



Part of **LGC Standards**

CERTIFIED REFERENCE MATERIALS

Products & Services Catalog

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REGISTRATION CERTIFICATE

***This document certifies that the administration systems of
Analytical Reference Materials International Corporation
3 Perimeter Road, Unit 9, Manchester, New Hampshire 03103, USA***

***have been assessed and approved by QAS International
to the following management systems, standards and guidelines:***

ISO 9001:2008

*With the permitted exclusion of clause 7.3 Design and Development
and 7.6 Control of Monitoring and Measuring Equipment*

The approved administration systems apply to the following:

*Supply of Certified Reference Materials and Related Services
to the Metals and Hydrocarbon Markets.*

Original Approval **24th May 2002**
Current Certificate **31st July 2015**
Certificate Expiry **31st July 2016**
Certificate Number **A1553US**

Signed: Certification Officer

On behalf of QAS International

This certificate remains valid while the holder maintains their quality administration systems in accordance with the standards and guidelines stated above, which will be audited annually by QAS International. The holder is entitled to display the above registration mark for the duration of this certificate, which should be returned to QAS International upon reasonable request.
Issuing Office: QAS International, 20A Oxford Street, Malmesbury, Wiltshire SN16 9AX, UK





ANALYTICAL REFERENCE MATERIALS INTERNATIONAL

Part of LGC Standards

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When Ordering IARMs, please use the "IARM-xxx" prefix followed by the appropriate suffix: "-G" for General Purpose OES, "-X" for XRF, or "-C" for Chips.

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Introduction

Analytical Reference Materials International (ARMI) was founded in 1984 for the purpose of producing Certified Reference Materials (CRMs) for the Metals Industry. Since that time, ARMI has expanded its metals inventory to include CRMs for the following matrices:

Carbon, Low Alloy, & Tool Steels

Stainless Steels

Nickel Alloys

Titanium Alloys

Aluminum Alloys

High Temperature Steels

Cobalt Alloys

Copper, Brass & Bronze Alloys

ARMI's CRMs are produced from commercially available material analyzed by participating laboratories that are members of ARMI's Inter-Laboratory Analysis Program (ILAP). The ILAP Laboratories utilize ASTM Standards to produce the analytical and statistical data used by ARMI to calculate the certified values and 95% confidence intervals of the CRMs. The result is a true CRM of the highest quality yielding consistent, reproducible results and reliability for Industry. Furthermore, ARMI's Certificates of Analysis contain all of the required and necessary informational disclosures and evidence that the CRMs are traceable to NIST.

ARMI is the worldwide distributor for Alcan Aluminum CRMs. Please see our Aluminum producers catalog for additional information.

ARMI now offers Heavy Metals in Plastic RMs. We have Br, Hg, Cr, Pb, and Cd in PE and PVC. These RMs are available in sets only.

ARMI also carries Set-up Standards (SUSs) for Low Alloy, Cast Iron, and Aluminum. In addition to its internally produced SUSs, ARMI also carries the full line of Alcoa Aluminum SUSs and MBH's lines of SUSs.

ARMI has expanded its inventory to include Hydrocarbon CRMs for Industry. The new CRMs are produced following ASTM Standards and like ARMI's metal CRMs, they have full informational disclosures and are traceable to NIST. The Hydrocarbon CRMs include standards for Sulfur in Oil and Coal.

In addition to these cataloged CRMs, ARMI has access to additional standards from its affiliates and associates throughout the world. We have an arrangement with MBH Analytical Limited of England and TechLab of France to distribute their products in the United States. Let ARMI's staff help fill your standards needs.

Thank you for considering ARMI's products and we look forward to supplying your Certified Reference Material needs. If you have any questions, need technical assistance, require additional information, or need assistance in locating a special CRM, please contact us. We will be happy to assist you in whatever way we can.

Best Regards,



Daniel Geist
Operations Manager

Carbon & Low-Alloy Steels

Please call for availability and current pricing - (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
28A	AISI 1018	0.003	<0.01	(0.006)	---	(0.0001)	---	(0.0004)	0.20	0.15	0.010	0.247	<0.005	---	0.69	0.031
<i>Chips Only</i>	G10180	0.099	0.002	0.0113	(0.0106)	0.011	---	0.22	0.023	---	0.011	0.002	(0.012)	0.006	---	(0.002)
28B	AISI 1018	0.004	---	0.008	---	[0.0002]	---	[0.0016]	0.18	0.13	0.011	0.36	<0.01	---	0.75	0.029
<i>Chips Only</i>	G10180	0.13	0.002	[0.0094]	[0.0080]	0.010	---	0.23	0.029	---	0.014	0.002	<0.01	(0.002)	---	<0.005
28C	AISI 1018	0.010	---	0.004	---	0.0002	---	---	0.16	0.073	0.008	0.23	---	---	0.76	0.042
<i>Chips Only</i>	G10180	0.24	0.0014	0.0084	0.0074	0.011	---	0.25	0.011	---	0.016	0.001	(0.004)	0.024	---	---
28D	AISI 1018	0.011	---	0.0039	---	0.0002	---	---	0.17	0.081	0.009	0.11	---	---	0.80	0.025
<i>Chips Only</i>	G10180	0.09	0.002	0.0079	0.0061	0.010	---	0.27	0.016	---	0.008	0.001	(0.003)	0.019	---	---
28E	AISI 1018	0.011	<0.001	0.007	---	0.0001	---	(0.0003)	0.169	0.079	0.008	0.120	<0.001	<0.002	0.68	0.033
<i>Chips Only</i>	G10180	0.145	0.001	0.0088	0.0052	0.009	---	0.171	0.0026	<0.001	0.010	0.001	0.002	0.019	---	<0.002
28J	AISI 1018	0.003	(0.003)	0.0064	---	0.0003	---	0.0006	0.170	0.111	0.007	0.27	(0.0003)	(0.0005)	0.82	0.024
<i>X-Ray Only</i>	G10180	0.087	0.0011	0.0067	0.0017	0.019	---	0.286	0.029	(0.002)	0.013	0.0015	0.005	0.0016	(0.001)	0.0012
209D	AISI 1030	[0.003]	[(0.003)]	[0.006]	---	[0.0002]	---	[0.002]	[0.32]	[0.14]	[0.006]	[0.243]	[(0.001)]	---	[0.67]	[0.036]
<i>Provisional</i>	G10400	[0.079]	[(0.001)]	[0.0107]	[(0.005)]	[0.009]	---	[0.27]	[0.021]	---	[0.011]	[0.0010]	[(0.001)]	[0.042]	---	---
210A	AISI 1040	0.003	---	0.007	---	<0.005	---	---	0.39	0.11	0.008	0.27	---	---	0.82	0.022
<i>Chips Only</i>	G10300	0.11	(0.002)	0.0124	(0.0033)	0.015	---	0.22	0.023	---	0.011	(0.002)	---	0.052	---	---
210C	AISI 1040	0.005	(0.003)	0.008	---	0.0003	---	---	0.443	0.161	0.008	0.36	0.002	---	0.87	0.017
<i>X-Ray Only</i>	G10400	0.097	0.025	0.0090	0.009	0.033	---	0.219	0.025	(0.001)	0.019	0.001	<0.005	0.005	---	---
210D	AISI 1040	[0.003]	[(0.002)]	[0.006]	---	[0.0004]	---	[(0.001)]	[0.41]	[0.10]	[0.006]	[0.27]	[(0.001)]	---	[0.73]	[0.033]
<i>Provisional</i>	G10400	[0.122]	---	[0.0113]	[(0.003)]	[0.005]	---	[0.230]	[0.031]	---	[0.010]	[0.010]	[(0.002)]	[0.024]	---	---
200A	AISI 1045	0.003	---	---	---	<0.0005	---	---	0.45	0.092	0.006	0.090	---	---	0.76	0.018
<i>Chips Only</i>	G10450	0.048	0.001	0.0084	(0.0031)	0.006	---	0.27	0.014	---	0.007	0.002	<0.01	0.057	---	---
200C	AISI 1045	0.002	0.002	0.006	---	0.0003	---	0.0020	0.453	0.100	0.007	0.236	---	---	0.775	0.023
Final	G10450	0.094	0.0014	0.0079	0.0037	0.007	---	0.241	0.020	---	0.0090	0.0011	(0.002)	0.025	(0.002)	(0.004)
254A	AISI 1050	0.025	(0.004)	0.005	---	0.0002	---	0.001	0.500	0.050	0.006	0.091	(0.0003)	---	0.78	0.013
Final	G10500	0.044	0.001	0.0096	(0.003)	0.010	---	0.211	0.024	---	0.005	0.001	(0.001)	0.002	---	(0.001)
29C	AISI 1117	0.003	---	0.009	---	(0.003)	---	---	0.18	0.076	(0.01)	0.15	---	---	1.20	0.016
<i>Chips Only</i>	G11170	0.076	(0.003)	0.010	0.005	0.011	---	0.28	0.13	---	0.008	0.001	(0.002)	0.003	---	---
29D	AISI 1117	0.0033	---	0.0046	---	(0.0003)	---	---	0.17	0.076	(0.023)	0.085	---	---	1.07	0.016
<i>Chips Only</i>	G11170	0.042	(0.0027)	0.0057	(0.0082)	0.018	---	0.050	0.1153	---	0.0072	0.0014	(0.0030)	0.0018	---	---
199C	AISI 1144	[0.002]	[(0.003)]	[0.006]	---	[0.001]	---	[(0.001)]	[0.47]	[0.19]	[(0.01)]	[0.19]	[(0.001)]	---	[1.6]	[0.029]
<i>Provisional</i>	G11440	[0.084]	[(0.001)]	[0.0070]	[0.003]	[0.016]	---	[0.22]	[0.28]	---	[0.009]	[0.002]	[(0.002)]	[0.004]	---	[(0.001)]

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[] Indicate provisional value, certification in progress.

Carbon & Low-Alloy Steels

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
183C	AISI 12L14	0.0021	(0.001)	0.003	<0.001	0.0011	---	---	0.079	0.055	(0.002)	0.016	0.18	<0.0005	1.06	0.010
Final	G12144	0.019	0.0010	0.0049	0.016	0.078	---	0.004	0.31	<0.001	0.003	0.0009	(0.002)	0.002	<0.001	0.001
206B	AISI 1215	0.0025	(0.002)	0.0045	---	0.0006	---	---	0.074	0.038	0.007	0.113	(0.001)	---	1.01	0.018
Final	G12150	0.053	0.002	0.0075	0.016	0.050	---	0.012	0.293	---	0.0064	0.0008	(0.003)	0.0016	---	0.002
233A	AISI 1215 Bi	0.002	0.002	0.004	0.14	0.001	---	0.001	0.082	0.045	0.0046	0.096	0.003	---	0.80	0.011
<i>X-Ray Only</i>	N/A	0.038	(0.001)	0.0057	0.013	0.072	---	0.010	0.30	---	0.011	0.001	0.002	0.002	<0.003	<0.002
349A	AISI 1541	[0.002]	[(0.002)]	[0.005]	---	[0.0003]	---	[0.0012]	[0.41]	[0.19]	[0.008]	[0.30]	[(0.002)]	[<0.001]	[1.48]	[0.059]
Provisional	G15410	[0.178]	[0.001]	[0.010]	[0.002]	[0.011]	---	[0.19]	[0.024]	---	[0.015]	[0.0015]	[0.004]	[0.027]	[(0.003)]	[<0.002]
143E	AISI 4130	0.025	0.0021	0.0046	---	0.0002	---	0.0004	0.289	0.90	0.008	0.193	(0.001)	(0.0002)	0.478	0.171
<i>Chips Only</i>	G41300	0.206	0.0016	0.0074	0.001	0.0082	---	0.202	0.020	(0.001)	0.012	0.0009	0.003	0.0024	---	(0.001)
30C	AISI 4140	0.027	---	---	---	(0.0001)	---	0.003	0.39	0.94	0.009	0.16	---	---	0.84	0.16
<i>Chips Only</i>	G41400	0.18	(0.002)	0.0108	0.0025	0.021	---	0.28	0.016	---	0.014	0.003	---	0.004	---	(0.003)
30D	AISI 4140	0.035	---	0.008	---	0.0004	---	(0.0006)	0.391	0.978	0.013	0.241	(0.0003)	(0.005)	0.83	0.220
<i>Chips Only</i>	G41400	0.159	0.002	0.0097	0.0014	0.013	---	0.24	0.020	(0.003)	0.017	0.002	0.003	(0.004)	---	---
30E	AISI 4140	0.014	---	0.015	---	0.0002	---	(0.001)	0.408	1.06	0.012	0.301	<0.001	<0.005	0.92	0.209
<i>Chips Only</i>	G41400	0.180	0.002	0.0063	0.0014	0.011	---	0.264	0.0071	---	0.017	0.003	0.005	0.005	(0.002)	---
30I	AISI 4140	0.026	0.0017	0.0054	---	0.0002	---	(0.0002)	0.408	0.98	0.0093	0.138	(0.001)	(0.0005)	0.904	0.219
Final	G41400	0.131	0.0016	0.0086	0.0007	0.0206	---	0.209	0.0171	(0.001)	0.0089	0.0013	0.003	0.0051	---	(0.001)
31A	AISI 4340	0.036	(0.002)	(0.006)	---	(0.0002)	---	(0.0012)	0.41	0.85	0.011	0.19	---	---	0.75	0.22
<i>Chips Only</i>	G43400	1.66	0.003	0.0114	(0.0015)	0.012	---	0.22	0.028	---	0.008	0.003	---	0.004	---	(0.003)
31B	AISI 4340	0.028	---	0.006	---	[0.0002]	---	[0.0005]	0.41	0.87	0.010	0.23	<0.01	---	0.71	0.26
<i>Chips Only</i>	G43400	1.81	(0.002)	[0.0087]	[0.0019]	0.013	---	0.25	0.022	---	0.010	0.003	(0.008)	0.006	---	(0.002)
31F	AISI 4340	0.026	(0.002)	0.005	---	0.0003	---	0.0005	0.39	0.83	0.008	0.181	(0.001)	(0.0003)	0.70	0.204
Final	G43400	1.78	0.002	0.0058	(0.001)	0.012	---	0.258	0.018	(0.003)	0.015	0.0017	(0.005)	0.0028	(0.001)	0.002
33B	AISI 4620	0.023	---	0.005	---	[0.0001]	---	[0.0003]	0.19	0.17	0.010	0.15	<0.01	---	0.54	0.22
<i>Chips Only</i>	G46200	1.68	0.003	[0.0073]	[0.0044]	0.010	---	0.22	0.014	---	0.010	0.002	<0.01	0.002	---	<0.005
33C	AISI 4620	0.025	---	(0.005)	---	(0.0002)	---	(0.0003)	0.184	0.133	0.008	0.223	<0.002	---	0.562	0.236
Final	G46200	1.71	0.002	0.0078	0.0021	0.009	---	0.25	0.017	---	0.009	0.0014	0.0026	0.0021	(0.002)	---
33D	AISI 4620	0.026	(0.002)	0.0035	---	0.0002	---	(0.0003)	0.209	0.139	0.008	0.072	<0.001	---	0.593	0.229
Final	G46200	1.78	0.002	0.0053	0.0013	0.009	---	0.207	0.023	---	0.005	0.003	0.002	<0.005	---	<0.002
155A	AISI 4820	0.030	---	0.004	---	0.0003	---	0.002	0.20	0.13	0.010	0.12	<0.01	---	0.54	0.25
<i>Chips Only</i>	G48200	3.34	0.003	0.0096	0.0016	0.009	---	0.28	0.024	---	0.006	0.002	<0.01	0.001	---	<0.005

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
155E <i>X-Ray Only</i>	AISI 4820 G48200	0.025 3.30	0.0020 0.0015	0.0050 0.0079	--- 0.0017	0.0003 0.009	--- ---	0.0004 0.192	0.200 0.020	0.121 ---	0.0091 0.009	0.191 0.0018	(0.001) 0.003	(0.0003) 0.002	0.65 (0.002)	0.201 0.002
49D <i>X-Ray Only</i>	AISI E52100 G52986	0.018 0.061	0.0016 0.0009	0.004 0.0102	--- 0.0008	(0.0004) 0.0173	--- ---	--- 0.24	0.99 0.0059	1.53 (0.001)	0.006 0.0076	0.120 0.0020	(0.0004) 0.0034	--- 0.004	0.39 ---	0.016 (0.001)
34A <i>Chips Only</i>	AISI E6150 G61500	0.014 0.14	--- 0.003	(0.006) 0.0076	--- (0.0014)	(0.0002) 0.01	--- ---	(0.0002) 0.22	0.51 0.010	0.99 ---	0.009 0.009	0.18 0.003	--- (0.016)	--- 0.17	0.78 ---	0.044 (0.002)
34C Provisional	AISI E6150 G61500	[0.068] [0.085]	[(0.001)] [0.0043]	[0.0025] [0.0029]	--- [0.001]	[0.0003] [0.009]	--- ---	[(0.0004)] [0.30]	[0.50] [0.0012]	[0.92] ---	[0.006] [0.0056]	[0.077] [0.0045]	[(0.0004)] [(0.003)]	--- [0.206]	[0.74] ---	[0.022] [(0.001)]
182A <i>Chips Only</i>	Alloy 86L20 N/A	0.020 0.50	--- 0.003	0.008 0.0067	--- 0.0014	0.0003 0.028	--- ---	0.002 0.25	0.20 0.023	0.56 ---	0.011 0.012	0.23 0.005	0.14 (0.008)	--- 0.005	0.90 ---	0.18 (0.003)
182B Final	Alloy 86L20 N/A	0.038 0.47	0.003 0.003	0.003 0.0040	--- 0.003	0.0003 0.016	--- ---	(0.0005) 0.27	0.21 0.037	0.49 (0.003)	0.006 0.0019	0.017 0.003	0.19 (0.01)	--- 0.004	0.81 (0.002)	0.172 0.001
252A <i>X-Ray Only</i>	AISI 8740 G87400	0.017 0.507	<0.005 0.002	0.005 0.0085	--- (0.001)	0.0002 0.024	--- ---	(0.0004) 0.248	0.419 0.009	0.501 ---	0.008 0.007	0.107 0.001	0.0007 0.004	--- 0.005	0.91 ---	0.206 (0.001)
252B <i>X-Ray Only</i>	AISI 8740 G87400	0.028 0.461	(0.002) 0.002	0.005 0.0081	--- 0.0016	0.0002 0.007	--- ---	0.0002 0.236	0.419 0.019	0.486 ---	0.005 0.021	0.084 0.002	0.0004 0.002	--- 0.004	0.91 ---	0.223 0.001
252C Final	AISI 8740 G87400	0.017 0.505	<0.005 0.002	0.004 0.0083	--- (0.002)	(0.0001) 0.025	--- ---	(0.0003) 0.248	0.416 0.008	0.501 ---	0.008 0.007	0.109 0.001	0.001 <0.005	--- 0.005	0.92 ---	0.205 <0.002
156C Final	AISI E9310 G93106	0.028 3.25	0.0006 0.003	0.003 0.0026	--- 0.002	0.0002 0.007	--- ---	0.0010 0.25	0.107 0.0010	1.18 ---	0.009 0.012	0.077 0.0024	<0.001 0.006	--- 0.005	0.46 (0.002)	0.113 0.0017
213A <i>X-Ray Only</i>	A36 K02600	0.0018 0.15	--- 0.002	0.007 0.0082	--- 0.011	0.0003 0.015	--- ---	--- 0.15	0.16 0.034	0.15 ---	0.008 0.018	0.41 0.001	0.0025 (0.007)	--- 0.002	0.66 ---	0.048 ---
213B <i>X-Ray Only</i>	A36 K02600	0.0009 0.149	(0.003) 0.002	0.0060 0.0094	--- 0.009	0.0002 0.0094	--- ---	(0.0001) 0.214	0.153 0.041	0.138 ---	0.008 0.010	0.28 0.0009	(0.001) 0.003	--- 0.016	0.78 0.0029	0.035 0.0013
213C Provisional	A36 K02600	[0.002] [0.068]	[(0.002)] [(0.001)]	[0.0059] [0.012]	[<0.0005] [0.004]	[0.0003] [0.007]	--- ---	[0.0014] [0.25]	[0.200] [0.026]	[0.098] ---	[0.007] [0.008]	[0.149] [0.0011]	[0.0011] [(0.001)]	[<0.001] [0.035]	[0.92] [<0.007]	[0.022] [(0.001)]
35A <i>Chips Only</i>	1¼Cr ½Mo K11572	0.028 0.088	--- 0.003	(0.003) 0.0081	--- (0.0014)	(0.0002) 0.005	--- ---	(0.0002) 0.61	0.12 0.006	1.23 ---	0.008 0.004	0.078 0.002	<0.005 ---	--- 0.020	0.52 ---	0.49 (0.002)
35B <i>Chips Only</i>	1¼Cr ½Mo K11572	0.017 0.084	--- 0.003	0.006 [0.0081]	--- [0.0025]	[0.0005] 0.006	--- ---	[0.0001] 0.58	0.13 0.016	1.12 ---	0.008 0.006	0.11 0.003	<0.01 <0.01	--- 0.005	0.45 ---	0.45 <0.005
35C <i>Chips Only</i>	1¼Cr ½Mo K11572	0.029 0.102	(0.005) 0.002	0.008 0.0093	--- 0.0016	0.0004 0.012	--- ---	(0.0004) 0.56	0.115 0.014	1.09 ---	0.011 0.017	0.271 0.003	(0.001) (0.005)	--- 0.005	0.44 ---	0.52 (0.002)

() and < > Indicate a non-certified value.

[] Indicate provisional value, certification in progress.

Carbon & Low-Alloy Steels

Please call for availability and current pricing - (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
35K	1¼Cr ½Mo	0.018	0.0024	0.0048	(0.001)	0.0003	---	0.0008	0.133	1.17	0.0066	0.135	(0.0003)	(0.0004)	0.47	0.56
<i>X-Ray Only</i>	K11572	0.059	0.002	0.0082	0.0023	0.0089	(0.0006)	0.52	0.016	(0.001)	0.010	0.0013	0.004	0.0042	(0.001)	(0.001)
229B	C ½Mo	[0.026]	[(0.0004)]	[0.0011]	---	[0.001]	---	[(0.001)]	[0.22]	[0.016]	[0.011]	[0.015]	---	---	[0.86]	[0.49]
<i>Provisional</i>	K12822	[0.029]	[0.002]	[0.007]	[(0.002)]	[0.008]	---	[0.33]	[0.011]	---	[0.001]	[0.002]	[(0.002)]	[0.006]	---	[(0.001)]
36B	2¼Cr 1Mo	0.030	---	0.008	---	[0.0003]	---	[0.0002]	0.14	2.18	0.012	0.13	(0.003)	---	0.49	0.95
<i>Chips Only</i>	K21590	0.18	0.003	[0.0102]	[0.0025]	0.010	---	0.21	0.038	---	0.007	0.003	<0.01	0.006	---	<0.005
330A	AISI 4330Mod	0.045	(0.001)	0.003	---	0.0003	---	0.0010	0.299	0.90	0.0063	0.074	(0.0004)	---	1.00	0.404
Final	K23080	1.80	0.003	0.0024	0.0009	0.005	---	0.273	0.001	---	0.0039	0.006	(0.004)	0.071	---	0.0015
305A	NIT 135M	1.09	0.005	0.005	---	0.0004	---	0.0003	0.401	1.62	0.034	0.098	(0.001)	(0.0005)	0.61	0.41
Final	K24065	0.142	0.003	0.0044	0.0008	0.005	---	0.38	0.0009	(0.003)	0.006	0.0034	0.011	0.012	(0.002)	0.0013
299A	D6-AC	0.092	(0.002)	0.003	---	0.0003	---	(0.001)	0.469	1.03	0.0054	0.100	(0.001)	---	0.70	0.99
Final	K24728	0.57	0.006	0.0028	(0.002)	0.008	---	0.22	0.002	---	0.0055	0.0038	0.010	0.120	---	(0.001)
342A	Hy-Tuff	0.019	0.0021	0.006	---	0.0004	---	(0.0001)	0.257	0.38	0.008	0.110	0.0008	(0.0002)	1.37	0.42
Final	K32550	1.76	(0.002)	0.0102	0.0006	0.006	---	1.63	0.0051	---	0.021	0.0028	(0.005)	0.023	(0.001)	(0.002)
340A	AISI 300M	0.062	0.0021	0.004	---	0.0004	---	(0.0004)	0.414	0.84	0.006	0.103	(0.001)	(0.0002)	0.755	0.39
Final	K44220	1.80	0.015	0.0020	(0.001)	0.011	---	1.63	0.001	---	0.005	0.0098	0.005	0.064	(0.0001)	(0.002)
38A	9Cr 1Mo	0.009	(0.001)	(0.023)	---	(0.0003)	---	(0.0005)	0.13	8.67	0.029	0.15	---	---	0.41	0.96
<i>Chips Only</i>	K90941	0.24	0.008	0.0190	(0.0050)	0.008	---	0.38	0.018	---	0.014	0.003	(0.023)	0.020	---	(0.003)
341A	HP9-4-30	0.032	(0.001)	0.003	---	0.0005	---	0.0011	0.298	0.99	4.44	0.143	(0.001)	---	0.226	1.01
Final	K91283	7.16	0.005	0.0025	0.0008	0.0038	---	0.10	0.0008	---	0.005	0.003	(0.01)	0.086	(0.0002)	(0.003)
321A	722	0.004	(0.002)	0.0052	---	0.0008	---	0.0016	0.53	0.24	0.007	0.212	(0.001)	---	1.53	0.026
Final	N/A	0.47	0.0017	0.0100	(0.005)	0.012	---	0.65	0.017	---	0.019	0.0036	0.0050	0.089	(0.005)	(0.001)
322A	75S	0.002	0.0027	0.005	---	0.0009	---	0.0019	0.317	0.159	0.006	0.33	(0.001)	(0.001)	1.40	0.021
Final	N/A	0.28	(0.001)	0.023	0.006	0.009	---	0.42	0.021	---	0.016	0.0016	0.003	0.124	0.003	(0.001)
323A	420/60	0.003	(0.002)	0.006	(0.0001)	0.0003	---	0.0008	0.41	0.15	0.007	0.30	(0.001)	(0.0004)	1.14	0.023
<i>X-Ray Only</i>	N/A	0.084	0.0012	0.0105	0.010	0.0178	---	0.19	0.061	(0.005)	0.011	0.0012	0.004	0.020	---	(0.001)
324A	M10	0.002	(0.002)	0.006	---	0.0004	---	0.0009	0.99	0.42	0.007	0.22	---	---	1.01	0.022
Final	N/A	0.081	0.014	0.0082	0.003	0.009	---	0.163	0.028	---	0.011	0.0016	(0.003)	0.0017	(0.003)	(0.001)

() and < > Indicate a non-certified value.

[] Indicate provisional value, certification in progress.

CKD Low-Alloy Steel CRMs
(Low-Alloy Calibration - Individual or Set of Ten)

CKD Number	Al t Ni	Al s P	As Pb	B S	Bi Sb	C Se	Co Si	Cr Sn	Cu Ta	Fe Te	Mn Ti	Mo V	N W	Nb Zr
180B	(0.001)	---	0.001	---	(0.0000)	(0.003)	0.003	0.013	0.006	(99.90)	0.047	0.001	(0.0028)	(0.0001)
	0.018	0.004	(0.0002)	0.0038	0.0004	(<0.001)	0.001	0.0011	(<0.0001)	(<0.001)	---	---	(0.0001)	---
181C	0.016	---	0.0290	0.0076	---	0.243	0.051	0.666	0.095	Bal.	0.988	0.394	(0.005)	0.063
	0.739	0.042	0.0005	0.008	0.017	---	0.443	0.122	0.042	---	0.159	0.307	0.187	0.001
181D	0.016	---	0.0280	0.007	---	0.231	0.050	0.661	0.093	Bal.	0.980	0.389	(0.005)	0.060
	0.726	0.040	0.0005	0.007	0.017	---	0.437	0.117	0.039	---	0.153	0.303	0.187	0.001
182B	0.023	0.017	0.005	0.0003	---	1.39	0.171	0.122	0.293	(94.59)	0.370	0.011	0.0049	0.001
	2.82	0.008	(0.000)	0.006	0.003	---	0.126	0.004	---	---	0.004	0.027	0.016	0.001
182C	0.03	---	0.005	0.000	---	1.360	0.171	0.123	0.294	Bal.	0.363	0.012	0.005	0.001
	2.80	0.009	(0.001)	0.008	0.001	---	0.111	0.004	(0.001)	---	0.002	0.028	0.018	0.001
183B	0.150	0.141	0.004	0.0005	0.0000	0.050	0.119	0.204	0.575	(94.44)	1.76	0.036	0.0036	0.006
	1.10	0.010	(0.000)	0.012	0.002	---	1.03	0.0054	(0.000)	---	0.003	0.004	0.347	0.001
183C	0.150	---	0.005	0.001	0.0000	0.049	0.120	0.205	0.575	Bal.	1.76	0.036	0.0040	0.006
	1.10	0.009	(0.000)	0.012	0.001	---	1.03	0.0530	(0.000)	---	0.003	0.004	0.353	0.081
183E	0.149	---	0.005	0.001	0.0000	0.049	0.119	0.205	0.575	Bal.	1.76	0.036	0.0040	0.006
	1.10	0.009	(0.000)	0.013	0.001	---	1.03	0.0530	0.000	---	0.003	0.004	0.351	0.080
184A	0.022	0.016	0.006	0.0005	---	1.013	0.007	2.33	0.089	(93.58)	2.23	0.016	0.0104	0.013
	0.250	0.028	(0.000)	(0.01)	0.27	(0.008)	0.348	0.008	0.000	---	0.010	0.017	(0.001)	(0.002)
186D	0.042	---	0.007	0.0009	---	0.392	0.006	1.510	0.226	Bal.	1.312	0.254	(0.005)	0.004
	1.58	0.013	(0.000)	0.007	0.002	---	1.41	0.018	0.008	---	0.047	0.021	0.054	(0.002)
187A	0.019	0.017	(0.007)	0.0006	0.003	0.119	0.071	3.51	0.036	(93.01)	0.525	0.565	0.0122	0.028
	0.085	0.035	0.003	0.018	0.023	(0.004)	0.567	0.013	0.015	---	0.087	0.558	0.67	0.013
187C	0.038	---	(0.007)	0.001	0.003	0.118	0.071	3.50	0.041	Bal.	0.530	0.563	0.0153	0.028
	0.085	0.035	0.003	0.013	0.023	---	0.588	0.014	0.016	---	0.110	0.559	0.67	0.011
187D	0.024	---	(0.007)	0.001	0.003	0.119	0.071	3.51	0.035	Bal.	0.529	0.566	0.0120	0.028
	0.085	0.035	0.003	0.015	0.022	---	0.576	0.013	0.016	---	0.096	0.560	0.67	0.012
188A	0.093	0.083	(0.005)	0.0047	---	0.332	0.006	5.11	0.057	(90.53)	0.169	1.28	0.0076	0.122
	0.445	0.006	0.001	0.033	0.006	---	0.775	0.005	0.022	(0.001)	0.034	0.802	0.091	0.052
189A	0.041	0.039	0.080	0.0030	---	0.175	0.007	1.065	0.060	(90.01)	0.262	0.837	(0.004)	0.017
	5.34	0.032	0.002	0.051	(0.003)	---	0.286	0.029	(0.005)	---	0.326	0.054	1.30	0.005

() and < > Indicates non-certified value.

Produced by Czech Metrology Institute

 Revised - 12/03/2015
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Special Carbon & Low-Alloy Steels

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	As O	B P	C Pb	Ca S	Co Si	Cr Sn	Cu Ti	Mn V	Mo W	N Zr	Nb
164A	CLA1	0.72	(0.002)	(0.0001)	0.004	0.0002	0.006	0.032	0.88	1.57	0.009	0.0003	0.006
Final	N/A	1.29	0.0005	0.004	(0.004)	0.070	0.019	0.002	0.002	0.78	1.44	<0.005	
165A	CLA2	0.80	(0.003)	(0.001)	0.003	0.0002	0.006	0.036	1.40	1.65	0.009	0.0004	0.007
<i>X-Ray & Chips Only</i>	N/A	1.43	0.0004	0.005	(<0.01)	0.086	0.021	0.002	0.002	1.13	1.57	<0.005	
166A	CLA3	0.55	(0.004)	(0.0002)	0.003	0.0003	0.004	0.014	0.64	1.29	1.08	0.0002	0.006
<i>X-Ray & Chips Only</i>	N/A	0.77	0.0006	0.005	(<0.01)	0.073	0.91	(0.003)	0.002	0.40	1.02	<0.01	
167A	CLA4	0.64	(0.004)	(0.0002)	0.003	0.0002	0.003	0.016	0.95	1.36	1.25	0.0005	0.006
<i>X-Ray Only</i>	N/A	1.00	0.0007	0.019	(0.002)	0.087	1.08	0.003	0.003	0.59	1.19	0.003	
168A	CLA5	0.19	(0.003)	0.0004	0.003	0.0002	0.003	0.004	0.009	0.12	0.69	0.0002	0.003
Final	N/A	2.32	0.0008	0.030	(<0.01)	0.064	0.46	0.003	0.004	0.004	0.52	0.003	
169A	CLA6	0.30	(0.009)	(0.001)	0.31	0.0003	0.005	2.19	0.31	0.21	0.95	0.0004	0.005
<i>X-Ray & Chips Only</i>	N/A	2.50	0.0006	0.033	(0.002)	0.065	0.79	0.003	0.005	0.006	0.65	<0.005	
170A	CLA7	0.032	(0.005)	(0.0002)	0.56	0.0001	0.004	2.55	0.005	0.019	1.57	0.0003	0.004
<i>X-Ray & Chips Only</i>	N/A	1.51	0.0003	0.039	(<0.01)	0.025	0.010	0.002	0.006	0.006	(0.018)	0.003	
171A	CLA8	0.082	(<0.01)	(0.0006)	0.64	0.0001	0.005	2.88	0.49	0.020	1.91	0.0003	0.005
<i>X-Ray Only</i>	N/A	1.95	(0.0004)	0.043	(<0.01)	0.059	0.25	0.002	0.005	0.006	0.13	0.003	
172A	CLA9	0.39	(0.005)	0.0003	0.78	0.0001	0.006	3.52	0.40	0.010	0.014	0.0004	0.004
Final	N/A	0.025	0.0006	0.007	(<0.01)	0.004	1.29	0.003	0.003	0.003	0.038	<0.005	
173A	CLA10	0.48	(<0.01)	0.0004	0.85	0.0002	0.010	4.39	0.72	0.011	0.015	0.0006	0.006
<i>X-Ray & Chips Only</i>	N/A	0.024	0.0007	0.015	(<0.01)	0.004	1.70	0.003	0.004	0.28	0.041	<0.002	
180A	CLA11	0.76	(0.004)	0.0004	0.007	0.0001	0.004	0.037	0.89	0.41	0.006	0.0096	(0.005)
Final	N/A	1.29	0.0006	0.004	(0.002)	0.046	0.023	0.002	0.002	0.76	1.48	0.003	
181A	CLA12	0.87	(0.013)	(0.0002)	0.007	0.0002	(0.004)	0.044	1.45	1.76	0.009	0.0185	(0.007)
<i>X-Ray & Chips Only</i>	N/A	1.40	0.0006	0.004	(0.002)	0.095	0.026	0.002	0.003	1.12	1.65	<0.01	

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

Tool Steels

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
304A Provisional	AISI M-1 T11301	[0.010] [0.132]	[(0.01)] [(0.01)]	[0.01] [0.034]	--- [0.003]	[0.002] [0.018]	--- ---	--- [0.37]	[0.86] [0.002]	[3.6] ---	[0.28] [0.006]	[0.13] [0.003]	[<0.002] [1.7]	--- [1.22]	[0.257] ---	[8.1] [(0.002)]
44A <i>Chips Only</i>	AISI M-2 T11302	0.027 0.20	--- (0.009)	(0.022) 0.0247	--- (0.0018)	(0.0022) 0.029	--- ---	--- 0.39	0.86 0.003	4.26 ---	0.16 0.011	0.14 0.005	<0.005 6.25	--- 1.86	0.31 ---	5.08 (0.004)
44B <i>Chips Only</i>	AISI M-2 T11302	--- 0.18	--- 0.016	--- 0.0252	--- 0.0028	--- 0.014	--- ---	--- 0.39	0.84 0.006	3.86 ---	0.41 (0.008)	0.072 0.004	(0.0001) 5.98	--- 1.83	0.27 ---	4.79 ---
44C Final	AISI M-2 T11302	0.05 0.132	(0.004) 0.012	(0.01) 0.033	--- 0.003	(0.002) 0.027	--- ---	--- 0.31	0.82 0.004	4.04 (0.004)	0.247 0.010	0.12 0.004	(0.002) 6.0	--- 1.91	0.301 0.006	5.02 0.002
251A Final	AISI M-4 T11304	0.01 0.131	--- 0.016	0.016 0.044	--- (0.01)	(0.002) 0.014	--- ---	(0.0005) 0.58	1.398 0.058	4.1 ---	0.129 0.011	0.13 0.003	(0.002) 5.5	--- 3.9	0.33 ---	5.16 (0.002)
320A Provisional	AISI M-35 T11335	[0.024] [0.20]	--- [0.012]	[0.010] [0.014]	--- [0.002]	[0.0011] [0.021]	--- ---	--- [0.36]	[0.94] [0.002]	[4.20] ---	[4.90] [0.008]	[0.089] [0.003]	--- [6.0]	--- [1.78]	[0.32] ---	[4.8] [(0.003)]
306A <i>X-Ray only</i>	AISI M-50 T11350	0.005 0.118	--- 0.007	(0.004) 0.0042	--- (0.001)	(0.001) 0.006	--- ---	--- 0.16	0.83 0.003	4.16 ---	0.011 0.005	0.042 0.002	--- 0.003	--- 0.97	0.209 ---	4.2 (0.001)
306B Provisional	AISI M-50 T11350	[0.08] [0.095]	[0.0025] [0.007]	[(0.003)] [0.0049]	--- [0.001]	[(0.001)] [0.006]	--- ---	--- [0.21]	[0.84] [0.001]	[4.12] ---	[0.010] [0.004]	[0.058] [0.002]	[(0.001)] [0.01]	--- [0.98]	[0.24] ---	[4.2] [(0.002)]
48A <i>Chips Only</i>	AISI T-1 T12001	(0.016) 0.23	--- (0.003)	(0.051) 0.0221	--- (0.0107)	(0.0018) 0.036	--- ---	(0.0006) 0.29	0.79 0.021	4.32 ---	0.13 0.019	0.13 0.004	--- 17.99	--- 1.13	0.33 ---	0.40 (0.006)
48B <i>Chips Only</i>	AISI T-1 T12001	--- 0.082	--- ---	--- 0.0103	--- ---	--- 0.024	--- ---	--- 0.28	0.74 0.023	4.2 ---	0.045 ---	0.070 ---	--- 17.5	--- 1.1	0.28 ---	0.10 ---
48C Final	AISI T-1 T12001	0.017 0.204	(0.002) 0.005	0.012 0.0165	--- 0.003	(0.001) 0.029	--- ---	--- 0.45	0.77 0.018	4.24 (0.01)	0.22 0.012	0.13 0.006	(0.0004) 17.5	(0.0002) 1.27	0.39 ---	0.17 (0.003)
281A Final	AISI T-4 T12004	0.007 0.15	--- 0.094	(0.02) 0.0064	--- 0.003	(0.003) 0.015	--- ---	--- 0.29	0.74 0.019	3.89 ---	4.8 0.02	0.096 0.004	--- 17.6	(0.003) 0.9	0.3 ---	0.49 (0.002)
255A Final	AISI H-11 T20811	0.01 0.083	--- 0.004	(0.002) 0.0067	--- 0.0011	0.0004 0.013	--- ---	(0.0004) 0.93	0.403 0.0012	4.84 <0.005	0.009 0.006	0.049 0.002	<0.001 0.007	--- 0.43	0.27 ---	1.33 <0.005
42A <i>X-Ray only</i>	AISI H-13 T20813	(0.024) 0.32	--- (0.001)	--- 0.0143	--- (0.0019)	(0.0007) 0.011	--- ---	--- 1.04	0.39 0.007	(5.42) ---	0.015 0.005	0.070 0.005	<0.005 (0.014)	--- 1.02	0.35 ---	1.29 ---
42B <i>X-Ray only</i>	AISI H-13 T20813	0.013 0.18	--- 0.004	--- 0.0105	--- 0.0026	(0.0005) 0.014	--- ---	--- 0.99	0.38 0.005	5.10 ---	0.013 0.005	0.089 0.003	(0.0003) 0.012	--- 0.94	0.36 ---	1.23 ---
42C Final	AISI H-13 T20813	0.018 0.051	(0.004) 0.004	(0.01) 0.0201	--- 0.003	0.0011 0.022	--- ---	(0.0005) 0.85	0.382 0.0037	4.86 (0.004)	0.022 0.006	0.066 0.0125	0.0007 0.32	--- 0.84	0.4 (0.008)	1.29 (0.002)

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

Tool Steels

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Cd Se	Ca Si	C S	Cr Ta	Co Sn	Cu Ti	Pb W	Mg V	Mn Zn	Mo Zr
39B	AISI A-2	0.006	---	---	---	---	---	---	0.99	4.79	0.014	0.10	---	---	0.54	1.01
Final	T30102	0.14	0.006	0.0096	---	0.017	---	0.35	0.003	---	0.004	0.003	(0.026)	0.22	---	---
40A	AISI A-6	0.009	---	(0.007)	---	(0.0003)	---	---	0.68	1.04	0.011	0.092	---	---	2.15	1.05
<i>Chips Only</i>	T30106	0.14	0.004	0.0077	(0.0024)	0.024	---	0.25	0.010	---	0.006	0.003	(0.013)	0.007	---	---
40B	AISI A-6	(0.006)	---	---	---	(0.0010)	---	---	0.68	1.04	0.015	0.050	---	---	1.98	1.22
Final	T30106	0.096	0.005	0.0107	(0.0014)	0.012	---	0.39	0.003	---	0.004	0.003	0.013	0.014	---	---
40C	AISI A-6	0.019	---	0.008	---	0.0009	---	(0.001)	0.72	0.99	0.010	0.142	---	---	1.91	1.27
Final	T30106	0.255	0.003	0.0083	0.0013	0.014	---	0.32	0.012	---	0.008	0.008	0.009	0.010	---	(0.002)
45A	AISI O-6	0.011	---	(0.003)	---	(0.0001)	---	---	1.39	0.13	0.004	0.049	<0.005	---	0.88	0.25
Final	T31506	0.11	0.002	0.0079	(0.0017)	0.014	---	1.02	0.012	---	0.005	0.003	---	0.005	---	0.005
45B	AISI O-6	0.010	(0.001)	0.002	---	(0.0001)	---	(0.001)	1.42	0.061	0.004	0.018	---	---	0.90	0.24
Final	T31506	0.024	0.002	0.0080	0.0005	0.010	---	0.92	0.008	---	0.008	0.002	(0.004)	0.003	---	(0.001)
46A	AISI S-1	0.011	---	(0.009)	---	(0.0012)	---	---	0.49	1.31	0.015	0.083	<0.005	---	0.48	0.16
<i>X-Ray Only</i>	T41901	0.30	0.004	0.0144	(0.0027)	0.023	---	0.94	0.012	---	0.024	0.004	1.84	0.16	---	0.005
46B	AISI S-1	0.011	---	(0.01)	---	0.0003	---	---	0.45	1.09	0.013	0.147	<0.002	---	0.27	0.222
Final	T41901	0.108	0.003	0.0069	0.002	0.019	---	0.89	0.0040	---	0.016	0.007	1.96	0.170	---	---
47A	AISI S-5	0.017	0.003	(0.014)	---	(0.0003)	---	---	0.58	0.29	0.009	0.25	<0.005	---	0.80	0.41
<i>X-Ray only</i>	T41905	0.23	(0.004)	0.0084	(0.0021)	0.015	---	1.92	0.010	---	0.031	0.008	(0.016)	0.22	---	0.01
47B	AISI S-5	0.014	---	---	---	(<0.001)	---	---	0.59	0.23	0.007	0.17	(0.0003)	---	0.79	0.20
Final	T41905	0.090	(0.002)	0.0092	(0.0014)	0.017	---	1.96	0.006	---	0.008	0.010	(0.016)	0.17	---	---
259A	AISI S-7	0.016	(0.002)	0.006	---	0.0003	---	(0.0003)	0.479	3.27	0.011	0.081	<0.0005	---	0.399	1.43
Final	T41907	0.194	0.003	0.0077	0.0014	0.020	---	0.44	0.0007	(0.005)	0.004	0.0026	0.035	0.256	<0.005	0.001
43A	AISI L-6	0.030	0.002	(0.006)	---	(0.0002)	---	---	0.68	0.66	0.016	0.15	<0.005	---	0.61	0.20
<i>Chips Only</i>	T61206	1.34	0.003	0.0089	(0.0026)	0.009	---	0.24	0.034	---	0.008	0.003	(0.016)	0.008	---	0.01
43B	AISI L-6	0.021	<0.002	0.005	---	0.0002	---	(0.002)	0.711	0.651	0.012	0.180	<0.0005	<0.003	0.56	0.206
Final	T61206	1.39	0.004	0.0093	0.0016	0.008	---	0.251	0.013	<0.001	0.013	0.0047	<0.005	0.0035	---	<0.001

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

Statistical Process Control (SPC) Standards

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	As O	B P	C Pb	Ca S	Co Sb	Cr Si	Cu Sn	Mn Ti	Mo V	N W	Nb Zr
195A	SPC2 - BD	0.013	0.021	0.0040	0.255	0.0001	0.102	0.214	0.52	1.85	0.052	0.0078	0.007
Final	N/A	1.01	0.0017	0.018	0.0014	0.007	0.013	1.16	0.084	0.002	0.083	0.38	0.002
195B	SPC2 - BH	0.029	0.021	0.0039	0.255	0.0002	0.101	0.216	0.52	1.84	0.052	0.0070	0.007
Final	N/A	1.00	0.0017	0.018	0.002	0.005	0.011	1.16	0.084	0.002	0.082	0.38	0.002
196A	SPC3 - ZH	0.015	0.025	0.0017	1.08	0.0002	0.013	2.35	0.25	2.40	0.129	0.0084	0.087
Final	N/A	0.61	0.0021	0.040	0.001	0.014	0.006	0.35	0.033	0.014	0.157	0.189	0.006

() and < > Indicate a non-certified value.

[] Indicate provisional value, certification in progress.

CMI Low-Alloy Cast Iron CRMs for Solid Sample Spectrometry

Intended Use

Intended for calibration, validation and matrix-match verification of cast iron spectrometric analysis from a plane of solid sample: Atomic Emission Spectrometry with spark, glow-discharge or laser excitation, and X-ray Fluorescence Spectrometry.

Technical Parameters (CZ2002-241 / CZ2002-249)

The samples were white chill-cast on a massive copper block with controlled speed at a controlled temperature of the molten metal. The samples are truncated pyramids with a base analytical surface (38x38 mm), a minimum total height of 20 mm and a side ledge 11-13 mm high. The samples can be used until 1 mm of the ledge height remains. The certified portion of a sample extends 10-12 mm from the original analytical surface.

Shrinkage cavities and porosity, which may appear in the uncertified portions of the samples, do not affect the analytical performance of the certified portions. The uncertified portions should not be used for calibration and/or validation.

Homogeneity was tested by Atomic Emission Spectrometry with an analytical area approximately 4 mm in diameter. The CRMs were tested for random homogeneity and trend homogeneity along the height of the certified portion. Trend homogeneity of the casting sequence was also tested. The latter test was supported by Combustion-IR Molecular Absorption Spectrometry and Thermo-evolution.

Technical Parameters (CZ02033-1 / CZ02033-8)

Homogeneity of the certified constituents and of the influence by structure were tested by the spark excitation AES, the technique prevailing in the cast iron analysis and coincidentally the most strongly structure-influenced technique. The within-sample trend homogeneity was tested as the difference of results on the opposite limits of the certified layer, the between-samples trend as the difference of results from the beginning and the end of casting. Both were found statistically insignificant except for a few cases, contributions of which were combined to the ultimate uncertainty of the certified values. Repeatability of the subsequent analyses distributed evenly on the same working surface was taken for a conservative estimate of the within-sample random homogeneity, as the repeatability of instrument itself cannot be exactly separated. This overall repeatability was satisfactory in respect to the uncertainty of all certified values. The CRM are stable by the nature of their matrix.

Manufactured as gangs of chill-cast discs, cooled on either side in vertical position. This resulted in a white (i.e. effectively graphite free) structure required by spectrometry. 0.5 mm was machined off either cooling surface.

Supplied in a set or as individual discs 40 mm in diameter and approximately 18 mm of total height, with two certified layers extending 6 mm upwards from either working surface. The discs are marked on side by the CRM code and the certified layers' limits. When used to both limits, the remainder, which may contain minor structure defects, should be discarded.

Manufacture and Characterization

Manufactured and characterized in compliance with the Czech Metrology Institute Methodical procedure No. 0217-MP-C001-06: Preparation and certification of reference materials, and ISO REMCO Guides 34, 35.

CMI Low-Alloy Cast Iron Spectrometric CRMs

(Cast Iron Calibration - Individual or Set)

CMI #	Al	Sb	As	B	Bi	C	Ce	Cr	Co	Cu	Fe	La	Pb	Mg	Mn
Status	Mo	Ni	Nb	N	P	Se	Si	S	Sn	Te	Ti	W	V	Zn	Zr
CZ02033-1E	0.058	---	---	0.0036	0.002	3.15	0.027	0.037	0.022	0.012	---	---	0.007	0.044	0.718
Final	0.185	0.367	---	---	0.037	---	2.72	0.006	0.032	---	0.046	0.021	0.015	0.009	(0.007)
CZ02033-1F	0.073	---	---	0.0043	0.001	3.23	0.036	0.035	0.024	0.018	---	---	0.009	0.070	0.693
Final	0.182	0.373	---	---	0.043	---	2068	0.005	0.03	(0.007)	0.041	0.022	0.014	0.004	(0.008)
CZ02033-1G	0.062	---	---	0.0034	0.005	3.22	0.023	0.044	0.010	0.027	---	---	0.016	0.050	0.701
Final	0.185	0.357	---	---	0.036	---	2.53	0.007	0.028	---	0.054	0.015	0.019	0.003	(0.004)
CZ02033-2D	0.015	0.022	---	0.0036	0.002	3.71	0.021	0.032	0.018	0.92	---	---	0.013	0.058	0.194
Final	0.013	0.635	---	---	0.165	---	1.28	0.011	0.025	---	0.019	0.003	0.028	0.023	---
CZ02033-2E	0.025	0.028	---	0.0024	0.005	3.47	0.017	0.043	0.005	0.89	---	---	0.004	0.038	0.168
Final	0.002	0.620	---	---	0.106	---	1.03	0.010	0.015	(0.006)	0.039	0.008	0.026	0.025	---
CZ02033-2F	0.024	0.028	---	0.0020	0.002	3.77	0.018	0.022	0.003	0.89	---	---	0.005	0.053	0.091
Final	0.002	0.658	---	---	0.159	---	1.23	0.009	0.014	---	0.021	0.003	0.010	0.018	(0.005)
CZ02033-2G	0.019	0.029	---	0.0023	0.006	3.78	0.013	0.027	0.012	0.88	---	---	0.008	0.036	0.096
Final	0.002	0.650	---	---	0.125	---	1.10	0.009	0.015	(0.004)	0.029	0.004	0.017	0.020	---
CZ02033-3C	0.024	---	(0.007)	0.0044	0.002	3.68	0.01	0.100	0.026	0.421	---	---	0.005	0.006	0.333
Final	0.490	0.040	---	---	0.026	---	2.15	---	0.009	(0.005)	0.021	0.003	0.016	---	0.317
CZ02033-3D	0.055	0.007	(0.018)	0.0071	0.002	3.24	0.01	0.236	0.014	0.396	---	---	0.005	0.016	---
Final	0.453	0.025	---	---	0.008	---	2.12	0.006	0.009	---	0.016	---	0.072	---	---
CZ02033-4A	0.015	---	---	---	---	4.18	---	0.040	0.002	0.081	---	---	0.006	---	0.236
Final	0.002	0.056	---	---	0.053	---	0.71	0.034	0.007	---	0.015	---	0.004	0.007	---
CZ02033-4B	0.003	(0.001)	---	---	---	3.95	---	0.049	0.005	0.062	---	---	0.004	---	0.145
Final	0.005	0.023	---	---	0.041	---	0.252	0.046	0.001	---	0.006	---	0.004	0.008	---
CZ02033-4D	0.007	---	(0.012)	(0.0001)	(0.002)	4.19	---	0.056	0.003	0.084	---	---	0.007	---	0.112
Final	0.024	0.063	---	---	0.050	---	0.259	0.041	0.001	---	0.009	---	0.012	0.009	---
CZ02033-4E	0.003	---	---	---	(0.002)	4.45	---	0.030	0.033	0.005	---	---	(0.002)	---	0.034
Final	0.002	0.049	---	---	0.023	---	0.090	0.006	0.001	---	0.011	---	0.015	---	---
CZ02033-5A	0.060	---	---	---	---	2.30	---	0.054	---	0.014	---	---	---	---	0.804
Final	0.100	0.096	---	---	0.035	---	1.26	0.100	---	---	0.008	---	0.005	---	---
CZ02033-5C	0.103	(0.002)	---	0.0078	0.007	2.30	---	0.085	0.013	0.013	---	---	---	---	0.704
Final	0.104	0.188	---	---	0.027	---	1.40	0.091	0.002	(0.010)	0.008	---	0.054	---	(0.009)
CZ02033-6A	0.022	0.056	---	---	---	3.14	---	1.40	---	0.225	---	---	---	---	1.22
Final	0.005	0.023	---	---	0.077	---	3.37	0.032	0.119	---	0.066	---	0.300	---	---

() Indicates non-certified value.

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CMI Low-Alloy Cast Iron Spectrometric CRMs

(Cast Iron Calibration - Individual or Set)

CMI #	Al	Sb	As	B	Bi	C	Ce	Cr	Co	Cu	Fe	La	Pb	Mg	Mn
Status	Mo	Ni	Nb	N	P	Se	Si	S	Sn	Te	Ti	W	V	Zn	Zr
CZ02033-6C	0.024	0.044	---	0.0024	---	3.11	---	1.33	0.005	0.273	---	---	0.003	---	1.25
Final	0.006	0.021	---	---	0.097	---	3.25	0.019	---	---	0.107	0.007	0.192	---	---
CZ02033-7A	0.029	---	---	---	---	3.11	---	0.479	0.044	0.022	---	---	---	---	0.321
Final	1.07	1.29	---	---	0.043	---	1.83	0.019	---	---	0.027	0.022	0.0005	---	---
CZ02033-7C	0.040	---	---	0.0008	(0.002)	3.55	---	0.542	0.048	0.016	---	---	---	---	0.389
Final	0.966	1.26	---	---	0.028	---	1.73	0.026	0.004	(0.006)	0.026	0.037	0.067	---	---
CZ02033-8C	0.004	0.014	(0.006)	---	0.009	3.41	---	0.125	0.030	0.158	---	---	0.008	---	0.408
Final	0.041	0.102	---	---	0.168	---	1.93	0.058	0.067	---	0.022	---	0.015	---	---
CZ2002-242A	0.036	0.007	0.015	0.008	0.015	1.84	---	0.029	0.002	0.055	---	---	0.012	---	0.050
Final	1.13	0.039	0.013	---	0.039	---	3.06	0.036	0.010	0.08	0.19	0.007	0.37	---	--
CZ2002-242B	0.042	0.005	0.009	0.005	0.020	2.06	---	0.031	0.004	0.040	(92.6)	---	0.027	---	0.189
Final	1.21	0.022	0.009	0.0092	0.044	(0.002)	2.81	0.028	0.010	0.031	0.28	(0.002)	0.46	---	---
CZ2002-243A	0.013	0.086	0.087	0.009	0.001	2.32	---	0.398	0.026	0.187	---	---	0.06	---	0.422
Final	0.262	0.085	0.019	0.0037	0.173	0.055	2.39	0.082	0.114	---	0.023	0.029	0.154	0.018	---
CZ2002-244B	0.019	0.004	0.040	0.093	---	2.57	0.018	0.360	0.049	0.308	(93.0)	0.009	0.002	0.025	0.68
Final	0.056	0.336	0.006	---	0.022	---	2.06	0.011	0.179	---	0.019	0.052	0.002	0.026	0.025
CZ2002-245B	0.038	0.052	0.006	0.003	0.009	2.95	---	0.197	0.007	0.081	(92.5)	---	0.020	0.003	1.38
Final	0.115	0.194	0.029	---	0.42	(0.029)	1.59	0.035	0.076	0.017	0.110	0.020	0.055	---	0.004
CZ2002-246	0.006	0.003	0.005	---	---	2.82	0.01	1.20	0.008	1.38	(92.9)	0.003	0.0003	0.010	0.302
Used	0.005	0.043	0.001	---	0.60	---	0.62	0.022	0.002	---	0.001	0.007	0.002	---	---
CZ2002-246B	0.101	0.004	0.003	---	0.001	2.73	0.007	1.16	0.012	1.39	(92.6)	0.003	(0.002)	0.016	0.354
Final	0.009	0.065	(0.001)	---	0.66	---	0.76	0.020	0.002	---	0.014	0.011	0.013	---	---

() Indicates non-certified value.

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Stainless & High Temperature Steel Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	B O	Ca P	C Se	Ce Si	Cr S	Co Ta	Cu Sn	H Ti	Pb W	Mg V	Mn Zn	Mo Zr
22B	AISI 15-5PH	0.004	---	<0.005	(0.0007)	<0.005	0.045	---	14.29	0.08	3.25	---	<0.005	<0.005	0.53	0.35
<i>Chips Only</i>	S15500	4.81	0.301	0.012	0.001	0.022	---	0.41	0.001	(0.010)	0.010	0.003	0.028	0.054	---	<0.005
22C	AISI 15-5PH	0.006	---	0.004	0.0006	(0.0002)	0.042	---	14.28	0.086	3.24	---	0.00003	(0.0001)	0.63	0.48
Final	S15500	4.63	0.290	0.030	0.0021	0.027	---	0.39	0.0004	(0.004)	0.013	0.002	0.031	0.068	(0.0005)	(0.002)
318B	Alloy 16-6-2-2	0.004	---	(0.004)	0.0003	---	0.050	---	15.9	0.100	1.63	---	---	---	1.02	1.57
Final	NA	5.71	0.086	0.032	0.009	0.022	---	0.41	0.0006	(0.004)	0.004	0.014	0.087	0.115	---	(0.003)
23A	AISI 17-4 PH	(0.002)	---	---	---	---	0.049	---	15.51	0.05	3.18	---	---	---	0.52	0.10
<i>Chips Only</i>	S17400	4.40	0.28	0.044	(0.013)	0.024	---	0.51	0.006	---	0.007	<0.01	(0.03)	0.054	---	---
23D	AISI 17-4 PH	0.005	---	(0.005)	0.0019	0.0013	0.038	---	15.16	0.041	3.27	---	(0.001)	(0.0004)	0.52	0.159
Final	S17400	4.88	0.29	0.037	0.0033	0.022	(0.001)	0.490	0.0006	0.002	0.0059	0.003	0.011	0.053	(0.001)	(0.001)
152B	AISI 17-7 PH	1.19	---	<0.01	0.002	---	0.075	---	16.94	0.17	0.31	---	---	<0.005	0.76	0.51
<i>Chips Only</i>	S17700	7.22	0.033	0.026	0.0011	0.0230	---	0.361	0.0019	<0.003	0.0081	0.115	0.05	0.091	---	<0.003
152C	AISI 17-7 PH	[0.95]	---	[(0.004)]	[0.003]	---	[0.072]	---	[16.99]	[0.113]	[0.315]	---	---	---	[0.74]	[0.36]
Provisional	S17700	[7.29]	[0.012]	[0.0172]	[0.001]	[0.024]	---	[0.263]	[0.0005]	[(0.01)]	[0.007]	[0.098]	[0.026]	[0.072]	---	---
17C	Nitronic 50	0.01	---	---	0.003	---	0.033	---	21.03	0.057	0.38	---	---	---	5.0	2.10
<i>Chips Only</i>	S20910	11.99	0.139	0.265	0.0035	0.022	---	0.47	0.0042	<0.01	0.006	<0.005	0.029	0.183	---	---
17D	Nitronic 50	[0.003]	---	[(0.005)]	[0.0005]	[(0.002)]	[0.041]	---	[21.1]	[0.23]	[0.41]	---	[(0.0002)]	[(0.0003)]	[4.15]	[1.51]
Provisional	S20910	[11.8]	[0.13]	[0.31]	[0.003]	[0.027]	[(0.001)]	[0.42]	[0.002]	[(0.002)]	[0.005]	[0.010]	[0.055]	[0.12]	---	[(0.002)]
18C	Nitronic 60	0.0142	---	---	0.0014	(0.002)	0.087	---	16.19	0.060	0.285	---	---	---	7.69	0.354
Final	S21800	8.05	0.090	0.152	0.0018	0.027	---	3.8	0.0010	(0.004)	0.004	0.013	0.05	0.099	---	---
19C	Nitronic 40	0.007	---	(0.004)	0.0011	---	0.012	---	19.51	0.087	0.45	---	---	---	9.02	0.40
Final	S21900	6.40	0.028	0.32	0.003	0.027	---	0.31	0.0007	0.005	0.0061	0.003	0.037	0.090	---	---
289A	AISI 301	0.01	---	---	0.0003	---	0.126	---	17.0	0.054	0.016	---	---	---	1.67	0.005
Final	S30100	7.12	0.008	0.0032	0.0104	0.006	---	0.58	0.0019	<0.005	0.002	0.028	0.01	0.01	---	---
241D	AISI 302	[0.022]	---	[(0.001)]	[0.0011]	[(0.001)]	[0.125]	---	[18.1]	[0.022]	[0.24]	---	[(0.0004)]	---	[1.94]	[(0.003)]
Provisional	S30200	[9.0]	[0.03]	[0.006]	[(0.004)]	[0.003]	[(0.002)]	[0.99]	[0.0021]	[(0.004)]	[0.002]	[0.018]	[(0.01)]	[0.034]	---	[(0.007)]
1D	AISI 303	---	---	(0.003)	<0.002	<0.001	0.061	---	18.24	0.208	0.51	---	---	---	1.98	0.130
Final	S30300	9.50	<0.005	0.027	0.007	0.025	---	0.22	0.34	<0.005	0.006	(0.002)	0.015	0.101	---	0.001
253A	AISI 303Se	0.003	---	---	0.0003	---	0.041	---	17.90	0.088	0.223	---	---	---	1.50	0.348
Final	S30323	9.17	0.016	0.0373	0.009	0.140	0.21	0.50	0.0089	---	0.01	0.002	0.10	0.106	---	---
2D	AISI 304	(0.002)	---	(0.006)	(0.0004)	(0.002)	0.047	---	18.22	0.098	0.43	---	<0.003	<0.001	1.48	0.48
<i>Chips Only</i>	S30400	8.86	0.003	0.0506	0.0080	0.031	<0.001	0.49	0.020	(0.002)	0.014	(0.002)	0.022	0.047	---	<0.005

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Stainless & High Temperature Steel Alloys

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	B O	Ca P	C Se	Ce Si	Cr S	Co Ta	Cu Sn	H Ti	Pb W	Mg V	Mn Zn	Mo Zr
2H Provisional	AISI 304 S30400	[0.004] [8.22]	[(0.002)] [0.010]	[(0.008)] [0.081]	[0.0004] [0.006]	[(0.002)] [0.032]	[0.051] [<0.0002]	--- [0.25]	[18.29] [0.028]	[0.129] [(0.007)]	[0.44] [0.011]	--- [0.002]	[(0.001)] [0.022]	--- [0.067]	[1.86] [(0.003)]	[0.27] [(0.004)]
162D Provisional	AISI 304L S30403	[0.003] [8.16]	[<0.002] [0.009]	[<0.008] [0.097]	[0.0026] [0.005]	[<0.002] [0.030]	[0.024] ---	--- [0.57]	[18.31] [0.027]	[0.075] [(0.01)]	[0.52] [0.011]	--- [0.012]	--- [0.026]	--- [0.063]	[1.82] [<0.002]	[0.57] [<0.003]
234A <i>Chips Only</i>	AISI 302 HQ S30430	0.36 8.06	--- 0.20	--- 0.096	0.0009 0.0007	--- 0.004	0.102 ---	--- 1.02	18.0 0.0026	0.35 (0.01)	3.65 0.003	--- 0.002	--- 0.02	--- 0.003	1.99 ---	0.004 ---
234C Provisional	AISI 302 HQ S30430	[0.035] [9.0]	--- [0.053]	[(0.002)] [0.008]	[0.0022] [0.004]	[(0.001)] [0.009]	[0.093] [(0.003)]	--- [0.89]	[18.2] [0.003]	[0.035] [(0.01)]	[3.40] [0.002]	--- [0.026]	--- [0.01]	--- [0.055]	[1.93] ---	[(0.01)] [(0.01)]
316A Final	Alloy 253MA S30815	0.006 10.81	--- 0.003	0.007 0.1605	(0.0003) 0.0052	0.0017 0.023	0.070 ---	0.064 1.50	21.07 0.0011	0.118 0.003	0.19 0.006	--- 0.002	(0.0001) 0.022	--- 0.042	0.61 (0.0008)	0.250 ---
3A <i>Chips Only</i>	AISI 309 S30900	(0.012) 12.48	--- 0.02	--- (0.089)	(0.0002) (0.020)	--- 0.026	0.076 ---	--- 0.43	22.54 0.002	0.113 ---	0.31 0.007	--- (0.002)	--- 0.04	--- 0.06	1.58 ---	0.36 ---
3B <i>Chips Only</i>	AISI 309 S30900	0.009 12.62	--- 0.077	<0.01 0.079	(0.0004) 0.0044	--- 0.027	0.058 <0.01	--- 0.46	22.41 0.0034	0.093 <0.01	0.282 0.008	--- 0.004	<0.005 0.047	<0.01 0.066	1.68 <0.001	0.49 <0.005
3E Provisional	AISI 309 S30900	[0.004] [11.99]	--- [0.014]	[(0.004)] [0.061]	[0.0004] [0.0046]	[(0.002)] [0.026]	[0.055] [(0.01)]	--- [0.31]	[22.5] [0.0009]	[0.119] [(0.005)]	[0.259] [0.008]	--- [0.0019]	[(0.0005)] [0.019]	--- [0.127]	[1.62] ---	[0.22] [(0.002)]
4D Final	AISI 310 S31000	0.009 20.20	--- 0.010	(0.003) 0.046	0.0008 0.004	(0.001) 0.022	0.052 ---	--- 0.49	24.34 0.0009	0.070 0.005	0.217 0.007	--- 0.0042	(0.0003) 0.026	(0.0003) 0.073	1.20 ---	0.39 (0.001)
4E Final	AISI 310 S31000	0.004 20.18	--- 0.024	(0.005) 0.038	0.0011 0.0021	--- 0.0224	0.044 ---	--- 0.514	24.25 0.0006	0.066 0.005	0.234 0.0060	--- 0.003	--- 0.046	--- 0.052	1.07 ---	0.32 (0.001)
302A <i>Chips Only</i>	Alloy 254SMO S31254	0.015 17.7	--- (0.01)	(0.007) 0.183	0.0027 0.003	(0.003) 0.024	0.024 ---	--- 0.54	20.3 0.0008	0.069 0.003	0.70 0.009	--- 0.003	--- 0.024	--- 0.052	0.92 ---	6.15 <0.01
302B Provisional	Alloy 254SMO S31254	[0.016] [17.7]	--- [0.014]	--- [0.182]	[0.0027] [0.003]	[(0.004)] [0.026]	[0.022] ---	--- [0.56]	[20.3] [0.0007]	[0.072] [(0.01)]	[0.70] [0.0071]	--- [0.005]	--- [0.028]	[(0.001)] [0.051]	[0.93] ---	[6.2] [(0.001)]
5G <i>Chips Only</i>	AISI 316 S31600	0.004 10.48	--- 0.007	0.006 0.033	0.0007 0.004	0.0007 0.028	0.044 ---	--- 0.27	17.5 0.026	0.33 (0.004)	0.37 0.010	--- 0.002	(0.0001) 0.050	(0.0004) 0.083	1.67 (0.001)	2.03 (0.002)
5H Provisional	AISI 316 S31600	[0.004] [10.05]	[(0.002)] [0.016]	[(0.007)] [0.051]	[0.0009] [(0.006)]	[<0.002] [0.030]	[0.047] ---	--- [0.405]	[16.86] [0.030]	[0.250] [(0.003)]	[0.46] [0.011]	--- [0.003]	[<0.0005] [0.081]	--- [0.068]	[1.46] ---	[2.03] [(0.003)]
163E Provisional	AISI 316L S31603	[0.0039] [10.17]	[(0.002)] [0.034]	[(0.008)] [0.061]	[0.0019] [0.007]	[(0.002)] [0.028]	[0.014] ---	--- [0.530]	[16.74] [0.031]	[0.115] ---	[0.47] [0.012]	--- [0.020]	[<0.0005] [0.035]	--- [0.063]	[1.48] ---	[2.05] [(0.001)]
339A Final	AISI 316H S31609	0.004 12.9	--- 0.005	(0.001) 0.0060	0.0006 0.016	0.0014 0.004	0.16 (0.0003)	--- 0.64	17.0 0.009	0.007 (0.005)	0.021 0.002	--- 0.002	(0.002) 0.0119	(0.0001) 0.007	1.71 (0.001)	2.79 0.003

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Stainless & High Temperature Steel Alloys

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	B O	Ca P	C Se	Ce Si	Cr S	Co Ta	Cu Sn	H Ti	Pb W	Mg V	Mn Zn	Mo Zr
153B	AISI 317L	0.006	---	(0.005)	0.0022	---	0.015	---	18.13	0.115	0.408	---	<0.002	---	1.58	3.12
<i>Chips Only</i>	S31703	13.19	0.008	0.0158	0.0052	0.031	---	0.28	0.0082	<0.01	0.014	0.002	0.020	0.031	---	---
153C	AISI 317L	[0.003]	[(0.001)]	[(0.006)]	[0.0007]	[(0.003)]	[0.023]	---	[18.22]	[0.25]	[0.446]	---	[(0.001)]	---	[1.60]	[3.0]
Provisional	S31703	[11.1]	[0.014]	[0.085]	[0.005]	[0.029]	---	[0.35]	[0.029]	[(0.01)]	[0.010]	[0.003]	[0.045]	[0.058]	---	[(0.004)]
292A	Alloy 2101	0.010	---	<0.01	0.0011	---	0.030	---	21.35	0.031	0.29	---	---	---	5.0	0.097
Final	S32101	1.47	0.009	0.245	0.0024	0.018	---	0.75	0.001	(0.006)	0.004	0.005	0.01	0.084	---	---
212D	Alloy 2205	0.005	---	(0.01)	0.001	(0.001)	0.019	---	22.6	0.049	0.125	---	(0.001)	---	1.21	3.27
Final	S32205	5.53	0.009	0.182	0.0034	0.024	---	0.34	0.0007	(0.003)	0.003	(0.002)	0.014	0.063	---	(0.004)
317A	Alloy 2304	0.005	---	(0.006)	0.0019	(0.0003)	0.025	---	22.5	0.064	0.21	---	(0.001)	---	1.26	0.249
Final	S32304	4.19	0.004	0.123	0.0032	0.028	---	0.39	0.0007	(0.004)	0.008	(0.002)	0.015	0.061	---	---
239B	Ferrallium 255	[0.009]	---	[(0.003)]	[0.001]	---	[0.013]	---	[25.9]	[0.047]	[1.48]	---	[(0.001)]	---	[0.86]	[3.42]
Provisional	S32550	[5.76]	[0.024]	[0.25]	[0.003]	[0.024]	---	[0.39]	[0.0007]	[(0.004)]	[0.003]	[0.002]	[0.10]	[0.10]	---	[0.002]
301A	Alloy 2507	[0.021]	---	---	[0.0020]	[(0.002)]	[0.016]	---	[24.9]	[0.038]	[0.108]	---	---	---	[0.81]	[3.85]
<i>Chips Only</i>	S32750	[6.95]	[0.007]	[0.281]	[0.004]	[0.020]	---	[0.27]	[0.0006]	[(0.003)]	[0.003]	[0.003]	[0.017]	[0.048]	---	---
301B	Alloy 2507	[0.006]	<0.001]	<0.004]	[0.003]	<0.001]	[0.021]	---	[25.1]	[0.055]	[0.19]	---	<0.005]	<0.0005]	[0.81]	[3.75]
Provisional	S32750	[7.01]	[0.020]	[0.30]	[0.007]	[0.026]	---	[0.42]	[0.0008]	[(0.003)]	[0.005]	[0.005]	[0.053]	[0.070]	<0.001]	<0.003]
319A	Zeron 100	[0.011]	---	[(0.005)]	[0.002]	---	[0.015]	---	[25.1]	[0.050]	[0.51]	---	---	---	[0.53]	[3.56]
Provisional	S32760	[6.9]	[0.006]	[0.239]	[0.003]	[0.023]	---	[0.23]	[0.0006]	[(0.003)]	[0.005]	[0.003]	[0.53]	[0.077]	---	[(0.002)]
8G	AISI 347	[0.0026]	[(0.01)]	[(0.007)]	[0.001]	<0.0005]	[0.042]	---	[17.20]	[0.16]	[0.39]	---	<0.0005]	---	[1.47]	[0.36]
Provisional	S34700	[9.01]	[0.53]	[0.046]	[0.0023]	[0.033]	<0.004]	[0.37]	[0.012]	[(0.005)]	[0.011]	[0.002]	[0.032]	[0.062]	<0.005]	[(0.003)]
335A	Alloy AM355	0.019	---	(0.01)	0.0007	(0.001)	0.138	---	15.30	0.063	0.086	---	(0.002)	---	0.85	2.72
Final	S35500	4.27	0.015	0.085	0.0020	0.016	---	0.39	0.0005	(0.01)	0.0034	(0.002)	0.008	0.094	---	(0.002)
9A	AISI 410	0.002	---	---	---	---	0.14	---	11.84	0.025	0.07	---	---	---	0.54	0.07
<i>Chips Only</i>	S41000	0.39	---	0.016	(0.028)	0.029	---	0.29	0.011	---	(0.007)	(0.004)	0.014	0.05	---	---
9B	AISI 410	0.024	---	---	---	---	0.13	---	11.97	0.016	0.054	---	---	---	0.54	0.064
<i>Chips Only</i>	S41000	0.30	0.028	0.0468	0.0019	0.019	---	0.29	0.006	---	0.004	0.005	0.01	0.048	---	---
9D	AISI 410	[0.004]	---	[(0.004)]	[0.001]	---	[0.142]	---	[12.52]	[0.022]	[0.11]	---	---	---	[0.58]	[0.037]
Provisional	S41000	[0.20]	[0.003]	[0.022]	[0.006]	[0.034]	---	[0.38]	[0.028]	[(0.004)]	[0.005]	[0.002]	[(0.005)]	[0.022]	---	[(0.002)]
327A	AISI 415	0.003	---	(0.004)	0.001	---	0.018	---	12.73	0.019	0.082	---	(0.0001)	(0.0003)	0.54	0.53
Final	S41500	3.83	0.008	0.0157	0.0047	0.018	---	0.43	0.0010	(0.004)	0.006	0.0026	0.009	0.036	---	(0.002)
10C	AISI 416	0.003	---	(0.006)	<0.0005	---	0.128	---	12.25	0.022	0.155	---	(0.0002)	---	0.35	0.08
<i>Chips Only</i>	S41600	0.24	0.003	0.015	0.008	0.026	---	0.37	0.29	---	0.009	0.002	0.011	0.024	---	(0.001)

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10D Provisional	AISI 416 S41600	[0.003] [0.29]	[(0.002)] [0.003]	[(0.005)] [0.024]	[(0.001)] [0.005]	[(0.001)] [0.018]	[0.110] ---	--- [0.47]	[12.4] [0.33]	[0.018] ---	[0.19] [0.009]	--- [0.002]	[(0.0004)] [(0.005)]	[(0.001)] [0.050]	[1.11] ---	[0.15] [(0.001)]
20A <i>Chips Only</i>	Greek Ascology S41800	(0.04) 2.02	--- 0.01	--- (0.04)	--- (0.029)	--- 0.015	0.18 ---	--- 0.35	12.78 0.011	0.034 ---	0.05 (0.003)	--- <0.01	--- 2.84	--- 0.10	0.41 ---	0.21 ---
20B Final	Greek Ascology S41800	0.006 1.94	--- 0.010	--- 0.0434	--- 0.0056	--- 0.019	0.18 ---	--- 0.40	12.42 0.004	0.030 ---	0.069 0.005	--- 0.004	--- 3.52	--- 0.17	0.35 ---	0.32 ---
20C Final	Greek Ascology S41800	(0.004) 1.93	--- 0.010	--- 0.0222	--- 0.0068	--- 0.018	0.18 ---	--- 0.35	12.15 0.007	0.031 ---	0.060 0.004	--- (0.003)	--- 2.59	--- 0.086	0.30 ---	0.12 ---
154A <i>Chips Only</i>	AISI 420 S42000	0.008 0.19	--- 0.004	--- 0.0294	--- (0.0068)	--- 0.018	0.39 ---	--- 0.35	12.82 0.003	0.021 ---	0.044 0.004	--- 0.002	--- 0.011	--- 0.045	0.47 ---	0.052 ---
154B <i>Chips Only</i>	AISI 420 S42000	0.002 0.223	--- 0.003	--- 0.020	(0.001) 0.0016	--- 0.017	0.35 ---	--- 0.45	12.20 0.0004	0.020 ---	0.087 0.006	--- 0.002	<0.001 0.010	--- 0.067	0.405 ---	0.079 ---
205C <i>X-Ray Only</i>	AISI 422 S42200	0.003 0.68	--- 0.010	0.004 0.040	0.0003 0.0041	(0.0005) 0.017	0.231 ---	--- 0.39	12.14 0.0034	0.058 (0.002)	0.109 0.004	--- 0.002	--- 1.03	--- 0.21	0.74 (0.001)	1.00 0.002
205d Provisional	AISI 422 S42200	[0.002] [0.84]	--- [0.013]	[(0.005)] [0.048]	[(0.001)] [0.005]	[(0.001)] [0.021]	[0.23] ---	--- [0.26]	[12.2] [0.003]	[0.043] [(0.003)]	[0.121] [0.005]	--- [0.002]	--- [1.09]	--- [0.32]	[0.74] ---	[1.00] [(0.002)]
11D Provisional	AISI 430 S43000	[0.014] [0.009]	[0.007] [0.0215]	[0.0007] [0.005]	[(0.003)] [0.023]	[0.069] [0.83]	[17.33] [0.003]	[0.023] [(0.002)]	[0.084] [0.006]	[0.003] [0.003]	[0.009] [0.009]	[0.052] [0.052]	[0.401] [0.401]	[0.076] [0.076]	[0.002] [0.002]	[0.002] [0.002]
12A <i>Chips Only</i>	AISI 431 S43100	(0.076) 2.27	--- 0.04	--- (0.057)	--- (0.020)	--- 0.024	0.14 ---	--- 0.37	16.03 0.006	0.03 ---	0.10 (0.007)	--- 0.004	--- 0.024	--- 0.07	0.61 ---	0.07 ---
12B <i>X-Ray Only</i>	AISI 431 S43100	(0.003) 2.15	--- 0.011	--- 0.061	(0.0003) 0.0101	--- 0.016	0.174 ---	--- 0.56	16.02 0.003	0.018 ---	0.143 0.006	--- 0.003	<0.0005 0.014	--- 0.037	0.60 ---	0.057 (0.002)
12C Final	AISI 431 S43100	0.004 2.23	--- 0.020	0.004 0.056	0.0004 0.005	0.0007 0.022	0.155 ---	--- 0.34	15.78 0.0032	0.048 (0.0005)	0.33 0.008	--- 0.002	(0.0005) 0.015	(0.0002) 0.040	0.55 ---	0.125 (0.001)
13C <i>Chips Only</i>	AISI 440C S44004	0.003 0.108	--- 0.004	<0.01 0.0188	<0.0005 0.0029	--- 0.017	1.02 ---	--- 0.69	16.84 0.001	0.021 <0.01	0.031 (0.004)	--- 0.005	<0.001 <0.005	--- 0.10	0.43 ---	0.455 <0.002
13D Provisional	AISI 440C S44004	[0.006] [0.26]	[(0.002)] [0.007]	[(0.01)] [0.049]	[(0.001)] [(0.003)]	[(0.001)] [0.020]	[1.04] [<0.005]	--- [0.61]	[16.4] [0.0010]	[0.021] [(0.003)]	[0.18] [0.011]	--- [0.003]	[<0.004] [0.04]	--- [0.058]	[0.70] ---	[0.49] [(0.001)]
14A <i>Chips Only</i>	AISI 446 S44600	<0.01 0.31	--- <0.01	--- 0.17	--- 0.021	--- 0.023	0.089 ---	--- 0.37	23.84 0.004	0.038 ---	0.06 0.013	--- <0.01	--- 0.014	--- 0.045	0.46 ---	0.05 ---
14B <i>X-Ray Only</i>	AISI 446 S44600	0.004 0.29	--- 0.006	<0.005 0.043	(0.0004) 0.0054	<0.005 0.022	0.016 ---	--- 0.51	23.60 0.0015	0.030 <0.001	0.071 0.005	--- 0.0024	<0.001 0.011	<0.001 0.11	0.426 ---	0.095 <0.005

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	B O	Ca P	C Se	Ce Si	Cr S	Co Ta	Cu Sn	H Ti	Pb W	Mg V	Mn Zn	Mo Zr
14C Provisional	AISI 446 S44600	[0.004] [0.37]	--- [0.013]	[(0.0045)] [0.058]	[0.001] [0.006]	--- [0.021]	[0.061] ---	--- [0.63]	[25.0] [0.002]	[0.044] [(0.004)]	[0.19] [0.005]	--- [0.013]	--- [0.031]	--- [0.079]	[0.38] ---	[0.10] [(0.002)]
15A <i>Chips Only</i>	Custom 450 S45000	0.029 6.54	--- 0.62	--- (0.015)	--- (0.022)	--- 0.021	0.033 ---	--- 0.41	14.9 0.003	0.11 ---	1.59 0.005	--- <0.01	--- 0.026	--- 0.09	0.38 ---	0.77 ---
15B Final	Custom 450 S45000	0.006 6.94	--- 0.65	--- 0.0355	--- 0.0039	--- 0.013	0.047 ---	--- 0.33	14.53 0.001	0.24 ---	1.53 0.009	--- 0.005	--- 0.12	--- 0.033	0.39 ---	0.82 ---
16C Final	Custom 455 S45500	0.072 8.23	--- 0.248	0.003 0.0030	0.0011 0.0014	--- 0.007	0.003 ---	--- 0.03	11.34 0.0046	0.017 (0.005)	2.08 0.003	--- 1.16	--- 0.008	(0.0001) 0.070	0.024 ---	0.009 0.0010
291A Final	M-152 S64152	(0.004) 2.62	--- 0.022	(0.005) 0.035	0.001 0.014	(0.001) 0.016	0.11 ---	--- 0.23	11.3 0.009	0.021 (0.001)	0.060 0.004	--- 0.0011	--- (0.01)	--- 0.29	0.71 ---	1.61 <0.005
26C <i>X-Ray Only</i>	A286 S66286	0.12 25.05	--- 0.002	0.004 0.0045	0.0074 0.002	(0.0002) 0.017	0.028 ---	--- 0.08	13.7 0.0004	0.052 0.002	0.144 0.011	--- 1.87	--- 0.01	(0.0003) 0.238	0.25 (0.002)	1.09 (0.001)
242A Final	Aermet 100 K92580	0.004 11.1	--- 0.004	--- 0.0003	(0.0005) 0.0006	--- 0.002	0.24 ---	--- 0.02	3.00 0.0004	13.5 0.008	0.007 (0.001)	--- 0.009	--- <0.01	--- 0.01	0.018 ---	1.21 (0.002)
308A Final	Alloy C-250 K92890	0.097 18.53	--- 0.003	(0.003) 0.0013	0.0029 0.0005	(0.0003) 0.004	0.003 ---	--- 0.014	0.023 0.0005	7.80 <0.01	0.018 0.001	--- 0.46	--- 0.01	--- 0.01	0.019 ---	4.78 0.01
99B <i>X-Ray Only</i>	Maraging 300 K93120	0.095 18.46	--- (0.005)	--- 0.0011	0.0026 0.0015	--- 0.005	0.005 ---	--- 0.022	0.081 0.0005	9.24 ---	0.094 (0.003)	--- 0.74	--- 0.016	--- 0.012	0.036 ---	4.88 <0.01
309A Final	Alloy C-350 K93540	0.11 18.4	--- 0.004	(0.004) 0.0010	0.0032 0.0005	<0.001 0.004	0.0059 ---	--- 0.020	0.053 0.0006	12.3 (0.006)	0.023 (0.001)	--- 1.47	--- 0.01	--- 0.01	0.018 ---	4.71 0.008
24A <i>X-Ray Only</i>	Invar-36 K93601	(0.002) 36.1	--- (0.01)	--- (0.003)	--- (0.01)	--- 0.01	0.055 (0.17)	--- 0.27	0.17 0.001	0.06 <0.2	0.08 (0.002)	--- (0.002)	--- (0.04)	--- 0.02	0.76 ---	0.01 ---
24B Final	Invar-36 K93601	0.002 35.86	--- <0.01	<0.005 0.0017	(0.001) 0.003	--- 0.009	0.053 0.19	--- 0.28	0.121 0.0010	0.036 <0.005	0.052 0.0018	--- 0.002	--- <0.04	--- <0.005	0.82 ---	0.011 <0.005
98A <i>Chips Only</i>	Kovar K94610	0.04 (29.09)	--- <0.01	--- ---	--- ---	--- (0.002)	0.019 ---	--- 0.10	0.12 0.002	(17.50) ---	0.05 ---	--- <0.01	--- (0.03)	--- <0.01	0.24 ---	0.05 <0.01
98B Final	Kovar K94610	0.07 29.4	--- 0.002	<0.002 0.0024	0.001 0.0021	<0.0005 0.002	0.007 ---	--- 0.17	0.012 0.0007	17.0 <0.05	0.028 0.002	--- 0.03	<0.0005 (0.02)	0.0040 (0.003)	0.18 <0.0005	0.010 <0.01
214A Final	NMS-100 N/A	(0.002) 2.33	--- 0.23	--- 0.27	(0.001) 0.0026	--- 0.033	0.018 ---	--- 1.00	12.36 0.002	0.021 ---	0.36 0.008	--- 0.002	--- 0.02	--- 0.04	18.3 ---	0.44 ---
294A Final	NMS J38 N/A	(0.01) 2.9	--- 0.03	--- 0.78	(0.003) 0.003	--- 0.026	0.017 ---	--- 0.43	19.7 0.0028	0.021 (0.003)	0.34 (0.006)	--- (0.002)	(0.001) 0.01	--- 0.046	21.6 ---	1.8 (0.002)

() and < > Indicates non-certified value.

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Stainless & High Temperature Steel Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	B O	Ca P	C Se	Ce Si	Cr S	Co Ta	Cu Sn	H Ti	Pb W	Mg V	Mn Zn	Mo Zr
295A	NMS 140	(0.01)	---	---	0.002	---	0.021	---	18.0	0.021	0.113	---	---	---	19.7	0.97
Final	N/A	1.84	0.018	0.62	0.003	0.028	---	0.36	0.0041	---	0.004	0.0019	0.016	0.046	---	(0.001)
296A	NMS MDC	(0.005)	---	---	(0.001)	---	0.074	---	11.2	0.018	0.12	---	---	---	10.6	0.60
Final	N/A	1.71	0.043	0.23	0.003	0.027	---	0.38	0.002	---	0.007	0.002	0.01	0.056	---	---
100C	Haynes 556	0.35	---	<0.005	(0.002)	---	0.104	---	17.9	21.9	0.105	---	---	(0.001)	0.97	3.06
<i>X-Ray Only</i>	R30556	20.5	0.172	0.126	0.001	0.013	---	0.441	0.0005	0.67	0.003	0.013	0.039	2.49	---	0.006

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CP Nickel & Nickel Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Ca Re	C Si	Cr Ag	Co S	Cu Ta	Hf Sn	Fe Ti	La W	Pb V	Mg Y	Mn Zr	Mo
51A <i>Chips Only</i>	Alloy 400 N04400	0.05 (66.02)	--- <0.01	--- ---	--- ---	<0.001 0.008	--- ---	0.13 0.26	0.01 ---	0.015 0.001	29.87 <0.01	--- ---	2.07 0.05	--- <0.01	--- <0.01	(0.024) ---	1.49 <0.01	<0.01
202A Final	Alloy R-405 N04405	0.080 64.8	--- ---	--- 0.0004	--- (0.0018)	<0.002 0.011	--- ---	0.13 0.046	0.008 ---	0.020 0.032	32.3 (0.008)	--- ---	1.31 0.005	--- <0.01	--- <0.01	0.024 ---	1.03 0.010	<0.01
69D Final	Alloy X N06002	0.21 48.1	(0.0005) 0.204	(0.003) 0.029	(0.00002) 0.0012	0.0044 0.012	--- ---	0.090 0.63	21.13 0.00012	1.67 0.0003	0.075 (0.01)	--- 0.0020	17.7 0.004	--- 0.49	0.00010 0.033	0.0021 ---	0.72 0.0074	8.78
65C Final	Alloy C-22 N06022	[0.18] [55.8]	[(0.0002)] [0.027]	--- [0.034]	--- [(0.001)]	[(0.001)] [0.012]	--- ---	[0.005] [0.04]	[21.13] [(0.0001)]	[1.43] [0.0006]	[0.073] [(0.02)]	--- [(0.001)]	[4.70] [0.005]	--- [2.75]	--- [0.010]	[0.0026] ---	[0.288] [(0.004)]	[13.29]
65D Final	Alloy C-22 N06022	0.29 56.8	--- 0.033	--- 0.019	--- 0.0005	(0.001) 0.008	--- ---	0.0021 0.035	21.5 (0.0001)	1.22 0.0004	0.050 (0.01)	--- (0.001)	3.7 0.005	--- 2.81	--- 0.012	0.007 ---	0.28 (0.002)	13.1
338A <i>Provisional</i>	Alloy 602CA N06025	[2.13] [62.3]	[(0.0001)] [0.004]	--- [0.028]	--- [0.0008]	[0.004] [0.003]	[(0.001)] ---	[0.17] [0.02]	[25.3] [(0.00004)]	[0.035] [0.0007]	[0.005] ---	--- [0.0004]	[9.8] [0.13]	--- ---	[(0.0001)] [0.003]	[0.006] [0.07]	[0.05] [0.08]	[0.0013]
67A <i>Chips Only</i>	Alloy G-30 N06030	0.20 (40.30)	--- 0.70	--- ---	--- ---	(0.005) 0.016	--- ---	0.019 0.30	28.77 ---	3.61 0.0014	1.88 (0.024)	--- <0.01	14.88 0.03	--- 3.13	<0.001 (0.04)	--- ---	1.11 <0.01	5.02
67C Final	Alloy G-30 N06030	0.14 45.8	(0.0003) 0.36	--- 0.035	--- 0.0016	0.001 0.011	--- ---	0.0058 0.14	28.9 ---	1.75 0.0006	1.24 (0.006)	--- 0.0014	13.48 0.005	--- 1.97	--- 0.031	0.0068 ---	1.01 0.002	4.93
329A <i>Provisional</i>	Alloy G-35 N06035	[0.29] [55.8]	[(0.0001)] [0.13]	[(0.001)] [0.073]	--- [0.003]	[(0.001)] [0.006]	--- ---	[0.008] [0.05]	[33.7] [(0.0001)]	[0.049] [0.0003]	[0.065] [(0.01)]	--- [(0.0003)]	[0.9] [0.005]	--- [0.02]	[(0.00003)] [0.009]	[(0.01)] ---	[0.22] [(0.001)]	[8.4]
258A Final	Alloy C-2000 N06200	0.30 58.6	<0.001 0.01	<0.001 0.032	--- 0.0009	0.001 0.005	--- ---	0.005 0.015	22.8 ---	0.083 0.0007	1.54 <0.01	--- <0.001	0.85 0.003	--- 0.14	<0.0005 0.014	0.009 ---	0.21 <0.005	15.5
68D <i>Provisional</i>	Haynes 230 N06230	[0.33] [60.3]	--- [0.029]	--- [0.0483]	--- [(0.0005)]	[0.004] [0.006]	--- ---	[0.099] [0.42]	[21.6] ---	[0.16] [(0.0001)]	[0.015] [(0.01)]	--- ---	[1.11] [0.011]	[(0.011)] [14.1]	--- [0.009]	[0.006] ---	[0.49] [0.003]	[1.29]
60A <i>Chips Only</i>	RA 333 N06333	(0.08) (44.20)	--- 0.14	--- (0.044)	--- ---	(0.003) (0.017)	--- ---	0.058 1.21	25.72 ---	3.02 0.001	0.10 (0.02)	--- <0.01	17.71 0.03	--- 2.98	<0.002 0.07	--- ---	1.50 <0.01	3.09
60B <i>Chips Only</i>	RA 333 N06333	0.05 45.3	0.002 0.016	<0.01 0.029	--- 0.0035	0.002 0.015	--- ---	0.062 0.87	25.3 ---	2.9 0.0003	0.05 (0.01)	--- 0.002	17.9 0.004	--- 3.08	--- 0.070	(0.001) ---	1.53 0.001	2.87
272A Final	Alloy 617 N06617	1.16 52.68	(0.0001) 0.015	(0.0002) 0.0049	<0.00001 0.0007	0.003 0.003	--- ---	0.082 0.07	21.98 (0.0001)	12.89 0.0002	0.015 (0.01)	--- (0.0003)	1.10 0.50	--- 0.061	(0.0001) 0.005	0.002 ---	0.067 0.002	9.34
62E Final	Waspaloy N07001	1.36 57.3	--- 0.037	(0.001) 0.0029	--- 0.001	0.0068 0.004	--- ---	0.035 0.054	19.56 ---	13.23 0.0003	0.012 0.004	--- 0.0011	0.90 3.07	--- 0.036	--- 0.034	0.0018 ---	0.019 0.061	4.27
325A Final	Rene 41 N07041	1.56 56.1	--- 0.007	(0.0004) 0.0016	--- 0.0005	0.0082 0.003	(0.0003) ---	0.067 0.012	18.52 (0.00001)	10.46 0.0003	(0.003) 0.003	--- (0.0002)	0.07 3.16	--- 0.03	(0.00004) 0.01	0.0044 ---	0.004 0.002	9.98

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CP Nickel & Nickel Alloys

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Ca Re	C Si	Cr Ag	Co S	Cu Ta	Hf Sn	Fe Ti	La W	Pb V	Mg Y	Mn Zr	Mo
61A <i>Chips Only</i>	Haynes 214 N07214	4.42 (75.62)	--- (0.01)	--- ---	--- ---	0.005 0.003	--- ---	0.042 0.02	16.12 ---	<0.01 0.001	(0.01) <0.01	---	3.57 <0.01	---	<0.001 <0.01	<0.002 (0.005)	0.17 0.02	<0.01
273A Provisional	Alloy C263 N07263	[0.49] [50.3]	[(0.0001)] [0.019]	[(0.001)] [0.0036]		[0.001] [0.003]	---	[0.060] [0.08]	[20.4] [(0.00002)]	[20.1] [0.0003]	[0.007] [(0.01)]	---	[0.28] [2.1]	---	[(0.0001)] [0.007]	[0.0022] ---	[0.21] [(0.001)]	[5.8]
287A Provisional	Udimet 500 N07500	[3.01] [54.8]	---	---		[0.009] [0.002]	---	[0.079] [0.017]	[18.47] ---	[17.0] [0.0008]	[0.002] [0.010]	---	[0.084] [3.01]	---	---	[0.0023] ---	[0.003] [0.008]	[3.51]
274A Final	Alloy 725 N07725	0.26 57.5	---	---	---	0.002 0.007	---	0.007 0.02	21.0 ---	0.143 0.0004	0.10 (0.002)	---	7.60 1.55	---	---	0.0019 ---	0.08 (0.001)	8.06
25A <i>Chips Only</i>	20Cb3 N08020	0.01 (39.45)	---	---	---	---	---	0.024 0.32	19.63 ---	0.27 0.003	3.23 (0.21)	---	---	---	(0.003) 0.10	---	0.48 ---	2.10
7A <i>Chips Only</i>	Alloy 330 N08330	0.022 35.53	---	---	---	---	---	0.063 1.24	19.00 ---	0.06 0.004	0.19 (0.19)	---	(41.75) (0.004)	---	(0.005) 0.05	---	1.47 ---	0.19
7B <i>Chips Only</i>	Alloy 330 N08330	0.023 35.84	---	---	---	(0.002)	---	0.062 1.38	19.32 ---	0.069 (0.001)	0.21 ---	---	(43.0) (0.005)	---	---	---	0.0130 ---	0.023
7C Final	Alloy 330 N08330	0.017 34.9	(0.0003)	(0.002)	---	0.0027 0.014	(0.002)	0.064 1.21	18.4 ---	0.041 0.0004	0.031 (0.002)	---	43.5 0.022	---	(0.0001) (0.02)	0.0015 ---	1.32 (0.001)	0.095
58B Final	Alloy 800 N08800	0.45 30.7	---	(0.002)	---	0.0003 0.010	---	0.073 0.282	19.6 ---	0.02 0.001	0.011 <0.01	---	47.7 0.50	---	(0.0001) 0.035	(0.001) ---	0.51 <0.005	0.01
59A <i>Chips Only</i>	Alloy 825 N08825	0.05 (40.91)	---	---	---	(0.002) 0.017	---	0.02 0.10	22.12 ---	0.25 0.001	1.71 <0.01	---	30.82 0.83	---	---	<0.001 ---	0.33 <0.01	2.68
59B <i>Chips Only</i>	Alloy 825 N08825	0.18 40.01	---	---	---	(0.0008) 0.010	---	0.032 0.23	21.20 ---	0.049 0.0028	2.48 ---	---	31.25 0.96	---	---	(0.002) ---	0.45 (0.005)	3.05
59E Final	Alloy 825 N08825	0.067 39.7	(0.001)	(0.001)	---	0.0027 0.015	---	0.0073 0.232	21.9 (0.00004)	0.270 0.0009	1.7 (0.004)	---	31.6 0.81	---	(0.00002) 0.049	(0.0001) ---	0.502 0.002	2.72
347A Provisional	Alloy 904L N08904	[0.017] [24.8]	[(0.001)] [0.011]	[(0.005)] [0.062]		[0.0022] [0.023]	[(0.003)]	[0.023] [0.55]	[20.2] [(0.0002)]	[0.082] [0.0009]	[1.34] [(0.01)]	---	[47.5] [(0.01)]	---	[(0.0003)] [0.077]	[0.0008] ---	[1.24] [(0.002)]	[4.2]
275A <i>X-ray only</i>	Alloy 925 N09925	0.22 42.8	---	---	---	0.002 0.019	---	0.010 0.23	20.1 ---	0.41 0.0003	1.77 <0.01	---	27.9 2.31	---	---	<0.001 ---	0.61 (0.001)	3.20
328A Provisional	Alloy 945 N09945	[0.19] [47.1]	[0.00024] [3.1]	[(0.001)] [0.0055]		[0.0010] [0.005]	---	[0.005] [0.020]	[20.56] ---	[0.002] [0.0007]	[1.93] [(0.003)]	---	[22.42] [1.53]	---	[(0.00001)] [0.008]	[(0.001)] ---	[0.02] [0.003]	[3.16]
55A <i>Chips Only</i>	Haynes 242 N10242	0.24 (64.71)	---	---	---	(0.005) 0.003	---	0.03 0.11	7.90 ---	0.04 (0.001)	(0.03) (0.01)	---	1.09 0.01	---	---	---	0.33 <0.02	(25.4)

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CP Nickel & Nickel Alloys

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IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Ca Re	C Si	Cr Ag	Co S	Cu Ta	Hf Sn	Fe Ti	La W	Pb V	Mg Y	Mn Zr	Mo
55B Final	Haynes 242 N10242	0.09 65.4	<0.0001 0.08	--- 0.016	--- 0.0009	0.002 0.005	<0.005 ---	0.004 0.021	8.25 ---	0.036 0.0010	0.013 (0.08)	---	1.12 0.002	---	<0.002 0.005	0.011 ---	0.323 (0.005)	24.62
66D Chips Only	Alloy C-276 N10276	0.18 60.1	--- 0.014	--- 0.0038	(0.00001) 0.0009	0.0008 0.004	(0.001) ---	0.0041 0.04	14.83 (0.00001)	0.033 0.0004	0.013 (0.004)	---	5.48 0.007	---	(0.00003) 0.207	0.0008 ---	0.52 0.003	15.38
63A Chips Only	Alloy B-2 N10665	0.28 (69.67)	--- <0.01	--- ---	--- ---	--- 0.004	--- ---	0.005 0.02	0.55 ---	0.09 0.001	0.05 <0.01	---	1.47 <0.01	---	<0.001 (0.18)	---	0.19 (0.02)	27.48
257A Chips Only	Hastelloy B-3 N10675	0.34 67.9	<0.0005 <0.03	<0.001 0.0039	--- 0.0004	<0.003 0.004	---	0.005 0.024	1.57 ---	0.024 0.0005	0.019 <0.005	---	1.47 0.002	---	<0.0005 0.01	0.010 ---	0.63 (0.008)	28.0
203A Final	Alloy 909 N19909	0.066 38.4	--- 5.00	--- 0.0010	--- ---	(0.002) 0.006	---	0.005 0.41	0.72 ---	12.9 0.0009	0.05 ---	---	40.6 1.58	---	<0.002 <0.01	0.023 ---	0.09 <0.01	0.09
277A Final	Rene 77 NA	4.38 58.9	--- 0.034	--- 0.0017	--- 0.0005	0.015 0.002	---	0.080 0.037	14.35 ---	14.5 0.0010	0.004 (0.02)	---	0.16 3.40	---	<0.003 0.011	0.0021 ---	0.01 0.010	4.22
283A Final	B 1900 NA	6.05 64.4	(0.00002) 0.020	--- 0.0003	--- 0.0004	0.014 0.003	---	0.114 0.019	8.05 ---	9.8 0.0006	(0.01) 4.3	(0.0002)	0.044 0.98	(0.002)	---	0.0033 0.0058	0.001 0.053	5.94
332A Provisional	CMSX-4 NA	[5.8] [61]	--- [0.005]	[(0.0002)] [0.0002]	--- [0.0003]	[0.001] [(0.002)]	---	[0.004] [2.9]	[6.31] ---	[9.4] [0.0003]	[(0.01)] [6.51]	[0.098] ---	[0.023] [0.99]	---	---	[0.006] ---	[(0.004)] [0.003]	[0.61]
333A Provisional	Mar-M 247 NA	[5.53] [61.1]	--- [0.005]	--- [0.0013]	--- [0.0004]	[0.015] [(0.004)]	---	[0.072] [(0.01)]	[8.32] ---	[9.4] [0.0004]	[(0.01)] [3.15]	[1.40] ---	[0.036] [0.73]	---	---	[0.0013] ---	[(0.005)] [0.009]	[0.49]

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Hi-Purity Nickel Materials

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Ag Mo	Al N	As Ni	B O	Be P	Bi Pb	C S	Ca Sb	Cd Se	Co Si	Cr Sn	Cu Te	Fe Ti	Ga Tl	Mg V	Mn Zn
187A	HPNI	0.1	11	0.1	(<5)	(<1)	<0.1	13	<10	(<0.1)	1.0	(3)	2.2	19	<0.5	(2)	3.0
Final	N/A	(<1)	(1)	Bal.	(14)	<1.0	0.15	1.9	<0.5	<0.1	(18)	0.4	<0.1	(3)	<0.2	(0.8)	<0.5
188A	HPNI-LO	1.1	24	0.7	(<5)	(<1)	0.9	22	<10	0.2	1.7	(6)	1.8	19	<0.5	(4)	2.3
Final	N/A	<1	(1)	Bal.	(17)	1.4	1.0	1.8	1.1	0.7	18	1.1	0.8	(2)	-0.9	(<0.5)	2.3
189A	HPNI-MI	2.4	44	0.7	(<5)	(<1)	2.6	23	<10	0.8	3.1	(10)	9.0	38	<0.5	(8)	1.9
Final	N/A	(<1)	(1)	Bal.	(18)	3.7	2.9	1.8	3.9	2.1	19	2.2	1.7	(3.3)	2.3	(<0.5)	2.8
190A	HPNI-HI	10.9	50	28	<5	(<1)	11.1	22	<10	5	8	(1)	17	99	<0.5	(6)	1.8
Final	N/A	(<1)	(1)	Bal.	(19)	34	9.3	3.3	11	6.5	28	6.2	8.9	(6)	5.8	(<0.5)	8.1
191A	ELNI-HP	0.1	1.5	13	(<5)	(<1)	<0.1	14	<10	<0.1	545	2.1	4.2	7.9	<0.5	(2)	3.1
Final	N/A	(<1)	(2)	Bal.	(30)	<1.0	0.3	2.1	<0.5	1.9	(5)	0.4	<0.1	(<1)	<0.2	(<0.5)	1.9

All Values Reported in ppm.

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

CP Cobalt & Cobalt Based Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Ni	Sb Nb	As N	Bi O	B P	Ca Re	C Si	Cr Ag	Co S	Cu Ta	Hf Sn	Fe Ti	La W	Pb V	Mg Y	Mn Zr	Mo
326A	Permendur 2V	(0.003)	---	<0.005	---	(0.001)	---	(0.002)	(0.002)	48.4	(0.002)	---	49.6	---	---	(0.001)	0.003	(0.002)
Final	R30005	0.037	0.038	0.0004	0.0082	0.0013	---	0.029	---	0.0011	(0.01)	<0.001	(0.002)	(0.001)	1.94	---	0.002	
95D	Alloy 6B	0.080	(0.0002)	---	---	0.0015	---	1.06	29.9	57.9	0.009	---	0.84	---	(0.00001)	(0.0002)	1.47	0.954
Final	R30016	2.99	0.024	0.0417	0.0009	0.0053	---	0.64	---	0.0003	0.03	(0.0001)	0.009	3.98	0.0100	---	(0.001)	
207A	MP35N	0.040	---	---	---	0.011	---	0.007	19.98	33.46	0.017	---	0.64	---	---	(0.0005)	0.015	9.6203
Final	R30035	35.19	0.043	0.0031	0.0011	0.002	---	0.053	---	0.0027	0.007	---	0.91	0.028	0.011	---	0.003	
208B	F-75	0.04	---	---	(0.0002)	0.005	---	0.100	30.0	60.0	0.03	---	1.17	---	0.0006	(0.0004)	0.75	6.63
<i>Chips Only</i>	R30075	0.42	0.06	0.003	0.0015	0.004	---	0.63	(0.0005)	0.0009	0.042	0.004	0.029	0.03	0.05	---	0.002	
208C	F 75	0.07	---	<0.0005	<0.0005	0.002	---	0.052	27.55	64.0	0.01	---	0.29	(0.0005)	(0.001)	(0.0002)	0.53	6.12
<i>Chips Only</i>	R30075	0.63	0.011	0.169	0.0010	0.008	---	0.62	<0.0001	0.0004	(0.02)	(0.001)	0.012	0.02	0.012	---	0.0014	
97B	Alloy 188	0.08	---	---	---	(0.002)	---	0.096	21.2	42.5	0.07	---	1.92	0.005	<0.005	<0.002	0.76	0.56
Final	R30188	19.4	0.022	0.014	0.003	0.009	---	0.34	---	(0.001)	0.019	<0.005	0.006	12.9	0.012	---	(0.001)	
97C	Alloy 188	0.19	---	(0.0005)	---	0.0028	---	0.130	22.2	35.8	0.027	---	2.34	0.009	---	0.0010	0.82	0.36
Final	R30188	22.8	0.023	0.075	0.0007	0.011	---	0.47	---	0.0004	0.04	(0.001)	0.011	14.6	0.010	---	(0.007)	
96A	Alloy 25	0.03	---	---	---	(0.003)	---	0.10	20.17	(49.48)	0.04	---	2.29	---	---	---	1.52	0.28
<i>Chips Only</i>	R30605	10.53	0.07	---	---	0.009	---	0.17	---	0.0011	(0.08)	<0.01	0.01	15.20	0.01	---	(0.01)	
96B	Alloy 25	0.035	<0.0005	<0.001	<0.0005	0.0021	<0.02	0.132	20.54	49.4	0.047	---	2.29	<0.005	<0.005	(0.0005)	1.39	1.17
Final	R30605	10.04	0.046	0.007	0.002	0.0063	---	0.16	<0.0005	0.0005	0.028	(0.003)	0.007	14.52	0.012	<0.0005	0.007	
96C	Alloy 25	0.08	<0.0005	<0.001	<0.0005	0.002	<0.005	0.132	19.95	47.1	0.08	---	2.93	<0.005	<0.005	(0.0002)	1.91	1.88
Final	R30605	10.36	0.047	0.031	0.001	0.008	---	0.31	<0.0005	0.001	0.030	<0.005	0.007	15.4	0.012	<0.0001	0.009	
64C	Ultimet 1233	0.138	<0.0005	<0.001	---	0.0010	---	0.064	25.4	53.4	0.019	---	2.99	---	---	0.0043	0.79	4.72
Final	R31233	9.47	0.016	0.113	0.0012	0.0064	---	0.24	---	0.0004	0.02	<0.01	0.007	2.39	0.020	---	<0.01	

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

Copper, Brass & Bronze Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Mg	Sb Mn	As Ni	Be Nb	Bi N	B O	Cd P	C Se	Cr Si	Co Ag	Cu S	Ge Te	In Sn	Fe Zn	Pb Zr
278A	CDA 145	<0.002	<0.005	(0.001)	---	(0.001)	---	---	0.003	(0.001)	0.001	99.5	---	---	0.004	0.003
Final	C14500	(0.0005)	(0.0004)	<0.005	---	(0.0001)	(0.0004)	0.011	---	0.002	(0.001)	0.002	0.53	0.001	0.002	---
71B	CDA 172	0.040	(0.002)	---	1.84	---	---	---	0.003	0.0030	0.21	97.7	---	---	0.042	0.006
<i>Chips Only</i>	C17200	(0.004)	0.0010	0.021	---	(0.0005)	(0.002)	0.004	---	0.060	(0.002)	(0.0004)	---	0.005	0.005	---
279A	CDA 182	0.002	(0.004)	(0.002)	---	(0.001)	---	(0.0005)	0.002	0.86	0.002	99.1	---	---	0.025	0.01
Final	C18200	(0.001)	(0.002)	0.014	---	(0.0003)	(0.001)	0.005	---	0.020	0.003	0.0015	---	0.021	0.01	0.012
72A	CDA 314	<0.01	<0.01	---	<0.001	---	---	---	(0.014)	---	<0.01	(89.71)	---	---	0.011	1.78
<i>Chips Only</i>	C31400	---	<0.01	<0.01	---	---	---	(0.007)	---	<0.01	<0.005	0.0014	---	<0.01	8.48	---
72B	CDA 314	---	0.006	(0.003)	---	---	---	---	0.002	---	---	90.08	---	---	0.007	1.99
Final	C31400	---	---	0.004	---	(0.0002)	0.002	0.005	---	(0.002)	(0.002)	0.0015	---	0.029	7.81	---
73C	CDA 360	(0.001)	0.008	0.005	---	0.011	(0.0004)	0.0014	(0.003)	0.001	0.002	61.3	---	---	0.199	2.97
Final	C36000	(0.001)	0.003	0.095	(0.001)	---	(0.0003)	0.003	---	0.003	0.006	0.002	---	0.256	35.1	---
74A	CDA 464	<0.01	<0.01	<0.01	---	---	---	---	(0.012)	---	---	(64.30)	---	---	0.01	0.02
<i>Chips & X-Ray</i>	C46400	---	<0.01	0.01	---	---	---	0.006	---	<0.01	(0.002)	0.001	---	0.50	38.14	---
74B	CDA 464	0.003	0.003	<0.01	---	<0.005	---	(0.002)	---	---	---	60.4	---	---	0.011	0.017
Final	C46400	---	<0.01	0.006	---	---	---	(0.008)	---	0.003	(0.005)	(0.003)	---	0.70	38.9	---
75A	CDA 482	<0.01	<0.01	<0.01	---	---	---	---	(0.010)	---	---	(59.79)	---	---	0.052	0.83
<i>Chips Only</i>	C48200	---	<0.01	0.025	---	---	---	0.005	---	<0.01	---	0.002	---	0.89	38.39	---
75B	CDA 482	(0.005)	(0.004)	(0.004)	---	(0.001)	---	(0.002)	(0.004)	---	(0.003)	60.63	---	---	0.06	0.63
Final	C48200	---	(0.003)	0.02	---	---	---	0.003	---	(0.003)	(0.005)	(0.001)	---	0.59	38.0	---
76A	CDA 485	<0.01	<0.02	<0.01	---	---	---	---	(0.031)	---	---	(60.92)	---	---	0.08	1.80
<i>Chips Only</i>	C48500	---	<0.01	0.03	---	---	---	0.005	---	<0.01	(0.002)	0.002	---	0.99	36.14	---
76C	CDA 485	(0.004)	(0.004)	(0.003)	---	---	---	---	0.003	---	---	60.4	---	---	0.013	1.6
<i>Chips Only</i>	C48500	---	(0.001)	0.003	---	---	<0.005	0.003	---	(0.003)	(0.002)	(0.001)	---	0.66	37.2	---
76D	CDA 485	[0.002]	[(0.004)]	[0.002]	[(0.001)]	[0.0011]	---	[(0.001)]	[(0.002)]	[(0.001)]	[0.001]	[60.7]	---	---	[0.013]	[1.68]
Provisional	C48500	[(0.001)]	[(0.001)]	[0.003]	---	---	---	[(0.001)]	[0.002]	---	[0.004]	[(0.001)]	[0.0014]	---	[0.73]	[36.8]
77A	CDA 510	<0.01	(0.01)	<0.01	---	---	---	---	(0.012)	---	<0.01	(95.21)	---	---	0.01	(0.011)
<i>Chips Only</i>	C51000	---	0.01	<0.01	---	---	---	0.12	---	<0.01	(0.010)	0.003	---	4.60	0.03	---
77B	CDA 510	(0.001)	0.005	(0.001)	---	(0.004)	---	---	0.003	---	---	95.2	---	---	0.002	0.016
Final	C51000	---	(0.002)	0.002	---	(0.0001)	(0.002)	0.148	---	(0.003)	(0.002)	0.002	---	4.66	0.007	(0.001)
78B	CDA 544	(0.002)	0.01	<0.003	---	(0.001)	---	---	<0.002	---	<0.0005	87.7	---	---	0.02	3.87
Final	C54400	---	(0.002)	0.077	---	---	---	0.19	---	<0.002	0.008	0.010	---	4.73	3.55	---

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Copper, Brass & Bronze Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Mg	Sb Mn	As Ni	Be Nb	Bi N	B O	Cd P	C Se	Cr Si	Co Ag	Cu S	Ge Te	In Sn	Fe Zn	Pb Zr
79B	CDA 623	9.19	---	---	---	(0.003)	---	---	0.002	(0.003)	(0.002)	88.4	---	---	2.13	(0.003)
Final	C62300	---	0.16	0.075	---	(0.001)	(0.002)	0.005	---	0.019	0.002	(0.001)	---	0.017	0.013	---
79C	CDA 623	9.20	<0.005	0.003	---	---	---	---	0.003	(0.002)	<0.005	87.6	---	---	2.28	<0.005
Final	C62300	---	0.20	0.55	---	<0.0001	(0.001)	0.006	---	0.033	<0.005	<0.001	---	0.010	0.014	---
80B	CDA 630	10.19	(0.004)	(0.004)	---	<0.005	---	---	(0.01)	0.012	0.014	81.2	---	---	3.31	0.009
<i>Chips Only</i>	C63000	---	0.54	4.69	---	---	---	0.009	---	0.030	0.006	(0.001)	---	0.018	0.078	---
80C	CDA 630	10.1	(0.005)	0.006	---	---	---	---	0.008	0.013	0.008	80.5	---	---	3.86	0.004
<i>X-Ray</i>	C63000	(0.002)	0.58	4.71	---	(0.0003)	0.0007	0.004	---	0.077	---	(0.001)	---	0.003	0.096	---
81B	CDA 642	6.70	0.003	0.058	---	<0.001	---	---	0.002	0.002	---	91.2	---	---	0.047	0.006
Final	C64200	---	0.012	0.003	---	<0.0005	(0.001)	0.004	---	1.84	(0.004)	<0.001	---	0.008	0.176	---
82A	CDA 655	(0.012)	<0.01	<0.01	---	---	---	---	(0.014)	---	<0.01	(95.79)	---	---	0.04	(0.02)
<i>Chips Only</i>	C65500	---	1.02	<0.01	---	---	---	(0.004)	---	3.07	<0.005	0.002	---	0.015	(0.01)	---
82B	CDA 655	0.002	<0.01	<0.002	---	---	---	---	(0.003)	0.004	---	95.3	---	---	0.080	0.011
Final	C65500	---	1.04	0.011	---	<0.0005	(0.001)	0.004	---	3.22	---	0.003	---	0.017	0.38	---
83A	CDA 675	<0.01	0.008	<0.01	---	---	---	---	(0.007)	---	<0.01	(58.32)	---	---	0.99	0.058
<i>Chips Only</i>	C67500	---	0.22	0.01	---	---	---	0.005	---	<0.01	<0.005	0.002	---	0.57	39.81	---
83B	CDA 675	0.002	(0.004)	---	---	---	---	(0.003)	0.003	(0.003)	(0.003)	58.7	---	---	0.97	0.017
Final	C67500	(0.001)	0.13	0.010	---	---	(0.001)	0.004	---	(0.003)	(0.002)	(0.001)	---	0.85	39.3	---
313A	CDA 693	(0.001)	0.014	0.0010	(0.0003)	(0.001)	0.0008	(0.0003)	(0.002)	(0.001)	(0.004)	75.4	---	---	0.011	0.042
Final	C69300	(0.0003)	(0.001)	0.002	(0.001)	(0.0001)	(0.001)	0.09	(0.001)	3.09	0.0017	0.0016	(0.003)	0.006	21.3	(0.0004)
84B	CDA 706	(0.002)	(0.002)	---	---	---	---	---	(0.01)	(0.003)	0.013	87.9	---	---	1.30	0.008
<i>Chips Only</i>	C70600	(0.008)	0.62	10.03	---	---	---	0.004	---	0.01	0.005	0.008	---	0.014	0.082	---
84C	CDA 706	[(0.002)]	[(0.001)]	[(0.001)]	---	[(0.0005)]	---	[(0.001)]	[0.003]	[(0.001)]	[0.005]	[89.7]	---	---	[0.29]	[0.04]
<i>Provisional</i>	C70600	[(0.001)]	[0.04]	[9.8]	---	---	[(0.008)]	[0.06]	[(0.001)]	[0.004]	[0.003]	[0.01]	---	[0.13]	[0.12]	[(0.0004)]
85A	CDA 715	<0.005	<0.01	---	---	---	---	---	0.043	<0.01	0.01	(68.74)	---	---	0.58	0.005
<i>Chips Only</i>	C71500	0.001	0.8	29.79	---	---	---	0.005	---	<0.01	<0.005	0.005	---	0.02	0.01	---
85B	CDA 715	<0.01	<0.01	---	---	---	---	---	0.011	---	0.034	(69.18)	---	---	0.53	0.005
<i>Chips Only</i>	C71500	---	0.53	29.60	---	---	---	0.007	---	<0.01	---	0.010	---	0.014	0.12	---
85C	CDA 715	<0.01	---	0.0009	---	---	---	---	0.008	0.002	0.016	67.3	---	---	0.63	0.004
Final	C71500	0.01	0.65	31.3	---	<0.0003	(0.003)	0.003	---	0.01	<0.002	0.002	---	0.005	0.057	---
158B	CDA 815	0.002	0.002	(0.001)	---	---	---	(0.005)	0.002	0.85	0.002	98.5	---	---	0.090	0.01
Final	C81500	---	0.019	0.32	---	<0.0005	0.002	0.005	---	0.02	(0.01)	0.003	---	0.01	0.014	---

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Copper, Brass & Bronze Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Mg	Sb Mn	As Ni	Be Nb	Bi N	B O	Cd P	C Se	Cr Si	Co Ag	Cu S	Ge Te	In Sn	Fe Zn	Pb Zr
158C	CDA 815	0.002	0.002	(0.001)	---	---	---	(0.005)	0.002	1.04	0.002	98.5	---	---	0.090	0.01
Final	C81500	---	0.019	0.32	---	<0.0005	0.002	0.005	---	0.02	(0.01)	0.003	---	0.01	0.014	---
250A	CDA 844	(0.002)	0.052	---	---	0.02	---	---	<0.005	<0.003	(0.002)	80.2	---	---	0.17	7.2
<i>X-Ray</i>	C84400	---	<0.002	0.33	---	---	(0.002)	0.003	---	0.003	(0.02)	0.046	---	2.46	9.7	---
87B	CDA 857	0.20	0.014	0.007	---	0.003	---	---	0.003	(0.002)	0.007	60.9	---	---	0.29	1.58
Final	C85700	(0.01)	0.006	0.095	---	---	---	0.008	---	0.004	(0.01)	(0.001)	---	0.78	36.1	---
88A	CDA 863	6.03	<0.01	<0.01	---	---	---	---	(0.022)	---	<0.01	(64.59)	---	---	2.27	0.03
<i>Chips Only</i>	C86300	---	3.72	0.02	---	---	---	(0.004)	---	0.02	---	(0.002)	---	0.04	23.25	---
88B	CDA 863	5.66	<0.005	(0.01)	---	---	---	---	0.003	---	---	63.9	---	---	2.12	0.066
<i>Chips only</i>	C86300	---	2.93	0.065	---	---	<0.001	0.011	---	0.09	---	<0.001	---	0.020	25.1	---
88C	CDA 863	[5.82]	[(0.003)]	[(0.003)]	---	[(0.004)]	---	[(0.002)]	[(0.004)]	[0.008]	[0.0010]	[64.6]	---	---	[2.99]	[0.13]
<i>Provisional</i>	C86300	[(0.001)]	[2.96]	[0.27]	[(0.002)]	[(0.0001)]	[(0.001)]	[0.020]	---	[0.09]	[(0.004)]	[(0.001)]	---	[0.14]	[22.8]	[(0.0003)]
150A	CDA 872	<0.01	<0.03	---	---	---	---	---	<0.01	---	---	---	---	---	0.045	---
<i>X-Ray</i>	C87200	1.05	---	---	0.013	---	0.005	0.011	---	3.93	<0.01	(0.001)	---	0.016	0.03	---
151A	CDA 875	<0.01	---	---	---	---	---	---	<0.01	---	---	(81.77)	---	---	0.076	---
<i>X-Ray</i>	C87500	0.002	---	---	0.009	---	0.006	---	---	3.95	<0.01	<0.01	---	(0.006)	14.02	---
151B	CDA 875	0.002	(0.001)	(0.002)	---	---	---	---	0.005	(0.003)	---	84.0	---	---	0.025	0.013
Final	C87500	---	0.002	0.011	---	---	(0.002)	0.003	---	3.11	(0.01)	<0.001	---	0.009	12.94	---
211A	Magnolia B	0.002	0.057	(0.01)	---	4.98	---	---	---	(0.002)	(0.001)	88.4	---	---	0.004	0.014
Final	C89320	---	(0.003)	0.003	---	---	---	0.19	---	0.003	0.005	0.002	---	6.23	0.006	---
226A	EnviroBrass 2-1	0.002	0.004	0.003	---	1.71	---	---	0.003	(0.001)	0.001	86.7	---	---	0.054	0.040
Final	C89520M	---	0.002	0.54	---	<0.0005	(0.001)	0.005	0.93	0.002	0.004	0.005	---	5.15	4.77	---
227A	EnviroBrass 2-2	0.002	<0.01	0.003	---	2.33	---	---	0.003	(0.001)	0.001	85.9	---	---	0.060	0.042
Final	C89520M	---	0.001	0.53	---	(0.0002)	0.0013	0.003	1.21	0.002	0.004	0.005	---	5.13	4.70	---
228A	EnviroBrass 2-3	0.002	0.010	0.003	---	1.53	---	---	0.003	0.001	0.001	89.0	---	---	0.052	0.026
Final	C89520M	---	0.001	0.45	---	<0.0005	(0.002)	0.032	0.67	0.002	0.003	0.004	---	4.11	4.07	---
264A	Federalloy I-844	0.003	0.074	(0.004)	---	3.6	---	---	(0.004)	(0.002)	0.001	(87.3)	---	---	0.048	0.057
Final	C89831	---	0.002	0.54	---	---	---	0.027	(0.001)	0.003	(0.005)	0.0013	---	3.03	5.33	---
263A	Federalloy I-848A	0.002	0.06	0.003	---	2.55	---	---	<0.005	0.002	0.001	(78)	---	---	0.047	0.022
Final	N/A	---	0.002	0.66	---	---	---	0.040	0.002	0.003	0.006	0.002	---	3.5	15.8	---
265A	Federalloy I-836	0.003	0.015	(0.005)	---	2.4	---	---	---	(0.001)	(0.001)	(90)	---	---	0.013	0.011
Final	C89833	---	(0.002)	0.69	---	---	---	0.024	(0.002)	0.003	(0.002)	(0.002)	---	4.4	2.45	---

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Copper, Brass & Bronze Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Mg	Sb Mn	As Ni	Be Nb	Bi N	B O	Cd P	C Se	Cr Si	Co Ag	Cu S	Ge Te	In Sn	Fe Zn	Pb Zr
266A Final	Federalloy I-932 C89835	0.002 ---	0.010 0.002	0.004 0.46	--- ---	2.37 ---	--- ---	--- 0.032	0.002 0.001	(0.002) 0.002	(0.001) 0.001	(87) 0.002	--- ---	--- 6.9	0.035 3.48	0.010 ---
89A <i>Chips Only</i>	CDA 903 C90300	<0.01 ---	<0.01 <0.01	--- 0.15	--- ---	--- ---	--- ---	--- 0.11	(0.009) ---	--- <0.01	<0.01 ---	(87.99) 0.018	--- ---	--- 8.14	0.009 3.48	0.09 ---
89B <i>Chips Only</i>	CDA 903 C90300	<0.01 ---	<0.01 <0.01	--- 0.15	--- ---	--- ---	--- ---	--- 0.087	--- <0.01	--- ---	<0.01 ---	(87.5) 0.018	--- ---	--- 8.17	0.013 3.96	0.089 ---
89C Provisional	CDA 903 C90300	[0.002] ---	[0.008] [0.001]	[0.003] [0.008]	--- ---	[(0.01)] ---	--- [(0.01)]	--- [0.004]	[0.002] ---	--- [0.003]	[(0.002)] [0.005]	[87.6] [0.001]	--- ---	--- [9.1]	[0.004] [3.1]	[0.17] ---
90B <i>Chips Only</i>	CDA 922 C92200	<0.01 ---	0.060 <0.01	--- 0.69	--- ---	--- ---	--- ---	--- 0.054	--- <0.01	--- ---	<0.01 ---	(88.0) 0.035	--- ---	--- 6.44	0.019 2.98	1.66 ---
90C Final	CDA 922 C92200	(0.001) (0.0002)	0.022 0.0030	0.0020 0.266	(0.0003) (0.0005)	0.009 (0.0003)	--- (0.001)	0.0003 0.026	(0.002) 0.0013	0.0010 0.0012	0.0012 0.011	87.5 0.010	--- (0.003)	--- 6.3	0.101 4.3	1.4 (0.0002)
91D <i>Chips Only</i>	CDA 932 C93200	(0.001) ---	0.112 (0.001)	0.008 0.43	--- (0.001)	(0.001) (0.0001)	0.06 (0.001)	0.002 0.09	0.0009 0.0011	0.0007 0.0016	0.013 0.02	81.9 0.018	--- (0.004)	--- 6.43	0.023 3.21	7.8 ---
91E Provisional	CDA 932 C93200	[0.002] [(0.0003)]	[0.17] [0.001]	[0.008] [0.30]	[0.001] [(0.0005)]	[0.11] [(0.0004)]	[(0.0005)] [(0.001)]	[0.0008] [0.027]	[(0.003)] [0.003]	[(0.0005)] [0.002]	[0.0024] [0.016]	[81.3] [0.030]	--- ---	--- [6.6]	[0.11] [3.7]	[7.6] ---
92C Provisional	CDA 937 C93700	[0.001] ---	[0.076] ---	[0.01] [0.17]	--- ---	[0.01] ---	--- ---	--- [0.08]	--- [<0.002]	--- [0.002]	--- [0.05]	[80.4] [0.027]	--- ---	--- [9.7]	[0.01] [0.15]	[9.5] ---
184A Final	CDA 941 C94100	0.0016 ---	0.27 0.002	0.010 0.30	--- ---	0.03 ---	--- ---	--- 0.008	(0.004) (0.002)	(0.001) 0.002	(0.001) (0.01)	(74) 0.021	--- ---	--- 6.0	0.003 0.37	19.0 ---
267A Final	CDA 947 C94700	0.003 ---	<0.03 0.002	(0.004) 5.1	--- ---	(0.005) ---	--- ---	--- 0.037	(0.003) 0.002	(0.001) 0.003	0.002 0.002	87.8 0.0014	--- ---	--- 4.95	0.019 2.06	0.026 ---
93B Final	CDA 954 C95400	10.33 ---	(0.012) 0.024	<0.01 0.088	--- ---	--- ---	--- ---	--- (0.002)	0.007 ---	(0.007) 0.024	0.006 (0.004)	85.4 0.002	--- ---	--- 0.009	3.87 0.17	0.012 ---
204A Final	CDA 954M C95410	10.55 ---	<0.01 0.052	<0.01 1.95	--- ---	--- ---	--- ---	--- 0.007	0.006 ---	0.008 0.034	0.008 0.009	83.3 (0.002)	--- ---	--- 0.005	3.87 0.22	0.004 ---
94A <i>Chips Only</i>	CDA 955 C95500	10.63 ---	<0.01 0.16	<0.01 4.37	--- ---	--- ---	--- ---	--- <0.01	(0.014) ---	--- <0.01	0.01 ---	(80.68) (0.003)	--- ---	--- <0.01	4.04 0.09	0.009 ---
94B Final	CDA 955 C95500	10.80 ---	(0.011) 0.071	<0.01 4.31	--- ---	--- ---	--- ---	--- 0.011	(0.006) ---	0.017 0.028	0.011 0.017	80.6 0.002	--- ---	--- (0.003)	3.99 0.14	0.004 ---
235A Final	CDA 958 C95800	8.9 ---	(0.004) 1.17	<0.005 4.44	--- ---	(0.004) (0.0001)	--- (0.001)	--- 0.012	0.009 ---	0.01 0.061	0.01 <0.005	81.2 0.002	--- ---	--- 0.018	4.07 0.083	0.012 ---

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Copper, Brass & Bronze Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Mg	Sb Mn	As Ni	Be Nb	Bi N	B O	Cd P	C Se	Cr Si	Co Ag	Cu S	Ge Te	In Sn	Fe Zn	Pb Zr
236A	CDA 964	0.003	<0.005	---	---	0.003	---	---	0.010	0.002	0.004	66.7	---	---	0.91	0.004
Final	C96400	---	1.04	30.0	0.92	0.0002	0.002	0.003	---	0.19	---	0.003	---	0.005	0.002	---
159A	NARloy-A	<0.01	---	---	---	---	---	---	(0.002)	<0.01	<0.01	(96.5)	---	---	<0.01	<0.01
Final	N/A	---	<0.01	<0.01	---	0.0003	0.0006	<0.01	---	<0.01	3.48	<0.01	---	<0.01	<0.01	---
160A	NARloy-Z	<0.01	---	---	---	---	---	---	0.003	<0.01	<0.01	(96.6)	---	---	<0.01	<0.01
Final	N/A	---	<0.01	<0.01	---	0.002	0.0030	(0.004)	---	<0.01	3.03	<0.003	---	<0.01	<0.01	0.40

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CP Titanium & Titanium Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Nb	Sb N	B O	C Pd	Cr P	Co Ru	Cu Si	Hf S	H Ta	Fe Sn	Pb Ti	Mg W	Mn V	Mo Y	Ni Zr
312A Final	Ti CP Gr. 1 R50250	0.006 ---	--- 0.0023	--- 0.066	0.004 (0.004)	(0.002) ---	(0.001) ---	0.002 0.006	--- (0.001)	0.0049 ---	0.028 0.0012	--- 99.7	--- ---	(0.001) (0.002)	(0.002) (0.0004)	(0.002) (0.001)
174C Final	Ti CP Gr. 4 R50700	(0.003) (0.004)	--- 0.004	--- 0.34	0.0057 ---	0.009 ---	(0.001) ---	0.0015 (0.006)	--- (0.0005)	0.0027 ---	0.28 0.023	--- (99.5)	--- ---	0.0019 0.002	0.002 (0.0004)	0.007 (0.003)
311A Final	Ti CP BT1-0	0.32 (0.002)	--- 0.012	--- 0.083	0.009 ---	0.013 ---	--- ---	0.0013 0.005	--- ---	0.0021 ---	0.060 0.0020	--- (99.4)	--- (0.002)	0.0013 0.004	0.0012 (0.0002)	0.014 0.012
280A Final	Ti 4-4-2-0.5 IMI 550	4.11 (0.001)	--- 0.0014	--- 0.19	0.005 (0.002)	0.0055 ---	(0.002) ---	0.003 0.47	--- (0.001)	0.0015 ---	0.044 2.07	--- (88.7)	--- ---	(0.002) 0.023	4.01 (0.0003)	0.012 0.002
271A X-Ray Only	Ti 5-2.5 R54520	5.28 (0.003)	--- 0.012	--- 0.16	0.026 ---	0.016 (0.002)	(0.002) ---	0.004 0.021	--- (0.002)	0.013 ---	0.31 2.49	--- ---	--- ---	0.002 0.09	0.011 ---	0.035 0.015
314A X-Ray Only	Ti 5-5-5-3 Ti5553	5.50 ---	--- 0.0034	--- 0.155	0.008 ---	3.09 (0.005)	(0.003) ---	0.002 0.02	--- ---	0.004 ---	0.46 (0.01)	--- (81)	--- ---	0.002 4.98	4.78 (0.0003)	0.022 0.002
314B Final	Ti 5-5-5-3 Ti5553	5.57 0.009	--- 0.0045	(0.001) 0.130	0.010 (0.003)	3.08 (0.001)	(0.004) ---	0.002 0.041	--- (0.001)	0.0057 (0.002)	0.39 0.022	--- (81)	--- (0.003)	0.001 5.04	4.88 (0.001)	0.0044 (0.002)
177C X-Ray Only	Ti 6-2-4-2 R54620	6.02 ---	--- 0.0022	(0.001) 0.107	0.005 (0.004)	0.012 ---	(0.001) ---	0.003 0.086	--- ---	0.0014 ---	0.033 2.02	--- (86)	--- ---	0.0015 0.020	1.96 (0.0002)	0.011 3.99
285A X-Ray Only	Ti 6-2-1-1 R56210	5.81 2.00	--- 0.0043	(0.002) 0.076	0.007 ---	(0.001) ---	(0.002) ---	0.008 0.009	--- (0.0004)	0.0038 0.97	0.037 0.004	--- (90)	--- (0.01)	(0.001) 0.004	0.77 0.0024	0.006 0.002
336A Final	Ti 6-2-4-6 R56260	5.9 ---	--- 0.0015	(0.001) 0.102	0.005 ---	0.002 ---	0.002 ---	0.002 0.019	--- (0.002)	0.0022 ---	0.115 2.03	--- 81.7	--- (0.004)	--- 0.005	6.16 (0.0003)	0.002 3.92
336B Final	Ti- 6-2-4-6 R56260	6.04 ---	--- 0.0016	(0.001) 0.101	0.006 ---	(0.001) (0.002)	(0.002) ---	0.002 0.020	--- (0.002)	0.0029 ---	0.132 2.04	--- 81.4	--- (0.005)	--- 0.004	6.16 (0.0002)	0.002 4.12
337A Final	Ti 6-2-2-2-2 Ti 6-22-22	5.60 (0.004)	--- 0.0017	(0.001) 0.104	0.008 ---	2.01 ---	0.0011 ---	0.002 0.14	--- (0.001)	0.005 ---	0.114 1.96	--- (86.0)	--- (0.003)	--- (0.003)	2.05 (0.0004)	0.011 1.89
261A Final	Ti 3-2.5 R56320	3.00 (0.01)	--- 0.007	--- 0.10	0.007 ---	0.013 ---	(0.001) ---	0.002 0.012	--- (0.001)	0.0023 ---	0.19 0.008	--- ---	--- ---	0.0011 2.48	0.003 (0.001)	0.006 (0.002)
175D Provisional	Ti 6-4 R56400	[6.38] ---	--- [0.030]	--- [0.177]	[0.008] ---	[0.015] ---	--- ---	[0.002] [0.009]	--- ---	[0.0028] ---	[0.22] [(0.01)]	--- [(89.1)]	--- ---	[0.002] [4.00]	[0.003] ---	[0.016] ---
176C X-Ray Only	Ti 6-4 ELI R56407	[5.97] ---	--- [0.005]	--- [0.111]	[0.012] [(0.004)]	[0.011] ---	--- ---	[0.003] [0.016]	--- [(0.001)]	[0.0034] ---	[0.14] [0.007]	--- [89.6]	--- ---	[(0.001)] [4.00]	[0.005] [(0.0001)]	[0.011] [0.003]
297A X-Ray Only	Ti 10-2-3 R56410	3.12 (0.06)	--- 0.008	(0.003) 0.109	0.014 ---	0.007 ---	--- (0.004)	0.002 0.022	--- (0.001)	0.0045 (0.01)	1.86 0.006	--- 85.0	--- ---	0.007 9.71	0.004 ---	0.0041 0.002

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CP Titanium & Titanium Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Al Nb	Sb N	B O	C Pd	Cr P	Co Ru	Cu Si	Hf S	H Ta	Fe Sn	Pb Ti	Mg W	Mn V	Mo Y	Ni Zr
178C	Ti 6-6-2	[5.44]	---	(0.001)	[0.022]	[0.014]	---	[0.62]	---	[0.0025]	[0.66]	---	---	[(0.002)]	[0.012]	[0.013]
Provisional	R56620	[(0.01)]	[0.011]	[0.17]	---	---	---	[0.047]	---	---	[1.97]	[(85.7)]	---	[5.43]	---	[0.004]
300A	Ti 6-7	[5.97]	---	(0.001)	[0.006]	[0.009]	---	[0.003]	---	[0.0019]	[0.19]	---	---	[(0.001)]	[(0.001)]	[0.008]
Provisional	R56700	[6.9]	[0.004]	[0.16]	---	---	---	[0.019]	---	---	[(0.01)]	[(86.7)]	---	[(0.01)]	---	---
344A	Ti 15-3-3-3	[3.16]	---	(0.001)	[0.011]	[3.08]	[(0.003)]	[(0.002)]	---	[0.016]	[0.20]	---	---	[0.002]	[(0.003)]	[0.011]
Provisional	R58153	---	[0.006]	[0.11]	---	---	---	[0.027]	---	---	[3.09]	[(75.0)]	---	[15.0]	[(0.002)]	[0.002]
286A	Ti 3-8-6-4-4	3.25	---	---	0.010	6.3	(0.006)	(0.004)	---	0.0039	0.09	---	---	(0.002)	4.15	0.013
X-Ray Only	R58640	---	0.010	0.089	(0.02)	---	---	0.030	(0.001)	---	(0.003)	73.4	---	8.1	0.001	4.08

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Aluminum Alloys

Please call for availability and current pricing - (603) 935-4100 or (800) 421-9454

IARM Status	Grade UNS#	Sb Mg	As Mn	Ba Hg	Be Mo	Bi Ni	B P	Cd Si	Ca Ag	Cr Na	Co Sr	Cu Sn	Ga Ti	Fe V	Pb Zn	Li Zr
104B	AA2024	---	---	---	[(0.0002)]	---	[(0.002)]	---	[(0.001)]	[0.009]	---	[4.60]	[0.010]	[0.26]	[0.014]	---
Provisional	A92024	[1.57]	[0.64]	---	---	[0.005]	[(0.003)]	[0.15]	[(0.001)]	[(0.0005)]	---	[(0.003)]	[0.055]	[0.007]	[0.064]	[(0.001)]
109C	AA6061	---	---	---	---	[(0.001)]	[(0.001)]	---	[(0.001)]	[0.10]	[(0.001)]	[0.30]	[0.013]	[0.53]	[0.007]	---
Provisional	A96061	[0.83]	[0.11]	---	---	[0.012]	[(0.001)]	[0.61]	---	---	---	[(0.002)]	[0.018]	[0.009]	[0.12]	[0.002]
343A	AA7055	---	---	---	---	---	---	[(0.0002)]	[(0.002)]	[0.001]	---	[2.29]	[0.013]	[0.09]	[0.001]	---
Provisional	A97055	[2.04]	[0.001]	---	---	[0.004]	[(0.001)]	[0.05]	---	---	---	[(0.003)]	[0.018]	[0.005]	[8.1]	[0.15]
111B	AA7075	---	---	---	[0.0009]	---	[(0.001)]	---	[(0.001)]	[0.21]	[(0.001)]	[1.37]	[0.009]	[0.23]	[0.006]	---
Provisional	A97075	[2.17]	[0.093]	---	---	[0.010]	[(0.002)]	[0.20]	---	[(0.003)]	---	[(0.003)]	[0.043]	[0.004]	[5.7]	[0.013]

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[] Indicate provisional value, certification in progress.

IRMM Impurities in Zinc Metal

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Part #	Grade	All Values in mg/kg										Size (mm)	
		Al	Cd	Cu	Fe	In	Mg	Ni	Pb	Sn	Ti	Ø	H
BCR-351	ZnAl4	43.55	(0.21)	12.13	---	---	131.0	(1.9)	4.50	---	0.74	80 x 20	
BCR-352	ZnAl4	41.50	2.88	31.26	---	3.02	283.0	6.74	(6.4)	6.0	3.2	80 x 20	
BCR-353	ZnAl4	39.5	10.44	100.0	---	2.55	452.5	---	24.4	5.60	3.95	80 x 20	
BCR-354	ZnAl4	37.27	29.7	312.3	---	9.8	602	83.1	30.8	14.1	11.01	80 x 20	
BCR-355	ZnAl4	34.43	58.1	1035	---	24.6	786	268	56.9	29.1	23.25	80 x 20	
BCR-356	ZnAl4Cu1	44.34	0.73	3.944	31.5	---	132.3	3.43	9.87	(0.32)	0.79	80 x 20	
BCR-357	ZnAl4Cu1	42.27	2.83	5.849	25.7	3.30	273	9.82	13.8	3.51	2.76	80 x 20	
BCR-358	ZnAl4Cu1	39.46	10.22	7.93	40.5	7.04	403	26.98	22.5	7.87	6.09	80 x 20	
BCR-359	ZnAl4Cu1	37.11	29.8	9.89	119.7	15.5	557	92.6	36.2	16.93	13.34	80 x 20	
BCR-360	ZnAl4Cu1	34.27	59.50	12.340	---	29.80	705.0	267.00	73.90	33.00	25.90	80 x 20	
BCR-361	ZnAl4Cu1	40.68	(0.80)	7.98	10.34	---	---	---	5.31	46.3	37.4	80 x 20	

IRMM Zirconium Alloys

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Part #	Grade	All Values in mg/kg				Form
		O	N	C		
BCR-275	Zircaloy-4	1670	39.0	113		1 bottle of 10 discs 13mm x 1mm
BCR-276	Zircaloy-4	1540	41	108		1 bottle of approximately 100 discs 4.5mm x 2mm

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These standards are produced by EC/JRC/IRMM

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Set-Up Standards (SUSs)

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Cast Irons

IARM Status	Grade	Al Ni	As P	B Pb	Bi S	C Sb	Co Si	Cr Sn	Cu Ti	Mg V	Mn W	Mo Zn	Nb Zr
215A Final	QA 21	(0.037) (0.9)	--- (0.3)	--- ---	--- (0.13)	(3.5) ---	--- (2.1)	(0.6) (0.17)	(0.6) (0.07)	--- (0.5)	(1.3) ---	(0.5) ---	--- ---
216A Final	QA 22	(0.06) (2)	(0.03) (0.026)	(0.037) (0.005)	(0.004) (0.001)	(3) (0.06)	(0.6) (3)	(1.5) (0.04)	(0.08) (0.007)	(0.08) (0.03)	(0.3) (0.043)	(0.004) (0.01)	(0.3) (0.05)

LAS

IARM Status	Grade	Al P	As Pb	B S	C Sb	Ca Si	Co Sn	Cr Ta	Cu Ti	Mn V	Mo W	N Zn	Nb Zr	Ni Fe
217A Final	QA A	(0.0002) (0.002)	(0.003) (0.004)	(<0.0001) (0.001)	(0.01) (0.006)	(0.0001) (0.01)	(0.004) (0.0005)	(0.01) (0.01)	(0.001) (0.0001)	(0.003) (0.002)	(0.01) (0.005)	(0.0005) (<0.0001)	(0.001) (0.005)	(0.01) >99.9
218A Final	QA C	(0.003) (0.1)	(0.1) (<0.001)	(0.0004) (0.07)	(0.05) (0.02)	(<0.0001) (0.1)	(0.01) (0.1)	(0.1) (0.02)	(0.6) (0.01)	(2) (1)	(0.1) (0.7)	(0.007) (<0.001)	(<0.0001) (<0.00)	(5) >89.8
219A Final	QA D	(0.2) (0.003)	(0.01) (0.003)	(0.01) (0.002)	(0.9) (0.1)	(<0.0001) (2)	(1) (0.06)	(5) (0.01)	(0.6) (1.7)	(0.02) (0.3)	(1.5) (0.01)	(0.002) (0.01)	(0.4) (0.002)	(2.8) >83.3

Aluminum

IARM Status	Grade	Ag Mn	B Na	Be Ni	Bi P	Ca Pb	Cd Si	Cr Sb	Co Sn	Cu Sr	Fe Ti	Ga V	Li Zn	Mg Zr
220F Final	QA 10	--- (<0.0001)	(<0.0001) (<0.0001)	(<0.0001) (<0.0001)	(<0.0001) (0.0001)	(<0.0001) (<0.0001)	(<0.0001) (0.0003)	(<0.0001) (0.0001)	(<0.0001) (0.0001)	(0.0002) (<0.0001)	(0.0003) (<0.0001)	(<0.0001) (0.0001)	(<0.0001) (0.0002)	(0.0002) (0.0001)
221A Final	QA 11	--- (0.4)	--- ---	(0.005) ---	--- ---	(0.03) ---	--- (0.2)	(0.2) (0.01)	(0.2) ---	(0.6) ---	(0.2) (0.1)	(0.03) ---	--- (6.7)	(4.8) ---
221B Final	QA 11	--- (0.4)	--- ---	(0.005) ---	--- ---	(0.03) ---	--- (0.2)	(0.2) (0.01)	(0.2) ---	(0.6) ---	(0.2) (0.1)	(0.03) ---	--- (6.8)	(4.8) ---
221C Final	QA 11	--- (0.4)	--- ---	(0.005) ---	--- ---	(0.03) ---	--- (0.2)	(0.2) (0.01)	(0.2) ---	(0.6) ---	(0.2) (0.1)	(0.03) ---	--- (6.8)	(4.8) ---
221D Final	QA 11	--- (0.4)	--- ---	(0.005) ---	--- ---	(0.03) ---	--- (0.2)	(0.2) ---	(0.2) ---	(0.6) ---	(0.2) (0.1)	(0.03) ---	--- (6.7)	(4.8) ---

() and < > Indicates non-certified value.

[] Indicates provisional value, certification in progress.

Heavy Metals in Plastic RMs - XRF Analysis

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

European Communion (EC) directives have defined specific limits for heavy metals in plastic. Sets of PE and PVC have been designed for screening heavy metals to check for compliance with these limits.

These sets of reference materials consist of 3 individual discs. Each disc is 31 mm in diameter and at least 12.9 mm thick. The overall error of concentration of the added element is estimated at less than 4% relative at a 95% confidence level, except, below 100 mg/kg, the estimated error is 5 mg/kg absolute at a 95% confidence level.

There are many various additives combined with different plastics or polymers to give specific properties. XRF is often used to monitor these products. If you have a specific or special application need, please contact us for the possibility of custom made reference materials.

These RMs are sold as sets only.

Heavy Metals in PE

Element	PE-High	PE-Low	PE-Blank
	Amount added, (mg/kg)	Amount added, (mg/kg)	Amount added, (mg/kg)
Br	1100	500	0
Hg	1100	200	0
Cr	1000	400	0
Pb	1200	400	0
Cd	300	100	0

Heavy Metals in PVC

Element	PVC-High	PVC-Low	PVC-Blank
	Amount added, (mg/kg)	Amount added, (mg/kg)	Amount added, (mg/kg)
Br	1100	500	0
Hg	1100	200	0
Cr	1000	400	0
Pb	1200	400	0
Cd	300	100	0

Every effort is made to assure the high quality of these standards and their data. The use of these standards and the interpretation of the results is the sole responsibility of the user.

Laboratory Proficiency Testing Program

LABORATORY PROFICIENCY TESTING PROGRAM

"Let ARMI be a cornerstone member of your Quality Team!"

In support of "Total Quality Assurance" programs, **Analytical Reference Materials International (ARMI)** developed its Laboratory Proficiency Testing (PT) Program in 1991. Having been in the business of CRM characterization, statistical evaluation, and certification of standards for many years, the Company has compiled a vast database of statistical information that is easily utilized as an extremely effective quality assurance tool. This statistical information library, combined with ARMI's CRMs, composes the basis for an unrivaled PT program to support your internal Quality System.

The PT Program offers benchmark proficiency testing which is directed towards supporting internal quality assurance programs, as well as fulfilling the accreditation requirements of several accrediting bodies, such as A2LA, NADCAP, and many others. The Program can also be incorporated into ISO 9000 and ISO 17025 certification requirements.

ARMI's PT Program is a direct, tailor made program, custom designed for the individual subscribing company. The participating company selects the timing and material matrix for testing. ARMI then selects the specific material from its extensive CRM inventory and sends it to the subscriber for testing and evaluation. Once the analysis results are received, ARMI reports back within 48 hours the results of the company's testing versus the certified values for that specific material. The results are reported in an easily read graphical format that allows for instant performance level recognition. This rapid turnaround ensures the company's ability to take corrective action for any problem quickly and efficiently and furthermore, the information is kept totally confidential. Finally, since the material used for testing is from a CRM, the company also now has an actual standard for use in its daily operations.

The PT Program is NOT method or instrument specific. The Program can be used for a single technique, method, and instrument or for several techniques, methods, and instruments. The Program has the flexibility to be adapted for most any laboratory situation. In addition, the PT Program is NOT a round-robin comparison. Your results are only compared against certified values and the results are returned to you within 48 hours, not 30, 60, or even 90 days.

The PT Program samples used are all actual CRMs and traceable to NIST. The analytical data used for the evaluation of the PT Program results is the same data generated by the expert members of ARMI's ILAP group. This is the same group of Industry and commercial laboratories that supports ARMI's CRM development and certification program. The data has been thoroughly critiqued, statistically evaluated, and it is free of any outliers. The end result is that by utilizing ARMI's PT Program, your performance test results are now indisputable and traceable to NIST!

Laboratory Proficiency Testing

Prices subject to change - (603) 935-4100 or (800) 421-9454

	Plan 1 - Monthly 12 Samples per Year Unit Price per Sample	Plan 2 - Quarterly 4 Samples per Year Unit Price per Sample	Plan 3 - Bi-Annual 2 Samples per Year Unit Price per Sample
Carbon Steel	\$160.00	\$220.00	\$280.00
Cast Iron (Solid Disk Only)	Call for quote	Call for quote	Call for quote
Low Alloy Steel	\$160.00	\$220.00	\$280.00
Tool Steel	\$160.00	\$220.00	\$280.00
Stainless Steel	\$170.00	\$230.00	\$290.00
High Temperature Steel	\$170.00	\$230.00	\$290.00
Nickel Alloy	\$185.00	\$250.00	\$305.00
Cobalt Alloy	\$200.00	\$265.00	\$320.00
Copper Alloy	\$160.00	\$220.00	\$280.00
Aluminum Alloy	\$765.00	\$765.00	\$765.00
Titanium Alloy	\$275.00	\$325.00	\$385.00
Magnesium Alloy	Call for quote	Call for quote	Call for quote
Sulfur in Refined Petroleum	N/A	\$175.00	\$175.00
Sulfur in Coal	N/A	\$175.00	\$175.00
Sulfur & Prox in Coal	N/A	\$200.00	\$200.00

Terms and Conditions

A one-time Initial Setup & Administrative Fee of \$225.00 will be added to invoices for new customers only. This includes a subscriber, instrument, and/or technique profile plus the set up of an individual historical database. A single invoice will be issued prior to the first sample being shipped for the total subscription period. Terms are 'Net 30 days'.

Unit prices apply to one set of data points per sample. In the case of a subscriber reporting multiple data sets from a single sample, add \$65.00 for each additional data set submitted. For metals, all prices include a single solid sample. Optional 10g Chip Sample Packs and/or a Pin Disk or Solid Pin Packs for C, S, O₂, and N₂ are available at an additional charge of \$25.00 per sample pack. Subscribers desiring chip samples only will be provided an equivalent weight.

Price includes hard copy reports and delivery of samples in the United States and Canada. Shipping will be added for other destinations.

Please contact ARMI for a formal price quotation.

90-10 Share Program

The 90/10 Share Program

In the same spirit of cooperation that has become the very foundation of ARMI's efforts to develop new CRMs in the private sector, in May of 1990, the Company launched its "90/10 Share Program." Although many materials are quite common, spectrochemical standards for these materials are frequently non-existent. The 90/10 Program was created to solve this all too common problem.

The 90/10 Program is a very simple and cost effective service offered by ARMI allowing the Company (which is a leading producer of CRMs) to work together with the scientific community by sharing the task, as well as the costs, of developing new commercially available CRMs.

Here is how it works! The customer furnishes ARMI with the material of the specific alloy, usually in the form of round bar stock. The bar stock needs to be a minimum of 1.25" outside diameter and an 1.5" outside diameter is ideal. The overall length should be at least 10 to 12 feet. Forms other than bar stock are acceptable as long as the quantity is sufficient for the sampling that is required for the laboratories' examinations. The material is then processed through ARMI's ILAP for certification as a CRM. Approximately 15% to 20% of the material is expended in the analysis process. After certification, 10% of the remaining material is returned to the customer in any form desired (OES solids, chips, X-Ray discs, etc.) and ARMI retains the balance for sale commercially.

The only cost to the customer is the cost of the material. ARMI has well-established vendors for most alloy materials and will assist in the location and acquisition of the base stock material.

That is all there is to it! By working together, we make available a new CRM, traceable to NIST, for the scientific community.

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
HK200 - Disk Grinder		
HK200	Manual disc grinding machine for preparation of iron and steel samples for OES and XRF analysis, desktop machine. Dimensions - ~40x45x40cm, Weight 22kg, 220V/60Hz	1
HKPACK	Export packing, wooden box	1
Optional Accessories		
HKHOLD3	Magnetic sample holder, round, 40-50mm Ø	1
HKHOLD4	Magnetic sample holder, rectangular, 35x35mm	1
Consumables		
PAP200K/40	Grinding paper Al ₂ O ₃ , 40 grit, PSA, 200mm Ø	100 pcs/pack
PAP200K/60	Grinding paper Al ₂ O ₃ , 60 grit, PSA, 200mm Ø	100 pcs/pack
PAP200K/80	Grinding paper Al ₂ O ₃ , 80 grit, PSA, 200mm Ø	100 pcs/pack
PAP200S/40	Grinding paper SiC, 40 grit, PSA, 200mm Ø	100 pcs/pack
PAP200S/60	Grinding paper SiC, 60 grit, PSA, 200mm Ø	100 pcs/pack
PAP200S/80	Grinding paper SiC, 80 grit, PSA, 200mm Ø	100 pcs/pack
PAP200Z/40	Grinding paper ZrO ₂ , 40 grit, PSA, 200mm Ø	100 pcs/pack
PAP200Z/60	Grinding paper ZrO ₂ , 60 grit, PSA, 200mm Ø	100 pcs/pack
PAP200Z/80	Grinding paper ZrO ₂ , 80 grit, PSA, 200mm Ø	100 pcs/pack
Special Accessories		
HK200W	Disc Grinder, dry & wet applications	1
HK210	Disc Grinder, Spectrographic & Metallographic	1
HKHOLD5	Non-magnetic sample holder, round	1
HKHOLD6	Magnetic sample holder, rectangular, 50x50mm	1

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
HK350 - Disk Grinder		
HK350	Manual disc grinding machine for preparation of iron and steel samples for OES and XRF analysis. Disk grinder, complete with dust trap and exhauster. Dimensions - ~70x70x105cm, Weight 100kg, 220V/60Hz	1
HKPACK	Export packing, wooden box	1
Optional Accessories		
HK350ERS	Spare parts set (bellows, safety glass, lamp, fuses)	1
HKHOLD3	Magnetic sample holder, round, 40-50mm Ø	1
HKHOLD4	Magnetic sample holder, rectangular, 35x35mm	1
HKEXFILT	Round filter, exhauster HK150/350, PAS 11-21	1
Consumables		
PAP350K/40G	Grinding paper Al ₂ O ₃ , grit 40, 350mm Ø	100 pcs/pack
PAP350K/60G	Grinding paper Al ₂ O ₃ , grit 60, 350mm Ø	100 pcs/pack
PAP350K/80G	Grinding paper Al ₂ O ₃ , grit 80, 350mm Ø	100 pcs/pack
PAP350S/40	Grinding paper SiC, grit 40, 350mm Ø	100 pcs/pack
PAP350S/60	Grinding paper SiC, grit 60, 350mm Ø	100 pcs/pack
PAP350S/80	Grinding paper SiC, grit 80, 350mm Ø	100 pcs/pack
PAP350Z/40	Grinding paper ZrO ₂ , grit 40, 350mm Ø	100 pcs/pack
PAP350Z/60	Grinding paper ZrO ₂ , grit 60, 350mm Ø	100 pcs/pack
PAP350Z/80	Grinding paper ZrO ₂ , grit 80, 350mm Ø	100 pcs/pack
Special Accessories		
HKHOLD5	Non-magnetic sample holder, round	1
HKHOLD6	Magnetic sample holder, rectangular, 50x50mm	1
HKEXFILT	Round filter, exhauster HK150/350, PAS 10-20	1
HKDUST	Spark arrester with metal tube for HK150 & HK350	1
PAP350K/60PE	Grinding paper PE63, grit 60, 350mm Ø	100 pcs/pack

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
HK150 - Disk Grinder		
HK150	Manual sample grinding machine for preparation of iron and steel samples for OES and XRF analysis. Pendulum grinder (bench top) complete for operation with stones (BR HKT32J), tools, and vice with low and high brackets. Dimensions - ~70x70x105cm, Weight 120kg, 220V/60Hz	1
HKPACK	Export packing, wooden box	1
Alternate Configuration		
HK150EXS	HK150 configuration as above with steel cabinet, exhauster, spark arrester, and tubing (floor standing). Dimensions - ~70x70x105cm, Weight 120kg, 3Ø 230/60Hz - Cabinet & Exhauster ~70x70x105cm, Wght 70kg	1
HKPACK	Export packing, wooden boxes (2)	2
Optional Accessories		
HK150ERS	Spare parts set (bellows, safety glass, lamp, fuses)	1
HK150MS	Magnetic plate, complete with arm, 100x65mm	1
HK150VICE	Vice for samples 44-58mm Ø	1
HKEXFILT	Round filter, exhauster HK150/350, PAS 11-21	1
Consumables		
HKT46J1	Al ₂ O ₃ -grinding stone	1-3 packs 3 pcs/pack
HKT46J2	Al ₂ O ₃ -grinding stone	4-8 packs 3 pcs/pack
HKT46J3	Al ₂ O ₃ -grinding stone	9+ packs 3 pcs/pack
HKT49M1	SiC-grinding stone	1-3 packs 3 pcs/pack
HKT49M2	SiC-grinding stone	4-8 packs 3 pcs/pack
HKT49M3	SiC-grinding stone	9+ packs 3 pcs/pack
Special Accessories		
HKEXFILT	Round filter, exhauster HK150/350, PAS 10-20	1
HKDUST	Spark arrester with metal tube for HK150 & HK350	1

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
HK80F - Milling Machine		
HK80F	Semi-automatic milling machine for preparation of non-ferrous metal samples for OES and XRF analysis. Dimensions - ~56x78x75cm, Weight 140kg, 220V/60Hz	1
HK80F80	Standard milling head with cutters, 80mm Ø	1
HKPACK	Export packing, wooden box	1
Optional Accessories		
HK80FERS	Spare parts set (bellows, safety glass, lamp, fuses)	1
HK80FWP	Hard metal cutters (standard)	10 pcs/pack
HK80FSN	Brackets for lower samples >3mm, 16-52mm Ø	1
HK80FSG	Brackets for universal use >9mm, 16-52mm Ø	1
HK80WZ	Measuring base, cutter positioning	1
HK80FSR	Special chuck, rectangular samples	1
Special Accessories		
HK80F63	Milling head complete with cutters, 63mm Ø	One
HK80F8022	Special milling head with special cutters, 80mm Ø	One
HK80FWPS	Special hard metal cutters, octagonal	6 pcs/pack

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
HK40 - Swing Grinder		
HK40	Swing grinder, desktop model for grinding of mineral samples for XRF or solution analysis. Dimensions - ~50x40x67cm, Weight 48kg, 115V/60Hz	1
HK40MG1	Vessel, Corundum 99.6%, bio-inert, 100ml	
HKPACK	Export packing, wooden box	1
Optional Accessories		
HK40MG2	Vessel, Corundum 99.9%, bio-inert, 100ml	1
HK40MG3	Vessel, Hardened Cr-steel, 100ml	1
HK40MG4	Vessel, Nitrided, Cr-steel, 100ml	1
HK40MG5	Vessel, Tungsten Carbide, 100ml	1
HK40MG6	Vessel, Zirconia Oxide >99.9%, 100ml	1
SPECTAB 20	Grinding & Pelletizing agent, tablets	4000 x 0.25g
BR70 - Jaw Crusher		
BR-70	Jaw crusher, laboratory model for crushing of mineral samples for XRF or solution analysis (with regular acc). Dimensions - ~50x60x60cm, Weight 90kg, 3Ø 220/60Hz	1
HKPACK	Export packing, wooden box	1

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
Manual Hydraulic Press		
PE-MAN	Hydraulic press, manual, variable from 0-20 tons available pressure for preparation of XRF and IR pellets. Dimensions - ~70x59x47cm, Weight 55kg	1
HKPACK	Export packing, wooden box	1
Optional Accessories		
4030	Evacuated Die Set, SS, includes 2 SS-pellets, 32mm Ø	1
4038	Evacuated Die Set, SS, includes 2 SS-pellets, 35mm Ø	1
4040	Evacuated Die Set, SS, includes 2 SS-pellets, 40mm Ø	1
Special Accessories		
4035	Press plate, tungsten carbide, 32mm Ø	1
4037	Press plate, tungsten carbide, 35mm Ø	1
4045	Press plate, tungsten carbide, 40mm Ø	1
4060	Press plate, stainless steel, 40mm Ø	1
Consumables		
HWC	Micropowder C, binder XRF-pellets	1 kg
HWC	Micropowder C, binder XRF-pellets	5 kg
HWC	Micropowder C, binder XRF-pellets	10 kg
HWC	Micropowder C, binder XRF-pellets	20 kg

Sample Preparation Equipment Parts List

Please call for availability and current pricing – (603) 935-4100 or (800) 421-9454

Catalog #	Description	Quantity/Pk
Electro-Hydraulic Press		
PE-EL	Electro-hydraulic press, manual, variable from 0-20 tons available pressure for preparation of XRF and IR pellets. Dimensions - ~70x59x47cm, Weight 70kg, 120V/60Hz	1
HKPACK	Export packing, wooden box	1
Optional Accessories		
4030	Evacuated Die Set, SS, includes 2 SS-pellets, 32mm Ø	1
4038	Evacuated Die Set, SS, includes 2 SS-pellets, 35mm Ø	1
4040	Evacuated Die Set, SS, includes 2 SS-pellets, 40mm Ø	1
Special Accessories		
4035	Press plate, tungsten carbide, 32mm Ø	1
4037	Press plate, tungsten carbide, 35mm Ø	1
4045	Press plate, tungsten carbide, 40mm Ø	1
4060	Press plate, stainless steel pellet, 40mm Ø	1
Consumables		
HWC	Micropowder C, binder XRF-pellets	1 kg
HWC	Micropowder C, binder XRF-pellets	5 kg
HWC	Micropowder C, binder XRF-pellets	10 kg
HWC	Micropowder C, binder XRF-pellets	20 kg