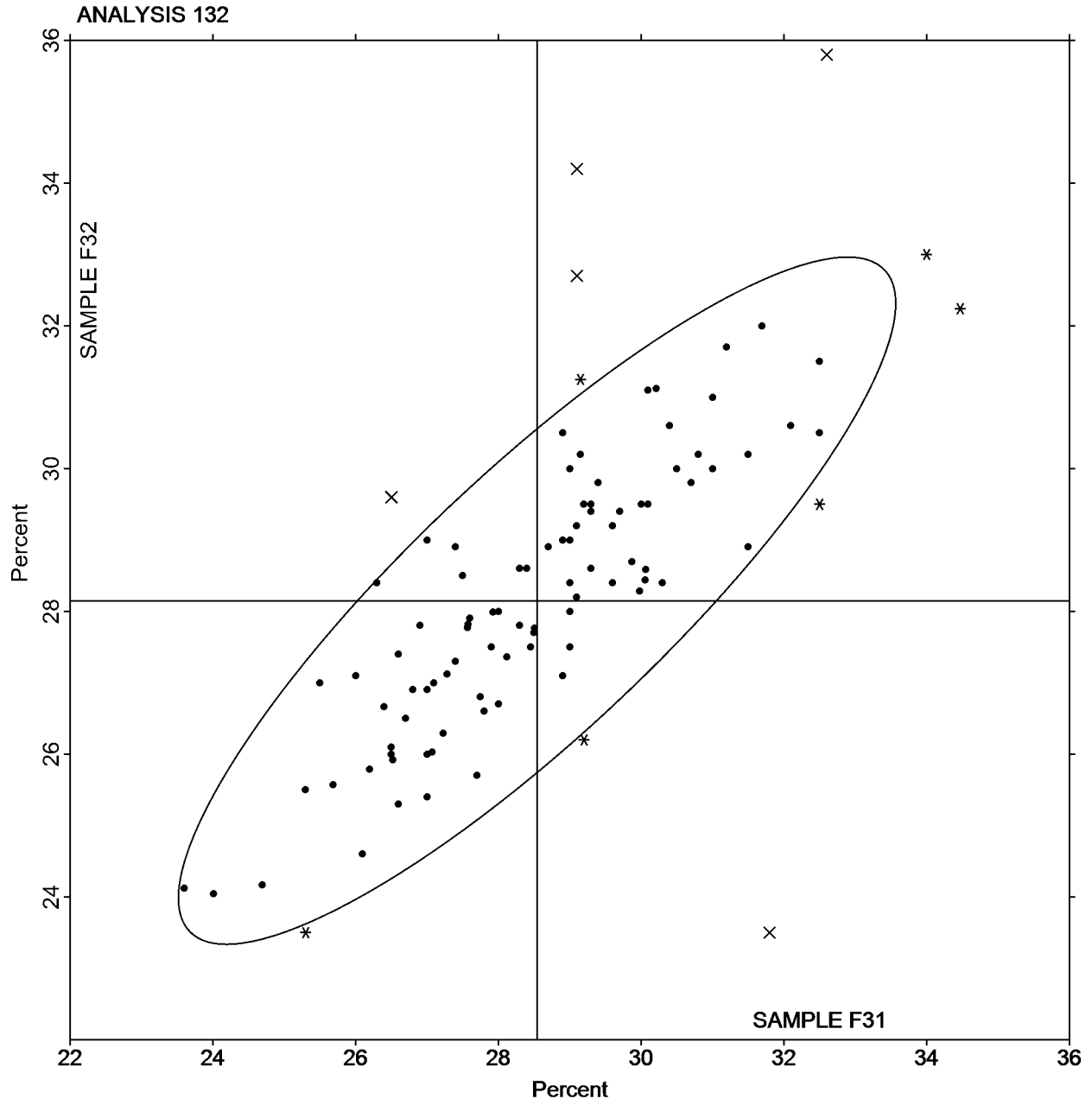
Interlaboratory Testing Program for Metals

Analysis 132

Elongation (Flat Steel) - Percent Increase
ASTM E8

SAMPLE F31
28.54 Percent

SAMPLE F32
28.15 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 136
Rockwell Superficial Hardness (30N Scale)
ASTM E18

| WebCode | Data Flag | Sample E31 | | | Sample E32 | | | Instr Code |
|---------|-----------|------------|-----------------------|--------|------------|-----------------------|--------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 23W49L | | 75.75 | 0.18 | 0.29 | 71.22 | 0.06 | 0.12 | ZZ |
| 2KW2GA | | 75.50 | -0.08 | -0.12 | 71.54 | 0.39 | 0.74 | ZZ |
| 2ZBEQU | | 75.76 | 0.18 | 0.29 | 71.68 | 0.53 | 1.01 | ZZ |
| 39YK6D | | 75.64 | 0.06 | 0.10 | 71.22 | 0.07 | 0.13 | ZZ |
| 3FE9WU | | 75.20 | -0.38 | -0.60 | 70.18 | -0.97 | -1.88 | ZZ |
| 3U6VDN | | 76.00 | 0.42 | 0.68 | 71.22 | 0.07 | 0.13 | ZZ |
| 4R9Y2Y | | 75.78 | 0.20 | 0.33 | 71.42 | 0.27 | 0.51 | ZZ |
| 4XEHE7 | | 74.86 | -0.72 | -1.15 | 70.16 | -0.99 | -1.92 | ZZ |
| 4YAZF8 | | 75.52 | -0.06 | -0.09 | 71.08 | -0.07 | -0.14 | ZZ |
| 6A34X7 | | 75.32 | -0.26 | -0.41 | 71.16 | 0.01 | 0.01 | ZZ |
| 7U8WPW | | 76.08 | 0.50 | 0.81 | 71.76 | 0.61 | 1.17 | ZZ |
| 8BVCHV | | 75.56 | -0.02 | -0.03 | 71.08 | -0.07 | -0.14 | ZZ |
| 8C4QP2 | | 76.18 | 0.60 | 0.97 | 71.80 | 0.65 | 1.24 | ZZ |
| 8DFEBL | | 74.70 | -0.88 | -1.41 | 70.46 | -0.69 | -1.34 | ZZ |
| 8ZRCQ9 | | 75.16 | -0.42 | -0.67 | 70.38 | -0.77 | -1.49 | ZZ |
| 9RWVEA | | 76.48 | 0.90 | 1.45 | 71.92 | 0.77 | 1.47 | ZZ |
| ACTWW6 | | 76.44 | 0.86 | 1.39 | 71.68 | 0.53 | 1.01 | ZZ |
| AW78AP | | 76.92 | 1.34 | 2.16 | 72.16 | 1.01 | 1.94 | ZZ |
| B34L9V | X | 73.90 | -1.68 | -2.69 | 69.06 | -2.09 | -4.04 | ZZ |
| B38VfV | * | 74.40 | -1.18 | -1.89 | 71.14 | -0.01 | -0.03 | ZZ |
| BR7H7M | | 75.90 | 0.32 | 0.52 | 71.82 | 0.67 | 1.28 | ZZ |
| CNJ8LN | | 74.14 | -1.44 | -2.30 | 70.50 | -0.65 | -1.26 | ZZ |
| CVNYR | | 74.96 | -0.62 | -0.99 | 70.42 | -0.73 | -1.42 | ZZ |
| CWY2MC | | 74.44 | -1.14 | -1.82 | 70.42 | -0.73 | -1.42 | ZZ |
| CZELJY | | 76.06 | 0.48 | 0.78 | 71.22 | 0.07 | 0.13 | ZZ |
| D6LE22 | | 76.26 | 0.68 | 1.10 | 72.14 | 0.99 | 1.90 | ZZ |
| DU4MPK | | 76.16 | 0.58 | 0.94 | 71.24 | 0.09 | 0.16 | ZZ |
| EJJTYA | | 76.64 | 1.06 | 1.71 | 72.00 | 0.85 | 1.63 | ZZ |
| EREV2L | | 76.14 | 0.56 | 0.90 | 71.00 | -0.15 | -0.30 | ZZ |
| EWBDF2 | | 75.00 | -0.58 | -0.92 | 71.00 | -0.15 | -0.30 | ZZ |
| FGWCGP | X | 57.88 | -17.70 | -28.38 | 52.54 | -18.61 | -35.88 | ZZ |
| FJZ7Y8 | | 75.26 | -0.32 | -0.51 | 71.08 | -0.07 | -0.14 | ZZ |
| GFAA2Z | | 76.04 | 0.46 | 0.74 | 71.20 | 0.05 | 0.09 | ZZ |
| GJ9X7E | | 75.44 | -0.14 | -0.22 | 71.06 | -0.09 | -0.18 | ZZ |
| HHWBH9 | | 75.60 | 0.02 | 0.04 | 70.88 | -0.27 | -0.53 | ZZ |
| J32FBZ | | 75.70 | 0.12 | 0.20 | 70.70 | -0.45 | -0.88 | ZZ |
| JH8W6E | | 75.88 | 0.30 | 0.49 | 71.44 | 0.29 | 0.55 | ZZ |
| M8LH7V | | 75.48 | -0.10 | -0.15 | 70.82 | -0.33 | -0.65 | ZZ |
| MGNZFC | * | 73.80 | -1.78 | -2.85 | 70.20 | -0.95 | -1.84 | ZZ |
| MJD4CQ | | 75.30 | -0.28 | -0.44 | 70.96 | -0.19 | -0.38 | ZZ |
| MK8UH6 | | 75.00 | -0.58 | -0.92 | 71.00 | -0.15 | -0.30 | ZZ |
| MQRY6D | | 74.98 | -0.60 | -0.96 | 71.20 | 0.05 | 0.09 | ZZ |
| MUWHD8 | | 75.30 | -0.28 | -0.44 | 71.60 | 0.45 | 0.86 | ZZ |
| MY7YMV | | 75.74 | 0.16 | 0.26 | 71.12 | -0.03 | -0.07 | ZZ |
| P4V8XF | | 75.72 | 0.14 | 0.23 | 71.42 | 0.27 | 0.51 | ZZ |
| QAVUDL | | 75.66 | 0.08 | 0.13 | 71.08 | -0.07 | -0.14 | ZZ |
| QUJCD8 | | 74.48 | -1.10 | -1.76 | 70.82 | -0.33 | -0.65 | ZZ |
| RQX3JZ | X | 76.90 | 1.32 | 2.12 | 70.46 | -0.69 | -1.34 | ZZ |
| TM9XML | | 76.16 | 0.58 | 0.94 | 72.18 | 1.03 | 1.98 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 136

Rockwell Superficial Hardness (30N Scale)

ASTM E18

| WebCode | Data Flag | Sample E31 | | | Sample E32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| U97YXF | | 75.30 | -0.28 | -0.44 | 70.64 | -0.51 | -0.99 | ZZ |
| V7FA32 | | 76.22 | 0.64 | 1.03 | 72.00 | 0.85 | 1.63 | ZZ |
| VLTCAP | | 75.52 | -0.06 | -0.09 | 71.10 | -0.05 | -0.11 | ZZ |
| W86XY2 | | 75.62 | 0.04 | 0.07 | 70.64 | -0.51 | -0.99 | ZZ |
| WNFEAB | X | 74.14 | -1.44 | -2.30 | 69.32 | -1.83 | -3.54 | ZZ |
| X2YJWX | | 75.62 | 0.04 | 0.07 | 70.84 | -0.31 | -0.61 | ZZ |
| XDQ2UB | | 76.44 | 0.86 | 1.39 | 71.60 | 0.45 | 0.86 | ZZ |
| XEKV98 | | 75.96 | 0.38 | 0.62 | 71.40 | 0.25 | 0.47 | ZZ |
| Y2UAQH | | 75.86 | 0.28 | 0.46 | 71.26 | 0.11 | 0.20 | ZZ |
| Y6UKHC | | 75.66 | 0.08 | 0.13 | 71.34 | 0.19 | 0.36 | ZZ |
| ZHVGEJ | | 76.12 | 0.54 | 0.87 | 70.98 | -0.17 | -0.34 | ZZ |
| ZLWHHM | | 74.99 | -0.59 | -0.94 | 70.22 | -0.93 | -1.79 | ZZ |
| ZV3L7W | | 75.62 | 0.04 | 0.07 | 71.18 | 0.03 | 0.05 | ZZ |

Summary Statistics

| | Sample E31 | | Sample E32 | |
|-------------------|------------|-------|------------|-------|
| Grand Means | 75.58 | HR30N | 71.15 | HR30N |
| Std Dev Btwn Labs | 0.62 | HR30N | 0.52 | HR30N |

Samples E31 , E32 : Steel

Statistics based on 58 of 62 reporting participants

Comments on assigned Data Flags for Analysis #136

WebCode Flag Analyst Comment

B34L9V X Data for sample E32 are low. Inconsistent within the determinations of both samples.

FGWCGP X Data for both samples are low.

RQX3JZ X Inconsistent in testing between samples. Inconsistent within the determinations of sample E32.

WNFEAB X Data for sample E32 are low. Inconsistent within the determinations of sample E31.

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

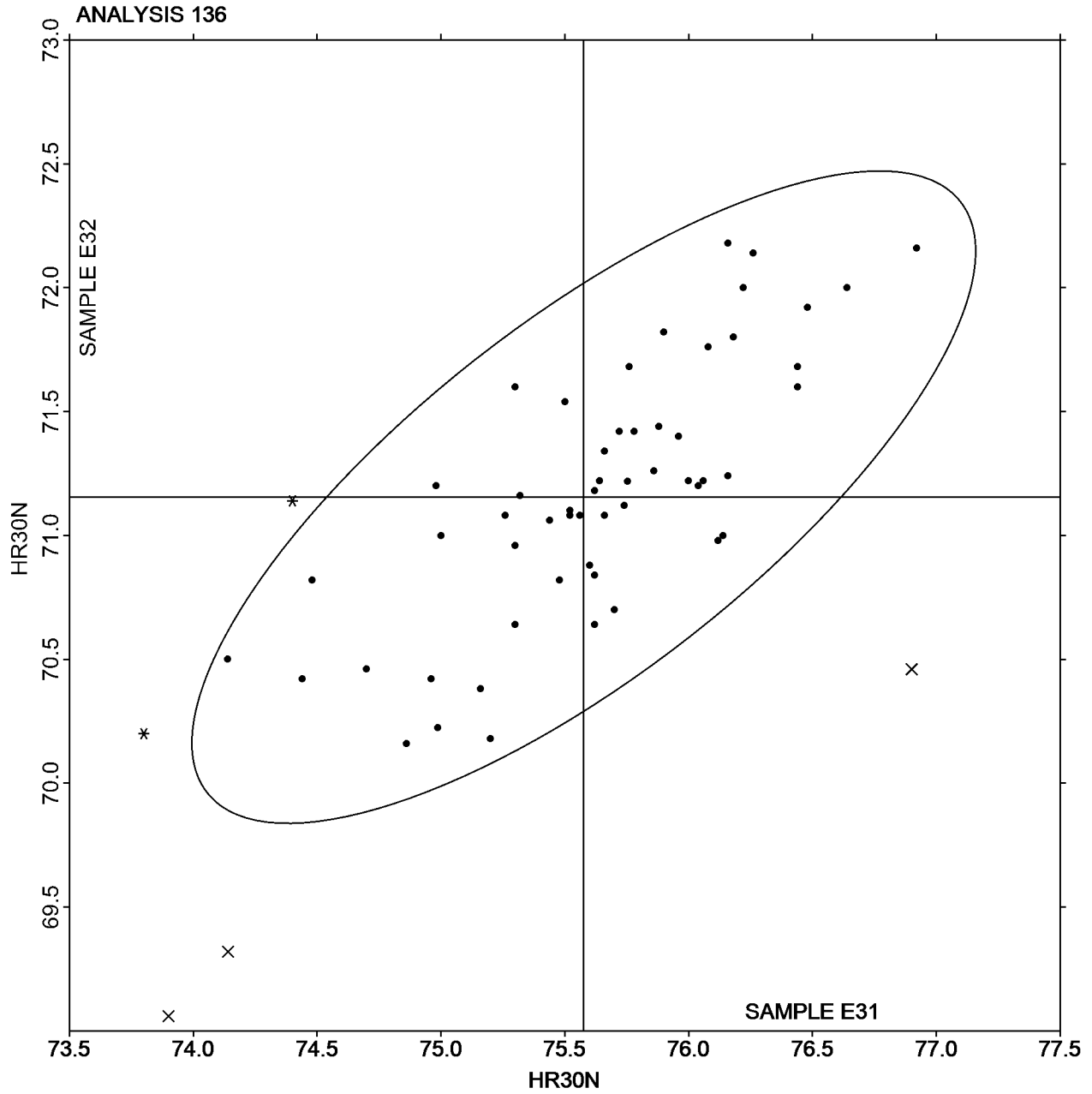
Analysis 136

Rockwell Superficial Hardness (30N Scale)

ASTM E18

SAMPLE E31
75.58 HR30N

SAMPLE E32
71.15 HR30N



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 145

Total Case Depth - inches
SAE J423, SAE J78

| WebCode | Data Flag | Sample C31 | | | Sample C32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 23W49L | | 0.0198 | 0.0031 | 1.01 | 0.0320 | 0.0030 | 0.70 | ZZ |
| 392YRL | | 0.0177 | 0.0010 | 0.33 | 0.0308 | 0.0018 | 0.42 | ZZ |
| 3FE9WU | | 0.0131 | -0.0036 | -1.17 | 0.0260 | -0.0030 | -0.70 | ZZ |
| 3H7CLV | | 0.0194 | 0.0027 | 0.87 | 0.0350 | 0.0059 | 1.39 | ZZ |
| 3U6VDN | | 0.0159 | -0.0008 | -0.27 | 0.0281 | -0.0009 | -0.21 | ZZ |
| 3WNNW9A | | 0.0163 | -0.0004 | -0.13 | 0.0270 | -0.0020 | -0.47 | ZZ |
| 3YQW7L | | 0.0213 | 0.0046 | 1.49 | 0.0346 | 0.0056 | 1.32 | ZZ |
| 4B636U | | 0.0102 | -0.0065 | -2.13 | 0.0208 | -0.0082 | -1.93 | ZZ |
| 4VVGJJ | | 0.0180 | 0.0013 | 0.43 | 0.0306 | 0.0016 | 0.37 | ZZ |
| 4YAZF8 | | 0.0167 | 0.0000 | -0.01 | 0.0285 | -0.0005 | -0.12 | ZZ |
| 6Z44TE | | 0.0168 | 0.0001 | 0.03 | 0.0307 | 0.0017 | 0.40 | ZZ |
| 734RPF | | 0.0198 | 0.0031 | 1.03 | 0.0320 | 0.0029 | 0.69 | ZZ |
| 9YD68C | | 0.0140 | -0.0027 | -0.89 | 0.0253 | -0.0037 | -0.87 | ZZ |
| AMV6NN | | 0.0141 | -0.0026 | -0.85 | 0.0275 | -0.0015 | -0.36 | ZZ |
| AQEZQG | | 0.0149 | -0.0018 | -0.58 | 0.0231 | -0.0059 | -1.39 | ZZ |
| AW78AP | | 0.0116 | -0.0051 | -1.65 | 0.0221 | -0.0069 | -1.62 | ZZ |
| B34L9V | | 0.0195 | 0.0028 | 0.92 | 0.0334 | 0.0044 | 1.03 | ZZ |
| B6UKNE | | 0.0170 | 0.0003 | 0.10 | 0.0300 | 0.0010 | 0.23 | ZZ |
| BR7H7M | | 0.0141 | -0.0026 | -0.83 | 0.0256 | -0.0034 | -0.81 | ZZ |
| CK7H7K | | 0.0128 | -0.0039 | -1.27 | 0.0232 | -0.0058 | -1.37 | ZZ |
| CVN2NW | | 0.0168 | 0.0001 | 0.03 | 0.0297 | 0.0007 | 0.17 | ZZ |
| CVNYR | | 0.0163 | -0.0004 | -0.12 | 0.0298 | 0.0008 | 0.19 | ZZ |
| CZELJY | | 0.0155 | -0.0012 | -0.39 | 0.0293 | 0.0003 | 0.07 | ZZ |
| DAVP2H | | 0.0152 | -0.0015 | -0.48 | 0.0292 | 0.0002 | 0.04 | ZZ |
| DNEANX | | 0.0175 | 0.0008 | 0.28 | 0.0325 | 0.0035 | 0.83 | ZZ |
| EVZDJ7 | | 0.0171 | 0.0004 | 0.12 | 0.0257 | -0.0033 | -0.78 | ZZ |
| FBMBX7 | | 0.0195 | 0.0028 | 0.91 | 0.0301 | 0.0011 | 0.26 | ZZ |
| G3NWPQ | | 0.0192 | 0.0025 | 0.82 | 0.0312 | 0.0022 | 0.51 | ZZ |
| G9BXTA | | 0.0191 | 0.0024 | 0.79 | 0.0333 | 0.0043 | 1.01 | ZZ |
| GJ9X7E | | 0.0145 | -0.0022 | -0.72 | 0.0255 | -0.0035 | -0.83 | ZZ |
| H6R3QH | | 0.0190 | 0.0023 | 0.75 | 0.0310 | 0.0020 | 0.46 | ZZ |
| J96C7T | | 0.0121 | -0.0046 | -1.48 | 0.0231 | -0.0059 | -1.39 | ZZ |
| K87N69 | | 0.0227 | 0.0060 | 1.96 | 0.0379 | 0.0089 | 2.08 | ZZ |
| KFHMYK | | 0.0125 | -0.0042 | -1.36 | 0.0254 | -0.0036 | -0.85 | ZZ |
| LTN7XQ | | 0.0182 | 0.0015 | 0.49 | 0.0309 | 0.0019 | 0.45 | ZZ |
| MFGK97 | | 0.0187 | 0.0020 | 0.65 | 0.0313 | 0.0023 | 0.54 | ZZ |
| MK8UH6 | | 0.0188 | 0.0021 | 0.68 | 0.0299 | 0.0008 | 0.20 | ZZ |
| MQRY6D | | 0.0130 | -0.0037 | -1.20 | 0.0240 | -0.0050 | -1.18 | ZZ |
| MT6MQY | * | 0.0239 | 0.0072 | 2.35 | 0.0357 | 0.0067 | 1.57 | ZZ |
| NXP3UV | | 0.0170 | 0.0003 | 0.11 | 0.0279 | -0.0012 | -0.27 | ZZ |
| P32CJJ | | 0.0170 | 0.0003 | 0.10 | 0.0312 | 0.0022 | 0.51 | ZZ |
| QABAF2 | | 0.0169 | 0.0002 | 0.07 | 0.0306 | 0.0016 | 0.37 | ZZ |
| QQJCZV | | 0.0160 | -0.0007 | -0.23 | 0.0248 | -0.0042 | -0.99 | ZZ |
| QUJCD8 | X | 0.0172 | 0.0005 | 0.16 | 0.3180 | 0.2890 | 67.84 | ZZ |
| QZAX8E | | 0.0176 | 0.0009 | 0.29 | 0.0266 | -0.0024 | -0.56 | ZZ |
| R6E6Y3 | | 0.0124 | -0.0043 | -1.40 | 0.0218 | -0.0072 | -1.70 | ZZ |
| RRN9ZQ | | 0.0207 | 0.0040 | 1.31 | 0.0340 | 0.0050 | 1.17 | ZZ |
| TM9XML | | 0.0191 | 0.0024 | 0.77 | 0.0345 | 0.0054 | 1.28 | ZZ |
| WPLW97 | | 0.0174 | 0.0007 | 0.23 | 0.0324 | 0.0034 | 0.79 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 145

Total Case Depth - inches
SAE J423, SAE J78

| WebCode | Data Flag | Sample C31 | | | Sample C32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| WZ7YYE | * | 0.00890 | -0.0078 | -2.54 | 0.0183 | -0.0107 | -2.51 | ZZ |
| X6FNT8 | | 0.0181 | 0.0014 | 0.44 | 0.0323 | 0.0033 | 0.77 | ZZ |
| XDQ2UB | | 0.0178 | 0.0011 | 0.36 | 0.0336 | 0.0046 | 1.07 | ZZ |

| Summary Statistics | | | | |
|--------------------|------------|--------|------------|--------|
| | Sample C31 | | Sample C32 | |
| Grand Means | 0.0167 | inches | 0.0290 | inches |
| Std Dev Btwn Labs | 0.0031 | inches | 0.0043 | inches |

Samples C31 , C32 : Steel

Statistics based on 51 of 52 reporting participants

Comments on assigned Data Flags for Analysis #145

WebCode Flag Analyst Comment

QUJCD8 X Data for sample C32 are high. Inconsistent within the determinations of sample C32.

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

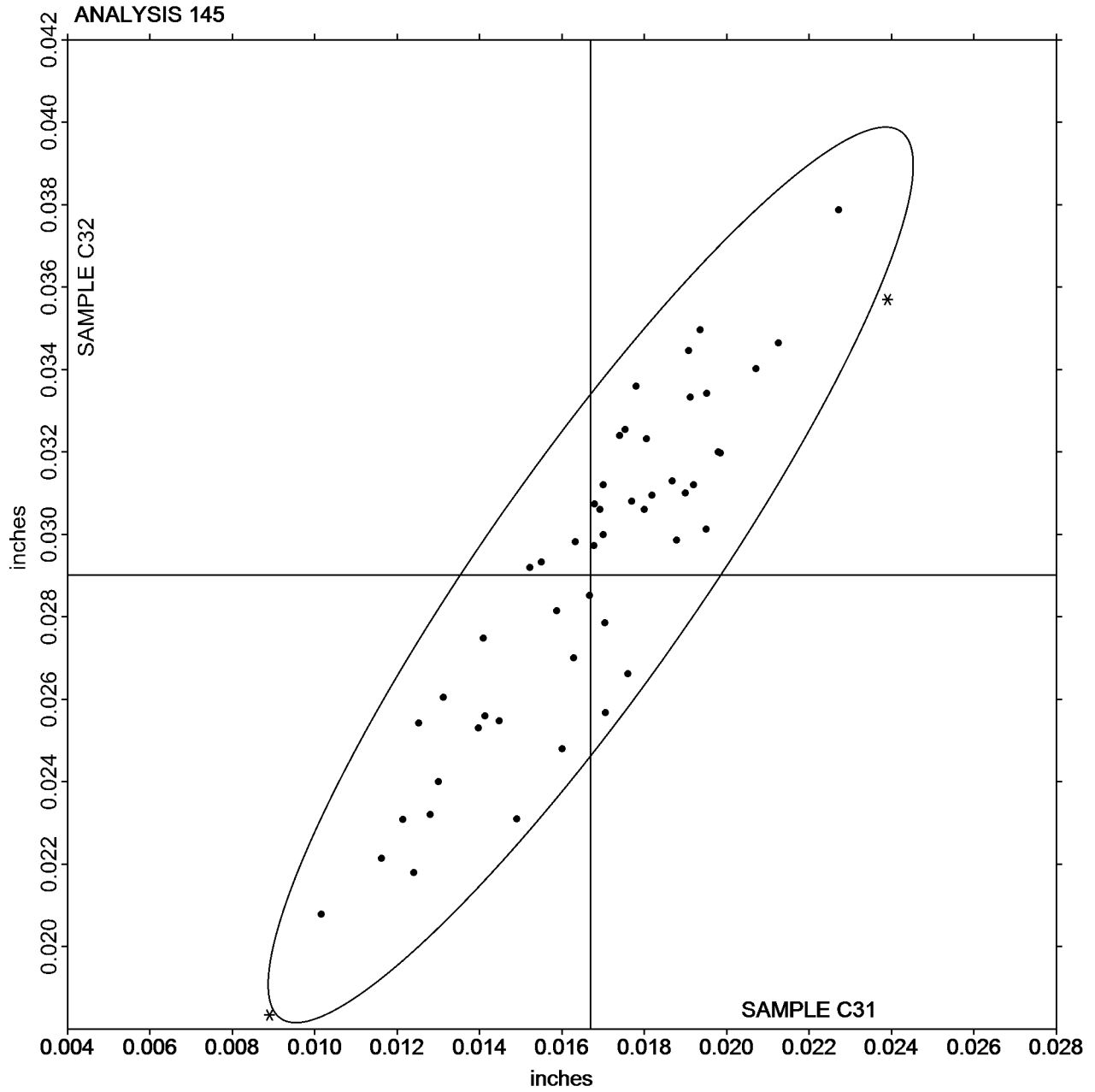
Analysis 145

Total Case Depth - inches

SAE J423, SAE J78

SAMPLE C31
0.0167 inches

SAMPLE C32
0.0290 inches



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 146

Effective Case Depth - inches
SAE J423, SAE J78

| WebCode | Data Flag | Sample C31 | | | Sample C32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 23W49L | | 0.0168 | 0.0013 | 1.01 | 0.0283 | 0.0011 | 0.51 | ZZ |
| 2DYC3Q | | 0.0147 | -0.0007 | -0.55 | 0.0261 | -0.0012 | -0.57 | ZZ |
| 392YRL | | 0.0154 | -0.0001 | -0.04 | 0.0276 | 0.0004 | 0.17 | ZZ |
| 3FE9WU | | 0.0133 | -0.0022 | -1.63 | 0.0270 | -0.0002 | -0.11 | ZZ |
| 3H7CLV | | 0.0165 | 0.0010 | 0.76 | 0.0294 | 0.0021 | 1.03 | ZZ |
| 3U6VDN | | 0.0145 | -0.0009 | -0.69 | 0.0248 | -0.0024 | -1.18 | ZZ |
| 3YQW7L | | 0.0156 | 0.0001 | 0.10 | 0.0257 | -0.0015 | -0.73 | ZZ |
| 4B636U | | 0.0134 | -0.0021 | -1.55 | 0.0269 | -0.0004 | -0.19 | ZZ |
| 4RBLHC | | 0.0136 | -0.0019 | -1.39 | 0.0244 | -0.0028 | -1.38 | ZZ |
| 4VVGJJ | | 0.0154 | -0.0001 | -0.04 | 0.0236 | -0.0036 | -1.77 | ZZ |
| 4YAZF8 | X | 0.0167 | 0.0012 | 0.92 | 0.0170 | -0.0102 | -4.95 | ZZ |
| 6GPKZH | | 0.0148 | -0.0007 | -0.52 | 0.0292 | 0.0019 | 0.93 | ZZ |
| 6Z44TE | | 0.0169 | 0.0014 | 1.08 | 0.0288 | 0.0016 | 0.76 | ZZ |
| 734RPF | | 0.0179 | 0.0024 | 1.82 | 0.0287 | 0.0014 | 0.68 | ZZ |
| 9BMUX2 | | 0.0152 | -0.0002 | -0.17 | 0.0283 | 0.0010 | 0.49 | ZZ |
| 9YD68C | | 0.0175 | 0.0021 | 1.56 | 0.0301 | 0.0028 | 1.38 | ZZ |
| AMV6NN | | 0.0149 | -0.0005 | -0.40 | 0.0287 | 0.0014 | 0.70 | ZZ |
| AQEZQG | X | 0.0167 | 0.0012 | 0.94 | 0.0228 | -0.0044 | -2.15 | ZZ |
| B34L9V | | 0.0168 | 0.0013 | 1.01 | 0.0274 | 0.0002 | 0.07 | ZZ |
| B6UKNE | | 0.0132 | -0.0023 | -1.69 | 0.0256 | -0.0016 | -0.80 | ZZ |
| BR7H7M | | 0.0141 | -0.0014 | -1.05 | 0.0255 | -0.0018 | -0.86 | ZZ |
| CK7H7K | | 0.0126 | -0.0029 | -2.14 | 0.0240 | -0.0032 | -1.57 | ZZ |
| CVN2NW | | 0.0158 | 0.0003 | 0.25 | 0.0282 | 0.0009 | 0.44 | ZZ |
| CVNYR | | 0.0160 | 0.0005 | 0.41 | 0.0282 | 0.0010 | 0.46 | ZZ |
| CZELJY | | 0.0159 | 0.0005 | 0.34 | 0.0290 | 0.0018 | 0.87 | ZZ |
| D3YPRW | | 0.0149 | -0.0006 | -0.43 | 0.0261 | -0.0012 | -0.57 | ZZ |
| DAVP2H | | 0.0169 | 0.0015 | 1.12 | 0.0259 | -0.0013 | -0.65 | ZZ |
| DNEANX | | 0.0154 | -0.0001 | -0.04 | 0.0280 | 0.0008 | 0.36 | ZZ |
| EVZDJ7 | | 0.0164 | 0.0009 | 0.68 | 0.0256 | -0.0016 | -0.78 | ZZ |
| EZKMFH | | 0.0162 | 0.0007 | 0.56 | 0.0294 | 0.0022 | 1.04 | ZZ |
| F6XXWJ | | 0.0148 | -0.0007 | -0.49 | 0.0254 | -0.0018 | -0.90 | ZZ |
| FXG67T | | 0.0154 | -0.0001 | -0.04 | 0.0278 | 0.0006 | 0.27 | ZZ |
| G3NWPQ | | 0.0142 | -0.0013 | -0.94 | 0.0232 | -0.0040 | -1.96 | ZZ |
| G9BXTA | | 0.0152 | -0.0003 | -0.19 | 0.0300 | 0.0028 | 1.33 | ZZ |
| GJ9X7E | | 0.0132 | -0.0023 | -1.69 | 0.0270 | -0.0002 | -0.12 | ZZ |
| H6R3QH | | 0.0166 | 0.0012 | 0.89 | 0.0282 | 0.0009 | 0.44 | ZZ |
| J96C7T | | 0.0154 | -0.0001 | -0.04 | 0.0282 | 0.0010 | 0.48 | ZZ |
| K87N69 | * | 0.0126 | -0.0029 | -2.14 | 0.0210 | -0.0062 | -3.02 | ZZ |
| KFHMYK | | 0.0150 | -0.0005 | -0.34 | 0.0284 | 0.0012 | 0.56 | ZZ |
| LTN7XQ | | 0.0161 | 0.0007 | 0.52 | 0.0287 | 0.0015 | 0.72 | ZZ |
| MFGK97 | | 0.0149 | -0.0006 | -0.41 | 0.0250 | -0.0022 | -1.09 | ZZ |
| MK8UH6 | | 0.0172 | 0.0018 | 1.35 | 0.0267 | -0.0006 | -0.27 | ZZ |
| MQRY6D | | 0.0150 | -0.0005 | -0.34 | 0.0286 | 0.0014 | 0.65 | ZZ |
| MT6MQY | | 0.0182 | 0.0027 | 2.06 | 0.0300 | 0.0028 | 1.33 | ZZ |
| N3ETP7 | | 0.0173 | 0.0018 | 1.39 | 0.0296 | 0.0024 | 1.15 | ZZ |
| NXP3UV | | 0.0159 | 0.0004 | 0.31 | 0.0259 | -0.0014 | -0.66 | ZZ |
| P32CJJ | | 0.0148 | -0.0007 | -0.49 | 0.0282 | 0.0010 | 0.46 | ZZ |
| QABAF2 | | 0.0168 | 0.0014 | 1.02 | 0.0288 | 0.0015 | 0.75 | ZZ |
| QAVUDL | | 0.0136 | -0.0019 | -1.39 | 0.0252 | -0.0020 | -0.99 | ZZ |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 146

Effective Case Depth - inches
SAE J423, SAE J78

| WebCode | Data Flag | Sample C31 | | | Sample C32 | | | Instr Code |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QQJCZV | | 0.0156 | 0.0001 | 0.11 | 0.0258 | -0.0014 | -0.70 | ZZ |
| QUJCD8 | | 0.0144 | -0.0011 | -0.79 | 0.0232 | -0.0040 | -1.96 | ZZ |
| QZAX8E | | 0.0158 | 0.0003 | 0.26 | 0.0258 | -0.0014 | -0.70 | ZZ |
| R6E6Y3 | | 0.0170 | 0.0015 | 1.16 | 0.0286 | 0.0014 | 0.65 | ZZ |
| RP488P | | 0.0164 | 0.0009 | 0.71 | 0.0284 | 0.0012 | 0.56 | ZZ |
| RWP8JV | | 0.0173 | 0.0019 | 1.42 | 0.0284 | 0.0011 | 0.55 | ZZ |
| TM9XML | | 0.0169 | 0.0014 | 1.05 | 0.0302 | 0.0029 | 1.41 | ZZ |
| U2BWXF | | 0.0169 | 0.0015 | 1.11 | 0.0303 | 0.0031 | 1.48 | ZZ |
| U97YXF | | 0.0143 | -0.0011 | -0.84 | 0.0267 | -0.0006 | -0.27 | ZZ |
| WPLW97 | | 0.0146 | -0.0009 | -0.64 | 0.0262 | -0.0010 | -0.51 | ZZ |
| X6FNT8 | | 0.0157 | 0.0002 | 0.19 | 0.0313 | 0.0040 | 1.96 | ZZ |
| XDQ2UB | | 0.0146 | -0.0009 | -0.64 | 0.0274 | 0.0002 | 0.07 | ZZ |
| XUY2GK | | 0.0148 | -0.0006 | -0.49 | 0.0265 | -0.0008 | -0.38 | ZZ |

Summary Statistics

| | Sample C31 | | Sample C32 | |
|-------------------|------------|--------|------------|--------|
| Grand Means | 0.0155 | inches | 0.0272 | inches |
| Std Dev Btwn Labs | 0.0013 | inches | 0.0021 | inches |

Samples C31 , C32 : Steel

Statistics based on 60 of 62 reporting participants

Comments on assigned Data Flags for Analysis #146

WebCode Flag Analyst Comment

4YAZF8 X Data for sample C32 are low.

AQEZQG X Inconsistent in testing between samples.

Cycle 112
4th Q, 2015

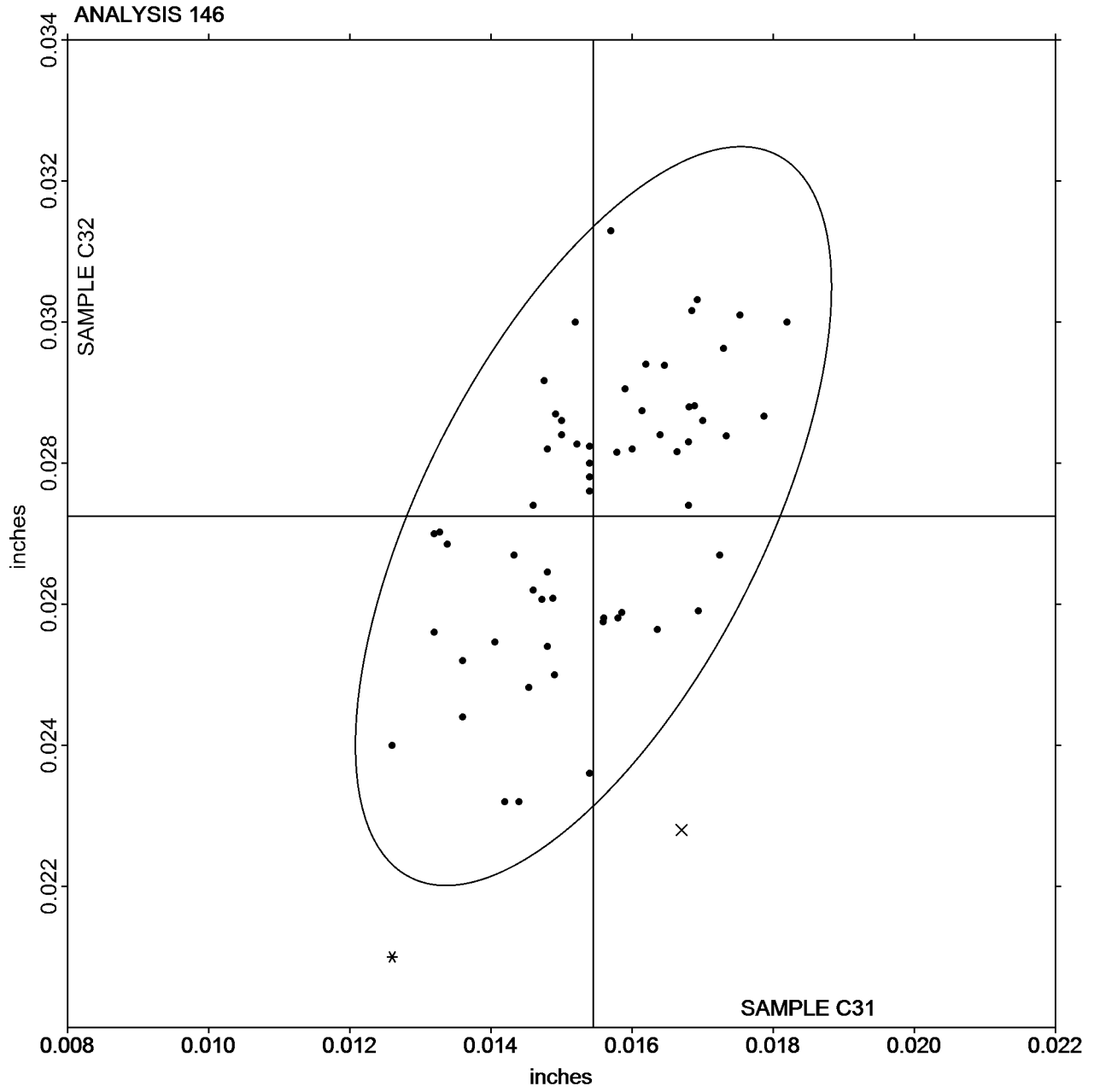
Interlaboratory Testing Program for Metals

Analysis 146

Effective Case Depth - inches
SAE J423, SAE J78

SAMPLE C31
0.0155 inches

SAMPLE C32
0.0272 inches



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 148

Grain Size (Inconel) - ASTM Grain Size Number (G)
ASTM E112, ASTM E1382

| WebCode | Data Flag | Sample M1 | | | Sample M2 | | | Instr Code |
|---------|-----------|-----------|-----------------------|-------|-----------|-----------------------|-------|------------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2X968E | | 9.60 | 0.79 | 1.17 | 7.50 | -0.07 | -0.11 | ZZ |
| 392YRL | | 8.50 | -0.31 | -0.46 | 7.20 | -0.37 | -0.61 | ZZ |
| 3U6VDN | | 8.60 | -0.21 | -0.31 | 7.50 | -0.07 | -0.11 | ZZ |
| 4B636U | | 9.20 | 0.39 | 0.58 | 7.60 | 0.03 | 0.06 | ZZ |
| 4RBLHC | | 8.70 | -0.11 | -0.16 | 7.40 | -0.17 | -0.28 | ZZ |
| 69X3L9 | | 8.00 | -0.81 | -1.20 | 6.60 | -0.97 | -1.61 | ZZ |
| 6A34X7 | | 9.80 | 0.99 | 1.46 | 8.60 | 1.03 | 1.72 | ZZ |
| C4WUV6 | | 8.30 | -0.51 | -0.75 | 7.80 | 0.23 | 0.39 | ZZ |
| D3YPRW | | 8.10 | -0.71 | -1.05 | 7.00 | -0.57 | -0.94 | ZZ |
| DGDXRZ | | 9.00 | 0.19 | 0.28 | 8.00 | 0.43 | 0.72 | ZZ |
| DJQKCZ | | 9.50 | 0.69 | 1.02 | 8.10 | 0.53 | 0.89 | ZZ |
| EFF482 | | 8.62 | -0.19 | -0.28 | 7.82 | 0.25 | 0.42 | ZZ |
| EUYU6H | | 9.40 | 0.59 | 0.87 | 7.37 | -0.20 | -0.33 | ZZ |
| EZKMFH | | 8.60 | -0.21 | -0.31 | 7.00 | -0.57 | -0.94 | ZZ |
| GJ9X7E | | 8.50 | -0.31 | -0.46 | 7.40 | -0.17 | -0.28 | ZZ |
| HT9ZV4 | | 8.71 | -0.10 | -0.15 | 7.35 | -0.22 | -0.36 | ZZ |
| J96C7T | | 9.40 | 0.59 | 0.87 | 8.40 | 0.83 | 1.39 | ZZ |
| JC4QUH | | 8.40 | -0.41 | -0.61 | 6.80 | -0.77 | -1.28 | ZZ |
| LVP2TM | * | 7.80 | -1.01 | -1.49 | 7.80 | 0.23 | 0.39 | ZZ |
| LYA9TA | X | 7.50 | -1.31 | -1.94 | 8.30 | 0.73 | 1.22 | ZZ |
| MNMEM8 | | 9.48 | 0.67 | 0.99 | 8.18 | 0.61 | 1.02 | ZZ |
| MXWUA8 | | 9.80 | 0.99 | 1.46 | 7.80 | 0.23 | 0.39 | ZZ |
| P4V8XF | | 9.80 | 0.99 | 1.46 | 8.20 | 0.63 | 1.06 | ZZ |
| QAVUDL | | 8.90 | 0.09 | 0.13 | 7.40 | -0.17 | -0.28 | ZZ |
| QQJCZV | | 8.70 | -0.11 | -0.16 | 7.40 | -0.17 | -0.28 | ZZ |
| UA3E9R | | 9.80 | 0.99 | 1.46 | 8.80 | 1.23 | 2.05 | ZZ |
| UKZ8VW | | 7.40 | -1.41 | -2.08 | 6.60 | -0.97 | -1.61 | ZZ |
| WWN7EY | | 8.00 | -0.81 | -1.20 | 6.40 | -1.17 | -1.94 | ZZ |
| X9HM4Z | | 7.90 | -0.91 | -1.35 | 7.20 | -0.37 | -0.61 | ZZ |
| ZYH4DF | | 9.00 | 0.19 | 0.28 | 8.20 | 0.63 | 1.06 | ZZ |

Summary Statistics

| | Sample M1 | | Sample M2 | |
|-------------------|-----------|-----------------|-----------|-----------------|
| Grand Means | 8.81 | ASTM Grain Size | 7.57 | ASTM Grain Size |
| Std Dev Btwn Labs | 0.68 | ASTM Grain Size | 0.60 | ASTM Grain Size |

Samples M1 , M2 : Inconel

Statistics based on 29 of 30 reporting participants

Comments on assigned Data Flags for Analysis #148

WebCode Flag Analyst Comment

LYA9TA X Inconsistent in testing between samples.

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 148

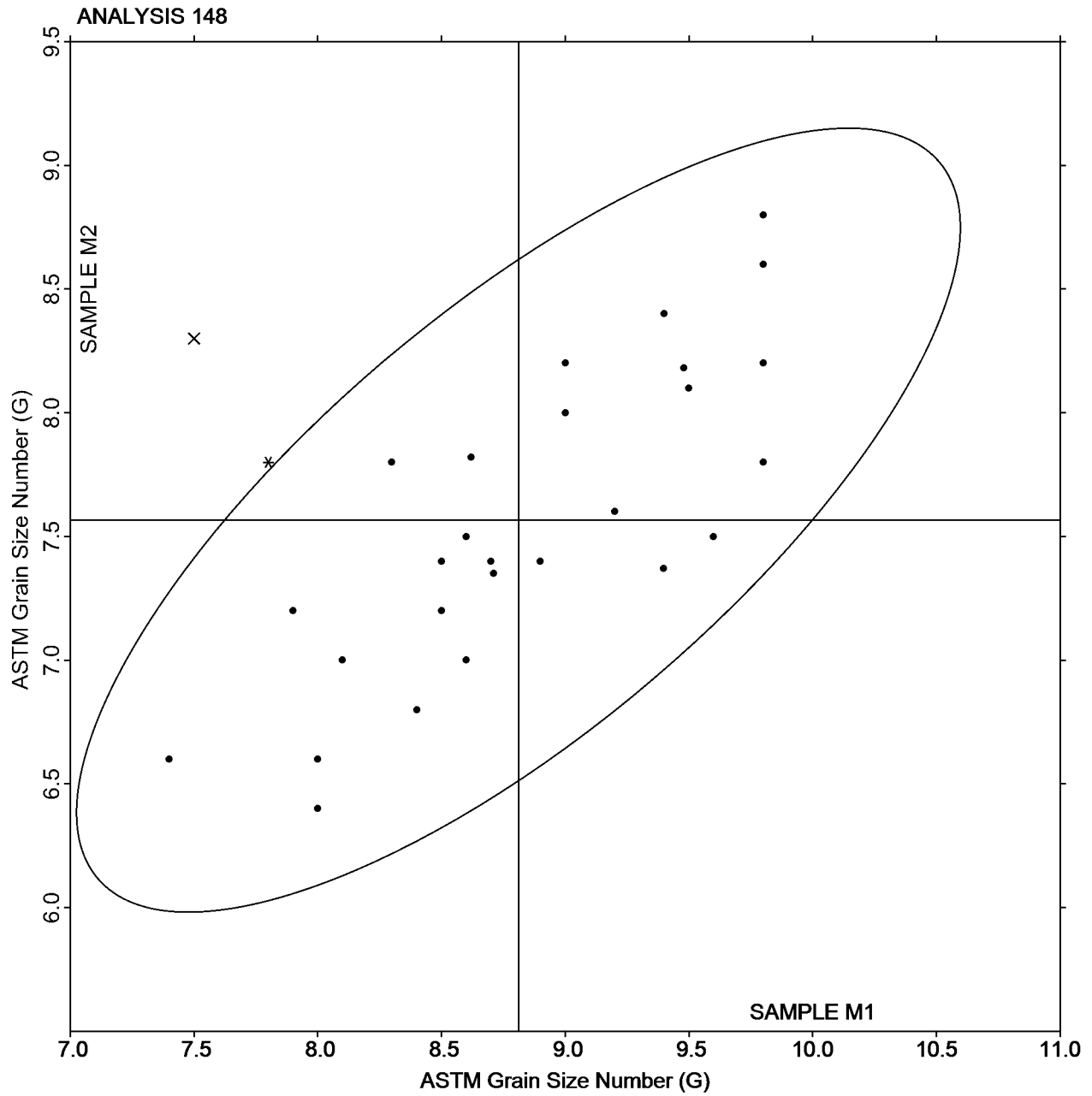
Grain Size (Inconel) - ASTM Grain Size Number (G)
ASTM E112, ASTM E1382

SAMPLE M1

8.81 ASTM Grain Size Number (G)

SAMPLE M2

7.57 ASTM Grain Size Number (G)



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 160

Chemical Analysis Element #1: Copper-based Alloy - Percent
COPPER (Cu)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 81.76 | -0.21 | -0.48 | 80.63 | -0.32 | -0.68 | OE |
| 3RBEQT | | 82.39 | 0.42 | 0.99 | 81.68 | 0.73 | 1.55 | XX |
| 4FH33L | | 81.90 | -0.07 | -0.16 | 80.87 | -0.08 | -0.17 | OE |
| 4RBLHC | | 82.70 | 0.73 | 1.71 | 81.68 | 0.73 | 1.56 | OE |
| 4YBZDL | * | 83.26 | 1.29 | 3.03 | 82.52 | 1.58 | 3.36 | ED |
| 8BQC4D | | 81.93 | -0.04 | -0.10 | 80.66 | -0.29 | -0.61 | OE |
| 92HXX6 | | 81.89 | -0.08 | -0.18 | 80.85 | -0.10 | -0.21 | WD |
| 9TRCR7 | | 81.67 | -0.30 | -0.71 | 80.67 | -0.28 | -0.60 | AA |
| AFJTVW | | 81.67 | -0.30 | -0.71 | 80.40 | -0.55 | -1.17 | OE |
| F6XXWJ | | 81.51 | -0.46 | -1.08 | 80.82 | -0.12 | -0.26 | GD |
| G9BXTA | | 82.01 | 0.04 | 0.10 | 80.66 | -0.29 | -0.62 | OE |
| GFAA2Z | | 81.50 | -0.47 | -1.10 | 80.99 | 0.05 | 0.10 | WD |
| LARLEK | | 82.03 | 0.06 | 0.14 | 80.80 | -0.15 | -0.32 | ED |
| LXXFY8 | | 81.88 | -0.09 | -0.22 | 80.87 | -0.08 | -0.17 | EL |
| MXWUA8 | | 81.80 | -0.17 | -0.40 | 80.86 | -0.09 | -0.18 | IC |
| QQJC2G | | 82.49 | 0.52 | 1.22 | 81.42 | 0.48 | 1.02 | EL |
| QZAX8E | | 81.74 | -0.23 | -0.54 | 80.56 | -0.39 | -0.83 | OE |
| TFU3UY | | 82.54 | 0.57 | 1.35 | 81.33 | 0.38 | 0.81 | OE |
| U97YXF | | 81.63 | -0.34 | -0.79 | 80.60 | -0.35 | -0.75 | OE |
| VDGAQA | | 81.97 | 0.00 | 0.00 | 80.90 | -0.05 | -0.10 | OE |
| VDY9Z2 | | 81.72 | -0.25 | -0.59 | 80.72 | -0.22 | -0.47 | GR |
| VGGKLA | | 82.10 | 0.13 | 0.32 | 80.92 | -0.03 | -0.06 | BD |
| WZBJLG | | 81.50 | -0.47 | -1.11 | 80.39 | -0.56 | -1.19 | OE |
| ZTFWXD | | 82.10 | 0.13 | 0.30 | 80.99 | 0.04 | 0.09 | IC |
| ZUPX3K | | 81.55 | -0.42 | -0.99 | 80.90 | -0.05 | -0.10 | BD |

Summary Statistics

| | Sample K31 | | Sample K32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 81.97 | Percent | 80.95 | Percent |
| Std Dev Btwn Labs | 0.43 | Percent | 0.47 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 25 of 25 reporting participants

Cycle 112
4th Q, 2015

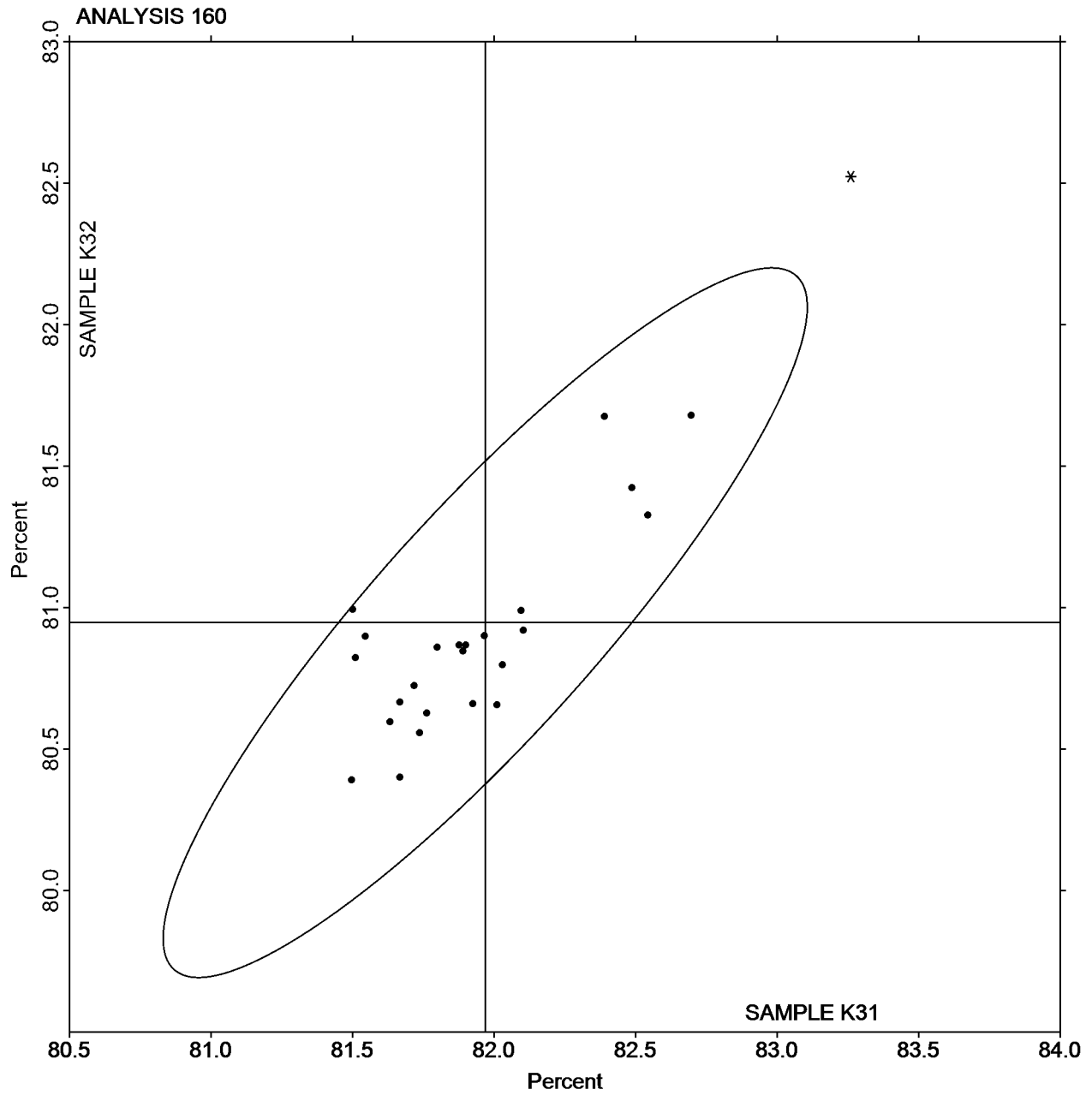
Interlaboratory Testing Program for Metals

Analysis 160

Chemical Analysis Element #1: Copper-based Alloy - Percent
COPPER (Cu)

SAMPLE K31
81.97 Percent

SAMPLE K32
80.95 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 161

Chemical Analysis Element #2: Copper-based Alloy - Percent
ALUMINUM (Al)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 9.876 | 0.257 | 1.10 | 9.854 | 0.123 | 0.52 | OE |
| 3RBEQT | | 9.261 | -0.358 | -1.53 | 9.209 | -0.522 | -2.21 | XX |
| 4FH33L | | 9.597 | -0.022 | -0.10 | 9.727 | -0.004 | -0.02 | OE |
| 4RBLHC | | 9.283 | -0.336 | -1.44 | 9.414 | -0.317 | -1.34 | OE |
| 4YBZDL | X | 8.147 | -1.472 | -6.30 | 8.119 | -1.612 | -6.84 | ED |
| 8BQC4D | | 9.603 | -0.016 | -0.07 | 9.793 | 0.063 | 0.27 | OE |
| 92HXX6 | | 9.707 | 0.088 | 0.38 | 9.820 | 0.089 | 0.38 | WD |
| 9FHNV3 | | 9.733 | 0.114 | 0.49 | 9.848 | 0.118 | 0.50 | IC |
| AFJTVW | | 9.730 | 0.111 | 0.47 | 9.927 | 0.196 | 0.83 | OE |
| DNEANX | | 9.713 | 0.094 | 0.40 | 9.780 | 0.049 | 0.21 | OE |
| F6XXWJ | * | 10.10 | 0.481 | 2.06 | 9.727 | -0.004 | -0.02 | GD |
| G9BXTA | | 9.523 | -0.096 | -0.41 | 9.817 | 0.086 | 0.36 | OE |
| GFAA2Z | | 9.743 | 0.124 | 0.53 | 9.861 | 0.130 | 0.55 | WD |
| LARLEK | | 9.895 | 0.276 | 1.18 | 9.985 | 0.255 | 1.08 | ED |
| MXWUA8 | | 9.606 | -0.013 | -0.05 | 9.719 | -0.011 | -0.05 | IC |
| QQJC2G | | 9.593 | -0.026 | -0.11 | 9.963 | 0.233 | 0.99 | IC |
| QZAX8E | | 9.586 | -0.033 | -0.14 | 9.755 | 0.025 | 0.10 | OE |
| TFU3UY | | 9.393 | -0.226 | -0.97 | 9.773 | 0.043 | 0.18 | OE |
| U97YXF | | 9.883 | 0.264 | 1.13 | 10.10 | 0.366 | 1.55 | OE |
| UD46V7 | | 9.500 | -0.119 | -0.51 | 9.662 | -0.069 | -0.29 | IC |
| VDGAQA | | 9.693 | 0.074 | 0.32 | 9.697 | -0.034 | -0.14 | OE |
| VDY9Z2 | | 9.547 | -0.072 | -0.31 | 9.443 | -0.287 | -1.22 | IC |
| VGGKLA | | 9.447 | -0.172 | -0.74 | 9.650 | -0.081 | -0.34 | OE |
| WZBJLG | | 9.960 | 0.341 | 1.46 | 10.04 | 0.306 | 1.30 | XX |
| ZTFWXD | | 9.429 | -0.190 | -0.81 | 9.610 | -0.121 | -0.51 | IC |
| ZUPX3K | * | 9.073 | -0.546 | -2.34 | 9.100 | -0.631 | -2.67 | IC |

Summary Statistics

| | Sample K31 | | Sample K32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 9.619 | Percent | 9.731 | Percent |
| Std Dev Btwn Labs | 0.234 | Percent | 0.236 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 25 of 26 reporting participants

Comments on assigned Data Flags for Analysis #161

WebCode Flag Analyst Comment

4YBZDL X Data for both samples are low. Possible Systematic error.

Cycle 112
4th Q, 2015

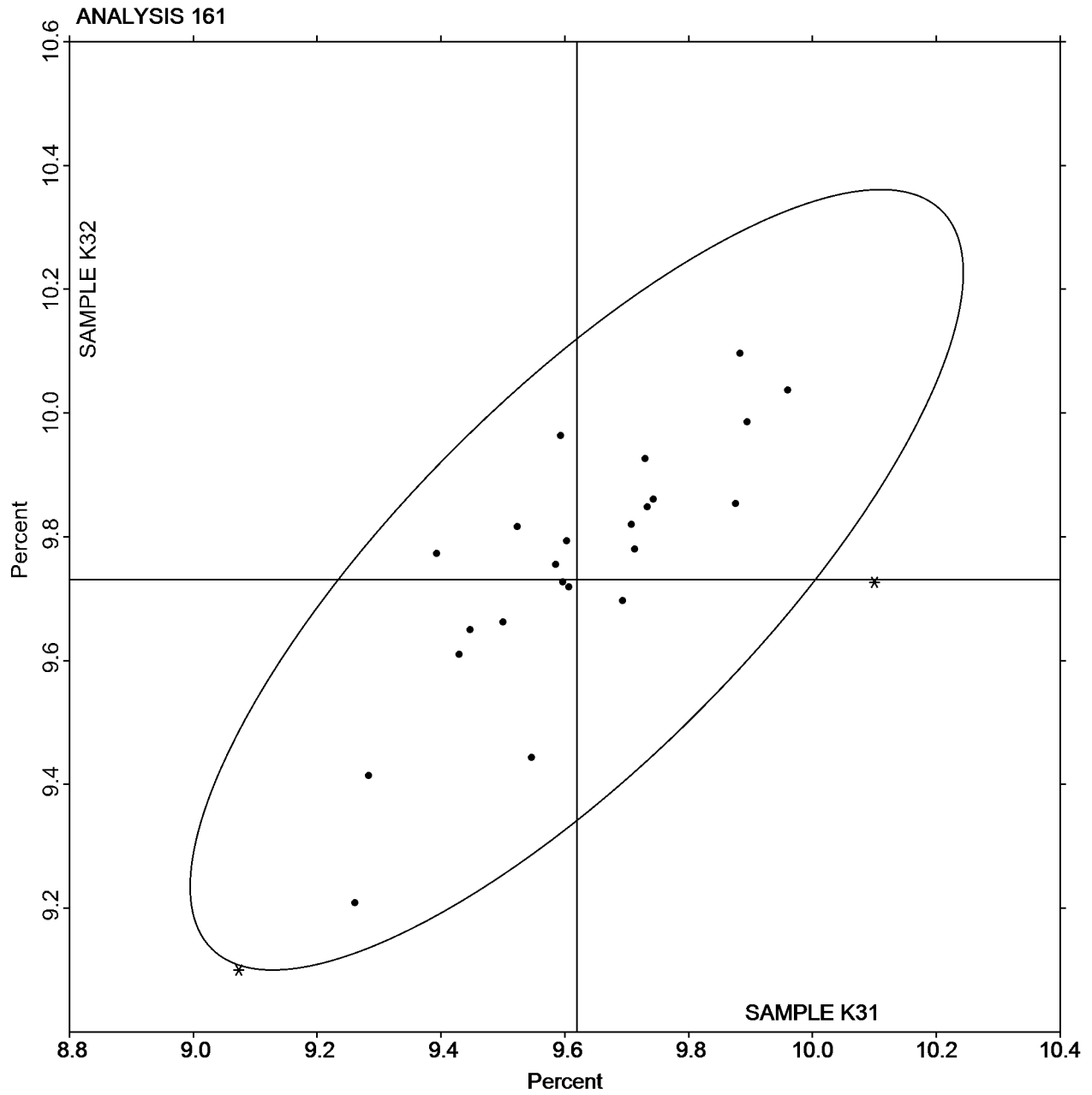
Interlaboratory Testing Program for Metals

Analysis 161

Chemical Analysis Element #2: Copper-based Alloy - Percent ALUMINUM (Al)

SAMPLE K31
9.619 Percent

SAMPLE K32
9.731 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 162

Chemical Analysis Element #3: Copper-based Alloy - Percent
IRON (Fe)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 2.852 | -0.093 | -1.08 | 3.555 | -0.204 | -1.81 | OE |
| 3RBEQT | | 2.972 | 0.027 | 0.31 | 3.621 | -0.137 | -1.22 | XX |
| 4FH33L | | 3.117 | 0.172 | 2.00 | 3.867 | 0.108 | 0.96 | OE |
| 4RBLHC | * | 2.682 | -0.263 | -3.06 | 3.451 | -0.307 | -2.73 | OE |
| 4YBZDL | | 3.007 | 0.062 | 0.72 | 3.814 | 0.055 | 0.49 | ED |
| 8BQC4D | | 2.923 | -0.022 | -0.25 | 3.837 | 0.078 | 0.70 | OE |
| 92HXX6 | | 2.916 | -0.029 | -0.34 | 3.712 | -0.046 | -0.41 | WD |
| 9FHNV3 | | 3.020 | 0.075 | 0.87 | 3.831 | 0.072 | 0.64 | IC |
| 9TRCR7 | | 2.900 | -0.045 | -0.52 | 3.640 | -0.118 | -1.05 | AA |
| AFJTVW | | 2.959 | 0.014 | 0.16 | 3.833 | 0.075 | 0.67 | OE |
| DNEANX | | 2.987 | 0.042 | 0.48 | 3.844 | 0.086 | 0.76 | OE |
| F6XXWJ | | 2.913 | -0.032 | -0.37 | 3.670 | -0.088 | -0.79 | GD |
| G9BXTA | | 2.953 | 0.008 | 0.10 | 3.813 | 0.055 | 0.49 | OE |
| GFAA2Z | | 3.087 | 0.142 | 1.65 | 3.733 | -0.026 | -0.23 | WD |
| LARLEK | | 2.906 | -0.039 | -0.46 | 3.842 | 0.083 | 0.74 | ED |
| MXWUA8 | | 2.985 | 0.040 | 0.46 | 3.720 | -0.038 | -0.34 | IC |
| QQJC2G | | 2.893 | -0.052 | -0.60 | 3.820 | 0.062 | 0.55 | IC |
| QZAX8E | | 2.988 | 0.043 | 0.50 | 3.888 | 0.130 | 1.16 | OE |
| TFU3UY | | 2.870 | -0.075 | -0.87 | 3.787 | 0.028 | 0.25 | OE |
| U97YXF | | 3.017 | 0.072 | 0.83 | 3.861 | 0.103 | 0.92 | OE |
| VDGAQA | | 2.870 | -0.075 | -0.87 | 3.660 | -0.098 | -0.87 | OE |
| VDY9Z2 | | 2.930 | -0.015 | -0.18 | 3.753 | -0.005 | -0.05 | IC |
| VGGKLA | | 2.933 | -0.012 | -0.14 | 3.749 | -0.009 | -0.08 | OE |
| WZBJLG | | 3.035 | 0.090 | 1.05 | 3.933 | 0.175 | 1.56 | XX |
| ZTFWXD | | 2.914 | -0.031 | -0.37 | 3.723 | -0.035 | -0.31 | IC |
| ZUPX3K | X | 3.453 | 0.508 | 5.91 | 3.957 | 0.198 | 1.76 | IC |

| Summary Statistics | | | | |
|--------------------|------------|---------|------------|---------|
| | Sample K31 | | Sample K32 | |
| Grand Means | 2.945 | Percent | 3.758 | Percent |
| Std Dev Btwn Labs | 0.086 | Percent | 0.112 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 25 of 26 reporting participants

Comments on assigned Data Flags for Analysis #162

WebCode Flag Analyst Comment

ZUPX3K X Data for sample K31 are high.

Cycle 112
4th Q, 2015

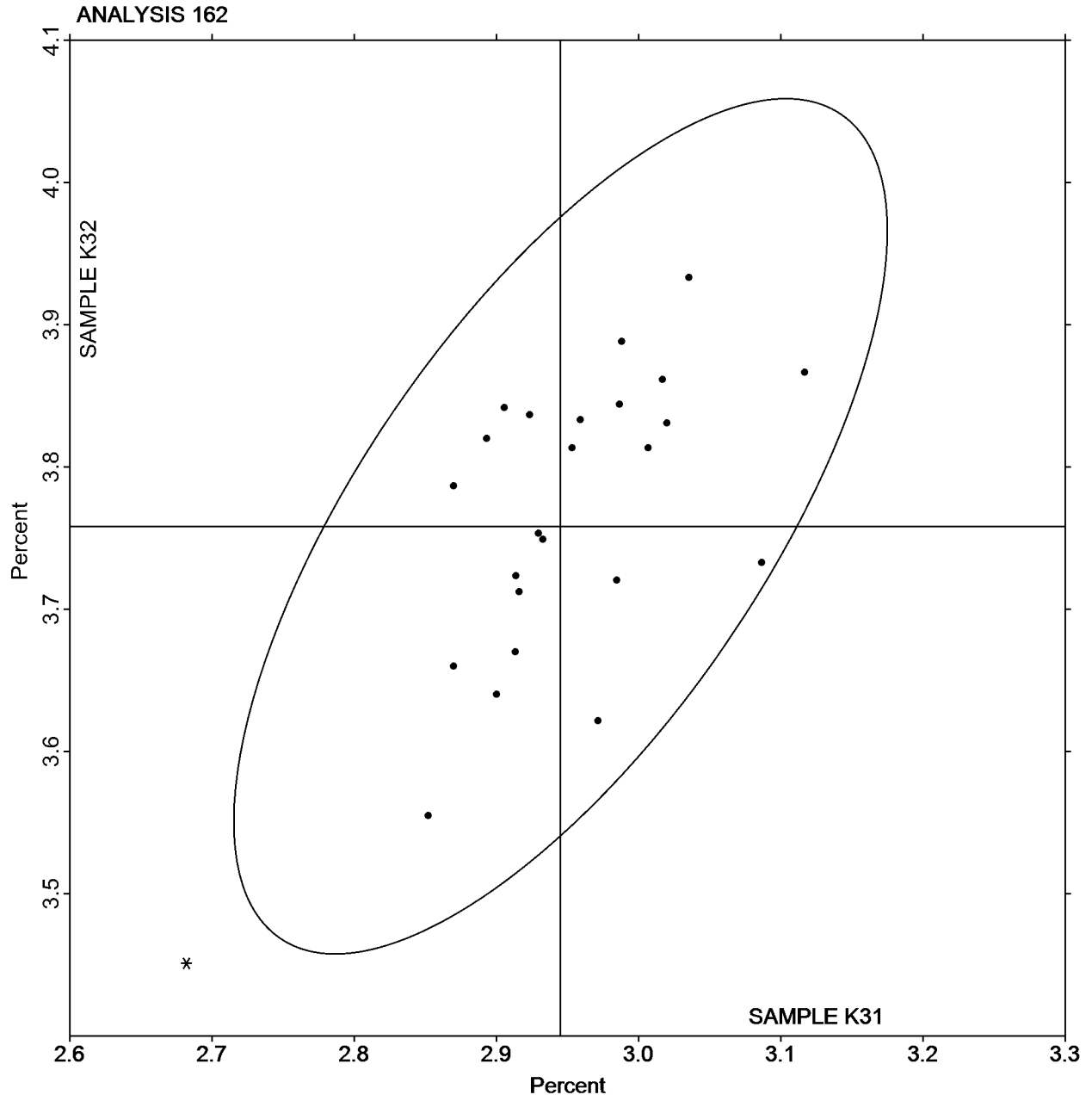
Interlaboratory Testing Program for Metals

Analysis 162

Chemical Analysis Element #3: Copper-based Alloy - Percent
IRON (Fe)

SAMPLE K31
2.945 Percent

SAMPLE K32
3.758 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 163

Chemical Analysis Element #4: Copper-based Alloy - Percent
MANGANESE (Mn)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | X | 0.4173 | 0.0854 | 4.94 | 1.012 | 0.3091 | 8.45 | OE |
| 3RBEQT | | 0.3397 | 0.0077 | 0.45 | 0.7257 | 0.0224 | 0.61 | XX |
| 4FH33L | | 0.2940 | -0.0380 | -2.20 | 0.6267 | -0.0766 | -2.10 | OE |
| 4RBLHC | | 0.3330 | 0.0010 | 0.06 | 0.7187 | 0.0154 | 0.42 | OE |
| 4YBZDL | | 0.2933 | -0.0386 | -2.24 | 0.6629 | -0.0404 | -1.10 | ED |
| 8BQC4D | | 0.3490 | 0.0170 | 0.99 | 0.7467 | 0.0434 | 1.19 | OE |
| 92HXX6 | | 0.3430 | 0.0110 | 0.64 | 0.7103 | 0.0071 | 0.19 | OE |
| 9FHNV3 | | 0.3257 | -0.0063 | -0.36 | 0.7150 | 0.0117 | 0.32 | IC |
| AFJTVW | X | 0.3703 | 0.0384 | 2.22 | 0.9777 | 0.2744 | 7.51 | OE |
| DNEANX | | 0.3360 | 0.0040 | 0.23 | 0.7033 | 0.0001 | 0.00 | OE |
| F6XXWJ | | 0.3263 | -0.0056 | -0.33 | 0.7277 | 0.0244 | 0.67 | GD |
| G9BXTA | | 0.3250 | -0.0070 | -0.40 | 0.6933 | -0.0099 | -0.27 | IC |
| GFAA2Z | | 0.3287 | -0.0033 | -0.19 | 0.7077 | 0.0044 | 0.12 | WD |
| LARLEK | | 0.3433 | 0.0114 | 0.66 | 0.7450 | 0.0417 | 1.14 | ED |
| MXWUA8 | | 0.3300 | -0.0020 | -0.11 | 0.7040 | 0.0007 | 0.02 | IC |
| QQJC2G | | 0.3390 | 0.0070 | 0.41 | 0.7070 | 0.0037 | 0.10 | IC |
| QZAX8E | | 0.3740 | 0.0420 | 2.43 | 0.7520 | 0.0487 | 1.33 | OE |
| TFU3UY | | 0.3303 | -0.0016 | -0.09 | 0.6530 | -0.0503 | -1.38 | OE |
| U97YXF | * | 0.3037 | -0.0283 | -1.64 | 0.6067 | -0.0966 | -2.64 | OE |
| UD46V7 | | 0.3252 | -0.0067 | -0.39 | 0.6804 | -0.0228 | -0.62 | IC |
| VDGAQA | | 0.3433 | 0.0114 | 0.66 | 0.7200 | 0.0167 | 0.46 | OE |
| VDY9Z2 | | 0.3314 | -0.0006 | -0.03 | 0.6998 | -0.0034 | -0.09 | IC |
| VGGKLA | | 0.3333 | 0.0014 | 0.08 | 0.7223 | 0.0191 | 0.52 | OE |
| WZBJLG | | 0.3430 | 0.0110 | 0.64 | 0.6997 | -0.0036 | -0.10 | XX |
| ZTFWXD | | 0.3290 | -0.0030 | -0.17 | 0.6973 | -0.0059 | -0.16 | IC |
| ZUPX3K | | 0.3480 | 0.0160 | 0.93 | 0.7533 | 0.0501 | 1.37 | IC |

Summary Statistics

| | Sample K31 | | Sample K32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.3320 | Percent | 0.7033 | Percent |
| Std Dev Btwn Labs | 0.0173 | Percent | 0.0366 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 24 of 26 reporting participants

Comments on assigned Data Flags for Analysis #163

WebCode Flag Analyst Comment

3H7CLV X Data for both samples are high.

AFJTVW X Data for sample K32 are high.

Cycle 112
4th Q, 2015

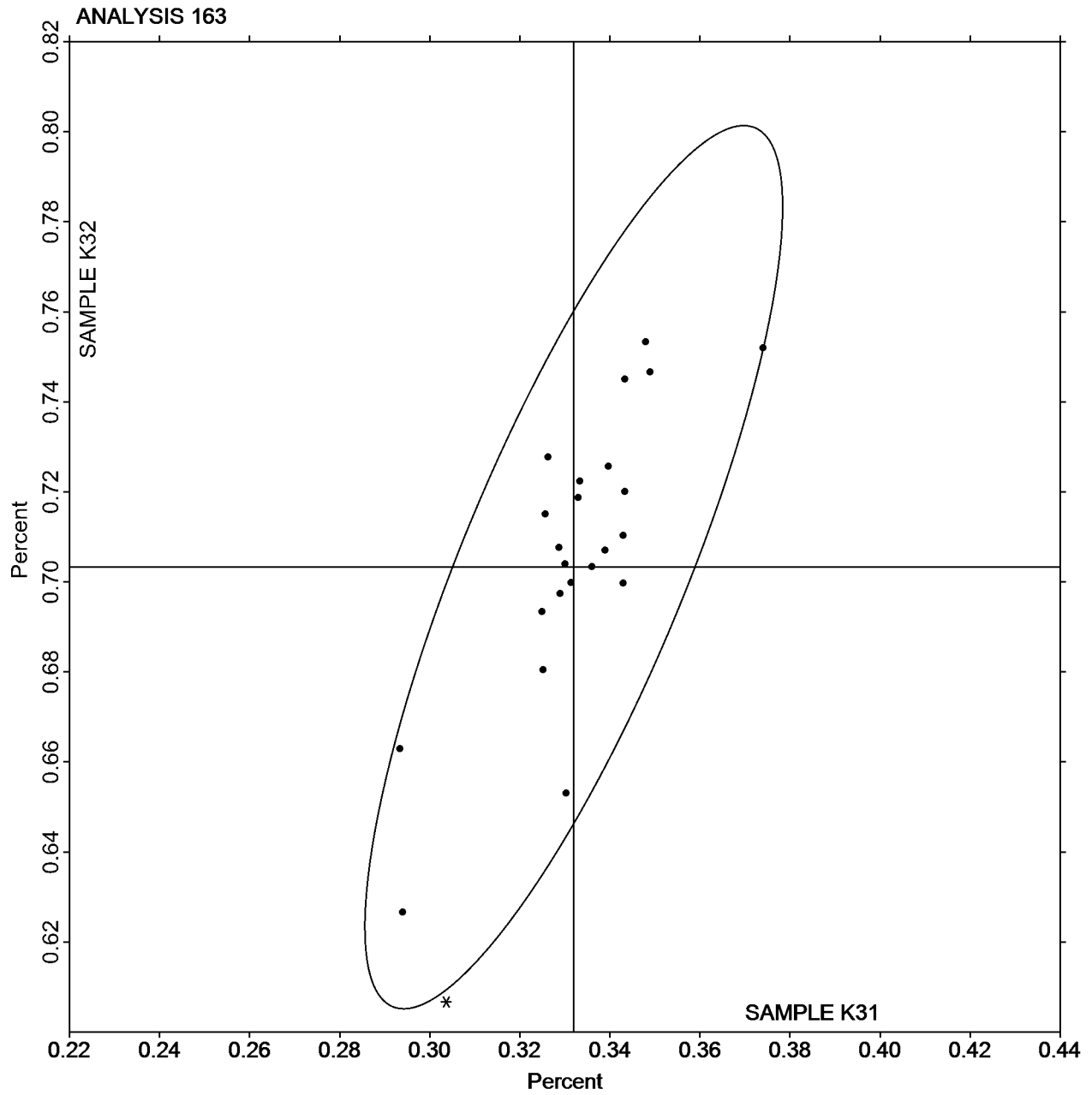
Interlaboratory Testing Program for Metals

Analysis 163

Chemical Analysis Element #4: Copper-based Alloy - Percent
MANGANESE (Mn)

SAMPLE K31
0.3320 Percent

SAMPLE K32
0.7033 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 164

Chemical Analysis Element #5: Copper-based Alloy - Percent
NICKEL (Ni)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 4.905 | -0.119 | -1.35 | 4.837 | -0.004 | -0.04 | OE |
| 3RBEQT | | 4.924 | -0.099 | -1.13 | 4.737 | -0.104 | -0.97 | XX |
| 4FH33L | | 5.027 | 0.003 | 0.03 | 4.827 | -0.014 | -0.13 | OE |
| 4RBLHC | | 4.811 | -0.213 | -2.43 | 4.624 | -0.217 | -2.03 | OE |
| 4YBZDL | | 5.127 | 0.103 | 1.17 | 4.836 | -0.005 | -0.05 | ED |
| 8BQC4D | | 5.087 | 0.063 | 0.72 | 4.877 | 0.036 | 0.33 | OE |
| 92HXX6 | | 4.990 | -0.034 | -0.39 | 4.844 | 0.003 | 0.02 | WD |
| 9FHNV3 | | 5.085 | 0.061 | 0.69 | 4.909 | 0.068 | 0.63 | IC |
| 9TRCR7 | | 5.003 | -0.020 | -0.23 | 4.797 | -0.044 | -0.41 | AA |
| AFJTVW | | 5.127 | 0.103 | 1.17 | 4.774 | -0.067 | -0.63 | OE |
| DNEANX | | 5.125 | 0.101 | 1.15 | 4.867 | 0.026 | 0.24 | OE |
| F6XXWJ | | 4.930 | -0.094 | -1.07 | 4.700 | -0.141 | -1.31 | GD |
| G9BXTA | | 5.053 | 0.030 | 0.34 | 4.923 | 0.082 | 0.77 | OE |
| GFAA2Z | | 4.988 | -0.035 | -0.40 | 4.801 | -0.040 | -0.37 | WD |
| LARLEK | | 4.861 | -0.163 | -1.86 | 4.579 | -0.262 | -2.44 | ED |
| MXWUA8 | | 5.045 | 0.022 | 0.25 | 4.872 | 0.031 | 0.29 | IC |
| QQJC2G | | 5.200 | 0.176 | 2.01 | 5.067 | 0.226 | 2.10 | IC |
| QZAX8E | | 5.125 | 0.102 | 1.16 | 4.959 | 0.118 | 1.10 | OE |
| TFU3UY | | 5.060 | 0.036 | 0.41 | 5.003 | 0.162 | 1.51 | OE |
| U97YXF | | 5.007 | -0.017 | -0.20 | 4.766 | -0.075 | -0.70 | OE |
| UD46V7 | | 5.029 | 0.005 | 0.06 | 4.910 | 0.069 | 0.64 | IC |
| VDGAQA | | 5.003 | -0.020 | -0.23 | 4.940 | 0.099 | 0.92 | OE |
| VDY9Z2 | | 5.030 | 0.006 | 0.07 | 4.793 | -0.048 | -0.45 | IC |
| VGGKLA | | 5.033 | 0.009 | 0.10 | 4.879 | 0.038 | 0.35 | OE |
| WZBJLG | | 5.001 | -0.022 | -0.26 | 4.846 | 0.005 | 0.05 | XX |
| ZTFWXD | | 5.043 | 0.019 | 0.21 | 4.902 | 0.061 | 0.57 | IC |
| ZUPX3K | X | 5.457 | 0.433 | 4.94 | 5.250 | 0.409 | 3.81 | IC |

| Summary Statistics | | | | |
|--------------------|------------|---------|------------|---------|
| | Sample K31 | | Sample K32 | |
| Grand Means | 5.024 | Percent | 4.841 | Percent |
| Std Dev Btwn Labs | 0.088 | Percent | 0.107 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 26 of 27 reporting participants

Comments on assigned Data Flags for Analysis #164

WebCode Flag Analyst Comment

ZUPX3K X Data for both samples are high. Inconsistent within the determinations of sample K32.

Cycle 112
4th Q, 2015

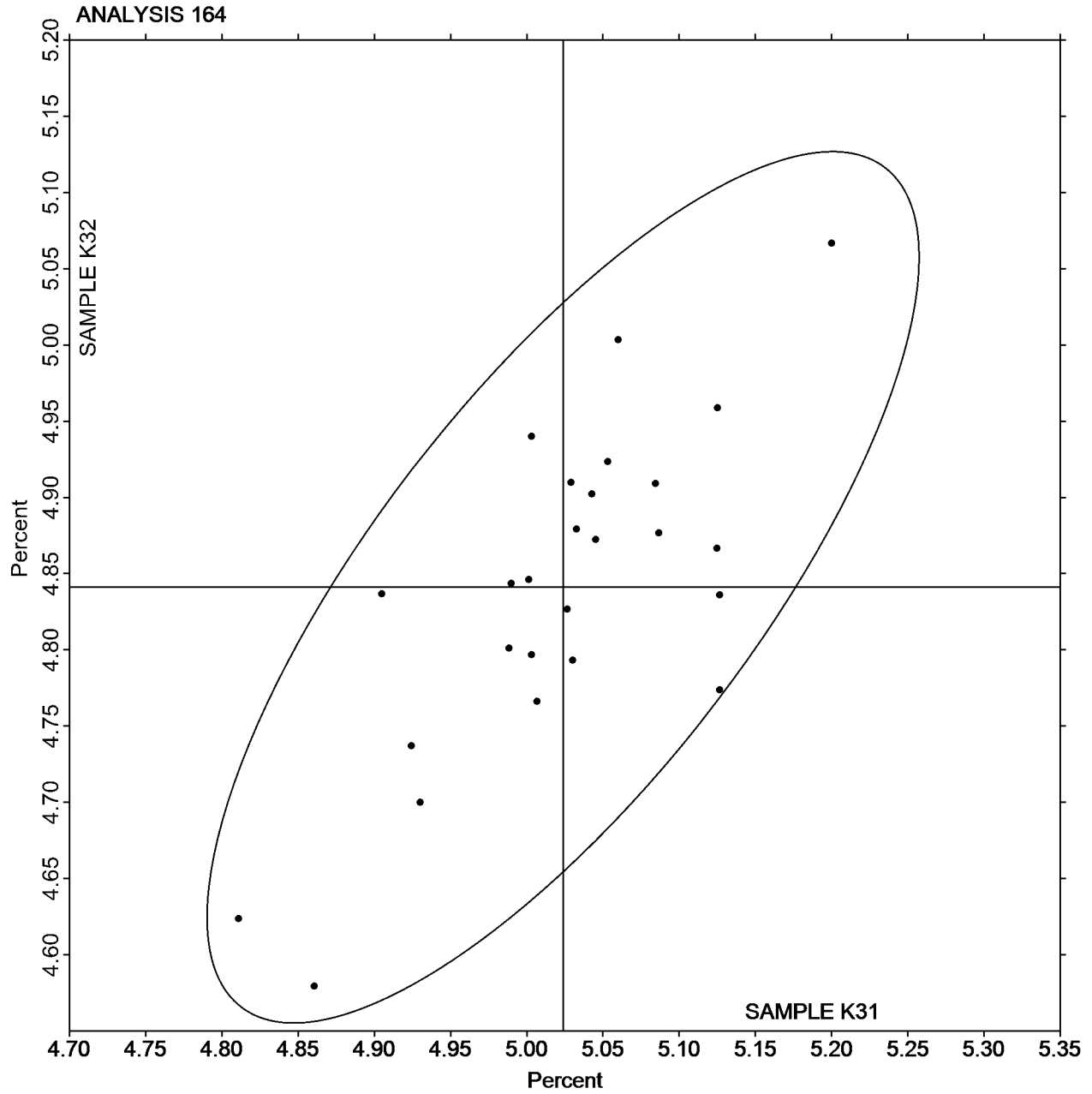
Interlaboratory Testing Program for Metals

Analysis 164

Chemical Analysis Element #5: Copper-based Alloy - Percent
NICKEL (Ni)

SAMPLE K31
5.024 Percent

SAMPLE K32
4.841 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 165

Chemical Analysis Element #6: Copper-based Alloy - Percent
TIN (Sn)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 0.0797 | -0.0048 | -0.25 | 0.00130 | -0.00466 | -0.78 | OE |
| 3RBEQT | M | 0.0701 | -0.0143 | -0.76 | No Data Reported | | | XX |
| 4FH33L | * | 0.0267 | -0.0578 | -3.05 | 0.00273 | -0.00323 | -0.54 | OE |
| 4RBLHC | | 0.1080 | 0.0236 | 1.25 | 0.0207 | 0.01474 | 2.45 | OE |
| 4YBZDL | M | 0.1100 | 0.0256 | 1.35 | No Data Reported | | | ED |
| 8BQC4D | | 0.0617 | -0.0228 | -1.20 | 0.00800 | 0.00204 | 0.34 | OE |
| 92HXX6 | | 0.0683 | -0.0161 | -0.85 | 0.00700 | 0.00104 | 0.17 | OE |
| 9FHNV3 | | 0.1080 | 0.0236 | 1.25 | 0.00260 | -0.00336 | -0.56 | IC |
| AFJTVW | M | 0.0813 | -0.0031 | -0.16 | No Data Reported | | | OE |
| DNEANX | | 0.1050 | 0.0206 | 1.09 | 0.00247 | -0.00350 | -0.58 | OE |
| F6XXWJ | | 0.0890 | 0.0046 | 0.24 | 0.00300 | -0.00296 | -0.49 | GD |
| G9BXTA | | 0.0825 | -0.0019 | -0.10 | 0.00090 | -0.00506 | -0.84 | IC |
| GFAA2Z | | 0.0920 | 0.0076 | 0.40 | 0.00957 | 0.00360 | 0.60 | OE |
| MXWUA8 | | 0.0870 | 0.0026 | 0.14 | 0.00210 | -0.00386 | -0.64 | IC |
| QQJC2G | | 0.0900 | 0.0056 | 0.29 | 0.00377 | -0.00220 | -0.37 | IC |
| QZAX8E | M | 0.0990 | 0.0146 | 0.77 | No Data Reported | | | OE |
| TFU3UY | | 0.0950 | 0.0106 | 0.56 | 0.0210 | 0.01504 | 2.50 | OE |
| U97YXF | | 0.0837 | -0.0008 | -0.04 | 0.00517 | -0.00080 | -0.13 | OE |
| UD46V7 | | 0.0820 | -0.0024 | -0.13 | 0.00163 | -0.00433 | -0.72 | IC |
| VGGKLA | | 0.0870 | 0.0026 | 0.14 | 0.00587 | -0.00010 | -0.02 | OE |
| WZBJLG | | 0.0960 | 0.0116 | 0.61 | 0.00800 | 0.00204 | 0.34 | XX |
| ZTFWXD | | 0.0783 | -0.0061 | -0.32 | 0.00157 | -0.00440 | -0.73 | IC |
| ZUPX3K | M | 0.0880 | 0.0036 | 0.19 | No Data Reported | | | IC |

Summary Statistics

| | Sample K31 | | Sample K32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.0844 | Percent | 0.00596 | Percent |
| Std Dev Btwn Labs | 0.0189 | Percent | 0.00601 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 18 of 23 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 165
Chemical Analysis Element #6: Copper-based Alloy - Percent
TIN (Sn)

Comments on assigned Data Flags for Analysis #165

WebCode Flag Analyst Comment

3RBEQT M Laboratory did not submit data for sample K32.

4YBZDL M Laboratory did not submit data for sample K32. Inconsistent within the determinations of sample K31.

AFJTVW M Laboratory did not submit data for sample K32.

QZAX8E M Laboratory did not submit data for sample K32.

ZUPX3K M Laboratory did not submit data for sample K32.

Cycle 112
4th Q, 2015

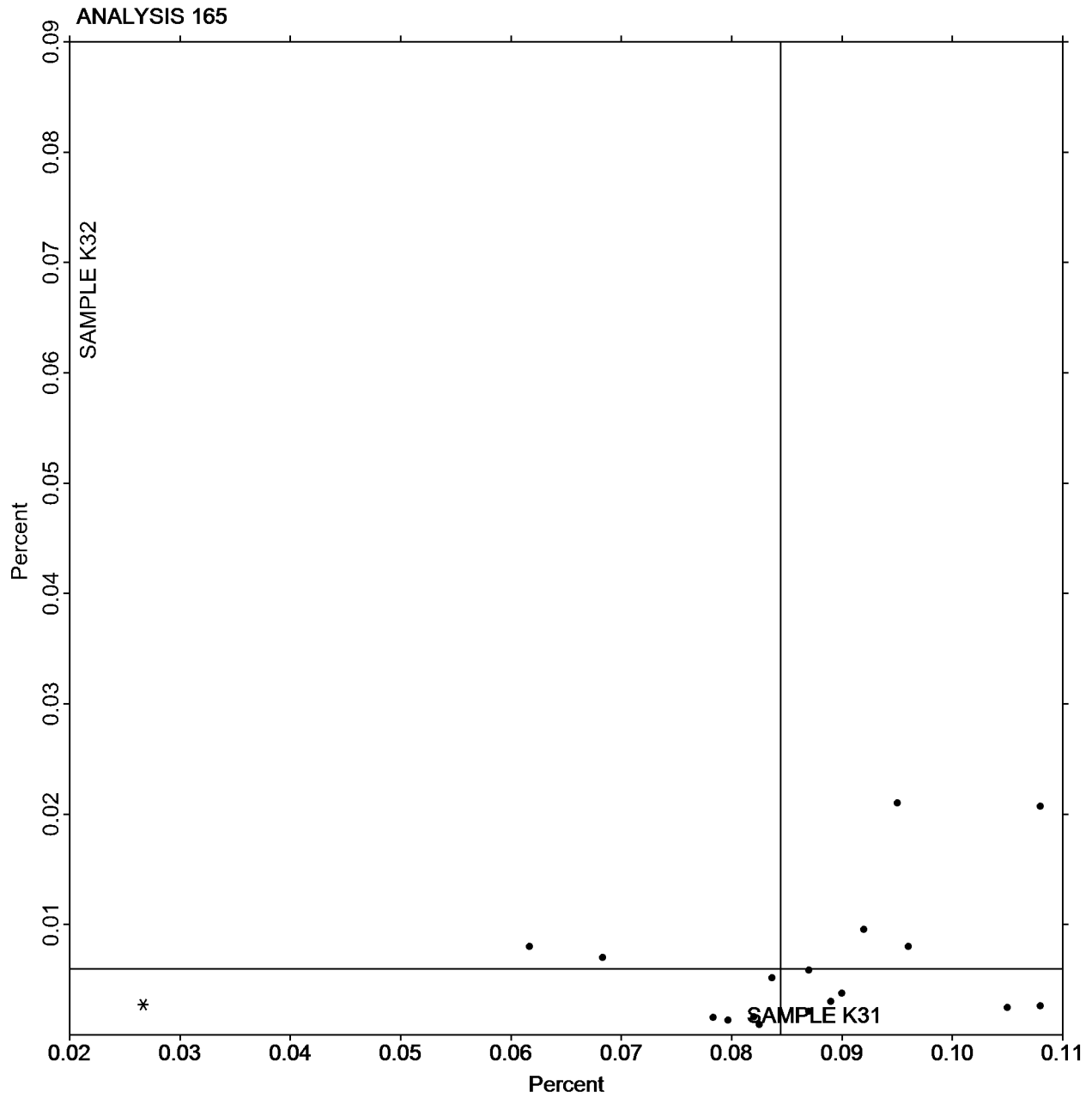
Interlaboratory Testing Program for Metals

Analysis 165

Chemical Analysis Element #6: Copper-based Alloy - Percent
TIN (Sn)

SAMPLE K31
0.0844 Percent

SAMPLE K32
0.00596 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 166

Chemical Analysis Element #7: Copper-based Alloy - Percent
SILICON (Si)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 0.0277 | 0.0023 | 0.55 | 0.0187 | 0.0020 | 0.45 | OE |
| 3RBEQT | | 0.0222 | -0.0031 | -0.72 | 0.0131 | -0.0036 | -0.82 | XX |
| 4RBLHC | | 0.0319 | 0.0065 | 1.53 | 0.0202 | 0.0036 | 0.81 | OE |
| 8BQC4D | | 0.0237 | -0.0017 | -0.39 | 0.0167 | 0.0000 | 0.00 | OE |
| 92HXX6 | | 0.0260 | 0.0007 | 0.16 | 0.0190 | 0.0023 | 0.53 | OE |
| 9FHNV3 | | 0.0225 | -0.0028 | -0.66 | 0.0136 | -0.0031 | -0.71 | IC |
| AFJTVW | | 0.0278 | 0.0025 | 0.59 | 0.0214 | 0.0047 | 1.07 | OE |
| DNEANX | | 0.0225 | -0.0028 | -0.66 | 0.0139 | -0.0028 | -0.64 | OE |
| F6XXWJ | | 0.0173 | -0.0080 | -1.87 | 0.00667 | -0.0100 | -2.27 | GD |
| G9BXTA | | 0.0259 | 0.0006 | 0.14 | 0.0176 | 0.0009 | 0.20 | OE |
| GFAA2Z | | 0.0280 | 0.0026 | 0.62 | 0.0222 | 0.0056 | 1.26 | OE |
| MXWUA8 | | 0.0231 | -0.0023 | -0.53 | 0.0140 | -0.0026 | -0.60 | IC |
| QQJC2G | | 0.0218 | -0.0035 | -0.82 | 0.0133 | -0.0034 | -0.77 | IC |
| QZAX8E | | 0.0264 | 0.0011 | 0.25 | 0.0179 | 0.0012 | 0.27 | OE |
| TFU3UY | | 0.0290 | 0.0037 | 0.86 | 0.0213 | 0.0047 | 1.06 | OE |
| U97YXF | | 0.0228 | -0.0025 | -0.59 | 0.0135 | -0.0032 | -0.73 | OE |
| VDGAQA | | 0.0300 | 0.0047 | 1.09 | 0.0200 | 0.0033 | 0.75 | OE |
| VGGKLA | | 0.0184 | -0.0070 | -1.63 | 0.00947 | -0.0072 | -1.64 | OE |
| WZBJLG | | 0.0260 | 0.0007 | 0.16 | 0.0200 | 0.0033 | 0.75 | XX |
| ZTFWXD | | 0.0236 | -0.0018 | -0.41 | 0.0142 | -0.0024 | -0.56 | IC |
| ZUPX3K | * | 0.0353 | 0.0100 | 2.34 | 0.0237 | 0.0070 | 1.59 | IC |

Summary Statistics

| | <u>Sample K31</u> | | <u>Sample K32</u> | |
|-------------------|-------------------|---------|-------------------|---------|
| Grand Means | 0.0253 | Percent | 0.0167 | Percent |
| Std Dev Btwn Labs | 0.0043 | Percent | 0.0044 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 21 of 21 reporting participants

Cycle 112
4th Q, 2015

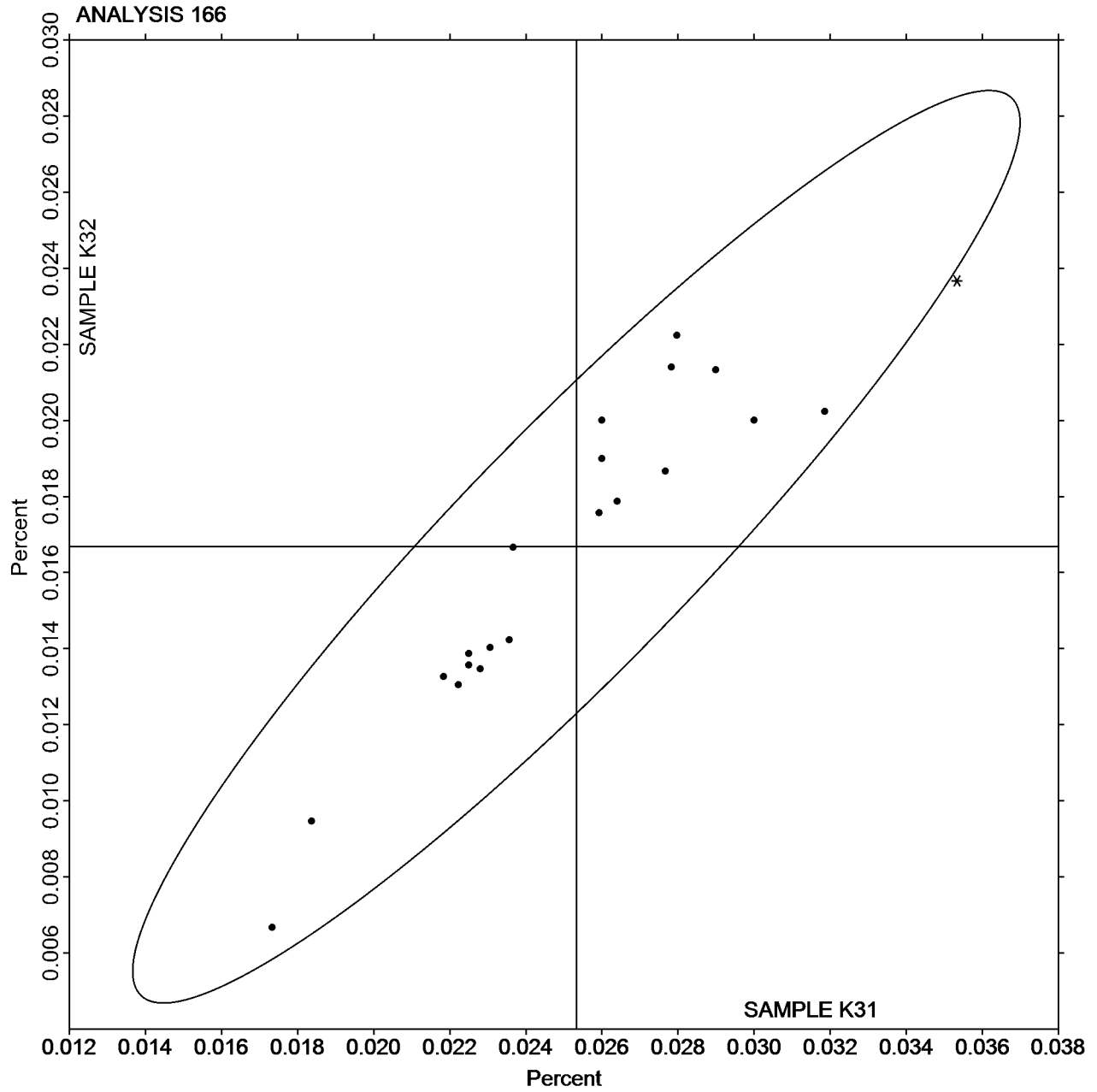
Interlaboratory Testing Program for Metals

Analysis 166

Chemical Analysis Element #7: Copper-based Alloy - Percent
SILICON (Si)

SAMPLE K31
0.0253 Percent

SAMPLE K32
0.0167 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 167

Chemical Analysis Element #8: Copper-based Alloy - Percent
ZINC (Zn)

| WebCode | Data Flag | Sample K31 | | | Sample K32 | | | Method |
|---------|-----------|------------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 3H7CLV | | 0.00810 | 0.00132 | 0.39 | 0.0203 | -0.0011 | -0.27 | OE |
| 3RBEQT | M | No Data Reported | | | 0.00315 | -0.0183 | -4.57 | XX |
| 4FH33L | | 0.00647 | -0.00031 | -0.09 | 0.0220 | 0.0006 | 0.14 | OE |
| 4RBLHC | | 0.00580 | -0.00098 | -0.29 | 0.0160 | -0.0054 | -1.35 | OE |
| 8BQC4D | | 0.00700 | 0.00022 | 0.06 | 0.0273 | 0.0059 | 1.48 | OE |
| 9FHNV3 | | 0.00573 | -0.00105 | -0.31 | 0.0204 | -0.0010 | -0.26 | IC |
| AFJTVW | M | No Data Reported | | | 0.0132 | -0.0082 | -2.06 | OE |
| DNEANX | | 0.00577 | -0.00101 | -0.30 | 0.0199 | -0.0016 | -0.39 | OE |
| F6XXWJ | | 0.00733 | 0.00055 | 0.16 | 0.0257 | 0.0042 | 1.06 | GD |
| G9BXTA | | 0.00400 | -0.00278 | -0.82 | 0.0193 | -0.0021 | -0.52 | IC |
| GFAA2Z | * | 0.0176 | 0.01085 | 3.19 | 0.0312 | 0.0097 | 2.44 | OE |
| MXWUA8 | | 0.00443 | -0.00235 | -0.69 | 0.0199 | -0.0016 | -0.39 | IC |
| QQJC2G | | 0.00217 | -0.00461 | -1.36 | 0.0151 | -0.0063 | -1.57 | IC |
| QZAX8E | | 0.00740 | 0.00062 | 0.18 | 0.0231 | 0.0017 | 0.43 | OE |
| TFU3UY | | 0.0110 | 0.00419 | 1.23 | 0.0246 | 0.0032 | 0.80 | OE |
| UD46V7 | | 0.00480 | -0.00198 | -0.58 | 0.0183 | -0.0032 | -0.79 | IC |
| VGGKLA | | 0.00687 | 0.00009 | 0.03 | 0.0209 | -0.0005 | -0.12 | OE |
| WZBJLG | | 0.00633 | -0.00045 | -0.13 | 0.0200 | -0.0014 | -0.36 | XX |
| ZTFWXD | | 0.00447 | -0.00231 | -0.68 | 0.0201 | -0.0013 | -0.33 | IC |
| ZUPX3K | M | No Data Reported | | | 0.0180 | -0.0034 | -0.86 | IC |

Summary Statistics

| | Sample K31 | | Sample K32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.00678 | Percent | 0.0214 | Percent |
| Std Dev Btwn Labs | 0.00340 | Percent | 0.0040 | Percent |

Samples K31 , K32 : CDA 630, two different heats

Statistics based on 17 of 20 reporting participants

Comments on assigned Data Flags for Analysis #167

| WebCode | Flag | Analyst Comment |
|---------|------|--|
| 3RBEQT | M | Laboratory did not submit data for sample K31. |
| AFJTVW | M | Laboratory did not submit data for sample K31. |
| ZUPX3K | M | Laboratory did not submit data for sample K31. |

Cycle 112
4th Q, 2015

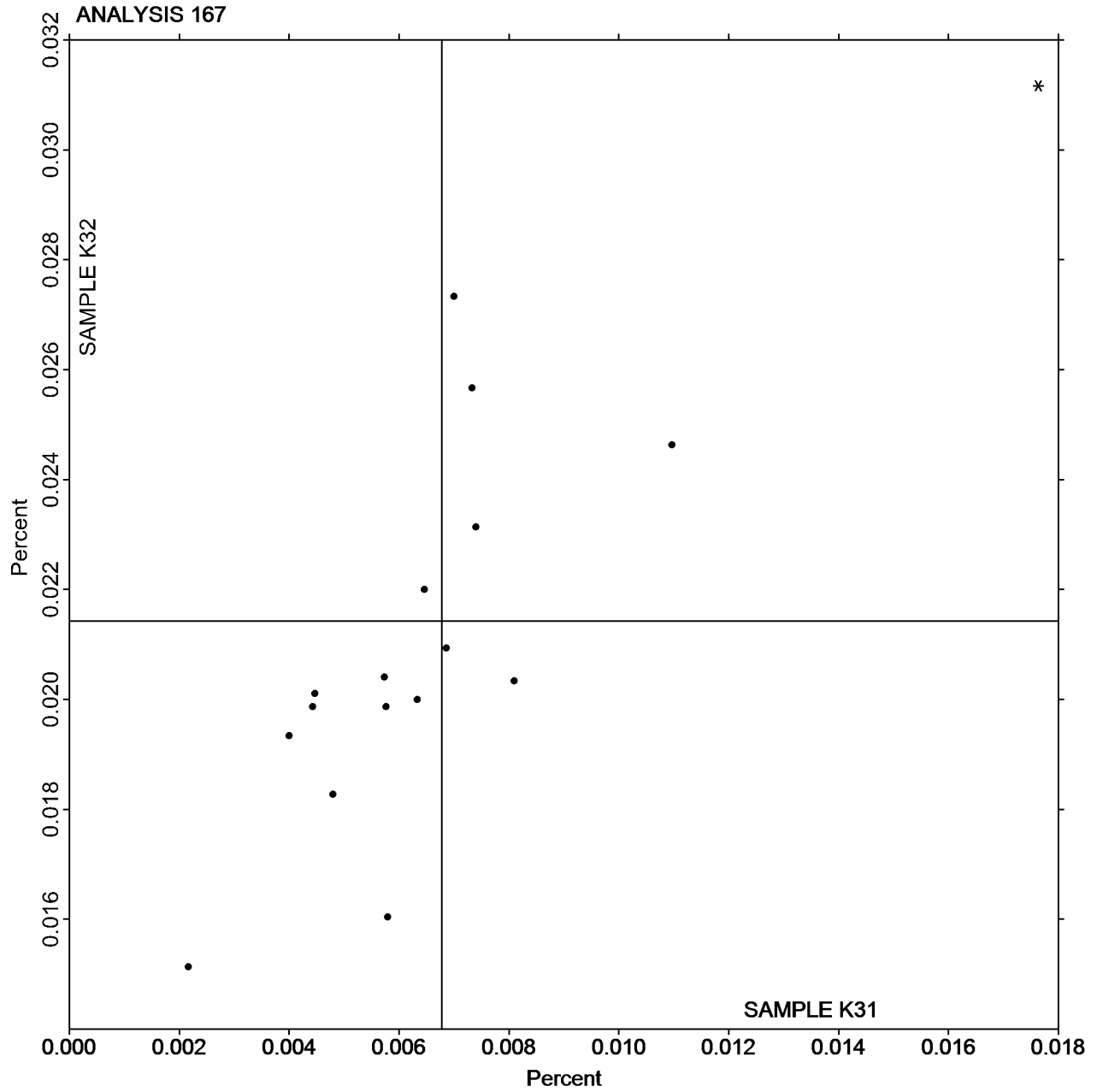
Interlaboratory Testing Program for Metals

Analysis 167

Chemical Analysis Element #8: Copper-based Alloy - Percent
ZINC (Zn)

SAMPLE K31
0.00678 Percent

SAMPLE K32
0.0214 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 180

Chemical Analysis Element #1 - Corrosion Resistant Steel - Percent
CARBON (C)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|---------|------------|-----------------------|---------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.0513 | 0.0026 | 0.79 | 0.0443 | -0.0014 | -0.45 | CI |
| 33UTRA | | 0.0473 | -0.0015 | -0.45 | 0.0438 | -0.0020 | -0.63 | CI |
| 3H4G3P | | 0.0520 | 0.0032 | 0.99 | 0.0496 | 0.0038 | 1.19 | OE |
| 4B636U | | 0.0543 | 0.0056 | 1.71 | 0.0483 | 0.0026 | 0.80 | CI |
| 4ENAGB | | 0.0477 | -0.0011 | -0.33 | 0.0456 | -0.0002 | -0.07 | CI |
| 4FH33L | | 0.0510 | 0.0022 | 0.68 | 0.0487 | 0.0029 | 0.90 | OE |
| 4FXEUY | | 0.0433 | -0.0055 | -1.69 | 0.0403 | -0.0055 | -1.71 | CI |
| 4RBLHC | | 0.0447 | -0.0041 | -1.27 | 0.0428 | -0.0030 | -0.94 | CO |
| 7QM6C9 | | 0.0490 | 0.0002 | 0.07 | 0.0450 | -0.0008 | -0.24 | GD |
| 7U8WPW | X | 0.0580 | 0.0092 | 2.84 | 0.0490 | 0.0032 | 1.01 | OE |
| 8BQC4D | | 0.0507 | 0.0019 | 0.58 | 0.0450 | -0.0008 | -0.24 | OE |
| 92HXX6 | | 0.0473 | -0.0014 | -0.45 | 0.0437 | -0.0021 | -0.66 | CO |
| 9FHNTG | | 0.0517 | 0.0029 | 0.89 | 0.0493 | 0.0036 | 1.11 | OE |
| 9FHNV3 | | 0.0503 | 0.0016 | 0.48 | 0.0494 | 0.0036 | 1.13 | CO |
| A3UWRD | X | 0.0343 | -0.0144 | -4.45 | 0.0323 | -0.0134 | -4.20 | CI |
| AFJTVW | | 0.0463 | -0.0025 | -0.76 | 0.0447 | -0.0011 | -0.35 | CO |
| AQEZQG | | 0.0480 | -0.0008 | -0.24 | 0.0453 | -0.0004 | -0.14 | OE |
| BEHMLG | | 0.0480 | -0.0008 | -0.25 | 0.0446 | -0.0011 | -0.36 | CI |
| CBV64V | | 0.0462 | -0.0026 | -0.79 | 0.0442 | -0.0016 | -0.49 | IR |
| CVN2NW | X | 0.0380 | -0.0108 | -3.32 | 0.0299 | -0.0159 | -4.98 | OE |
| DAVP2H | | 0.0460 | -0.0028 | -0.86 | 0.0420 | -0.0038 | -1.18 | GD |
| DNEANX | | 0.0511 | 0.0023 | 0.71 | 0.0494 | 0.0037 | 1.14 | OE |
| DQ694G | | 0.0510 | 0.0022 | 0.68 | 0.0483 | 0.0026 | 0.80 | XX |
| DVH8HV | | 0.0505 | 0.0017 | 0.53 | 0.0462 | 0.0005 | 0.14 | OE |
| EUYU6H | | 0.0537 | 0.0050 | 1.52 | 0.0524 | 0.0067 | 2.08 | OE |
| EYCN8U | | 0.0527 | 0.0039 | 1.20 | 0.0487 | 0.0029 | 0.90 | OE |
| F2Z9PJ | X | 0.0650 | 0.0162 | 4.99 | 0.0637 | 0.0179 | 5.60 | OE |
| FMFW42 | | 0.0492 | 0.0004 | 0.12 | 0.0444 | -0.0013 | -0.42 | CI |
| FPKEEQ | | 0.0503 | 0.0016 | 0.48 | 0.0443 | -0.0014 | -0.45 | OE |
| GA4QPT | | 0.0473 | -0.0015 | -0.47 | 0.0455 | -0.0002 | -0.08 | CI |
| GEYKMU | * | 0.0490 | 0.0002 | 0.07 | 0.0507 | 0.0049 | 1.53 | CI |
| GFAA2Z | | 0.0467 | -0.0020 | -0.63 | 0.0450 | -0.0008 | -0.24 | CI |
| GTLQXX | | 0.0427 | -0.0061 | -1.88 | 0.0407 | -0.0051 | -1.60 | IR |
| H6PHTG | | 0.0517 | 0.0029 | 0.89 | 0.0473 | 0.0016 | 0.49 | OE |
| J8TMT9 | * | 0.0553 | 0.0066 | 2.02 | 0.0540 | 0.0082 | 2.57 | OE |
| JCNGPN | | 0.0486 | -0.0002 | -0.07 | 0.0455 | -0.0003 | -0.09 | OE |
| JE8NZ6 | X | 5.167 | 5.1179 | 1,575.6 | 4.810 | 4.7642 | 1,490.2 | ED |
| JK34ZD | | 0.0493 | 0.0006 | 0.17 | 0.0440 | -0.0018 | -0.56 | OE |
| LTN7XQ | | 0.0480 | -0.0008 | -0.24 | 0.0473 | 0.0016 | 0.49 | OE |
| LXDNAG | X | 0.0600 | 0.0112 | 3.45 | 0.0500 | 0.0042 | 1.32 | OE |
| MFGK97 | | 0.0477 | -0.0011 | -0.34 | 0.0453 | -0.0004 | -0.14 | CI |
| MK8UH6 | X | 0.0547 | 0.0059 | 1.81 | 0.0560 | 0.0102 | 3.20 | OE |
| NN2B94 | | 0.0470 | -0.0018 | -0.55 | 0.0440 | -0.0018 | -0.56 | CI |
| PNZME7 | | 0.0507 | 0.0019 | 0.59 | 0.0483 | 0.0026 | 0.80 | OE |
| QE64D4 | | 0.0477 | -0.0011 | -0.34 | 0.0437 | -0.0021 | -0.66 | OE |
| QQJC2G | | 0.0468 | -0.0019 | -0.60 | 0.0427 | -0.0031 | -0.96 | GD |
| QQJCZV | | 0.0550 | 0.0062 | 1.91 | 0.0453 | -0.0004 | -0.14 | CO |
| QUJCD8 | | 0.0513 | 0.0026 | 0.79 | 0.0473 | 0.0016 | 0.49 | OE |
| QZAX8E | | 0.0494 | 0.0006 | 0.19 | 0.0468 | 0.0010 | 0.32 | OE |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 180

Chemical Analysis Element #1 - Corrosion Resistant Steel - Percent
CARBON (C)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| RWP8JV | | 0.0493 | 0.0006 | 0.17 | 0.0457 | -0.0001 | -0.03 | OE |
| TFU3UY | | 0.0413 | -0.0074 | -2.29 | 0.0393 | -0.0064 | -2.02 | OE |
| TK4FCX | | 0.0468 | -0.0020 | -0.62 | 0.0435 | -0.0022 | -0.70 | CI |
| TV9F2X | | 0.0443 | -0.0044 | -1.37 | 0.0417 | -0.0041 | -1.29 | CI |
| U97YXF | | 0.0431 | -0.0057 | -1.76 | 0.0405 | -0.0053 | -1.65 | OE |
| VDGAQA | * | 0.0573 | 0.0086 | 2.63 | 0.0527 | 0.0069 | 2.16 | OE |
| VGGKLA | | 0.0513 | 0.0026 | 0.79 | 0.0475 | 0.0017 | 0.53 | OE |
| WDWVXQ | X | 0.0343 | -0.0144 | -4.45 | 0.0323 | -0.0134 | -4.20 | CI |
| WZBJLG | | 0.0470 | -0.0018 | -0.55 | 0.0440 | -0.0018 | -0.56 | OE |
| X9HM4Z | | 0.0458 | -0.0030 | -0.93 | 0.0453 | -0.0004 | -0.14 | CI |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.0488 | Percent | 0.0458 | Percent |
| Std Dev Btwn Labs | 0.0032 | Percent | 0.0032 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 50 of 59 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 180
Chemical Analysis Element #1 - Corrosion Resistant Steel - Percent
CARBON (C)

Comments on assigned Data Flags for Analysis #180

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|--|
| 7U8WPW | X | Data for sample M31 are high. Inconsistent in testing between samples. |
| A3UWRD | X | Data for both samples are low. Possible Systematic error. |
| CVN2NW | X | Data for both samples are low. Possible Systematic error. |
| F2Z9PJ | X | Data for both samples are high. Possible Systematic error. |
| JE8NZ6 | X | Data for both samples are high. Possible Systematic error. Inconsistent within the determinations of both samples. |
| LXDNAG | X | Data for sample M31 are high. Inconsistent in testing between samples. |
| MK8UH6 | X | Data for sample M32 are high. Inconsistent in testing between samples. Inconsistent within the determinations of sample M31. |
| WDVXQ | X | Data for both samples are low. Possible Systematic error. |

Cycle 112
4th Q, 2015

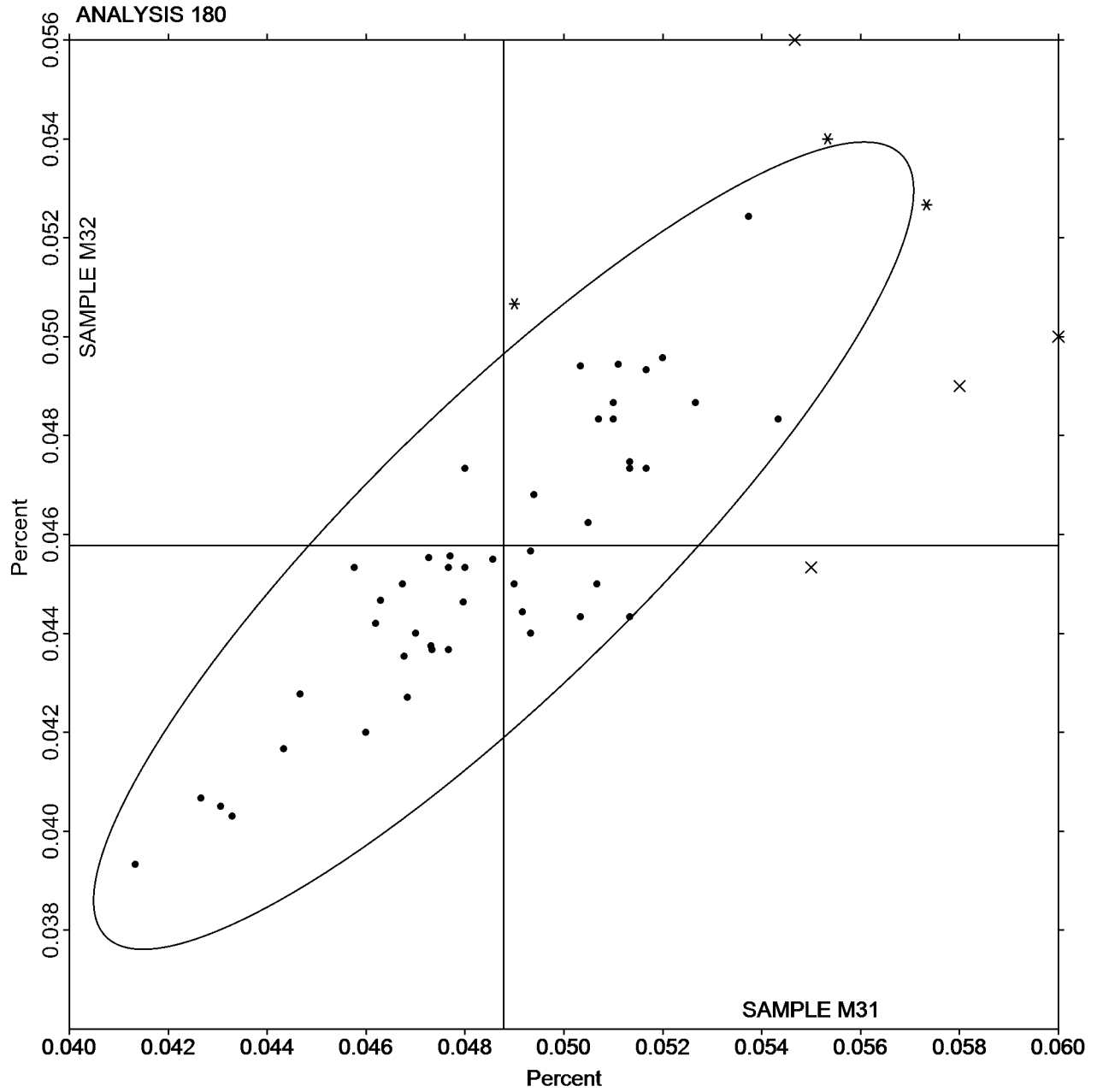
Interlaboratory Testing Program for Metals

Analysis 180

Chemical Analysis Element #1 - Corrosion Resistant Steel - Percent
CARBON (C)

SAMPLE M31
0.0488 Percent

SAMPLE M32
0.0458 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 181

Chemical Analysis Element #2 - Corrosion Resistant Steel - Percent
MANGANESE (Mn)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 1.789 | 0.029 | 1.29 | 1.533 | 0.027 | 1.78 | IC |
| 33UTRA | | 1.770 | 0.010 | 0.43 | 1.503 | -0.003 | -0.18 | WD |
| 3H4G3P | | 1.768 | 0.007 | 0.33 | 1.520 | 0.013 | 0.90 | OE |
| 4B636U | * | 1.820 | 0.060 | 2.66 | 1.550 | 0.044 | 2.91 | IC |
| 4ENAGB | | 1.764 | 0.004 | 0.16 | 1.503 | -0.003 | -0.19 | WD |
| 4FH33L | X | 1.833 | 0.073 | 3.25 | 1.480 | -0.026 | -1.74 | OE |
| 4FXEUY | | 1.745 | -0.015 | -0.67 | 1.501 | -0.005 | -0.32 | WD |
| 4RBLHC | | 1.746 | -0.014 | -0.64 | 1.490 | -0.017 | -1.10 | OE |
| 7QM6C9 | | 1.753 | -0.007 | -0.31 | 1.503 | -0.003 | -0.19 | GD |
| 7U8WPW | | 1.740 | -0.020 | -0.91 | 1.473 | -0.033 | -2.18 | OE |
| 8BQC4D | * | 1.723 | -0.037 | -1.65 | 1.513 | 0.007 | 0.48 | OE |
| 92HXX6 | | 1.754 | -0.006 | -0.28 | 1.511 | 0.005 | 0.34 | WD |
| 9FHNTG | | 1.712 | -0.049 | -2.17 | 1.490 | -0.017 | -1.10 | OE |
| 9FHNV3 | | 1.763 | 0.002 | 0.10 | 1.502 | -0.005 | -0.30 | IC |
| A3UWRD | | 1.768 | 0.007 | 0.33 | 1.505 | -0.001 | -0.08 | WD |
| AFJTVW | | 1.737 | -0.024 | -1.06 | 1.503 | -0.003 | -0.19 | OE |
| AQEZQG | | 1.794 | 0.034 | 1.51 | 1.535 | 0.029 | 1.92 | OE |
| BEHMLG | | 1.799 | 0.038 | 1.71 | 1.509 | 0.003 | 0.19 | IC |
| CBV64V | | 1.750 | -0.011 | -0.48 | 1.491 | -0.015 | -0.99 | WD |
| CVN2NW | | 1.772 | 0.012 | 0.53 | 1.521 | 0.015 | 0.99 | OE |
| DAVP2H | | 1.777 | 0.016 | 0.73 | 1.527 | 0.020 | 1.36 | GD |
| DNEANX | | 1.762 | 0.002 | 0.07 | 1.503 | -0.003 | -0.21 | OE |
| DQ694G | | 1.751 | -0.009 | -0.42 | 1.510 | 0.004 | 0.25 | XX |
| DVH8HV | | 1.763 | 0.003 | 0.12 | 1.506 | 0.000 | -0.02 | OE |
| EUYU6H | | 1.780 | 0.020 | 0.88 | 1.510 | 0.004 | 0.25 | OE |
| EYCN8U | | 1.770 | 0.010 | 0.43 | 1.507 | 0.000 | 0.03 | WD |
| F2Z9PJ | X | 1.970 | 0.210 | 9.35 | 1.577 | 0.070 | 4.69 | OE |
| FMFW42 | | 1.761 | 0.001 | 0.04 | 1.511 | 0.005 | 0.34 | WD |
| FPKEEQ | | 1.733 | -0.027 | -1.22 | 1.501 | -0.005 | -0.32 | OE |
| GA4QPT | * | 1.705 | -0.055 | -2.47 | 1.463 | -0.043 | -2.87 | OE |
| GEYKMU | | 1.813 | 0.053 | 2.36 | 1.523 | 0.017 | 1.14 | DR |
| GFAA2Z | * | 1.811 | 0.051 | 2.26 | 1.519 | 0.013 | 0.88 | OE |
| GTLQXX | | 1.770 | 0.010 | 0.43 | 1.517 | 0.010 | 0.70 | XR |
| H6PHTG | | 1.759 | -0.001 | -0.05 | 1.495 | -0.012 | -0.76 | OE |
| J8TMT9 | | 1.746 | -0.014 | -0.64 | 1.503 | -0.003 | -0.19 | OE |
| JCNGPN | | 1.764 | 0.003 | 0.15 | 1.508 | 0.001 | 0.10 | OE |
| JE8NZ6 | X | 1.683 | -0.077 | -3.44 | 1.757 | 0.250 | 16.65 | ED |
| JK34ZD | | 1.760 | 0.000 | -0.02 | 1.517 | 0.010 | 0.70 | OE |
| L93EYU | | 1.750 | -0.010 | -0.46 | 1.490 | -0.016 | -1.07 | OE |
| LTN7XQ | | 1.760 | 0.000 | -0.02 | 1.497 | -0.010 | -0.63 | OE |
| LXDNAG | | 1.753 | -0.007 | -0.31 | 1.510 | 0.004 | 0.25 | OE |
| MFGK97 | | 1.759 | -0.001 | -0.06 | 1.498 | -0.009 | -0.57 | OE |
| MK8UH6 | | 1.748 | -0.013 | -0.57 | 1.497 | -0.009 | -0.59 | OE |
| NN2B94 | | 1.766 | 0.006 | 0.25 | 1.506 | 0.000 | 0.01 | OE |
| PNZME7 | | 1.750 | -0.010 | -0.46 | 1.493 | -0.013 | -0.85 | OE |
| QE64D4 | X | 1.859 | 0.098 | 4.39 | 1.583 | 0.077 | 5.11 | OE |
| QQJC2G | X | 1.877 | 0.116 | 5.19 | 1.573 | 0.067 | 4.46 | GD |
| QQJCZV | X | 1.594 | -0.166 | -7.41 | 1.773 | 0.266 | 17.72 | DR |
| QUJCD8 | | 1.753 | -0.007 | -0.31 | 1.497 | -0.010 | -0.63 | OE |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 181

Chemical Analysis Element #2 - Corrosion Resistant Steel - Percent
MANGANESE (Mn)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QZAX8E | | 1.729 | -0.031 | -1.40 | 1.484 | -0.023 | -1.50 | OE |
| RWP8JV | X | 2.087 | 0.326 | 14.56 | 1.803 | 0.297 | 19.75 | OE |
| TFU3UY | | 1.773 | 0.013 | 0.58 | 1.530 | 0.024 | 1.58 | OE |
| TMQ8D2 | X | 1.763 | 0.003 | 0.13 | 1.607 | 0.101 | 6.70 | ED |
| TV9F2X | | 1.753 | -0.007 | -0.31 | 1.510 | 0.004 | 0.25 | WD |
| U97YXF | | 1.746 | -0.014 | -0.64 | 1.501 | -0.005 | -0.32 | OE |
| VDGAQA | | 1.767 | 0.006 | 0.28 | 1.520 | 0.014 | 0.92 | OE |
| VGGKLA | | 1.759 | -0.001 | -0.05 | 1.494 | -0.012 | -0.81 | OE |
| WDWVXQ | | 1.767 | 0.007 | 0.30 | 1.504 | -0.003 | -0.17 | WD |
| WZ7YYE | X | 1.553 | -0.207 | -9.24 | 1.300 | -0.206 | -13.71 | ED |
| WZBJLG | | 1.753 | -0.007 | -0.31 | 1.507 | 0.000 | 0.03 | XX |
| X9HM4Z | X | 1.797 | 0.036 | 1.62 | 1.473 | -0.033 | -2.18 | AA |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 1.760 | Percent | 1.506 | Percent |
| Std Dev Btwn Labs | 0.022 | Percent | 0.015 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 51 of 61 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 181
Chemical Analysis Element #2 - Corrosion Resistant Steel - Percent
MANGANESE (Mn)

Comments on assigned Data Flags for Analysis #181

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|---|
| 4FH33L | X | Data for sample M31 are high. |
| F2Z9PJ | X | Data for both samples are high. |
| JE8NZ6 | X | Data for sample M31 are low and data for sample M32 are high. Inconsistent within the determinations of both samples. |
| QE64D4 | X | Data for both samples are high. |
| QQJC2G | X | Data for both samples are high. Inconsistent within the determinations of both samples. |
| QQJCZV | X | Data for sample M31 are low and data for sample M32 are high. |
| RWP8JV | X | Data for both samples are high. |
| TMQ8D2 | X | Data for sample M32 are high. |
| WZ7YYE | X | Data for both samples are low. Inconsistent within the determinations of both samples. |
| X9HM4Z | X | Inconsistent in testing between samples. Inconsistent within the determinations of sample M32. |

Cycle 112
4th Q, 2015

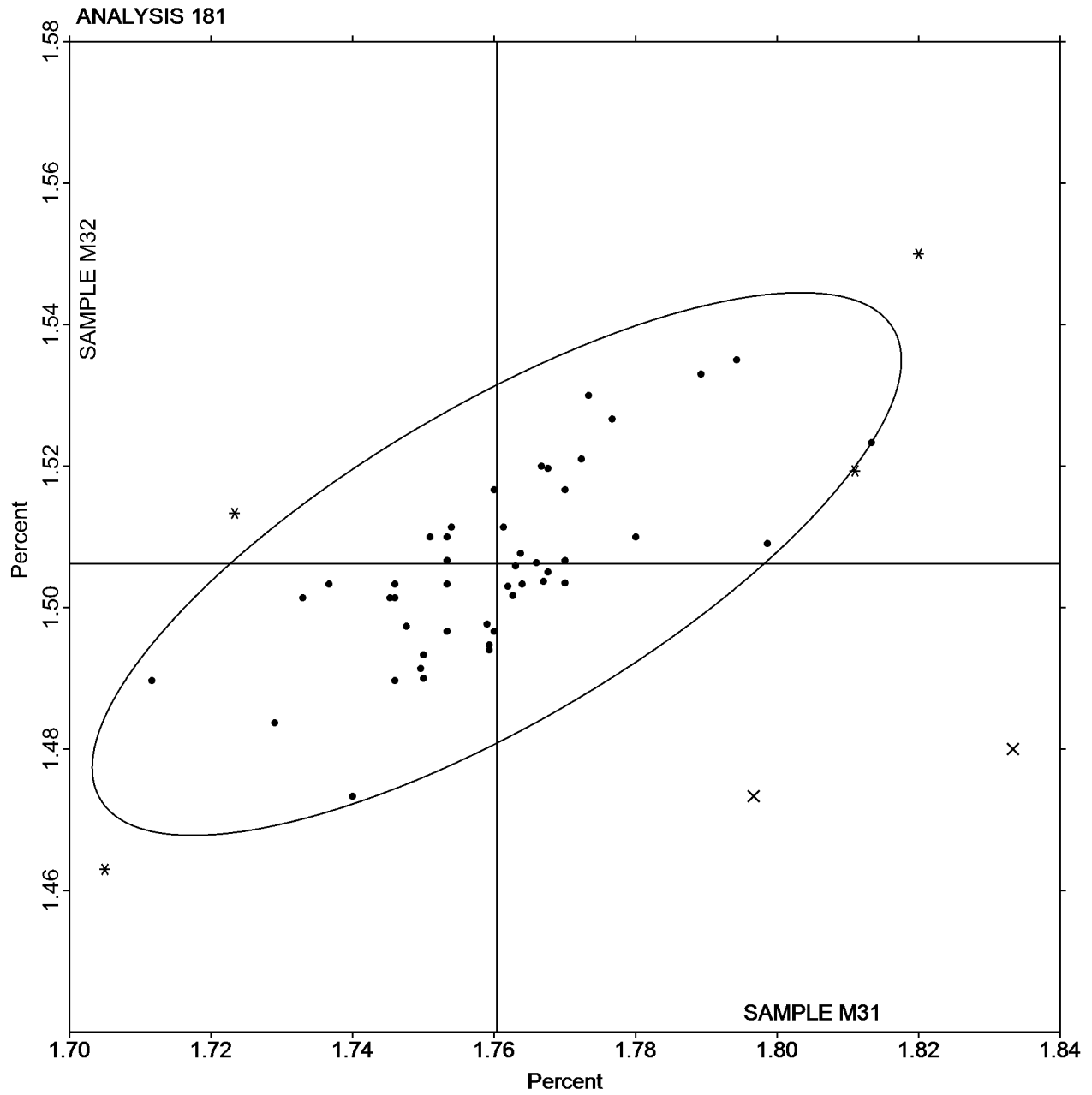
Interlaboratory Testing Program for Metals

Analysis 181

Chemical Analysis Element #2 - Corrosion Resistant Steel - Percent
MANGANESE (Mn)

SAMPLE M31
1.760 Percent

SAMPLE M32
1.506 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 182

Chemical Analysis Element #3 - Corrosion Resistant Steel - Percent
PHOSPHORUS (P)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.0213 | 0.0003 | 0.19 | 0.0299 | 0.0014 | 0.56 | IC |
| 33UTRA | | 0.0219 | 0.0010 | 0.54 | 0.0292 | 0.0007 | 0.29 | WD |
| 3H4G3P | | 0.0196 | -0.0013 | -0.72 | 0.0264 | -0.0021 | -0.87 | OE |
| 4B636U | | 0.0190 | -0.0019 | -1.08 | 0.0250 | -0.0035 | -1.44 | IC |
| 4ENAGB | | 0.0211 | 0.0002 | 0.10 | 0.0287 | 0.0002 | 0.08 | WD |
| 4FH33L | | 0.0227 | 0.0017 | 0.98 | 0.0320 | 0.0035 | 1.43 | OE |
| 4FXEUY | | 0.0212 | 0.0002 | 0.14 | 0.0298 | 0.0013 | 0.52 | WD |
| 4RBLHC | | 0.0224 | 0.0015 | 0.84 | 0.0307 | 0.0022 | 0.90 | OE |
| 7QM6C9 | | 0.0223 | 0.0014 | 0.79 | 0.0280 | -0.0005 | -0.21 | GD |
| 7U8WPW | | 0.0212 | 0.0003 | 0.17 | 0.0278 | -0.0007 | -0.28 | OE |
| 92HXX6 | | 0.0210 | 0.0001 | 0.04 | 0.0273 | -0.0012 | -0.49 | OE |
| 9FHNTG | | 0.0197 | -0.0013 | -0.70 | 0.0270 | -0.0015 | -0.62 | OE |
| 9FHNV3 | | 0.0215 | 0.0006 | 0.34 | 0.0288 | 0.0003 | 0.13 | IC |
| A3UWRD | | 0.0228 | 0.0018 | 1.03 | 0.0310 | 0.0025 | 1.04 | WD |
| AFJTVW | | 0.0223 | 0.0014 | 0.79 | 0.0311 | 0.0026 | 1.08 | OE |
| AQEZQG | | 0.0197 | -0.0013 | -0.70 | 0.0257 | -0.0028 | -1.17 | OE |
| BEHMLG | | 0.0210 | 0.0000 | 0.02 | 0.0286 | 0.0001 | 0.05 | IC |
| CBV64V | | 0.0243 | 0.0033 | 1.87 | 0.0308 | 0.0023 | 0.93 | WD |
| CVN2NW | * | 0.0198 | -0.0012 | -0.65 | 0.0318 | 0.0033 | 1.35 | OE |
| DAVP2H | | 0.0207 | -0.0003 | -0.14 | 0.0273 | -0.0012 | -0.49 | GD |
| DNEANX | | 0.0219 | 0.0010 | 0.55 | 0.0290 | 0.0005 | 0.19 | OE |
| DQ694G | | 0.0207 | -0.0003 | -0.14 | 0.0293 | 0.0008 | 0.34 | XX |
| DVH8HV | | 0.0168 | -0.0041 | -2.31 | 0.0227 | -0.0058 | -2.40 | OE |
| EUYU6H | | 0.0201 | -0.0009 | -0.48 | 0.0287 | 0.0002 | 0.08 | OE |
| EYCN8U | | 0.0230 | 0.0021 | 1.16 | 0.0300 | 0.0015 | 0.61 | WD |
| F2Z9PJ | * | 0.0163 | -0.0046 | -2.57 | 0.0233 | -0.0052 | -2.13 | OE |
| FMFW42 | | 0.0216 | 0.0007 | 0.38 | 0.0300 | 0.0015 | 0.61 | WD |
| FPKEEQ | | 0.0211 | 0.0002 | 0.12 | 0.0293 | 0.0008 | 0.32 | OE |
| GA4QPT | | 0.0218 | 0.0009 | 0.51 | 0.0293 | 0.0008 | 0.32 | OE |
| GEYKMU | | 0.0230 | 0.0021 | 1.16 | 0.0303 | 0.0018 | 0.75 | DR |
| GFAA2Z | | 0.0212 | 0.0002 | 0.14 | 0.0325 | 0.0040 | 1.62 | OE |
| GTLQXX | | 0.0210 | 0.0001 | 0.04 | 0.0290 | 0.0005 | 0.20 | XR |
| H6PHTG | | 0.0217 | 0.0007 | 0.42 | 0.0310 | 0.0025 | 1.02 | OE |
| J8TMT9 | | 0.0178 | -0.0031 | -1.75 | 0.0264 | -0.0021 | -0.88 | OE |
| JCNGPN | | 0.0204 | -0.0005 | -0.29 | 0.0279 | -0.0006 | -0.27 | OE |
| JE8NZ6 | X | 0.0400 | 0.0191 | 10.68 | 0.0567 | 0.0282 | 11.57 | ED |
| JK34ZD | | 0.0177 | -0.0033 | -1.82 | 0.0267 | -0.0018 | -0.76 | OE |
| L93EYU | X | 0.0307 | 0.0097 | 5.45 | 0.0410 | 0.0125 | 5.13 | OE |
| LTN7XQ | | 0.0217 | 0.0007 | 0.42 | 0.0310 | 0.0025 | 1.02 | OE |
| LXDNAG | | 0.0203 | -0.0006 | -0.33 | 0.0273 | -0.0012 | -0.49 | OE |
| MFGK97 | * | 0.0257 | 0.0047 | 2.65 | 0.0317 | 0.0032 | 1.30 | OE |
| MK8UH6 | | 0.0206 | -0.0003 | -0.18 | 0.0305 | 0.0020 | 0.80 | OE |
| NN2B94 | | 0.0197 | -0.0013 | -0.70 | 0.0290 | 0.0005 | 0.20 | OE |
| PNZME7 | X | 0.0104 | -0.0105 | -5.89 | 0.0163 | -0.0122 | -5.03 | OE |
| QE64D4 | * | 0.0177 | -0.0033 | -1.82 | 0.0217 | -0.0068 | -2.81 | OE |
| QQJC2G | * | 0.0234 | 0.0025 | 1.39 | 0.0278 | -0.0007 | -0.29 | GD |
| QUJCD8 | | 0.0206 | -0.0003 | -0.18 | 0.0279 | -0.0006 | -0.25 | OE |
| QZAX8E | | 0.0172 | -0.0037 | -2.08 | 0.0230 | -0.0055 | -2.27 | OE |
| RWP8JV | | 0.0217 | 0.0007 | 0.42 | 0.0300 | 0.0015 | 0.61 | OE |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 182

Chemical Analysis Element #3 - Corrosion Resistant Steel - Percent PHOSPHORUS (P)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| TFU3UY | | 0.0209 | -0.0001 | -0.03 | 0.0263 | -0.0022 | -0.92 | OE |
| TV9F2X | | 0.0210 | 0.0001 | 0.04 | 0.0297 | 0.0012 | 0.47 | OE |
| U97YXF | | 0.0226 | 0.0016 | 0.92 | 0.0315 | 0.0030 | 1.21 | OE |
| VDGAQA | | 0.0197 | -0.0013 | -0.70 | 0.0270 | -0.0015 | -0.62 | OE |
| VGGKLA | | 0.0209 | -0.0001 | -0.03 | 0.0259 | -0.0026 | -1.06 | OE |
| WDWVXQ | | 0.0221 | 0.0012 | 0.66 | 0.0299 | 0.0014 | 0.57 | WD |
| WZBJLG | | 0.0217 | 0.0007 | 0.42 | 0.0300 | 0.0015 | 0.61 | XX |
| X9HM4Z | | 0.0213 | 0.0004 | 0.23 | 0.0273 | -0.0012 | -0.49 | IC |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.0209 | Percent | 0.0285 | Percent |
| Std Dev Btwn Labs | 0.0018 | Percent | 0.0024 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 54 of 57 reporting participants

Comments on assigned Data Flags for Analysis #182

WebCode Flag Analyst Comment

JE8NZ6 X Data for both samples are high. Inconsistent within the determinations of both samples.

L93EYU X Data for both samples are high. Inconsistent within the determinations of sample M32.

PNZME7 X Data for both samples are low.

Cycle 112
4th Q, 2015

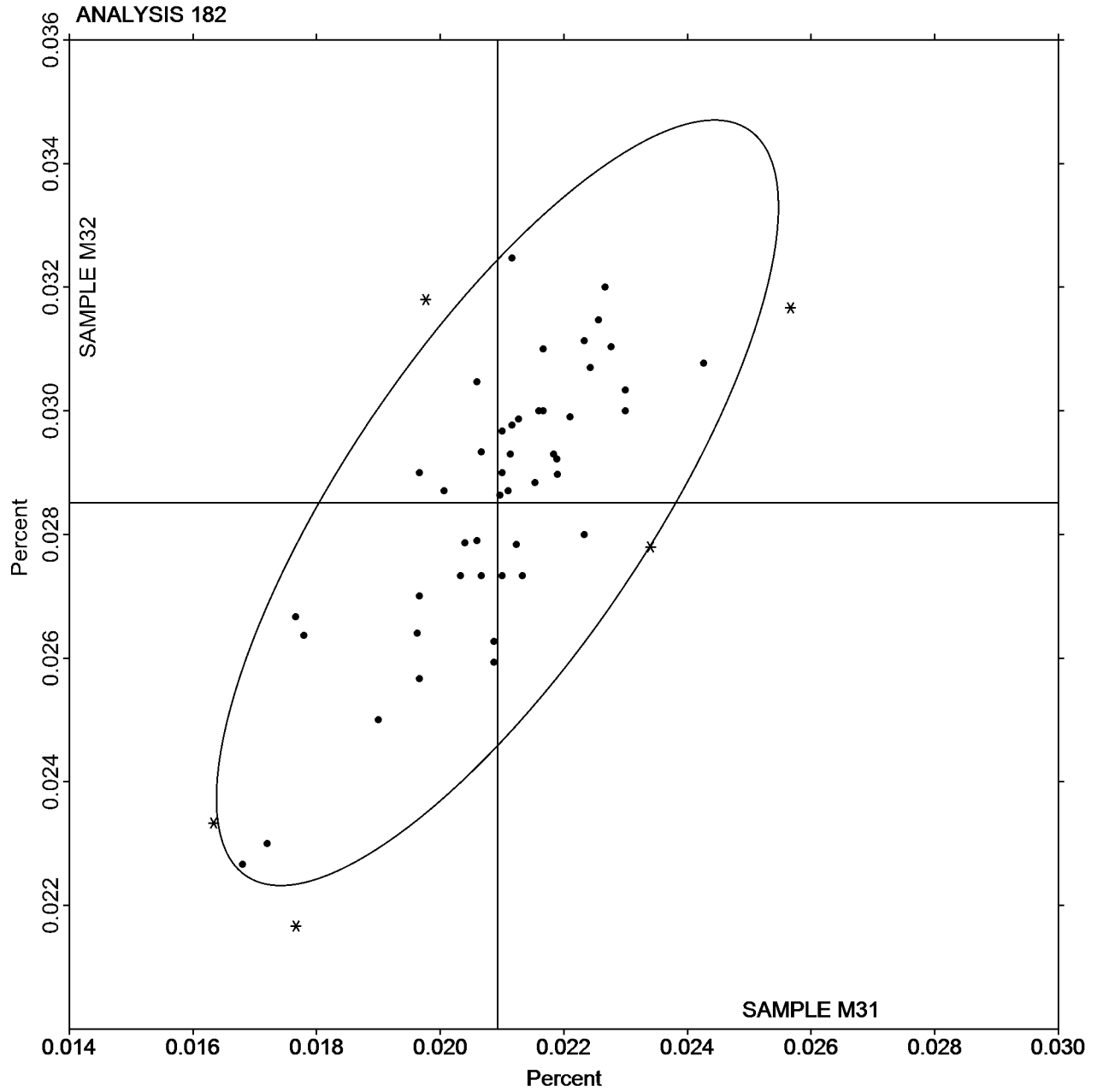
Interlaboratory Testing Program for Metals

Analysis 182

Chemical Analysis Element #3 - Corrosion Resistant Steel - Percent
PHOSPHORUS (P)

SAMPLE M31
0.0209 Percent

SAMPLE M32
0.0285 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 183

Chemical Analysis Element #4 - Corrosion Resistant Steel - Percent
TITANIUM (Ti)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|--------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.5887 | -0.0003 | -0.01 | 0.3348 | 0.0086 | 0.55 | IC |
| 33UTRA | | 0.6249 | 0.0359 | 1.70 | 0.3387 | 0.0124 | 0.79 | WD |
| 3H4G3P | | 0.5873 | -0.0017 | -0.08 | 0.3160 | -0.0102 | -0.65 | OE |
| 4B636U | | 0.6103 | 0.0213 | 1.01 | 0.3483 | 0.0221 | 1.41 | IC |
| 4ENAGB | | 0.5983 | 0.0093 | 0.44 | 0.3380 | 0.0118 | 0.75 | WD |
| 4FH33L | | 0.5733 | -0.0157 | -0.74 | 0.3233 | -0.0029 | -0.19 | OE |
| 4FXEUY | | 0.5953 | 0.0063 | 0.30 | 0.3353 | 0.0091 | 0.58 | WD |
| 4RBLHC | | 0.5930 | 0.0040 | 0.19 | 0.3257 | -0.0006 | -0.04 | OE |
| 7QM6C9 | | 0.5707 | -0.0183 | -0.87 | 0.3007 | -0.0256 | -1.63 | GD |
| 7U8WPW | | 0.5900 | 0.0010 | 0.05 | 0.3300 | 0.0038 | 0.24 | OE |
| 8BQC4D | | 0.5933 | 0.0043 | 0.21 | 0.3483 | 0.0221 | 1.41 | OE |
| 92HXX6 | | 0.5977 | 0.0087 | 0.41 | 0.3283 | 0.0021 | 0.13 | WD |
| 9FHNTG | | 0.5683 | -0.0207 | -0.98 | 0.2917 | -0.0346 | -2.21 | OE |
| 9FHNV3 | | 0.5847 | -0.0043 | -0.21 | 0.3237 | -0.0026 | -0.16 | IC |
| A3UWRD | | 0.5977 | 0.0087 | 0.41 | 0.3317 | 0.0054 | 0.35 | WD |
| AFJTVW | | 0.5983 | 0.0093 | 0.44 | 0.3270 | 0.0008 | 0.05 | OE |
| AQEZQG | | 0.6007 | 0.0117 | 0.55 | 0.3487 | 0.0224 | 1.43 | OE |
| BEHMLG | | 0.5610 | -0.0280 | -1.33 | 0.3347 | 0.0084 | 0.54 | IC |
| CBV64V | | 0.6353 | 0.0463 | 2.20 | 0.3393 | 0.0131 | 0.84 | WD |
| CVN2NW | X | 0.6940 | 0.1050 | 4.98 | 0.3690 | 0.0428 | 2.73 | OE |
| DAVP2H | X | 0.4930 | -0.0960 | -4.55 | 0.2567 | -0.0696 | -4.45 | GD |
| DNEANX | | 0.5873 | -0.0017 | -0.08 | 0.3207 | -0.0056 | -0.36 | OE |
| DQ694G | X | 0.3780 | -0.2110 | -10.00 | 0.2137 | -0.1126 | -7.20 | XX |
| DVH8HV | | 0.5784 | -0.0106 | -0.50 | 0.3222 | -0.0040 | -0.26 | XX |
| EUYU6H | | 0.5873 | -0.0017 | -0.08 | 0.2997 | -0.0266 | -1.70 | OE |
| EYCN8U | | 0.5967 | 0.0077 | 0.36 | 0.3283 | 0.0021 | 0.13 | WD |
| F2Z9PJ | * | 0.5267 | -0.0623 | -2.96 | 0.2920 | -0.0342 | -2.19 | OE |
| FMFW42 | | 0.5937 | 0.0047 | 0.22 | 0.3430 | 0.0168 | 1.07 | WD |
| FPKEEQ | | 0.5463 | -0.0427 | -2.02 | 0.2967 | -0.0296 | -1.89 | OE |
| GA4QPT | | 0.5900 | 0.0010 | 0.05 | 0.3240 | -0.0022 | -0.14 | OE |
| GEYKMU | | 0.5863 | -0.0027 | -0.13 | 0.3260 | -0.0002 | -0.01 | DR |
| GFAA2Z | * | 0.5983 | 0.0093 | 0.44 | 0.3010 | -0.0252 | -1.61 | OE |
| GTLQXX | | 0.6203 | 0.0313 | 1.49 | 0.3417 | 0.0154 | 0.99 | XR |
| H6PHTG | | 0.5953 | 0.0063 | 0.30 | 0.3263 | 0.0001 | 0.01 | OE |
| J8TMT9 | | 0.6267 | 0.0377 | 1.79 | 0.3530 | 0.0268 | 1.71 | OE |
| JCNGPN | | 0.5966 | 0.0076 | 0.36 | 0.3394 | 0.0131 | 0.84 | OE |
| JE8NZ6 | X | 0.7233 | 0.1343 | 6.37 | 0.2833 | -0.0429 | -2.74 | ED |
| JK34ZD | | 0.5760 | -0.0130 | -0.62 | 0.3217 | -0.0046 | -0.29 | OE |
| L93EYU | X | 0.6280 | 0.0390 | 1.85 | 0.3057 | -0.0206 | -1.31 | OE |
| LARLEK | X | 0.6170 | 0.0280 | 1.33 | 0.3810 | 0.0548 | 3.50 | ED |
| LTN7XQ | | 0.5720 | -0.0170 | -0.81 | 0.3410 | 0.0148 | 0.94 | OE |
| LXDNAG | | 0.5867 | -0.0023 | -0.11 | 0.3267 | 0.0004 | 0.03 | OE |
| MFGK97 | | 0.5733 | -0.0157 | -0.74 | 0.3193 | -0.0069 | -0.44 | OE |
| MK8UH6 | | 0.5903 | 0.0013 | 0.06 | 0.3200 | -0.0062 | -0.40 | XX |
| NN2B94 | | 0.6063 | 0.0173 | 0.82 | 0.3363 | 0.0101 | 0.65 | OE |
| PNZME7 | X | 0.6663 | 0.0773 | 3.67 | 0.3330 | 0.0068 | 0.43 | OE |
| QE64D4 | X | 0.4850 | -0.1040 | -4.93 | 0.2637 | -0.0626 | -4.00 | OE |
| QQJC2G | | 0.5493 | -0.0397 | -1.88 | 0.3063 | -0.0199 | -1.27 | GD |
| QQJCZV | X | 0.3663 | -0.2227 | -10.56 | 0.5737 | 0.2474 | 15.82 | DR |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 183

Chemical Analysis Element #4 - Corrosion Resistant Steel - Percent
TITANIUM (Ti)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|--------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QUJCD8 | | 0.5747 | -0.0143 | -0.68 | 0.3183 | -0.0079 | -0.51 | OE |
| QZAX8E | | 0.5763 | -0.0127 | -0.60 | 0.3293 | 0.0031 | 0.20 | OE |
| RWP8JV | | 0.5867 | -0.0023 | -0.11 | 0.3487 | 0.0224 | 1.43 | OE |
| TFU3UY | X | 0.2420 | -0.3470 | -16.45 | 0.1187 | -0.2076 | -13.27 | OE |
| TMQ8D2 | X | 0.5258 | -0.0632 | -3.00 | 0.2312 | -0.0950 | -6.07 | ED |
| TV9F2X | | 0.5860 | -0.0030 | -0.14 | 0.3213 | -0.0049 | -0.31 | WD |
| U97YXF | | 0.6143 | 0.0253 | 1.20 | 0.3373 | 0.0111 | 0.71 | OE |
| VGGKLA | | 0.6373 | 0.0483 | 2.29 | 0.3423 | 0.0161 | 1.03 | OE |
| WDWVXQ | | 0.5933 | 0.0043 | 0.21 | 0.3280 | 0.0018 | 0.11 | WD |
| WZ7YYE | | 0.5567 | -0.0323 | -1.53 | 0.2967 | -0.0296 | -1.89 | ED |
| WZBJLG | | 0.5817 | -0.0073 | -0.35 | 0.3103 | -0.0159 | -1.02 | XX |
| X9HM4Z | | 0.5900 | 0.0010 | 0.05 | 0.3300 | 0.0038 | 0.24 | AA |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.5890 | Percent | 0.3262 | Percent |
| Std Dev Btwn Labs | 0.0211 | Percent | 0.0156 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 50 of 61 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 183
Chemical Analysis Element #4 - Corrosion Resistant Steel - Percent
TITANIUM (Ti)

Comments on assigned Data Flags for Analysis #183

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|---|
| CVN2NW | X | Data for both samples are high. |
| DAVP2H | X | Data for both samples are low. |
| DQ694G | X | Data for both samples are low. |
| JE8NZ6 | X | Data for sample M31 are high and data for sample M32 are low. Inconsistent within the determinations of both samples. |
| L93EYU | X | Inconsistent in testing between samples. Inconsistent within the determinations of both samples. |
| LARLEK | X | Data for sample M32 are high. Inconsistent within the determinations of sample M31. |
| PNZME7 | X | Data for sample M31 are high. |
| QE64D4 | X | Data for both samples are low. |
| QQJCZV | X | Data for sample M31 are low and data for sample M32 are high. |
| TFU3UY | X | Data for both samples are low. |
| TMQ8D2 | X | Data for both samples are low. |

Cycle 112
4th Q, 2015

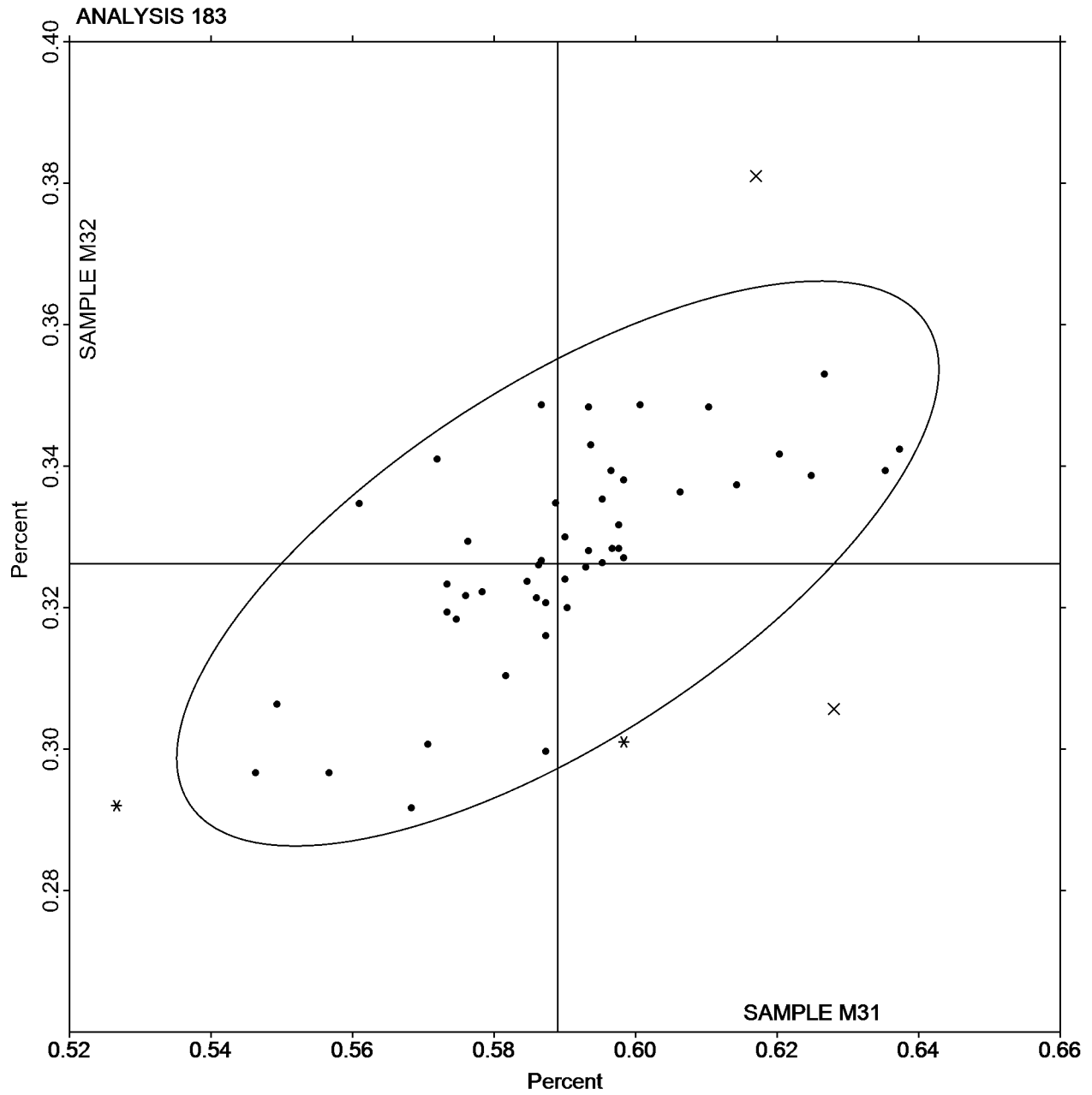
Interlaboratory Testing Program for Metals

Analysis 183

Chemical Analysis Element #4 - Corrosion Resistant Steel - Percent
TITANIUM (Ti)

SAMPLE M31
0.5890 Percent

SAMPLE M32
0.3262 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 184

Chemical Analysis Element #5 - Corrosion Resistant Steel - Percent
SILICON (Si)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.3134 | -0.0137 | -1.08 | 0.6255 | 0.0009 | 0.05 | IC |
| 33UTRA | | 0.3363 | 0.0092 | 0.72 | 0.6333 | 0.0087 | 0.51 | OE |
| 3H4G3P | | 0.3220 | -0.0051 | -0.40 | 0.6200 | -0.0046 | -0.27 | OE |
| 4B636U | | 0.3467 | 0.0196 | 1.53 | 0.6467 | 0.0221 | 1.30 | IC |
| 4ENAGB | | 0.3180 | -0.0091 | -0.71 | 0.6193 | -0.0053 | -0.31 | WD |
| 4FH33L | * | 0.3400 | 0.0129 | 1.01 | 0.6000 | -0.0246 | -1.45 | OE |
| 4FXEUY | | 0.3180 | -0.0091 | -0.71 | 0.6330 | 0.0084 | 0.49 | WD |
| 4RBLHC | | 0.3287 | 0.0016 | 0.12 | 0.6163 | -0.0083 | -0.49 | OE |
| 7QM6C9 | | 0.3067 | -0.0204 | -1.60 | 0.5880 | -0.0366 | -2.15 | GD |
| 7U8WPW | | 0.3227 | -0.0044 | -0.35 | 0.5917 | -0.0329 | -1.94 | OE |
| 8BQC4D | X | 0.3693 | 0.0422 | 3.31 | 0.5867 | -0.0379 | -2.23 | OE |
| 92HXX6 | | 0.3277 | 0.0006 | 0.04 | 0.6210 | -0.0036 | -0.21 | OE |
| 9FHNTG | X | 0.2850 | -0.0421 | -3.30 | 0.6197 | -0.0049 | -0.29 | OE |
| 9FHNV3 | | 0.3207 | -0.0064 | -0.51 | 0.6337 | 0.0091 | 0.53 | IC |
| A3UWRD | | 0.3090 | -0.0181 | -1.42 | 0.6133 | -0.0113 | -0.66 | WD |
| AFJTVW | | 0.3360 | 0.0089 | 0.70 | 0.6193 | -0.0053 | -0.31 | OE |
| AQEZQG | | 0.3400 | 0.0129 | 1.01 | 0.6407 | 0.0161 | 0.94 | OE |
| BEHMLG | | 0.3230 | -0.0041 | -0.32 | 0.6170 | -0.0076 | -0.45 | IC |
| CBV64V | | 0.3423 | 0.0152 | 1.19 | 0.6597 | 0.0351 | 2.06 | WD |
| CVN2NW | | 0.3290 | 0.0019 | 0.15 | 0.6197 | -0.0049 | -0.29 | OE |
| DAVP2H | | 0.3323 | 0.0052 | 0.41 | 0.6263 | 0.0017 | 0.10 | GD |
| DNEANX | | 0.3273 | 0.0002 | 0.02 | 0.6303 | 0.0057 | 0.34 | OE |
| DQ694G | | 0.3470 | 0.0199 | 1.56 | 0.6240 | -0.0006 | -0.04 | XX |
| DVH8HV | | 0.3324 | 0.0053 | 0.41 | 0.6325 | 0.0079 | 0.46 | OE |
| EUYU6H | | 0.3383 | 0.0112 | 0.88 | 0.6403 | 0.0157 | 0.93 | OE |
| EYCN8U | | 0.3400 | 0.0129 | 1.01 | 0.6400 | 0.0154 | 0.91 | WD |
| F2Z9PJ | | 0.3273 | 0.0002 | 0.02 | 0.6000 | -0.0246 | -1.45 | OE |
| FMFW42 | | 0.3280 | 0.0009 | 0.07 | 0.6310 | 0.0064 | 0.38 | WD |
| FPKEEQ | | 0.3123 | -0.0148 | -1.16 | 0.5970 | -0.0276 | -1.62 | OE |
| GA4QPT | | 0.3070 | -0.0201 | -1.58 | 0.6080 | -0.0166 | -0.98 | OE |
| GEYKMU | | 0.3267 | -0.0004 | -0.03 | 0.6190 | -0.0056 | -0.33 | DR |
| GFAA2Z | | 0.3147 | -0.0124 | -0.98 | 0.6363 | 0.0117 | 0.69 | OE |
| GTLQXX | | 0.3130 | -0.0141 | -1.11 | 0.6160 | -0.0086 | -0.51 | XR |
| H6PHTG | | 0.3173 | -0.0098 | -0.77 | 0.6317 | 0.0071 | 0.42 | OE |
| J8TMT9 | | 0.3497 | 0.0226 | 1.77 | 0.6410 | 0.0164 | 0.96 | OE |
| JCNGPN | | 0.3190 | -0.0081 | -0.63 | 0.6185 | -0.0061 | -0.36 | OE |
| JE8NZ6 | X | 0.3733 | 0.0462 | 3.63 | 0.6933 | 0.0687 | 4.04 | ED |
| JK34ZD | | 0.3070 | -0.0201 | -1.58 | 0.5967 | -0.0279 | -1.64 | OE |
| L93EYU | X | 0.3793 | 0.0522 | 4.10 | 0.6000 | -0.0246 | -1.45 | OE |
| LTN7XQ | | 0.3163 | -0.0108 | -0.85 | 0.6397 | 0.0151 | 0.89 | OE |
| LXDNAG | | 0.3467 | 0.0196 | 1.53 | 0.6433 | 0.0187 | 1.10 | OE |
| MFGK97 | | 0.3273 | 0.0002 | 0.02 | 0.6227 | -0.0019 | -0.11 | OE |
| MK8UH6 | | 0.3463 | 0.0192 | 1.51 | 0.6340 | 0.0094 | 0.55 | OE |
| NN2B94 | | 0.3233 | -0.0038 | -0.30 | 0.6277 | 0.0031 | 0.18 | OE |
| PNZME7 | * | 0.3583 | 0.0312 | 2.45 | 0.6610 | 0.0364 | 2.14 | OE |
| QE64D4 | X | 0.2993 | -0.0278 | -2.18 | 0.5367 | -0.0879 | -5.17 | OE |
| QQJC2G | | 0.3400 | 0.0129 | 1.01 | 0.6293 | 0.0047 | 0.28 | GD |
| QQJCZV | X | 0.5040 | 0.1769 | 13.88 | 0.3370 | -0.2876 | -16.92 | DR |
| QUJCD8 | | 0.3197 | -0.0074 | -0.58 | 0.6023 | -0.0223 | -1.31 | OE |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 184

Chemical Analysis Element #5 - Corrosion Resistant Steel - Percent SILICON (Si)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------------|-----------------------|-------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QZAX8E | | 0.3313 | 0.0042 | 0.33 | 0.6330 | 0.0084 | 0.49 | OE |
| RWP8JV | | 0.3117 | -0.0154 | -1.21 | 0.6367 | 0.0121 | 0.71 | OE |
| TFU3UY | | 0.3423 | 0.0152 | 1.19 | 0.6293 | 0.0047 | 0.28 | OE |
| TMQ8D2 | | 0.3171 | -0.0100 | -0.79 | 0.6042 | -0.0204 | -1.20 | ED |
| TV9F2X | | 0.3180 | -0.0091 | -0.71 | 0.6190 | -0.0056 | -0.33 | WD |
| U97YXF | | 0.3163 | -0.0108 | -0.85 | 0.6160 | -0.0086 | -0.51 | OE |
| VDGAQA | | 0.3303 | 0.0032 | 0.25 | 0.6417 | 0.0171 | 1.00 | OE |
| VGGKLA | | 0.3090 | -0.0181 | -1.42 | 0.5823 | -0.0423 | -2.49 | OE |
| WDWVXQ | | 0.3177 | -0.0094 | -0.74 | 0.6393 | 0.0147 | 0.87 | WD |
| WZ7YYE | M | No Data Reported | | | 0.1967 | -0.4279 | -25.18 | ED |
| WZBJLG | | 0.3327 | 0.0056 | 0.44 | 0.6403 | 0.0157 | 0.93 | XX |
| X9HM4Z | | 0.3400 | 0.0129 | 1.01 | 0.6400 | 0.0154 | 0.91 | AA |

| Summary Statistics | | | | |
|--------------------|------------|---------|------------|---------|
| | Sample M31 | | Sample M32 | |
| Grand Means | 0.3271 | Percent | 0.6246 | Percent |
| Std Dev Btwn Labs | 0.0127 | Percent | 0.0170 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 54 of 61 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 184
Chemical Analysis Element #5 - Corrosion Resistant Steel - Percent
SILICON (Si)

Comments on assigned Data Flags for Analysis #184

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|--|
| 8BQC4D | X | Data for sample M31 are high. |
| 9FHNTG | X | Data for sample M31 are low. Inconsistent within the determinations of sample M32. |
| JE8NZ6 | X | Data for both samples are high. Inconsistent within the determinations of both samples. |
| L93EYU | X | Data for sample M31 are high. Inconsistent within the determinations of sample M32. |
| QE64D4 | X | Data for sample M32 are low. |
| QQJCZV | X | Data for sample M31 are high and data for sample M32 are low. |
| WZ7YYE | M | Laboratory did not submit data for sample M31. Inconsistent within the determinations of sample M32. |

Cycle 112
4th Q, 2015

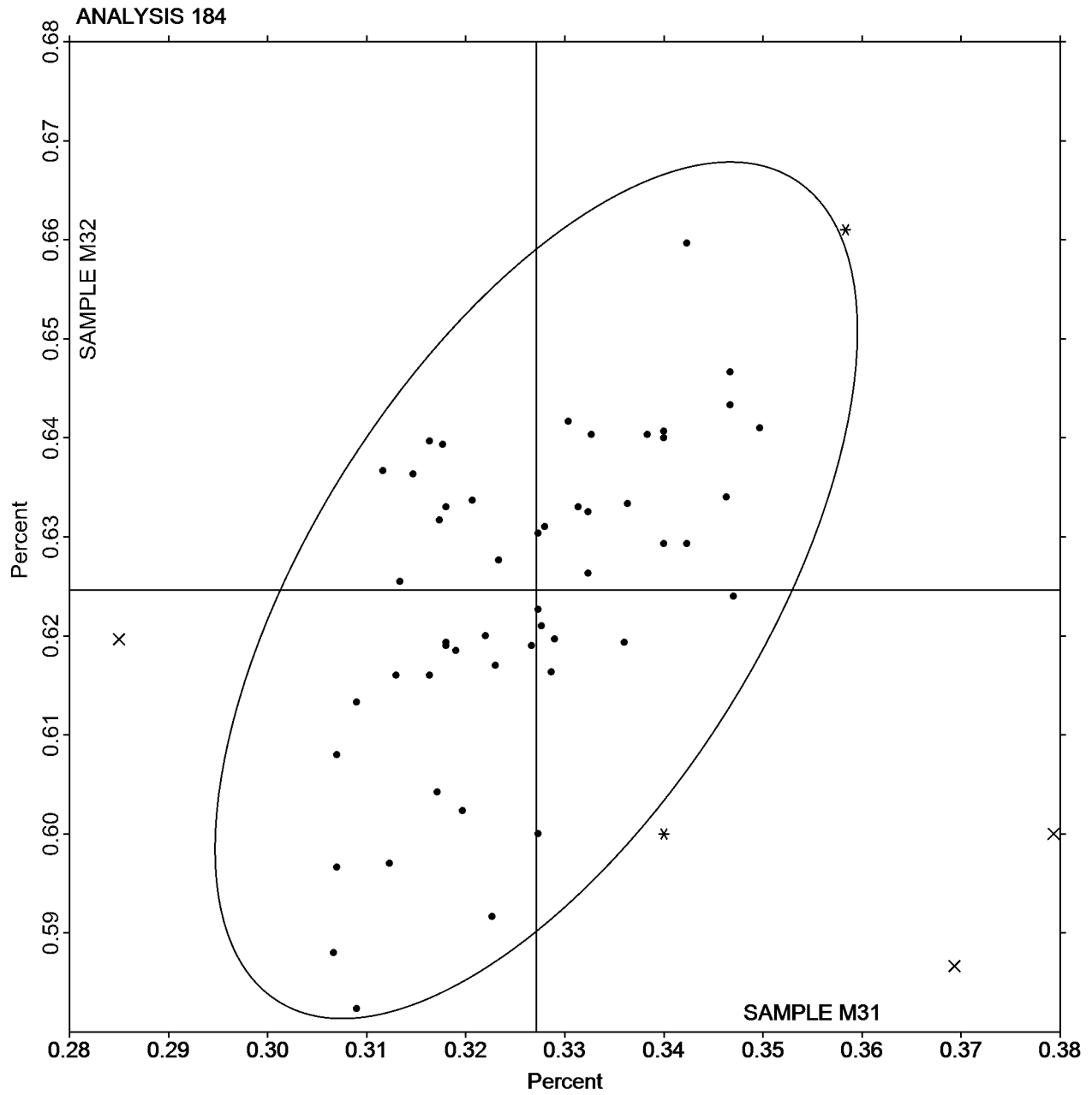
Interlaboratory Testing Program for Metals

Analysis 184

Chemical Analysis Element #5 - Corrosion Resistant Steel - Percent SILICON (Si)

SAMPLE M31
0.3271 Percent

SAMPLE M32
0.6246 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 185

Chemical Analysis Element #6 - Corrosion Resistant Steel - Percent
NITROGEN (N)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.0141 | -0.0014 | -0.21 | 0.0103 | -0.0034 | -0.51 | CO |
| 33UTRA | | 0.0160 | 0.0005 | 0.07 | 0.0138 | 0.0001 | 0.02 | CI |
| 3H4G3P | | 0.0113 | -0.0042 | -0.62 | 0.0116 | -0.0020 | -0.31 | OE |
| 4B636U | | 0.0123 | -0.0032 | -0.47 | 0.0115 | -0.0022 | -0.33 | XX |
| 4ENAGB | | 0.00987 | -0.0057 | -0.83 | 0.0104 | -0.0033 | -0.50 | CI |
| 4FXEUY | | 0.0132 | -0.0023 | -0.33 | 0.0105 | -0.0032 | -0.49 | CO |
| 4RBLHC | | 0.0165 | 0.0009 | 0.14 | 0.0141 | 0.0004 | 0.07 | OE |
| 92HXX6 | | 0.00633 | -0.0092 | -1.34 | 0.00633 | -0.0073 | -1.12 | XX |
| 9FHNTG | X | 0.0480 | 0.0325 | 4.74 | 0.0370 | 0.0233 | 3.55 | OE |
| 9FHNV3 | | 0.0108 | -0.0047 | -0.68 | 0.0110 | -0.0027 | -0.41 | CO |
| A3UWRD | * | 0.0267 | 0.0112 | 1.63 | 0.0143 | 0.0007 | 0.10 | CI |
| AQEZQG | | 0.0247 | 0.0092 | 1.34 | 0.0258 | 0.0121 | 1.85 | OE |
| CBV64V | | 0.0143 | -0.0012 | -0.17 | 0.0117 | -0.0020 | -0.30 | CO |
| DNEANX | | 0.0114 | -0.0041 | -0.60 | 0.0110 | -0.0027 | -0.41 | OE |
| DQ694G | * | 0.0293 | 0.0138 | 2.01 | 0.0310 | 0.0173 | 2.64 | XX |
| DVH8HV | | 0.0122 | -0.0034 | -0.49 | 0.00837 | -0.0053 | -0.81 | OE |
| EUYU6H | | 0.00600 | -0.0095 | -1.39 | 0.00590 | -0.0078 | -1.18 | OE |
| EYCN8U | | 0.00867 | -0.0069 | -1.00 | 0.0110 | -0.0027 | -0.41 | OE |
| FMFW42 | | 0.0114 | -0.0041 | -0.60 | 0.0108 | -0.0028 | -0.43 | CI |
| GA4QPT | | 0.0161 | 0.0005 | 0.08 | 0.0136 | -0.0001 | -0.01 | CI |
| GTLQXX | | 0.0114 | -0.0042 | -0.61 | 0.0125 | -0.0011 | -0.17 | IR |
| H6PHTG | | 0.0117 | -0.0039 | -0.56 | 0.00967 | -0.0040 | -0.61 | CI |
| JCNGPN | | 0.00943 | -0.0061 | -0.89 | 0.00980 | -0.0039 | -0.59 | OE |
| JE8NZ6 | X | 0.2333 | 0.2178 | 31.77 | 0.1400 | 0.1263 | 19.24 | ED |
| MFGK97 | | 0.0117 | -0.0039 | -0.56 | 0.0113 | -0.0023 | -0.36 | CO |
| MK8UH6 | | 0.0189 | 0.0034 | 0.50 | 0.0139 | 0.0003 | 0.04 | OE |
| NN2B94 | | 0.0122 | -0.0033 | -0.48 | 0.0118 | -0.0019 | -0.29 | XX |
| PNZME7 | | 0.0287 | 0.0132 | 1.92 | 0.0265 | 0.0129 | 1.96 | XX |
| QUJCD8 | | 0.0123 | -0.0033 | -0.48 | 0.0121 | -0.0016 | -0.24 | OE |
| QZAX8E | | 0.0143 | -0.0012 | -0.17 | 0.00797 | -0.0057 | -0.87 | OE |
| TFU3UY | | 0.00900 | -0.0065 | -0.95 | 0.0110 | -0.0027 | -0.41 | XX |
| TV9F2X | | 0.0157 | 0.0002 | 0.03 | 0.0106 | -0.0030 | -0.46 | CO |
| VGGKLA | | 0.0307 | 0.0152 | 2.21 | 0.0307 | 0.0170 | 2.59 | OE |
| WDWVXQ | * | 0.0267 | 0.0112 | 1.63 | 0.0143 | 0.0007 | 0.10 | CI |
| WZBJLG | | 0.0250 | 0.0095 | 1.38 | 0.0280 | 0.0143 | 2.18 | XX |
| X9HM4Z | | 0.0188 | 0.0033 | 0.48 | 0.0115 | -0.0022 | -0.33 | XX |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.0155 | Percent | 0.0137 | Percent |
| Std Dev Btwn Labs | 0.0069 | Percent | 0.0066 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 34 of 36 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 185
Chemical Analysis Element #6 - Corrosion Resistant Steel - Percent
NITROGEN (N)

Comments on assigned Data Flags for Analysis #185

WebCode Flag Analyst Comment

9FHNTG X Data for both samples are high. Possible Systematic error. Inconsistent within the determinations of both samples.

JE8NZ6 X Data for both samples are high. Possible Systematic error. Inconsistent within the determinations of both samples.

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 186

Chemical Analysis Element #7 - Corrosion Resistant Steel - Percent
NICKEL (Ni)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|--------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 9.229 | 0.039 | 0.44 | 9.042 | 0.040 | 0.43 | IC |
| 33UTRA | | 9.154 | -0.036 | -0.41 | 8.954 | -0.048 | -0.51 | WD |
| 3H4G3P | | 9.283 | 0.093 | 1.06 | 9.056 | 0.055 | 0.59 | OE |
| 4B636U | | 9.327 | 0.136 | 1.55 | 9.157 | 0.155 | 1.66 | IC |
| 4ENAGB | | 9.197 | 0.006 | 0.07 | 8.990 | -0.012 | -0.13 | WD |
| 4FH33L | | 9.207 | 0.016 | 0.19 | 8.963 | -0.038 | -0.41 | OE |
| 4FXEUY | | 9.091 | -0.100 | -1.13 | 8.947 | -0.054 | -0.58 | WD |
| 4RBLHC | | 9.183 | -0.008 | -0.09 | 9.029 | 0.027 | 0.29 | OE |
| 7QM6C9 | | 9.117 | -0.074 | -0.84 | 8.833 | -0.168 | -1.81 | GD |
| 7U8WPW | | 9.170 | -0.020 | -0.23 | 8.950 | -0.052 | -0.56 | OE |
| 8BQC4D | | 9.223 | 0.033 | 0.38 | 9.160 | 0.158 | 1.70 | OE |
| 92HXX6 | | 9.189 | -0.002 | -0.02 | 9.028 | 0.026 | 0.28 | WD |
| 9FHNTG | X | 9.386 | 0.196 | 2.23 | 9.415 | 0.413 | 4.43 | OE |
| 9FHNV3 | | 9.200 | 0.010 | 0.11 | 9.060 | 0.059 | 0.63 | IC |
| A3UWRD | | 9.121 | -0.069 | -0.79 | 8.977 | -0.024 | -0.26 | WD |
| AFJTVW | | 9.190 | 0.000 | 0.00 | 9.070 | 0.068 | 0.73 | OE |
| AQEZQG | | 9.203 | 0.013 | 0.15 | 8.987 | -0.014 | -0.16 | OE |
| BEHMLG | | 9.212 | 0.021 | 0.24 | 8.969 | -0.033 | -0.36 | IC |
| CBV64V | | 9.116 | -0.075 | -0.85 | 8.905 | -0.097 | -1.04 | WD |
| CVN2NW | | 9.207 | 0.016 | 0.19 | 8.963 | -0.038 | -0.41 | OE |
| DAVP2H | | 9.223 | 0.033 | 0.38 | 9.070 | 0.068 | 0.73 | GD |
| DNEANX | | 9.220 | 0.029 | 0.33 | 9.030 | 0.029 | 0.31 | OE |
| DQ694G | | 9.227 | 0.037 | 0.42 | 8.983 | -0.019 | -0.20 | XX |
| DVH8HV | | 9.289 | 0.099 | 1.12 | 9.153 | 0.151 | 1.63 | OE |
| EUYU6H | | 9.120 | -0.070 | -0.80 | 8.923 | -0.078 | -0.84 | OE |
| EYCN8U | | 9.168 | -0.022 | -0.25 | 8.969 | -0.032 | -0.35 | WD |
| F2Z9PJ | | 9.103 | -0.087 | -0.99 | 8.850 | -0.152 | -1.63 | OE |
| FMFW42 | | 9.186 | -0.005 | -0.05 | 8.976 | -0.026 | -0.28 | WD |
| FPKEEQ | | 9.307 | 0.116 | 1.32 | 9.083 | 0.082 | 0.88 | OE |
| GA4QPT | | 9.330 | 0.140 | 1.59 | 9.100 | 0.098 | 1.05 | OE |
| GEYKMU | | 9.307 | 0.117 | 1.33 | 9.042 | 0.040 | 0.43 | DR |
| GFAA2Z | | 9.050 | -0.141 | -1.60 | 8.809 | -0.193 | -2.07 | OE |
| GTLQXX | | 9.193 | 0.003 | 0.03 | 9.017 | 0.015 | 0.16 | XR |
| H6PHTG | | 9.297 | 0.106 | 1.21 | 9.033 | 0.032 | 0.34 | OE |
| J8TMT9 | | 9.348 | 0.158 | 1.80 | 9.132 | 0.130 | 1.40 | OE |
| JCNGPN | | 9.175 | -0.015 | -0.18 | 8.968 | -0.034 | -0.37 | OE |
| JE8NZ6 | X | 8.053 | -1.137 | -12.95 | 7.980 | -1.022 | -10.97 | ED |
| JK34ZD | | 9.090 | -0.100 | -1.14 | 8.893 | -0.108 | -1.16 | OE |
| L93EYU | | 9.127 | -0.064 | -0.72 | 8.950 | -0.052 | -0.56 | OE |
| LARLEK | | 9.089 | -0.101 | -1.15 | 9.026 | 0.024 | 0.26 | ED |
| LTN7XQ | | 9.170 | -0.020 | -0.23 | 8.997 | -0.005 | -0.06 | OE |
| LXDNAG | | 9.103 | -0.087 | -0.99 | 8.930 | -0.072 | -0.77 | OE |
| MFGK97 | | 9.078 | -0.112 | -1.28 | 8.915 | -0.086 | -0.93 | OE |
| MK8UH6 | | 9.074 | -0.116 | -1.32 | 8.860 | -0.142 | -1.52 | OE |
| NN2B94 | | 9.137 | -0.054 | -0.61 | 8.963 | -0.038 | -0.41 | OE |
| PNZME7 | | 9.117 | -0.074 | -0.84 | 8.903 | -0.098 | -1.06 | OE |
| PVKT4Q | | 9.209 | 0.019 | 0.22 | 8.996 | -0.006 | -0.06 | WC |
| QE64D4 | | 9.335 | 0.144 | 1.64 | 9.066 | 0.064 | 0.69 | OE |
| QQJC2G | | 9.270 | 0.080 | 0.91 | 9.103 | 0.102 | 1.09 | GD |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 186

Chemical Analysis Element #7 - Corrosion Resistant Steel - Percent
NICKEL (Ni)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QQJCZV | | 9.179 | -0.011 | -0.13 | 9.235 | 0.234 | 2.51 | DR |
| QUJCD8 | | 9.140 | -0.050 | -0.57 | 8.930 | -0.072 | -0.77 | OE |
| QZAX8E | * | 9.444 | 0.254 | 2.89 | 9.258 | 0.257 | 2.75 | OE |
| RWP8JV | | 9.273 | 0.083 | 0.95 | 9.190 | 0.188 | 2.02 | OE |
| TFU3UY | * | 9.133 | -0.057 | -0.65 | 9.117 | 0.115 | 1.23 | OE |
| TMQ8D2 | | 9.064 | -0.127 | -1.44 | 8.911 | -0.091 | -0.98 | ED |
| TV9F2X | | 9.113 | -0.077 | -0.88 | 8.933 | -0.068 | -0.74 | WD |
| U97YXF | | 9.367 | 0.176 | 2.01 | 9.117 | 0.115 | 1.23 | OE |
| VDGAQA | | 9.010 | -0.180 | -2.05 | 8.923 | -0.078 | -0.84 | OE |
| VGGKLA | | 9.247 | 0.056 | 0.64 | 9.035 | 0.033 | 0.35 | OE |
| WDWVXQ | | 9.200 | 0.009 | 0.11 | 9.002 | 0.001 | 0.01 | WD |
| WZ7YYE | | 9.203 | 0.013 | 0.15 | 9.120 | 0.118 | 1.27 | ED |
| WZBJLG | | 9.150 | -0.040 | -0.46 | 8.877 | -0.125 | -1.34 | XX |
| X9HM4Z | | 9.117 | -0.074 | -0.84 | 8.913 | -0.088 | -0.95 | AA |

| Summary Statistics | | | | |
|--------------------|------------|---------|------------|---------|
| | Sample M31 | | Sample M32 | |
| Grand Means | 9.190 | Percent | 9.002 | Percent |
| Std Dev Btwn Labs | 0.088 | Percent | 0.093 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 60 of 63 reporting participants

Comments on assigned Data Flags for Analysis #186

WebCode Flag Analyst Comment

9FHNTG X Data for sample M32 are high. Inconsistent in testing between samples.

JE8NZ6 X Data for both samples are low. Possible Systematic error. Inconsistent within the determinations of both samples.

Cycle 112
4th Q, 2015

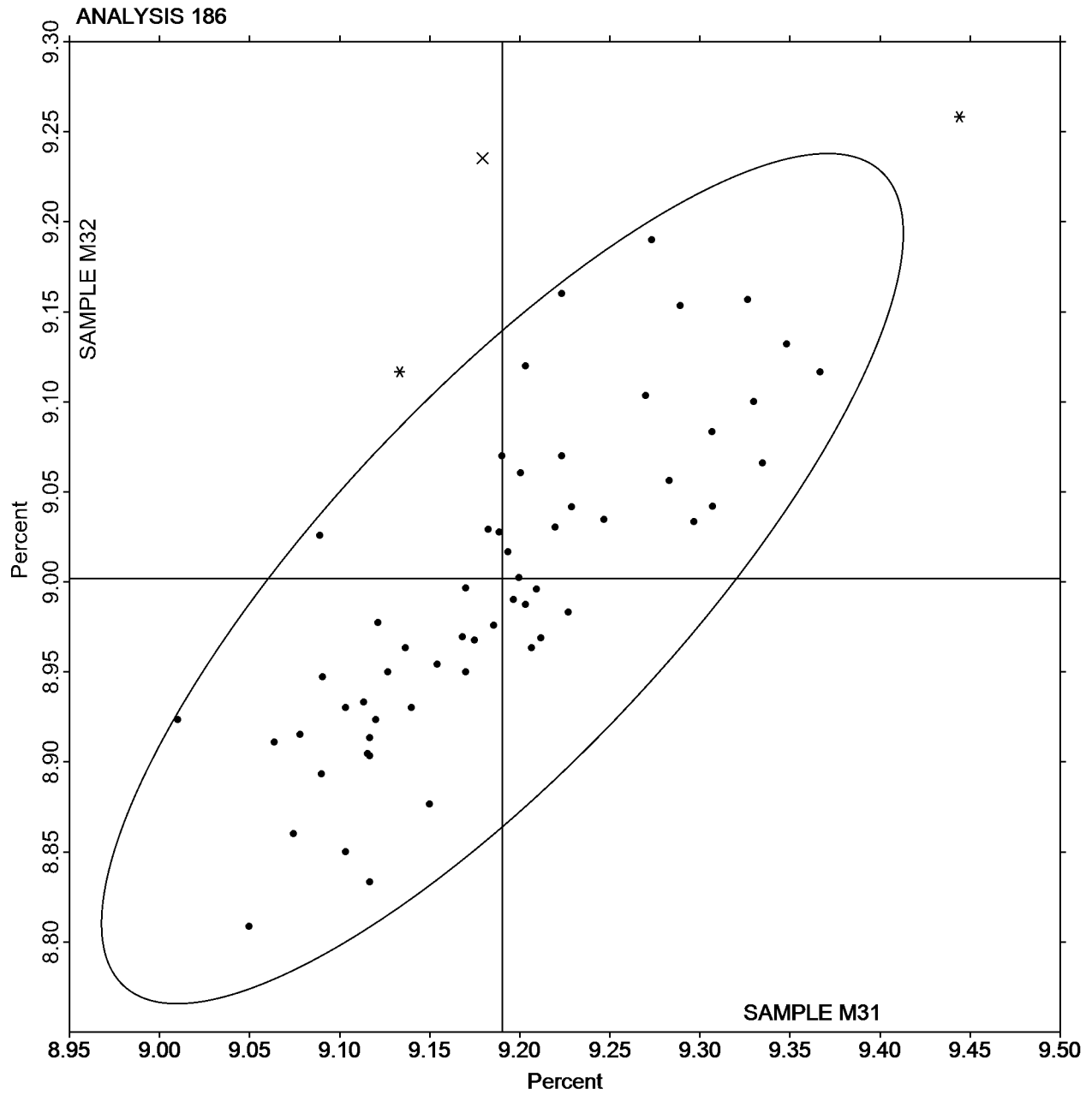
Interlaboratory Testing Program for Metals

Analysis 186

Chemical Analysis Element #7 - Corrosion Resistant Steel - Percent
NICKEL (Ni)

SAMPLE M31
9.190 Percent

SAMPLE M32
9.002 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 187

Chemical Analysis Element #8 - Corrosion Resistant Steel - Percent
CHROMIUM (Cr)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 17.80 | 0.01 | 0.12 | 17.73 | 0.02 | 0.15 | IC |
| 33UTRA | | 17.78 | -0.01 | -0.11 | 17.70 | -0.02 | -0.23 | WD |
| 3H4G3P | | 17.75 | -0.04 | -0.46 | 17.69 | -0.03 | -0.33 | OE |
| 4B636U | | 17.58 | -0.21 | -2.38 | 17.49 | -0.23 | -2.35 | TI |
| 4ENAGB | | 17.82 | 0.03 | 0.37 | 17.72 | 0.00 | 0.04 | WD |
| 4FH33L | | 17.71 | -0.08 | -0.95 | 17.65 | -0.07 | -0.74 | OE |
| 4FXEUY | X | 17.52 | -0.27 | -3.10 | 17.69 | -0.03 | -0.33 | WD |
| 4RBLHC | | 17.77 | -0.02 | -0.27 | 17.68 | -0.04 | -0.37 | OE |
| 7QM6C9 | | 17.77 | -0.02 | -0.27 | 17.63 | -0.09 | -0.87 | GD |
| 7U8WPW | | 17.82 | 0.03 | 0.34 | 17.74 | 0.02 | 0.21 | OE |
| 8BQC4D | * | 17.63 | -0.16 | -1.85 | 17.73 | 0.01 | 0.09 | OE |
| 92HXX6 | | 17.75 | -0.04 | -0.43 | 17.71 | -0.01 | -0.11 | WD |
| 9FHNTG | X | 17.98 | 0.19 | 2.18 | 17.66 | -0.06 | -0.56 | OE |
| 9FHNV3 | | 17.78 | -0.01 | -0.12 | 17.69 | -0.03 | -0.30 | IC |
| A3UWRD | | 17.75 | -0.04 | -0.46 | 17.70 | -0.02 | -0.16 | WD |
| AFJTVW | | 17.68 | -0.11 | -1.25 | 17.57 | -0.15 | -1.55 | OE |
| AQEZQG | | 17.83 | 0.03 | 0.39 | 17.68 | -0.04 | -0.40 | OE |
| BEHMLG | | 17.75 | -0.04 | -0.46 | 17.56 | -0.16 | -1.65 | IC |
| CBV64V | | 17.79 | 0.00 | 0.02 | 17.68 | -0.04 | -0.43 | WD |
| CVN2NW | | 17.84 | 0.05 | 0.53 | 17.81 | 0.09 | 0.91 | OE |
| DAVP2H | | 17.87 | 0.08 | 0.87 | 17.73 | 0.01 | 0.14 | GD |
| DNEANX | | 17.76 | -0.03 | -0.38 | 17.67 | -0.05 | -0.54 | OE |
| DQ694G | | 17.82 | 0.03 | 0.34 | 17.86 | 0.14 | 1.45 | XX |
| DVH8HV | | 17.79 | 0.00 | -0.05 | 17.71 | -0.01 | -0.10 | OE |
| EUYU6H | | 17.90 | 0.11 | 1.24 | 17.80 | 0.08 | 0.85 | OE |
| EYCN8U | | 17.81 | 0.02 | 0.19 | 17.67 | -0.05 | -0.49 | WD |
| F2Z9PJ | * | 17.82 | 0.03 | 0.34 | 17.58 | -0.14 | -1.38 | OE |
| FMFW42 | | 17.81 | 0.02 | 0.26 | 17.73 | 0.01 | 0.14 | WD |
| FPKEEQ | | 17.81 | 0.02 | 0.22 | 17.79 | 0.07 | 0.74 | OE |
| GA4QPT | | 17.89 | 0.10 | 1.13 | 17.79 | 0.07 | 0.71 | OE |
| GEYKMU | | 17.71 | -0.08 | -0.88 | 17.65 | -0.07 | -0.68 | DR |
| GFAA2Z | | 17.72 | -0.07 | -0.79 | 17.71 | -0.01 | -0.10 | OE |
| GTLQXX | | 17.94 | 0.15 | 1.70 | 17.83 | 0.11 | 1.15 | XR |
| H6PHTG | | 17.88 | 0.09 | 1.05 | 17.75 | 0.03 | 0.27 | OE |
| J8TMT9 | | 17.81 | 0.02 | 0.19 | 17.75 | 0.03 | 0.31 | OE |
| JCNGPN | | 17.77 | -0.02 | -0.23 | 17.66 | -0.06 | -0.57 | OE |
| JE8NZ6 | X | 16.94 | -0.85 | -9.63 | 16.97 | -0.75 | -7.54 | ED |
| JK34ZD | | 17.83 | 0.04 | 0.41 | 17.78 | 0.06 | 0.64 | OE |
| L93EYU | | 17.76 | -0.03 | -0.38 | 17.72 | 0.00 | 0.04 | OE |
| LARLEK | | 17.79 | 0.00 | 0.04 | 17.84 | 0.12 | 1.18 | ED |
| LTN7XQ | | 17.84 | 0.05 | 0.53 | 17.69 | -0.03 | -0.30 | OE |
| LXDNAG | X | 18.27 | 0.48 | 5.39 | 17.90 | 0.18 | 1.82 | OE |
| MFGK97 | | 17.71 | -0.08 | -0.95 | 17.64 | -0.08 | -0.84 | OE |
| MK8UH6 | | 17.86 | 0.07 | 0.83 | 17.84 | 0.12 | 1.18 | OE |
| NN2B94 | | 17.83 | 0.04 | 0.49 | 17.75 | 0.03 | 0.27 | OE |
| PNZME7 | | 17.98 | 0.19 | 2.15 | 17.94 | 0.22 | 2.26 | OE |
| PVKT4Q | | 17.73 | -0.06 | -0.63 | 17.62 | -0.10 | -0.99 | WC |
| QE64D4 | | 17.93 | 0.14 | 1.53 | 17.84 | 0.12 | 1.17 | OE |
| QQJC2G | | 17.73 | -0.06 | -0.64 | 17.80 | 0.08 | 0.81 | GD |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 187

Chemical Analysis Element #8 - Corrosion Resistant Steel - Percent CHROMIUM (Cr)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QQJCZV | X | 17.26 | -0.53 | -5.99 | 17.69 | -0.03 | -0.27 | DR |
| QUJCD8 | | 17.94 | 0.15 | 1.70 | 17.92 | 0.20 | 2.06 | OE |
| QZAX8E | | 17.63 | -0.16 | -1.85 | 17.48 | -0.24 | -2.45 | OE |
| RWP8JV | | 17.61 | -0.18 | -2.00 | 17.58 | -0.14 | -1.44 | OE |
| TFU3UY | | 17.72 | -0.07 | -0.76 | 17.64 | -0.08 | -0.84 | OE |
| TMQ8D2 | | 17.69 | -0.10 | -1.14 | 17.63 | -0.09 | -0.90 | ED |
| TV9F2X | * | 17.62 | -0.17 | -1.89 | 17.68 | -0.04 | -0.43 | WD |
| U97YXF | X | 18.19 | 0.40 | 4.56 | 17.99 | 0.27 | 2.70 | OE |
| VDGAQA | | 17.90 | 0.11 | 1.28 | 17.81 | 0.09 | 0.91 | OE |
| VGGKLA | | 17.95 | 0.16 | 1.81 | 17.86 | 0.14 | 1.42 | OE |
| WDWVXQ | | 17.78 | -0.01 | -0.10 | 17.70 | -0.02 | -0.18 | WD |
| WZ7YYE | | 17.88 | 0.09 | 0.98 | 17.88 | 0.16 | 1.59 | ED |
| WZBJLG | | 17.85 | 0.06 | 0.64 | 17.82 | 0.10 | 1.05 | XX |
| X9HM4Z | X | 17.86 | 0.07 | 0.75 | 17.35 | -0.37 | -3.70 | IC |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 17.79 | Percent | 17.72 | Percent |
| Std Dev Btwn Labs | 0.09 | Percent | 0.10 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 56 of 63 reporting participants

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 187
Chemical Analysis Element #8 - Corrosion Resistant Steel - Percent
CHROMIUM (Cr)

Comments on assigned Data Flags for Analysis #187

| <u>WebCode</u> | <u>Flag</u> | <u>Analyst Comment</u> |
|----------------|-------------|--|
| 4FXEUY | X | Data for sample M31 are low. Inconsistent in testing between samples. |
| 9FHNTG | X | Inconsistent in testing between samples. Inconsistent within the determinations of sample M32. |
| JE8NZ6 | X | Data for both samples are low. Possible Systematic error. Inconsistent within the determinations of sample M32. |
| LXDNAG | X | Data for sample M31 are high. Inconsistent in testing between samples. Inconsistent within the determinations of sample M31. |
| QQJCZV | X | Data for sample M31 are low. Inconsistent in testing between samples. |
| U97YXF | X | Data for sample M31 are high. Inconsistent in testing between samples. |
| X9HM4Z | X | Data for sample M32 are low. Inconsistent in testing between samples. Inconsistent within the determinations of sample M32. |

Cycle 112
4th Q, 2015

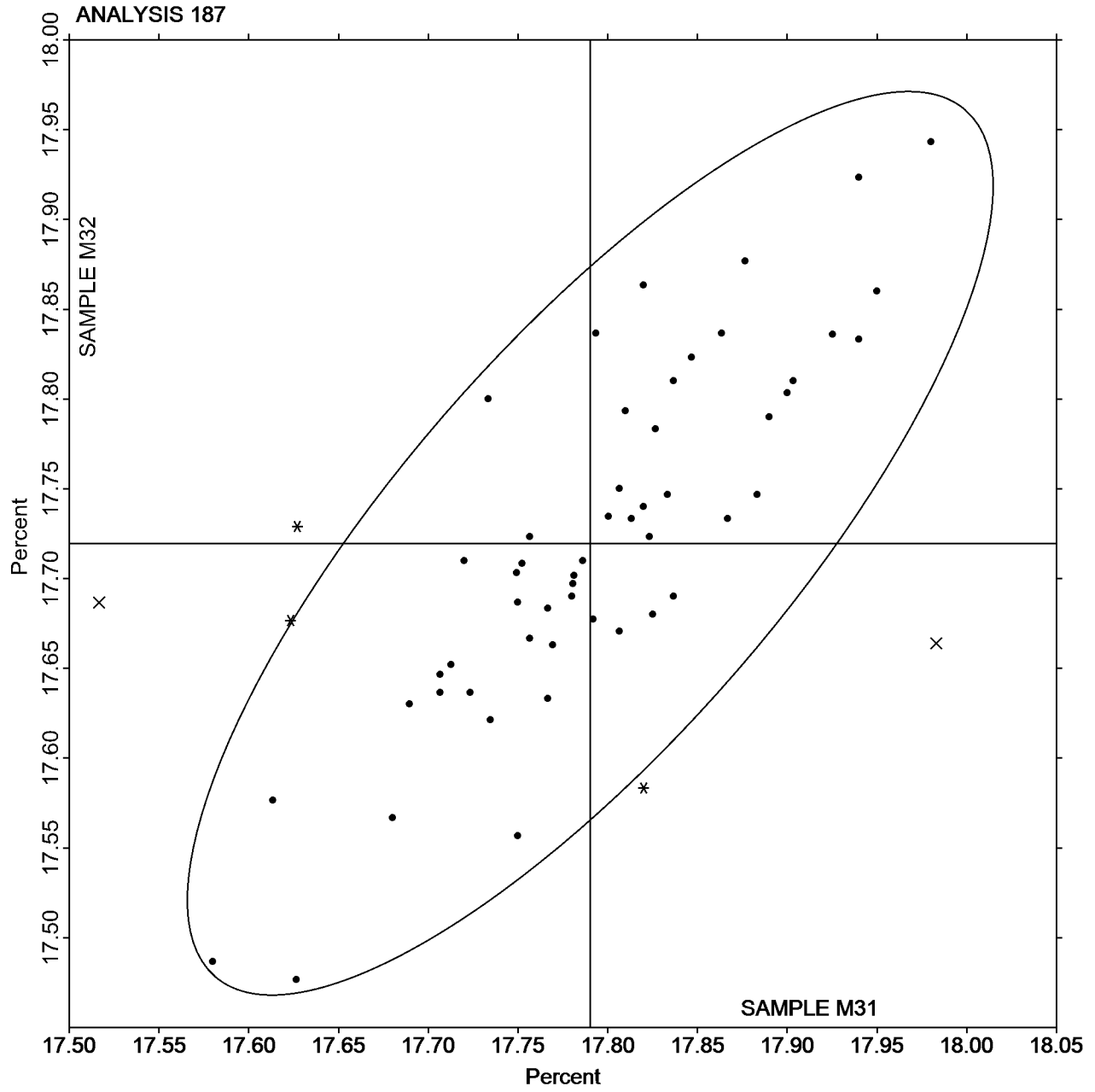
Interlaboratory Testing Program for Metals

Analysis 187

Chemical Analysis Element #8 - Corrosion Resistant Steel - Percent
CHROMIUM (Cr)

SAMPLE M31
17.79 Percent

SAMPLE M32
17.72 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 188

Chemical Analysis Element #9 - Corrosion Resistant Steel - Percent
MOLYBDENUM (Mo)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|--------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.1234 | -0.0100 | -1.15 | 0.3842 | 0.0001 | 0.01 | IC |
| 33UTRA | | 0.1286 | -0.0049 | -0.56 | 0.3840 | -0.0001 | -0.01 | WD |
| 3H4G3P | | 0.1473 | 0.0139 | 1.61 | 0.3683 | -0.0158 | -1.38 | OE |
| 4B636U | | 0.1343 | 0.0009 | 0.11 | 0.3837 | -0.0004 | -0.04 | IC |
| 4ENAGB | | 0.1297 | -0.0037 | -0.43 | 0.3847 | 0.0006 | 0.05 | WD |
| 4FH33L | | 0.1293 | -0.0041 | -0.47 | 0.3567 | -0.0274 | -2.41 | OE |
| 4FXEUY | | 0.1180 | -0.0154 | -1.78 | 0.3913 | 0.0072 | 0.64 | WD |
| 4RBLHC | | 0.1303 | -0.0031 | -0.35 | 0.3860 | 0.0019 | 0.17 | OE |
| 7QM6C9 | | 0.1373 | 0.0039 | 0.45 | 0.4017 | 0.0176 | 1.54 | GD |
| 7U8WPW | | 0.1173 | -0.0161 | -1.85 | 0.3670 | -0.0171 | -1.50 | OE |
| 8BQC4D | X | 0.1643 | 0.0309 | 3.57 | 0.3740 | -0.0101 | -0.88 | OE |
| 92HXX6 | | 0.1310 | -0.0024 | -0.28 | 0.3787 | -0.0054 | -0.48 | OE |
| 9FHNTG | * | 0.1603 | 0.0269 | 3.10 | 0.3927 | 0.0086 | 0.75 | OE |
| 9FHNV3 | | 0.1353 | 0.0019 | 0.22 | 0.3777 | -0.0064 | -0.56 | IC |
| A3UWRD | | 0.1237 | -0.0097 | -1.12 | 0.3797 | -0.0044 | -0.39 | WD |
| AFJTVW | | 0.1440 | 0.0106 | 1.22 | 0.3760 | -0.0081 | -0.71 | OE |
| AQEZQG | | 0.1250 | -0.0084 | -0.97 | 0.4050 | 0.0209 | 1.84 | OE |
| BEHMLG | | 0.1360 | 0.0026 | 0.30 | 0.3883 | 0.0042 | 0.37 | IC |
| CBV64V | | 0.1253 | -0.0081 | -0.93 | 0.3757 | -0.0084 | -0.74 | WD |
| CVN2NW | | 0.1503 | 0.0169 | 1.95 | 0.3730 | -0.0111 | -0.97 | OE |
| DAVP2H | | 0.1403 | 0.0069 | 0.80 | 0.4037 | 0.0196 | 1.72 | GD |
| DNEANX | | 0.1373 | 0.0039 | 0.45 | 0.3793 | -0.0048 | -0.42 | OE |
| DQ694G | | 0.1447 | 0.0113 | 1.30 | 0.3903 | 0.0062 | 0.55 | XX |
| DVH8HV | | 0.1310 | -0.0024 | -0.27 | 0.3792 | -0.0049 | -0.43 | OE |
| EUYU6H | | 0.1357 | 0.0023 | 0.26 | 0.3880 | 0.0039 | 0.34 | OE |
| EYCN8U | | 0.1293 | -0.0041 | -0.47 | 0.3860 | 0.0019 | 0.17 | WD |
| F2Z9PJ | X | 0.0997 | -0.0337 | -3.89 | 0.3357 | -0.0484 | -4.25 | OE |
| FMFW42 | | 0.1320 | -0.0014 | -0.16 | 0.3790 | -0.0051 | -0.45 | WD |
| FPKEEQ | | 0.1370 | 0.0036 | 0.41 | 0.3793 | -0.0048 | -0.42 | OE |
| GA4QPT | | 0.1250 | -0.0084 | -0.97 | 0.3850 | 0.0009 | 0.08 | OE |
| GEYKMU | | 0.1300 | -0.0034 | -0.39 | 0.3873 | 0.0032 | 0.28 | DR |
| GFAA2Z | X | 0.1277 | -0.0057 | -0.66 | 0.3423 | -0.0418 | -3.66 | OE |
| GTLQXX | | 0.1300 | -0.0034 | -0.39 | 0.3817 | -0.0024 | -0.21 | XR |
| H6PHTG | | 0.1273 | -0.0061 | -0.70 | 0.3737 | -0.0104 | -0.91 | OE |
| J8TMT9 | | 0.1443 | 0.0109 | 1.26 | 0.3997 | 0.0156 | 1.37 | OE |
| JCNGPN | | 0.1264 | -0.0070 | -0.81 | 0.3800 | -0.0041 | -0.36 | OE |
| JE8NZ6 | X | 0.1900 | 0.0566 | 6.53 | 0.3067 | -0.0774 | -6.79 | ED |
| JK34ZD | | 0.1330 | -0.0004 | -0.05 | 0.3827 | -0.0014 | -0.12 | OE |
| L93EYU | | 0.1167 | -0.0167 | -1.93 | 0.3717 | -0.0124 | -1.09 | OE |
| LARLEK | | 0.1323 | -0.0011 | -0.12 | 0.3813 | -0.0028 | -0.24 | ED |
| LTN7XQ | | 0.1250 | -0.0084 | -0.97 | 0.3743 | -0.0098 | -0.86 | OE |
| LXDNAG | | 0.1300 | -0.0034 | -0.39 | 0.3733 | -0.0108 | -0.94 | OE |
| MFGK97 | | 0.1300 | -0.0034 | -0.39 | 0.3777 | -0.0064 | -0.56 | OE |
| MK8UH6 | | 0.1457 | 0.0123 | 1.41 | 0.4043 | 0.0202 | 1.78 | OE |
| NN2B94 | | 0.1380 | 0.0046 | 0.53 | 0.3793 | -0.0048 | -0.42 | OE |
| PNZME7 | | 0.1390 | 0.0056 | 0.64 | 0.4110 | 0.0269 | 2.36 | OE |
| QE64D4 | | 0.1353 | 0.0019 | 0.22 | 0.3703 | -0.0138 | -1.21 | OE |
| QQJC2G | * | 0.1340 | 0.0006 | 0.07 | 0.4170 | 0.0329 | 2.89 | GD |
| QQJCZV | X | 0.3957 | 0.2623 | 30.24 | 0.1393 | -0.2448 | -21.48 | DR |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals

Analysis 188

Chemical Analysis Element #9 - Corrosion Resistant Steel - Percent
MOLYBDENUM (Mo)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| QUJCD8 | X | 0.1253 | -0.0081 | -0.93 | 0.3257 | -0.0584 | -5.13 | OE |
| QZAX8E | | 0.1330 | -0.0004 | -0.05 | 0.3810 | -0.0031 | -0.27 | OE |
| RWP8JV | | 0.1313 | -0.0021 | -0.24 | 0.3790 | -0.0051 | -0.45 | OE |
| TFU3UY | | 0.1490 | 0.0156 | 1.80 | 0.3820 | -0.0021 | -0.18 | OE |
| TMQ8D2 | | 0.1309 | -0.0025 | -0.29 | 0.3857 | 0.0016 | 0.14 | ED |
| TV9F2X | | 0.1270 | -0.0064 | -0.74 | 0.3797 | -0.0044 | -0.39 | WD |
| U97YXF | | 0.1520 | 0.0186 | 2.14 | 0.3840 | -0.0001 | -0.01 | OE |
| VDGAQA | | 0.1347 | 0.0013 | 0.14 | 0.3867 | 0.0026 | 0.23 | OE |
| VGGKLA | | 0.1373 | 0.0039 | 0.45 | 0.4027 | 0.0186 | 1.63 | OE |
| WDVVXQ | | 0.1287 | -0.0047 | -0.55 | 0.3810 | -0.0031 | -0.27 | WD |
| WZ7YYE | | 0.1333 | -0.0001 | -0.01 | 0.3900 | 0.0059 | 0.52 | ED |
| WZBJLG | | 0.1343 | 0.0009 | 0.11 | 0.3977 | 0.0136 | 1.19 | XX |
| X9HM4Z | | 0.1233 | -0.0101 | -1.16 | 0.3700 | -0.0141 | -1.24 | AA |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.1334 | Percent | 0.3841 | Percent |
| Std Dev Btwn Labs | 0.0087 | Percent | 0.0114 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 56 of 62 reporting participants

Comments on assigned Data Flags for Analysis #188

WebCode Flag Analyst Comment

8BQC4D X Data for sample M31 are high.

F2Z9PJ X Data for both samples are low.

GFAA2Z X Data for sample M32 are low.

JE8NZ6 X Data for sample M31 are high and data for sample M32 are low. Inconsistent within the determinations of both samples.

QQJCZV X Extreme Data.

QUJCD8 X Data for sample M32 are low.

Cycle 112
4th Q, 2015

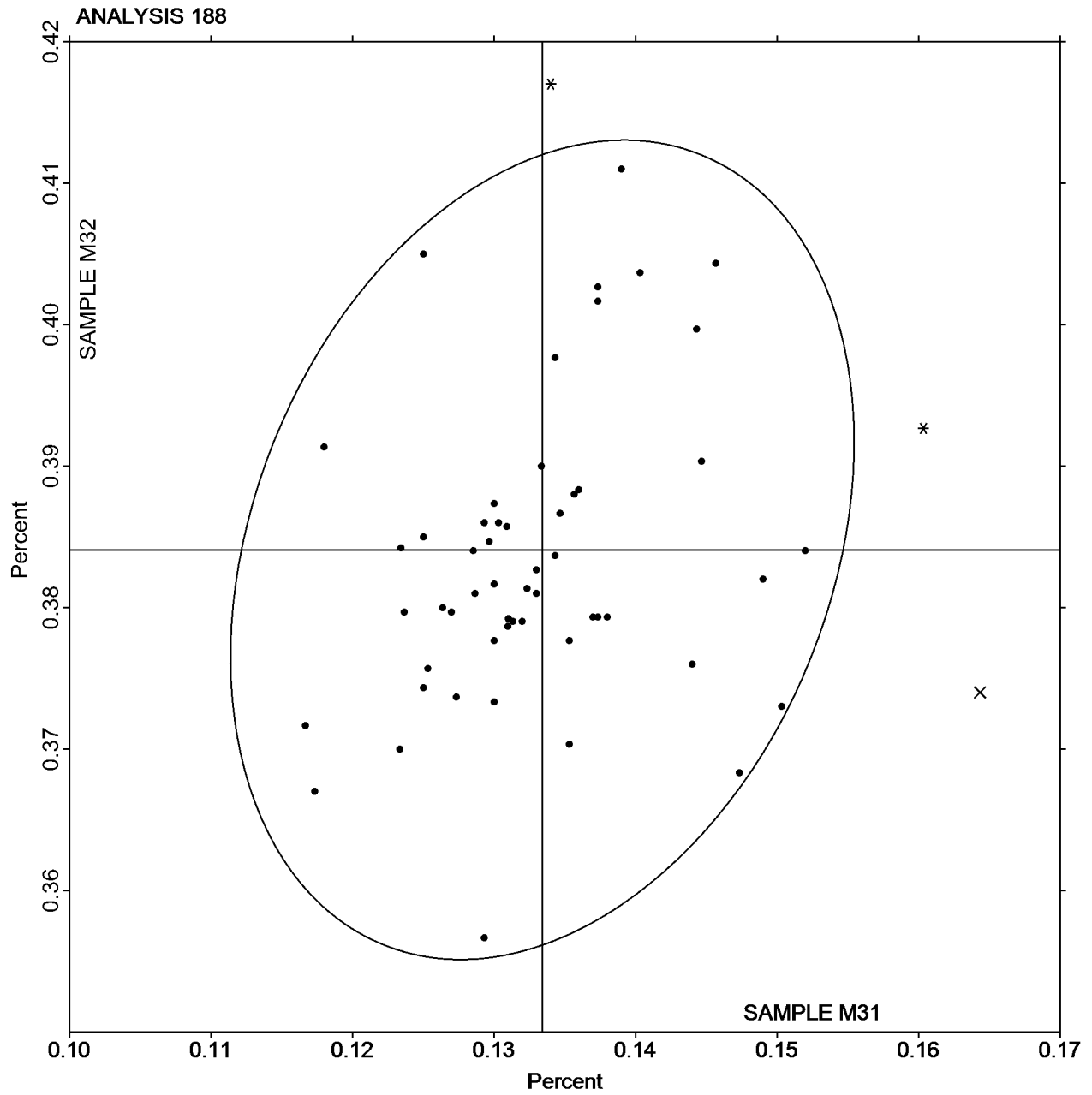
Interlaboratory Testing Program for Metals

Analysis 188

Chemical Analysis Element #9 - Corrosion Resistant Steel - Percent
MOLYBDENUM (Mo)

SAMPLE M31
0.1334 Percent

SAMPLE M32
0.3841 Percent



Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 189

Chemical Analysis Element #10 - Corrosion Resistant Steel - Percent
VANADIUM (V)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| 2RZXEN | | 0.0492 | -0.0016 | -0.29 | 0.0815 | 0.0007 | 0.17 | IC |
| 33UTRA | | 0.0550 | 0.0042 | 0.78 | 0.0860 | 0.0053 | 1.20 | OE |
| 3H4G3P | | 0.0547 | 0.0039 | 0.71 | 0.0810 | 0.0003 | 0.06 | OE |
| 4B636U | | 0.0507 | -0.0001 | -0.02 | 0.0860 | 0.0053 | 1.20 | IC |
| 4ENAGB | | 0.0448 | -0.0060 | -1.10 | 0.0774 | -0.0034 | -0.76 | WD |
| 4FXEUY | | 0.0458 | -0.0049 | -0.91 | 0.0773 | -0.0034 | -0.77 | WD |
| 4RBLHC | | 0.0530 | 0.0022 | 0.41 | 0.0820 | 0.0013 | 0.29 | OE |
| 7QM6C9 | | 0.0397 | -0.0111 | -2.04 | 0.0730 | -0.0077 | -1.76 | GD |
| 7U8WPW | | 0.0475 | -0.0033 | -0.60 | 0.0800 | -0.0007 | -0.17 | OE |
| 8BQC4D | | 0.0540 | 0.0032 | 0.59 | 0.0810 | 0.0003 | 0.06 | OE |
| 92HXX6 | | 0.0520 | 0.0012 | 0.22 | 0.0840 | 0.0033 | 0.74 | OE |
| 9FHNTG | X | 0.0293 | -0.0214 | -3.94 | 0.0600 | -0.0207 | -4.71 | OE |
| 9FHNV3 | | 0.0557 | 0.0049 | 0.90 | 0.0857 | 0.0049 | 1.12 | IC |
| A3UWRD | | 0.0430 | -0.0078 | -1.43 | 0.0770 | -0.0037 | -0.85 | WD |
| AFJTVW | | 0.0573 | 0.0066 | 1.20 | 0.0812 | 0.0005 | 0.11 | OE |
| AQEZQG | | 0.0590 | 0.0082 | 1.51 | 0.0883 | 0.0076 | 1.73 | OE |
| BEHMLG | | 0.0477 | -0.0030 | -0.56 | 0.0787 | -0.0021 | -0.47 | IC |
| CBV64V | | 0.0467 | -0.0041 | -0.76 | 0.0800 | -0.0007 | -0.17 | WD |
| CVN2NW | * | 0.0359 | -0.0149 | -2.74 | 0.0680 | -0.0127 | -2.89 | OE |
| DAVP2H | | 0.0470 | -0.0038 | -0.69 | 0.0783 | -0.0024 | -0.54 | XX |
| DNEANX | | 0.0550 | 0.0042 | 0.78 | 0.0823 | 0.0016 | 0.36 | OE |
| DQ694G | | 0.0477 | -0.0031 | -0.57 | 0.0800 | -0.0007 | -0.17 | XX |
| DVH8HV | | 0.0476 | -0.0032 | -0.58 | 0.0764 | -0.0043 | -0.98 | OE |
| EUYU6H | | 0.0521 | 0.0014 | 0.25 | 0.0837 | 0.0030 | 0.68 | OE |
| EYCN8U | | 0.0530 | 0.0022 | 0.41 | 0.0770 | -0.0037 | -0.85 | OE |
| F2Z9PJ | | 0.0607 | 0.0099 | 1.82 | 0.0843 | 0.0036 | 0.82 | OE |
| FMFW42 | | 0.0518 | 0.0010 | 0.18 | 0.0840 | 0.0033 | 0.74 | WD |
| FPKEEQ | | 0.0477 | -0.0031 | -0.57 | 0.0860 | 0.0053 | 1.20 | OE |
| GA4QPT | | 0.0490 | -0.0018 | -0.33 | 0.0750 | -0.0057 | -1.30 | OE |
| GEYKMU | | 0.0530 | 0.0022 | 0.41 | 0.0810 | 0.0003 | 0.06 | DR |
| GFAA2Z | | 0.0547 | 0.0039 | 0.71 | 0.0837 | 0.0029 | 0.67 | OE |
| GTLQXX | | 0.0480 | -0.0028 | -0.51 | 0.0790 | -0.0017 | -0.39 | XR |
| H6PHTG | | 0.0537 | 0.0029 | 0.53 | 0.0887 | 0.0079 | 1.80 | OE |
| J8TMT9 | | 0.0580 | 0.0072 | 1.33 | 0.0797 | -0.0011 | -0.24 | OE |
| JE8NZ6 | | 0.0467 | -0.0041 | -0.76 | 0.0767 | -0.0041 | -0.92 | ED |
| JK34ZD | | 0.0500 | -0.0008 | -0.14 | 0.0757 | -0.0051 | -1.15 | OE |
| L93EYU | | 0.0467 | -0.0041 | -0.76 | 0.0767 | -0.0041 | -0.92 | OE |
| LTN7XQ | * | 0.0657 | 0.0149 | 2.74 | 0.0940 | 0.0133 | 3.01 | OE |
| LXDNAG | | 0.0500 | -0.0008 | -0.14 | 0.0800 | -0.0007 | -0.17 | OE |
| MFGK97 | | 0.0543 | 0.0036 | 0.65 | 0.0833 | 0.0026 | 0.59 | OE |
| MK8UH6 | | 0.0550 | 0.0042 | 0.78 | 0.0817 | 0.0009 | 0.21 | OE |
| NN2B94 | * | 0.0440 | -0.0068 | -1.25 | 0.0843 | 0.0036 | 0.82 | OE |
| PNZME7 | | 0.0492 | -0.0016 | -0.30 | 0.0791 | -0.0016 | -0.36 | XX |
| QE64D4 | | 0.0540 | 0.0032 | 0.59 | 0.0750 | -0.0057 | -1.30 | OE |
| QQJC2G | | 0.0470 | -0.0038 | -0.69 | 0.0813 | 0.0006 | 0.14 | GD |
| QUJCD8 | | 0.0537 | 0.0029 | 0.53 | 0.0840 | 0.0033 | 0.74 | OE |
| QZAX8E | | 0.0402 | -0.0106 | -1.95 | 0.0800 | -0.0008 | -0.17 | OE |
| TFU3UY | | 0.0583 | 0.0076 | 1.39 | 0.0823 | 0.0016 | 0.36 | OE |
| TV9F2X | | 0.0530 | 0.0022 | 0.41 | 0.0850 | 0.0043 | 0.97 | OE |

Cycle 112
4th Q, 2015

Interlaboratory Testing Program for Metals
Analysis 189

Chemical Analysis Element #10 - Corrosion Resistant Steel - Percent
VANADIUM (V)

| WebCode | Data Flag | Sample M31 | | | Sample M32 | | | Method |
|---------|-----------|------------|-----------------------|-------|------------|-----------------------|-------|--------|
| | | Lab Mean | Diff. from Grand Mean | CPV | Lab Mean | Diff. from Grand Mean | CPV | |
| U97YXF | | 0.0448 | -0.0059 | -1.09 | 0.0770 | -0.0037 | -0.85 | OE |
| VDGAQA | | 0.0550 | 0.0042 | 0.78 | 0.0780 | -0.0027 | -0.62 | OE |
| VGGKLA | | 0.0507 | -0.0001 | -0.02 | 0.0770 | -0.0037 | -0.85 | OE |
| WDWVXQ | | 0.0547 | 0.0039 | 0.71 | 0.0833 | 0.0026 | 0.59 | WD |
| WZ7YYE | X | 0.0900 | 0.0392 | 7.21 | 0.0733 | -0.0074 | -1.68 | ED |
| WZBJLG | | 0.0510 | 0.0002 | 0.04 | 0.0827 | 0.0019 | 0.44 | XX |
| X9HM4Z | | 0.0477 | -0.0031 | -0.57 | 0.0750 | -0.0057 | -1.30 | AA |

Summary Statistics

| | Sample M31 | | Sample M32 | |
|-------------------|------------|---------|------------|---------|
| Grand Means | 0.0508 | Percent | 0.0807 | Percent |
| Std Dev Btwn Labs | 0.0054 | Percent | 0.0044 | Percent |

Samples M31 , M32 : AISI 321, two different heats

Statistics based on 54 of 56 reporting participants

Comments on assigned Data Flags for Analysis #189

WebCode Flag Analyst Comment

9FHNTG X Data for both samples are low.

WZ7YYE X Data for sample M31 are high. Inconsistent within the determinations of sample M31.

Cycle 112
4th Q, 2015

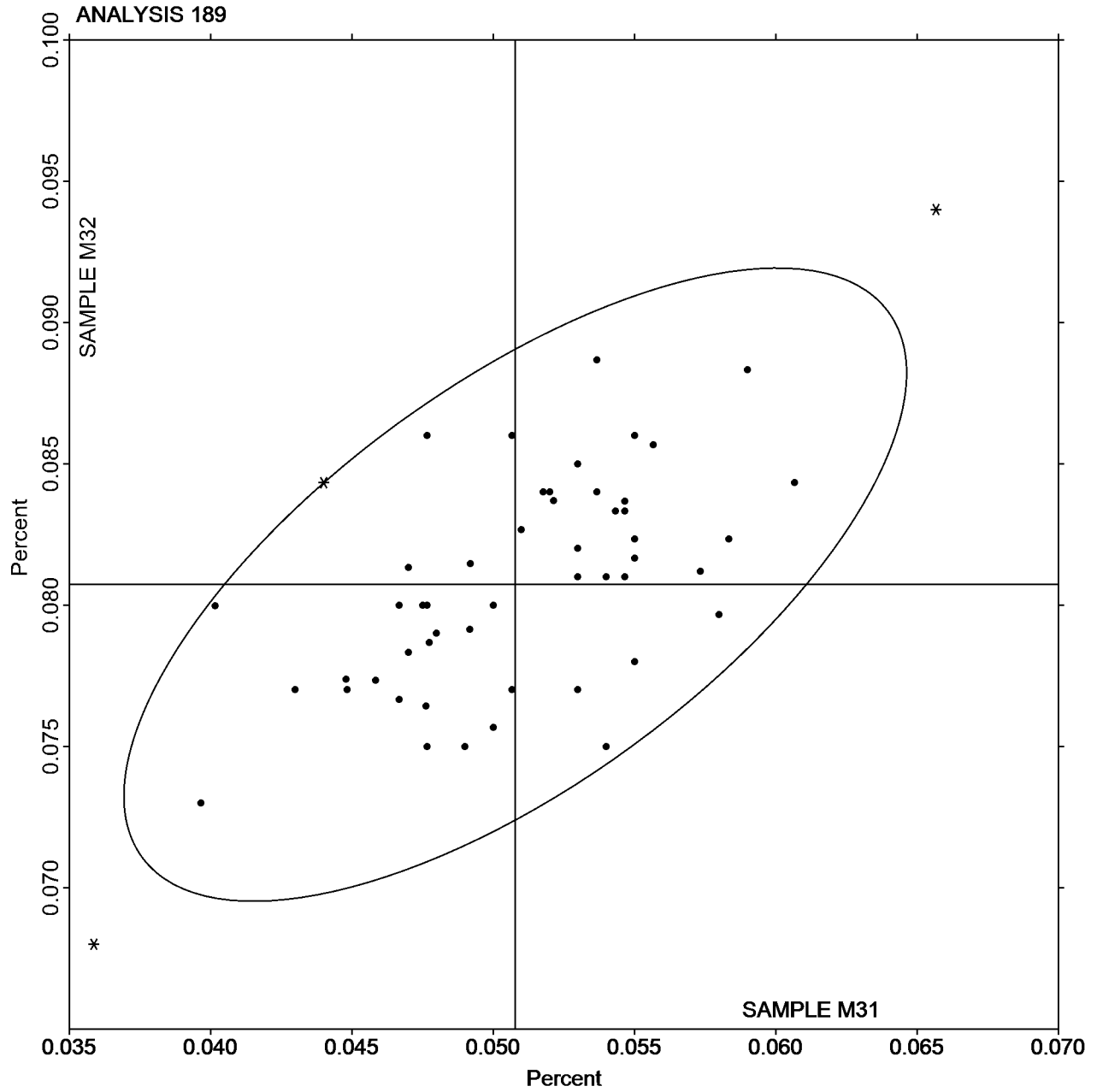
Interlaboratory Testing Program for Metals

Analysis 189

Chemical Analysis Element #10 - Corrosion Resistant Steel - Percent
VANADIUM (V)

SAMPLE M31
0.0508 Percent

SAMPLE M32
0.0807 Percent



Instrument and Method Code List - Cycle 112

Instrument and Method information as provided by laboratories

Instruments are no longer tracked for analyses 105-148

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

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| BD | By Difference |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| EL | Electrochemistry |
| GD | Spectrometry - Glow Discharge (GDS) |
| GR | Gravimetry |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element |

161: Copper-based Alloy, Element #2 - ALUMINUM (Al)

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|--|
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element |

162: Copper-based Alloy, Element #3 - IRON (Fe)

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

163: Copper-based Alloy, Element #4 - MANGANESE (Mn)

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|--|
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XX | Please Indicate Method Used for Current Element |

164: Copper-based Alloy, Element #5 - NICKEL (Ni)

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

165: Copper-based Alloy, Element #6 - TIN (Sn)

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|---|
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |

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

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|---|
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |

167: Copper-based Alloy, Element #8 - ZINC (Zn)

| <u>Instrument code</u> | <u>Description</u> |
|------------------------|---|
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |

180: Corrosion Resistant Steel, Element #1 - CARBON (C)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|---|
| CI | Combustion / IR |
| CO | Combustion |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IR | IR (Absorbstion / Detection) |
| OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |

181: Corrosion Resistant Steel, Element #2 - MANGANESE (Mn)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

182: Corrosion Resistant Steel, Element #3 - PHOSPHORUS (P)

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

183: Corrosion Resistant Steel, Element #4 - TITANIUM (Ti)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

184: Corrosion Resistant Steel, Element #5 - SILICON (Si)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

185: Corrosion Resistant Steel, Element #6 - NITROGEN (N)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|---|
| CI | Combustion / IR |
| CO | Combustion |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| IR | IR (Absorbstion / Detection) |
| OE | Spectrometry - Optical Emission (OES) |
| XX | Please Indicate Method Used for Current Element |

186: Corrosion Resistant Steel, Element #7 - NICKEL (Ni)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WC | Wet Chemistry |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

187: Corrosion Resistant Steel, Element #8 - CHROMIUM (Cr)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| TI | Titrimetry |
| WC | Wet Chemistry |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

188: Corrosion Resistant Steel, Element #9 - MOLYBDENUM (Mo)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

189: Corrosion Resistant Steel, Element #10 - VANADIUM (V)

| <u>Method Code</u> | <u>Description</u> |
|--------------------|--|
| AA | Spectrometry - Atomic Absorption (AAS) |
| DR | Spectrometry - Direct Reading OE (DROES) |
| ED | X-Ray Fluorescence - Energy Dispersive (EDX) |
| GD | Spectrometry - Glow Discharge (GDS) |
| IC | Spectrometry - Inductively Coupled Plasma (ICP) |
| OE | Spectrometry - Optical Emission (OES) |
| WD | X-Ray Fluorescence - Wavelength Dispersive (WDX) |
| XR | X-Ray Fluorescence - ED or WD not specified |
| XX | Please Indicate Method Used for Current Element |

Key for Fasteners & Metals Program Web Summary Report

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

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

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

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

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

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

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

Data Flags

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

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