# ARMI MBH

Certified Reference Material

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## Certificate of Analysis

ISO ISO ISO/IEC 17034:2016 17025:2017 9001:2015

Revision No.: 000

Revision Date: 11/14/2022

## Product ID: IARM-FED6AC-22

# Product Description: Alloy Steel, Welding Wire, D6-AC / K24728

Description and Intended Use: This Certified Reference Material is covered under the scope of accreditation to ISO 17034 by LGC Standards - Manchester, NH. As an ISO 17034 certified reference material, appropriate use of this material will fulfill the certified reference material and traceability requirements for use in ISO 17025 accredited laboratories. This CRM may come in the form of a solid disk, or chips. The intended use of this CRM may include, but is not limited to, the calibration of instruments and the validation of analytical methods. . . . . . ..

Certified Values listed in wt.% with associated uncertainties												
Al	0.035	±0.001	Cr	1.02	±0.01	Nb	0.0037	±0.0005	Sn	0.0019	± 0.0004	
As	0.0031	±0.0004	Cu	0.036	±0.001	Ni	0.539	±0.008	Ti	0.0021	± 0.0002	
В	0.00023	±0.00007	Mn	0.82	±0.01	0	0.0010	±0.0007	V	0.108	± 0.002	
С	0.471	±0.009	Мо	0.98	±0.02	Р	0.0068	±0.0006	W	0.0026	± 0.0009	
Co	0.0050	±0.0005	Ν	0.0038	±0.0008	Si	0.260	±0.005				

### Indicative Values listed in ppm

Pb (20) S (19)

Homogeneity and Uncertainty: "Uncertainty" values, as reported adjacent to certified concentration values, are based on a 95% Confidence Interval. These estimated uncertainties include the combined effects of method imprecision, material inhomogeneity, and any bias between methods. Homogeneity data from experimental XRF results are reflected in both the overall statistics and certified data. Homogeneity samples are selected by a systematic sampling procedure. The number of samples may be determined by equation 1, where Nprod is the number of units produced and Nmin is the number of samples used for homogeneity testing. These samples are arranged in a simple randomized design such that each sample is analyzed multiple times by XRF. Homogeneity may also be determined within sample using an applied version of ASTM E826. A single factor ANOVA is used to calculated uncertainty due to inhomogeneity (Uhom). Uncertainty of the material is calculated by equation 2, where H=U<sub>hom</sub>, S= Standard deviation, t= t-value at 95% CI, and n= number of observations.

$$1.N_{MIN} = \max(10, \sqrt[3]{N_{PROD}})$$

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$$2.U_{CRM} = \frac{\sqrt{H^2 + S^2}}{\sqrt{n}} * t$$

Certification Laboratories: Much of the analytical work performed to assess this material has been carried out by laboratories with proven competence, as indicated by their accreditation to ISO 17025. It is an implicit requirement for this accreditation that analytical work should be performed with due traceability, via an unbroken chain of comparisons, each with stated uncertainty, to primary standards such as the mole, or to nationally- or internationally-recognised reference materials. Of the individual results herein, some have traceability (to the mole) via primary analytical methods. Some are traceable to substances of known stoichiometry. Most have traceability via commercial solutions. Furthermore, some results have additional traceability to NIST standards, as part of the analytical calibration or process control.

Eurofins EAG Laboratories - Liverpool, NY .

- AnchorCert Analytical Birmingham, England
- Applied Technical Services Marietta, GA
- Cleveland Cliffs West Chester, OH
- Connecticut Metallurgical, Inc. East Hartford, CT
- Dirats Laboratories Westfield, MA
- IMR Test Labs Louisville, KY . LGC Standards - Manchester, NH
- Lithea S.R.O. - Brno, Czech Republic

14 November 2022

**Certification Date** 

- Luvak Inc Boylston, MA
- New Hampshire Materials Laboratory Inc Somersworth, NH NSL Analytical Services - Cleveland, OH
- . Scrooby's Laboratory Service Pty Ltd - Benoni, South Africa
- SGS MSi Melrose Park, IL
- . TCR Engineering - Navi Mumbai, India
- Instructions for Use: The test surface is on the opposite side of the labeled surface, which includes the material identification. The entire thickness of the unit is certified. However, the user is cautioned not to measure disks less than 2 mm thick when using X-ray fluorescence spectrometry. Each packaged disk has been prepared by finishing the test surface using a lathe. The user must determine the correct surface preparation procedure for each analytical technique. The user is cautioned to use care when either resurfacing the disk or performing additional polishing, as these processes may contaminate the surface. The minimum sample size for chips should be individually evaluated based on the analytical technique used; this would typically be greater than 0.1 grams. The material should be stored in a cool, dry location when not in use.

Chips are not recommended for gas analysis.

Period of Validity: The certification of this material is valid indefinitely, within the uncertainty specified, provided the material is handled and stored in accordance with the instructions stated on this certificate. The certification is nullified if the material is damaged, contaminated, otherwise modified, or used in a manner for which it was not intended.

Gordren

Chuck Goudreau, Certifying Officer

Conditions of Sale and Supply: All CRMs & RMs sold are subject to applicable LGC Standard Terms and Conditions of Sale.



ISO 17034 Accredited: Reference Materials Producer, Certificate # 2848.02 ISO/IEC 17025 Accredited: Chemical Testing, Certificate # 2848.01



### The following data represents all pertinent information reported as it applies to the chemical characterization of this material.

	Al	Δ	s	В	С	Co	Cr	Cu	Mn	Мо	N	Nb
1	0.0290	0.0		0.00009	0.4410	0.0030	0.9560	0.0308	0.7730	0.9080	0.0020	0.0020
2	0.0315	0.0		0.00020	0.4490	0.0032	0.9640	0.0320	0.7810	0.9200	0.0028	0.0020
3	0.0320	0.0		0.00020	0.4580	0.0035	0.9870	0.0340	0.7860	0.9280	0.0032	0.0020
4	0.0330	0.0		0.00020	0.4640	0.0042	1.0000	0.0341	0.7950	0.9400	0.0041	0.0024
5	0.0330	0.0		0.00026	0.4670	0.0045	1.0000	0.0345	0.8000	0.9470	0.0043	0.0025
6	0.0330	0.0		0.00030	0.4700	0.0046	1.0020	0.0349	0.8040	0.9500	0.0044	0.0029
7	0.0332	0.0	030	0.00033	0.4700	0.0050	1.0086	0.0350	0.8160	0.9644	0.0045	0.0030
8	0.0340		030	<0.0005	0.4710	0.0051	1.0100	0.0350	0.8160	0.9672	0.0048	0.0036
9	0.0340	0.0	030	<0.0005	0.4710	0.0051	1.0120	0.0351	0.8200	0.9770		0.0040
10	0.0346	0.0	031	<0.0005	0.4730	0.0052	1.0140	0.0354	0.8217	0.9808		0.0040
11	0.0348	0.0	034	<0.001	0.4740	0.0055	1.0160	0.0358	0.8270	0.9812		0.0040
12	0.0350	0.0	035	<0.001	0.4770	0.0055	1.0200	0.0360	0.8270	0.9930		0.0040
13	0.0350	0.0	038	<0.001	0.4810	0.0056	1.0203	0.0360	0.8320	0.9950		0.0041
14	0.0350	0.0		<0.0010	0.4950	0.0056	1.0240	0.0360	0.8350	0.9950		0.0042
15	0.0353	0.0		<0.002	0.5040	0.0057	1.0240	0.0361	0.8370	0.9960		0.0046
16	0.0358	0.0				0.0057	1.0268	0.0363	0.8389	0.9960		0.0046
17	0.0361	<0.0				0.0060	1.0340	0.0370	0.8390	0.9980		0.0047
18	0.0364	<0.				0.0060	1.0360	0.0390	0.8400	1.0000		0.0051
19	0.0367	<0.0				0.0063	1.0540	0.0390	0.8400	1.0010		0.0053
20	0.0375	<0				< 0.01	1.0600	0.0395	0.8410	1.0090		0.0056
21	0.0410	<0	.01			<0.01	1.0700	0.0400	0.8424	1.0150		< 0.001
22	0.0419						1.0700	0.0410	0.8430	1.0200		<0.01
23								0.0431	0.8513	1.0400		
24										1.0450		
Mean	0.0349	0.0		0.00023	0.4710	0.0050	1.0186	0.0363	0.8220	0.9819	0.0038	0.0037
STDV	0.0029	0.0		0.00008	0.0157	0.0010	0.0293	0.0028	0.0222	0.0356	0.0010	0.0011
Certified	0.035	0.0		0.00023	0.471	0.0050	1.02	0.036	0.82	0.98	0.0038	0.0037
UCRM	0.001	0.0		0.00007	0.009	0.0005	0.01	0.001	0.01	0.02	0.0008	0.0005
Methods												
moulous	I,G,IM,O,X	I,G,IM,	U,A,X	I,G,IM,O	C,I,G,O	I,G,IM,O,X	I,G,O,X	I,IM,O,X	I,G,O,X	I,G,O,X	C,F,I,O	I,G,IM,O,X
monous	Ni	0	0,A,X P		Pb	I,G,IM,O,X	I,G,O,X Si	1,1101,O,X	Ti		<b>V</b>	W
1	Ni										V	
	Ni	0	P	13 0.	Pb	S	Si	Sn	Ti	013 0.1	<b>V</b> 1000 (	W
1	<b>Ni</b> 0.5000	<b>O</b> 0.00030	P 0.004 0.005 0.005	13 0. 52 0. 57 0.	<b>Pb</b> 0008	<b>S</b> 0.0007	<b>Si</b> 0.2390	<b>Sn</b> 0.0010	<b>Ti</b>	013 0.° 017 0.°	<b>V</b> 1000 (0 1000 (0	<b>W</b> 0.0008
1 2 3 4	Ni 0.5000 0.5020 0.5050 0.5160	0.00030 0.00052	P 0.004 0.005 0.005 0.005	13         0.           52         0.           57         0.           59         0.	Pb 0008 0009 0010 0011	<b>S</b> 0.0007 0.0009 0.0010 0.0015	<b>Si</b> 0.2390 0.2460 0.2500 0.2500	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012	Ti 0.00 0.00 0.00 0.00	013 0. 017 0. 017 0. 017 0.	V 1000 ( 1000 ( 1020 ( 1031 (	W 0.0008 0.0010 0.0011 0.0020
1 2 3 4 5	Ni 0.5000 0.5020 0.5050 0.5160 0.5219	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.005	13         0.           52         0.           57         0.           59         0.           51         0.	Pb 0008 0009 0010 0011 0012	<b>S</b> 0.0007 0.0009 0.0010 0.0015 0.0017	<b>Si</b> 0.2390 0.2460 0.2500 0.2500 0.2509	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012	Ti 0.00 0.00 0.00 0.00 0.00	D13         0.           D17         0.           D17         0.           D18         0.           D19         0.	V 1000 ( 1000 ( 1020 ( 1031 ( 1040 (	W 0.0008 0.0010 0.0011 0.0020 0.0022
1 2 3 4 5 6	Ni 0.5000 0.5020 0.5050 0.5160 0.5219 0.5228	0.00030 0.00052 0.00080 0.00086	P 0.004 0.005 0.005 0.005 0.005 0.006 0.006	13         0.           52         0.           57         0.           59         0.           51         0.	Pb           0008           0009           0010           0011           0012           0030	<b>S</b> 0.0007 0.0009 0.0010 0.0015 0.0017 0.0018	<b>Si</b> 0.2390 0.2460 0.2500 0.2500 0.2509 0.2509 0.2530	<b>Sn</b> 0.0010 0.0011 0.0011 0.0012 0.0012 0.0013	Ti 0.00 0.00 0.00 0.00 0.00 0.00	013         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.	V 1000 (0 1000 (0 1020 (0 1031 (0 1040 (0 1050 (0	W 0.0008 0.0010 0.0011 0.0020 0.0022 0.0023
1 2 3 4 5 6 7	Ni 0.5000 0.5020 0.5050 0.5160 0.5219 0.5228 0.5300	<b>O</b> 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006	13         0.           52         0.           57         0.           59         0.           51         0.           52         0.	Pb           0008           0009           0010           0011           0012           0030	<b>S</b> 0.0007 0.0009 0.0010 0.0015 0.0017 0.0018 0.0020	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530	<b>Sn</b> 0.0010 0.0011 0.0012 0.0012 0.0012 0.0013	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	013         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.           020         0.	V         000         0           1000         0         0         0           1020         0         0         0           1031         0         0         0           1040         0         0         0           1050         0         0         0	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030
1 2 3 4 5 6 7 8	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350	<b>O</b> 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006	13         0.           52         0.           57         0.           59         0.           51         0.           52         0.           53         0.           54         0.           55         0.           52         0.           52         0.           52         0.	Pb         0008           0009         0010           0011         0012           0030         0030           0050         0	<b>S</b> 0.0007 0.0009 0.0010 0.0015 0.0017 0.0018 0.0020 0.0022	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2542	<b>Sn</b> 0.0010 0.0011 0.0012 0.0012 0.0012 0.0013 0.0013 0.0015	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	D13         O.           D17         O.           D17         O.           D18         O.           D19         O.           D19         O.           D20         O.	V         000         0           1000         0         0         0           1000         0         0         0         0           1020         0         0         0         0         0           1031         0	W           0.0008           0.0010           0.0011           0.0020           0.0022           0.0023           0.0030           0.0040
1 2 3 4 5 6 7 8 9	Ni 0.5000 0.5020 0.5050 0.5160 0.5219 0.5228 0.5300 0.5350 0.5380	<b>O</b> 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006	13         0           52         0           57         0           59         0           51         0           52         0           51         0           52         0           52         0           52         0           56         <0	Pb           0008           0009           0010           0011           0012           0030           0030           0050           00005	<b>S</b> 0.0007 0.0009 0.0010 0.0015 0.0017 0.0018 0.0020 0.0022 0.0026	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	D13         O.           D17         O.           D17         O.           D18         O.           D19         O.           D19         O.           D20         O.           D20         O.           D20         O.	V         000         0           1000         0         0         0           1000         0         0         0         0           1020         0         0         0         0         0           1031         0	W           0.0008           0.0010           0.0011           0.0020           0.0022           0.0030           0.0030           0.0040
1 2 3 4 5 6 7 8 9 10	Ni 0.5000 0.5020 0.5050 0.5160 0.5219 0.5228 0.5300 0.5350 0.5380 0.5400	<b>O</b> 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006	13         0.           52         0.           57         0.           59         0.           51         0.           52         0.           52         0.           52         0.           52         0.           52         0.           56         <0.	Pb           0008           0009           0010           0011           0012           0030           0050           00005	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2542           0.2570           0.2590	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	013         0.13           017         0.           017         0.           018         0.           019         0.           019         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.	V           1000         0           1020         0           1021         0           1031         0           1040         0           1050         0           1060         0           1064         0           1069         0           1074         0	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041
1 2 3 4 5 6 7 8 9 10 11	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.5400           0.5400	<b>O</b> 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006	13         0.           32         0.           37         0.           39         0.           31         0.           32         0.           31         0.           32         0.           36         <0.	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2542           0.2570           0.2590           0.2500	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	D13         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1020         C           1020         C         1031         C           1040         C         1050         C           1050         C         1060         C           1060         C         1064         C           1069         C         1074         C           1084         C         1084         C	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047
1 2 3 4 5 6 7 8 9 10 11 12	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5400           0.5400           0.5400	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006	13         0           32         0           37         0           39         0           31         0           32         0           31         0           32         0           36         <0	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0009           0.0010	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2542           0.2570           0.2590           0.2500	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00	D13         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1040         C           1050         C         1050         C           1060         C         1064         C           1069         C         1074         C           1084         C         1100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1 2 3 4 5 6 7 8 9 10 11 12 13	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5400           0.5400           0.5400           0.5400           0.5410	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006	13         0           13         0           12         0           17         0           19         0           11         0           12         0           131         0           142         0           152         0           166         <0	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0009           0.0010           0.0010	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2503           0.2530           0.2530           0.2542           0.2570           0.2590           0.2500           0.2542           0.2500           0.2500           0.2500           0.2500           0.2542           0.2500           0.2500           0.2600           0.2600           0.2630	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0025	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000	013         0.           017         0.           017         0.           017         0.           019         0.           019         0.           0120         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.	V         1000         (C           1000         (C         1000         (C           1020         (C         1031         (C           1040         (C         1050         (C           1050         (C         1060         (C           1064         (C         1069         (C           1074         (C         1084         (C           1100          1100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1 2 3 4 5 6 7 8 9 10 11 12 13 14	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5400           0.5400           0.5400           0.5410           0.5470	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006	13         0           52         0           57         0           59         0           51         0           52         0           51         0           52         0           52         0           52         0           52         0           56         <0	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0009           0.0010           0.0010           0.0011           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.25030           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2590           0.2600           0.2600           0.2630           0.2640	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0025 0.0027	Ti           0.00	D13         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1040         C           1050         C         1050         C           1060         C         1064         C           1069         C         1074         C           1084         C         1100            1100         1100          1100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5350           0.5350           0.5350           0.5350           0.5400           0.5400           0.5410           0.5470           0.5489	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007	13         0.           52         0.           57         0.           59         0.           51         0.           52         0.           53         0.           54         0.           55         0.           56         <0.	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0009           0.0010           0.0011           0.0011           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.25030           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2500           0.2600           0.2600           0.2630           0.2640           0.2670	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0022 0.0022 0.0027 0.0028	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	D13         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1000         C           1020         C         1010         C           10100         C         10100         C           1050         C         1060         C           1060         C         1064         C           1074         C         10104         C           1100         C         1100         1100           1100         1100         C         1100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5350           0.5350           0.53400           0.5400           0.5410           0.54400           0.54400           0.54400           0.54400	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007	13         0.           13         0.           13         0.           14         0.           15         0.           16         0.           17         0.           18         0.           19         0.           11         0.           12         0.           13         0.           14         0.           15         0.           16         <0.	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2500           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0015 0.0020 0.0020 0.0020 0.0022 0.0022 0.0022 0.0022 0.0022 0.0022	Ti 0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.	D13         0.           D17         0.           D17         0.           D17         0.           D18         0.           D19         0.           D19         0.           D19         0.           D20         0.	V           1000         C           1020         C           1020         C           1031         C           1040         C           1050         C           1060         C           1060         C           1064         C           1074         C           1084         C           1100         1100           1100         1100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5410           0.5470           0.5489           0.5490           0.5500	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007	13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           11         0.           12         0.           132         0.           14         0.           152         0.           166         <0.	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2500           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0015 0.0020 0.0020 0.0020 0.0022 0.0022 0.0022 0.0022 0.0022 0.0022 0.0022 0.0022 0.0020	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           D17         0.           D17         0.           D17         0.           D18         0.           D19         0.           D19         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1000         C           1020         C         1010         C           10100         C         10100         C           10100         C         10100         C           10100         C         1064         C           10104         C         C         10104         C           10104         C         C         10104         C           11100         11100         11100         11100         11100	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5490           0.5500           0.5500	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.00	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           12         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	<b>Sn</b> 0.0010 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0020 0.0025 0.0027 0.0028 0.0030 0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           D17         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D19         0.           D19         0.           D100         0.           D20         0.	V           1000         C           1000         C           1020         C           1020         C           1031         C           1040         C           1050         C           1064         C           1064         C           1074         C           1100         11100           11100         11100           1110         1111	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5410           0.54270           0.5489           0.5500           0.5500           0.5500           0.5510	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.08	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           122         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2500           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	<b>Sn</b> 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0025 0.0027 0.0025 0.0027 0.0028 0.0030 0.0030 0.0030 0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           D17         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D19         0.           D19         0.           D100         0.           D20         0.	V           1000         C           1000         C           1020         C           1020         C           1031         C           1040         C           1050         C           1064         C           1064         C           1074         C           1084         C           1100         11100           1110         1110           1110         1111           1120         1111	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5410           0.54270           0.5489           0.5500           0.5500           0.5500           0.5500           0.5550	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.08	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           122         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	<b>Sn</b> 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0020 0.0025 0.0027 0.0025 0.0027 0.0025 0.0027 0.0028 0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           D17         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D19         0.           D19         0.           D20         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1040         C         1050         C           1050         C         1064         C           1064         C         1074         C           1100         11100         11100         11100           1110         1111         1120         1120	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5500           0.5550           0.5630	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.08	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           122         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	Sn           0.0010           0.0011           0.0012           0.0012           0.0013           0.0015           0.0016           0.0020           0.0020           0.0025           0.0027           0.0030           0.0030           0.0030           0.0030           <0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.           019         0.           019         0.           020         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           21         0.           22         0.           23         0.           24         0.           25         0.           26         0.           29         0.	V           1000         C           1000         C           1020         C           1020         C           1031         C           1040         C           1050         C           1064         C           1064         C           1074         C           1084         C           1100         11100           1110         1110           1110         1111           1120         1111	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5500           0.5500           0.5550           0.5630           0.5630	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.08	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           122         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	<b>Sn</b> 0.0010 0.0011 0.0012 0.0012 0.0013 0.0013 0.0015 0.0016 0.0020 0.0020 0.0020 0.0020 0.0025 0.0027 0.0025 0.0027 0.0025 0.0027 0.0028 0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.           019         0.           019         0.           020         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           21         0.           22         0.           23         0.           24         0.           25         0.           26         0.           29         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1040         C         1050         C           1050         C         1064         C           1064         C         1074         C           1100         11100         11100         11100           1110         1111         1120         1120	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5550           0.5550           0.5630           0.5670           0.5670	O 0.00030 0.00052 0.00080 0.00086 0.00160	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.08	13         0.           13         0.           13         0.           13         0.           14         0.           157         0.           169         0.           171         0.           182         0.           192         0.           11         0.           122         0.           138         <00	Pb           0008           0009           0010           0011           0012           0030           0050           00005           0.0002           0.0010           0.0011           0.0012           0.0010           0.0011           0.002           0.002           0.002           0.002           0.002           0.002           0.002           0.002	\$           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2630           0.2640           0.2670           0.2700           0.2760	Sn           0.0010           0.0011           0.0012           0.0012           0.0013           0.0015           0.0016           0.0020           0.0020           0.0025           0.0027           0.0030           0.0030           0.0030           0.0030           <0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	D13         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.           019         0.           019         0.           020         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           21         0.           22         0.           23         0.           24         0.           25         0.           26         0.           29         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1040         C         1050         C           1050         C         1064         C           1064         C         1074         C           1100         11100         11100         11100           1110         1111         1120         1120	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.0033
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23           24	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5630           0.5630           0.5670           0.5670	0 0.00030 0.00052 0.00080 0.00086 0.00160 0.00200	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.007 0.008 0.009 0.009 0.009 0.009 0.009 0.009	13     0.       13     0.       13     0.       12     0.       10     0.       11     0.       12     0.       13     0.       14     0.       15     0.       16     <0.	Pb           0008           0009           0010           0011           0012           0030           0030           0050           00005           00002           00010           0.0010           0.0011           0.002           0.002           0.002           0.001           0.001           0.002           0.002           0.002           0.002           0.002           0.01           0.01	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2530           0.2542           0.2570           0.2590           0.2600           0.2600           0.2600           0.2630           0.2640           0.2670           0.2760           0.2789           0.2800	Sn           0.0010           0.0011           0.0012           0.0012           0.0013           0.0015           0.0016           0.0020           0.0020           0.0025           0.0025           0.0030           0.0030           <0.0030	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	013         0.           017         0.           017         0.           017         0.           018         0.           019         0.           019         0.           019         0.           020         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           21         0.           22         0.           23         0.           24         0.           25         0.           26         0.           29         0.	V           1000         C           1000         C           1020         C           1020         C           1031         C           1050         C           1050         C           1060         C           1060         C           1060         C           1074         C           1084         C           1100         -           1100         -           1110         -           1110         -           1110         -           1111         -           1120         -           1130         -	W           0.0008           0.0010           0.0011           0.0020           0.0023           0.0030           0.0040           0.0041           0.0047           0.0041           0.0041           0.0041           0.0041           0.0041
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23           24           Mean	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.53400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5500           0.5630           0.5630           0.5670           0.5670           0.5395	0 0.00030 0.00052 0.00080 0.00086 0.00160 0.00200	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.007 0.008 0.009 0.00	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pb 0008 0009 0010 0011 0012 0030 0030 0050 00005 00005 00002 0000 0.0010 0.0011 0.002 0.002 0.002 0.002 0.002 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.002 0.00	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.001	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2530           0.2542           0.2570           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2700           0.2789           0.2800           0.2789           0.2800           0.2789           0.2800	Sn           0.0010           0.0011           0.0012           0.0012           0.0013           0.0013           0.0015           0.0016           0.0020           0.0020           0.0027           0.0030           0.0030           0.0030           <0.001	Ti           0.00	D13         0.           D17         0.           D17         0.           D17         0.           D19         0.           D19         0.           D19         0.           D19         0.           D20         0.           D21         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1050         C         1050         C           1060         C         1060         C           1060         C         1064         C           1074         C         1084         C           1100         -         1100         -           11100         -         1110         -           1110         -         1110         -           1110         -         1110         -           11120         -         -         -           1130         -         -         -           10775         C         -         -	W           0.0008           0.0010           0.0011           0.0020           0.0023           0.0030           0.0040           0.0041           0.0047           0.0041
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23           24           Mean           STDV	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5550           0.5550           0.5630           0.5670           0.5670           0.5670           0.5395           0.0199	0 0.00030 0.00052 0.00080 0.00086 0.00160 0.00200	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.007 0.008 0.008 0.009 <0.009 <0.009 <0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pb 0008 0009 0010 0011 0012 0030 0030 0050 00005 00005 00002 0000 0001 0001	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           <0.0005	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2500           0.2530           0.2530           0.2530           0.2542           0.2570           0.2600           0.2600           0.2600           0.2630           0.2640           0.2670           0.2760           0.2789           0.2800           0.2789           0.2800           0.2800           0.2789           0.2800	Sn           0.0010           0.0011           0.0012           0.0013           0.0013           0.0015           0.0016           0.0020           0.0020           0.0027           0.0030           0.0030           0.0030           0.0030           0.001           <0.001	Ti           0.00	013         0.           017         0.           017         0.           017         0.           019         0.           019         0.           019         0.           019         0.           020         0.           020         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           20         0.           21         0.           22         0.           23         0.           24         0.           25         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22         0.           22	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1050         C         1050         C           1060         C         1060         C           1060         C         1069         C           1074         C         1074         C           1100         1100         1100         11100           11100         11110         11110         11120           11130         I         I         I         I           1075         C         C         C         C	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.003           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23           24           Mean           STDV           Certified	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5550           0.5630           0.5670           0.5670           0.5670           0.5395           0.0199           0.539	0 0.00030 0.00052 0.00080 0.00160 0.00200 0.00200	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.008 0.009 0.009 <0.009 <0.009 0.000 0.009 0.009 0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pb 0008 0009 0010 0011 0012 0030 0030 0050 00005 00005 00002 0000 0.0010 0.0011 0.002 0.002 0.002 0.002 0.002 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.001 0.002 0.00	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           0.0030           <0.001	Si           0.2390           0.2460           0.2500           0.2500           0.2509           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2542           0.2570           0.2590           0.2600           0.2600           0.2600           0.2630           0.2640           0.2760           0.2760           0.2789           0.2800           0.2770           0.2789           0.2800           0.2789           0.2800           0.2595           0.0112           0.260	Sn           0.0010           0.0011           0.0012           0.0013           0.0013           0.0015           0.0016           0.0020           0.0020           0.0025           0.0026           0.0030           0.0030           0.0030           0.001           <0.001	Ti           0.00	013         0.           017         0.           017         0.           017         0.           019         0.           019         0.           019         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           220         0.           23         0.           24         0.           25         0.           02         0.           02         0.           021         0.	V	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.003           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041
1           2           3           4           5           6           7           8           9           10           11           12           13           14           15           16           17           18           19           20           21           22           23           24           Mean           STDV	Ni           0.5000           0.5020           0.5050           0.5160           0.5219           0.5228           0.5300           0.5350           0.5350           0.5380           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5400           0.5500           0.5500           0.5550           0.5550           0.5630           0.5670           0.5670           0.5670           0.5395           0.0199	0 0.00030 0.00052 0.00080 0.00086 0.00160 0.00200	P 0.004 0.005 0.005 0.005 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.006 0.007 0.007 0.007 0.007 0.007 0.008 0.008 0.009 <0.009 <0.009 <0.009 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0.000 0	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Pb 0008 0009 0010 0011 0012 0030 0030 0050 00005 00005 00002 0000 0001 0001	S           0.0007           0.0009           0.0010           0.0015           0.0017           0.0018           0.0020           0.0022           0.0026           0.0030           <0.0030	Si           0.2390           0.2460           0.2500           0.2500           0.2500           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2530           0.2590           0.2600           0.2600           0.2600           0.2600           0.2600           0.2600           0.2670           0.2700           0.2760           0.2760           0.2789           0.2800           0.2760           0.2759           0.2800           0.2800           0.2595           0.0112           0.260           0.005	Sn           0.0010           0.0011           0.0012           0.0013           0.0013           0.0015           0.0016           0.0020           0.0020           0.0027           0.0030           0.0030           0.0030           0.0030           0.001           <0.001	Ti           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.00           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000           0.000	013         0.           017         0.           017         0.           017         0.           019         0.           019         0.           019         0.           019         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           020         0.           220         0.           23         0.           24         0.           25         0.           02         0.           02         0.           021         0.           022         0.	V         1000         C           1000         C         1000         C           1020         C         1020         C           1031         C         1031         C           1040         C         1050         C           1050         C         1060         C           1064         C         1069         C           1074         C         1074         C           1100         1100         1100         1110           1110         1110         1110         1110           11120         1130         1130         1130           1075         C         0040         C           108         C         0002         C	W           0.0008           0.0010           0.0011           0.0022           0.0023           0.0030           0.0040           0.0041           0.0047           0.003           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041           0.0041

Legend: W = Classical, C = Combustion, F = Fusion, A = AA or GFAA, I = ICP or DCP, IM=ICP-MS, D = DC Arc, O = AES, X = XRF, G = GDAES or GDMS, H = Hollow Cathode AES