



ARM | MBH

Catalog of Reference Materials
and Sample Preparation Equipment



Quality

Over 1,400 reference materials
20 different alloy groups

Our certification process is accredited to ISO 17034 for reference material producers and includes both homogeneity testing of candidate material, and chemical analysis of major and trace elements using a wide range of analytical methods including XRF, ICP-OES, ICP-MS, Arc-Spark Optical Emission, GD-AES and GD-MS.

Chemical analyses are performed in our state-of-the-art laboratory accredited to ISO/IEC 17025 using XRF, ICP-OES and ICP-MS, as well as through a network of external laboratories through the use of multiple analytical techniques.

This approach insures that we produce high quality reference materials with the largest number of certified elements while limiting inter-technique biases.

#MeasureTheDifference

**ISO
17034**

**ISO/IEC
17025**

**ISO
9001**

**ISO
17043
PT**

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Our Facility

ARMI | MBH is a producer of high quality reference materials for the chemical analysis of metal alloys.

Our reference materials are available in disc and chip forms to suit various analytical techniques including Optical Emission (OE), X-ray Fluorescence spectrometry (XRF), and Inductively Coupled Plasma (ICP). Custom forms are available upon request.

We recognize that sample preparation along with reference materials are critical components in producing high quality analytical data.

We therefore provide sample preparation equipment including disc and pendulum grinders for the surface preparation of metal samples for XRF and OE analysis, fusion systems for the preparation of powdered materials for XRF analysis, and a unique ColdBlock™ digestion system for ICP and AA sample preparation.



ARMI.com

#MeasureTheDifference

ARMi | MBH is part of the wider LGC Standards family. LGC is the UK's designated National Measurement Institute for chemical and bioanalytical measurements.

With 2,600 professionals working in 21 countries, our analytical measurement and quality control services are second to none.

As a global leader, LGC provides the widest range of reference materials available from any single supplier.

When you make a decision using our resources, you can be sure it's based on precise, robust data.

Together, we're creating fairer, safer, more confident societies worldwide.



lgcstandards.com

Science for a safer world



Available Matrices include:

- Cast Iron
- Carbon Steel
- Low Alloy Steel
- Stainless Steel
- Tool Steel
- Nickel Alloy
- Cobalt Alloy
- Copper Alloy
- Foundry Aluminum Alloy
- Magnesium Alloy
- Titanium Alloy
- Wrought Aluminum Alloy
- Zinc Alloy
- Tin
- Lead
- Magnesium

Cast Iron

Part Number	Grade	Description	Ag	Al	As	B	Bi	C	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	P	Pb	S	Sb	Se	Si	Sn	Te	Ti	V	W	Zn	Zr
11XSG2A	Spheroidal Graphite	Grey Cast Iron		0.0238	0.0022			3.48		0.0304	0.0245	0.055	0.297				0.0263	0.0353		0.0075			3.03			0.0146			0.040	
11XAR5K	Abrasion Resistant	White Cast Iron		0.120				3.20	0.34	8.83	0.0517		0.535	0.149		0.027	5.15	0.0405	0.0035	0.0215			1.695			0.062	0.0533	0.073		
11X15294V	Chromium	White Cast Iron						2.29	0.124	30.82	0.134		0.467	0.325			0.649	0.093	0.0084	0.031			0.399	0.0560			0.117	0.293		
11X15295R	Chromium	White Cast Iron						2.52	1.510	27.53	0.197		0.491	0.391		(0.036)	0.304	0.0504	(0.015)	0.0413			0.589	0.047			0.201	0.195		
11X15309S	Chromium	White Cast Iron						3.05	0.032	23.26	0.505		1.506	0.249		0.0192	0.919	0.040		0.086			1.398			0.0156	0.056	0.015		
11X0331.1J	Corrosion Resistant	White Cast Iron		0.122				2.82	0.1117	0.607	7.59		1.646	0.120		0.149	12.43	0.069	0.0327	0.13			2.50	0.0439		0.1099				
11X0331.2K	Corrosion Resistant	White Cast Iron		0.191				2.64	0.161	1.025	6.47		1.272	0.0644		0.104	14.26	0.049	0.0205	0.119			2.32	0.0205		0.14	0.0158			
11X0331.3H	Corrosion Resistant	White Cast Iron		0.0323				2.08	0.126	1.530	7.01		0.756	0.0381		0.071	16.51	0.0459	0.0088	0.056			1.83	0.0098		0.075	0.0386			
11X20001J†	Corrosion Resistant	White Cast Iron						2.90		1.50	0.01		0.58				21.4	0.005		0.143			1.01							
11X20002J†	Corrosion Resistant	White Cast Iron						2.67		2.03	0.30		1.06				20.0	0.060		0.045			2.04							
11X20003K†	Corrosion Resistant	White Cast Iron						2.91		2.53	0.52		1.53				17.8	0.174		0.007			3.03							
11XS/1 Cr3J	Corrosion Resistant	White Cast Iron						2.91		1.61	9.01		0.861				14.53	0.072		0.023			1.07							



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Cast Iron

Cast Iron

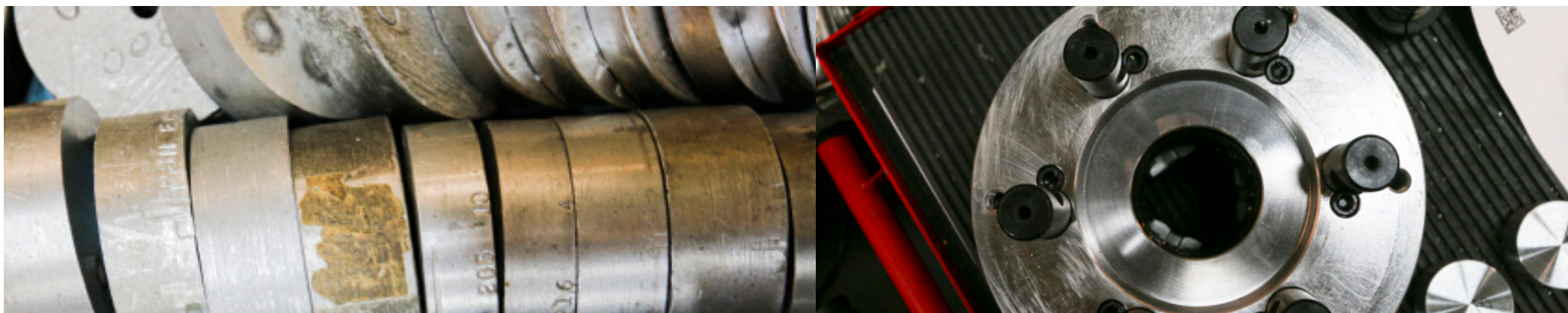
Part Number	Grade	Description	Ag	Al	As	B	Bi	C	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	P	Pb	S	Sb	Se	Si	Sn	Te	Ti	V	W	Zn	Zr	
11XHPC1H	High Phosphorus	White Cast Iron						3.29		1.056			0.620	0.060				0.808		0.0035				3.27							
11XHPC2L	High Phosphorus	White Cast Iron						3.18		1.509	0.0460		1.005	0.0354		0.0354	0.388	1.51		0.0418				2.20			0.0502	0.0350			
11XHPC5A	High Phosphorus	White Cast Iron						3.68		1.42			1.028					0.246		0.223				1.175							
11XC1R	Low Alloy	White Cast Iron		0.0195	0.0141	0.0357	0.011	2.91	0.0694	0.250	0.132		1.350	0.0278	0.0091	0.09	0.557	0.102	0.005	0.057	0.046	0.0050	1.49	0.0391		0.112	0.109	0.100	0.0097	0.0030	
11XC10D **	Low Alloy	White Cast Iron		0.021	0.022	0.003		3.40	0.059	0.415	0.645		0.750	0.290	0.007		0.880	0.104	0.0027	0.083	0.038		1.94	0.036		0.047	0.103	0.325			
11XC2V	Low Alloy	White Cast Iron		0.104	0.0541	0.0098	0.0084	3.17	0.116	1.126	0.191		1.23	0.116	0.0096	0.0160	1.803	0.256	0.0133	0.077	0.115	0.0157	1.180	0.0627		0.0870	0.328	0.0228	0.0115		
11XC3AD	Low Alloy	White Cast Iron		0.0104	0.086	0.0253	0.0124	3.45	0.240	1.669	0.351		0.896	0.235	0.0075	0.021	4.34	0.539	0.0170	0.180	0.243	0.028	1.06	0.166		0.127	0.605	0.040	0.007		
11XC4S	Low Alloy	White Cast Iron		0.006	0.0235	0.0351	0.0070	1.954	0.0210	1.382	0.095		0.565	0.177	0.0126	0.0233	3.21	0.1014	0.034	0.096	0.0055	0.009	2.98	0.0140		0.080	0.0165	0.099	0.0037		
11XC5Y	Low Alloy	White Cast Iron		0.060	0.0203	0.0058	0.005	2.78	0.0495	0.950	0.542		0.754	0.443	0.0094	0.020	1.186	0.092	0.0108	0.092	0.030	0.0072	1.913	0.0357	(0.002)	0.0934	0.0739	0.0072	0.0107	(0.002)	
11XC7P	Low Alloy	White Cast Iron	(0.026)	0.029	0.0110	0.0099		3.24	0.0068	0.61	0.072		2.214	0.0401	0.0153	0.0195	0.0273	0.0587	0.0106	0.0081	0.009		0.604	0.0110		0.064	0.0081	0.053	0.0152		
11XC8V	Low Alloy	White Cast Iron		0.086	0.0812	0.0366	0.014	2.60	0.126	0.148	0.310		0.394	0.148	0.0065	0.0217	0.275	1.00	0.0052	0.204	0.069	0.0210	1.643	0.1063	0.0049	0.235	0.064	0.0258	0.0068	0.0064	
11XC9D	Low Alloy	White Cast Iron		0.051	0.068	0.0049		3.24	0.1301	1.206	0.581		1.886	0.155		0.0766	2.79	0.069	0.0052	0.0260	0.149		1.462	0.040	0.011	(0.062)	0.359	0.304	0.009		



Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Carbon Steel

Part Number	Grade	UNS	Form	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
213B>	A36	K02600		0.0009	0.006	0.0002		0.153	(0.0001)		0.008	0.138	0.28		0.78	0.035	0.0094	0.002	0.149	0.009	0.0094	(0.001)	0.041			0.214	0.01		0.0009	0.016	0.003	0.0029	0.0013
213C	A36	K02600		0.0019	0.0058	0.0003		0.201	0.0014		0.0074	0.099	0.149		0.922	0.022	0.0116	0.0011	0.068	0.0042	0.007	0.0011	0.025	0.002		0.25	0.0081	(0.007)	0.001	0.035	0.002	(0.006)	(0.0004)
213D	A36	K02600		0.003	(0.006)	(0.0004)		0.158	(<0.001)		0.009	0.093	0.207		0.725	0.0131	0.008	0.0012	0.076	(0.01)	0.012	(<0.001)	0.031	(0.0032)		0.226	0.0147	(<0.005)	0.0011	0.001	0.003	(0.002)	(0.0015)
12X 10180B	AISI 1018	G10180	W	0.043	0.0059			0.169				0.0451	0.0544		0.722	0.0062	0.0071		0.0333		0.0101		0.0056			0.114	0.0065					0.0079	
12X 10180C	AISI 1018	G10180	W	0.0198	0.0029			0.171				0.0793	0.0500		0.803	0.0047	0.0051		0.0284		0.0150		0.0200			0.147	0.0024					0.0005	
12X 10180D	AISI 1018	G10180	W	(0.003)	0.0068			0.179			0.0070	0.0251	0.0663		0.807	0.0026	0.0070		0.0531		0.0153		0.0259			0.286	0.0033						
28A*	AISI 1018	G10180		0.003	(0.006)	(0.0001)		0.2	(0.0004)		0.01	0.15	0.247		0.69	0.031	0.0113	0.002	0.099	(0.0106)	0.011	(<0.005)	0.023	(<0.01)		0.22	0.011		0.002	0.006	(0.012)		(0.002)
28B*	AISI 1018	G10180		0.0037	0.008	0.0002		0.18	(0.002)		0.011	0.13	0.36		0.75	0.029	0.0094	0.002	0.13	0.007	0.01	(<0.01)	0.029			0.23	0.014		0.002	(0.002)	(<0.01)		(<0.005)
28C*	AISI 1018	G10180		0.01	0.004	0.0002		0.16			0.008	0.073	0.23		0.76	0.042	0.0084	0.0014	0.24	0.0074	0.011		0.011			0.25	0.016		0.001	0.024	(0.004)		
28D*	AISI 1018	G10180		0.011	0.0039	0.0002		0.17			0.009	0.081	0.11		0.8	0.025	0.0079	0.002	0.09	0.006	0.01		0.016			0.27	0.008		0.001	0.019	(0.003)		
28E*	AISI 1018	G10180		0.011	0.007	0.0001		0.169	(0.0003)		0.008	0.079	0.12		0.68	0.033	0.0088	0.001	0.145	0.0052	0.009	(<0.001)	0.0026	(<0.001)		0.171	0.01		0.001	0.019	0.002		(<0.002)
28J	AISI 1018	G10180		0.003	0.0064	0.0003		0.17	0.0006		0.007	0.111	0.27	(0.0005)	0.82	0.024	0.0067	0.0011	0.087	0.0017	0.019		0.029	(0.003)		0.286	0.013	(0.002)	0.0015	0.0016	0.005	(0.001)	0.0012
28K	AISI 1018	G10180		0.0019	(0.005)	(0.0004)	(<0.001)	0.174	(<0.001)	(<0.001)	0.006	0.107	0.17	(<0.005)	0.805	0.0209	0.008	0.0015	0.064	(0.0029)	0.012	(0.0005)	0.027	(0.002)	(<0.005)	0.29	0.008	(<0.008)	(0.0014)	0.001	(0.0023)	(<0.003)	(0.00016)
359A	AISI 1026	G10260		0.002	0.0073	0.0003		0.267	0.0013		0.0069	0.121	0.186	(0.0005)	0.686	0.023	0.0094	0.002	0.068	0.0044	0.0094	(0.001)	0.02	(0.002)		0.233	0.01		0.0009	0.027	(0.001)		(0.001)

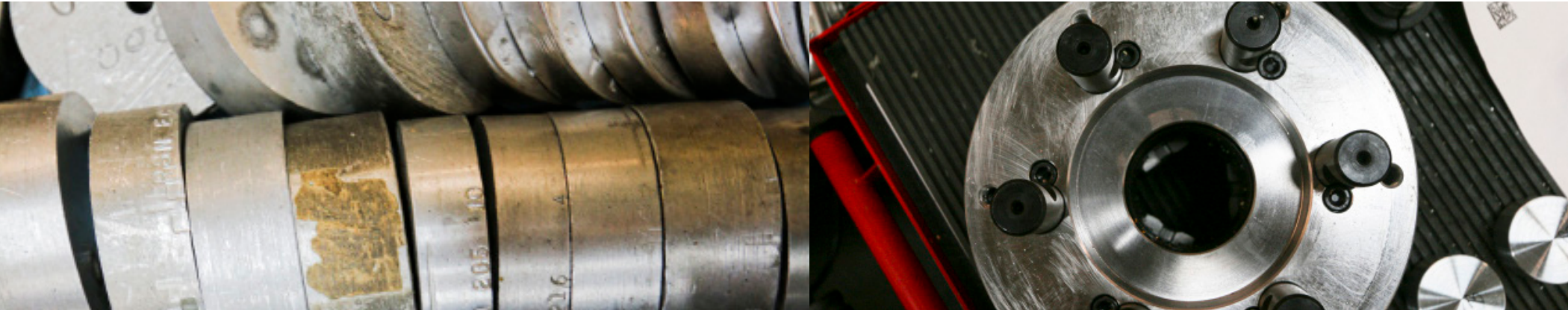


Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Carbon Steel

Carbon Steel

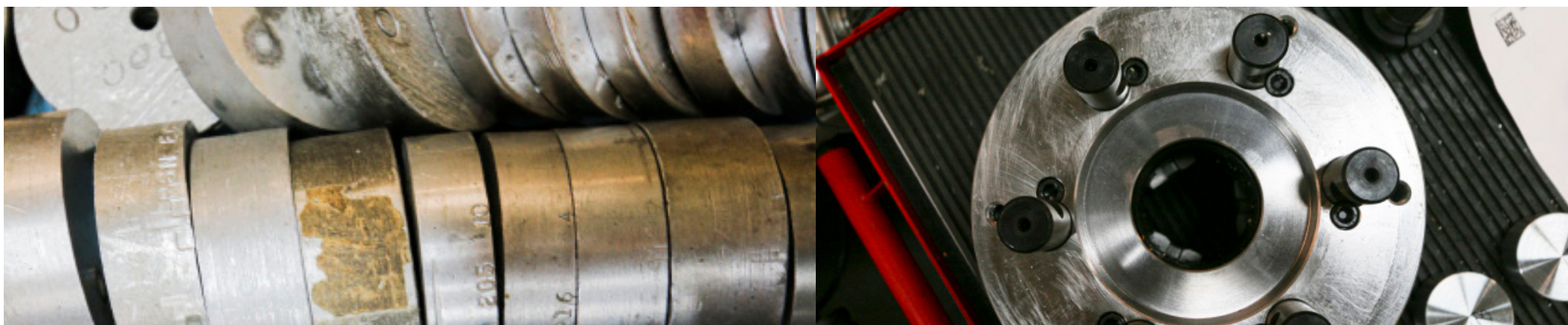
Part Number	Grade	UNS	Form	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
209D	AISI 1030	G10300		0.003	0.006	0.0002		0.322	0.002		0.007	0.137	0.243		0.68	0.037	0.0107	0.0014	0.079	0.005	0.0084	0.001	0.021	0.004		0.268	0.012		0.0011	0.042	0.002	(0.003)	
360A	AISI 1035	G10350		0.0016	0.006	0.0004		0.331	0.0017		0.0067	0.113	0.235	(0.0003)	0.733	0.024	0.0102	0.0015	0.078	0.004	0.008	(0.001)	0.023	0.0023		0.26	0.01		0.001	0.039	(0.001)	(0.003)	(0.001)
210D	AISI 1040	G10400		0.002	0.0059	0.0004		0.412	0.0009		0.007	0.096	0.273	(0.001)	0.73	0.034	0.011	0.001	0.122	0.0034	0.0052	0.001	0.03	0.002		0.23	0.01		0.0104	0.024	0.002		(0.001)
12X 10400 A	AISI 1040	G10400	W	0.0323	0.0068			0.420				0.139	0.140		0.754	0.0169	0.0133		0.0631		0.0137		0.0305			0.220	0.0127					0.0033	
200D	AISI 1045	G10450		0.004	0.005	(0.0002)		0.453	(0.0009)		0.007	0.109	0.232	(<0.001)	0.749	0.0217	0.009	0.001	0.097	(0.004)	0.0103	(<0.002)	0.024	(0.0019)		0.225	0.0079	(<0.005)	0.00013	0.0244	0.003	(0.002)	(0.001)
254A*	AISI 1050	G10500		0.025	0.005	0.0002		0.5	0.001		0.006	0.05	0.091		0.78	0.013	0.0096	0.001	0.044	(0.003)	0.01	(0.0003)	0.024	(0.004)		0.211	0.005		0.001	0.002	(0.001)		(0.001)
12X 10550 A	AISI 1055	G10550	W	0.0325	0.0059			0.549				0.338	0.0290		0.685	0.0086	0.0051		0.0247		0.0184		0.0055			0.281	0.0018					(0.002)	
373A	AISI 1060	G10600		0.002	0.0046	0.0003		0.625	0.0005		0.005	0.096	0.107	(0.0004)	0.7	0.0176	0.0088	0.001	0.048	0.002	0.0123	(0.001)	0.031	(0.002)		0.22	0.0069		0.0017	0.023	0.002	(0.003)	(0.003)
12X 15180 A	AISI 1518	G15180	W	0.018	0.0117			0.170				0.118	0.141		1.196	0.0231	0.0051		0.1030		0.0110		0.0022			0.212	0.0115					0.0016	
12X 15240 A	AISI 1524	G15240	W	0.0188	0.0106			0.201				0.1032	0.200		1.496	0.0166	0.0070		0.0761		0.0152		0.0201			0.198	0.0153			0.0020		0.0020	
349A	AISI 1541	G15410		0.002	0.005	0.0003		0.41	0.0015		0.0085	0.189	0.3	(0.0004)	1.49	0.059	0.01	0.0012	0.178	0.003	0.011	(0.001)	0.025	0.003		0.192	0.015	(0.007)	0.0013	0.027	0.004	(0.003)	(0.002)
12X 12700 A			C	0.055	0.0060			0.365			0.0047	0.070	0.0342		0.636	0.0345	0.0073		0.0197		0.0205		0.0116			0.238				0.0033		0.0120	
12X 12701 A			C	0.0426	0.0060			0.330			0.0058	0.235	0.0346		0.636	0.0163	0.0072		0.0557		0.0218		0.0124			0.308				0.0040		0.0014	



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Carbon Steel

Part Number	Grade	UNS	Form	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
12X12746V			W	0.459	0.051			0.048			0.142	0.374	0.646		1.198	0.658			0.226		0.0347		0.064			0.156	0.264		0.088	0.0208	0.105		
12X12747V			CC	0.0271	0.0075			0.201			0.211	0.58	0.232		1.240	0.606	0.025		0.494		0.0648		0.0275			0.298	0.144		0.099	0.0272	0.0276		
12X12748U			W	0.111	0.129			0.106			0.323	0.401	0.347		0.902	0.329			0.376		0.0309		0.050			0.221	0.080		0.105	0.0499	0.0464		
12X12749X**			W	0.195	0.085			0.175			0.435	0.455	0.25		1.37	0.19			0.475		0.025		0.062			0.47	0.018		0.018	0.069	0.035		
12X12750U			W	0.253				0.258			0.581	0.792	0.106		0.510	0.088		0.111	0.786		0.0078		0.0053			0.599	0.110		0.159	0.102	0.100		
12X349E			CC	0.154	0.0107			0.319			0.0194	0.131	0.156		0.600	0.077			0.216		0.0119		0.0128			0.256	0.115		0.090	0.0262	0.093		
12X350C			CC	0.290	0.057			0.159			0.0304	0.335	0.196		0.758	0.147			0.160		0.0296		0.0408			0.467	0.0382		0.076	0.0115	0.260		
12X352E**			W	0.26	0.028			0.35			0.025	0.245	0.12		0.81	0.22		0.055	0.34		0.067		0.095			0.43	0.11		0.24	0.024	0.27		
12X353G			W	0.0485	0.0461		0.0246	0.111			0.0240	0.701	0.232		0.726	0.1063	0.0027	0.0641	0.214		0.0099		0.0147	0.138	0.0192	0.207	0.113		0.0387	0.0189	0.135		
12X354B			W	0.0150	0.023			0.252			0.0237	0.0487	0.0679		5.03	0.0328	0.0027	0.0802	0.082		0.0478		0.0105			0.200	0.0154		0.0248	0.0204	0.0248		
12X355C			W	0.1104	0.0331			0.159			0.0495	0.113	0.657		0.508	0.1010	0.0023	0.023	0.0710		0.0214		0.0241	0.0796	0.0395	0.494	0.0564		0.153	0.1265	0.037		
12X356D**			CC	0.034	0.025		0.005	0.23			0.11	0.24	0.40		0.32	0.030	0.011	0.017	0.070		0.058		0.037	0.021	0.009	0.24	0.038		0.015	0.07	0.087	0.011	
12X357C			W	0.208	0.0147		0.0058	0.270			0.199	0.094	0.265		0.220	0.0105	0.0079	0.0051	0.0954		0.0101		0.0590	0.0140	(0.004)	0.153	0.0188		0.0569	0.166	0.0194	0.0094	
12X358A			W	0.0616	0.0393		0.0102	0.129			0.0355	0.625	0.250		0.709	0.108	0.0029	0.104	0.212		0.0102		0.0142	0.128	0.097	0.199	0.117		0.0453	0.0261	0.123		



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Free Machining/Rephosphorized/Resulfurized Carbon Steel

Free Machining/Rephosphorized/Resulfurized Carbon Steel

Part Number	Grade	UNS	Form	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
183C	AISI 12L14	G12144		0.0021	0.003	0.0011	(<0.001)	0.079			(0.002)	0.055	0.016	(<0.0005)	1.06	0.01	0.0049	0.001	0.019	0.016	0.078	0.18	0.31	(0.001)		0.004	0.003	(<0.001)	0.0009	0.002	(0.002)	(<0.001)	0.001
29C*	AISI 1117	G11170		0.003	0.009	(0.003)		0.18			(0.01)	0.076	0.15		1.2	0.016	0.01	(0.003)	0.075	0.005	0.011	(<0.001)	0.13			0.28	0.008		0.0015	0.003	(0.002)		
29E	AISI 1117	G11170		0.0032	0.0085	0.0007	(<0.013)	0.193	0.0012		0.008	0.105	0.253	(0.0003)	1.19	0.0269	0.0093	0.0024	0.082	0.005	0.0157	0.001	0.121	0.003	(0.0006)	0.239	0.0109	(0.0004)	0.0014	0.0255	(<0.007)	(0.004)	(<0.004)
307A	AISI 1118	G11180		0.032	0.008	(<0.005)	(<0.02)	0.163	(<0.0005)	(<0.001)	0.01	0.104	0.19	(<0.006)	1.44	0.045	0.0108	(0.002)	0.197	0.003	0.0113	0.002	0.096	(<0.004)	(<0.006)	0.281	0.009	(<0.005)	0.0015	0.0028	(0.005)	(<0.002)	(0.002)
307B	AISI 1118	G11180		0.034	(0.008)	(0.0005)	(<0.014)	0.162	(<0.001)	(<0.001)	0.0101	0.105	0.191	(<0.005)	1.45	0.045	0.011	0.0013	0.195	(0.004)	0.012	(0.006)	0.094	(<0.006)	(<0.005)	0.3	0.01	(<0.008)	0.003	0.003	(0.005)	(<0.004)	(0.004)
348A	AISI 1141	G11410		0.002	0.007	0.0013	(<0.02)	0.384	0.001	(<0.001)	0.01	0.123	0.23	(<0.006)	1.46	0.026	0.01	0.027	0.081	0.003	0.0121	(0.002)	0.102	(0.003)	(<0.005)	0.27	0.0112	(<0.008)	0.0015	0.0029	(0.009)	(<0.003)	(0.003)
199C	AISI 1144	G11440		0.0019	0.0059	(0.003)		0.469	(0.0011)		0.007	0.19	0.193	(0.0002)	1.55	0.0293	0.007	0.0016	0.085	0.0037	0.0155	0.001	0.281	(0.003)	(<0.006)	0.21	0.0084	(0.0007)	0.0016	0.0037	0.0023	(0.0006)	(<0.0040)
206B	AISI 1215	G12150		0.0025	0.0045	0.0006		0.074			0.007	0.038	0.113		1.01	0.018	0.0075	0.002	0.053	0.016	0.05	(0.001)	0.293	(0.002)		0.012	0.0064		0.0008	0.0016	(0.003)		0.002
14X 12130 A	AISI 1213	G12130	W	0.0024	0.0016			0.0871				0.0505	0.0201		1.219	0.0102	0.0097		0.0345		0.061		0.305			0.022	0.0054						
14X 12144 A	AISI 12L14	G12144	W	0.0034	0.0022			0.0800				0.0807	0.0106		1.227	0.0089	0.0066		0.0162		0.0630	0.328	0.325			0.0093							
14X 11170 A	AISI 1117	G11170	W	0.0023	0.0044			0.154				0.1126	0.1101		1.129	0.0317	0.0112		0.0877		0.0133	0.0011	0.120			0.151	0.0110						
14X 11390 A	AISI 1139	G11390	W	0.0026	0.0028			0.419				0.0609	0.0395		1.040	0.0067	0.0042		0.0239		0.0342		0.191			0.198	0.0022						
14X 606M36T A			W	0.0071	0.0085			0.378				0.163	0.179		1.574	0.272	0.0096		0.0931		0.0159		0.196			0.167	0.0103						
14X MSFM1 L			CC	(0.08)				0.143			0.0509	0.89	0.1073		1.155	0.264	0.026		0.147		0.0689		0.414			0.404	0.0289			0.0154			
14X MSFM2 K			CC	0.123				0.272			0.104	0.996	0.162		1.568	0.355	0.028		0.235		0.0491		0.248			0.353	0.0218			0.0324			
14X MSFM3 G			CC	(0.18)		0.0043		0.438			0.0494	0.454	0.205		1.809	0.390	0.0206		0.161		0.0297		0.147			0.292	0.0378			0.0199			
14X MSFM4 A			CC	(0.007)				0.226			0.0253	1.69	0.429		1.141	0.974	0.0220		6.22		0.0386		0.224			0.469	0.0141			0.0151			

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Low Alloy Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
12X16604A	1.6604			0.0111				0.299			0.0366	1.912	0.131		0.444	0.334	0.0046		1.892		0.0064		0.0018			0.239	0.0060			0.0069			
12X826M40A	1.6745			0.0404	0.0056			0.395				0.649	0.1294		0.529	0.510	0.0089		2.408		0.0094		0.0025			0.248	0.0085						
12X835M30A	1.6747			0.004	0.0068			0.275				1.119	0.195		0.457	0.213	0.0087		4.01		0.0071		0.0157			0.198	0.0101		0.0012	0.0029			
12X722M24A	1.7361			0.0187	0.0075			0.236				3.094	0.200		0.510	0.497			0.208		0.0135		0.0199			0.262	0.0116			0.0080		0.0028	
12X15CDV6A	1.7734			0.019	0.0041			0.171				1.397	0.0231		0.839	0.875	0.0069		0.044		0.0056		0.0086			0.152	0.0011			0.242			
12X40CDV12A	1.8523			0.0208	0.0040			0.401			0.0197	3.29	0.0978		0.604	0.946	0.0155		0.1062		0.0060		0.0013			0.250	0.0049			0.198			
12X19MNV56A	19MNV56			0.0101				0.174				0.1087	0.203		1.563	0.0270	0.0210		0.110		0.0114		0.0245			0.357	0.0214			0.0939			
12X605M36A	605M36			0.0105	0.0102			0.373	0.0033		0.0151	0.243	0.199		1.504	0.292	0.0095		0.146		(0.009)		0.0317			0.283	0.0101						
340A	AISI 300M		K44220	0.062	0.004	0.0004		0.414	(0.0004)		0.006	0.84	0.103	(0.0002)	0.755	0.39	0.002	0.015	1.8	(0.001)	0.011	(0.001)	0.001	0.0021		1.63	0.005		0.0098	0.064	0.005	(0.0001)	(0.002)
12X44220A	AISI 300M		K44220	0.029	0.0026			0.417				0.846	0.031		0.874	0.401	0.0030		1.89		0.0050		0.0009			1.662	0.0019			0.0764			
12X4330VA	AISI 4330V		J24045	0.0311	0.0059			0.327				0.922	0.0954		0.857	0.470	0.0078		1.99		0.0062		0.0030			0.303	0.0071			0.0507			
12X61500A	AISI 6150		G61500	(0.007)	0.0067			0.530				1.023	0.157		0.912	0.0195			0.0976		0.0104		0.0102			0.240	0.0114			0.110		0.0055	
12X86200A	AISI 8620		G86200	0.0305	0.0051			0.198				0.602	0.213		0.849	0.224	0.0091		0.598		0.0110		0.0104			0.299	0.0100			0.0045			

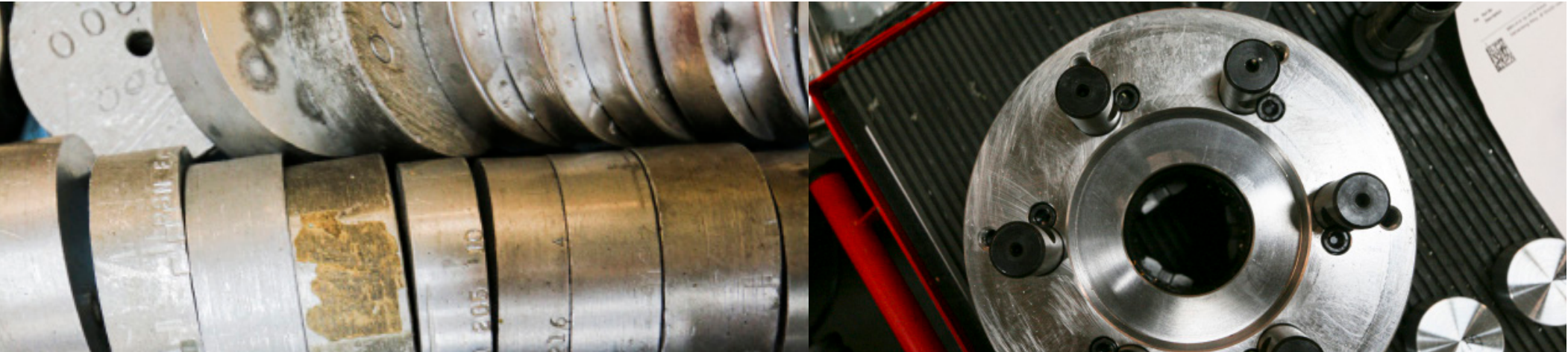


Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Low Alloy Steel

Low Alloy Steel

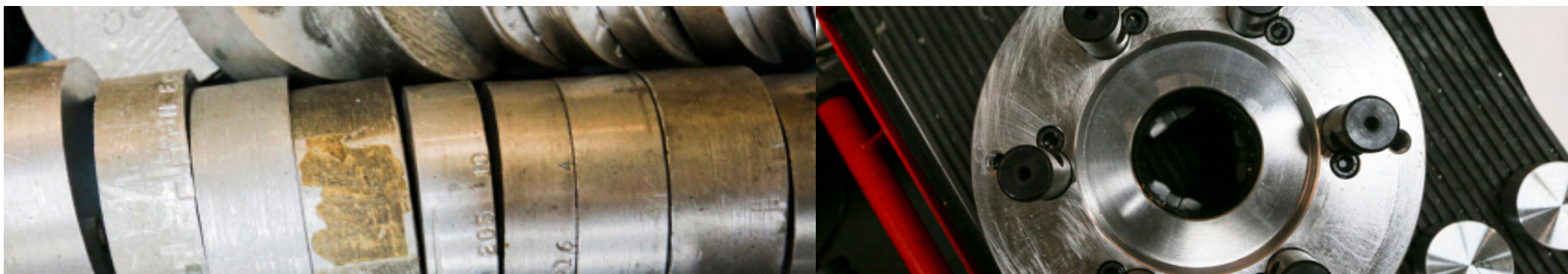
Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
12X 93106 A	AISI E9310		G93106	0.0246	0.0050			0.122				1.107	0.199		0.605	0.0879	0.0098		3.255		0.0071		0.0103			0.206	0.0094			0.0030			
229B	ASTM A182 Grade F1		K12822	0.025	0.002	0.0006	(<0.0005)	0.22	(0.0003)		0.0116	0.017	0.0153	(<0.001)	0.858	0.495	0.0072	0.0019	0.03	0.0017	0.0073	0.0005	0.0106	(0.0006)	(<0.0012)	0.329	0.0012	(0.003)	0.0019	0.0059	0.003	(<0.003)	0.0008
35A*	ASTM A182 Grade F11 Class 2		K11572	0.028	(0.003)	(0.0002)		0.12	(0.0002)		0.008	1.23	0.078		0.52	0.49	0.0081	0.003	0.088	(0.0014)	0.005	(<0.005)	0.006			0.61	0.004		0.002	0.02			(0.002)
35B*	ASTM A182 Grade F11 Class 2		K11572	0.016	0.006	0.0005		0.13	0.0001		0.008	1.12	0.11		0.45	0.46	0.0079	0.003	0.084	0.0016	0.006	(<0.01)	0.015			0.58	0.006		0.003	0.005	(<0.01)		(<0.005)
35C*	ASTM A182 Grade F11 Class 2		K11572	0.029	0.008	0.0004		0.115	(0.0004)		0.011	1.09	0.271		0.44	0.52	0.0093	0.002	0.102	0.0016	0.012	(0.001)	0.014	(0.005)		0.56	0.017		0.003	0.005	(0.005)		(0.002)
35L	ASTM A182 Grade F11 Class 2		K11572	0.017	0.0045	0.00044	(<0.001)	0.119	(<0.002)	(<0.001)	0.007	1.35	0.123	(<0.003)	0.535	0.607	0.0072	0.0026	0.071	(<0.005)	0.007	(<0.001)	0.014	(0.003)	(<0.002)	0.679	0.0088	(<0.002)	0.0015	0.0037	0.004	(<0.002)	(<0.004)
12X 11572 A	ASTM A182 Grade F11 Class 2		K11572	0.0290	0.0030			0.111				1.107	0.0576		0.498	0.499	0.0058		0.0977		0.0069		0.0025			0.649	0.0049					0.0009	
36B*	ASTM A182 Grade F22		K21590	0.03	0.009	(0.0002)		0.14	0.0002		0.012	2.18	0.13		0.49	0.95	0.0102	0.004	0.18	0.0018	0.01	(0.003)	0.0038			0.21	0.008		0.003	0.006	(<0.01)		(<0.005)
36C	ASTM A182 Grade F22		K21590	0.017	0.005	(<0.01)	(<0.01)	0.14	(<0.001)	(<0.001)	0.008	2.43	0.142	(<0.003)	0.49	0.98	0.008	(0.004)	0.085	(0.004)	0.009	(<0.001)	0.014	(<0.002)	(<0.002)	0.25	0.008		(0.0022)	0.0061	(<0.006)	(<0.004)	(<0.004)
12X 21590 A	ASTM A182 Grade F22		K21590	0.0202	0.0091			0.139				2.10	0.283		0.457	0.935	0.0134		0.144		0.0128		0.0059			0.211	0.0190		0.0011	0.0032		0.0045	
37C	ASTM A182 Grade F5a		K42544	0.01	0.009	(0.0003)	(<0.03)	0.096	(<0.002)		0.015	4.34	0.121	(<0.001)	0.408	0.5	0.008	0.004	0.148	(<0.02)	0.014	(<0.002)	0.004	(<0.01)	(<0.006)	0.31	0.009	(<0.002)	0.0025	0.017	0.012	(<0.008)	(0.002)
38A*	ASTM A182 Grade F9		K90941	0.009	(0.023)	(0.0003)		0.13	(0.0005)		0.029	8.67	0.15		0.41	0.96	0.019	0.008	0.24	(0.0050)	0.008		0.018	(0.001)		0.38	0.014		0.003	0.02	(0.023)		(0.003)



Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; ++ = Unsuitable for use with glow discharge systems

Low Alloy Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
38B*	ASTM A182 Grade F9		K90941	0.032	0.01	0.0004		0.13	0.0005		0.017	8.84	0.119		0.427	0.94	0.0192	0.007	0.15	0.003	0.023	(<0.001)	0.013	0.01		0.78	0.01		0.004	0.014	(0.01)		0.003
12X 14072 A	ASTM A193 B16		K14072	0.0039				0.430			0.0098	1.061	0.203		0.680	0.573	0.0103		0.136		0.0151		0.0061			0.322	(0.011)			0.301			
FeT23-18	ASTM A213 Grade T23		K40712			0.002		0.068			0.085	2.47	0.046		0.82	0.261	0.003	0.052	0.53	0.0044	0.012		0.006			0.18	0.004		0.004	0.238	1.6		
12X 19965 A	ASTM A485 Grade 3		K19965	0.0256				0.936				1.713	0.148		0.600	0.210	0.0087		0.141		0.0196		0.0081			0.247	0.0070			0.0087		0.0008	
321A*	Grade 722			0.004	0.0052	0.0008		0.53	0.0016		0.007	0.24	0.212		1.53	0.026	0.01	0.0017	0.47	(0.005)	0.012	(0.001)	0.017	(0.002)		0.65	0.019		0.0036	0.089	0.005		(0.001)
322A*	Grade 75S			0.002	0.005	0.0009		0.317	0.0019		0.006	0.159	0.33		1.4	0.021			0.28	0.006	0.009	(0.001)	0.021	0.0027		0.42	0.016		0.0016	0.124	0.003		(0.001)
342A	Hy-TUF		K32550	0.019	0.006	0.0004		0.257	(0.0001)		0.008	0.38	0.11	(0.0002)	1.37	0.42	0.102	(0.002)	1.76	0.0006	0.006	0.0008	0.0051	0.0021		1.63	0.021		0.0028	0.023	(0.005)	(0.001)	(0.002)
12X 32550 A	HY-TUF		K32550	0.0178	0.0054			0.257				0.377	0.108		1.350	0.417	0.0101		1.750		0.0061		0.0054			1.59	0.0206			0.0222			
12X 24065 A	Nitralloy 135		K24065	1.035	0.0074			0.370				1.412	0.216		0.502	0.1716	0.0076		0.271		0.0129		0.0044			0.218	0.0120		0.0028	0.0040		0.0033	
196A	SPC 3			0.015	0.025	0.0017		1.08	0.0002			2.35	0.25		2.4	0.129	0.0084	0.087	0.61	0.0021	0.04	0.001	0.014	0.006		0.35	0.033		0.014	0.157	0.189		0.006
268B>	STA 361			0.002	(<0.005)	0.0011		0.087			0.003	0.094	0.31		0.58	0.033	0.0015	0.006	0.127	(0.015)	0.011	(<0.003)	0.035			0.21	0.01		(<0.001)	0.047	0.01		(<0.001)
12X 15217 R				0.081				0.166			0.193	1.011	0.257		0.885	0.311	0.014	0.102	0.860		0.064		0.078			1.392	0.058			0.607	0.100		
12X 15251 U				0.1085				1.017			0.228	0.612	0.1194		0.910	0.205	0.0031	0.266	0.896		0.0253		0.0215			2.05	0.0108			0.391	0.0393		
12X 15252 Q				0.074				0.0478			0.154	0.887	0.154		0.818	0.248	0.0218	0.10	2.03		0.0213		0.0580			0.265	0.0448	(0.054)		0.330			
12X 15253 T				0.0242	0.0216			0.222			0.265	2.022	0.266		1.208	1.039	0.029	0.374	0.991		0.0900		0.0821			0.347	0.309	0.007		0.276	0.276		

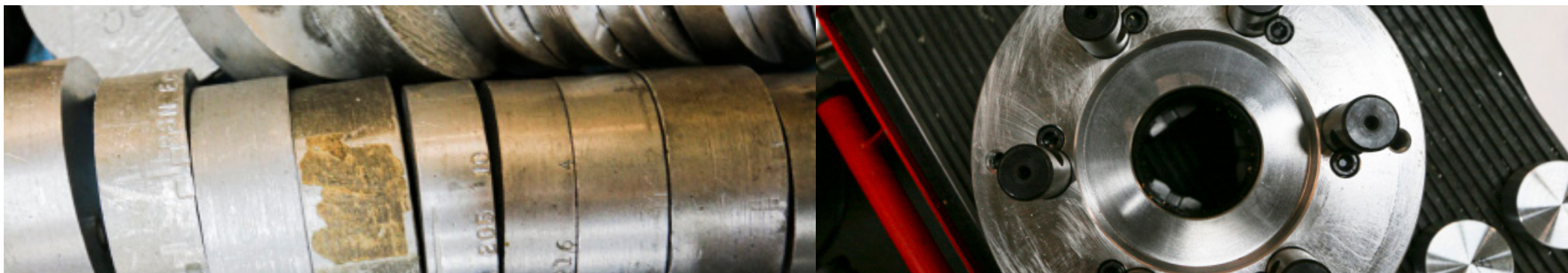


Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Low Alloy Steel

Low Alloy Steel

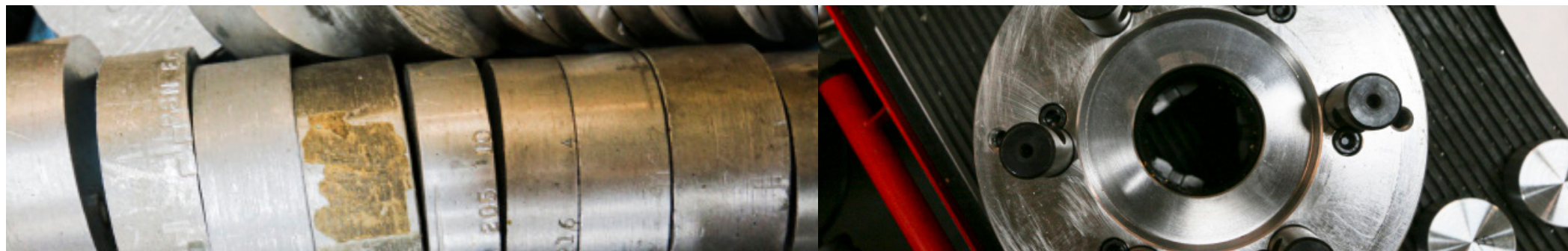
Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
12X15254AA				0.625				0.299			0.498	1.830	0.0853		1.151	0.711		0.310	0.311		0.065		0.0460			0.831	0.0458	0.003	0.285	0.288	0.310		
12X15255R**				0.155				0.39			0.045	1.45	0.285		1.08	0.11	0.006	0.21	0.31		0.083		0.064			1.02	0.11	0.035	0.052	0.48	0.14		
12X15256Q				0.1300				0.123			0.493	0.362	0.0550		0.492	0.0740	0.0056	0.0509	5.33		0.0125		0.0163			0.190	0.107			0.619	0.101		
12X15258P				0.087		0.0100		0.392			0.310	0.631	0.1090		1.23	0.361		0.133	0.497		0.0670		0.0322			1.014	0.0718	(0.002)	0.100	0.378	0.125		
12X15259Q				0.1488				0.603			0.141	0.512	0.200		0.401	0.407	0.0151	0.249	4.02		0.0401		0.0704			1.81	0.053			0.139	0.49		
12X15260W				0.191	0.055			0.352			0.0884	2.98	0.152		2.08	0.098		0.254	0.453		0.0275		0.074			0.485	0.0094	(0.016)		0.442			
12X15261X				1.648	0.0051			0.546			0.333	0.496	0.308		0.483	1.594		0.601	0.0985		0.090		0.0518			1.513	0.0172		0.385	0.122	0.269		0.0297
12X15266V				0.526	0.0640			0.455			0.286	3.49	0.226		1.240	0.298		1.438	1.317		0.0344		0.0258			0.674	0.0082	0.116		0.106			
12XLA1B				0.0104	0.0213			0.104			0.0144	1.026	0.0572		1.262	0.068	0.0144		0.210		0.0090		0.060			0.777				0.448			
12XLA2E				1.381	0.282			0.195			0.0306	0.813	0.786		0.57	0.136	0.0173		0.783		0.0241		0.0263			0.678	0.0066			0.0990			
12XLA3C				0.0410	0.0301			0.500			0.0475	0.375	0.213		1.693	0.303	0.0039		0.280		0.0274		0.0442			0.163				0.157		0.004	0.0197
12XLA4C**				0.18	0.019			0.65			0.097	0.53	0.26		0.36	0.40	0.011		0.47		0.052		0.025			0.475				0.37	0.090	0.0060	
12XLA5C				0.10	0.0085			0.783			0.166	0.678	0.158		0.726	0.305			0.484		0.0577		0.0261			0.493	0.0100			0.579		0.0091	
12XLA6D				0.174				0.0090			0.0051	0.099	0.0250		0.0867	0.0110	0.0070		0.0338		0.0041		0.0057			0.075				0.0033		0.0067	



Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; ++ = Unsuitable for use with glow discharge systems

Low Alloy Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
143F	AISI 4130	G41300	Cr-Mo	0.026	0.0051	(<0.003)	(<0.02)	0.308	(<0.001)		0.01	0.865	0.221	(<0.005)	0.573	0.163	0.0098	0.0015	0.088	0.003	0.011	(<0.003)	0.0177	(<0.009)	(<0.005)	0.23	0.01	(<0.008)	0.0012	0.0046	0.003	(<0.005)	(<0.01)
12X 41300 A	AISI 4130	G41300	Cr-Mo	0.027	0.0043			0.319				0.996	0.131		0.551	0.217	0.0095		0.084		0.0082		0.0156			0.183	0.0060					0.0012	
30C*	AISI 4140	G41400	Cr-Mo	0.027		(0.0001)		0.39	0.003		0.009	0.94	0.16		0.84	0.16	0.0108	(0.002)	0.18	0.0025	0.021		0.016			0.28	0.014		0.003	0.004			(0.003)
30D*	AISI 4140	G41400	Cr-Mo	0.035	0.008	0.0004		0.391	(0.0006)		0.013	0.978	0.241	(0.005)	0.83	0.22	0.0097	0.002	0.159	0.0014	0.013	(0.0003)	0.02			0.24	0.017	(0.003)	0.002	(0.004)	0.003		
30E*	AISI 4140	G41400	Cr-Mo	0.014	0.015	0.0002		0.408	(0.001)		0.012	1.06	0.301		0.92	0.209	0.0063	0.002	0.18	0.0014	0.011	(<0.001)	0.0071			0.264	0.017		0.003	0.005	0.005		
30H	AISI 4140	G41400	Cr-Mo	0.02	0.0046	0.0007	(0.002)	0.425	(0.0009)		0.0071	0.97	0.131	(0.001)	0.937	0.199	0.0081	0.003	0.063	0.0016	0.015	0.0005	0.022	0.0013	(<0.005)	0.253	0.008	(0.004)	0.0024	0.004	0.007	(0.002)	0.002
30I*	AISI 4140	G41400	Cr-Mo	0.026	0.0054	0.0002		0.408	(0.0002)		0.0093	0.98	0.138	(0.0005)	0.904	0.219	0.0086	0.0016	0.131	0.0007	0.0206	(0.001)	0.0171	0.0017		0.209	0.0089	(0.001)	0.0013	0.0051	0.003		(0.001)
30J	AISI 4140	G41400	Cr-Mo	0.023	0.005	(0.0004)	(<0.02)	0.405	(<0.001)	(<0.001)	0.0098	0.972	0.173	(<0.005)	0.884	0.205	0.01	0.0016	0.187	(0.003)	0.01	(0.002)	0.036	(0.004)	(<0.005)	0.256	0.0109	(<0.008)	0.0013	0.0045	0.005	(<0.002)	(0.003)
12X 41400 A	AISI 4140	G41400	Cr-Mo	0.0195	0.0088			0.418				1.003	0.238		0.795	0.211	0.0101		0.127		0.0138		0.0210			0.221	0.0181						
12X 41400 B	AISI 4140	G41400	Cr-Mo	0.0137	0.0152			0.452				0.999	0.161		0.764	0.177	0.0124		0.156		0.0095		0.0417			0.32	0.0099						
12X 41450 A	AISI 4145	G41450	Cr-Mo	0.0220	0.0053			0.446				1.194	0.1318		1.011	0.340	0.0080		0.187		0.0093		0.0032			0.261	0.0090		0.0385				
Fe91-18	ASTMA182 Grade F91	K90901	Cr-Mo-V	0.006				0.099			0.013	8.24	0.041		0.453	0.94	0.046	0.07	0.187	0.003	0.015		0.002			0.27	0.004		0.0021	0.198	0.003		
FeP92-18	ASTMA182 Grade F92	K92460	Cr-Mo-W-V	0.005		0.0026		0.092			0.036	9.4	0.074		0.737	0.52	0.0036	0.096	0.82	0.013	0.005		0.005			0.2	0.006		0.003	0.188	1.97		
Fe5140H-18	AISI 5140H	H51400	Cr	0.013	0.011			0.37			0.0081	0.67	0.253		0.93	0.031	0.007	0.0015	0.266		0.014		0.022			0.187	0.0069		0.0015	0.0024	0.003		
12X 52986 A	AISI E52100	G52986	Cr	0.0258	(0.002)			1.023				1.418	0.077		0.372	0.0169	(0.002)		0.0411		0.0049		0.0011			0.246	0.0063			0.0615			

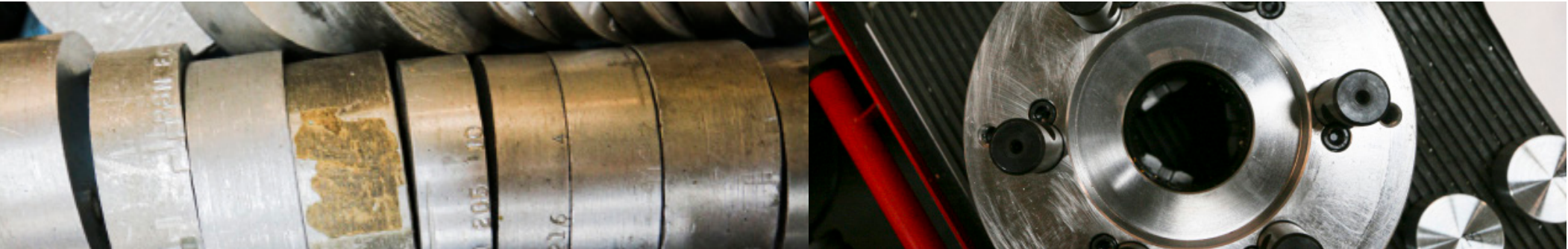


Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Low Alloy Steel

Low Alloy Steel

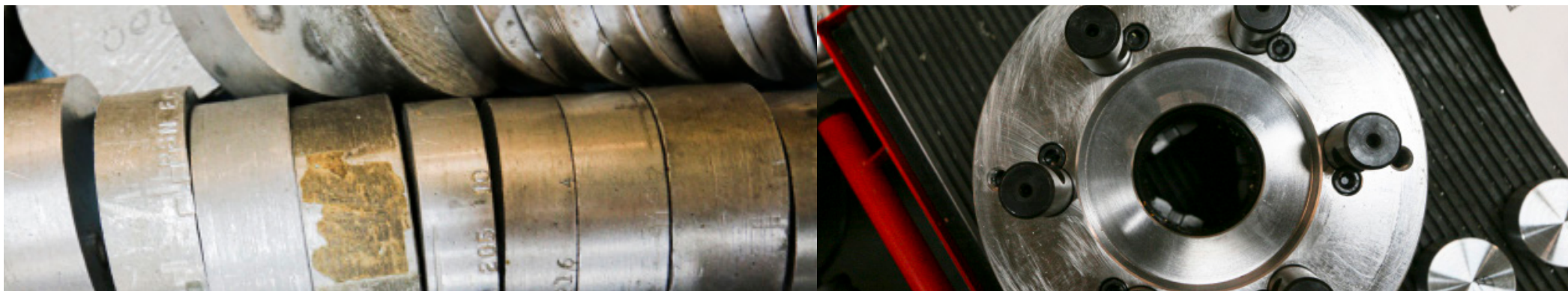
Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
49E	AISI E52100	G52986	Cr	0.024	0.0029	(<0.005)	(<0.001)	1.03	(<0.003)	(<0.001)	0.006	1.43	0.076	(<0.0005)	0.364	0.017	0.003	0.003	0.043	0.002	0.006	(<0.001)	0.002	(0.001)	(<0.002)	0.248	0.0065	(<0.005)	0.0006	0.066	(0.002)	(0.001)	(0.002)
34A*	AISI E6150	G61500	Cr-V	0.014	(0.006)	(0.0002)		0.51	(0.0002)		0.009	0.99	0.18		0.78	0.044	0.0076	0.003	0.14	(0.0014)	0.01		0.01			0.22	0.009		0.003	0.17	(0.016)		(0.002)
34B*	AISI E6150	G61500	Cr-V	0.024	0.006	0.0002		0.48	0.0002		0.009	0.94	0.21		0.81	0.053	0.0089	0.002	0.14	0.0018	0.021	(<0.01)	0.021			0.29	0.012		0.002	0.16	(<0.01)		(<0.005)
34C	AISI E6150	G61500	Cr-V	0.068	0.0024	0.0003		0.5	(0.0004)		0.005	0.914	0.078		0.739	0.022	0.003	0.004	0.085	0.0008	0.009	(0.0003)	0.0011	(0.001)		0.3	0.0058		0.0045	0.206	(0.003)		(0.001)
FeDP1080-18	Grade DP1080		Dual Phase	0.002				0.11			0.069	0.554	0.042		1.88	0.445	0.009	0.014	0.554	0.0055	0.014		0.006			0.11	0.0064		0.0013	0.0043	0.03		
27F	Commercially Pure Iron	K00095		(0.0009)	(0.0023)	(<0.002)	(<0.01)	0.002	(<0.001)	(<0.003)	0.0025	(<0.005)	(<0.005)	(<0.001)	(<0.005)	(<0.005)	(<0.002)	(<0.002)	(<0.005)	0.079	(<0.005)	(<0.005)	0.0011	(<0.001)	(<0.005)	0.004	(<0.002)	(<0.005)	(<0.002)	(0.0007)	(<0.005)	(<0.002)	(<0.005)
27G	Commercially Pure Iron	K00095		0.0013	0.0016	(0.0002)	(<0.002)	0.003	(0.0002)	(<0.003)	0.0009	0.043	0.04	(0.0002)	0.003	(0.002)	(0.0003)	(0.002)	0.045	0.025	0.003	(<0.003)	0.0011	(<0.01)	(<0.02)	0.07	(0.001)	(<0.008)	(0.0009)	(0.0007)	(<0.002)	(<0.005)	(<0.01)
14XMN1AL			Hign Mn	(0.23)				0.597				1.321	0.178		22.08	0.499	0.0585	0.096	0.692		0.053		0.0054			0.944	0.0393	(0.011)	0.0346	0.0226			
14XMN2S**			Hign Mn	0.022				0.79				0.36	0.087		12.4	1.08	0.037	0.23	0.73		0.025		0.007			2.20	0.015	0.004	0.019	0.090			
14XMN3U**			Hign Mn	0.048				1.07				0.59	0.135		10.2	0.35	0.026	0.41	0.39		0.025		0.016			1.05	0.027	0.010	0.102	0.023			
14XMN4AC			Hign Mn	0.20				0.938				1.983	0.270		13.62	0.796	0.0450	0.153	1.052		0.073		0.0194			0.900	0.0634		0.075	0.0332			
14XMN5U			Hign Mn	0.0257				1.36				3.18	0.691		8.78	1.93	0.0231	0.102	2.10		0.0552		0.0273			1.47	0.0228	(0.007)	0.93	0.0490			
14XMN5V			Hign Mn	0.145				1.42				3.28	0.551		8.02	2.26	0.0146	0.041	3.09		0.057		0.0207			2.27	0.0278	0.004	0.51	0.0810			
14X93603A	Invar (ASTM F1684)	K93603	Ni Steel	0.0404				0.0101			0.0974	0.024	0.0460	0.0019	0.339	0.0145	0.0057		35.79		0.0050		0.0045			0.153			0.0011				
24A*	Invar-36	K93601	Ni Steel	(0.002)				0.055			0.06	0.17	0.08		0.76	0.01	(0.003)	(0.01)	36.1	(0.01)	0.01		0.001		(0.17)	0.27	(0.002)	(<0.2)	(0.002)	0.02	(0.04)		



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Low Alloy Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
24B	Invar-36	K93601	Ni Steel	0.002	(<0.005)	(0.001)		0.053			0.036	0.121	0.052		0.82	0.011	0.0017	(<0.01)	35.86	0.003	0.009		0.001		0.19	0.28	0.0018	(<0.005)	0.002	(<0.005)	(<0.04)		(<0.005)
14X 94100 A	Iron-Nickel Sealing Alloy	K94100	Ni Steel					0.0055			0.0208	0.0265	0.0628	0.0021	0.443	0.0053	0.0016		41.00		0.0051		0.0027			0.103			0.0011				
14X FeNi10 A			Ni Steel	0.0251				0.094				0.070	0.0281		0.274		0.0052		10.10		0.0151		0.0275			0.061							
14X FeNi35 D			Ni Steel	(0.004)				0.035			0.400	0.409	0.0363		0.303				34.17		0.0400		0.146			0.255							
14X FeNi40 C			Ni Steel	2.00				0.0129			1.057	0.645	0.0810		0.0316				40.12		0.0148		1.03			0.050							
14X FeNi45 C			Ni Steel	0.988				0.0082			0.572	0.076	0.089		0.0222				45.88		0.0269		0.0015			0.772							
14X FeNi50 C			Ni Steel	0.319				0.0245			0.416	0.0662	0.089		0.0571				51.56		0.0168		0.16			0.151							
14X FeNi6 A			Ni Steel	0.0247				0.100				0.0732	0.0287		0.331		0.0056		6.09		0.0150		0.0275			0.0750							
14X FeNi8 A			Ni Steel	0.030				0.0974				0.251	0.0304		0.333		0.0062		8.11		0.0151		0.0284			0.099							
330A	AISI 4330M	K23080	Ni-Cr-Mo	0.045	0.003	0.0003		0.299	0.001			0.9	0.074		1	0.404	0.0024	0.003	1.8	0.0009	0.005	(0.0004)	0.001	(0.001)		0.273	0.0039		0.006	0.071	(0.004)		0.0015
330B	AISI 4330M	K23080	Ni-Cr-Mo	0.023	(<0.1)	(0.001)	(<0.001)	0.302	(0.0011)	(<0.001)	0.013	0.807	0.084	(<0.001)	0.82	0.406	(0.0043)	0.002	1.856	(0.004)	0.0075	(<0.01)	0.003	(<0.01)	(<0.001)	0.277	0.0047		(0.001)	0.076	0.024	(<0.001)	(.0013)
31A*	AISI 4340	G43400	Ni-Cr-Mo	0.036	(0.006)	(0.002)		0.41	(0.0012)		0.011	0.85	0.19		0.75	0.22	0.0114	0.003	1.66	(0.0015)	0.012		0.028	(0.002)		0.22	0.008		0.003	0.004			(0.003)
31G	AISI 4340	G43400	Ni-Cr-Mo	0.0214	0.004	0.0004	(<0.02)	0.4	(<0.0009)	(0.001)	0.0083	0.82	0.183		0.689	0.223	0.0069	0.0023	1.814	(0.002)	0.0136	(<0.007)	0.013	(<0.002)		0.262	0.0077	(<0.02)	0.0015	0.0036	0.004	(<0.003)	0.0012
12X 43400 A	AISI 4340	G43400	Ni-Cr-Mo	0.013	0.0084			0.422				1.181	0.177		0.592	0.223	0.0089		1.378		0.0164		0.0284			0.259	0.007					0.0027	
Fe8620-18	AISI 8620	G86200	Ni-Cr-Mo	0.0246	0.009			0.211			0.0085	0.536	0.197		0.857	0.199	0.007	0.0014	0.446		0.012		0.026			0.23	0.009		0.0015	0.0061	0.004		

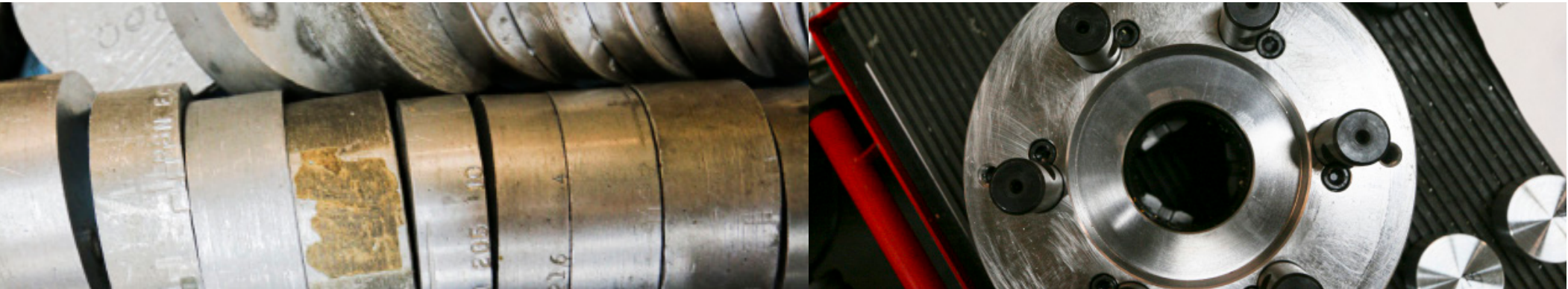


Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Low Alloy Steel

Low Alloy Steel

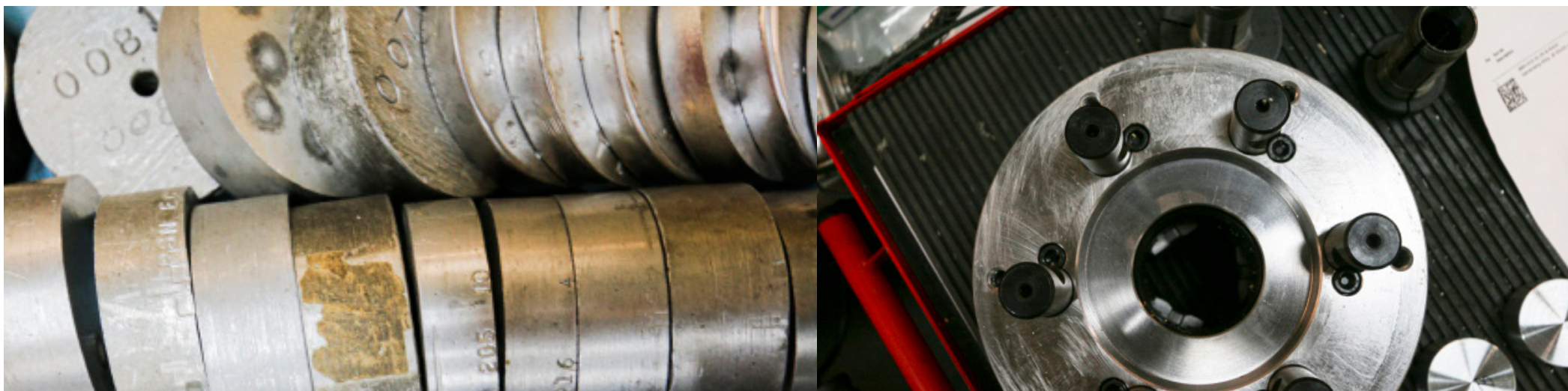
Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
182B	AISI 86L20		Ni-Cr-Mo	0.038	0.003	0.0003		0.21	(0.0005)		0.006	0.49	0.017		0.81	0.172	0.004	0.003	0.47	0.003	0.016	0.19	0.037	0.003		0.27	0.0019		0.003	0.004	(0.01)		0.001
252B*	AISI 8740	G87400	Ni-Cr-Mo	0.028	0.005	0.0002		0.419	0.0002		0.005	0.486	0.084		0.91	0.223	0.0081	0.002	0.461	0.0016	0.007	0.0004	0.019	(0.002)		0.236	0.021		0.002	0.004	0.002		0.001
252C>	AISI 8740	G87400	Ni-Cr-Mo	0.017	0.004	(0.0001)		0.416	(0.0003)		0.008	0.501	0.109		0.92	0.205	0.0083	0.002	0.505	(0.002)	0.025	0.001	0.008	(<0.005)		0.248	0.007		0.001	0.005	(<0.005)		(<0.002)
252D	AISI 8740	G87400	Ni-Cr-Mo	0.024	0.0053	0.0002	(0.0005)	0.423	(0.001)		0.0078	0.468	0.27	(0.0002)	0.842	0.204	0.0068	0.0013	0.424	0.0013	0.0075	0.0004	0.0128	0.0024	(<0.003)	0.256	0.012	(<0.005)	0.0012	0.0022	0.004	0.0005	0.0013
252E	AISI 8740	G87400	Ni-Cr-Mo	0.028	0.0046	(0.001)	(<0.02)	0.413	(<0.001)	(<0.001)	0.0093	0.486	0.164	(<0.005)	0.87	0.204	0.0064	(0.003)	0.407	(0.003)	0.009	(0.005)	0.012	(0.003)	(<0.005)	0.257	0.0075	(<0.008)	0.001	0.0028	(0.006)	(<0.002)	(<0.003)
252F	AISI 8740	G87400	Ni-Cr-Mo	0.026	0.006	(0.001)	(<0.02)	0.406	(<0.001)	(<0.001)	0.0086	0.463	0.182	(<0.005)	0.88	0.21	0.0059	0.0016	0.412	(0.003)	0.011	(0.003)	0.009	(0.003)	(<0.005)	0.247	0.008	(<0.008)	0.001	0.003	0.003	(<0.002)	(0.003)
FeE9310-18	AISI E9310	G93106	Ni-Cr-Mo	0.036	(0.004)	(<0.005)	(<0.005)	0.121	(<0.005)	(<0.005)	0.009	1.09	0.158	(<0.02)	0.62	0.086	0.007	(0.002)	3.07	0.0017	0.009	(0.0001)	0.0128	(0.002)	(<0.005)	0.256	0.0072	(<0.005)	(0.001)	0.003	(0.003)	(0.001)	(0.002)
12X 46150 A	AISI 4615	G46150	Ni-Mo	0.0116	0.0016			0.160				0.0348	0.0158		0.471	0.243	0.0082		1.590		0.0162	0.0012	0.0074			0.24	0.0012			0.0019		0.0067	
33B*	AISI 4620	G46200	Ni-Mo	0.022	0.005	0.0002		0.19	0.0002		0.01	0.17	0.15		0.54	0.22	0.007	0.003	1.68	0.002	0.01	(<0.01)	0.014			0.22	0.01		0.002	0.002	(<0.01)		(<0.005)
33C*	AISI 4620	G46200	Ni-Mo	0.025	(0.005)	(0.0002)		0.184	(0.0003)		0.008	0.133	0.223		0.562	0.236	0.0078	0.002	1.71	0.0021	0.009	(<0.002)	0.017			0.25	0.009		0.0014	0.0021	0.0026		
33D	AISI 4620	G46200	Ni-Mo	0.026	0.0035	0.0002		0.209	(0.0003)		0.008	0.139	0.072		0.593	0.229	0.0053	0.002	1.78	0.0013	0.009	(<0.001)	0.023	(0.002)		0.207	0.005		0.003	0.002	(<0.005)		(<0.002)
155B*	AISI 4820	G48200	Ni-Mo	0.027	0.0038	0.0002		0.207	0.0026		0.011	0.149	0.152		0.635	0.239	0.008	0.0024	3.57	0.0017	0.009	0.0005	0.028	(0.001)		0.313	0.008		0.003	0.003	(0.01)		0.002
155F	AISI 4820	G48200	Ni-Mo	0.0356	0.0006	(0.0004)		0.199	(<0.001)	(<0.001)	0.012	0.144	0.219	(<0.001)	0.617	0.244	0.005	0.0016	3.36	0.003	0.008	(<0.006)	0.013	(<0.003)		0.223	0.0084	(<0.005)	0.002	0.0015	0.004	(<0.001)	(<0.002)
Fe4820-18	AISI 4820	G48200	Ni-Mo	0.022	0.006			0.192			0.0107	0.144	0.167		0.541	0.287	0.007	0.002	3.51	0.003	0.011		0.018			0.26	0.0089		0.0011	0.0015	0.004		
164A	CLA1		SCLA	0.72	(0.002)	(0.0001)		0.004	0.0002		0.006	0.032	0.88		1.57	0.009	0.0003	0.006	1.29	0.0005	0.004	(0.004)	0.07			0.019	0.002		0.002	0.78	1.44		(<0.005)



Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Low Alloy Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
173A>	CLA10		SCLA	0.48	(<0.01)	0.0004		0.85	0.0002		0.01	4.39	0.72		0.011	0.015	0.0006	0.006	0.024	0.0007	0.015	(<0.01)	0.004			1.7	0.003		0.004	0.28	0.041		(<0.002)
180A	CLA11		SCLA	0.76	(0.004)	0.0004		0.007	0.0001		0.004	0.037	0.89		0.41	0.006	0.0096	(0.005)	1.29	0.0006	0.004	(0.002)	0.046			0.023	0.002		0.002	0.76	1.48		0.003
165A w	CLA2		SCLA	0.8	(0.003)	(0.001)		0.003	(0.0002)		0.006	0.036	1.4		1.65	0.009	0.0004	0.007	1.43	0.0004	0.005	(<0.01)	0.086			0.021	0.002		0.002	1.13	1.57		(<0.005)
166A	CLA3		SCLA	0.55	(0.004)	(0.0002)		0.003	0.0003		0.004	0.014	0.64		1.29	1.08	0.0002	0.006	0.77	0.0006	0.005	(<0.01)	0.073			0.91	(0.003)		0.002	0.4	1.02		(<0.01)
167A>	CLA4		SCLA	0.64	(0.004)	(0.0002)		0.003			0.003	0.016	0.95		1.36	1.25			1		0.019	(0.002)	0.087			1.08	0.003			0.59	1.19		
168A	CLA5		SCLA	0.19	(0.003)	0.0004		0.003	0.0002		0.003	0.004	0.009		0.12	0.69	0.0002	0.003	2.32	0.0008	0.03	(<0.01)	0.064			0.46	0.003		0.004	0.004	0.52		(0.003)
169A>	CLA6		SCLA	0.3	(0.009)		(0.001)	0.31	(0.0003)		0.005	2.19	0.31		0.21	0.95	0.0004	0.005	2.5	0.0006	0.033	(0.002)	0.065			0.79	0.003		0.005	0.006	0.65		(<0.005)
169B	CLA6		SCLA	0.36	(0.002)	0.0003	(<0.011)	0.232	(<0.006)		0.003	0.01	0.005	(<0.005)	0.75	0.004	(0.004)	0.004	0.01	(0.004)	0.004	(0.001)	0.004	(0.0009)	(0.005)	0.32	0.002	(0.008)	0.23	0.002	0.003	(<0.001)	(0.004)
170A>	CLA7		SCLA	0.032	(0.005)	(0.0002)		0.56	(0.0001)		0.004	2.55	0.005		0.019	1.57	0.0003	0.004	1.51	0.0003	0.039	(<0.01)	0.025			0.01	0.002		0.006	0.006	(0.018)		(0.003)
170B	CLA7		SCLA	0.23	(0.005)	0.0004	(<0.01)	0.4	(<0.004)	(<0.001)	0.005	0.009	0.005	(<0.005)	0.821	0.003	(0.005)	0.004	0.197	(<0.006)	0.005	(<0.002)	0.004	(0.0007)	(<0.005)	0.21	0.002	(0.008)	0.19	0.002	(0.002)	(<0.002)	0.005
171A>	CLA8		SCLA	0.082	(<0.01)	(0.0006)		0.64	(0.0001)		0.005	2.88	0.49		0.02	1.91	0.0003	0.005	1.95	(0.0004)	0.043	(<0.01)	0.059			0.25	0.002		0.005	0.006	0.13		(0.003)
172A	CLA9		SCLA	0.39	(0.005)	0.0003		0.78	0.0001		0.006	3.52	0.4		0.01	0.014	0.0004	0.004	0.025	0.0006	0.007	(<0.01)	0.004			1.29	0.003		0.003	0.003	0.038		(<0.005)



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Reinforcing Steel

Reinforcing Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
378A	ASTMA615 Grade 75			0.0029	(0.0055)	0.0006	(<0.015)	0.274	(<0.002)		0.013	0.187	0.299	(<0.005)	1.38	0.031	0.02	0.003	0.142	(<0.014)	0.018	(0.003)	0.037	(0.004)		0.307	0.0236	(<0.008)	0.003	0.0844	0.006	(0.002)	(0.003)
323A	ASTMA706 Grade 60			0.003	0.006	0.0003	(0.0001)	0.41	0.0008		0.007	0.15	0.3	(0.0004)	1.14	0.023	0.0105	0.0012	0.084	0.01	0.0178	(0.001)	0.061	(0.002)		0.19	0.011	(0.005)	0.0012	0.02	0.004		(0.001)
380A	ASTMA706 Grade 60			0.0029	0.007	(0.0005)		0.268	(<0.001)	(<0.001)	0.01	0.192	0.265	(<0.001)	1.24	0.059	0.012	0.002	0.114	(0.007)	0.021	(<0.005)	0.025	(0.0038)		0.181	0.0117	(0.001)	(0.003)	0.0475	0.009	(0.002)	(0.0014)
380B	ASTMA706 Grade 60			0.0021	0.0058	(0.0005)	(<0.001)	0.243	(0.0004)	(<0.001)	0.014	0.153	0.307	(<0.001)	1.27	0.055	0.013	0.0016	0.182	(<0.014)	0.016	(0.002)	0.027	(0.003)	(<0.001)	0.238	0.0132	(<0.001)	0.0011	0.049	0.003	(<0.004)	(<0.002)
381A	ASTMA706 Grade 80			0.0023	0.0055	(0.0007)	(<0.001)	0.272	(0.0004)	(<0.001)	0.011	0.129	0.379	(<0.001)	1.16	0.0341	0.014	0.0018	0.185	(0.005)	0.013	(<0.007)	0.043	(0.005)	(<0.001)	0.269	0.0137	(<0.005)	0.002	0.0299	0.003	(<0.003)	(<0.002)

Alloy Steel Welding Wire

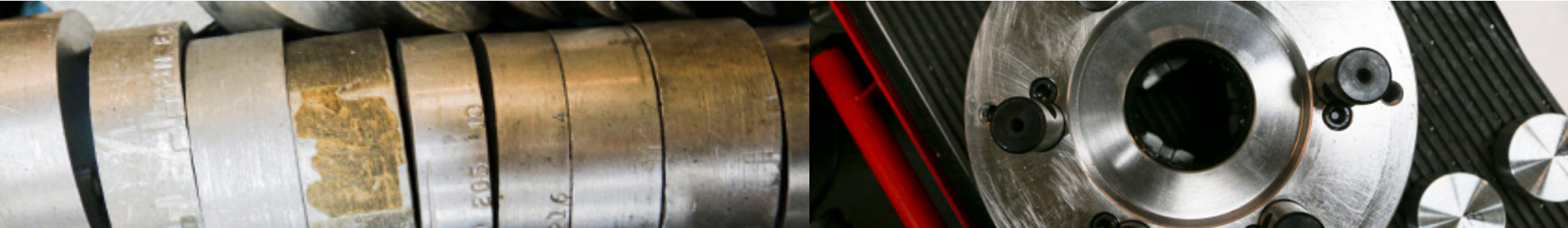
Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
299A	D6-AC	K24728		0.092	0.003	0.0003		0.469	(0.001)		0.0054	1.03	0.1		0.7	0.99	0.0028	0.006	0.57	(0.002)	0.008	(0.001)	0.002	(0.002)		0.22	0.0055		0.0038	0.12	0.01		(0.001)

Superstrength Alloy Steel

Part Number	Grade	UNS	Form	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
341A	HP9-4-30	K91283		0.032	0.003	0.0005		0.298	0.0011		4.44	0.99	0.143		0.226	1.01	0.0025	0.005	7.16	0.0008	0.0038	(0.001)	0.0008	(0.001)		0.1	0.005		0.003	0.086	(0.01)	(0.0002)	(0.003)

Nitriding Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
305B	Nitralloy 135 Modified	K24065		0.92	0.006	0.0006	(<0.002)	0.425	0.0007		0.007	1.63	0.214	(0.002)	0.58	0.32	0.0044	0.002	0.156	0.0006	0.011	(0.0003)	0.014	0.004		0.349	0.011	(<0.005)	0.0044	0.004	0.004	(0.002)	0.0011



Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

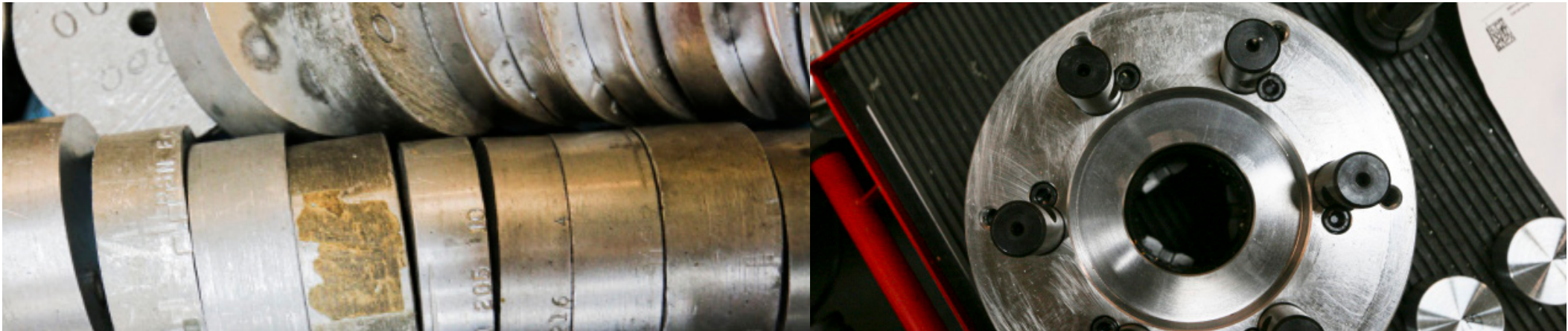
Tool Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
306A>	AISI M-50	T11350	Bearing	0.005	(0.004)	(0.001)		0.83			0.011	4.16	0.042		0.209	4.2	0.118			(0.001)	0.006		0.003			0.16	0.005		0.002	0.97	0.003		
306B	AISI M-50	T11350	Bearing	0.082	0.004	0.0007	(<0.0001)	0.837	(0.001)		0.01	4.12	0.058	(<0.002)	0.24	4.23	0.005	0.005	0.095	0.0009	0.0061	(0.0008)	0.0011	(0.002)	(<0.002)	0.213	0.0042	(<0.011)	0.0016	0.98	0.009	(<0.055)	0.0014
39B	AISI A-2	T30102	Cold-work	0.006				0.99			0.014	4.79	0.1		0.54	1.01	0.0096	0.006	0.14		0.017		0.003			0.35	0.004		0.003	0.22	(0.026)		
39C	AISI A-2	T30102	Cold-work	0.017	(0.005)	0.001		0.99	(0.001)		0.013	4.99	0.077		0.45	0.97	0.011	0.004	0.144	0.001	0.019	(0.0001)	0.007	(0.002)		0.28	0.005		0.0029	0.21	0.011		(0.002)
40A*	AISI A-6	T30106	Cold-work	0.009	(0.007)	(0.0003)		0.68			0.011	1.04	0.092		2.15	1.05	0.0077	0.004	0.14	(0.0024)	0.024		0.01			0.25	0.006		0.003	0.007	(0.013)		
40B	AISI A-6	T30106	Cold-work	(0.006)		(0.0010)		0.68			0.015	1.04	0.5		1.98	1.22	0.0107	0.005	0.096	(0.0014)	0.012		0.003			0.39	0.004		0.003	0.014	0.013		
40C	AISI A-6	T30106	Cold-work	0.019	0.008	0.0009		0.72	(0.001)		0.01	0.99	0.142		1.91	1.27	0.0083	0.003	0.255	0.0013	0.014		0.012			0.32	0.008		0.008	0.01	0.009		(0.002)
41D	AISI D-2	T30402	Cold-work	0.014	(0.01)	(0.0006)	(<0.002)	1.519	(0.0008)		0.02	11.5	0.047	(<0.001)	0.256	0.74	0.0152	0.004	0.114	0.003	0.021	(0.0008)	0.012	(<0.01)	(<0.002)	0.256	0.005	(<0.01)	0.003	0.77	0.034	(<0.002)	(0.002)
43A*	AISI L-6	T61206	High-Speed	0.03	(0.006)	(0.0002)		0.68	(0.0006)		0.016	0.66	0.15		0.61	0.2	0.0089	0.003	1.34	(0.0026)	0.009	(<0.005)	0.034	(0.002)		0.24	0.008		0.003	0.008	(0.016)		(<0.01)
43B	AISI L-6	T61206	High-Speed	0.021	0.005	0.0002		0.711	(0.002)		0.012	0.651	0.18	(<0.003)	0.56	0.206	0.0093	0.004	1.39	0.0016	0.008	(<0.0005)	0.013	(<0.002)		0.251	0.013	(<0.001)	0.0047	0.0035	(<0.005)		(<0.001)
304A	AISI M-1	T11301	High-Speed	0.009	(0.01)	0.002		0.857	(0.002)		0.278	3.55	0.14		0.26	8.04	0.034	0.021	0.133	0.002	0.019		0.0016	(0.001)		0.36	0.006	(0.002)	0.002	1.23	1.65		(0.002)
324A	AISI M-10	T11310	High-Speed	0.002	0.006	0.0004		0.99	0.0009		0.007	0.42	0.22		1.01	0.022	0.0082	0.014	0.081	0.003	0.009		0.028	(0.002)		0.163	0.011		0.0016	0.0017	(0.003)	(0.003)	(0.001)
44B*	AISI M-2	T11302	High-Speed					0.84			0.41	3.86	0.072		0.27	4.79	0.0251	0.016	0.18	0.0028	0.014	(0.0001)	0.006			0.39	(0.008)		0.004	1.83	5.98		
44C	AISI M-2	T11302	High-Speed	0.05	(0.01)	(0.002)		0.82			0.247	4.04	0.12		0.301	5.02	0.033	0.012	0.132	0.00321875	0.027	(0.002)	0.004	(0.004)		0.31	0.01	(0.004)	0.004	1.91	6	0.006	0.002
320A	AISI M-35	T11335	High-Speed	0.023	0.013	0.0011	(<0.0001)	0.093	(<0.003)		4.9	4.22	0.091	(<0.003)	0.33	4.79	0.014	0.015	0.204	0.0021	0.021	(<0.007)	0.0015	(<0.0011)	(<0.0001)	0.36	0.008	(<0.0020)	0.0032	1.76	6.01	(<0.001)	(0.003)
251A	AISI M-4	T11304	High-Speed	0.01	0.016	(0.002)		1.398	(0.0005)		0.129	4.1	0.13		0.33	5.16	0.044	0.016	0.131	(0.01)	0.014	(0.002)	0.058			0.58	0.011		0.003	3.9	5.5		(0.002)
FeM62-18	AISI M62	T11362	High-Speed	0.006		0.003		1.32			0.105	3.86	0.115		0.27	10.2	0.045	0.017	0.129	0.003	0.016		0.015			0.37			0.003	2.02	6.31		
48A*	AISI T-1	T12001	High-Speed	(0.016)	(0.051)	(0.0018)		0.79	(0.0006)		0.39	4.32	0.13		0.33	0.4	0.0221	(0.003)	0.23	(0.0107)	0.036		0.021			0.29	0.019		0.004	1.13	17.99		(0.006)
48C	AISI T-1	T12001	High-Speed	0.017	0.012	(0.001)		0.77			0.22	4.24	0.13	(0.0002)	0.39	0.17	0.0165	0.005	0.204	0.003	0.029	(0.0004)	0.018	(0.002)		0.45	0.012	(0.01)	0.006	1.27	17.5		(0.003)
14X14946 D†	AISI T-1	T12001	High-Speed					0.85			0.44	5.06	0.25		0.53	0.21			1.06		0.051		0.048			0.46				1.03	16.9(7)		
14XH51 C	AISI T-1	T12001	High-Speed					0.718			0.25	4.00	0.069		0.29	0.37	0.023		0.27		0.018		0.020			0.22	(0.035)			1.05	17.0		
FeT1-18	AISI T-1	T12001	High-Speed	0.054	(0.007)	(<0.005)	(<0.005)	0.8	(<0.005)	(<0.005)	0.096	3.98	0.034	(<0.012)	0.295	0.124	0.0195	0.004	0.14	0.0027	0.026	(<0.013)	(<0.001)	(<0.001)	(<0.005)	0.3	0.01	(<0.005)	0.026	1.05	18	(0.0017)	(0.003)
281A	AISI T-4	T12004	High-Speed	0.007	(0.02)	(0.003)		0.74			4.8	3.89	0.096	(0.003)	0.3	0.49	0.0064	0.094	0.15	0.003	0.015		0.019			0.29	0.02		0.004	0.9	17.6		(0.002)

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Tool Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
255A	AISI H-11	T20811	High-Speed	0.01	(0.002)	0.0004		0.403	(0.0004)		0.009	4.84	0.049		0.27	1.33	0.0067	0.004	0.083	0.0011	0.013	(<0.001)	0.0012			0.93	0.006	(<0.005)	0.002	0.43	0.007		(<0.005)
255B	AISI H-11	T20811	High-Speed	0.032	(0.004)	(0.0004)	(<0.004)	0.389	(<0.0003)	(<0.0001)	0.009	4.82	0.073	(<0.0001)	0.317	1.3	0.005	0.006	0.062	(0.002)	0.01	(<0.0005)	0.002	(<0.002)	(<0.011)	0.91	0.006	(<0.008)	(0.0048)	0.515	(0.007)	(<0.011)	(<0.005)
42A>	AISI H-13	T20813	High-Speed	(0.024)		(0.0007)		0.39	(0.0002)		0.015	5.42	0.07		0.35	1.29	0.0143	(0.001)	0.32	(0.0019)	0.011	(<0.005)	0.007			1.04	0.005		0.005	1.02	(0.014)		
42Bw	AISI H-13	T20813	High-Speed	0.013		(0.0005)		0.38			0.013	5.1	0.089		0.36	1.23	0.0105	0.004	0.18	0.0026	0.014	(0.003)	0.005			0.99	0.005		0.003	0.94	0.012		
42C	AISI H-13	T20813	High-Speed	0.018	(0.01)	0.0011		0.382	(0.0005)		0.022	4.86	0.066		0.4	1.29	0.0201	0.004	0.051	0.003	0.022	0.0007	0.0037	(0.004)		0.85	0.006	(0.004)	0.0125	0.84	0.32	(0.008)	(0.002)
45B	AISI O-6	T31506	Oil Hardening	0.01	0.002	(0.0001)		1.42	(0.001)		0.004	0.061	0.018		0.9	0.24	0.008	0.002	0.024	0.0005	0.01		0.008	(0.001)		0.92	0.008		0.002	0.003	(0.004)		(0.001)
46Aw	AISI S-1	T41901	Shock resisting	0.011	(0.009)	(0.0012)		0.49	(<0.0002)		0.015	1.31	0.083		0.48	0.16	0.0144	0.004	0.3	(0.0027)	0.023	(<0.005)	0.012			0.94	0.024		0.004	0.16	1.84		(<0.005)
46B	AISI S-1	T41901		0.011	(0.01)	0.0003		0.45			0.013	1.09	0.147		0.27	0.222	0.0069	0.003	0.108	0.002	0.019	(<0.002)	0.004			0.89	0.016		0.007	0.17	1.96		
47Aw	AISI S-5	T41905		0.017	(0.014)	(0.0003)		0.58			0.009	0.29	0.25		0.8	0.41	0.0084	(0.004)	0.23	(0.0021)	0.015	(<0.005)	0.01	(0.003)		1.92	0.031		0.008	0.22	(0.016)		(<0.01)
47B	AISI S-5	T41905		0.014		(<0.001)		0.59			0.007	0.23	0.17		0.79	0.2	0.0092	(0.002)	0.09	(0.0014)	0.017	(0.0003)	0.006			1.96	0.008		0.01	0.17	(0.016)		
259A	AISI S-7	T41907		0.016	0.006	0.0003		0.479	(0.0003)		0.011	3.27	0.081		0.399	1.43	0.0077	0.003	0.194	0.0014	0.02	(<0.0005)	0.0007	(0.002)		0.44	0.004	(0.005)	0.0026	0.256	0.035	(<0.005)	0.001
14XHS10A			HIP					1.710			0.0866	14.83	0.0605		0.134	1.679	(0.001)		0.146		0.0135		0.0099			0.660				1.142	1.75		
14X72305A	AISI W-5	T72305	Water-Hardening	0.0049				1.085				0.425	0.149		0.349	0.0231	0.0068		0.089		0.0128		0.0028			0.206	0.0101			0.0045			



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Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
289A	AISI 301	S30100	Austenitic Steel	0.01		0.0003		0.126				0.054	17	0.016		1.67	0.005	0.0032		0.008		7.12	0.0104	0.006		0.0019			0.58	0.002	(<0.005)	0.028	0.01	0.01		
289B	AISI 301	S30100	Austenitic Steel	0.007	(<0.004)	0.0008		0.161	(0.001)		(<0.001)	0.013	17.09	0.241	(<0.001)	1.92	0.008	0.011		0.013		7.02	0.017	0.004	(0.005)	0.0025	(<0.001)	(<0.006)	0.99	0.002	(0.003)	0.005	0.018	0.012	(<0.03)	0.007
241D	AISI 302	S30200	Austenitic Steel	0.022	(0.001)	0.0011		0.125	(0.001)			0.022	18.1	0.24		1.94	(0.003)	0.006		0.03		9	(0.004)	0.003	(0.0004)	0.0021		(0.002)	0.99	0.002	(0.004)	0.018	0.034	(0.01)		(0.007)
234A	AISI 302 HQ	S30430	Austenitic Steel	0.36		0.0009		0.102				0.35	18	3.65		1.99	0.004	0.096		0.2		8.06	0.0007	0.004		0.0026			1.02	0.003	(0.01)	0.002	0.003	0.02		
234C	AISI 302 HQ	S30430	Austenitic Steel	0.035	(0.0010)	0.0023		0.092	(0.0017)			0.034	18.15	3.41	(0.0020)	1.93	0.012	0.01		0.053		9	0.005	0.009	(0.0010)	0.0027	(0.0040)	(0.0030)	0.88	0.0017	0.003	0.026	0.055	0.006	(0.0010)	0.006
13X 30300 A	AISI 303	S30300	Austenitic Steel			0.0035		0.041				0.0259	17.59	0.0252		1.84	0.333	0.0350				8.55		0.0199		0.312			0.424				0.092			
Fe303-18	AISI 303	S30300	Austenitic Steel	(0.004)	0.007	0.0012	(<0.0001)	0.046	(0.002)	(<0.0001)		0.14	17.2	0.61	(<0.001)	1.55	0.42	0.069		0.015		8.12	0.006	0.033	(<0.0001)	0.35	(<0.001)	(<0.001)	0.47	0.015	(<0.005)	(0.004)	0.072	0.029	(<0.005)	(<0.005)
253A	AISI 303Se	S30323	Austenitic Steel	0.003		0.0003		0.041				0.088	17.9	0.223		1.5	0.348	0.0373		0.016		9.17	0.009	0.14		0.0089		0.21	0.5	0.01		0.002	0.106	0.1		
253B	AISI 303Se	S30323	Austenitic Steel	0.004	0.0052	0.0007		0.051	(0.0006)		(<0.001)	0.145	17.64	0.44	(0.0006)	1.61	0.59	0.031		0.021		9.11	0.007	0.13	(0.0002)	0.011	(0.0018)	0.13	0.46	0.012	(0.003)	0.0027	0.092	0.05	(<0.002)	(<0.008)
Fe304H-18	AISI 304H	S30400	Austenitic Steel	0.005	0.0076	(<0.005)	(<0.005)	0.052	(<0.005)	(<0.005)		0.136	18.4	0.46	(<0.005)	1.82	0.43	0.072		0.01		8.35	0.008	0.031	(<0.001)	0.027	(<0.005)	(<0.005)	0.298	0.014	(<0.005)	(<0.005)	0.075	0.027	(<0.005)	(<0.005)
162D	AISI 304L	S30403	Austenitic Steel	0.0026	0.0072	0.0027		0.024	(0.003)			0.074	18.31	0.52	(0.0001)	1.82	0.573	0.097		0.009		8.15	0.005	0.0296	(<0.003)	0.0271	(0.0019)	(<0.03)	0.57	0.0102	0.005	0.013	0.063	0.028	(<0.007)	(<0.007)
13X 30403 B	AISI 304L	S30403	Austenitic Steel	0.0056				0.0277	0.0027			0.178	18.30	0.497		1.820	0.313	0.083		0.0201		8.13		0.0321		0.0266			0.288	0.0139		0.0013	0.0700	0.035		
Fe304L-18	AISI 304L	S30403	Austenitic Steel	0.003	0.007	0.0012		0.024	(0.002)		(<0.002)	0.156	18.34	0.54	(<0.001)	1.39	0.462	0.081		0.013		8.17	0.006	0.034	(<0.001)	0.029	(0.002)	(<0.001)	0.43	0.013	(<0.005)	0.0056	0.076	0.056	(<0.005)	(<0.005)
13X 30600 A	AISI 306	S30600	Austenitic Steel	0.0204				0.0090				0.0149	17.43	0.0121	0.0016	0.648	0.0040	0.0270		(0.004)		14.96		0.0091		0.0007			4.23				0.0206			
3E	AISI 309	S30900	Austenitic Steel	0.0045	(0.005)	0.0005		0.0553	0.0015			0.12	22.47	0.259	(0.0003)	1.62	0.215	0.063		0.014		11.99	0.0048	0.0259	0.0003	0.0009	0.0013	(<0.022)	0.307	0.007	(0.005)	0.0022	0.126	0.018	(0.0004)	0.0018
13X 14828 A	AISI 309	S30900	Austenitic Steel	0.008				0.104				0.143	19.37	0.409		1.529	0.301	0.0377		0.0163		11.25		0.0268		0.0067			2.19	0.0128			0.0803	0.0167		
13X 30908 A	AISI 309S	S30908	Austenitic Steel	0.0035		0.0027		0.0560				0.120	22.51	0.269		1.638	0.221	0.0652		0.0142		12.05		0.0267		0.0011			0.320				0.128			
4D>	AISI 310	S31000	Austenitic Steel	0.009	(0.003)	0.0008		0.052				0.07	24.34	0.217	(0.0003)	1.2	0.39	0.046		0.01		20.2	0.004	0.022	(0.0003)	0.0009			0.49	0.007	0.005	0.0042	0.073	0.026		(0.001)
4E	AISI 310	S31000	Austenitic Steel	0.004	(0.005)	0.0011		0.044				0.066	24.25	0.234		1.07	0.32	0.038		0.024		20.18	0.0021	0.0224		0.0006			0.514	0.006	0.005	0.003	0.052	0.046		(0.001)
4F	AISI 310	S31000	Austenitic Steel	0.015	0.003	0.0012		0.047	(0.002)		(<0.005)	0.067	24.5	0.146	(<0.002)	1.17	0.142	0.056		0.007		20.1	0.004	0.0195	(<0.001)	0.0015	(0.001)	(0.001)	0.494	0.005	0.007	0.0031	0.146	0.012	(0.001)	0.002
4G	AISI 310	S31000	Austenitic Steel	0.008	0.005	0.0032		0.0454	(0.001)			0.085	24.9	0.32	0.007	1.36	0.58	0.058		0.008		19.2	0.003	0.027	(0.0005)	0.0008	(0.001)	(0.001)	0.63	0.008	0.008	0.029	0.092	0.017	(0.0005)	0.002
13X 31008 A	AISI 310S	S31008	Austenitic Steel					0.063				0.078	24.48	0.159		1.234	0.338	0.063		0.013		19.34		0.0302		0.0040			0.503				0.078	0.165		
13X 31400 A	AISI 314	S31400	Austenitic Steel	0.0225				0.0330	0.0024			0.1296	24.38	0.210		1.603	0.240	0.0288		0.0189		18.76		0.0262		0.0006			2.23				0.092	0.015		

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Stainless Steel

Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
339A	AISI 316H	S31609	Austenitic Steel	0.004	(0.001)	0.0006		0.16	0.0014			0.007	17	0.021	(0.0001)	1.71	2.79	0.006		0.005		12.9	0.016	0.004	(0.002)	0.009		(0.0003)	0.64	0.002	(0.005)	0.002	0.007	0.0119	(0.001)	0.003
13X31603 D	AISI 316L	S31603	Austenitic Steel	0.006				0.0203	0.0029			0.188	17.58	0.356		1.475	2.019	0.062		0.010		10.04		0.0363		0.0265			0.395	0.0084		(0.001)	0.0722	0.040		
Fe316L-18	AISI 316L	S31603	Austenitic Steel	0.006	(<0.023)	(0.001)		0.021	(0.002)		(<0.002)	0.209	16.7	0.55	(0.0004)	1.7	2.02	0.067		0.027		10.12	0.005	0.033	(<0.003)	0.029	(0.0018)	(<0.004)	0.438	0.013	(<0.005)	0.003	0.067	0.06	(<0.005)	(<0.005)
13X31635 A	AISI 316Ti	S31635	Austenitic Steel	0.0054				0.0254				0.174	16.98	0.404		1.807	2.089	0.020		0.010		10.80		0.0352		0.0301			0.487			0.149	0.0584	0.031		
153C	AISI 317L	S31703	Austenitic Steel	0.003	0.0061	0.0009		0.0225	(0.0026)			0.251	18.22	0.442		1.6	3	0.086		0.015		11.1	0.006	0.0289	(0.001)	0.0288	(0.0020)	(<0.04)	0.349	0.01	(0.006)	0.004	0.058	0.043	(<0.001)	0.004
13X31726 A	AISI 317LMN	S31726	Austenitic Steel	0.0208				0.0124				0.0502	17.62	0.206		1.849	4.56	0.135		0.009		13.56		0.0218		0.0012			0.415				0.0426	0.0384		
13X32100 A	AISI 321	S32100	Austenitic Steel	0.0247		0.0025		0.0463				0.105	17.39	0.415		1.52	0.282	0.0115		0.0191		9.32		0.0298		0.0011			0.498	0.0115		0.376	0.106	0.021		
6I	AISI 321	S32100	Austenitic Steel	0.084	(0.005)	0.0034		0.049	(0.0004)		(<0.005)	0.052	17.76	0.202	(<0.03)	1.76	0.133	0.013		0.018		9.2	0.0012	0.0208	(<0.02)	0.023	(0.0008)	(<0.03)	0.31	0.006	(<0.01)	0.6	0.048	0.023	(0.003)	(0.003)
6J	AISI 321	S32100	Austenitic Steel	0.0195	(<0.04)	0.0024		0.045	(<0.001)			0.191	17.74	0.383	(<0.001)	1.52	0.387	0.0109		0.01		9	(0.001)	0.028	(<0.03)	0.002	(<0.005)	(<0.001)	0.62	0.009	(0.01)	0.34	0.081	0.026	(<0.001)	(<0.002)
13X 32900 A	AISI 329	S32900	Austenitic Steel	0.007		0.0028		0.0251				0.0724	24.91	0.354		1.478	1.310	0.097				5.57		0.0276		0.0269			0.556				0.0938	0.017		
13X34700 A	AISI 347	S34700	Austenitic Steel	0.025		0.0007		0.016				0.132	17.22	0.165		1.283	0.392	0.0163		0.329		9.32		0.0276		(0.0005)			0.480	0.0053			0.123	0.144		
8G	AISI 347	S34700	Austenitic Steel	0.003	(0.007)	0.0005		0.042	(<0.0005)			0.162	17.2	0.39	(<0.0200)	1.468	0.359	0.046		0.53		9.02	0.003	0.0327	(<0.02)	0.0126	(<0.02)	0.01	0.36	0.0107	0.004	0.0024	0.062	0.032	(<0.005)	0.002
8H	AISI 347	S34700	Austenitic Steel	0.005	(<0.01)	(0.0002)		0.049	(<0.002)			0.083	17.14	0.192	(<0.001)	1.81	0.237	0.027		0.48		9.08	(0.004)	0.025	(<0.03)	0.002	(<0.002)	(<0.001)	0.4	0.008	(0.01)	0.0027	0.049	0.016	(<0.001)	(<0.002)
8I	AISI 347	S34700	Austenitic Steel	0.003	(<0.008)	(0.0005)		0.0424	(<0.001)			0.301	17.08	0.441		1.395	0.416	0.052		0.6		9.01	(0.004)	0.0352	(<0.03)	0.0118	(<0.002)	(<0.001)	0.38	0.012	(<0.005)	0.008	0.057	0.06	(<0.001)	(<0.005)
318B	Alloy 16-6-2-2		Austenitic Steel	0.004	(0.004)	0.0003		0.05				0.1	15.9	1.63		1.02	1.57	0.032		0.086		5.71	0.009	0.022		0.0006			0.41	0.004	(0.004)	0.014	0.115	0.087		(0.003)
316A	Alloy 253MA	S30815	Austenitic Steel	0.006	0.007	(0.0003)		0.07	0.0017		0.064	0.118	21.07	0.19		0.61	0.25	0.1605		0.003		10.81	0.0052	0.023	(0.0001)	0.0011			1.5	0.006	0.003	0.002	0.042	0.022	(0.0008)	



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Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
302B	Alloy 254SMO	S31254	Austenitic Steel	0.0159	(0.009)	0.0027		0.0226	(0.0031)			0.072	20.33	0.701	0.0009	0.93	6.24	0.18		0.012		17.7	0.0032	0.0256	(0.001)	0.0007	(0.0018)	(0.0006)	0.56	0.0075	0.004	0.0031	0.052	0.025	(<0.01)	(<0.01)
13X 31254 A	Alloy 254SMO	S31254	Austenitic Steel	0.0134		0.0025		0.0185				0.125	20.11	0.575		0.590	6.13	0.205				18.34		0.0191		0.0011			0.400				0.0595	0.017		
19C	Nitronic 40	S21900	Austenitic Steel	0.007	(0.004)	0.0011		0.012				0.087	19.51	0.45		9.02	0.4	0.32		0.028		6.4	0.003	0.027		0.0007			0.31	0.0061	0.005	0.003	0.09	0.037		
17D	Nitronic 50	S20910	Austenitic Steel	0.0032	0.005	0.001		0.041	(0.002)			0.23	21.06	0.412	(0.0003)	4.15	1.52	0.311		0.14		11.83	0.003	0.026	(0.0002)	0.0018	(0.001)	(0.001)	0.416	0.0044	0.003	0.01	0.118	0.056	(0.0004)	0.002
13X NSA10 A	Nitronic 50	S20910	Austenitic Steel			(0.0029)		0.016				0.061	20.69	0.175		5.23	2.636	0.343		0.142		12.96		0.0207		0.0006			0.375				0.151	0.061		
FeN50-18	Nitronic 50	S20910	Austenitic Steel	0.006	(0.006)	(0.0007)	(<0.005)	0.03	(0.0014)	(<0.005)		0.081	21	0.28	(<0.005)	5.27	2.01	0.26		0.18		11.9	0.006	0.026	(<0.005)	0.0013	(<0.02)	(<0.005)	0.24	0.007	(<0.005)	0.002	0.121	0.023	(<0.005)	(<0.005)
18D	Nitronic 60	S21800	Austenitic Steel	0.006	(0.007)	0.0011	(<0.001)	0.069	(0.002)	(<0.001)	(<0.005)	0.086	16.7	0.421	(<0.021)	8.1	0.325	0.17		0.031		8.39	(0.004)	0.032	(<0.11)	0.0025	(<0.004)	(<0.03)	3.68	0.007	(0.01)	0.012	0.064	0.026	(<0.02)	(0.005)
α 21800 A	Nitronic 60	S21800	Austenitic Steel	0.012		(0.001)		0.0765				0.0943	16.81	0.431		8.00	0.325	0.125		0.007		8.32		0.032		0.0011			4.03				0.0619			
295A	NMS 140		Austenitic Steel	(0.01)		0.002		0.021				0.021	18	0.113		19.7	0.97	0.62		0.018		1.84	0.003	0.028		0.0041			0.36	0.004		0.0019	0.046	0.016		(0.001)
294A	NMS J38		Austenitic Steel	(0.01)		(0.003)		0.017				0.021	19.7	0.34		21.6	1.8	0.78		0.03		2.9	0.003	0.026	(0.001)	0.0028			0.43	(0.006)	(0.003)	(0.002)	0.046	0.01		(0.002)
296A	NMS MDC		Austenitic Steel	(0.005)		(0.001)		0.074				0.018	11.2	0.12		10.6	0.6	0.23		0.043		1.71	0.003	0.027		0.002			0.38	0.0007		0.002	0.056	0.01		
13X 12533 Z			Austenitic Steel	0.059		0.0100		0.110				0.0299	18.80	0.131		0.812	1.05	0.073				5.06		0.0149		0.0156			0.440	0.0097		0.147	0.181			
13X 12534 X			Austenitic Steel	0.0485				0.0716				0.0602	17.71	0.0586		0.589	2.04			0.201		8.50		0.0192		0.0086			0.811		0.031	0.348	0.110	0.010		
13X 12535 BE			Austenitic Steel	0.194		0.0051		0.229				0.146	16.95	0.130		0.342	4.09	0.029				14.79		0.0400		0.0591			1.407	0.0194	(0.020)	0.625	0.252			
13X 12536 T			Austenitic Steel	0.108		0.0214		0.146				0.280	16.09	0.0793		0.374	2.48	0.0084		0.060		12.12		0.0449		0.090			0.546	0.0068	0.104	0.444	0.0513			
13X 12537 T			Austenitic Steel	(0.062)		0.0029		0.0889				0.1520	20.43	0.248		1.116	3.05	0.048		0.102		10.71		0.0382		0.0206			1.151	0.0401	0.0194	0.273	0.0908			
13X 12853 L			Austenitic Steel	0.18		0.0018		0.069				0.0415	17.13	0.092		1.156	2.718	0.0086		0.180		12.31		0.0053		0.0062			0.994		0.034	0.0455		0.089		
13X 12855 N			Austenitic Steel	0.048		0.0098		0.107				0.155	16.29	0.340		0.918	2.96	0.0078		0.098		11.79		0.0020		0.0063	0.093		0.863		0.122	0.083		0.199		
13X 17001 C			Austenitic Steel	0.0312		0.0085		0.0769				0.0979	14.83	0.0161		1.543	0.0967			0.546		6.31		0.055		0.0134			0.215		0.0124					
13X 17002 E			Austenitic Steel	(0.030)		0.0012		0.112				0.0702	17.45	0.1012		0.801	0.204	0.061		0.487		7.87		0.0409		0.0250			0.486		(0.012)		0.0587			
13X 17003 A†			Austenitic Steel					0.10				0.07	11.89	0.08		0.85	0.27			0.34		11.90		0.037		0.035			0.78							
13X 17004 B			Austenitic Steel	0.0433		0.0066		0.0844				0.0555	21.37	0.0449		0.497	0.455	0.0086		0.179		16.04		0.0189		0.0396			1.23		0.057	0.034				

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Stainless Steel

Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
13X 17005 E			Austenitic Steel	0.049		0.0030		0.0217				0.0265	24.69	0.120		0.209	0.599	0.0097		0.101		20.06		0.0040		0.0431			1.739		0.015	0.0073				
13X 18001 B			Austenitic Steel	0.0157				0.207				0.0231	15.92	0.149		0.463	0.816	0.0347		0.612		6.13		0.0090		0.0786			0.203				0.0996			
13X 18002 D			Austenitic Steel	0.0617				0.159				0.0514	17.77	0.116		0.722	0.209	0.072		1.531		7.92		0.0245		0.0487			0.352				0.0542			
13X 18003 C			Austenitic Steel	0.0292				0.113				0.100	19.56	0.0433		1.000	0.401	0.090		1.042		10.08		0.0545		0.0245			0.805				0.0750			
13X 18004 B			Austenitic Steel	0.0111				0.099				0.211	21.57	0.050		1.400	0.601	0.061		0.749		12.67		0.068		0.0191			1.21				0.161			
13X 19001 B			Austenitic Steel					0.055				0.025	15.07	0.202		0.460	1.51	0.070		0.032		5.10		0.0151		0.0174			1.20		(0.019)		0.083			
13X 19003 C			Austenitic Steel					0.047				0.105	18.99	0.171		1.138	2.5	0.077		0.12		12.46		0.0382		0.046			0.497		(0.005)		0.0486			
13X 19004 C			Austenitic Steel	0.03		(0.001)		0.075				0.0501	22.77	0.0112		2.017	3.43			0.152		17.9		0.074		0.0135			0.356	(0.001)	0.011		0.0417			
292A	Alloy 2101	S32101	Duplex Stainless	0.01	(<0.01)	0.0011		0.03				0.031	21.35	0.29		5	0.097	0.245		0.009		1.47	0.0024	0.018		0.001			0.75	0.004	(0.006)	0.005	0.084	0.01		
13X 32101 A	Alloy 2101	S32101	Duplex Stainless	0.0122		0.0014		0.0325				0.0347	21.12	0.295		4.913	0.0970	0.241		0.0070		1.476		0.0194		(0.0004)			0.777				0.0830			
Fe2205-18	Alloy 2205	S32205	Duplex Stainless	0.007	(0.003)	(0.002)	(<0.0001)	0.018	(0.002)	(<0.0001)		0.104	22.6	0.208	(<0.001)	1.18	3.2	0.17		0.011		5.57	0.004	0.023	(<0.003)	0.001	(0.001)	(<0.001)	0.46	0.006	(0.02)	0.003	0.063	0.024	(<0.005)	(<0.005)
317A	Alloy 2304	S32304	Duplex Stainless	0.005	(0.006)	0.0019		0.025	(0.0003)			0.064	22.5	0.21		1.26	0.249	0.123		0.004		4.19	0.0032	0.028	(0.001)	0.0007			0.39	0.008	(0.004)	(0.002)	0.061	0.015		
301A*	Alloy 2507	S32750	Duplex Stainless	0.02	(0.002)	0.0021		0.016	(0.002)			0.039	24.88	0.107		0.81	3.87	0.279		0.006		6.93	0.003	0.02	(0.0001)	0.0007		(0.0001)	0.27	0.003	0.003	0.003	0.045	0.015		(0.002)
301B	Alloy 2507	S32750	Duplex Stainless	0.005	(0.004)	0.0024		0.0206	(0.0009)			0.055	25.06	0.192	(0.0003)	0.807	3.75	0.297		0.02		7.01	0.0069	0.251	(0.0003)	0.001	(0.0006)	(0.00008)	0.419	0.0051	0.003	0.003	0.07	0.05	(0.0004)	0.0008
13X NSA13 A	Alloy 2507	S32750	Duplex Stainless	(0.007)		0.0030		0.0200				0.0328	25.27	0.156		0.761	3.73	0.269		0.028		6.73		0.0249		0.0005			0.257				0.0712	0.035		
239C	Alloy 255	S32550	Duplex Stainless	0.007	(0.004)	0.0014		0.017	(<0.004)		(<0.005)	0.039	25.8	1.49	(<0.03)	0.87	3.33	0.228		0.006		6.14	(0.007)	0.023	(0.004)	0.001	(0.0004)	(<0.03)	0.38	0.003	(0.004)	0.004	0.083	0.05	(<0.03)	(0.003)
239B>	Ferrallium 255	S32550	Duplex Stainless	0.008	(0.003)	0.0008		0.013				0.048	25.9	1.48		0.86	3.42	0.25		0.024		5.78	0.004	0.025	(0.001)	0.0005			0.39	0.003	(0.004)	0.002	0.099	0.106		0.002
13X NSA7 B	Ferrallium 255	S32550	Duplex Stainless	0.0142		0.0018		0.0130				0.0471	25.69	1.53		0.864	3.28	0.232		(0.009)		6.37		0.0160		0.0005			0.278				0.0802	0.133		
319A	Zeron 100	S32760	Duplex Stainless	0.01	(0.004)	0.002		0.015				0.051	25.2	0.51		0.53	3.56	0.24		0.006		6.92	0.0025	0.024		0.0006			0.23	0.0055	(0.002)	0.003	0.076	0.52		0.002
13X NSA8 B	Zeron 100	S32760	Duplex Stainless			0.0017		0.0206	0.0011			0.0448	25.49	0.589		0.598	3.49	0.232		0.026		7.48		0.0248		0.0007			0.285				0.0583	0.599		
FeZ100-18	Zeron 100	S32760	Duplex Stainless	0.017	(0.0045)	0.002	(<0.001)	0.017	(<0.002)	(<0.001)		0.123	25.5	0.55	(0.002)	0.52	3.61	0.22		0.005		7.1	0.003	0.026	(<0.003)	0.0009	(0.001)	(<0.004)	0.24	0.006	(<0.045)	(0.004)	0.09	0.56	(<0.005)	(<0.005)
13X 14122 A	1.4122 DIN X39CrMo17-1		Martensitic Steel	(0.002)				0.356				0.0224	15.91	0.066		0.480	0.855	0.0290		0.006		0.632		0.0177		0.0021			0.449	0.0041			0.101	0.004		
13X 14713 A	1.4713 DIN X10CrAlSi7		Martensitic Steel	0.551				0.0446				0.0110	7.17	0.0368	0.0016	0.495	0.0266	0.0065				0.122		0.0203		0.0080			0.911	0.0034		0.0056	0.0411			

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
242A	Aermet 100	K92580	Martensitic Steel	0.004		(0.0005)		0.24				13.5	3	0.007		0.018	1.21	0.0003		0.004		11.1	0.0006	0.002		0.0004			0.02	(0.001)	0.008	0.009	0.01	(<0.01)		(0.002)
FeA100-18	Aermet 100	K92580	Martensitic Steel	0.007				0.222				13.4	2.98	0.01		0.013	1.19	0.001		0.003		11.2	0.0009	0.004					0.039			0.008	0.007	0.006		
13X 40900 A	AISI 409	S40900	Martensitic Steel	0.0311				0.0354				0.0530	10.98	0.134		0.715	0.102	0.0070		0.0324		0.231		0.0032		0.0059			0.616	0.0080		0.530	0.0990			
13X 40930 A	AISI 409HP	S40930	Martensitic Steel	0.0362				0.0227				0.0241	11.09	0.222		0.707	0.0328	0.0075		0.051		0.301		0.0104		0.0046			0.689	0.0069		0.434	0.0339			
9B*	AISI 410	S41000	Martensitic Steel	0.024				0.13				0.016	11.97	0.054		0.54	0.064	0.0468		0.028		0.3	0.0019	0.019		0.006			0.29	0.004		0.005	0.048	0.01		
9D*	AISI 410	S41000	Martensitic Steel	0.003	0.003	0.0005		0.143	(0.001)			0.0213	12.51	0.11	(0.0004)	0.57	0.038	0.0225		0.0023		0.2	0.0053	0.033	(0.0002)	0.028		(0.0001)	0.38	0.006	0.004	0.0016	0.022	0.004	(0.0001)	(0.001)
Fe410-18	AISI 410	S41000	Martensitic Steel	0.003	(0.0032)	(<0.005)	(<0.005)	0.132	(<0.007)	(<0.005)		0.012	12.2	0.046	(<0.005)	0.5	0.146	0.046		0.0021		0.28	0.009	0.017	(<0.001)	0.0014	(<0.008)	(<0.005)	0.29	(0.004)	(<0.013)	(0.002)	0.065	0.008	(<0.005)	(<0.005)
13X 41001 A	AISI 410* ASTM A579	S41001	Martensitic Steel	(0.004)				0.136	0.0010			0.0143	12.06	0.056		0.464	0.0102	0.0316				0.0939		0.0142		0.0037			0.298	0.0051			0.079			
13X 41008 A	AISI 410S	S41008	Martensitic Steel	0.076				0.0292				0.0491	12.39	0.0915		0.711	0.0365	0.0131		0.0202		0.319		0.0105		0.0048			0.641	0.0077			0.0569			0.007
13X 41008 B **	AISI 410S	S41008	Martensitic Steel	0.029				0.035				0.053	12.4	0.26		0.68	0.041	0.009		0.019		0.33		0.013		0.0072			0.72	0.008			0.059			0.049
327A	AISI 415	S41500	Martensitic Steel	0.003	(0.004)	0.001		0.018				0.019	12.73	0.082	(0.0003)	0.54	0.53	0.0157		0.008		3.83	0.0047	0.018	(0.0001)	0.001			0.43	0.006	(0.004)	0.0026	0.036	0.009		(0.002)
13X 41500 A	AISI 415	S41500	Martensitic Steel					0.0385				0.0999	13.00	0.1296		0.596	0.504	0.0504		0.0405		3.52		0.021		0.0101			0.402			0.0012	0.091			
10D	AISI 416	S41600	Martensitic Steel	0.0027	0.007	0.002		0.11	(0.0011)			0.0187	12.42	0.192	(<0.09)	1.11	0.148	0.0241		0.0027		0.291	0.005	0.0178	(0.0003)	0.334	(0.0022)	(<0.02)	0.475	0.01		0.0015	0.051	0.005	(0.006)	(<0.005)
13X 41600 A	AISI 416	S41600	Martensitic Steel	(0.004)				0.111				0.0216	13.23	0.160		0.627	0.0499	0.0245		0.0053		0.331		0.0253		0.302			0.442	0.0066			0.0888	(0.003)		
20C	AISI 418 Greek Ascoloy	S41800	Martensitic Steel	(0.004)				0.18				0.031	12.15	0.06		0.3	0.12	0.0222		0.01		1.93	0.0068	0.018		0.007			0.35	0.004		(0.003)	0.086	2.59		
13X 41800 A	AISI 418 Greek Ascoloy	S41800	Martensitic Steel	(0.003)				0.172				0.0357	12.30	0.104		0.328	0.0689	0.0283		(0.006)		2.053		0.0176		0.0006			0.316	0.0040			0.0200	2.75		
Fe418-18	AISI 418 Greek Ascoloy	S41800	Martensitic Steel	0.004	(0.003)	(<0.005)	(<0.005)	0.168	(<0.005)	(<0.005)		0.029	12.4	0.222	(<0.005)	0.429	0.104	0.031		0.019		2	0.004	0.016	(<0.005)	(0.0005)	(<0.05)	(<0.005)	0.32	0.005	(<0.005)	(0.004)	0.046	2.63	(<0.005)	(<0.005)
154A*	AISI 420	S42000	Martensitic Steel	0.008				0.39				0.021	12.82	0.044		0.47	0.052	0.0294		0.004		0.19	(0.0068)	0.018		0.003			0.35	0.004		0.002	0.045	0.011		
154B	AISI 420	S42000	Martensitic Steel	0.002		(0.001)		0.35				0.02	12.2	0.087		0.405	0.079	0.02		0.003		0.223	0.0016	0.017		0.0004			0.45	0.006		0.002	0.067	0.01		
154C	AISI 420	S42000	Martensitic Steel	0.0034	(0.004)	0.0007		0.339	(<0.001)			0.016	12.41	0.12	(<0.001)	0.423	0.036	0.054		0.014		0.215	0.0042	0.0174	(<0.01)	0.0043	(0.001)	(0.0003)	0.37	0.0058	(<0.005)	0.0015	0.043	0.005	(<0.005)	(0.0014)
13X 42000 A	AISI 420	S42000	Martensitic Steel			0.0013		0.208				0.0161	12.56	0.202		0.679	0.0398	0.0273				0.295		0.0241		0.0253			0.496	0.0073			0.046			
13X 14418 A	AISI 420* EN 1.4418	S42010	Martensitic Steel	(0.003)				0.0450				0.1004	15.44	0.173		0.819	0.847	0.0423		(0.009)		4.65		0.0265		0.0108			0.291	0.005			0.0539	0.013		
352A	AISI 420FS	S42020	Martensitic Steel	0.0025	0.005	0.0007		0.341	(<0.005)		(<0.005)	0.016	13.11	0.148	(<0.009)	1.13	0.38	0.029		0.012		0.269	0.005	0.0182	(<0.001)	0.21	(0.004)	(0.006)	0.357	0.0046	(0.0007)	0.0015	0.028	0.005	(<0.02)	(<0.003)

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Stainless Steel

Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
205D	AISI 422	S42200	Martensitic Steel	0.0021	0.004	0.0007		0.232	(0.002)		(<0.0010)	0.043	12.18	0.122	(0.0007)	0.736	1.002	0.0484		0.013		0.841	0.0053	0.0209	0.002	0.0028	(<0.0070)	(<0.0050)	0.257	0.0047	(<0.0050)	0.0022	0.319	1.07	(<0.0050)	0.0022
13X 14923 A	AISI 422	S42200	Martensitic Steel	0.003				0.205	0.0044			0.0207	11.26	0.0563		0.501	0.819	0.0321		0.005		0.452		0.0197		0.0031			0.330	0.004			0.295			
13X 42200 A	AISI 422	S42200	Martensitic Steel	0.0020				0.220				0.0114	11.41	0.136		0.651	1.042	0.0585		0.0203		0.738		0.0182		0.0012			0.314	0.0052			0.246	1.177		
11D	AISI 430	S43000	Martensitic Steel	0.015	(0.005)	0.0006		0.07	(0.002)			0.024	17.35	0.085	(0.0003)	0.4	0.075	0.021		0.009		0.6	0.004	0.023	(0.0005)	0.004		(0.001)	0.83	0.006	(0.003)	0.003	0.052	0.008	(0.004)	(0.001)
13X 43020 A	AISI 430F	S43020	Martensitic Steel	0.0047		(0.003)		0.147				0.0191	16.07	0.0687		1.439	0.226	0.0212		0.0102		0.517		0.0246		0.189			0.415				0.0542	0.0108		
355A	AISI 430FS	S43020	Martensitic Steel	0.0016	0.004	0.0011		0.0274	(<0.005)		(<0.005)	0.047	17.81	0.083	(0.0008)	0.47	0.337	0.0439		0.0095		0.427	0.01	0.0186	(0.0002)	0.31	(<0.004)	(0.0001)	0.435	0.005	(0.001)	0.002	0.038	0.018	(0.0007)	(0.002)
12A*	AISI 431	S43100	Martensitic Steel	(0.076)				0.14				0.03	16.03	0.1		0.61	0.07	(0.057)		0.04		2.27	(0.02)	0.024		0.006			0.37	(0.007)		0.004	0.07	0.024		
12B	AISI 431	S43100	Martensitic Steel	(0.003)		(0.0003)		0.174				0.018	16.02	0.143		0.6	0.057	2.15		0.011		2.15	0.0101	0.016	(<0.0005)	0.003			0.56	0.006		0.003	0.037	0.014		(0.002)
12C	AISI 431	S43100	Martensitic Steel	0.004	0.004	0.0004		0.155	0.0007			0.048	15.78	0.33	(0.0002)	0.55	0.125	0.056		0.02		2.23	0.005	0.022	(0.0005)	0.0032			0.34	0.008	(0.0005)	0.002	0.04	0.015		(0.001)
13X 43100 A	AISI 431	S43100	Martensitic Steel					0.166				0.0239	16.39	0.134		0.378	0.0768	0.075		0.006		2.10		0.0199		0.0050			0.535	0.004			0.0577	0.004		
13D	AISI 440C	S44004	Martensitic Steel	0.006	0.008	0.0005		1.04	(0.0007)			0.0212	16.36	0.184		0.697	0.488	0.0492		0.0074		0.256	0.0031	0.0195	(<0.0090)	0.0012	0.0027	(<0.02)	0.614	0.011	0.004	0.0035	0.058	0.046	(<0.02)	0.0017
13X 44004 B	AISI 440C	S44004	Martensitic Steel	0.0160				1.012				0.0167	16.50	0.0687		0.378	0.468	0.0308		0.008		0.197		0.0232		0.0018			0.440			(0.004)	0.0484	0.0156		
353A	AISI 440F Se	S44023	Martensitic Steel	0.0018	0.004	0.0006		0.98	(0.0003)		(<0.005)	0.032	17.01	0.13	(0.004)	0.95	0.5	0.027		0.011		0.265	0.005	0.019	(0.002)	0.025	(0.002)	0.17	0.49	0.0056	0.004	0.0015	0.116	0.041	(0.005)	0.002
13X 14742 A	AISI 442	S44200	Martensitic Steel	0.804				0.084				0.0186	17.60	0.1267	0.0022	0.714	0.0968	0.0209		0.0202		0.449		0.0214		0.0008			0.910	0.0046		0.0051	0.0463			
14A*	AISI 446	S44600	Martensitic Steel	(<0.01)				0.089				0.038	23.84	0.06		0.46	0.05	(0.17)		(<0.01)		0.31	(0.021)	0.023	(0.0005)	0.004			0.37	(0.013)		(<0.01)	0.045	0.014		
14B*	AISI 446	S44600	Martensitic Steel	0.004	(<0.005)	(0.0004)		0.016	(<0.005)			0.03	23.6	0.071	(<0.001)	0.426	0.095	0.043		0.006		0.29	0.0054	0.022	(<0.001)	0.0015			0.51	0.005	(<0.001)	0.0024	0.11	0.011		(<0.005)
14C	AISI 446	S44600	Martensitic Steel	0.0041	0.003	0.0005		0.061	(0.001)			0.043	24.9	0.19	(0.0005)	0.385	0.101	0.058		0.013		0.364	0.006	0.021	(0.0001)	0.0015	(0.002)	(0.0001)	0.63	0.004	(0.002)	0.013	0.078	0.031	(0.0003)	(0.001)
13X 14762 A	AISI 446	S44600	Martensitic Steel	1.318				0.082	0.0025			0.0293	24.38	0.0801	0.0024	0.662	0.0553	0.0285		0.0277		0.346		0.0275		0.0007			1.069	0.0048		0.0058	0.0993			
13X 90901 A	ASTM A182 Grade F91	K90901	Martensitic Steel	0.0216				0.1020					8.43	0.0399		0.447	0.905	0.0472		0.0704		0.249		0.0148		0.0009			0.429	0.0020		(0.003)	0.208	0.0094		
13X 12547 M			Martensitic Steel					0.238				0.302	17.49	0.531		1.191	1.006	0.099		0.347		1.492		0.0441		0.0746			0.344	0.030			0.1021			
13X 12548 M			Martensitic Steel					0.189				0.352	12.98	0.228		0.576	1.33	0.0508		0.585		1.08		0.0260		0.218	0.022		0.421					0.033		
13X 12549 L			Martensitic Steel					0.1025				0.492	12.01	0.492		0.354	1.311	0.0393		0.19		1.203		0.0052		0.124			0.344				0.0144			
13X 14775 S			Martensitic Steel	0.0301	(0.002)			0.006				0.153	17.78	0.167		1.405	0.529			0.691		1.949		0.047		0.154			0.552	0.0007			0.0287			

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Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
13X15023 W			Martensitic Steel	(0.004)				0.089				0.0501	11.05	0.0312		1.75	0.961	0.0081		1.440		0.947		0.0078		0.0053			0.340				0.0308	0.0396		
13X15024 X			Martensitic Steel	0.0049				0.166				0.1059	14.65	0.332		0.610	0.299	0.0156		0.099		2.99		0.0284		0.0294			0.749				0.150	0.039		
13X15035 U			Martensitic Steel	(0.093)				0.115				0.199	14.00	0.204		0.674	0.399	0.0584		0.500		2.38		0.0415		0.0456			0.636				0.160	0.048		
13X15059 P			Martensitic Steel					0.084				0.266	15.85	0.105		0.995	0.600			0.430		1.584		0.0130		0.0133			0.495	(0.02)		0.038	0.070	0.081		
13X8110 LE			Martensitic Steel	(0.004)	0.072	1.07		0.697				(0.32)	0.223			0.650	2.71	0.0200				4.20		0.047		0.0943			0.788			0.031	0.220			
98A*	ASTM F15, Kovar	K94610	Fe-Ni-Co Sealing	0.04				0.019				17.5	0.12	0.05		0.24	0.05			<0.01		29.09		0.002		0.002			0.1	<0.01		<0.01	<0.01	0.03		<0.01
98B	ASTM F15, Kovar	K94610	Fe-Ni-Co Sealing	0.07	<0.002	0.001		0.007	<0.0005			17	0.012	0.028	0.004	0.18	0.01	0.0024		0.002		29.4	0.0021	0.002	<0.0005	0.0007			0.17	0.002	<0.05	0.03	(0.003)	(0.02)	<0.0005	<0.01
FeKovar-18	ASTM F15, Kovar	K94610	Fe-Ni-Co Sealing	<0.006	(0.003)	<0.005	<0.005	0.024	<0.005	<0.005		17.3	0.068	0.077	<0.01	0.26	0.062	<0.002		<0.005		29	<0.008	0.004	<0.005	0.0055	<0.005	<0.005	0.09	0.0021	<0.005	<0.005	<0.005	0.02	<0.005	<0.005
214A	NMS-100		Non-Magnetic Steel	(0.002)		(0.001)		0.018				0.021	12.36	0.36		18.3	0.44	0.27		0.23		2.33	0.0026	0.033		0.002		1	0.008		0.002	0.04	0.02			
308A	Alloy C-250	K92890	Maraging Steel	0.097	(0.003)	0.0029		0.003	(0.0003)			7.8	0.023	0.018		0.019	4.78	0.0013		0.003		18.53	0.0005	0.004		0.0005			0.014	0.001	<0.01	0.46	0.01	0.01		0.01
99B	Alloy C-300	K93120	Maraging Steel	0.095		0.0026		0.005				9.24	0.081	0.094		0.036	4.88	0.0011		(0.005)		18.46	0.0015	0.005		0.0005			0.022	(0.003)		0.74	0.012	0.016		<0.01
99D	Alloy C-300	K93120	Maraging Steel	0.117	<0.002	0.0026		0.006	<0.001			9.24	0.12	0.045	<0.005	0.013	4.8	0.0014		0.011		18.4	<0.003	0.004	(0.01)	0.0011	<0.004		0.03	(0.002)	<0.032	0.67	0.037	0.01	<0.002	(0.008)
309A	Alloy C-350	K93540	Maraging Steel	0.11	(0.004)	0.0032		0.0059	<0.001			12.3	0.053	0.023		0.018	4.71	0.001		0.004		18.4	0.0005	0.004		0.0006			0.02	(0.001)	(0.006)	1.47	0.01	0.01		0.008
13X14935 T			Maraging Steel	(0.007)				0.0105				7.17	0.745			0.494	5.61	0.0102				18.96		0.036		0.055			0.441			0.106				
13X42027 A**	AISI 420*AMS 5898	S42027	High Nitrogen	0.005				0.30				0.02	15.3	0.035		0.36	0.99	0.39				0.16		0.014		0.0005			0.54				0.050	0.02		
13XNSA9 A	ASTMA182 Grade F51	S31803	High Nitrogen					0.019				0.072	22.57	0.240		1.592	3.11	0.156		0.012		5.44		0.0248		(0.0007)			0.469				0.068	0.024		
13XNSA9 B	ASTMA182 Grade F51	S31803	High Nitrogen			0.0018		0.0304				0.0337	22.39	0.154		1.524	3.27	0.184		0.021		5.75		0.0237		0.0009			0.290				0.0607	0.033		
13XNSA2 J			High Nitrogen					0.132					17.82	0.259		1.03	2.013	0.131		0.155		10.08		0.0252		0.0275			0.739				0.139			
13XNSA4 B			High Nitrogen	0.0048				0.115					23.85	0.595		5.55	4.32	0.446		0.154		17.62		0.0302		0.0095			0.519							
13XNSA6 B			High Nitrogen	(0.08)				0.0467					26.14	1.52		1.607	7.03	0.245		0.149		31.13		0.060		0.0113			0.64							
13XNSB1 D†			High Nitrogen					0.17					19.1			0.44	0.11	0.04				10.0							0.58							
13XNSB2 D†			High Nitrogen					0.06					18.2			0.62	0.21	0.095				11.1							0.66							
13XNSB3 G			High Nitrogen					0.121					15.22			0.632	0.630	0.198				9.26							0.471							

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Stainless Steel

Stainless Steel

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Ce	Co	Cr	Cu	Mg	Mn	Mo	N	Na	Nb	Nd	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
13XNSC1P			High Nitrogen					0.316					18.76	0.391		6.53	0.196	0.0877		1.499		5.06				0.0097			0.788				0.501	0.100		
13XNSC3AA			High Nitrogen	0.051				0.868					22.32	0.292		8.43	0.057	0.498		2.45		5.00				0.0295			1.51				0.098			
13XNSC6A			High Nitrogen	(0.009)				0.0266					20.47	0.0064		8.85	(0.002)	0.235				6.52		0.0049		0.0055			0.523				0.0052			
291A	M152	S64152	High Strength	(0.004)	(0.005)	0.001		0.11	(0.001)			0.021	11.3	0.06		0.71	1.61	0.035		0.022		2.62	0.014	0.016		0.009			0.23	0.004	(0.001)	0.0011	0.29	(0.01)		(<0.005)
13X 64152 A	M152	S64152	High Strength	0.0315				0.114				0.0185	11.34	0.0622		0.666	1.567	0.0339				2.50		0.0123		0.0020			0.224				0.275			
26D	A286	S66286	Fe Super Alloy	0.29	(0.003)	0.0063		0.038	(<0.0005)		(<0.015)	0.04	14.29	0.047	(<0.005)	0.224	1.23	0.0035		0.007		24.6	(0.001)	0.013	(<0.03)	0.0008	(<0.004)	(<0.03)	0.05	0.0039	(<0.008)	2.17	0.223	0.036	(<0.02)	(0.0016)
13X 66286 A	A286	S66286	Fe Super Alloy	0.193		0.0044		0.035				0.083	14.99	0.195		1.173	1.185	0.0040				25.21		0.0172		(0.0006)			0.216			1.92	0.262	0.098		
22C	AISI 15-5PH	S15500	Precip. Hardenable	0.006	0.004	0.0006		0.042	(0.0002)			0.086	14.28	3.24	(0.0001)	0.63	0.48	0.03		0.29		4.63	0.0021	0.027	0.00003	0.0004			0.39	0.013	(0.004)	0.002	0.068	0.031	(0.0005)	(0.002)
23D*	AISI 17-4 PH	S17400	Precip. Hardenable	0.005	(0.005)	0.0019		0.038	0.0013			0.041	15.16	3.27	(0.0004)	0.52	0.159	0.037		0.29		4.88	0.0033	0.022	(0.001)	0.0006		(0.001)	0.49	0.0059	0.002	0.003	0.053	0.011	(0.001)	(0.001)
13X PH17400 A	AISI 17-4 PH	S17400	Precip. Hardenable					0.0200				0.0411	15.74	3.09		0.829	0.061	0.0342		0.184		4.52		0.0202		0.0215			0.349				0.112			
Fe174PH-18	AISI 17-4PH	S17400	Precip. Hardenable	0.007	(<0.01)	(<0.005)	(<0.006)	0.041	(<0.005)	(<0.005)		0.047	15.1	3.33	(<0.006)	0.47	0.315	0.0436		0.285		4.73	0.0035	0.024	(<0.005)	(<0.004)	(<0.01)	(<0.005)	0.52	0.008	(0.0003)	(<0.006)	0.051	0.015	(<0.005)	(<0.003)
152C	AISI 17-7 PH	S17700	Precip. Hardenable	0.94	(0.004)	0.0029		0.072				0.113	16.99	0.316		0.74	0.36	0.0172		0.012		7.3	0.001	0.024		0.0006			0.263	0.007	(0.005)	0.098	0.072	0.026		
13X PH17700 A	AISI 17-7 PH	S17700	Precip. Hardenable	1.172		0.0033		0.0732				0.0464	16.88	0.146		0.496	0.340	0.0192		0.0201		6.98		0.0181		0.0008			0.551			0.051	0.0390	0.009		
Fe177PH-18	AISI 17-7 PH	S17700	Precip. Hardenable	1.09	(0.004)	0.0017	(<0.005)	0.08	(<0.005)			0.048	17.08	0.36	(0.006)	0.73	0.35	0.0153		0.009		7.11	(0.004)	0.02	(<0.005)	0.0005	(<0.005)	(<0.005)	0.51	0.006	(<0.005)	0.083	0.062	0.011	(<0.005)	(<0.005)
21D	AISI PH13-8Mo	S13800	Precip. Hardenable	1.03	(0.003)	(0.0004)		0.032	(0.0004)			0.078	12.69	0.017	(<0.0005)	0.052	2.23	0.0037		0.005		8.29	(0.0006)	0.008	(<0.001)	0.0014	(<0.001)	(<0.001)	0.039	(0.001)	(<0.003)	0.016	0.017	0.012	(<0.002)	(0.002)
13X PH13800 A	AISI PH13-8Mo	S13800	Precip. Hardenable	1.075				0.0386				0.0220	12.52	0.0449		0.0332	2.10	0.0041				8.04		0.0064		0.0030			0.081			0.0122	0.0188			
335A	Alloy AM355	S35500	Precip. Hardenable	0.019	(0.01)	0.0007		0.138	(0.001)			0.063	15.3	0.086		0.85	2.72	0.085		0.015		4.27	0.002	0.016	(0.002)	0.0005			0.39	0.0034	(0.01)	(0.002)	0.094	0.008		(0.002)
15A*	Custom 450	S45000	Precip. Hardenable	0.029				0.033				0.11	14.9	1.59		0.38	0.77	(0.015)		0.62		6.54	(0.022)	0.021		0.003			0.41	0.005		(<0.01)	0.09	0.026		
15B	Custom 450	S45000	Precip. Hardenable	0.006				0.047				0.24	14.53	1.53		0.39	0.82	0.0355		0.65		6.94	0.0039	0.013		0.001			0.33	0.009		0.005	0.033	0.12		
15C	Custom 450	S45000	Precip. Hardenable	0.005	0.0044	0.0006		0.032	(0.0004)		(<0.01)	0.024	14.39	1.54	(<0.005)	0.76	0.722	0.0148		0.63		6.35	0.003	0.019	(0.003)	0.0018	(0.003)	(0.0003)	0.26	0.009	(0.004)	0.002	0.041	0.02	(0.01)	0.003
16C	Custom 455	S45500	Precip. Hardenable	0.072	0.003	0.0011		0.003				0.017	11.34	2.08	(0.0001)	0.024	0.009	0.003		0.248		8.23	0.0014	0.007		0.0046			0.03	0.003	(0.005)	1.16	0.07	0.008		0.001
13X 45500 A	Custom 455	S45500	Precip. Hardenable	0.073				0.0041				0.0152	11.39	2.20		0.0263	0.0185	0.0030		0.250		8.36		0.0049		0.0020			0.059			1.187	0.0689			
354A	Custom 465	S46500	Precip. Hardenable	0.05	(0.002)	0.0023		0.0076	(0.0003)		(<0.001)	0.022	11.61	0.018	(0.0001)	0.012	0.95	0.0018		0.02		11.05	0.0012	0.0029	(0.004)	0.0019	(0.0002)	(<0.003)	0.04	0.002	(<0.004)	1.56	0.02	0.02	(<0.005)	(<0.005)

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Stainless Steel

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13X46500 A	Custom 465	S46500	Precip. Hardenable	0.069		0.0016		(0.003)				0.0101	11.70	0.0373		0.004	0.948	0.0031		0.005		10.91		0.0020		0.0010			0.075			1.51	0.0049			
13X FV520B A	FV520B	S45000	Precip. Hardenable					0.0181				0.030	13.73	1.462		0.655	1.334	0.0197		0.301		5.29		0.0221		0.0016			0.342			0.080	0.020			
13X PH2S143 A	PH2S143	S45000	Precip. Hardenable					0.044				0.0483	13.46	1.61		0.546	1.326	0.0246		0.225		5.20		0.0212		0.0021			0.479			0.087	0.018			
13X PH2 M			Precip. Hardenable	0.0419		0.0047		0.0598				0.0927	16.80	4.03		1.184	1.009	0.052		0.143		3.56		0.0201		0.0419			0.502		0.049	0.1028				
13X PH3 M			Precip. Hardenable			0.0049		0.184				0.420	15.86	5.99		0.395	0.751	0.070		0.394		3.08		0.0188		0.0208			1.60			0.176				
13X PH4 N			Precip. Hardenable	0.094		0.0033		0.0400				0.600	14.87	5.24		0.793	0.247	0.078		0.303		4.00		0.0285		0.0166			0.747		0.100	0.500				
13X PH7 F			Precip. Hardenable	0.012				0.118				0.0493	13.16	0.777		1.487	2.52	0.044		0.241		5.41		0.0283		0.0057			1.402		0.0196	0.043				
13X 14207 L	14207		Special Stainless	0.0226				0.0388				0.0089	19.63	0.186		0.597	0.573	0.0099		0.258		12.43		0.0061		0.0060			1.448	0.082	0.0119	0.0043	2.99			
13X 12538 J†			Special Stainless					0.04					23.72			0.78	1.53				6.07							0.64								
13X 12540 M			Special Stainless					0.131				0.109	27.44	0.181		0.800	0.993	0.054		0.107		4.975		0.051		0.0512			0.805			0.210	0.097			
13X 14212 S			Special Stainless					0.119				0.1090	21.64	0.611		0.166	0.520	0.0055		0.550		8.81		0.032		0.0386			2.47			0.1175	3.68			
13X 14215 L			Special Stainless					0.136				0.0057	22.89	0.0110		1.110	0.0048			0.0196		15.86		0.0050		0.0068			0.596			0.0480	3.02			
13X 14216 P			Special Stainless					0.0424				0.248	23.44	0.231		0.663	0.209	0.0152		0.248		12.06		0.0048		0.0070			1.566			0.0722	2.25			
13X 14219 K			Special Stainless					0.0997				0.0475	21.46	0.138		0.482	0.169			0.140		12.66		0.0401		0.0456			1.504			0.0188	4.17			



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Nickel Alloy

Nickel Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zr
53F	Alloy 600	N06600	Ni-Cr	0.17	(<0.001)	0.0026	(<0.0001)	0.077	(<0.001)	(<0.0003)	0.056	16	0.077	9.5	(<0.0001)	0.016	0.26	0.084	(0.007)	0.088	72.7	(0.001)	0.007	(0.0006)	0.0022	(0.00011)	(<0.001)	0.17	0.002	0.004	0.255	0.024	0.014	(<0.0001)	(0.002)
273A	Alloy C263	N07263	Ni-Cr	0.49	0.0011	0.0012		0.06	(<0.0020)		20.12	20.43	0.007	0.285		0.003	0.214	5.84	0.0037	0.019	50.3	0.0012	0.003	(<0.0001)	0.0003	(<0.001)		0.078	0.001	0.007	2.12	0.007	0.019		0.001
NiX-18	Alloy X	N06002	Ni-Cr	0.24	(0.002)	0.0038	(<0.001)	0.08	(<0.005)	(<0.005)	1.43	22	0.046	19.2	(<0.0001)	0.003	0.215	8.6	0.042	0.024	46.9	0.0012	0.0107	(<0.00008)	(0.005)	(0.00027)	(<0.005)	0.49	(0.0017)	(<0.005)	0.017	0.037	0.55	(<0.001)	(<0.005)
57E	Alloy X750	N07750	Ni-Cr	0.74	(0.0004)	0.008	(0.000002)	0.06	(<0.0005)	(<0.0001)	0.021	15.3	0.01	8.01	(0.00002)	0.0013	0.079	0.014	(0.0025)	1	72.1	(0.0012)	0.005	(0.0003)	0.0009	(0.00007)	(<0.0006)	0.052	(<0.016)	(<0.023)	2.54	0.021	0.009	(<0.002)	0.037
61A	Haynes 214	N07214	Ni-Cr	4.42		0.005		0.042			(<0.01)	16.12	(0.01)	3.57		(<0.002)	0.17	(<0.01)		(0.01)	(75.62)		0.003	(<0.001)	0.001			0.02	(<0.001)	(<0.01)	(<0.01)	(<0.01)	(<0.01)		0.02
NiH214-18	Haynes 214	N07214	Ni-Cr	4.28	(0.0003)	0.0033	(<0.0001)	0.036	(<0.005)	(<0.005)	0.007	16.24	0.0011	3.48	(<0.0001)	0.0053	0.185	0.004	0.0026	0.003	75.6	(0.001)	0.0017	(<0.001)	(0.0004)	(<0.001)	(<0.005)	0.02	(<0.0001)	(0.0001)	0.003	0.003	0.02	0.008	0.026
Ni282-18	Haynes 282	N07208	Ni-Cr	1.57	(<0.005)	0.0014	(<0.0002)	0.06	(<0.002)	(<0.0001)	10.38	19.4	0.012	0.9	(<0.0001)	0.0054	0.042	8.4	(0.0073)	0.058	56.8	(<0.002)	0.003	(<0.0001)	0.0006	(<0.0002)	(<0.001)	0.054	(0.0003)	(<0.01)	2.2	0.013	0.043	(<0.002)	0.0014
22X 1052 C	Nimonic Type Alloy		Ni-Cr	4.08				0.19			18.6	15.7	0.13	0.65		0.002	0.26	4.48										0.51			1.09				
22X 804 D	Nimonic Type Alloy		Ni-Cr	1.33				0.07			0.20	19.72	0.21	0.66		0.004	0.54	0.09										0.56			2.34				
22X 806 D	Nimonic Type Alloy		Ni-Cr	1.35		0.004		0.007			0.03	19.66	0.004	0.18			0.09	0.01						0.007				0.10			2.48		0.02		0.004
22X 904 C	Nimonic Type Alloy		Ni-Cr	1.29				0.08			16.9	19.9	0.10	0.25		0.005	0.50	0.21										0.52			2.26				
325A	Rene 41	N07041	Ni-Cr	1.56	(0.0004)	0.0082		0.067	(0.0003)		10.46	18.52	(0.003)	0.07		0.0044	0.004	9.98	0.0016	0.007	56.1	0.0005	0.003	(0.00004)	0.0003			0.012	(0.0002)	0.003	3.16	0.01	0.03		0.002
287A	Udimet 500	N07500	Ni-Cr	3.02		0.009		0.079			16.99	18.47	(0.001)	0.086		0.0023	0.002	3.51	0.0007	0.022	54.8	0.0005	0.001		0.0008			0.02	0.0002	0.01	3.02	0.004	0.013		0.008
NiWasp-18	Waspalloy	N07001	Ni-Cr	1.36	(<0.005)	0.0061	(<0.001)	0.038	(<0.005)	(<0.005)	13.13	19.7	0.009	0.69	(<0.0001)	0.0018	0.022	4.28	0.0046	0.033	57.8	0.0009	0.0032	(<0.002)	(0.0004)	(0.00008)	(<0.005)	0.028	(0.0005)	0.005	3.01	0.023	0.03	(<0.002)	0.058
219X 20500 C			Ni-Cr					0.0212			0.0110	51.1	0.0101	1.515			0.300	0.0103	0.199	0.0117	45.45		0.0048		0.0137			1.29					0.0086		
358A	Alloy 740		Ni-Cr-Co	1.33	(<0.01)	0.0011	(<0.002)	0.026	(0.001)	(<0.0005)	20.1	24.6	0.005	0.122		0.0019	0.259	0.31	0.0045	1.51	50.3	0.001	0.004	(<0.005)	0.0018	(<0.001)		0.145	(<0.001)	(0.006)	1.36	0.009	0.002		0.022
24X 07001 C	Waspalloy Type Alloy		Ni-Cr-Co	1.476		0.0062		0.0360			13.20	19.62	0.0118	1.023			0.024	4.31		0.050	56.92		0.0023		0.0005			0.042			3.14		0.041		0.060
24X 7201 A	Waspalloy Type Alloy		Ni-Cr-Co	2.47		0.0246		0.0326			14.79	15.99		0.09			0.0022	3.01	0.0043		57.09		0.0030		0.0027			0.039			5.11		1.29		0.0432
272A	Alloy 617	N06617	Ni-Cr-Co-Mo	1.16	(0.0002)	0.003	(<0.00001)	0.082			12.89	21.98	0.015	1.1		0.002	0.067	9.34	0.0049	0.015	52.68	0.0007	0.003	(0.0001)	0.0002	(0.0001)		0.07	(0.0003)	(0.01)	0.5	0.005	0.061		0.002
Ni617-18	Alloy 617	N06617	Ni-Cr-Co-Mo	1.08	(<0.005)	0.0023	(<0.001)	0.079	(<0.005)	(<0.028)	11.81	21.9	0.009	1.45	(<0.0001)	0.0011	0.24	9.33	0.0082	0.197	53.3	0.001	0.004	(<0.001)	0.0007	(<0.001)	(<0.005)	0.21	(<0.006)	(<0.009)	0.32	0.006	0.02	(<0.001)	0.06
60A	Alloy 333	N06333	Ni-Cr-Fe	0.08							3.02	25.72	0.1	17.71			1.5		0.044		(44.20)				0.001						0.03	0.07	2.98		
366A	Alloy 601	N06601	Ni-Cr-Fe	1.51		(0.0026)	(<0.0001)	0.025			0.041	22	0.038	14.3		0.004	0.205	0.079	0.0136	0.069	60.9	0.001	0.008	(<0.003)	0.0003			0.019	(<0.005)	(<0.02)	0.43	0.028	0.02	(<0.0001)	0.012
338A	Alloy 602CA	N06025	Ni-Cr-Fe	2.13	(<0.0005)	0.0049	(<0.0001)	0.168	0.002		0.035	25	0.0059	9.74		0.0058	0.052	0.0017	0.0276	0.004	62.3	0.001	0.003	0.00007	0.0008	(0.00009)		0.02	0.00037	(0.002)	0.13	0.0026	(<0.02)	0.06	0.081

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Nickel Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zr
Ni690-18	Alloy 690	N06690	Ni-Cr-Fe	0.25	(<0.001)	(<0.03)	(<0.0001)	0.025	(<0.001)		0.013	29.1	0.012	10		0.003	0.154	0.013	0.012	0.007	59.8	(0.0002)	0.004	(0.001)	0.0007	(<0.0001)		0.049	(<0.003)	(<0.006)	0.324	0.048	0.003		(0.002)
372A	Alloy 693	N06693	Ni-Cr-Fe	3.28	(<0.0002)	0.0016	(<0.0001)	0.03	(<0.001)		0.009	28.3	0.004	3.12	(<0.0001)	0.016	0.285	0.006	0.011	0.71	63.6	0.0008	0.003	(0.001)	0.0016	(0.056)		0.02	(0.001)	(<0.022)	0.486	0.008	0.02	(<0.0001)	0.017
67C	Alloy G-30	N06030	Ni-Cr-Fe	0.14		0.001		0.0058			1.75	28.9	1.24	13.48		0.0069	1.01	4.93	0.035	0.36	45.8	0.0016	0.011		0.0006	(0.0003)		0.14	0.0014	(0.006)	0.005	0.031	1.97		0.002
NiPE16-18	Alloy PE16		Ni-Cr-Fe	1.2	(<0.005)	0.0028	(<0.001)	0.052	(<0.005)	(<0.009)	0.77	16.6	0.053	34.4	(<0.0001)	(<0.003)	0.122	3.29	0.006	0.04	42.9	0.0006	0.006	(<0.008)	0.0007	(<0.001)	(<0.005)	0.13	(<0.007)	(<0.03)	1.18	0.018	0.038	(<0.001)	0.019
28X 06625 A	Inconel Type Alloy		Ni-Cr-Fe	0.184		0.0009		0.020			0.031	21.94	0.0288	0.917			0.090	9.15	0.0219	3.52	63.49		(0.002)		0.0037			0.273			0.238				
28X 07718 A	Inconel Type Alloy		Ni-Cr-Fe	0.544		0.0034		0.026			0.172	18.62	0.038	19.55			0.055	3.01	0.0056	5.05	51.99		0.0063		0.0015			0.076			0.945				
28X 6001 G	Inconel Type Alloy		Ni-Cr-Fe	0.02							1.02	16.38	0.83	6.33		0.01	0.12											0.95			0.58				
28X 6002 F	Inconel Type Alloy		Ni-Cr-Fe	0.18							0.22	16.23	0.02	8.24		0.004	0.65											0.25			0.12				
28X 6003 E	Inconel Type Alloy		Ni-Cr-Fe	0.025							0.62	15.56	0.42	7.1		0.01	0.47											0.74			0.22				
28X 6004 E	Inconel Type Alloy		Ni-Cr-Fe	0.05							0.77	16.21	0.42	7.17		0.008	0.38											0.65			0.27				
28X 6251 M	Inconel Type Alloy		Ni-Cr-Fe	0.006		0.0040		0.002			0.0078	20.24	0.057	4.21			0.069	9.58		2.64	62.95		0.0023		0.0013			0.252		0.0111	0.0097				
28X 6252 Q	Inconel Type Alloy		Ni-Cr-Fe	0.130				0.078			0.279	20.33	0.230	4.73			0.331	8.78	0.085	3.14	60.62		0.0110		0.0144			0.982		(0.004)	0.113				
28X 6253 T	Inconel Type Alloy		Ni-Cr-Fe	(0.19)				0.116			0.39	21.91	0.306	5.62			0.490	7.82	0.092	4.50	(56.8)		0.0242		0.0106			1.32		0.039	0.247				
28X 6255 M	Inconel Type Alloy		Ni-Cr-Fe	0.337		0.0101		0.0343			0.164	19.63	0.0646	2.03			0.203	8.31		4.09	64.2		0.0104		0.0081			0.447		0.093	0.348				
28X 6256 A	Inconel Type Alloy		Ni-Cr-Fe	0.301				0.0173				21.29	0.018	(0.034)			0.0004	8.81	0.007	3.75	65.4		0.0033		(0.002)			0.041			0.266				
28X 7181 K	Inconel Type Alloy		Ni-Cr-Fe	0.07		0.0021		0.0198			(0.014)	18.37	0.042	18.98			0.150	3.25	0.038	4.88	53.10		0.0146		0.0089			0.811			0.125				
28X 7186 K	Inconel Type Alloy		Ni-Cr-Fe	0.664		0.0048		0.0237			0.301	17.55	0.109	15.97			0.238	3.16	0.040	5.07	(55.3)		0.0192		0.0096			0.562			0.910				
219X 86182 B			Ni-Cr-Fe					0.148			0.047	15.88	0.150	7.88			7.68	0.078		2.17	64.7		0.0098		0.0034			0.83		0.031	0.40				
54G	Alloy 625	N06625	Ni-Cr-Mo	0.15	(0.002)	0.0027	(<0.0001)	0.053	(0.00004)	(<0.02)	0.06	21.1	0.066	4.03	(<0.0001)	0.004	0.172	8.52	0.022	3.48	61.9	(0.0011)	0.007	(<0.005)	(0.002)	(0.00048)	(<0.0008)	0.27	0.0009	(<0.03)	0.24	0.025	0.03	(<0.0001)	(<0.002)
54H	Alloy 625	N06625	Ni-Cr-Mo	0.31		(0.0020)		0.018			0.099	21.95	(0.1)	4.05		(<0.001)	0.105	8.68	(<0.02)	3.51	60.7	(<0.001)	0.006		0.001		0.144	(<0.001)	(<0.03)	0.286	(<0.02)	(<0.08)		(<0.002)	
56H	Alloy 718	N07718	Ni-Cr-Mo	0.51	(<0.001)	0.0045	(<0.0001)	0.0248	(<0.0001)	(<0.007)	0.049	17.86	0.012	18.6	(<0.0001)	0.001	0.04	2.9	0.0062	5.2	53.8	(0.0004)	0.0052	(<0.0001)	0.0005	(0.00009)	(<0.0008)	0.054	0.00026	0.006	0.96	0.025	0.014	(<0.01)	(<0.01)
347A	Alloy 904L	N08904	Ni-Cr-Mo	0.016	0.006	0.002	(0.00001)	0.023	0.0029		0.083	20.14	1.34	47.4	(0.0006)	0.0008	1.24	4.16	0.062	0.01	24.88	0.0026	0.023	0.0003	0.0009	0.0013		0.56	0.011	(0.005)	0.007	0.078	0.02		(0.002)
13X NSA12 A	Alloy 904L	N08904	Ni-Cr-Mo	0.0169		0.0020		0.0192			0.090	19.63	1.485				1.272	4.20	0.0662	0.0088	24.84		0.0267		0.0007			0.492			0.0660	0.047			

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Nickel Alloy

Nickel Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zr	
65D	Alloy C-22	N06022	Ni-Cr-Mo	0.29		(0.001)		0.0021			1.22	21.5	0.05	3.66		0.007	0.28	13.1	0.019	0.033	56.8	0.0005	0.008		0.0004			0.035	(0.001)	(0.01)	0.005	0.012	2.81		(0.002)	
276A	Alloy C-22HS	N27022	Ni-Cr-Mo	0.245	(0.0009)	0.0038	(0.000003)	0.004	(<0.007)		0.041	20.54	0.038	1.3	(<0.007)	0.007	0.305	16.2	0.0388	0.014	61.1	0.001	0.006	0.000004	0.0005	0.00019		0.043	0.0004	0.011	0.004	0.008	0.03		0.003	
329A	Alloy G-35	N06035	Ni-Cr-Mo	0.29	0.0009	0.001	(<0.0001)	0.0086	(<0.006)		0.052	33.7	0.065	0.92		0.0124	0.222	8.38	0.073	0.131	55.8	0.0027	0.0059	0.00003	0.0003	0.00013		0.053	0.0005	(<0.008)	0.005	0.009	0.021		0.0012	
26X11384E			Ni-Cr-Mo	0.50							0.30	20.5	0.12	0.98			0.13	10.2										0.15			2.6					
27X14184F			Ni-Cr-Mo-Co	0.02							10.5	21.8	0.09	0.40			0.40	10.7										0.41			0.02					
27X14188D			Ni-Cr-Mo-Co	<0.01							10.4	21.17	(0.003)	0.44			0.30	10.3										0.33			0.03					
27X14387E			Ni-Cr-Mo-Co	<0.005							10.0	20.2	<0.005	1.11			0.27	10.8										0.28			<0.005					
274A	Alloy 725	N07725	Ni-Cr-Mo-Nb	0.26		0.002		0.007			0.143	21	0.1	7.6		0.0019	0.08	8.06	0.007	3.48	57.5	0.0006	0.007		0.0004			0.02	0.001	(0.002)	1.55	0.019	0.06		(0.001)	
Ni725-18	Alloy 725	N07725	Ni-Cr-Mo-Nb	0.22	(<0.002)	0.0023	(<0.0001)	0.008	(<0.001)		0.077	20.5	0.103	7.47		0.005	0.076	7.9	0.008	3.47	58.4	(0.0005)	0.0047	(<0.001)	0.0008	(<0.0001)		0.084	0.0011	0.006	1.55	0.013	0.04	(<0.01)	(<0.005)	
25X10221F			Ni-Cr-Mo-Nb								0.26	20.0	0.11	0.62			0.28	6.57		7.43								0.45					2.23			
362B	Alloy 686	N06686	Ni-Cr-Mo-W	0.32	(<0.01)	(0.003)	(<0.001)	0.0079	(<0.001)	(<0.0005)	0.01	20.4	(0.003)	0.1		0.008	0.229	16.1	0.006	0.015	58.7	0.0006	0.005	(<0.004)	0.0004	(<0.013)	(<0.005)	0.04	(<0.003)	(0.005)	0.052	0.01	3.9	(<0.0001)	(0.004)	
68B	Haynes 230	N06230	Ni-Cr-W-Mo	0.22		(0.002)		0.097			0.4	21.02	0.019	1.48	(0.006)	0.004	0.52	2.34	0.05	0.018	59.8	(0.0009)	(0.005)		(0.0004)			0.38		(0.021)	0.008	0.013	13.45		(<0.01)	
68E	Haynes 230	N06230	Ni-Cr-W-Mo	0.3	(0.0003)	0.007	(0.000004)	0.099	(0.00002)	(<0.002)	0.16	21.88	0.022	1.06	0.008	0.006	0.51	1.18	0.05	0.035	(59.9)	0.0007	0.005	(0.0002)	0.0005	(0.00006)	(<0.0007)	0.39	(0.0004)	(<0.015)	0.015	0.007	14.6	(<0.001)	(0.001)	
68F	Haynes 230	N06230	Ni-Cr-W-Mo	0.26		0.005	(<0.001)	0.101	(<0.005)		0.24	21.9	0.031	1.5		0.006	0.499	1.35	0.045	0.084	(59.6)	0.0007	0.006	(<0.001)	0.0005	(<0.001)		0.381	(<0.001)	(0.009)	0.01	0.007	14.5	(<0.001)	(0.002)	
283A	B-1900		Ni-Co-Cr	6.05		0.014		0.114			9.8	8.05	(0.01)	0.044	(0.002)	0.0033	0.001	5.94	0.0003	0.02	64.4	0.0004	0.003		0.0006	(0.00002)		0.019	(0.0002)	4.3	0.98	0.0058	0.056		0.053	
277A	Rene 77		Ni-Co-Cr	4.38		0.015		0.08			14.46887333	14.35	0.004	0.16		0.0021	0.01	4.22	0.0017	0.034	58.9	0.0005	0.002		0.001			0.037	(<0.003)	(0.02)	3.4	0.011	0.047		0.01	
51A	Alloy 400	N04400	Ni-Cu	0.05		(<0.001)		0.13			0.015	0.01	29.87	2.07		(0.024)	1.49	(<0.01)		(<0.01)	(66.02)		0.008		0.001					(<0.01)	0.05	(<0.01)	(<0.01)		(<0.01)	
51D	Alloy 400	N04400	Ni-Cu	0.036	(<0.003)	(<0.0003)	(<0.003)	0.139	(<0.001)	(<0.0001)	0.011	0.064	32.6	1.68	(<0.0001)	0.016	1.03	0.019	(0.00019)	0.006	64.1	(<0.0007)	0.01	(<0.001)	0.0015	(<0.0001)	(<0.0004)	0.16	(0.00016)	(<0.001)	0.033	(0.001)	(0.0017)	(<0.0005)	(0.0008)	
52D	Alloy K500	N05500	Ni-Cu	2.95	(<0.003)	0.002	(<0.003)	0.125	(<0.003)	(<0.0001)	0.005	0.004	29.6	1.38	(<0.0001)	0.0065	0.59	(0.002)	(<0.002)	0.002	64.5	(0.0004)	0.002	0.002	0.0012	(<0.004)	(<0.0007)	0.17	0.0013	(<0.01)	0.6	0.001	(<0.008)	(<0.0005)		0.026
212X 04400 A	Monel Type Alloy		Ni-Cu	0.030		0.0019		0.157			0.0432	0.166	32.47	2.065		0.053	1.027	0.0307	0.0005		63.69		0.0033		(0.002)			0.253			0.0193					
212X 05500 A	Monel Type Alloy		Ni-Cu	3.00		0.0015		0.135			(0.009)	0.073	29.91	1.162		0.0098	0.634		0.0010		64.3		0.0031		0.0010			0.167			0.632					0.0343
212X 4001 Q	Monel Type Alloy		Ni-Cu	(0.038)				0.0130			0.111	0.0795	28.92	0.503		0.0016	2.95			0.100	65.49		0.0198	0.0703	0.0206			1.48	(0.056)		(0.094)					
212X 4005 G	Monel Type Alloy		Ni-Cu	1.399				0.0494			0.156	0.20	21.53	1.053		(0.003)	1.437	0.102		0.341	(70.1)		0.0106	0.0091	0.0038			2.52			1.005					

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Nickel Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zr
212X 4007 B	Monel Type Alloy		Ni-Cu	0.0307			0.040	0.0483		(0.003)	0.0205	0.498	28.95	2.02		0.050	1.08	0.048		2.40	[bal]		0.025	0.0192	0.0039		0.019	2.18	0.0110		0.099				
212XNA2 G	Monel Type Alloy		Ni-Cu					0.07					29.8	1.53		0.008	1.06						0.019	0.02	0.023			2.50							
157D	AL 6XN	N08367	Ni-Fe-Cr	0.02	(<0.004)	0.0007	(<0.03)	0.0154	(<0.005)	(<0.02)	0.102	20.31	0.196	48	(<0.07)	(<0.0003)	0.626	6.08	0.203	0.149	23.9	(0.004)	0.016	(<0.002)	0.0005	(0.0007)	(<0.0002)	0.28	0.0036	(0.003)	0.009	0.05	0.036	(<0.001)	(0.001)
13XNSA11 A	AL 6XN	N08367	Ni-Fe-Cr	(0.02)				0.0159			0.0981	20.19	0.187				0.640	6.16	0.203	0.150	23.89		0.0186		<0.001			0.275				0.0513	0.038		
357A	Alloy 028	N08028	Ni-Fe-Cr	0.09	(<0.01)	0.0014	(<0.0001)	0.0199	(<0.005)		0.17	27	0.81	34.3	(<0.001)	0.005	1.63	3.48	0.011	0.089	31.9	0.005	0.013	(<0.002)	0.0021	(<0.001)		0.458	(0.002)	(0.008)	0.079	0.091	0.108	(<0.001)	(0.005)
25A	Alloy 20	N08020	Ni-Fe-Cr	0.01				0.024			0.27	19.63	3.23				0.48	2.1	(0.015)	0.51	33.57	(0.012)	0.02	(0.003)	0.003			0.32	0.028	(0.21)	0.004	0.1	0.05		
25D	Alloy 20	N08020	Ni-Fe-Cr	0.015	(0.004)	0.0036	(<0.0001)	0.028	(<0.009)	(<0.005)	0.14	20	3.46	38.7	(<0.001)	0.0016	1.14	2.1	0.034	0.66	32.6	0.005	0.019	(0.004)	0.0013	(0.0008)	(<0.0003)	0.7	0.008	(0.002)	0.009	0.089	0.13	(<0.0005)	(0.003)
Ni256Mo-18	Alloy 25-6Mo	N08926	Ni-Fe-Cr	0.17		0.0009	(<0.0001)	0.0182	0.0014		0.02	20.3	1.98	44		(0.0092)	0.83	6.63	0.022	0.01	25.5	(0.003)	0.004	(<0.03)	0.0011	(<0.0001)		0.41	(<0.002)	(<0.03)	0.006	0.009	0.01		(0.003)
7A	Alloy 330	N08330	Ni-Fe-Cr	0.022				0.063			0.06	19	0.19				1.51	0.31	0.038	0.013	(35.53)	(0.014)	0.018	(0.005)	0.004			1.24	0.003	(0.19)	(0.004)	0.05	(0.045)		
7B	Alloy 330	N08330	Ni-Fe-Cr	0.023		(0.002)		0.062			0.069	19.32	0.21	(43.0)			1.47	0.19	0.013	0.023	35.84	0.0026	0.018		(0.001)			1.38	0.004		(0.005)	0.048	(0.031)		
7C	Alloy 330	N08330	Ni-Fe-Cr	0.017	(0.002)	0.0027		0.064	(0.002)		0.041	18.4	0.031	43.5		0.0015	1.32	0.095	0.034	0.189	34.9	0.0021	0.014	(0.0001)	0.0004	(0.0003)		1.21	0.002	(0.002)	0.022	0.06	(0.02)		(0.001)
58B	Alloy 800	N08800	Ni-Fe-Cr	0.45	(0.002)	0.0003		0.073			0.02	19.6	0.011	47.7		(0.001)	0.51	0.01	0.01	0.01	30.7	0.001	0.01	(0.0001)	0.001			0.282	0.002	(<0.01)	0.5	0.035	0.01		(<0.005)
59A	Alloy 825	N08825	Ni-Fe-Cr	0.05		(0.002)		0.02			0.25	22.12	1.71	30.82		(<0.001)	0.33	2.68		0.02	(40.91)		0.017		0.001			0.1	(0.001)	(<0.01)	0.83	0.03	0.13		(<0.01)
Ni825-18	Alloy 825	N08825	Ni-Fe-Cr	0.11	(0.002)	0.0023	(<0.001)	0.006	(<0.005)	(<0.005)	0.55	22.4	1.81	29.5	(<0.0001)	(0.0002)	0.49	2.8	0.0093	0.31	40.8	0.002	0.013	(<0.001)	(0.003)	(0.004)	(<0.005)	0.17	0.0023	0.0011	0.96	0.047	0.23	(<0.001)	0.002
Ni925-18	Alloy 925	N09925	Ni-Fe-Cr	0.23		0.0034		0.0114			0.43	20.8	1.69	26.4			0.518	2.82	0.0033	0.4	44.2	0.0011	0.012		0.0024			0.075			2.19	0.031	0.27		
328A	Alloy 945	N09945	Ni-Fe-Cr	0.189	0.0009	0.0011	(<0.001)	0.006	(<0.004)		0.003	20.57	1.94	22.41	(<0.0005)	0.0008	0.017	3.16	0.0056	3.14	47.03	0.0006	0.004	0.00002	0.0006	0.00023		0.021	0.0002	0.004	1.53	0.008	0.015		0.004
328B	Alloy 945X	N09945	Ni-Fe-Cr	0.116	(<0.001)	0.001		0.01	(0.001)	(<0.001)	0.063	20.5	2	15		(0.0013)	0.077	3.12	0.006	3.99	53.7	(0.002)	0.005	(<0.001)	0.0006	(<0.0001)	(<0.002)	0.05	(0.001)	(0.01)	1.53	0.014	0.04	(<0.01)	(<0.001)
282A	Alloy HR-120	N08120	Ni-Fe-Cr	0.085	(0.003)	0.005	(<0.0001)	0.054			0.12	24.6	0.0615	0.0615		0.004	0.81	0.21	0.207	0.57	37.1	0.0023	0.016	(0.001)	0.0003	(0.0004)		0.63	0.003	(0.005)	0.019	0.052	0.043		(0.002)
23X 08811 A	Incoloy Type Alloy		Ni-Fe-Cr	0.453		0.0038		0.068			0.082	19.72	0.247	45.81		0.0044	1.009	0.242	0.0096	0.009	31.31		0.0212		<0.001			0.263	0.0054		0.543	0.060	0.0279		
23XDS4 E	Incoloy Type Alloy		Ni-Fe-Cr	0.037				0.06			0.48	16.83	0.30				1.02	0.29			37.15							2.01			0.20				
23XDS5 E	Incoloy Type Alloy		Ni-Fe-Cr	0.083				0.080			0.50	18.64	0.30				1.04	0.30			36.57							1.98			0.17				
219X 08825 A			Ni-Fe-Cr	0.149		0.0028		0.015			0.0646	21.94	1.87	31.82		(0.003)	0.499	3.01		(0.007)	39.12		0.0189		(0.001)			0.232			1.192	0.038			0.0021

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Nickel Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zr
203A	Alloy 909	N19909	Ni-Fe-Co	0.066		(0.002)		0.005			12.9	0.72	0.05	40.6		(<0.002)	0.023	0.09	0.001	5	38.4		0.006		0.0009			0.41			1.58	(<0.01)	(0.02)		(<0.01)
NI909-18	Alloy 909	N19909	Ni-Fe-Co	0.009	(<0.005)	0.0013	(<0.001)	0.006	(<0.005)	(<0.001)	13.1	0.01	0.007	42.4	(<0.0001)	0.00012	0.03	(<0.04)	0.0026	4.6	37.7	0.004	0.002	(<0.001)	0.0018	(<0.001)	(<0.005)	0.42	(<0.012)	0.006	1.62	(<0.0001)	0.009	(<0.0011)	(<0.003)
Ni244H-18	Alloy 244H	N02216*	Ni-Fe-Mn Weld Filler	0.23	0.0009	0.002	(<0.005)	0.052	(0.0003)	(<0.005)	0.005	6.9	0.013	39.9	(<0.0005)	0.0014	10.9	0.003	0.0087	0.7	41.1	0.0009	0.003	(<0.025)	0.0038	0.00012	(<0.001)	0.16	0.0003	(0.001)	0.2	0.004	(0.002)	(<0.001)	0.0008
219X 20004 A			Ni-Mn					0.224			(0.104)	13.63	0.319	9.48			14.07	0.104		1.53	59.1		0.0147		0.0028			0.916		0.077	0.52				
63D	Alloy B-2	N10665	Ni-Mo	0.13	(<0.001)	0.0017	(<0.0001)	0.0079	(<0.001)	(<0.07)	0.013	0.153	0.003	1.56	(<0.01)	0.0013	0.76	26.6	(0.0007)	0.04	70.4	(<0.006)	0.004	(<0.001)	0.0006	(<0.0005)	(<0.0002)	0.03	(0.002)	(<0.011)	0.14	0.007	0.02	(<0.001)	0.002
NiB3-18	Alloy B-3	N10675	Ni-Mo	0.41	(0.002)	(0.002)	(<0.001)	0.003	(<0.005)	(<0.005)	0.142	1.55	0.014	1.57	(<0.0001)	0.01	0.7	28.2	0.0027	0.15	67.2	(0.0007)	0.005	(<0.004)	(0.0004)	(0.00023)	(<0.0001)	0.021	(0.0015)	(0.0007)	0.007	0.007	0.07	(<0.001)	(<0.0005)
NiC276-18	Alloy C276	N10276	Ni-Mo-Cr	0.114	(<0.005)	0.002	(<0.001)	0.0032	(<0.005)	(<0.005)	0.17	15.9	0.14	6.09	(<0.001)	0.01	0.42	15.4	0.017	0.061	58.5	(0.001)	0.008	(<0.001)	0.0007	(0.001)	(<0.005)	0.017	(0.0005)	(<0.06)	0.007	0.018	3.23	(<0.001)	(<0.001)
215X 10276 A	Hastelloy Type Alloy		Ni-Mo-Cr	0.203				0.008			0.182	15.56	0.0423	5.79		0.0090	0.498	15.96	0.0099	0.031	57.81		0.0027		(0.001)			0.029			0.0186	0.196	3.59		0.009
215XHB1P	Hastelloy Type Alloy		Ni-Mo-Cr					0.0422			0.252	1.090	0.0718	5.78			0.697	33.04	0.0156	0.203	58.00		0.0056		0.0506			0.150				0.504			
215XHB4G	Hastelloy Type Alloy		Ni-Mo-Cr	0.0159				0.0843			1.703	0.375	0.0192	5.94			0.597	27.94	0.0013	0.056	61.80		0.049		0.0313			1.005			0.0338	0.212	(0.096)		
215XHC1M	Hastelloy Type Alloy		Ni-Mo-Cr	0.008				0.0255			2.49	15.62	0.024	4.03			1.272	19.72	0.0040						(0.002)			0.493			0.267	0.149	3.59		
215XHC2K	Hastelloy Type Alloy		Ni-Mo-Cr	0.005				0.0456			1.70	16.46		2.97			0.909	18.44	0.0091		(53.8)				0.0163			1.22			0.181	0.282	4.02		
215XHC3M	Hastelloy Type Alloy		Ni-Mo-Cr	0.111				0.0897			0.973	17.86	0.0988	4.84			0.685	17.38	0.0066				0.0211		0.0131			0.944			0.150	0.399	4.63		
215XHC4M	Hastelloy Type Alloy		Ni-Mo-Cr	(0.052)				0.141			0.709	18.44	0.331	6.01			0.441	16.93	0.071		(50.3)		0.0390		0.0222			1.15			(0.094)	0.491	4.99		
215XHC5V	Hastelloy Type Alloy		Ni-Mo-Cr	0.721				0.201			0.0460	20.05	0.485	8.15			0.100	16.03	0.0081		(45.9)		0.054		0.038			1.379			0.198	0.607	6.19		
55A	Haynes 242	N10242	Ni-Mo-Cr	0.24		0.005		0.03			0.04	7.9	0.03	1.09			0.33	25.4		0.02	(64.71)		0.003		0.001			0.11	(<0.01)	(0.01)	0.01	(<0.01)	0.09		(<0.02)
55B	Haynes 242	N10242	Ni-Mo-Cr	0.09		0.002		0.004	(<0.005)		0.036	8.25	0.013	1.12		0.011	0.323	24.62	0.016	0.08	65.4	0.0009	0.005	(<0.002)	0.001	(<0.0001)		0.021	(<0.001)	(0.08)	0.002	0.005	0.12		(0.005)

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Commercially Pure Nickel - Values listed in %

Part Number	Grade	UNS	Al	B	C	Ca	Co	Cr	Cu	Fe	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Si	Ti	V	Zn
50C	Ni 200	N02200	0.004	0.0027	0.015	(0.0012)	0.011	0.005	0.028	0.084	0.005	0.22	(0.0005)	0.002	99.4	(0.006)	0.0014	(0.001)	0.0012	0.031	0.026	(0.0006)	(0.00009)

High Purity Nickel - Values listed in PPM

Part Number	Grade	Type	Ag	Al	As	B	Be	Bi	C	Ca	Cd
187A	HPNI	Carbonyl Ni	0.1	11	0.1	(<5)	(<1)	(<0.1)	13	(<10)	(<0.1)
188A	HPNI-LO	Carbonyl Ni-Low	1.1	24	0.7	(<5)	(<1)	0.9	22	(<10)	0.2
189A	HPNI-MI	Carbonyl Ni-Mid	2.4	44	0.7	(<5)	(<1)	2.6	23	(<10)	0.8
190A	HPNI-HI	Carbonyl Ni-High	10.9	50	28	(<5)	(<1)	11.1	22	(<10)	5
191A	ELNI-HP	High Purity Electrolytic	0.1	1.5	13	(<5)	(<1)	(<0.1)	14	(<10)	



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

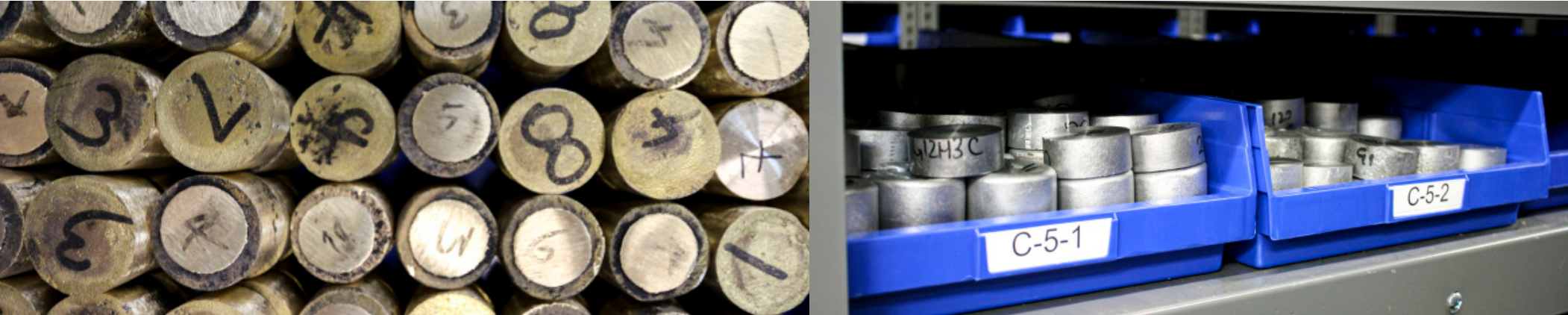
Cobalt Alloy

Cobalt Alloy

Part Number	Grade	UNS	Type	Al	As	B	Be	C	Ca	Co	Cr	Cu	Fe	Mg	Mn	Mo	N	Nb	Ni	O	P	S	Si	Sn	Ta	Ti	V	W	Zn	Zr
112X14943H	Stellite 8/BS 3531 Type		Co-Cr-Mo	(0.13)		0.0045		0.190			31.00	0.203	0.763		1.008	7.96	0.0284	0.099	0.151		0.0043	0.0197	0.201		(0.014)			0.051		
Co6B-18	Alloy 6B	R30016	Co	0.07	(<0.01)	(0.0006)		1.02	(<0.005)	58	30.5	0.016	2.68	(<0.01)	1.48	0.02	0.017	0.014	2.6	(0.001)	(0.004)	(<0.005)	0.62	(<0.01)	(<0.02)	0.007	0.011	3.92	(<0.01)	(<0.01)
CoElgiloy-18	Elgiloy	R30003	Co	0.011	(<0.022)	0.002	(<0.0001)	0.008	(0.0015)	40.4	20.4	0.005	12.6	(<0.002)	2.36	8.6	0.0034	0.006	15.9	0.009	0.0019	0.0018	0.05	(<0.0001)	(0.01)	0.004	0.009	0.008		(<0.001)
119XCOB1H			Co	0.056				0.0518			24.62	0.0607	15.14		0.513	0.416	0.094	0.398	22.11		0.0195	0.0099	0.492					11.99		
64A*	Ultimet 1233	R31233	Co-Cr	0.16				0.057		(55.38)	24.78	0.02	2.98		0.81	4.72	0.077	(<0.01)	8.92		0.006	0.002	0.34	(<0.01)	0.03	0.02	(<0.01)	1.83		(<0.01)
326A	Permendur 2V	R30005	Soft Magnetic	(0.003)	(<0.005)	(0.001)		(0.002)		48.4	(0.002)	(0.002)	49.6	(0.001)	0.003	(0.002)	0.0004	0.038	0.037	0.0082	0.0013	0.0011	0.029	(<0.001)	(0.01)	(0.002)	1.94	(0.001)		0.002

Zirconium Alloy

Part Number	Grade	UNS	Type	Al	C	Cr	Cu	Fe	H	Hf	In	Mn	Mo	N	Nb	Ni	O	S	Sn	Ta	Ti	V	W	Zr
Zr702-18	Grade 702	R60702		0.014	0.017	0.009	(0.001)	0.09	0.0011	0.84	(0.0005)	(0.0020)	(0.0010)	0.003	(<0.0001)	(0.0022)	0.141	(0.0002)	0.04	(0.0002)	0.004	(0.005)	(0.0001)	(98.78)
Zr705-18	Grade 705	R60705		(<0.01)	0.009	0.007	0.007	0.08	0.0012	0.38	(<0.0005)	(<0.005)	(<0.005)	0.005	2.53	(0.0021)	0.133	(0.0001)	(0.0200)	(0.0018)	(0.0015)	(0.0040)	(0.0001)	(96.76)



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Titanium Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Co	Cr	Cu	Fe	H	Hf	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	Pd	Ru	S	Sb	Si	Sn	Ta	Ti	V	W	Y	Zr
312B	Grade 1	R50250	Comm. Pure	0.018		<0.001		0.0092		<0.002	0.01	0.003	0.072	0.0004	(0.0004)	<0.002	(0.001)	0.003	0.007	(0.001)	0.019	0.128	<0.002		<0.005	<0.001	(0.0008)	(0.0003)	0.006	0.004	<0.005	(99.7)	0.009	<0.005	<0.001	0.0014
311A	Grade 2	R50400	Comm. Pure	0.32				0.009			0.013	0.0013	0.06	0.0021			0.0013	0.0012	0.012	(0.002)	0.014	0.083							0.005	0.002		(99.4)	0.004	(0.002)	(0.0002)	0.012
303B	Ti Grade 7	R52400	Comm. Pure	0.015		<0.001		0.035		<0.002	0.0018	0.002	0.12	0.0008	<0.003	<0.001	0.001	0.002	0.017	0.006	0.0013	0.176	<0.002		0.13	<0.01	<0.002		0.006	0.006	<0.005	(99.6)	0.0023	<0.002	<0.001	0.0028
361A	Ti Grade 12	R53400		0.013		(0.0005)		0.012		<0.002	0.008	0.003	0.095	0.0027	<0.004	<0.002	<0.05	0.288	0.006	(0.004)	0.88	0.15	<0.003		(0.002)	<0.006	<0.004		0.012	0.004	<0.005	(98.5)	0.006	<0.03	(0.0004)	0.0016
271A	Grade 6(5-2.5)	R54520	Alpha	5.28				0.026		(0.002)	0.016	0.004	0.31	0.013			0.002	0.011	0.012	(0.003)	0.035	0.016	(0.002)				(0.002)		0.021	2.49			0.09			0.015
271B	Grade 6(5-2.5)	R54520	Alpha	5.21		0.0012		0.0128		(0.0010)	0.01	0.0068	0.196	0.0139		(0.001)	0.0036	0.0063	0.013	0.005	0.0089	0.155	(0.0011)		(0.0011)	(0.003)	(0.001)		0.01	2.52	(0.0104)	(91.9)	0.057	(0.0021)	(0.00018)	0.059
Ti1023-18	Ti 10-2-3	R56410	Beta	3.31	<0.005	<0.005	<0.005	0.032	<0.005	(0.001)	0.016	0.006	1.98	0.002	<0.005	<0.005	0.0024	0.003	0.005	<0.01	0.009	0.109	<0.01	<0.01			<0.001	<0.025	0.018	(0.002)	<0.005	84.8	9.75	<0.005	<0.005	<0.005
344A	Ti 15-3-3-3	R58153	Meta Stable Beta	3.15		0.0011		0.011		(0.001)	3.09	0.002	0.2	(0.015)			(0.003)	0.004	0.005	(0.005)	0.011	0.107	(0.002)		(0.001)		(0.001)		0.03	3.09	(0.001)	(74.9)	15.3	(0.003)	<0.001	(0.002)
344B	Ti 15-3-3-3	R58153	Meta Stable Beta	3.03		<0.001		0.0095		<0.004	2.91	0.0024	0.118	0.007	<0.001	<0.004	0.003	0.006	0.016	(0.003)	0.021	0.118	<0.003	<0.001	<0.03	<0.02	<0.003	<0.001	0.03	3.01	<0.04	(76.0)	14.7	<0.03	<0.006	0.002
314A>	Ti 5-5-5-3		Near Beta	5.5				0.008		(0.003)	3.09	0.002	0.46	0.004			0.002	4.78	0.0034		0.022	0.155	(0.005)					0.02	(0.01)		(81)	4.98		(0.0003)	0.002	
Ti6242-18	Ti 6-2-4-2	R54620	Near-Alpha	6.11	<0.005	<0.01		0.007	<0.005	<0.005	(0.002)	(0.003)	0.025	0.0022	<0.005	<0.01	<0.005	2.02	0.004	<0.01	0.0038	0.121	(0.003)	<0.01			<0.01	<0.001	0.077	2.06	<0.001		(0.0017)	<0.005	<0.005	4.05
269B	Ti 8-1-1	R54810	Near Alpha	7.86		<0.001		0.014		<0.0005	0.0014	0.0023	0.071	0.007		<0.0001	0.0071	0.98	0.006	0.004	(0.001)	0.09	(0.003)		<0.005	(0.004)	(0.003)		0.025	0.008	<0.005	(89.9)	1.03	(0.001)	<0.001	0.002
367A	Ti 2-1.5		Pseudo-Alpha	2.02		<0.001		0.014		<0.002	0.012	0.002	0.064	0.003	<0.001	<0.001	1.61	0.0023	0.0074	<0.01	0.013	0.105	<0.005	<0.001	<0.01	<0.01	(0.0012)	<0.0005	0.011	0.0019	<0.005	(96.1)	0.005	<0.002	<0.001	0.003

Titanium Alpha-Beta Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Co	Cr	Cu	Fe	H	Hf	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	Pd	Ru	S	Sb	Si	Sn	Ta	Ti	V	W	Y	Zr
Ti64ELI-18	"Grade 23	R50250	Comm. Pure	0.018		(<0.001)		0.0092		(<0.002)	0.01	0.003	0.072	0.0004	(0.0004)	(<0.002)	(0.001)	0.003	0.007	(0.001)	0.019	0.128	(<0.002)		(<0.005)	(<0.001)	(0.0008)	(0.0003)	0.006	0.004	(<0.005)	(99.7)	0.009	(<0.005)	(<0.001)	0.0014
(6-4ELI)"	R56407	Alpha-Beta	6.11	(<0.005)	(<0.01)	(<0.005)	0.033	(<0.005)	(<0.0002)	0.004	0.002	0.167	0.0021	(<0.01)	(<0.01)	0.0014	(0.002)	0.006	(0.003)	0.003	0.118	(<0.005)	(<0.01)			(0.0005)	(0.001)	0.014	0.022	(<0.01)		4.01	(0.0005)	(<0.01)	(0.002)	0.012
Ti42515-18	"Grade 38	R52400	Comm. Pure	0.015		(<0.001)		0.035		(<0.002)	0.0018	0.002	0.12	0.0008	(<0.003)	(<0.001)	0.001	0.002	0.017	0.006	0.0013	0.176	(<0.002)		0.13	(<0.01)	(<0.002)		0.006	0.006	(<0.005)	(99.6)	0.0023	(<0.002)	(<0.001)	0.0028
(4-2.5-1.5)"	R54250	Alpha-Beta	3.99				0.0067			0.015	0.0022	1.58	0.0018			0.006	0.0014	0.0026	0.0016	0.009	0.25							0.011	0.004			2.53			0.0019	0.0016
175D	Grade 5 (6-4)	R56400	Alpha-Beta	6.38		(0.0008)		0.008			0.015	0.002	0.22	0.0028			0.002	0.003	0.03	(0.008)	0.016	0.177							0.009	0.01		(89.2)	4	(0.002)	(0.001)	(0.002)

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Titanium Alpha-Beta Alloy

Titanium Alpha-Beta Alloy

Part Number	Grade	UNS	Type	Al	As	B	Bi	C	Ca	Co	Cr	Cu	Fe	H	Hf	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	Pd	Ru	S	Sb	Si	Sn	Ta	Ti	V	W	Y	Zr
Ti64-18	Grade 5 (6-4)	R56400	Alpha-Beta	6.52	<(0.01)		<(0.005)	0.034	<(0.005)	(0.0004)	0.013	(0.002)	0.19	0.0031	<(0.01)	<(0.01)	(0.001)	0.004	0.025	(0.004)	0.011	0.181	<(0.005)	<(0.01)	<(0.001)	<(0.01)	<(0.001)	<(0.02)	0.011	0.003	(0.0002)		4.08	(0.0002)	<(0.005)	<(0.01)
261A	"Grade 9	R56410	Beta	3.31	<(0.005)	<(0.005)	<(0.005)	0.032	<(0.005)	(0.001)	0.016	0.006	1.98	0.002	<(0.005)	<(0.005)	0.0024	0.003	0.005	<(0.01)	0.009	0.109	<(0.01)	<(0.01)			<(0.001)	<(0.025)	0.018	(0.002)	<(0.005)	84.8	9.75	<(0.005)	<(0.005)	<(0.005)
(3-2.5)"	R56320	Alpha-Beta	3				0.007		(0.001)	0.013	0.002	0.19	0.0023			0.0011	0.003	0.007	(0.01)	0.006	0.1				(0.001)		0.012	0.008			2.48		(0.001)	(0.002)	(0.002)	
261B	"Grade 9	R58153	Meta Stable Beta	3.03		<(0.001)		0.0095		<(0.004)	2.91	0.0024	0.118	0.007	<(0.001)	<(0.004)	0.003	0.006	0.016	(0.003)	0.021	0.118	<(0.003)	<(0.001)	<(0.03)	<(0.02)	<(0.003)	<(0.001)	0.03	3.01	<(0.04)	(76.0)	14.7	<(0.03)	<(0.006)	0.002
(3-2.5)"	R56320	Alpha-Beta	2.98		0.0004		0.011		<(0.004)	0.016	0.003	0.19	(0.001)			(0.003)	0.004	0.004	(0.002)	0.023	0.083	(0.004)		(0.001)	(0.0004)		0.008	0.004		(94.4)	2.23	(0.003)	(0.0004)	0.002	0.002	
261C	"Grade 9	R54620	Near-Alpha	6.11	<(0.005)	<(0.01)		0.007	<(0.005)	<(0.005)	(0.002)	(0.003)	0.025	0.0022	<(0.005)	<(0.01)	<(0.005)	2.02	0.004	<(0.01)	0.0038	0.121	(0.003)	<(0.01)			<(0.01)	<(0.001)	0.077	2.06	<(0.001)		(0.0017)	<(0.005)	<(0.005)	4.05
(3-2.5)"	R56320	Alpha-Beta	3.05		0.0004		0.011		(0.005)	0.014	0.003	0.18	0.001			(0.003)	0.004	0.005	(0.003)	0.016	0.085	(0.003)		(0.002)	(0.001)	(0.001)		0.007	0.006		(94.1)	2.46	(0.001)	(0.0004)	0.003	0.002
261D	Grade 9 (3-2.5)	R56320	Alpha-Beta	3.02		0.0003		0.011		<(0.001)	0.016	0.0028	0.185	(0.0005)			(0.002)	0.003	0.0051	(0.003)	0.018	0.083	<(0.004)		(0.002)	(0.0005)	(0.001)		0.008	0.005	(0.0005)	(94.2)	2.5	(0.001)	(0.0005)	0.003
261E	"Grade 9																																			
(3-2.5)"	R56320	Alpha-Beta	3.05		0.0003		0.012		(0.0004)	0.016	0.0025	0.18	(0.0005)			(0.001)	0.003	0.006	(0.005)	0.018	0.084	<(0.003)		(0.002)	(0.001)	(0.001)		0.007	0.005		(94.1)	2.51	(0.001)	(0.001)	(0.003)	
280A	Ti 4-4-2		Alpha-Beta	4.11				0.005		(0.002)	0.0055	0.003	0.044	0.0015			(0.002)	4.01	0.0014	(0.001)	0.012	0.19			(0.002)		(0.001)		0.47	2.07		(88.7)	0.023		(0.0003)	0.002
345A	Ti 5-2-2-4-4	R58650	Alpha-Beta	5.12		(0.001)		0.01		(0.002)	3.89	0.002	0.121	0.004			0.0009	4.09	0.0025	(0.002)	0.015	0.12	(0.002)		(0.002)		(0.001)		0.013	1.99	(0.003)	(82.8)	0.005	(0.002)	0.0003	1.9
337A	Ti 6-2-2-2-2	R56222	Alpha-Beta	5.6		(0.001)		0.008		0.0011	2.01	0.002	0.114	0.005				2.05	0.0017	(0.004)	0.011	0.104					(0.001)		0.14	1.96		(86.0)	(0.003)	(0.003)	(0.0004)	1.89
336A	Ti 6-2-4-6	R56260	Alpha-Beta	5.9		(0.001)		0.005		0.002	0.002	0.002	0.115	0.0022				6.16	0.0015		0.002	0.102					(0.002)		0.019	2.03		81.7	0.005	(0.004)	(0.0003)	3.92
336B	Ti- 6-2-4-6	R56260	Alpha-Beta	6.04		(0.001)		0.006		(0.002)	(0.001)	0.002	0.132	0.0029				6.16	0.0016		0.002	0.101	(0.002)				(0.002)		0.02	2.04		81.4	0.004	(0.005)	(0.0002)	4.12
178C	Ti 6-6-2	R56620	Alpha-Beta	5.44		0.001		0.022		(0.003)	0.014	0.61	0.66	0.0025			0.002	0.012	0.011	<(0.01)	0.013	0.168	(0.003)		(0.003)	(0.002)	(0.002)		0.045	1.98	<(0.002)	(85.8)	5.41		(0.001)	0.0038
178D	Ti 6-6-2	R56620	Alpha-Beta	5.49		(0.001)		0.028		0.005	0.031	0.52	0.55	0.0016			0.003	0.1	0.017	(0.01)	0.067	0.17	(0.002)		(0.003)	(0.001)	(0.001)		0.053	1.84	(0.001)	(85.8)	5.47	(0.001)	(0.001)	0.026
Ti662-18	Ti 6-6-2	R56620	Alpha-Beta	5.61				0.007			0.046	0.46	0.51	0.0089			0.005	0.0031	0.021		0.039	0.19							0.011	2.01		85.8	5.35			0.0011
300A	Ti 6-7	R56700	Alpha-Beta	5.96		(0.0008)		0.007		(0.001)	0.0097	0.0039	0.191	0.0018		(0.0004)	0.0012	(0.001)	0.0033	6.86	0.0081	0.162	(0.001)						0.018	0.007	0.004	86.71	0.005	<(0.002)	(0.0004)	0.003
300B	Ti 6-7	R56700	Alpha-Beta	6.09		(0.0012)		0.0081		(0.002)	0.0174	0.014	0.175	0.0025		<(0.002)	0.006	0.0013	0.003	6.84	0.012	0.171	<(0.004)		(0.005)		(0.001)		0.016	0.004	0.005	(86.3)	0.004	<(0.005)	<(0.005)	0.013
300C	Ti 6-7	R56700	Alpha-Beta	5.97		(0.0006)		0.01		(0.001)	0.008	0.003	0.181	(0.0006)		<(0.001)	(0.003)	0.0023	0.0061	6.8	0.014	0.174	<(0.001)	<(0.0001)	<(0.005)		(0.0005)	(0.0005)	0.018	(0.006)	(0.005)	(86.7)	0.03	<(0.002)	(0.002)	(0.005)
300D	Ti 6-7	R56700	Alpha-Beta	6.06		(0.001)		0.01		(0.004)	0.006	0.003	0.183			<(0.001)	<(0.005)	0.0019	0.005	6.82	0.013	0.166	<(0.002)	<(0.0005)	<(0.005)	<(0.001)	(0.001)	(0.0004)	0.021	(0.005)	(0.005)	(86.7)	0.03	<(0.002)	(0.003)	(0.005)
300E	Ti 6-7	R56700	Alpha-Beta	6.16		<(0.002)		0.008		(0.004)	0.007	<(0.02)	0.17	(0.001)	<(0.001)	<(0.001)	<(0.02)	0.0028	0.0059	6.85	0.011	0.18	<(0.001)	<(0.0001)	<(0.001)	<(0.01)	<(0.001)	<(0.001)	0.017	0.005	(0.006)	(86.5)	0.03	<(0.002)	0.003	<(0.02)

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
102A	AA 2014	A92014	Al-Cu		(0.001)	0.003	0.027	0.003			0.043	4.51	0.48	0.028		0.45	0.77		0.04	0.005	0.034		0.89	0.036		0.051	0.024	0.053	0.011
103A	AA 2018	A92018	Al-Cu		(0.001)	0.004	0.027	0.005			0.011	4.16	0.38	0.026		0.65	0.02		2.16	0.003	0.026		0.5	0.027		0.036	0.01	0.033	0.011
104A	AA 2024	A92024	Al-Cu		(0.002)	0.004	0.015	0.007			0.016	4.66	0.25	0.026		1.65	0.65		0.03	0.002	0.025		0.31	0.02		0.03	0.01	0.017	0.012
104B	AA 2024	A92024	Al-Cu	(0.0005)	0.0016	0.00021	(<0.002)	(<0.002)	(<0.0002)	(0.0005)	0.0088	4.63	0.262	0.011		1.56	0.645		0.0053	(<0.005)	0.014	(<0.02)	0.15	0.003		0.056	0.006	0.065	0.001
343A	AA 7055	A97055	Al-Cu	(<0.003)	0.0007	(<0.004)	(<0.009)	0.0024	(0.0002)	(0.0008)	0.0009	2.29	0.084	0.012		2.04	0.002		0.005	0.001	0.0012	(<0.004)	0.05	(<0.005)		0.0175	0.0058	8.15	0.152
56X G2000J1 C			Al-Cu	0.0048			0.008			0.00044	0.0007	3.29	0.086		(0.0001)	1.70	1.27		0.0046		0.022		0.099	0.099		0.0053	0.0097	0.864	0.293
56X G2000J2 C			Al-Cu	0.0446		0.0054	0.078			0.056	0.0200	3.73	1.38		0.0112	1.292	0.937		0.149		1.114		0.517	0.092		0.096	0.170	0.711	0.188
56X G2000J3 C			Al-Cu	0.0105		0.0039	0.152			0.108	0.0573	4.78	0.382		0.0019	1.018	0.589		0.091		0.375		0.773	0.0157		0.196	0.0099	0.114	0.0268
56X G2000J4 C			Al-Cu	0.0122			0.0049			0.0247	0.053	5.02	0.705		0.0025	0.505	0.271		0.089		0.879		1.33	0.0092		0.135	0.0132	0.0131	0.105
56X G2000J5 C			Al-Cu	0.234		0.0050	0.136			0.077	0.0078	5.52	0.98		0.009	0.39	0.007		0.204		0.69		0.321	<0.005		0.063	0.027	0.368	0.064
56X G14H4 C			Al-Cu							0.0288	0.0309	3.82	0.251			1.72	0.122		2.37		0.050		0.504	0.037		0.069	0.0252	0.091	
56X G2007 A			Al-Cu				0.147	0.0051			0.0354	3.699	0.252			0.663	0.605		0.0087		0.889		0.328	0.0676		0.0236		0.386	0.0020
56X G2011 A			Al-Cu				0.527				0.0031	5.70	0.632			0.0102	0.0183		0.0044		0.332		0.089	0.0037		0.0121		0.0188	
56X G2014 A			Al-Cu				0.0013				0.0766	4.41	0.243			0.453	0.572		0.0070		0.0110		0.611	(0.0047)		0.0244		0.195	0.135
56X G2024 A			Al-Cu								0.0389	4.34	0.178			1.509	0.658		0.0055		0.0010		0.122	0.0010		0.0099	0.0070	0.0446	0.0053
56X G250J1 C			Al-Cu			<0.0005				0.008	0.0067	3.82	0.41			0.075	0.040		1.33		0.101	(0.003)	0.26	0.125		0.008	0.102	0.28	(0.003)
56X G250J2 D			Al-Cu							0.195	0.063	4.81	0.346			0.060	0.225		1.10		(0.0016)	0.324	0.211	(0.004)		0.210	0.018	0.155	0.247
56X G250J3 C			Al-Cu			0.0014				0.264	0.024	4.90	0.079			(0.001)	0.278		0.92		0.024	0.35	0.11	0.031		0.162	0.036	0.103	0.275
56X G250J5 D			Al-Cu			0.0022				0.34	0.047	4.36	0.535			0.022	0.150		1.77		0.076	0.076	0.205	0.097		0.051	0.021	0.086	0.22
56X G2618 A			Al-Cu					0.0020			0.0165	2.45	1.057			1.625	0.0394		0.953		0.0020		0.175	0.0007		0.069	0.0162	0.0139	0.0011
56X A201.1 A		A12010	Al-Cu-Ag	0.494							0.0029	4.49	0.089			0.198	0.310		0.0066		0.0020		0.193	(0.0025)		0.132		0.0113	
57X AlCu25 A			Al-Cu-Si									25.08	0.42			0.0012	0.0035		0.0017				5.78	0.0024				5.89	
57X AlCu28 A			Al-Cu-Si									27.78	0.22			0.0020	0.0032		0.0030				5.44	0.0023				5.42	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
57X G12H1 C			Al-Cu-Si			0.0019			0.012	0.113	0.069	5.54	0.88		0.008	0.40	0.032		0.31		0.016		2.52	0.095		0.114	0.15	1.03	0.07
57X G12H2 C			Al-Cu-Si		(0.003)				0.0025	0.0391	0.0148	7.96	1.021			0.336	0.0900		0.309		0.12		2.79	0.202		0.0081	0.0027	0.999	0.0111
57X G12H3 C			Al-Cu-Si			0.0016			0.0055	0.039	0.086	8.69	0.350			0.296	0.117		0.479		0.092		1.48	0.132		0.196	0.0126	0.554	(0.001)
57X G12H5 G			Al-Cu-Si			0.003			0.023	0.054	0.016	12.2	0.19	0.017		0.028	0.073		0.11		0.068	0.066	0.55	0.067		0.036	0.033	0.072	0.045
57X G12H6 A			Al-Cu-Si			(0.0003)			0.0028	0.0247	0.054	8.28	0.85			0.292	0.223		0.387		0.110		1.63	0.108		0.108	0.0143	6.74	0.0262
57X G12H7 A			Al-Cu-Si		0.0093				0.0002	0.0483	0.0221	4.75	0.369			0.020	0.0327		0.0380		0.030		1.21	0.0307		0.0565	0.0111	0.384	0.0328
106A	AA 5052	A95052	Al-Mg		(0.001)	0.004	0.021	0.008			0.198	0.05	0.32	0.029		2.59	0.07		0.03	0.003	0.03		0.1	0.024		0.039	0.01	0.04	0.012
107A	AA 5083	A95083	Al-Mg		(0.001)	0.004	0.028	0.005			0.14	0.08	0.38	0.029		4.75	0.789		0.03	0.001	0.025		0.18	0.021		0.034	0.01	0.041	0.016
108A	AA 5356	A95356	Al-Mg		(0.001)	0.004	0.02	0.006			0.062	0.04	0.2	0.029		5.08	0.111		0.02	0.001	0.025		0.13	0.021		0.09	0.01	0.02	0.011
109C	AA 6061	A96061	Al-Mg	(0.0004)	(0.0012)	(0.001)	0.003	0.002	(0.0003)	(0.0006)	0.102	0.302	0.529	0.013		0.83	0.108		0.0123	(0.002)	0.0072	(<0.005)	0.616	0.004		0.0176	0.009	0.121	0.0018
Al6061-18	AA 6061	A96061	Al-Mg	(<0.002)	(0.0008)	(<0.0001)	(<0.007)	(0.0020)	(0.0001)		0.103	0.271	0.31	(0.0122)		0.88	0.105	(<0.001)	0.0081	(0.003)	0.0023	(<0.01)	0.67	0.005		0.016	0.013	0.023	0.0022
111A	AA 7075	A97075	Al-Mg		(0.002)	0.004	0.021	0.008			0.208	1.73	0.87	0.029		2.75	0.045		0.03	0.001	0.021		0.17	0.018		0.094	0.02	5.764	0.006
111B	AA 7075	A97075	Al-Mg	(<0.002)	(0.0008)	0.00087	(<0.002)	(0.001)	(0.0003)	(0.0005)	0.205	1.38	0.225	0.008		2.2	0.093		0.0098	(<0.0040)	0.0063	(<0.015)	0.192	(0.002)		0.0427	0.0035	5.7	0.0132
511X G05H1 J			Al-Mg						0.0071		0.245	0.319	0.730	0.0096		1.99	0.0111		0.120		0.0132		0.397	0.203		0.201	0.071	0.230	0.0022
511X G05H2 H			Al-Mg		0.0083	0.0018			0.0023		0.172	0.188	0.641			3.58	0.124		0.157		0.049		0.299	0.0495		0.068	0.0248	0.372	0.0105
511X G05H3 H			Al-Mg			0.0074					0.095	0.093	0.41			3.97	0.40		0.090		0.107		0.21	0.096		0.25		0.092	
511X G05H4 F			Al-Mg			0.014					0.029	0.056	0.14			5.1	0.55		0.040		0.15		0.11	0.14		0.048		0.062	
511X G05H5 G			Al-Mg		0.0011	0.0004			0.0115		0.0306	0.0365	0.081			8.99	1.273		0.0124		0.247		0.0626	0.0112		0.0246	0.0216	0.131	0.100
511X G10H4 C			Al-Mg			0.0061					0.083	0.163	0.193			10.24	0.228		0.117		0.080		0.244	0.075		0.155		0.117	
511X G10H5 B			Al-Mg			0.0274					0.0017	0.0227	0.057		0.0032	13.97	0.098		0.036		0.165		0.050	0.013		0.0052		0.029	
511X G3000B1 C			Al-Mg								0.0972	0.287	0.669	0.051		0.253	0.752		0.142		0.145		0.788	0.163		0.0327	0.054	0.0347	
511X G3000B2 B			Al-Mg			0.0017			(0.0007)	0.007	0.200	0.20	0.335	0.012	0.017	0.68	0.81	(0.059)	0.063		0.137		0.23	0.105		0.111	<0.005	0.098	
511X G3000B3 B			Al-Mg			0.005			(0.001)	0.008	0.056	0.120	0.376	0.014		0.80	1.06	(0.093)	0.116		0.062		0.35	0.028		0.22	<0.005	0.140	

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Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
511XG3000B4C			Al-Mg			0.0140					0.0121	0.086	0.440	0.0284		1.267	0.916		0.0347		0.0285		0.130	0.0456		0.052	0.0199	0.058	
511XG5083A			Al-Mg				0.0016				0.237	0.042	0.363			3.98	0.592		0.0094		0.0069		0.22	0.0015		0.0294	0.0092	0.0488	0.0011
511XG6061A			Al-Mg								0.200	0.260	0.304	0.0160		0.896	0.0721		0.0044		0.0014		0.696	0.0012		0.0204	0.0138	0.0105	
511XG6063A			Al-Mg								0.0021	0.0014	0.185			0.437	0.0239		0.0021		0.0011		0.412	(0.001)		0.011	0.0087	0.0062	
511XG6082A			Al-Mg								0.0606	0.0184	0.081			0.759	0.534		0.0035		0.0012		0.753	0.0011		0.0278		0.054	
511XG6082B			Al-Mg				(0.0007)				0.0055	0.0141	0.180			0.660	0.566		0.0044		(0.001)		0.910	(0.001)		0.0158		0.0016	
511XG6012		A96012	Al-Mg w/ Bi, Sn and Pb			0.0072	0.552				0.269	0.114	0.285			1.10	0.910		0.0154		1.10		1.35	0.040		0.016		0.255	0.032
511XG6012A		A96012	Al-Mg w/ Bi, Sn and Pb			0.0110	0.701				0.0223	0.351	0.71			0.712	0.424		0.048		0.211		0.768	1.88		0.197		0.060	0.0480
511XG6023A		A96023	Al-Mg w/ Bi, Sn and Pb			0.0020	0.353				0.0054	0.451	0.51			0.512	0.556		0.036		0.0110		1.21	1.037		0.0117		0.0260	0.0110
511XG6026A		A96026	Al-Mg w/ Bi, Sn and Pb		0.0017		0.498				0.0706	0.413	0.470	0.0092		0.692	0.703		0.0075		0.277		0.898	0.0043		0.0255	0.0066	0.0775	0.0030
511XG6065A		A96065	Al-Mg w/ Bi, Sn and Pb			0.0011	1.27				0.0759	0.214	0.74			1.180	0.131		0.0144		0.0310		0.495	0.0251		0.112		0.164	0.144
511XG6262A		A96262	Al-Mg w/ Bi, Sn and Pb			0.0011	0.444				0.121	0.267	0.58			0.881	0.163		0.028		0.0081		0.649	0.539		0.045		0.198	0.0051
511XG6262B		A96262	Al-Mg w/ Bi, Sn and Pb				0.424				0.0666	0.243	0.329			0.829	0.0737		0.0034		0.499		0.557	(0.001)		0.0194		0.0209	
105A	AA 3003	A93003	Al-Mn		(0.001)	0.003	0.017	0.003			0.019	0.09	0.66	0.028		0.01	1.08		0.04	0.005	0.023		0.25	0.022		0.023	0.01	0.038	0.013
514X9091.1C			Al-Mn								<0.005	0.046	0.081			(0.001)	6.93		(0.0026)		0.016		0.035	0.013		0.0017		0.029	0.184
110A	AA 6253	A96253	Al-Si		(0.001)	0.005	0.03	0.007			0.259	0.04	0.29	0.028		1.36	0.025		0.03	0.003	0.03		0.65	0.026		0.046	0.01	2.104	0.016
112A	AA 4343	A94343	Al-Si		(0.003)	0.004	0.015	0.004			0.021	0.06	0.5	0.029		0.03	0.048		0.04	0.003	0.02		7.49			0.05	0.01	0.049	0.015
113A	AA 4032	A94032	Al-Si		(0.001)	0.004	0.022	0.004			0.031	0.94	0.47	0.031		1.18	0.033		0.97	0.002	0.03		11.38	0.027		0.057	0.02	0.033	0.008
114A	AA 4643	A94643	Al-Si		(0.001)	0.004	0.019	0.005			0.028	0.04	0.16	0.028		0.1	0.041		0.04	0.005	0.02		3.82	0.017		0.052	0.01	0.031	0.008
115A	AA 4145	A94145	Al-Si		(0.002)	0.004	0.028	0.004			0.05	4.24	0.55	0.028		0.04	0.052		0.03	0.003	0.028		10.13	0.024		0.061	0.03	0.051	0.007
116A	AA 4043	A94043	Al-Si		(0.002)	0.004	0.023	0.006			0.027	0.05	0.34	0.03		0.05	0.05		0.06	0.004	0.029		5.21	0.029		0.046	0.02	0.05	0.007
54XG06H1R			Al-Si				0.006		0.0074	0.015	0.084	0.630	1.08		<0.001	0.489	0.022		0.611		0.082		8.43	0.133		0.248	0.010	0.60	
54XG06H3P			Al-Si				0.0067		0.0048	0.0208	0.0530	0.322	0.510			0.202	0.345		0.214		0.0203		9.94	0.0488		0.079	0.0278	0.0270	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
54X G06H4 R			Al-Si					0.0024	0.0028	0.117	0.0132	0.128	0.262	0.0057	0.0018	0.123	0.502		0.124		0.040		11.96	0.0057	0.0024	0.121	0.0604	0.124	
54X G06H5 L			Al-Si						(0.0002)		0.026	0.0229	0.210		(0.0001)	(0.0022)	0.85		0.0067		(0.0020)		13.76	0.022		0.0106	0.008	0.225	
54X G13H1 N			Al-Si			0.0078	<0.001			0.0051	0.062	1.87	0.801			2.89	0.0137		1.83		0.240		8.91	0.260	<0.001	0.112		0.37	<0.005
54X G13H2 M			Al-Si			...				0.004	0.103	1.29	0.767			1.37	0.248		1.15		0.083		10.42	0.145		0.166		0.530	
54X G13H3 M			Al-Si			0.0075				0.009	0.060	0.82	0.79			0.89	0.43		0.95		0.050		10.2	0.092		0.152		0.42	(0.004)
54X G13H4 Q			Al-Si			0.0018		(0.0015)		0.0048	0.283	0.688	0.534			0.644	0.227		0.789		0.062		12.41	0.060	(0.037)	0.109		0.443	0.0165
54X G13H4 R**			Al-Si			0.0022		0.0035		0.010	0.032	0.68	0.39	0.01		0.64	0.59		0.75		0.047		12.2	0.047	0.043	0.091	0.003	0.195	0.019
54X G13H5 L			Al-Si			0.0049				0.0016	0.044	0.216	0.715			0.092	0.119		0.115		0.013		13.26	0.009	(0.033)	0.032		0.070	
54X G231H1 E			Al-Si			0.0018					0.107	1.141	0.945			0.336	0.0568		0.349		0.096		10.52	0.156	(0.009)	0.0233		0.726	
54X G231H1 F			Al-Si			(0.0001)		0.0075			0.116	1.063	0.892			0.339	0.0111		0.295		0.147		9.50	0.169	0.0041	0.0290		0.624	
54X G231H2 C			Al-Si			0.0146					0.0469	0.868	0.131			0.159	0.191		0.171		0.082		11.6	0.127	(0.0006)	0.085		0.397	
54X G231H3 C			Al-Si			0.0003					0.0630	0.420	0.393			0.039	0.477		0.0932		0.0080		13.17	0.0139		0.128		0.130	
54X G25D1 L			Al-Si			0.0011	0.112				0.140	0.010	0.721			0.67	0.815		0.262		(0.0033)		3.37	<0.005		0.099	0.016	0.359	(0.004)
54X G25D2 K			Al-Si			0.049	0.22		0.011	0.105	0.150	0.130	0.576			0.59	0.479		0.139		0.073		3.93	0.042		0.152	(0.006)	0.169	
54X G25D3 T			Al-Si			0.0022				0.0086	0.0413	0.119	0.379			0.386	0.256		(0.038)		0.050		6.29	0.046	(0.04)	0.067	0.0047	0.102	
54X G25D4 P			Al-Si			0.0067	0.0705		0.0070	0.0204	0.043	0.148	0.14			0.151	0.195		0.0665		0.142		7.22	0.076		0.0978	0.0542	0.207	
54X G25D6 A			Al-Si			0.0220					0.0009	0.0021	0.080	0.0027		0.715	0.0096		0.0044		(0.003)		5.97	(0.002)		0.0071	0.0133	0.0050	
54X G25DX A			Al-Si					0.0048			0.0053	0.0200	0.0792	0.0209		0.402	0.0302		0.0084		0.0018		7.20	0.0011		0.1519	0.0080	0.0354	0.0065
54X GS20J1 E			Al-Si			(0.0001)					0.115	0.308	0.79			0.186	0.097		0.159		0.120		18.8	0.130	<0.0001	0.129		0.43	
54X GS20J2 E			Al-Si			<0.0001					0.066	0.168	0.56			0.178	0.059		0.091		0.066		18.7	0.075	<0.0001	0.082		0.305	
54X GS20J3 D			Al-Si			<0.0001					0.0017	0.079	0.328			0.118	0.302		(0.003)		0.077		23.9	(0.012)	<0.0001	0.0055		0.030	
54X GS20J4 D			Al-Si			0.0017					0.194	(0.0037)	0.227			0.0050	0.146		0.265		0.0014		25.5	(0.0021)	(0.002)	0.107		0.224	
55XA30J1 J**			Al-Si			0.0047	0.017	0.0032		0.075	0.007	5.04	1.13			0.87	0.105		0.0095	0.0025	0.145		14.9	0.009		0.21	0.0114	0.14	

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Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
55X A30J4 G			Al-Si								0.0752	3.21	0.511			0.508	0.350		0.164	(0.003)	0.0257		16.4	0.0190		0.0231	0.020	0.067	
55X A30J5 A			Al-Si			0.0029	0.0100	0.0053		0.0396	0.069	4.51	0.727			0.722	0.213		0.209	0.016	0.084		17.08	0.0776		0.070		0.693	
55X G02D10 L			Al-Si			0.0389			0.0012	0.0544	0.128	4.59	0.975			0.0206	0.0524		0.645		0.022	0.0086	7.33	0.138		0.0302	0.0341	2.77	
55X G02D5 A			Al-Si			0.0037			0.0182	0.0752	0.760	0.406	0.557			0.331	0.391		0.0652		0.067	0.031	10.03	0.051		0.0180	0.0129	0.131	
55X G02D6 K			Al-Si			0.0026			0.0115	0.0195	0.366	0.510	0.528			0.376	0.300		0.0511		0.0580	0.0150	11.55	0.0355		0.055	0.0182	0.577	
55X G02D7 P			Al-Si			0.0001		0.0070	0.0008	0.0378	0.0558	1.489	1.02			0.343	0.493		0.209		0.352	0.0021	10.24	0.171		0.214	0.0242	0.908	
55X G02D8 M			Al-Si			0.0008			0.0029	0.0107	0.0756	2.481	0.776			0.1517	0.256		0.406		0.201	0.0112	9.24	0.201		0.1535	0.0536	1.415	
55X G02D9 K			Al-Si			0.0035	0.033		0.0012	0.0074	0.185	3.51	0.423			0.093	0.269		0.494		0.10	0.049	8.49	0.187		0.096	0.0223	2.48	
55X G02DX B			Al-Si	0.0046			0.0168	0.0021	0.0007	0.0096	0.0308	2.198	0.762			0.115	0.244		0.207	0.0019	0.0319		9.45	0.0285		0.0553	0.0119	0.989	0.0109
55X G02DY A			Al-Si	0.0102		0.0012	0.0100	(0.001)	0.0032	0.0195	0.063	3.67	0.591			0.309	0.107		0.109	(0.01)	0.0620		11.31	0.0747		0.0687	0.0250	0.153	0.0218
55X G04H10 D			Al-Si				0.029			0.043	0.090	1.36	0.512	0.011	(0.001)	0.004	0.532		0.0232		(0.0074)		7.21	<0.01		0.0097	0.008	2.26	
55X G04H6 E			Al-Si				0.029		0.0039	0.0024	0.126	5.56	0.83		0.019	0.151	0.028		0.77		0.221		3.30	0.181		0.126	0.014	0.199	
55X G04H7 E			Al-Si				0.022		0.0073	0.030	0.035	4.65	0.633		0.0066	0.263	0.212		0.500		0.227		4.43	0.174		0.0476	0.0057	0.537	
55X G04H8 J			Al-Si				0.007		0.0055	0.0160	0.0301	2.86	0.529		0.0033	0.126	0.255		0.197		0.128		4.96	0.0809		0.179	0.0214	0.998	
55X G04H9 E			Al-Si				(0.0037)		0.0018	0.0114	0.0172	2.70	0.393		(0.0028)	0.043	0.436		0.160		0.101		6.60	0.0563		0.117	0.0188	1.70	
55X G04HX A			Al-Si	0.0030		0.0006	0.0058	0.0011	0.0048	0.0060	0.0165	3.40	0.280			0.063	0.193		0.302	(0.002)	0.0125	0.0053	5.78	0.0112		0.176	0.0183	0.492	0.0278
55X G26H1 F			Al-Si				0.07			0.022	0.20	4.34	1.78			0.29	0.015		0.012		0.24		7.69	(0.008)		0.21	0.012	1.14	
55X G26H2 F			Al-Si				0.035		(0.0024)	0.052	0.083	4.14	0.71			1.49	0.52		0.41		0.111		9.36	0.110		0.120	0.011	0.64	
55X G26H3 F			Al-Si							0.076	0.130	2.19	1.07			1.01	0.45		0.51		0.23		9.6	0.16		0.147	0.020	0.79	
55X G26H4 D			Al-Si				(0.025)				0.0623	3.72	0.511			1.64	0.165		0.909		0.120		10.37	0.234		0.304	0.0189	0.286	
55X G26H5 E			Al-Si				0.0201			0.015	0.0394	1.40	0.199			1.41	0.495		1.13		0.0108		11.38	0.035		0.018	0.0169	0.008	
55X G28J1 Z			Al-Si							0.119	0.319	1.82	0.678			1.26	0.024		2.47	(0.0048)	0.0036		14.33	0.182		0.104	0.0095	0.258	
55X G28J2 T			Al-Si			(0.0002)			0.0023	0.0029	0.088	1.44	0.516			0.0902	0.231		1.63		0.058	0.030	15.04	0.136		0.065	0.0221	0.292	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Aluminum Alloy

Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
55X G28J3 U			Al-Si								0.09	1.45	0.43			1.30	0.33		1.47		0.07		21.6	0.11		0.07		0.30	
55X G28J4 T			Al-Si							0.079	0.040	0.82	0.52			0.60	0.45		0.84	(0.002)	0.094		20.4	0.041		0.28	0.010	0.32	
55X G28J5 Y			Al-Si								0.009	0.69	0.26			0.73	0.67		0.43	<0.005	0.18		27.6	0.03		0.24		0.015	
55X G900J1 F			Al-Si			0.0011	0.071				0.0012	0.91	0.549			0.966	0.0133		0.0048		0.202		0.127	0.348		0.0056	0.0108	0.152	0.0236
55X G900J2 G			Al-Si			0.0035	0.366				0.080	0.726	0.504		(0.007)	0.594	0.192		0.083		0.217	0.0374	0.227	0.240		0.079		0.295	0.0637
55X G900J3 F			Al-Si							0.070	0.25	0.41	0.29			0.38	0.56		0.21		0.14	(0.029)	0.82	0.15		0.16		0.39	
55X G900J4 F			Al-Si				0.285				0.343	0.249	0.306			0.459	0.75		0.351		0.088		1.39	0.153		0.171	(0.010)	0.149	
55X G900J5 E			Al-Si								0.46	0.024	0.18			0.009	1.16		0.41		0.014		1.65	0.006		0.33		0.023	
58X G40H10 C			Al-Zn			(0.0003)				0.050	0.468	0.188	0.361			1.25	0.269		0.097		0.044		0.224	0.042		0.187		4.66	0.215
58X G40H6 B			Al-Zn			(0.002)			0.032	0.006	0.005	0.111	0.08		(0.004)	(0.003)	0.004		0.008		<0.002	<0.0005	0.09	<0.005		0.064		7.55	(0.004)
58X G40H7 B			Al-Zn			0.0012			0.027	0.026	0.0018	0.050	0.101		(0.0003)	0.304	0.078		0.142		0.054	0.007	0.161	0.067		0.0045		7.16	0.0030
58X G40H8 B			Al-Zn								0.22	0.14	0.30			0.69	0.20		0.22		0.090		0.1	0.010		0.063		6.5	(0.004)
58X G40H9 C			Al-Zn			(0.0001)				0.0150	0.241	0.172	0.320			0.960	0.0372		0.062		0.190		0.347	0.068		0.279		4.83	0.157
59X G7020 A			Al-Zn-Mg-Cu		0.0025						0.192	0.0320	0.178			1.313	0.200		0.0051		0.0018		0.049	0.0022		0.0261	0.0107	4.82	0.146
59X G7022 A			Al-Zn-Mg-Cu								0.140	0.631	0.120			2.69	0.127		0.0030		0.0019		0.126	0.0006		0.0160		5.17	0.0016
59X G7050 A			Al-Zn-Mg-Cu		0.0011						0.0097	2.119	0.0745			2.030	0.0047		0.0041		0.0010		0.045	0.0010		0.0242	0.0092	6.18	0.100
59X G7068 A			Al-Zn-Mg-Cu								0.0324	1.676	0.117			2.70	0.0156		0.0056		0.0020		0.051	(0.001)		0.0419		7.96	0.088
59X G7075 B			Al-Zn-Mg-Cu		(0.003)						0.1831	1.227	0.122	0.0105		2.231	0.0229		0.0035		0.0011		0.066	(0.001)		0.0248	0.0058	5.49	0.0008
59X G77J1 G			Al-Zn-Mg-Cu				0.0578		0.0351	0.0104	0.297	2.810	0.209	0.010		4.52	0.810		0.205		0.158		0.1015	0.148		0.251	0.0064	2.289	0.0484
59X G77J2 E			Al-Zn-Mg-Cu						0.0023		0.0966	2.37	0.293			3.04	0.239		0.527		0.127		0.206	0.0054		0.0156	0.0153	3.25	0.152
59X G77J3 F			Al-Zn-Mg-Cu				0.0297		0.0095	0.032	0.150	1.30	0.70			2.53	0.246		0.402		0.108		0.647	0.122		0.148	0.0181	4.72	0.0144
59X G77J4 E			Al-Zn-Mg-Cu						0.00054		0.071	0.81	1.04			1.47	0.224		0.0037		0.073		0.59	0.219		0.119	0.0067	5.30	0.080
59X G77J5 E			Al-Zn-Mg-Cu			0.0036			0.0142	0.0373	0.0301	0.0203	1.37			0.851	0.0398		1.002		0.0194		0.562	0.0140		0.0255	0.052	7.82	0.0194

Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
59X G77J6 B			Al-Zn-Mg-Cu			0.0079			0.0015	0.0087	0.0127	1.08	0.293			2.60	0.0318		0.0248		0.0123		0.094	0.0267		0.020	0.0107	12.02	0.261
518X 429 A			Pressed Powder Al		(0.002)			0.020		2.22	0.0034	1.023	0.201			1.25	0.0165		0.014	(0.004)	0.0020		28.9		0.0006	0.0163	0.0090	0.0042	
518X 905 A			Pressed Powder Al					(0.0007)		0.0033	0.0090	2.51	2.54			0.645	0.994	0.807	4.98		(0.001)		0.10	(0.0024)		0.587	0.0186	0.0052	0.77



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Aluminum Alloy

Residuals in Aluminum Alloy

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
101A	AA 1100	A91100	Residuals in Al			(0.002)	0.003	0.014	0.002			0.017	0.092	0.6	0.03		0.012	0.029	0.036	0.005	0.018		0.16	0.017	0.032	0.012	0.03	0.011	
51X G00H1 D			Residuals in Al					0.023				0.0061	0.0131	0.831			0.054	0.0074	0.231		0.0021	(0.003)	0.142	0.096	0.0135	0.0081	0.243	(0.001)	
51X G00H2 E			Residuals in Al		(0.005)			0.011		0.0031		0.0174	0.111	0.356	0.011		0.093	0.154	0.119		0.114	0.0265	0.350	0.0065	0.128	0.0148	0.113	0.0150	
51X G00H3 D			Residuals in Al	0.0079	(0.0003)			0.076		0.0186	0.0042	0.095	0.399	0.313	0.010	<0.001	0.0077	0.210	0.0115		0.055	0.0025	0.895	0.083	0.0043	0.0142	0.097	0.0095	
51X G00H4 C			Residuals in Al	0.0208	(0.0026)			0.0246		0.0267	0.0109	0.0602	0.0465	0.082	0.0315	0.0011	0.054	0.0792	0.0323		0.0204	0.0077	(0.04)	0.0285	0.0292	0.0220	0.197	0.0278	
51X G00H5 B			Residuals in Al	0.11	(0.0005)			0.130		0.0103	0.045	0.0249	0.227	0.490	0.0122	<0.001	0.110	0.196	0.161		0.130	0.056	0.739	0.201	0.100	0.0295	0.479	0.0005	
51XA1350 A		A91350	Residuals in Al								0.0005	0.0024	0.0016	0.0968	0.0137		0.0032	0.0019	0.0071		(0.001)		0.0232	0.0005	0.0029	0.0042	0.0148	0.0007	



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Magnesium Alloy

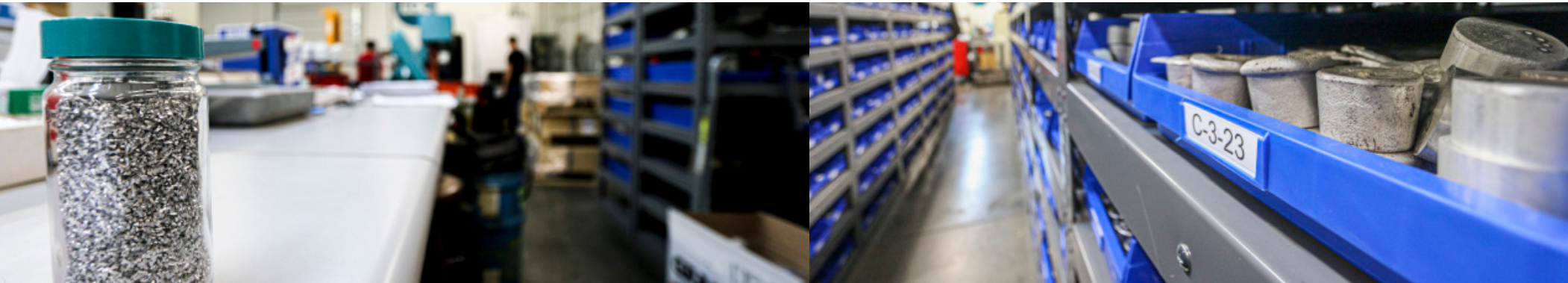
Part Number	Grade	UNS	Type	Ag	Al	Be	Ca	Cd	Ce	Cu	Fe	Gd	Hg	La	Mn	Nd	Ni	Pb	Pr	Si	Sn	Sr	Ti	Y	Zn	Zr
63XMG1E			Mg-Mn	0.0195	(0.088)	(0.0002)		0.0017		0.0503	0.0014				0.860		0.0162	0.011		0.052	0.0053				0.083	
63XMG2B			Mg-Mn	0.0090	0.0432		0.0015	0.0009		0.0203	0.0020				1.75		0.0035	0.0020		0.019	0.0024				0.0245	
63XMG3C			Mg-Mn	0.0041	(0.056)	<0.0001		0.0046		0.0072	0.0005				1.62		0.0028	0.0046		0.014	0.006				0.0101	
64XMGQ1A	AZ10A		Mg-Al		1.083	0.00036				0.0840	0.0034				0.377		0.0041	0.0199		0.062	0.0195				0.235	
64XMGQ2A	AM50A		Mg-Al		4.53	0.0013				0.0151	0.0041				0.378		0.0061	0.0107		0.051	0.0107				0.107	
64XMGQ3A	AM90A		Mg-Al		8.66	0.0041				0.0349	0.0090				0.206		0.0032	0.0022		0.083	0.0019				0.0039	
64XMGQ4A	AM60A		Mg-Al		6.50	0.00029				0.310	0.0040				0.183		0.0068	0.0322		0.067	0.0282				0.188	
64XMGQ5A	AM60B		Mg-Al		5.76	0.0013				0.0072	0.0043				0.276		0.0010	0.0056		0.052	0.0050				0.0465	
64XMGQ6A	AS21A	Mn Si seg	Mg-Al		2.31	0.0007				0.0045	(0.004)				(0.26)		0.0026	0.0060		(0.97)	0.0055				0.072	
64XMGQ7A	AS41A	Mn Si seg	Mg-Al		4.02	0.00042				0.0167	0.0028				(0.43)		0.0053	0.0126		(1.05)	0.0096				0.061	
64XMGQ8A	AZ10-mod		Mg-Al		1.030	0.00015				0.0019	0.0018				0.700		0.0004	0.0008		0.045	0.0022				0.0442	
64XMGQ9A	AS21B	Si Seg	Mg-Al		2.14	0.0015			0.111	0.0104	0.0069			0.083	0.0684	0.114	0.0020	0.0096		(0.37)	0.0076				0.243	
65XMG1J++			Mg-Al-Zn	0.012	5.45	0.006	0.029	0.013	0.009	0.221	0.021			0.007	0.060		0.021	0.012		0.20	0.072				1.26	
65XMG11B			Mg-Al-Zn	(0.0002)	3.63	0.0022	(0.09)	0.0014	(0.0005)	0.0496	0.0048		0.006	(0.0005)	0.047		0.0134	0.0183		(0.024)	0.093				1.59	
65XMG12A			Mg-Al-Zn	0.0128	5.68	(0.0036)	0.037	0.0121	0.0009	0.266	0.0053		(0.016)	0.0007	0.198		0.0148	0.010		0.0142	0.0021				3.18	
65XMG13A			Mg-Al-Zn	0.0074	7.45	(0.010)	0.0064	0.0055	0.0024	0.125	(0.008)		(0.033)	0.0021	0.092		0.0039	0.0085		0.022	0.043				0.925	
65XMG14B			Mg-Al-Zn	0.0016	9.09	0.0029		0.0014	0.0120	0.0102	0.0084		(0.08)	0.0111	0.282		0.0082	0.0061		0.080	0.0085				0.685	
65XMG15A			Mg-Al-Zn	0.030	10.67	0.0062	(0.0014)	0.0034	0.0069	0.0273	0.010		0.011	0.0048	0.067		0.0026	0.0051		0.034	0.0021				0.348	
65XMG16A			Mg-Al-Zn	0.0035	6.78	0.0011	0.0024	0.0066	0.0017	0.099	0.0073		0.005	0.0012	0.271		0.0057	0.050		0.023	0.028				4.03	
65XMG17A			Mg-Al-Zn	0.0064	4.20		0.021	0.0049		0.0215	0.0069				0.203		0.0141	0.0009		0.33	0.0050				0.128	
65XMG18A	AZ61A	M11610	Mg-Al-Zn		6.75	0.00051				0.052	0.0081				0.192		0.0074	0.0244		0.043	0.0114				0.502	
65XMG19A	AZ92A	M11920	Mg-Al-Zn		8.97	0.00025				0.0426	0.0085				0.322		0.0065	0.0489		0.196	0.0489				2.17	
65XMG20A	AZ61A	M11610	Mg-Al-Zn		5.87	0.0018				0.0131	0.0078				0.067		0.0025	0.0075		0.052	0.0320				1.32	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Magnesium Alloy

Magnesium Alloy

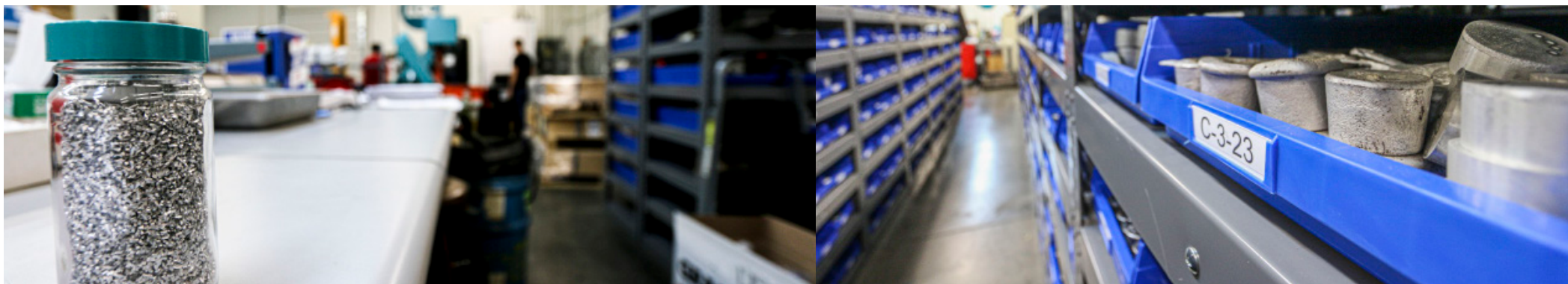
Part Number	Grade	UNS	Type	Ag	Al	Be	Ca	Cd	Ce	Cu	Fe	Gd	Hg	La	Mn	Nd	Ni	Pb	Pr	Si	Sn	Sr	Ti	Y	Zn	Zr
65X MGA21 A	AZ125A	M11125	Mg-Al-Zn		12.37	0.0006				0.0020	0.0140				0.0777		0.0010	0.0048		0.028	0.0063				5.11	
65X MGA22 A	AZ91A	M11910	Mg-Al-Zn		8.62	0.0006				0.078	0.0060				0.40		0.0058	0.0038		0.085	0.0033				0.89	
65X MGA23 B	AZ91D	M11916	Mg-Al-Zn		9.72	0.0030				0.0153	0.0083				(0.13)		0.0011	0.0020		0.028	0.0026				0.543	
65X MGB1 E			Mg-Al-Zn	0.0300	1.90	0.0008	(0.067)	0.076		0.051	0.0027				0.770		0.0020	0.0095		0.069	0.0098				1.60	
65X MGB2 C			Mg-Al-Zn	0.0099	2.67	0.0008	0.011	0.0115	0.0009	0.113	0.010			0.0007	0.333		0.0028	0.0036		0.069	0.0047		0.0003		0.95	
65X MGB2 D			Mg-Al-Zn	0.0099	2.81	0.0014	(0.010)	0.0103		0.065	0.0032				0.526		0.0043	0.0053		(0.088)	0.0052				1.047	
65X MGB3 B++			Mg-Al-Zn	(0.002)	3.19	0.0029	0.030	0.012		0.0214	(0.005)				0.0122		0.0020	0.0037		0.012	0.0050		(0.003)		0.608	
65X MGB3 C			Mg-Al-Zn	0.0028	3.38	0.0019	(0.003)	0.0025		0.0222	0.0028				0.277		0.0027	0.0023		0.042	0.0017				0.711	
65X MGB4 C			Mg-Al-Zn	0.0046	3.86	0.0033	0.0010	0.00016	0.0003	0.0183	(0.009)			(0.0001)	0.031		0.0003	0.0037		0.037	0.0050		(0.0008)		0.333	
66X MGC4 C			Mg-Zn	0.0074	0.039	(0.0001)				0.0024	0.006				0.166		0.0009	0.0030		0.06	0.021	(0.00014)			6.81	<0.001
66X MGC5 A			Mg-Zn		0.072					0.0286	0.0008				1.17		0.0111	0.0281		0.026	0.0051				6.61	
66X MGD1 B			Mg-Zn		0.147				0.065	0.066	0.0029			0.031	0.125	0.064	0.0162	0.026		(0.073)	0.026				1.19	
66X MGD5 A			Mg-Zn	0.044	0.040	<0.0005	(0.030)			2.88	0.008				0.307		0.0120	0.097		0.134	0.104				6.25	
67X MGK2 A			Mg-Al - Rare Earth		3.84	0.0025			0.70	0.0041	0.0016	0.053		0.34	0.534	0.125	0.0033		0.053	0.057					0.132	
67X MGK3 A			Mg-Al - Rare Earth		4.56	0.0007			0.83	0.0017	0.0024	0.038		0.374	0.516	0.175	0.0016		0.069	0.068					0.050	



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Residuals in Pure Magnesium

Part Number	Grade	UNS	Type	Ag	B	Be	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Li	Mg	Mn	Mo	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr
61XMGP2 A++				0.003	0.065	<0.0001	0.0138	0.0063	0.0019	0.0109	0.0061			0.0014	0.0118		0.0029	0.0061		0.031	0.0073				0.0122	(0.0007)			
61XMGP3 A++				0.0125	0.096	<0.0001	0.054	0.0154	0.0055	0.0292	0.014			0.0038	0.0137		0.0048	0.0148		0.044	0.0155				0.0196	(0.0014)			
61XMGP4 A++				0.0203	0.0247	<0.0001	0.028	0.0071	0.0041	0.0108	(0.0044)			0.0030	0.0100		0.0028	0.0066		0.037	0.0067				0.0158	0.030			
61XMGP5 A				0.0342	0.119	0.0018		0.0292	0.049	0.092	0.0048			0.0382	0.201	0.0446	0.0176	0.0357		0.094	0.0352			0.0132	0.099				
61XMGP6 A				0.0043	0.0449		(0.001)	0.0025	0.0209	0.0067	0.0041			0.0137	0.0125	0.0238	0.0025	0.0120		0.044	0.0091			0.0375	0.010				



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Zinc Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Be	Bi	Cd	Ce	Co	Cr	Cu	Fe	Hg	In	La	Mg	Mn	Ni	Pb	Sb	Si	Sn	Sr	Ti	Tl	Zn	Zr
41X GLV1 E			Galvanizing		0.285	(0.0004)		0.0045	0.0087		0.0008		0.0188	(0.001)				0.0021		0.0021	0.0175	0.0016		0.0049					
41X GLV10 A			Galvanizing		0.969			0.0031	0.0030		0.0002		0.0073	0.0051				0.0040	0.0062	0.0022	0.0066	0.0009		0.0062					
41X GLV11 A			Galvanizing		0.463			0.0009	0.0010		(0.0001)		0.0017	0.0027				0.0009	0.0008	0.0008	0.0057	0.168		0.0009	(0.0004)				
41X GLV12 A **			Galvanizing	0.0043	0.171			0.0050	0.0050		0.0035		0.0089	0.016				0.0043	0.0086	0.0095	0.0100	0.0064		0.0082					
41X GLV13 A **			Galvanizing	0.0011	0.220			0.0008	0.0011		0.0012		0.0050	0.006				0.0013	0.0008	0.0028	0.0030	<0.005		0.0012					
41X GLV2 C			Galvanizing		0.0905	0.0017		0.0158	0.0037		0.0055	0.0015	0.0057	0.0155				0.0006	0.0218	0.0053	0.0248	0.0049		0.0097					
41X GLV3 C			Galvanizing		0.326	0.0036		0.0031	0.0183		0.0034	0.0003	0.0332	0.0014				0.0014	0.0185	0.0335	0.0249	0.0555		0.0031					
41X GLV4 E			Galvanizing		0.503	0.0002		0.0047	0.0013		0.0061	0.0010	0.0246	(0.01)				0.0025	0.164	0.0078	0.0058	0.0235		0.0035					
41X GLV5 B			Galvanizing		0.0139	0.00044		0.0098	0.0136		0.0011		0.0103	0.0443				0.0014		0.0025	0.0166	0.148		0.0172					
41X GLV6 B			Galvanizing		0.441			0.0254	0.0051		0.0061	0.0007	0.0371	0.0020					0.00235	0.0007	0.097	0.0122		0.0155					
41X GLV7 A			Galvanizing		0.399	0.0016		0.0108	0.00056		(0.0001)	0.0010	0.023	0.0031					0.0025	0.0060	0.082	0.0031		(0.0006)					
41X GLV8 B			Galvanizing		0.258			0.0006	0.0004			(0.0001)	0.0111	0.0080				0.0009	0.0035	0.0023	0.0039	0.0062		0.0005					
41X GLV9 A			Galvanizing		0.547			0.0019	0.0028		0.0005		0.0037	0.0039				0.0014	0.0027	0.0009	0.0043	0.0048		0.0028					
56X G2000J4 C			Galvanizing	0.0122				0.0049				0.0247	0.053	5.02	0.705					0.0025	0.505	0.271			0.089		0.879	0.105	
56X G2000J5 C			Galvanizing	0.234			0.0050	0.136				0.077	0.0078	5.52	0.98					0.009	0.39	0.007			0.204		0.69	0.064	
56X G14H4 C			Galvanizing									0.0288	0.0309	3.82	0.251						1.72	0.122			2.37		0.050		
56X G250J1 C			Galvanizing				<0.0005					0.008	0.0067	3.82	0.41						0.075	0.040			1.33		0.101	(0.003)	
56X G250J2 D			Galvanizing									0.195	0.063	4.81	0.346						0.060	0.225			1.10		(0.0016)	0.247	
56X G250J3 C			Galvanizing				0.0014					0.264	0.024	4.90	0.079						(0.001)	0.278			0.92		0.024	0.275	
56X G250J5 D			Galvanizing				0.0022					0.34	0.047	4.36	0.535						0.022	0.150			1.77		0.076	0.22	
41X Z11 A			Residuals in Pure Zn		261			189	155				116	19	(9)	345					77	26		72			(10)		
41X Z3 M			Residuals in Pure Zn		15.8			31.5	32.7				34.5	60.5	28.9	23.3		(3.4)	52.4	20.9	50.2	16.7		29.7			21.0		
41X Z4 L			Residuals in Pure Zn		65			31.9	43.7				32.6	148	25	30.4		33.1	28.6	32.0	58.4	34.0		22.1			27.7		

Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Zinc Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Be	Bi	Cd	Ce	Co	Cr	Cu	Fe	Hg	In	La	Mg	Mn	Ni	Pb	Sb	Si	Sn	Sr	Ti	Tl	Zn	Zr
41XZ5N			Residuals in Pure Zn		243			56	165				109	262	50	57.3		107	49.4	51.4	286	54		63.2			68		
41XZ6A			Residuals in Pure Zn		96			122	93				88	(20)		228		<5	2	2	310			38			4		
41X2951Zn1A			Zn-Cu		0.029				0.0005			0.083	0.79	0.011				0.0029	0.0013	0.0038	0.0042			(0.0007)		0.278			
41X2951Zn2A			Zn-Cu		0.032				0.0037			0.142	1.37	0.019				0.0123	0.0011	0.0027	0.0040			(0.0015)		0.209			
41X2951Zn3A			Zn-Cu		0.078				0.0062			0.184	1.89	0.029				0.0164	0.0018	0.0010	0.0065			(0.006)		0.133			
41X0336Zn1L			Zn With Impurities		0.0177	0.0008			0.0067				0.0088	0.0106				0.0062	0.0102	0.0009	1.007			0.0051					
41X0336Zn2N			Zn With Impurities	0.0131	1.000			0.0043	0.147		0.0190		0.216	0.0283				0.0568	0.0227	0.0047	0.492	0.0019		0.0547			0.0016		
41X0336Zn3K			Zn With Impurities		0.336	0.0003			0.341				0.353	0.0456				0.147	0.0106	0.0022	0.0282			0.127					
41X0336Zn5A			Zn With Impurities		0.035			(0.001)	0.056				0.023	0.016				<0.0005	(0.0001)	(0.0005)	0.91	0.008		0.21					
41X4380Zn1D			Zn With Impurities	0.0012	0.039			0.0021	0.394			0.0007	0.178	0.0276				0.0032	0.0006	0.0058	0.0618	0.0019		0.0510		0.0004			
41X4380Zn10A			Zn With Impurities		0.0004				0.0007			0.117	0.0022	0.49				0.184		0.063	0.0043	0.0005		0.0014					
41X4380Zn2C			Zn With Impurities		0.0153			0.0076	0.284			0.0027	0.0288	0.048				0.0243	0.0087	0.0023	0.268	0.0093		0.0021		0.0251			
41X4380Zn3C			Zn With Impurities		0.0203			0.0103	0.0950			0.0029	0.073	0.017				0.0220	0.0180	0.0120	0.180	0.0046		0.080		0.125			
41X4380Zn4D			Zn With Impurities		0.446			0.0101	0.086		0.0018	0.0029	0.0284	0.017				0.118	0.0092	0.0172	0.310	0.0156		0.0416		(0.0003)			
41X4380Zn5C			Zn With Impurities		0.0215			0.0308	0.0571			0.0075	0.071	0.0120				0.00165	0.035	0.00147	0.140	0.0061		0.0101		0.339			
41X4380Zn6D			Zn With Impurities	0.0030	0.0260			0.0047	0.0466		0.0091	0.0064	0.0327	0.0307				0.0044	0.200	0.0073	0.427	(0.002)		0.101		0.0029			
41X4380Zn7D			Zn With Impurities		0.277				0.0156				0.0133	0.0018				0.0029	0.0036	0.0120	1.18	0.086		0.0036		0.0065			
41X4380Zn8D			Zn With Impurities	0.0140	0.232			0.0156	0.0097			(0.0001)	0.0208	0.0074				0.0054	0.0081	0.0445	0.700	0.0151		0.0177		0.0020			
41X4380Zn9A			Zn With Impurities		0.295			0.00046	0.0032			0.0015	0.0416	0.0113				0.0153	0.0018	0.0009	0.0139	0.0060		0.0008					
42XZ1J			Zn-Al		4.66				0.0014	0.0011		0.0004	0.0050	0.013			(0.0008)	0.0009	0.0038	0.0014	0.0017	0.0011	(0.002)	0.0007					
42XZ10A			Zn-Al		4.93				0.0029				0.314	0.0009		0.0018		0.0020	0.0183	0.0099	0.0065	0.0022		0.0033			0.0013		
42XZ11A			Zn-Al		3.19				0.0020	0.0014		0.0016	0.093	(0.036)		0.0037	(0.0009)	0.0329	0.0196	0.0241	0.0058	0.0047		0.0017			0.0047		
42XZ12A			Zn-Al		4.72				0.00277	0.0116		0.00063	0.156	0.046		0.0068	0.0084	0.0488	0.0483	0.0413	0.0079	0.0070		0.0022			0.0076		

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Zinc Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Be	Bi	Cd	Ce	Co	Cr	Cu	Fe	Hg	In	La	Mg	Mn	Ni	Pb	Sb	Si	Sn	Sr	Ti	Tl	Zn	Zr
42X Z15 A			Zn-Al		9.99				0.0023			0.0003	0.0028	0.026		0.0024		0.0026	0.0037	0.0017	0.0074	0.0006		0.0006					
42X Z16 A			Zn-Al		12.28				0.0045			0.0007	0.235	0.033		0.0051		0.105	0.0028	0.0039	0.0090		0.011	0.0034			(0.003)		
42X Z2 K			Zn-Al		3.79				0.0017	0.0055		(0.0001)	0.0300	0.0055			0.0026	0.0146	0.0274	0.0155	0.0029	0.0010	0.0011	0.0011					
42X Z3 J			Zn-Al		3.84				0.0065	0.0032			0.135	0.0145			0.0013	0.0503	0.0090	0.0071	0.0068	0.0006	(0.002)	0.0048					
42X Z4 J			Zn-Al		3.52				0.0065	0.0361		(0.0002)	0.0752	0.019		0.0025	0.0183	0.0663	0.0083	0.0170	0.0133		0.006	0.0052					
42X Z5 M			Zn-Al		4.33				0.0013	0.0328		(0.0002)	0.111	(0.05)		0.0047	0.0150	0.0508	0.0049	0.041	0.0030			0.0012			0.0017		
42X Z6 B			Zn-Al		3.67				0.0039	(0.012)		0.0034	0.238	0.008		0.0019	(0.011)	0.177	0.0157	0.00030	0.0093	0.0169	(0.010)	0.0057			0.0021		
42X Z7 D **			Zn-Al		4.35				0.0021	0.059			0.024	0.024			0.027	0.0097	0.0047	0.008	0.004		0.002	0.0025					
42X Z8 A			Zn-Al		7.03				0.0003	0.0081		(0.0002)	0.0215	0.013			0.0079	0.0033	0.0014	0.0019	0.0025		0.013	(0.002)					
42X Z9 A			Zn-Al		5.58				0.0054	0.0047			0.0070	0.032			0.0044	0.0464	0.0006	(0.0003)	0.0021		(0.004)	(0.0004)					0.011
45X ZnAl7 C †	Galvalume		Zn-Al										0.0050	0.077				0.0070		0.0049	0.010		1.59	0.0096	(0.0004)	0.0049		47.5	
45X ZnAl7 E †	Galvalume		Zn-Al										0.0100	0.170				0.0005		0.0032	0.0042		1.56	(0.0005)	(0.004)	0.028		43.6	
43X GALF2 A	Galfan Type	Z38510*	Zn-Al-Cu		5.40				0.0043	0.0318			0.0585	0.032			0.0158	0.0504			0.0050			0.0040					
43X GALF3 A	Galfan Type	Z38510*	Zn-Al-Cu		8.37				0.0018	0.0152			0.507	0.018			0.0076	0.0099			0.0032			0.0025					
43X GALF4 A	Galfan Type	Z38510*	Zn-Al-Cu		10.71				0.0108	0.079			2.470	0.074			0.041	0.0062			0.0122			0.0110					
43X GALF1 A			Zn-Al-Cu		4.68				0.0499	0.0569			4.39	0.061			0.0284	0.0999			0.0505			0.0514					
43X GALF5 A			Zn-Al-Cu		15.03				0.0080	0.0041			0.0114	(0.072)			0.0019	0.0016			0.0084			0.0081					
43X SC1 A			Zn-Al-Cu		3.75				0.0011			0.0082	1.903	0.073				0.740	0.0201	0.0161	0.0150		0.022	0.0082					
43X SC2 A	spin-casting		Zn-Al-Cu		3.41				0.0018			0.023	4.80	0.046				0.498	0.0183	0.0096	0.0097		0.0133	0.0031					
43X SC3 A	spin-casting		Zn-Al-Cu		3.14				0.0028			0.0108	3.03	0.018				0.257	0.0337	0.0261	0.0066		0.022	0.0078					
43X SC4 A			Zn-Al-Cu		4.35				0.0058			0.009	1.122	0.022				0.093	0.044	0.0249	0.0064		0.022	0.0056					
43X Z1 L			Zn-Al-Cu	0.0037	4.48			(0.0008)	0.0004				0.720	0.0009				0.0345	0.0075	0.0069	0.0011	(0.0006)		(0.0005)					
43X Z10 A			Zn-Al-Cu		3.99				0.0014			0.0003	2.97	0.007				0.0403	0.0050	0.0036	0.0046		0.009	0.0012					

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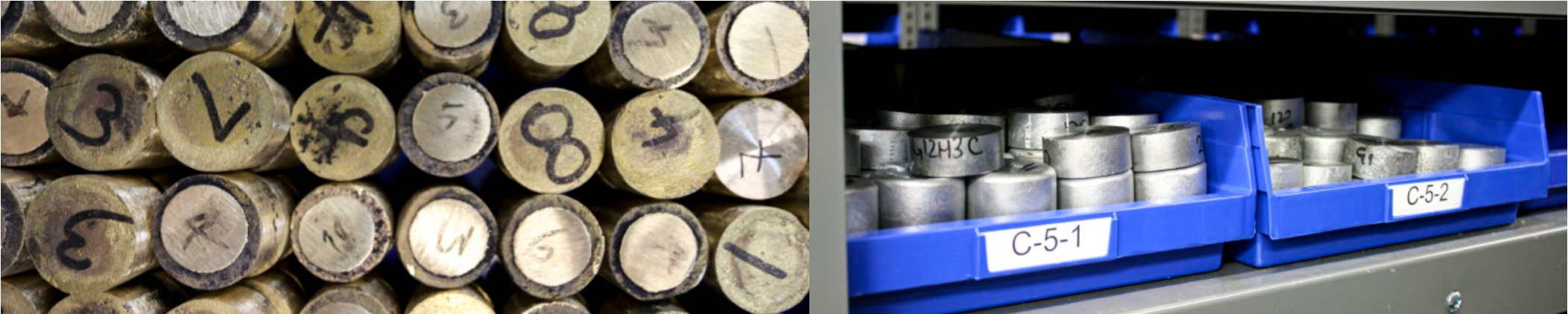
Zinc Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Be	Bi	Cd	Ce	Co	Cr	Cu	Fe	Hg	In	La	Mg	Mn	Ni	Pb	Sb	Si	Sn	Sr	Ti	Tl	Zn	Zr
43XZ11F			Zn-Al-Cu		11.12			0.0046	0.0175			(0.0003)	0.335	0.015				0.0357	0.0032	0.0014	0.0202	0.0009	0.0013	0.0145					
43XZ12E			Zn-Al-Cu		10.38			0.0021	0.0045			0.0008	0.791	0.037				0.0287	0.0026	0.0033	0.0041	0.0032	(0.002)	0.0017		0.0050			
43XZ13E			Zn-Al-Cu		9.01			0.0014	0.0072			0.0004	1.113	0.0045				0.0198	0.0025	0.0036	0.0086	0.0020	(0.001)	0.0056					
43XZ14F			Zn-Al-Cu		7.98			0.0106	0.00567			0.0037	1.238	0.0025				0.0123	<0.001	0.0058	0.0019	0.0105	<0.001	0.0005		<0.001			
43XZ15D**			Zn-Al-Cu		8.30			0.0053	0.0036				1.17	0.0053				0.023	0.0067	0.008	0.0029	0.0005		0.0017					
43XZ2P			Zn-Al-Cu	0.0098	4.07			0.0038	0.0031				1.019	0.0013				0.0614	0.0162	0.0100	0.0048	0.0012		0.0033					
43XZ21D			Zn-Al-Cu		23.9				0.0010				2.68	0.0067				0.0142	0.0022	0.0021	0.0087		0.0191	0.0007	(0.0005)				
43XZ22D			Zn-Al-Cu		27.4				0.0043			0.0010	2.11	0.068				0.0099	0.0057	0.0101	0.0053		0.019	0.0020		0.0073			
43XZ23E			Zn-Al-Cu		30.7				0.0042			0.0147	3.22	0.055				0.0242	0.0090	0.0236	0.0112		0.077	0.0115		0.0045			
43XZ3M			Zn-Al-Cu		3.40			0.0092	0.0109			0.0046	1.499	(0.042)				0.114	0.0013	0.0062	0.0077	0.0029		0.0058					
43XZ4C			Zn-Al-Cu		4.79			0.0113	0.0033				2.69	0.0017				0.0480	0.0153	0.0258	0.0062	(0.002)	(0.001)	0.0030					
43XZ5B			Zn-Al-Cu	0.0254	3.164			0.0148	0.0030				5.92	0.10				0.0144	0.0061	0.0056	0.0029	0.065		(0.0004)	(0.0013)				
43XZ6B			Zn-Al-Cu		4.51			0.0054	0.0031			0.0005	2.85	0.024				0.0238	0.0022	0.0027	0.005	0.0044		0.0052					
43XZ7A	Beric type		Zn-Al-Cu		3.68		0.0194	(0.001)	0.00092			0.0003	3.14	0.029				0.062	0.0025	0.0005	0.0058	0.0016		0.0031		0.067			
43XZ8A			Zn-Al-Cu		2.51				0.00090			0.00024	0.481	(0.002)				0.00155	0.00021	0.00033	0.0027			(0.0005)					
43XZ9A			Zn-Al-Cu		3.17		0.0010	0.0033	0.0034			0.0034	4.82	0.073				0.0472	0.0108	0.0027	0.0078	0.0033		0.0020		0.0012			
41XZSb1A†			Zn-Sb Binary																			1.03							
41XZSb4A†			Zn-Sb Binary																			3.78							
41XZSb8A†			Zn-Sb Binary																			7.68							
41XZNi2A			Zn-Ni Binary		0.0135			0.0050	0.0010				0.0056	0.0061						1.97	0.0172			0.141					
41XZNiBiA			Zn-Ni Binary		0.050			0.502	0.0020				0.0132	0.0133						2.02	0.0187			0.154					

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

RoHS Monitors

Part Number	Grade	UNS	Type	Ag	Al	As	Be	Bi	Cd	Ce	Co	Cr	Cu	Fe	Hg	In	La	Mg	Mn	Ni	Pb	Sb	Si	Sn	Sr	Ti	Tl	Zn	Zr
41XZSC1 A			RoHS Monitor						0.0288			0.0039			0.026						0.0621								
41XZSC2 A			RoHS Monitor						0.0016			0.0036			0.0053						0.111								
41XZSC3 A			RoHS Monitor						0.119			0.0148			0.0021						0.0273								
41XZSC4 A			RoHS Monitor						0.0131			0.0299			0.050						0.156								
41XZSC6 A			RoHS Monitor						0.215			<0.0002			0.029						0.0077								



Code Key: ☉ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; ++ = Unsuitable for use with glow discharge systems

Copper Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Ge	In	Mg	Mn	N	Nb	Ni	O	P	Pb	Pd	S	Sb	Se	Si	Sn	Te	Ti	Zn	Zr
264A	"Federalloy																																			
I-844"	C89831	Cu-Sn	(0.005)	0.003	(0.004)				3.6	(0.004)		0.001	(0.002)	(87.3)	0.048				0.002			0.54		0.027	0.057		0.0013	0.074	(0.001)	0.003	3.03			5.33		
265A	"Federalloy																																			
I-836"	C89833	Cu-Sn	(0.002)	0.003	(0.005)				2.4			(0.001)	(0.001)	(90)	0.013				(0.002)			0.69		0.024	0.011		(0.002)	0.015	(0.002)	0.003	4.4			2.45		
266A	"Federalloy																																			
III-932"	C89835	Cu-Sn	0.001	0.002	0.004				2.37	0.002		(0.001)	(0.002)	(87)	0.035				0.002			0.46		0.032	0.01		0.002	0.01	0.001	0.002	6.9			3.48		
263A	"Federalloy																																			
I-848A"		Cu-Sn	0.006	0.002	0.003				2.55	(<0.005)		0.001	0.002	(78)	0.047				0.002			0.66		0.04	0.022		0.002	0.06	0.002	0.003	3.5			15.8		
Cu172-18	CDA 172	C17200	Cu-Be	(0.002)	0.022	(<0.005)		(<0.005)	1.79	(<0.005)	(0.003)	(<0.005)	0.344	0.0007	97.7	0.029			(0.0013)	0.0017	(<0.001)		0.01	(<0.005)	0.003	0.005		(0.001)	(0.001)	(<0.005)	0.057	0.0009		(<0.005)	0.008	(<0.005)
36X CBC4E	CDA 173	C17300	Cu-Be-Co		0.0258				1.869				0.215		97.47	0.0274			0.0035				0.0080		0.0027	0.329					0.048	0.002			0.003	
36X CBC2F	CDA 175	C17500	Cu-Be-Co	0.0013	0.0097				0.439				2.22		97.15	0.0076			0.0036				0.121		0.0067	(0.001)					0.0257	(0.001)			0.0018	(0.001)
36X CBC5B		C17510	Cu-Be-Co	0.0011	0.0104				0.404				0.0084		97.61	0.0108			0.0009				1.905			0.0015					0.004	0.0013			0.0010	
36X CBC3D	CDA 170	C17000	Cu-Be-Co		0.019				1.840				0.209		97.77	0.046			0.0040				0.007			0.0025					0.039	0.0021			0.004	
36X CBC6A			Cu-Be-Co	0.0015	0.0490				0.507				1.045		97.11	0.0243			0.0070				1.132		0.0016	0.0014					0.0263	0.0041			0.0010	0.0553
36X 274 B	CDA 180	C18000	Cu-Cr	0.0016	0.0011								0.0042	0.333	96.44	0.0164				0.0004			2.59		0.0015	0.0011					0.645	(0.001)			(0.001)	
36X CCR1E		C18150	Cu-Cr	0.0042	0.0013	0.0007								0.652	99.24	0.0170			(0.0003)				0.0111		0.0223	0.0008		0.0016				0.0018			(0.001)	0.079
279A	CDA 182	C18200	Cu-Cr	0.003	0.002	(0.002)				(0.001)	0.002	(0.0005)	0.002	0.86	99.1	0.025			(0.001)	(0.002)	(0.0003)		0.014	(0.001)	0.005	0.01		0.0015	(0.004)		0.02	0.021			0.01	0.012
158B	CDA 815	C81500	Cu-Cr	(0.01)	0.002	(0.001)					0.002		0.002	0.85	98.5	0.09				0.019	(<0.0005)		0.32	0.002	0.005	0.01		0.003	0.002		0.02	0.01			0.014	
158C	CDA 815	C81500	Cu-Cr	(0.01)	0.002	(0.001)					0.002	(0.005)	0.002	1.04	98.5	0.09				0.019	(<0.0005)		0.32	0.002	0.005	0.01		0.003	0.002		0.02	0.01			0.014	
36X 70600A	CDA 706	C70600	Cu-Ni		(0.001)						(0.002)		0.0087		86.70	1.619				0.759			10.65		0.0062	0.0086		0.0136				0.0090			0.115	
84C	CDA 706	C70600	Cu-Ni	0.002	(0.002)	(0.002)			(<0.002)	(<0.005)	0.003	(0.001)	0.006	(0.0008)	89.4	0.28			(0.0007)	0.04			9.8	(0.008)	0.06	0.047	0.047	0.006	0.0012	(0.002)	0.004	0.13	(<0.03)		0.13	(0.0004)
36X 71500A	CDA 715	C71500	Cu-Ni		(0.001)			0.0049			0.0240		0.0163		66.74	0.888				0.850			31.24		0.0074	0.0114		0.0454				0.0113			0.150	
85C	CDA 715	C71500	Cu-Ni	(<0.002)	(<0.01)	0.0009					0.008		0.016	0.002	67.3	0.63			0.01	0.65	(<0.0003)		31.3	(0.003)	0.003	0.004		0.002			0.01	0.005			0.057	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Copper Alloy

Copper Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Ge	In	Mg	Mn	N	Nb	Ni	O	P	Pb	Pd	S	Sb	Se	Si	Sn	Te	Ti	Zn	Zr
36X CN11 A		C72420	Cu-Ni		1.457						(0.001)		0.0049	0.380	77.56	0.992			0.0241	4.34		0.124	14.96		(0.002)	(0.003)		0.0012			0.083	(0.002)			(0.006)	
36X SP1 A	CDA 727/ Spinodal Type	C72700	Cu-Ni	0.005	0.0020			0.0007		0.0039			0.057		84.90	0.45				0.084		(0.031)	8.33		(0.003)	0.0115		0.005	0.0177		0.004	5.75		(0.0004)	0.344	
36X SP2 A	CDA 729/ Spinodal Type	C72900	Cu-Ni	0.0181	0.0003			0.0005		(0.0027)			0.119		74.91	(0.09)			0.0002	0.0019			15.72		(0.0006)	0.026		0.0030	0.006		(0.0023)	8.92		(0.0008)	0.029	
236A	CDA 964	C96400	Cu-Ni		0.003					0.003	0.01		0.004	0.002	66.7	0.91				1.04	0.0002	0.92	30	0.002	0.003	0.004		0.003	(<0.005)		0.19	0.005			0.002	
36X CN1 P			Cu-Ni		0.055						0.0106		0.114	0.156	(85.9)	1.856			0.0321	1.77		0.0236	9.27		0.0574	0.035		0.0071			0.104	0.227			0.351	
36X CN10 C			Cu-Ni					(0.012)			0.0107		0.122	1.491	61.67	4.76				0.552		0.450	28.35		(0.009)	0.013		0.030			0.906	0.0164		(0.22)	0.058	0.080
36X CN12 A			Cu-Ni		2.41			0.0055			0.0101		0.0056		83.79	0.105			0.072	0.402		0.0010	13.05		0.0011	0.0037				0.040	(0.001)			0.157		
36X CN13 A	Hiduron 130		Cu-Ni		2.65			(0.002)			(0.003)		(0.001)		81.46	0.870			0.0039	0.442			14.52		0.0011	(0.001)		(0.002)			0.012	(0.001)			0.0017	
36X CN2 K			Cu-Ni		0.0009						0.0013		0.197	0.0043	86.25	0.0404			0.030	(0.69)		0.0176	11.45		0.0408	0.0449		0.0100			0.049	0.0258		0.0350	1.03	
36X CN21 A			Cu-Ni	0.0064	1.95	0.0067						0.0021	0.0079	0.0050	92.17	0.0316				0.0391			5.50		0.053	0.051					0.038			0.0203		
36X CN22 A			Cu-Ni	0.0196	6.09	0.0208						0.0083	0.0231	0.0144	91.80	0.088				(0.016)			1.806		0.0178	0.0260					0.0371			0.0175		
36X CN23 A			Cu-Ni	0.042	0.007	0.047						0.0021	0.0509	0.0021	70.22	0.140				0.0095			14.38		0.0299	0.115						0.102			14.88	
36X CN24 A			Cu-Ni	0.0466	(0.0010)	(0.0011)					0.0436		0.0096	0.0065	52.56	0.127				23.60			15.41		0.0037	0.0056					(0.0023)			8.00		
36X CN3 M			Cu-Ni					(0.002)	0.0042		0.020		0.0701	0.0259	76.60	0.996			0.075	0.726		0.030	19.55		0.049	0.223		0.0153			0.349	0.190			1.014	
36X CN4 L			Cu-Ni		0.040					0.0096	(0.005)		0.0305	0.0273	72.09	0.548			0.008	0.529		0.461	25.58		0.0140	0.0193		0.0075			0.448	0.0093			0.164	
36X CN5 P			Cu-Ni					0.0053	0.0035		(0.008)		0.0238	0.141	66.67	0.347			0.0106	0.217		0.430	31.03		0.034	0.0120		0.088			0.689	0.0090		0.0203	0.209	
36X CN6 J			Cu-Ni		0.079					0.0260	0.0198		0.0433	2.17	63.41	0.481				0.567		0.271	32.51		0.0187	0.0165		0.0097			0.150			0.0510	0.147	0.0228
36X CN7 F			Cu-Ni					(0.004)		(0.014)	0.0106		0.108	1.51	65.58	1.021			0.0041	0.659		0.58	29.95		(0.021)	0.028		0.0151			0.304	0.039		(0.037)	0.203	(0.003)
36X CN8 J			Cu-Ni		(0.030)			0.005		0.0518	0.013		0.121	1.38	65.78	1.65				0.951		0.585	28.94		0.019	0.037		0.0119			0.309	0.0502		(0.038)	0.107	
36X CN9 K			Cu-Ni		0.051					0.0197	0.005		0.0785	2.02	66.94	1.262				1.005		1.37	26.40		(0.021)	0.070		0.0105			0.406	0.0351		0.111		0.102
34X 79830 A		C79830	Ni-Ag	0.0028	0.0012						(0.005)		(0.001)		45.88	0.079				0.311			9.76		0.0047	2.033		(0.001)				0.1158			41.80	
298A	CDA 976	C97600	Ni-Ag	0.009	0.003	0.004		(<0.005)	(<0.001)	0.014	0.013	(<0.001)	0.016	0.005	65.3	0.73			0.0004	0.34	(<0.001)	(<0.01)	19.6	(<0.005)	0.004	4.0		0.011	0.04	(<0.02)	0.019	4.0	(<0.005)		5.8	(<0.01)
34X NS3 F			Ni-Ag	0.100	<0.001								0.0922		64.16	0.285			<0.001	0.0377			14.96		0.0295	0.178		0.0028			(0.002)	0.056			19.96	

Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Copper Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Ge	In	Mg	Mn	N	Nb	Ni	O	P	Pb	Pd	S	Sb	Se	Si	Sn	Te	Ti	Zn	Zr
34XNS5 G			Ni-Ag	0.0096	0.085								0.211		57.53	0.247				0.1103			16.55		0.104	0.896					0.122	0.142			23.87	
159A	NARloy-A		High Strength	3.48	(<0.01)						(0.002)		(<0.01)	(<0.01)	(96.5)	(<0.01)				(<0.01)	0.0003		(<0.01)	0.0006	(<0.01)	(<0.01)		(<0.01)			(<0.01)	(<0.01)			(<0.01)	
160A	NARloy-Z		High Strength	3.03	(<0.01)						0.003		(<0.01)	(<0.01)	(96.6)	(<0.01)				(<0.01)	0.002		(<0.01)	0.003	(0.004)	(<0.01)		(<0.003)			(<0.01)	(<0.01)			(<0.01)	
70C	CDA 110	C11000	Electrolytic	0.0011	0.0014	0.0009		(0.0004)	(<0.002)	(0.002)	0.002	(0.0008)	0.0014	(0.0002)	99.94	0.0016	(<0.0002)	(<0.0001)	(0.0003)	(0.0002)	(<0.008)	(0.004)	(0.0004)	(0.002)	0.0014	0.0013		0.0008	(0.003)	(0.001)	0.0006	0.0005	(0.001)		(0.002)	(0.001)
278A	CDA 145	C14500	P Deoxidized	(0.001)	(<0.002)	(0.001)				(0.001)	0.003		0.001	(0.001)	99.5	0.004			(0.0005)	(0.0004)	(0.0001)		(<0.005)	(0.0004)	0.011	0.003		0.002	(<0.005)		0.002	0.001	0.53		0.002	
37X 218 B	CDA 180	C18000	Cr-Ni-Si		0.0018									0.176	97.29	0.0209				0.0022			1.892			0.0014					0.564	0.0032			0.0054	

Residuals in Pure Copper

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Ge	In	Mg	Mn	N	Nb	Ni	O	P	Pb	Pd	S	Sb	Se	Si	Sn	Te	Ti	Zn	Zr
39X 17866 AH			CC	0.0086	0.0028	0.0435	(0.0004)			0.0109		0.041	0.0273	0.0316		0.0075	0.0052	0.0097		0.0147			0.0511		0.0125	0.0501		0.0326	0.0095	0.0053		0.0614	0.0065		0.084	
39X 17867 AD			CC	0.0079		0.0387	0.0075			0.0153		0.011	0.0194				0.0062	0.013	0.0041				0.041		0.0015	0.0196		0.041	0.0143	0.0067		0.115	0.0078		0.0325	
39X 17868 AH			CC	0.0209	0.0098	0.0145				0.0226		0.028	0.005	0.0267		0.0227	0.0272	0.0197	(0.0100)	0.0204			0.0277		0.0107	0.019		0.0124	0.0319	0.0103		0.0322	0.0273		0.55	
39X 17869 AG			CC	0.0399	0.0168	0.0104	0.0022			0.0401		0.0027	0.0084	0.0199		0.0365	0.0047	0.0026	0.0103	0.0325			0.0111		0.0245	0.0714		0.0069	0.0375	0.0197		0.07	0.0392		0.0261	
39X 17870 AH			CC	0.0556	0.144	0.0023	0.0017			0.0494		0.0022	0.0021	0.0012		0.074		0.0102	0.033	0.0596			0.0555		0.0535	0.0328		0.0018	0.0415	0.0118		0.0054	0.05		0.0285	
39X 17871 D			CC	0.0309		0.015	0.0005			0.0527		0.0027				0.0019	(0.0009)	0.0032					0.0412		0.0204	0.0503		0.0052	0.0141	0.031		0.1058	0.0137		0.0918	
39X 17872 A			C	0.0214	0.0118	0.0203	(0.002)			0.0240		0.0013	0.0102			(0.045)		0.0241		0.0055			0.0537		0.0045	0.293		0.0242	0.0217	0.0103		0.180	0.0208		0.107	
39X 17873 B			CC	0.0291		0.0197				0.0254		0.0023	0.0004	(0.0003)		0.0052		0.0040		0.0005			0.0280		0.0009	0.059		0.0095	0.0202	0.0143		0.0247	0.0144		0.0160	
39X 27866 A			W	0.0057		0.0383	0.0016			0.0047		0.0139	0.0308	0.0012		0.003	0.0029	0.0437				0.0487		0.0147	0.0054		0.0469	0.0052	0.0028		0.0448	0.0032		0.0287		
39X 27869 A			W	0.0349		0.0098	0.008			0.0376		0.0028	0.0036	(0.0002)		0.003	0.0123	0.009				0.019		0.0119	0.0225		0.0112	0.0362	0.0127		0.0106	0.0153		0.0065		
38X C1 C			Wire	0.0011		0.000019				0.00001		(<0.00001)		(<0.000005)	0.00017					(0.0000005)			0.000027	0.0266	(<0.000005)	(0.000005)		0.0002	0.00001	(0.000025)	(<0.00001)	(0.000001)	(0.000021)		(<0.00001)	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Brass Alloy

Brass Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
313A	CDA 693	C69300	Alloyed	0.0017	(0.001)	0.001	0.0008	(0.0003)	(0.001)	(0.002)	(0.0003)	(0.004)	(0.001)	75.4	0.011	(0.0003)	(0.001)	(0.0001)	(0.001)	0.002	(0.001)	0.09	0.042	0.0016	0.014	(0.001)	3.09	0.006	(0.003)	21.3	(0.0004)
31XB10M			Alloyed		0.358	0.0087			0.0215			0.0390	0.0192	60.18	(1.39)		0.205			1.475			0.0274		0.0124		0.0389	0.0310		36.05	
31XB11H			Alloyed		0.0262	0.0061			0.0054					60.72	0.802		0.653			1.033			0.0134		0.0057		0.0063	0.0117		36.65	
31XB12G			Alloyed		0.081	0.0181			0.0198					60.51	0.430		1.720			0.491			0.0244		0.0194		0.0207	0.0229		36.67	
31XB13G			Alloyed		0.0148	0.0120			0.0116					60.03	0.182		2.84			0.212			0.0188		0.0056		0.032	0.0127		36.67	
31XB14G			Alloyed	0.0130	4.02	0.0091			0.0103			0.0109		58.85	0.0183		0.0117			0.0190			0.0104		0.0139		0.051	0.486		36.52	
31XB15H			Alloyed	0.0071	2.98	0.0048			0.0074			0.0046		59.07	0.0176		0.0122			0.0102			0.0073		0.0111		0.109	0.944		36.80	
31XB16H			Alloyed	0.0052	1.98	0.0056			0.0042			0.0023		58.37	0.0162		0.0029			0.0076			0.0295		0.0126		0.197	2.13		37.18	
31XB17F			Alloyed		6.05	(0.015)			<0.001					60.0	(0.02)		<0.001			(0.01)			(0.05)		<0.001		(0.007)	0.010		(33.9)	
31XB18K			Alloyed	0.0143	0.0193	0.0215			0.0196		0.0254	0.0015	(0.013)	59.37	0.0237		0.0207			0.0233		0.0195	1.018		0.0205		0.019	0.0117	0.017	39.41	
31XB20N			Alloyed		0.0025	0.0028			0.0025					58.53	0.024		0.0005			0.021		0.0230	4.43	(0.004)	0.0039		(0.005)	0.0244		37.03	
31XB21E			Alloyed		0.0244	0.0908			0.104					69.32	0.126		0.0603			0.117		0.1269	0.113	(0.002)	0.105		0.059	0.101		29.55	
31XB22F			Alloyed		0.0402	0.165	0.0043		0.17		0.0117	0.139		82.47	0.158					0.154		0.207	0.152	0.030	0.161		0.047	0.160		15.92	
31XB23D			Alloyed		0.0048	0.0482			0.0463		0.0010	0.0472		89.57	0.060		0.0053			0.047		0.030	0.046	0.053	0.0448		0.0046	0.060		9.97	
31XB24D			Alloyed		(0.002)	0.0116			0.0126		0.0008			95.65	0.0342		0.0030			0.134		0.0065	0.050	0.050	0.118			1.93		1.99	
31XB26F			Alloyed	0.053	1.005	0.126			0.106		0.0147	0.1197		62.93	0.650		0.408			1.397		0.0593	0.930		0.098		0.252	1.476		30.30	
31XB29A			Alloyed		0.219						0.0144		0.062	67.08	0.144		0.0625			4.11		3.33	0.146					0.0328		24.75	
31XBIB1D		C89550*	Bismuth Brass		0.124	0.0303			1.87		0.0100			59.57	0.053		0.0273			0.255		0.0451	0.157	(0.001)	0.0106	0.0031	0.169	0.463		37.20	
31XBIB2E		C89550*	Bismuth Brass		0.504	0.0224			1.031		0.0055	0.0437		61.12	0.143					0.550		0.0232	0.118	<0.001	0.087	0.0027	0.151	1.267		35.01	
31XBIB3C		C89550*	Bismuth Brass		0.154	0.0476			4.04		0.0014	0.0032		63.18	0.0510					0.127		0.0626	0.181	0.0018	0.0321	0.0047	0.0516	0.198		31.83	
31XBIB4C		C89550*	Bismuth Brass		0.412	0.0131	0.0017		0.851		0.0028	0.0291		62.45	0.123		0.0146			0.199		0.0373	0.092		0.0477	0.0133	0.203	0.85		34.69	
31XB1Q			Cu-Zn Binary		(0.001)	0.0070	0.0007		0.0183		0.0018	0.0015	0.0091	54.99	0.0223		0.0079			0.0200		0.0385	0.0155		0.0075		(0.007)	0.0279		44.82	
31XB2N**			Cu-Zn Binary	0.012	0.15	0.015	0.003		0.015		0.003	0.04		[bal]	0.10		0.03			0.10		0.018	0.055		0.013		0.015	0.013	0.002	39.5	

Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Brass Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
31XB3M			Cu-Zn Binary	0.0247	0.074	0.0196	0.0022		0.0149		0.0040	0.0109		64.58	0.0264		0.0296			0.0259		0.0421	0.0299		0.0205			0.0202	0.0098	35.01	
31XB3N			Cu-Zn Binary	0.0152		0.0104	0.0008		0.0152		0.0027	0.0066		64.56	0.0408		0.0290			0.0171		0.0366	0.085		0.0148			0.0394	0.0056	35.05	
31XB4N**			Cu-Zn Binary			0.055			0.015		0.035	0.008	0.002	[bal]	0.025		0.030			0.010		0.008	0.080	0.005	0.007		0.03	0.050		30.5	
31XB5L			Cu-Zn Binary		0.0138	0.0357	(0.001)		0.0088		0.0040	0.0250		75.38	0.038		(0.002)			0.0275			0.084		0.016		(0.005)	0.266		23.98	
31XB6K			Cu-Zn Binary		0.0010	0.0009	0.0023		0.0010		0.0037	0.0063	<0.0005	79.90	0.0097		0.0039			0.0066			0.0122		0.0011		0.015	0.0029		19.93	
31XB7L			Cu-Zn Binary		0.0435	0.0054	0.0013		0.0607		0.0064	0.0044		84.22	0.099		0.0088			0.0351			0.0416		0.0196		0.018	0.089	(0.002)	15.34	
31XB8J			Cu-Zn Binary		(0.001)	0.0074			0.030		0.0155	0.0072	(0.001)	89.37	0.132		0.0006			0.0421		0.0026	0.082	0.045	0.0254		(0.002)	0.0311		10.23	
31XB9M			Cu-Zn Binary	0.0065	(0.001)	0.0103	(0.001)		0.0059					94.81	0.0361		0.0006			0.0379		0.0047	0.090		0.0089			0.062	0.0181	4.92	
73C	CDA 360	C36000	Free Cutting	0.006	(0.001)	0.005	(0.0004)		0.011	(0.003)	0.0014	0.002	0.001	61.3	0.199	(0.001)	0.003		(0.001)	0.095	(0.0003)	0.003	2.97	0.002	0.008		0.003	0.256		35.1	
31XHT38A	CDA 674	C67400	High Tensile		0.960	0.0008				0.003				58.77	0.0530		2.60			0.0242		0.0024	0.051	(0.001)	(0.0006)		0.869	0.039		36.66	
31XHT37A			High Tensile		0.0004	0.0011				0.003				60.33	0.0344		2.88			0.0105		0.003	0.623	<0.0005	0.0007		1.38	0.0116		34.69	
31XCZ114A	CZ114	C67500	Leaded Brass		0.714				0.0107					57.10	0.740		1.475			0.0183		0.0018	1.219		(0.003)		(0.006)	0.511		38.25	
31XCZ115A	CZ115		Leaded Brass	0.0041	0.0007	0.0008								57.19	0.601		1.095			0.0143		0.0091	1.169		0.0020		(<0.005)	0.729		39.20	
31XCZ121A	CZ121	C38500	Leaded Brass	0.0060	0.0034	0.0299			0.0046					57.84	0.167		0.0052			0.1028		0.0028	3.01		0.0050		(0.003)	0.1940		38.57	
31XCZ122A	CZ122	C37700	Leaded Brass	0.0030		0.150					0.0011			61.51	0.066		0.00097			0.0261			1.97		0.0088		(0.001)	0.0866		36.21	
31XCZ132A	CZ132	C35330	Leaded Brass	0.0050	0.0007	0.0119					0.0012	0.0009		57.63	0.165		0.0007			0.0510			2.05	0.0008	0.0054		(0.004)	0.160		39.90	
31X7835.1 J**			Leaded Brass	0.009	0.020	0.014			0.008		0.0037	0.009		[bal]	0.175		0.011			0.120		0.050	2.77		0.016		0.018	0.44		33.5	
31X7835.10A			Leaded Brass		0.648	0.0635			0.0202			0.0203		62.55	0.408		0.0318			0.159		0.0417	1.419		0.0216		0.010	0.234		34.36	
31X7835.11A			Leaded Brass		0.908	0.143			0.011			0.0065		65.75	0.192		0.0101			0.1007		0.024	1.695		0.0122		0.010	0.1522		30.98	
31X7835.2K			Leaded Brass	0.0102	0.060	0.0280	0.0023		0.0099		0.0020	0.0290		64.49	0.0309					0.0462		0.0226	2.07		0.0358		0.0193	0.152		32.94	
31X7835.3 K**			Leaded Brass	0.021	0.485	0.059			0.029		0.0060	0.007		[bal]	0.49		0.048			0.15		0.035	1.70		0.061		0.07	0.355		36.5	
31X7835.4 K**			Leaded Brass		0.16	0.057	0.002		0.018		0.009	0.007		[bal]	0.24		0.027			0.10		0.16	0.97		0.03			0.21		37.9	
31X7835.5A			Leaded Brass		0.078	0.104								91.25	0.126					0.249		0.018	1.64		0.114			0.116		6.23	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Brass Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
31X 7835.6 D**			Leaded Brass	0.005	0.63	0.007	0.004		0.004		0.0017	0.006		[bal]	0.12					0.06		0.04	1.29				0.01	0.71		37.0	
31X 7835.7 A			Leaded Brass		0.0084				0.048		0.0047	0.0120		88.87	0.030					0.943		0.080	2.29	0.0075	0.0327		0.039	0.137		750	
31X 7835.8 B			Leaded Brass	0.549	0.219	0.151			0.101		0.0944	0.313		72.7	0.0446		0.0102			0.157		0.154	3.22		0.110			0.451		21.55	
31X 7835.9 B			Leaded Brass	2.014	0.119	0.101			0.91		0.0586	0.113		76.6	0.191		0.0045			0.196		0.0627	1.045	0.0200	0.44	0.300	0.0471	1.60		16.26	
226A	EnviroBrass II	C89520M	Pb-Free Casting	0.004	0.002	0.003			1.7	0.003		0.001	(0.001)	86.7	0.054		0.002	(<0.0005)		0.54	(0.001)	0.005	0.04	0.005	0.004	0.93	0.002	5.1		4.8	
227A	EnviroBrass II	C89520M	Pb-Free Casting	0.004	0.002	0.003			2.3	0.003		0.001	(0.001)	85.9	0.06		0.001	(0.0002)		0.53	0.0013	0.003	0.042	0.005	(<0.01)	1.21	0.002	5.1		4.7	
228A	EnviroBrass II	C89520M	Pb-Free Casting	0.003	0.002	0.003			1.53	0.003		0.001	0.001	89	0.052		0.001	(<0.0005)		0.45	(0.002)	0.032	0.026	0.004	0.01	0.67	0.002	4.1		4.1	
31X MNB11 B			Mn Brass		1.204	0.0060			0.0051			0.0636		59.24	0.420		12.50			4.71		0.0380	0.345		0.0073		0.0545	0.199		21.21	
31X MNB2 D			Mn Brass	0.041	0.272	0.0201						0.0086		63.75	0.548		2.05			0.118		0.0246	0.983		0.0177		0.579	0.289		31.30	
31X MNB3 F**			Mn Brass	0.005	1.4	0.045						0.038	0.038	[bal]	1.25		2.1			0.38		0.055	0.52		0.045		1.65	0.42		25.5	
31X MNB4 F			Mn Brass	0.0131	3.91	0.0125						0.0312		64.62	1.728		2.97			0.347		0.0274	0.221		0.0189		0.103	0.547		25.59	
31X MNB5 Q			Mn Brass	0.0063	2.96	0.0100						0.0155	0.19	56.18	0.013		0.137			0.996		(0.008)	0.243		0.0118		0.44	1.60		37.12	
31X MNB5 R			Mn Brass	0.0195	3.24	0.0021						0.066	0.0116	55.14	0.898		0.175			1.32		0.0399	0.157		(0.006)		0.528	1.228		37.11	
31X MNB6 C			Mn Brass	0.0509	0.0148	0.0107						0.0107		70.01	0.0697		0.871			0.261		0.0226	0.016		0.0128		0.0196	0.0310		28.53	
31X NB1 H			Naval Brass		(0.0004)	0.161			0.0065			(0.0006)		68.35	0.037		0.051			0.520		0.0223	0.504	0.0024	0.0057		0.004	0.535		29.73	
31X NB2 H			Naval Brass		0.168	0.0970			0.100					62.21	0.112		0.151			0.0578		0.0139	0.239	0.0019	0.099		0.107	1.009		35.47	
31X NB3 J			Naval Brass	0.0464	0.130	0.0559	0.0028		0.0786					72.86	0.071		0.124			0.0599		0.203	0.127	(0.004)	0.197		0.127	1.38		24.46	
31X NB4 J			Naval Brass		0.178	0.0062	0.0009		0.104					63.71	0.235		0.0053			0.230		0.230	0.067	(0.0032)	0.450		0.203	2.01		32.57	
76A*	CDA 485	C48500	Naval High Pb	(0.002)	(<0.01)					(0.031)					0.08		(<0.01)			0.03		0.005	1.8	0.002	(<0.01)		(<0.01)	0.99		36.14	
76D	CDA 485	C48500	Naval High Pb	0.0014	0.002	0.004	(<0.001)	0.0006	0.0011	0.002	0.001	0.001	0.0006	60.7	0.013	0.0005	0.0006	(<0.001)	(<0.002)	0.003	(0.0006)	0.0018	1.69	0.0012	0.004	(<0.001)	0.0037	0.73	(<0.0009)	36.8	(<0.0001)
75A*	CDA 482	C48200	Naval Med Pb		(<0.01)	(<0.01)				(0.01)				(59.79)	0.052		(<0.01)			0.025		0.005	0.83	0.002	(<0.01)		(<0.01)	0.89		38.39	
75B	CDA 482	C48200	Naval Med Pb	(0.005)	(0.005)	(0.004)			(0.001)	(0.004)	(0.002)	(0.003)		60.63	0.06		(0.003)			0.02		0.003	0.63	(0.001)	(0.004)		(0.003)	0.59		37.98125	
75C	CDA 482	C48200	Naval Med Pb	(0.004)	(0.003)	0.005	(<0.1)	(<0.001)	0.0012	(0.002)	0.0015	0.0007	0.0009	60.7	0.06	(0.0003)	0.0024	(0.0006)	(<0.001)	0.013	(0.0007)	0.004	0.42	0.0015	0.007	(0.005)	0.005	0.69	(0.003)		(<0.001)

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Brass Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
74A*	CDA 464	C46400	Naval Uninhibited	(0.002)	(<0.01)	(<0.01)				(0.012)					0.01		(<0.01)			0.01		0.006	0.02	0.001	(<0.01)		(<0.01)	0.5		38.14	
74B	CDA 464	C46400	Naval Uninhibited	(0.005)	0.003	(<0.01)			(<0.005)		(0.002)			60.4	0.011		(<0.01)			0.006		(0.008)	0.017	(0.003)	0.003		0.003	0.7		38.9	
31X CZ112 A	CZ112	C46400*	Naval Uninhibited	0.0043	(0.001)	0.0052								61.24	0.0488		0.0010			0.0150		0.0136	0.458		0.0043		(0.003)	1.130		37.07	
31X WSB6 F	CDA 872	C87200	Si Brass	0.0131	(0.001)	0.0110	0.0054				0.0039	0.0095		95.40	0.158		0.924			0.0509		0.0179	0.0310		0.0406		3.13	0.0142		0.0506	
151Aw	CDA 875	C87500	Si Brass	(<0.01)	(<0.001)					(<0.01)					0.076		0.002			0.009		0.006	0.02	(<0.01)	(<0.03)		3.95	(0.006)		14.02	
151B	CDA 875	C87500	Si Brass	(0.01)	0.002	(0.002)				0.005			(0.003)	84	0.025		0.002			0.011	(0.002)	0.003	0.013	(<0.001)	(0.001)		3.11	0.009		12.94	
31XTB1 K			Traces in Brass	0.0455	0.493	0.111	0.0010		0.0414		0.0118	0.0500		63.08	0.171		0.280			0.0619			0.207		0.105		0.080	0.134		35.17	
31XTB2 J			Traces in Brass	0.0142	0.0282	0.0166			0.0176		0.0015	0.0151	0.0054	63.68	0.059		0.142			0.0758			0.065		0.0498		0.049	0.127	0.0206	35.71	
31XTB3 L**			Traces in Brass	0.013	0.04	0.048	0.0015		0.008		0.010	0.004		[bal]	0.02		0.035			0.03			0.12		0.03		0.02	0.14	0.003	37.0	
31XTB4 G			Traces in Brass		0.0041	0.0106	(0.0004)		0.0058		0.0032	0.0067		66.07	0.0340		0.0013			0.0133			0.0246		0.0095		0.0203	0.0197	0.0035	33.64	
31XTB5 B			Traces in Brass	0.216	0.0711	0.396			0.292		0.49	0.0202	0.0031	61.49	0.094		0.283			0.106			0.575		0.229		0.111	0.129		35.62	



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Bronze Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	In	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
32XCA7A	CDA 623	C62300	Al Bronze	0.0009	9.37						0.0028			0.0028	88.06	2.09		0.0004	0.151			0.234			(0.004)				0.017	0.0172		0.006	
79B	CDA 623	C62300	Al Bronze	0.002	9.19					(0.003)	0.002		(0.002)	(0.003)	88.4	2.13			0.16	(0.001)		0.075	(0.002)	0.005	(0.003)	(0.001)			0.019	0.017		0.013	
79C	CDA 623	C62300	Al Bronze	<0.005	9.2	0.003					0.003		<0.005	(0.002)	87.6	2.28			0.2	<0.0001		0.55	(0.001)	0.006	<0.005	<0.001	<0.005		0.033	0.01		0.014	
32XALB12A	CDA 628	C62800	Al Bronze	0.044	8.29								0.0056		82.90	1.094		0.0013	0.958			6.33		0.0101	0.0018				0.0202	0.310		0.0625	
80D	CDA 630	C63000	Al Bronze	0.04	9.67	0.009		(0.003)	<0.002	0.004	(0.004)	(0.002)	0.022	0.005	(81.7)	2.99		0.003	0.346	(0.002)	<0.02	5.01	(0.001)	0.005	0.005	0.003	<0.02	<0.03	0.025	0.093	(0.04)	0.007	<0.002
32XCA23A	CDA 632	C63200	Al Bronze	0.0008	9.19						(0.0050)			0.0018	81.05	3.63		0.0003	1.298			4.71		0.0011	(0.0026)				0.026	0.0164		0.031	
Cu642-18	CDA 642	C64200	Al Bronze	(0.015)	6.5	(0.01)		<0.005		(0.001)	<0.005	<0.005	<0.005	<0.005	90	0.039		<0.005	0.0024	(0.001)	<0.005	0.014	(0.001)	0.009	0.019	(0.002)	<0.005	(0.002)	1.96	0.019		1.19	<0.005
204A	CDA 954M	C95410	Al Bronze	0.009	10.55	<0.01					0.006		0.008	0.008	83.3	3.87			0.052			1.95		0.007	0.004	(0.002)	<0.01		0.034	0.005		0.22	
94B	CDA 955	C95500	Al Bronze	0.017	10.8	<0.01					(0.006)		0.011	0.017	80.6	3.99			0.071			4.31		0.011	0.004	0.002	(0.011)		0.028	(0.003)		0.14	
334A	CDA 955M	C95510	Al Bronze	(0.001)	9.76	(0.004)		(0.001)	(0.001)	(0.001)	0.0058	(0.001)	(0.003)	(0.01)	80.7	3.82		(0.001)	0.69	(0.0001)		4.77	(0.0003)	(0.005)	0.01	0.0007	0.0043		0.073	0.025		0.11	
334B	CDA 955M	C95510	Al Bronze	0.0013	9.91	(0.003)		(0.002)	(0.001)	(0.001)	0.005	(0.001)	(0.003)	(0.004)	80.8	3.7		(0.001)	0.6	(0.0004)	(0.001)	4.7	(0.0006)	0.005	0.006	0.0008	(0.004)	(0.004)	0.075	0.019		0.122	
32XALB2M**			Al Bronze	0.022	10.7	0.017							0.16	0.05	[bol]	3.8		0.008	0.32		0.025	4.8		0.035	0.03				0.21	0.10		0.27	
32XALB3S			Al Bronze	0.0272	10.43	0.0213							0.0760	0.0392	80.01	3.718		0.0659	0.243		0.018	3.51		0.0345	0.118				0.155	0.1209		1.314	
32XALB4H			Al Bronze		7.87	0.0130								0.022	79.61	3.55		0.153	1.028			7.03		0.036	0.120			low stock	0.252	0.085		0.264	
32XALB5K			Al Bronze	0.0061	7.21								0.0606	0.192	83.71	2.04		0.179	1.417		0.181	3.92		(0.05)	0.0512				0.107	0.0293		0.80	
32XALB6K			Al Bronze	0.0082	9.69	0.0116							0.139		80.77	2.71		0.0104	0.787			5.42		(0.006)	0.0749				0.073	0.120		0.126	
32XALB8F			Al Bronze	0.0100	6.21	0.189							0.425	0.088	77.04	5.37		0.194	1.57		(0.002)	6.11		0.261	0.049		0.0250		0.513	0.435		1.395	
32XALB9C			Al Bronze	0.0417	13.52	0.0163							0.0027	0.0206	81.64	3.12		0.090	0.159			0.628		0.096	0.267				0.235	0.0601		0.142	
32XALB10B			Al Bronze	0.0144	12.11	0.0194							0.0984	0.0152	73.64	3.63		0.0122	1.626			7.21		0.069	0.152				0.158	0.201		0.961	
32XALB13A			Al Bronze		7.09								0.0011		84.96	1.171			5.39			1.381		0.009	(0.001)				0.086	0.0072		0.0194	
32XCA12A		C64250	Al Bronze	0.0010	6.14						(0.002)				90.48	0.657		0.0005	0.0290			0.088			(0.0017)				2.57	0.0157		0.0405	
32XCA31A			Al Bronze	0.0008	8.95						0.006			0.0026	82.24	4.06		0.0008	0.336			4.28		(0.003)	(0.0024)				0.036	0.0037		0.041	
32X61400A	CDA 614	C61400	Al Bronze D	0.0010	6.81										89.99	2.74		0.0050	0.082			0.0242		0.0008	(0.001)				0.0124	0.301		0.060	

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Bronze Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	In	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
32XCA7A	CDA 623	C62300	Al Bronze	0.0009	9.37						0.0028			0.0028	88.06	2.09		0.0004	0.151			0.234			(0.004)				0.017	0.0172		0.006	
79B	CDA 623	C62300	Al Bronze	0.002	9.19					(0.003)	0.002		(0.002)	(0.003)	88.4	2.13			0.16	(0.001)		0.075	(0.002)	0.005	(0.003)	(0.001)			0.019	0.017		0.013	
79C	CDA 623	C62300	Al Bronze	<0.005	9.2	0.003					0.003		<0.005	(0.002)	87.6	2.28			0.2	<0.0001		0.55	(0.001)	0.006	<0.005	<0.001	<0.005		0.033	0.01		0.014	
32XALB12A	CDA 628	C62800	Al Bronze	0.044	8.29								0.0056		82.90	1.094		0.0013	0.958			6.33		0.0101	0.0018				0.0202	0.310		0.0625	
80D	CDA 630	C63000	Al Bronze	0.04	9.67	0.009		(0.003)	<0.002	0.004	(0.004)	(0.002)	0.022	0.005	(81.7)	2.99		0.003	0.346	(0.002)	<0.02	5.01	(0.001)	0.005	0.005	0.003	<0.02	<0.03	0.025	0.093	(0.04)	0.007	<0.002
32XCA23A	CDA 632	C63200	Al Bronze	0.0008	9.19						(0.0050)			0.0018	81.05	3.63		0.0003	1.298			4.71		0.0011	(0.0026)				0.026	0.0164		0.031	
Cu642-18	CDA 642	C64200	Al Bronze	(0.015)	6.5	(0.01)		<0.005		(0.001)	<0.005	<0.005	<0.005	<0.005	90	0.039		<0.005	0.0024	(0.001)	<0.005	0.014	(0.001)	0.009	0.019	(0.002)	<0.005	(0.002)	1.96	0.019		1.19	<0.005
204A	CDA 954M	C95410	Al Bronze	0.009	10.55	<0.01					0.006		0.008	0.008	83.3	3.87			0.052			1.95		0.007	0.004	(0.002)	<0.01		0.034	0.005		0.22	
94B	CDA 955	C95500	Al Bronze	0.017	10.8	<0.01					(0.006)		0.011	0.017	80.6	3.99			0.071			4.31		0.011	0.004	0.002	(0.011)		0.028	(0.003)		0.14	
334A	CDA 955M	C95510	Al Bronze	(0.001)	9.76	(0.004)		(0.001)	(0.001)	(0.001)	0.0058	(0.001)	(0.003)	(0.01)	80.7	3.82		(0.001)	0.69	(0.0001)		4.77	(0.0003)	(0.005)	0.01	0.0007	0.0043		0.073	0.025		0.11	
334B	CDA 955M	C95510	Al Bronze	0.0013	9.91	(0.003)		(0.002)	(0.001)	(0.001)	0.005	(0.001)	(0.003)	(0.004)	80.8	3.7		(0.001)	0.6	(0.0004)	(0.001)	4.7	(0.0006)	0.005	0.006	0.0008	(0.004)	(0.004)	0.075	0.019		0.122	
32XALB2M**			Al Bronze	0.022	10.7	0.017							0.16	0.05	[bal]	3.8		0.008	0.32		0.025	4.8		0.035	0.03				0.21	0.10		0.27	
32XALB3S			Al Bronze	0.0272	10.43	0.0213							0.0760	0.0392	80.01	3.718		0.0659	0.243		0.018	3.51		0.0345	0.118				0.155	0.1209		1.314	
32XALB4H			Al Bronze		7.87	0.0130								0.022	79.61	3.55		0.153	1.028			7.03		0.036	0.120			low stock	0.252	0.085		0.264	
32XALB5K			Al Bronze	0.0061	7.21								0.0606	0.192	83.71	2.04		0.179	1.417		0.181	3.92		(0.05)	0.0512				0.107	0.0293		0.80	
32XALB6K			Al Bronze	0.0082	9.69	0.0116							0.139		80.77	2.71		0.0104	0.787			5.42		(0.006)	0.0749				0.073	0.120		0.126	
32XALB8F			Al Bronze	0.0100	6.21	0.189							0.425	0.088	77.04	5.37		0.194	1.57		(0.002)	6.11		0.261	0.049		0.0250		0.513	0.435		1.395	
32XALB9C			Al Bronze	0.0417	13.52	0.0163							0.0027	0.0206	81.64	3.12		0.090	0.159			0.628		0.096	0.267				0.235	0.0601		0.142	
32XALB10B			Al Bronze	0.0144	12.11	0.0194							0.0984	0.0152	73.64	3.63		0.0122	1.626			7.21		0.069	0.152				0.158	0.201		0.961	
32XALB13A			Al Bronze		7.09								0.0011		84.96	1.171			5.39			1.381		0.009	(0.001)				0.086	0.0072		0.0194	
32XCA12A		C64250	Al Bronze	0.0010	6.14						(0.002)				90.48	0.657		0.0005	0.0290			0.088			(0.0017)				2.57	0.0157		0.0405	
32XCA31A			Al Bronze	0.0008	8.95						0.006			0.0026	82.24	4.06		0.0008	0.336			4.28		(0.003)	(0.0024)				0.036	0.0037		0.041	
32X61400A	CDA 614	C61400	Al Bronze D	0.0010	6.81										89.99	2.74		0.0050	0.082			0.0242		0.0008	(0.001)				0.0124	0.301		0.060	

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Bronze Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	In	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
32X SEB1 D	Sebiloy Type	C89510*	Bi Bronze			0.0402				4.25		0.0033	0.0478		81.88	0.071						0.102		0.0021	0.197	0.0052	0.305	0.812		4.26		7.81	
32X SEB2 D	Sebiloy Type	C89510*	Bi Bronze	0.0443		0.0160				4.57		0.0255	0.0133		86.56	0.074	0.074					0.0449		0.036	0.104	0.030	0.0222	0.044		6.96		1.40	
32X SEB3 E	Sebiloy Type	C89510*	Bi Bronze			0.0325				6.47		0.0095	0.0491		86.47	0.0113						1.214		0.0139	0.296	0.0180	0.108	1.30		2.96		0.887	
32X SEB4 F	Sebiloy Type	C89510*	Bi Bronze		0.0007	0.0065				2.50		0.0017	0.32		79.82	0.093						0.0199		0.0043	0.0357		0.0343	0.119		10.05		7.02	
32X SEB5 C	Sebiloy Type	C89510*	Bi Bronze		(0.001)					1.056		0.0051	0.0156		87.21	0.0430						0.317		0.072	0.268	0.050	0.0334	0.471		5.18		5.30	
32X SEB7 B**	Sebiloy Type	C89510*	Bi Bronze	0.033		0.035				3.2		0.008	0.13		[bal]	0.09						1.15		0.005	0.28	0.05	0.16	1.35		3.1		4.7	
32X CSN1 A			Bronze													0.0020								0.0007						0.306		0.0039	
32X SN1 F			Bronze		(0.001)	0.0111							0.0136		80.34	0.0014			<0.001			1.931		0.0022	5.66	0.0126	0.0274		(0.001)	11.65		0.259	
32X SN2 J			Bronze	0.0107	(0.002)	0.0119				0.119			0.0343		81.17	0.041			0.0246			1.025		0.220	2.06	0.0106	0.106		0.009	14.22		0.940	
32X SN3 G			Bronze		(0.14)	0.0323							0.0460		81.7	0.14			0.067			0.464		0.646	0.159	0.035	0.362		0.0247	16.14		0.150	
32X SN4 B			Bronze	0.495	0.0513	0.0651				0.0150			0.100		76.87	0.0811			0.0148			0.607		1.208	0.864	0.0132	0.143		0.0223	18.96		0.496	
32X SN6 B			Bronze	1.007	0.059	0.804	0.0027			0.127		0.0242	0.750	0.015	85.73	0.376			0.090			0.295			1.644		0.304			6.78		2.00	
32X SN7 B**			Bronze	0.32	0.025	1.15				0.20		0.03	0.35		[bal]	0.035						0.28		0.005	2.3	0.02	0.24			12.5		1.2	
211A	Magnolia B-1	C89320	Pb-Free Bronze	0.005	0.002	(0.01)				4.98			(0.001)	(0.002)	88.4	0.004			(0.003)			0.003		0.19	0.014	0.002	0.057		0.003	6.23		0.006	
72A*	CDA 314	C31400	Leaded Bronze	<0.005	<0.01				<0.001		(0.014)		<0.01		(89.71)	0.011			<0.01			<0.01		(0.007)	1.78	0.0014	<0.01		<0.01	<0.01		8.48	
72B	CDA 314	C31400	Leaded Bronze	(0.002)		(0.003)					0.002				90.08	0.007				(0.0002)		0.004	0.002	0.005	1.99	0.0015	0.006		(0.002)	0.029		7.81	
32X 93700 A	CDA 937	C93700	Leaded Bronze										0.0004		80.43	0.0011						0.307		(0.0015)	8.38	0.0017	0.0051			9.95		0.78	
32X LB16 A	CDA 941	C94100	Leaded Bronze	0.0016	(0.001)					0.0119					74.42	0.0040						0.793		(0.002)	18.78	0.0012	(0.001)			5.55		0.458	
32X LB10 G			Leaded Bronze	0.0686	(0.001)	0.169				0.093			0.084		77.10	0.0011						0.690		0.0034	12.60	0.0100	0.599			8.29	0.0107	0.110	
32X LB11 E			Leaded Bronze	0.0617	(0.001)	0.0408				0.0519			0.0098		78.72	0.0034						0.498		0.0050	10.21	0.0295	0.0680		0.0093	10.19	0.0147	0.039	
32X LB12 E			Leaded Bronze	0.0450	0.0337	0.112				0.0338			0.061		79.76	0.029						0.354		0.240	8.64	0.053	0.484		0.0099	9.63	0.0215	0.459	
32X LB14 G			Leaded Bronze	0.120	0.0006	0.0500				0.720			0.089		77.02	0.0094			0.0005			0.254		0.0589	15.42	0.0176	0.0750		(0.001)	5.63		0.586	
150A>	CDA 872	C87200	Cu-Si Bronze	<0.01	<0.01						<0.01					0.045			1.05			0.013		0.005	0.011	(0.001)	<0.03		3.93	0.016		0.03	

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Bronze Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	In	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
83A*	CDA 675	C67500	Mn Bronze A	<0.005	<0.01	<0.01					(0.007)		<0.01			0.99			0.22			0.01		0.005	0.058	0.002	0.008		<0.01	0.57		39.81	
83B	CDA 675	C67500	Mn Bronze A	(0.002)	0.002						0.003	(0.003)	(0.003)	(0.003)	58.7	0.97		(0.001)	0.13			0.01	(0.001)	0.004	0.017	(0.001)	(0.004)		(0.003)	0.85		39.3	
88A*	CDA 863	C86300	Mn Bronze		6.03	<0.01					(0.022)		<0.01			2.27			3.72			0.02		(0.004)	0.03	(0.002)	(0.01)		0.02	0.04		23.25	
88C	CDA 863	C86300	Mn Bronze	0.004	5.79	0.007		<0.1	<0.005	0.004	0.005	0.0009	0.001	0.008	64.5	2.98		0.0006	2.99	(0.00016)	(0.0001)	0.276	(0.0006)	0.02	0.133	0.001	(0.003)	<0.005	0.091	0.147	(0.0001)	22.86	0.0004
31XHT31B	CDA 670	C67000	Mn Bronze B		6.82	0.0005		0.0014			0.0057				67.00	3.01			5.69			0.226		0.0030	0.0139	0.0007			0.0443	0.079		17.06	
33XGM20 B**			Gun Metal	0.21	0.14	0.28				0.035		0.02	0.04		[bal]	0.43			0.04			0.21		0.06	0.30		2.35			4.5		1.78	
33XGM21B			Gun Metal	0.701	0.173	0.333				0.459		0.249			78.86	0.693						0.197		0.0697	7.53	0.0628	1.033	0.173	0.0213	4.50		4.96	
33XGM24A			Gun Metal	0.0046		0.0010				0.0009				(0.0013)	88.88	0.0083			<0.0005			0.0087		0.190	3.35	0.003	0.0012		0.0028	3.85		3.67	
33XGM29A			Gun Metal	0.0026		0.0017				0.0019				(0.0004)	89.36	0.0102			(0.0005)			0.0289		0.138	0.050	0.0024	0.0015		0.0027	6.12		4.23	
33XGM4AD			Gun Metal	0.0206	0.0015	0.0228				0.0442			0.0077		84.02	0.0932			0.0006			1.482		0.0034	5.27	0.034	0.0568		0.0010	3.02		5.90	
33XGM5P			Gun Metal	0.0497	0.055	0.0498				0.018		0.0048	0.0298		83.39	0.127						0.728		0.0507	5.18	0.0411	0.072		0.0310	4.48		5.66	
33XGM6K			Gun Metal	0.0148	0.0012	0.158				0.0359			0.0100		86.51	0.0256			0.0022			0.890		0.0041	3.94	0.090	0.259		(0.001)	6.58		1.409	
33XGM7K			Gun Metal	0.0682		0.095				0.098			0.100		85.69	0.0178						0.531		0.0050	1.79	0.0613	0.111			10.07		1.363	
33XGM8H**			Gun Metal	0.10	0.005	0.01				0.015			0.015	0.015	[Bal]	0.14						0.49		0.035	5.8	0.02	0.06			3.9		6.0	
33XGM9A			Gun Metal	0.0321	0.0052	0.0251				0.076		0.0072	0.079		75.1	0.090						0.710		0.0547	6.91	0.0153	0.184		(0.003)	2.93		13.81	
33XRB2B			Gun Metal	0.105	0.0078	0.0395				0.091			0.0326		82.02	0.503			0.0076			0.330		0.0435	2.99	0.069	0.0494		(0.002)	4.65		9.01	
267A	CDA 947	C94700	Ni-Sn Bronze	0.002	0.003	(0.004)				(0.005)	(0.003)		0.002	(0.001)	87.8	0.019			0.002			5.1		0.037	0.026	0.0014	<0.03	0.002	0.003	4.95		2.06	
32X51000A	CDA 510	C51000	Phosphor Bronze 5%	0.0024	(0.001)										94.84	0.0025						0.0083		0.300	0.0031	0.0021				4.86		0.0112	
77A*	CDA 510	C51000	Phosphor Bronze 5%	(0.010)	<0.01	<0.01					(0.012)		<0.01			0.01			0.01			<0.01		0.12	(0.011)	0.003	(0.01)		<0.01	4.6			
77B	CDA 510	C51000	Phosphor Bronze 5%	(0.002)	(0.001)	(0.001)				(0.004)	0.003				95.2	0.002			(0.002)	(0.0001)		0.002	(0.002)	0.148	0.016	0.002	0.005		(0.003)	4.66		0.007	(0.001)
33X54400A	CDA 544	C54400	Phosphor Bronze B-2	0.0124	0.0009	0.0156							0.0013		86.79	0.072						0.244		0.243	4.69	0.0251	0.0362			3.97		3.87	
78B	CDA 544	C54400	Phosphor Bronze B-2	0.008	(0.002)	<0.003				(0.001)	<0.002		<0.0005		87.7	0.02			(0.002)			0.077		0.19	3.87	0.01	0.01		<0.002	4.73		3.55	
32X52480A	ASTM B888	C52480	Phosphor Bronze	0.0131						0.0013					88.54	0.020						0.369		0.0103	0.329	0.0071	0.0182		(0.002)	10.33		0.397	

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Bronze Alloy

Part Number	Grade	UNS	Type	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Cu	Fe	In	Mg	Mn	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Zr
32XPB20A	CDA 510	C51000	Phosphor Bronze		<0.001	0.0011									95.22	0.0013			(0.007)			0.0090		0.196	0.0045	0.0030	0.0012		0.0046	4.55		0.007	
32XPB10P			Phosphor Bronze		(0.002)	0.0126				0.034			0.0062		87.14	0.0043			<0.001			0.0130		0.0030	0.0182	0.0144	0.0134		(0.001)	12.37		0.256	
32XPB12F			Phosphor Bronze	0.0155	(0.001)	0.0512				0.0647			0.0150		94.16	0.053			0.0014			0.205		0.076	0.0436	0.0108	0.1822		(0.002)	5.03		0.130	
32XPB13F			Phosphor Bronze	0.0196	0.0034	0.0309				0.0309			0.0091		92.64	0.057			0.0216			0.099		0.128	0.075		0.1091		0.0107	6.34	0.0298	0.374	
32XPB14E			Phosphor Bronze	0.0152	0.0201	0.0235				0.146			0.0047		89.70	0.0211			0.0141			0.103		0.128	0.0354	0.070	0.0433		(0.003)	9.65		0.103	
32XPB15A			Phosphor Bronze		0.045	0.123							0.0509		96.07	0.116		0.0275	0.0125			0.212		0.0873	0.174		0.026		0.043	2.21		0.76	
32XPB16A			Phosphor Bronze	0.0166	(0.001)	0.0035				0.0530					82.02	(0.001)						0.127		0.0073	0.088	0.0049	0.013		0.005	17.59	(0.002)	0.0082	
32X52100A	CDA 521	C52100	Phosphor Bronze 8%	0.0011	0.0008	0.0009				0.0019					92.08	(0.001)						0.0110		0.147	0.0031	0.0007				7.72		0.0028	
82A*	CDA 655	C65500	Silicon Bronze A	<0.005	(0.012)	<0.01					(0.014)		<0.01			0.04			1.02			<0.01		(0.004)	(0.02)	0.002	<0.01		3.07	0.015		(0.01)	
82B	CDA 655	C65500	Silicon Bronze A		0.002	<0.002					(0.003)			0.004	95.3	0.08			1.04	<0.0005		0.011	(0.001)	0.004	0.011	0.003	<0.01		3.22	0.017		0.38	
37X65500A	CDA 655	C65500	Silicon Bronze A		0.0028						(0.004)			0.0029	95.75	0.035			0.960			0.0059		0.0046	0.0034	0.0010			3.13	0.0426		0.0353	
89A*	CDA 903	C90300	Sn Bronze		<0.01						(0.009)		<0.01			0.009			<0.01			0.15		0.11	0.09	0.018	<0.01		<0.01	8.14		3.48	
89C	CDA 903	C90300	Sn Bronze	0.005	(0.002)	0.004			(0.0005)	(0.003)	0.002	(0.001)	(0.001)	(0.002)	87.5	0.004		(0.0004)	(0.001)	(0.0004)	(0.005)	0.008	0.006	0.004	0.17	0.0011	0.008	(0.001)	0.003	9.14	(0.0004)	3	(0.001)
310A	CDA 907	C90700	Sn Bronze	0.002	0.0009	0.002			(0.001)	(0.001)	(0.005)	(0.001)	0.0011	(0.001)	89.2	0.006		(0.001)	(0.001)			0.043	(0.001)	0.094	0.064	0.0021	(0.002)	(0.001)	(0.001)	10.56		0.1	
90C	CDA 922	C92200	Sn Bronze Leaded	0.011	(0.001)	0.002			(0.0003)	0.009	(0.002)	0.0003	0.0012	0.001	87.5	0.101		(0.0002)	0.003	(0.0003)	(0.0005)	0.266	(0.001)	0.026	1.4	0.01	0.022	0.0013	0.0012	6.3	(0.003)	4.3	(0.0002)
91E	CDA 932	C93200	Sn Bronze Leaded	0.015	0.0015	0.008		(0.0005)	0.0005	0.109	0.003	0.0011	0.0024	0.0008	81.3	0.11		<0.0050	0.0007	(0.0004)	(0.0005)	0.3	(0.0020)	0.026	7.59	0.028	0.168	0.004	0.0021	6.69	<0.04	3.68	
92C	CDA 937	C93700	Sn Bronze Leaded	0.05	0.0013	0.005			<0.001	0.011	(0.002)		(0.0007)	(0.0007)	80.35	0.008			0.0016			0.17	(0.004)	0.073	9.42	0.026	0.078	(0.001)	0.0019	9.65		0.15	
184A	CDA 941	C94100	Sn Bronze Leaded	(0.01)	0.0016	0.01				0.03	(0.004)		(0.001)	(0.001)	(74)	0.003			0.002			0.3		0.008	19	0.021	0.27	(0.002)	0.002	6		0.37	

Code Key: ☼ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Lead Alloy

Code	UNS	Type	Ag	Al	As	Au	Bi	Ca	Cd	Cu	Fe	Hg	In	Mg	Na	Ni	Pd	Pt	Re	Rh	Ru	S	Sb	Se	Sn	Te	Tl	Zn
84XBA1K	L50790	Battery Alloy (Pb-Sn-Ca)	0.0098	0.0336	0.0005		0.0146	0.120	0.0014	(0.0013)						(0.0001)							0.0009		0.888	(0.0003)		0.0068
84XBA11B	L507550	Battery Alloy (Pb-Sn-Ca)	0.0025	0.0207	0.0006		0.0159	0.0546	0.0006	0.0017													(0.005)		1.289			0.0006
84XBA12C	L507550	Battery Alloy (Pb-Sn-Ca)	0.0051	0.0158			0.0146	0.0647	0.0012	0.0014													0.0029		1.460			0.0032
84XBA13B	L507550	Battery Alloy (Pb-Sn-Ca)	0.0076	0.0363	0.0004		0.0282	0.0725	0.0014	0.0010													0.0018		1.685			0.0079
84XBA14A		Battery Alloy (Pb-Sn-Ca)	0.0103	0.0188	(0.0004)		0.0162	0.076	0.0015	0.0016						(0.0002)							(0.002)		0.959	(0.0002)		0.0057
84XBA15A		Battery Alloy (Pb-Sn-Ca)	0.0095	0.0161	0.0005		0.0140	0.0865	0.0013	0.0011													0.0047		0.941			0.0062
84XBA2D		Battery Alloy (Pb-Sn-Ca)	0.0044	0.0183	0.0004		0.0230	0.0756	0.0040	(0.002)						(0.0004)							(0.003)		0.544	(0.0003)		0.0273
84XBA20B		Battery Alloy (Pb-Sn-Ca)	0.0295	0.065			0.0144	0.368	0.0051														0.0038		0.370			0.0435
84XBA21B		Battery Alloy (Pb-Sn-Ca)	0.0102	0.0125			0.0173	0.553	0.0007														0.0028		0.162			0.0155
84XBA22B		Battery Alloy (Pb-Sn-Ca)	0.0044	0.074			0.0138	0.799	0.0018														0.0022		0.128			0.0053
84XBA23C**		Battery Alloy (Pb-Sn-Ca)	0.0031	0.042			0.021	1.015	0.0002					0.0033									0.002		0.19			0.0020
84XBA3D		Battery Alloy (Pb-Sn-Ca)	0.0062	0.0043	<0.001		0.0351	0.0212	0.0047	0.0061													(0.006)		0.324			0.0032
84XBA4D**		Battery Alloy (Pb-Sn-Ca)	0.017		<0.001		0.015	<0.001	0.013	0.027			0.003			<0.001							0.013		0.006	0.039		0.0035
84XBA7B		Battery Alloy (Pb-Sn-Ca)	0.0015	0.0085	(0.0004)		0.0140	0.0391	0.0004	0.0020						(0.0003)							0.0022		0.594	(0.0002)		0.0024
84XBA8D		Battery Alloy (Pb-Sn-Ca)	0.0035	0.0359	0.0005		0.0147	0.136	0.00043	0.0008						0.0002							0.0043		0.325	(0.00024)		0.0018
84XBA8E**		Battery Alloy (Pb-Sn-Ca)	0.003	0.0034			0.014	0.117	0.0005	0.0008				0.0005		<0.001							0.002		0.29			0.0018
84XBA9C		Battery Alloy (Pb-Sn-Ca)	0.0023	0.0207	(0.0005)		0.0145	0.118	0.0011	0.0021						(0.0001)							(0.005)		2.94	(0.0003)		0.0017
86XPSS1B		Babbitts	0.0049		0.554		0.195		0.0057	0.0249	0.0018		0.0074			0.0100	0.0023						11.54		4.29			0.0030
86XPSS2C**		Babbitts	0.02		0.52		0.06		0.21	0.14	0.001		0.016			0.001							8.9		6.5	0.003		0.001
86XPSS3B		Babbitts	0.0140		0.409		0.0273		0.0170	0.489	0.0025		0.0111			0.0009							14.13		9.39	0.0050		0.0030
86XPSS4C		Babbitts	0.0279		0.202		0.119		0.0575	0.113	0.0012		0.0194			0.0005							16.18		10.22	0.0071		0.0156
83XCU06A		Pb w/ Impurities	0.0019		(0.0001)		0.0134		(0.0001)	0.0554						0.0003						0.0011	(0.0008)	(0.0005)	(0.0004)	(0.0002)		(0.0003)
83XPR1K		Pb w/ Impurities	0.1029		0.0338	0.0019	0.0508		0.074	0.0465			0.0080			(0.0004)							0.0100	0.0008	0.016	0.0058		(0.002)

Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Lead Alloy

Code	UNS	Type	Ag	Al	As	Au	Bi	Ca	Cd	Cu	Fe	Hg	In	Mg	Na	Ni	Pd	Pt	Re	Rh	Ru	S	Sb	Se	Sn	Te	Tl	Zn
83XPR2 G		Pb w/ Impurities	0.055		0.0233	0.0005	0.0404		0.0020	0.0309		0.003	0.0010		0.0013	0.0006							0.0499	0.0005	0.0948	0.0100	(0.0017)	0.0005
83XPR3 G		Pb w/ Impurities	0.0029		0.0011	0.0036	0.144		0.0462	0.0694		0.0008	0.0093		(0.004)	0.0116							0.0888	0.0166	0.0417	0.0039	0.0033	(0.0007)
83XPR4 H		Pb w/ Impurities	0.0114		0.0003	0.0021	0.0150		0.0081	0.0454		0.019				0.0029							0.0050	(0.004)		0.0229	0.0021	
83XPR5 G2		Pb w/ Impurities	0.0011		0.0003		0.0086		0.0003	0.0006		(0.0001)	(0.0001)			(0.0002)							0.0006	0.0004	(0.0007)	0.0003	(0.0001)	(0.0002)
83XPR7 C **		Pb w/ Impurities	0.29		0.052		0.49		0.46	0.15			0.58			0.0025		0.004					0.78	0.006	0.22	0.009		
83XPR8 D		Pb w/ Impurities	0.497		0.134	0.0106	1.18		0.199	0.0448		0.086	0.293			0.0008							0.257	(0.0003)	0.604	0.0014		0.0004
83XPR11 A		Pb w/ Impurities	0.0030		0.0095		0.0117		0.0008	0.0551	(0.0003)					0.0011					0.009	0.497	(0.0001)	0.119		0.0042		
83XPR12 A		Pb w/ Impurities	0.0030		(0.0003)		0.0119		0.0011	0.0353	(0.0003)					0.0009					(0.0002)	0.0011	(0.0002)	0.0005		0.0051		
81XPA0.5 C		Pb-Sb Binary																					0.481					
81XPA1.0 C		Pb-Sb Binary																					0.989					
81XPA10.0 C		Pb-Sb Binary																					9.60					
81XPA12.5 D		Pb-Sb Binary																					12.72					
81XPA3.5 E		Pb-Sb Binary																					3.49					
81XPMg1 A †		Pb-Mg Binary												1.15														
81XPMg2 A †		Pb-Mg Binary												0.173														
81XPMg3 A †		Pb-Mg Binary												0.023														
82XPAg 1.5RE		Pb-Ag Alloy	1.55		0.005		0.065			0.27													0.386		0.036			(0.004)
82XPAg 2.5RD		Pb-Ag Alloy	2.21		0.009		0.13			0.26													0.246		0.082			(0.0024)
82XPAg 3.5RD		Pb-Ag Alloy	3.54	0.0015	0.020		0.290		0.0027	0.073	<0.001		0.037										0.106		0.25			(0.0004)
82XPAG0.7 A †		Pb-Ag Alloy	0.733																									
82XPAG0.9 A †		Pb-Ag Alloy	0.903																									
85X0494Pb1 A					0.049		0.0017			0.012													0.95	0.004	0.051			
85X0494Pb3 D			0.0186		0.245		0.126			0.0974	0.0005											0.0185	2.99	0.049	0.221	0.0155		

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Lead Alloy

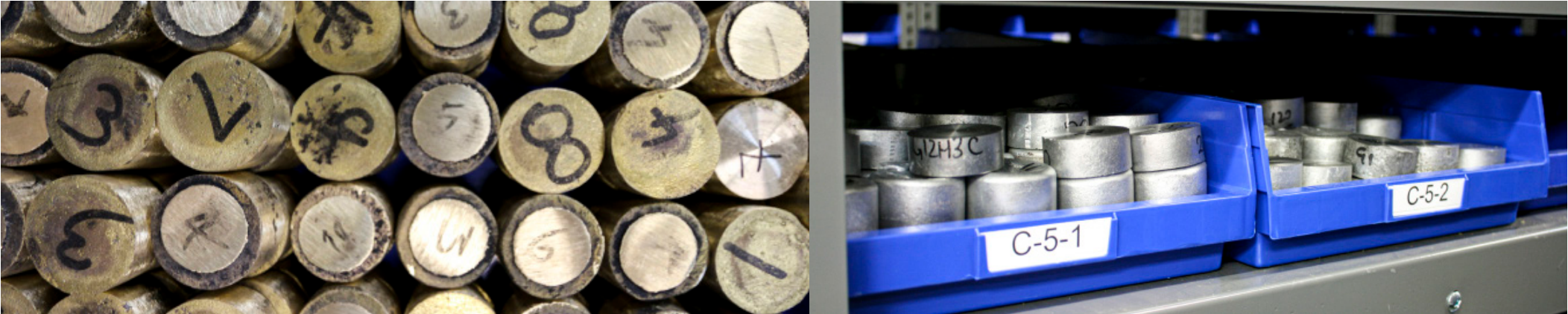
Code	UNS	Type	Ag	Al	As	Au	Bi	Ca	Cd	Cu	Fe	Hg	In	Mg	Na	Ni	Pd	Pt	Re	Rh	Ru	S	Sb	Se	Sn	Te	Tl	Zn
85X0616Pb1D			0.0089		0.0600		0.0365		0.0018	0.0158		(0.001)				0.0007							1.539	0.0047	(0.002)	0.0082		(0.001)
85X2.5LA A			0.0017		0.334		0.0142		(0.0002)	0.0372						0.0005						(0.0006)	2.48	0.0006	0.068	0.0004		0.0002
85X9494Pb2 C			0.0279		0.102		0.0387			0.0279	<0.001											0.0052	1.928	0.0272	0.124	0.0038		
85XA16 A			0.0297		0.0503		0.0165		0.0001	0.0006	(0.0001)					0.0006						(0.0003)	1.57	0.0218	0.0356			0.0001
85XANTH F			0.0070		0.183		0.0196		0.0039	0.0072	(0.0004)					0.0045						0.0026	6.25	0.014	1.25	0.0067		0.0005
85XCADH C			0.0093		0.0918		0.0138		2.01	0.013	0.0010					0.0007							1.89		0.115	0.0035		(0.0004)
85XCADL A			0.0076		0.0065		0.0169		1.69	0.0093	(0.0006)					(0.0005)							1.54	(0.0011)	0.010	0.0030		(0.0018)
85XCADL B			0.0132		0.102		0.0489		1.22	0.0384	0.0008					0.0002							2.00		0.0182	<0.001		(0.011)
85XHRH H			0.236		0.721		0.0996		0.0066	0.072						0.0012						(0.0022)	1.107	0.0375	0.851	0.0024		
85XM2 A			0.0016		0.259		0.0141		0.0003	0.0281	(0.0002)					0.0005						(0.0008)	1.847	0.0247	0.071			(0.0001)
85XMS2X A			0.0043		0.176		0.0188		0.0002	0.0277	(0.0001)					0.0004						(0.0002)	1.367	0.0334	0.392			0.0003
85XN35 A			0.0011		0.201		0.0130		0.00013	0.0246	(0.0001)					0.0006						0.007	3.42	0.0004	0.044			0.0001
85XPSb10 B			0.0020		0.127		0.0410		0.0018	0.169						0.0027						<0.001	10.00	0.0020	0.090	0.0037		0.015
85XPSb12 B			0.0019		0.071		0.0310		0.00053	0.330						0.0033						<0.001	11.50	0.0004	0.270	0.0056		0.071
85XPSB24 A **	L52710		0.0012		0.14		0.011			0.027												0.0004	2.37	0.027	0.235			
85XPSB28 A **			0.0014		0.24		0.011			0.010												0.0015	2.78	0.010	0.065			
85XPSb3 K **			0.0045		0.27		0.022		0.0022	0.029						0.002						0.009	2.26	0.038	0.145	0.005		0.001
85XPSB33 A **	L52770		0.0014		0.14		0.011			0.036												0.0008	3.25	0.021	0.21			
85XPSb5 E			0.0018		0.149		0.0134		0.0016	0.0593						0.0015						0.018	4.51	0.014	0.285	0.0029		0.00057
85XPSb5 F			0.0038		0.221		0.0267		0.0011	0.0361						0.0018						0.0056	4.69	0.0077	0.207	0.0007		0.0009
85XPSb5 G **			0.0030		0.25		0.012		0.0005	0.051						0.0008						0.009	4.65	0.014	0.29	0.0015		0.0002
85XPSb6 A			0.0459		0.111		0.0270		0.0046	0.0651						0.0021							6.51	0.0018	0.065	0.0108		
85XPSB60 A **	L53105		0.0011		0.078		0.009			0.040												0.003	5.90	0.008	0.025			

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Lead Alloy

Lead Alloy

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85XPSb8B			0.0049		0.0352		0.0178		0.0010	0.0169						0.0016						0.005	8.04	0.0022	0.041	0.0043		<0.001
85XPSn2C	L54210		0.0048		0.0048		0.0154		0.0007	0.0128						0.0003						(0.0009)	0.0239	0.0042	2.06	0.0045		(0.0004)
85XS744A			0.0046		0.125		0.0182		0.0003	0.0366	<0.001					0.0005						0.0028	1.532	0.0253	0.237			0.0002
85XSASHA			0.0016		0.683		0.0602		0.00024	0.0245						0.0005						(0.0005)	1.54		0.0130	0.0006		
85XSB28A			0.0025		0.162		0.0140		(0.0001)	0.0035	(0.0002)					0.0012						0.0010	2.87	0.0223	0.051			(0.0001)
85XSM31A			0.0009		0.0581		0.0114		(0.0001)	0.0084	(0.0001)					0.0006						0.0003	2.98	0.0183	0.0274			0.0002
85XSSBCA			0.456		0.075	0.0079	0.413		0.455				0.209									(0.0008)	2.14	0.0029	9.70	0.0037	0.0196	
85XYUMA			0.0018		0.306		0.0137		0.0002	0.0234						0.0007						0.0062	2.47	0.0008	0.0046	0.0005		(0.0002)
92C	CDA 937	C93700	Sn Bronze Leaded	0.05	0.0013	0.005			<(0.001)	0.011	(0.002)		(0.0007)	(0.0007)	80.35	0.008			0.0016			0.17	(0.004)	0.073	9.42	0.026	0.078	(0.001)
184A	CDA 941	C94100	Sn Bronze Leaded	(0.01)	0.0016	0.01				0.03	(0.004)		(0.001)	(0.001)	(74)	0.003			0.002			0.3		0.008	19	0.021	0.27	(0.002)



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Silver Alloy

Code	Type	Al	As	Au	Bi	Cd	Co	Cr	Cu	Fe	Ga	Ge	Code	In	Mn	Ni	Pb	Pd	Pt	Sb	Se	Si	Sn	Te	Zn
131X AGP1 B	Ag with Impurities		0.0145	0.0521	0.0523	0.0377			0.0815	0.0057			131X AGP1 B		0.0404	0.0276	0.042	0.0332	0.0505	0.0485	0.0299		0.0505	0.0435	0.0502
131X AGP2 B	Ag with Impurities		0.0029	0.0114	0.0096	0.0056			0.0193	(0.0020)			131X AGP2 B		0.0049	0.0057	0.0075	0.0105	0.0112	0.0107	0.0065		0.0095	0.009	0.0109
131X AGP3 B	Ag with Impurities		0.0006	0.0026	0.0012	0.0006			0.0066	(0.0011)			131X AGP3 B		0.0003	0.0012	0.0012	0.0016	0.0023	0.0021	0.0016		0.0022	0.0018	0.0034
131X AGP4 B	Ag with Impurities		0.0003	0.0009	0.0007	0.0002			0.0041	(0.0023)			131X AGP4 B		0.0003	0.0006	0.0005	0.0007	0.0007	0.0012	0.0006		0.0006	0.0005	0.002
131X AgSe1 A	Ag with Impurities				0.0304					0.0023			131X AgSe1 A								0.0162				
131X AgSe2 A	Ag with Impurities	0.0043			0.079			0.0037	0.1333	0.0022			131X AgSe2 A								0.0465	0.0039			
131X PAg1 A	Ag with Impurities	0.0008	0.0012	0.012	0.004	0.0035			0.0075	0.0005	0.006		131X PAg1 A		0.0035	0.0025	0.004	0.018	0.0035	0.005	0.0035	0.003	0.004	0.012	0.005
131X PAg2 A	Ag with Impurities	0.0002	0.0008	0.002	0.0012	0.0005			0.040	0.0007	0.0015		131X PAg2 A		0.001	0.0009	0.0012	0.018	0.001	0.0012	0.001	0.0004	0.001	0.0015	0.004
133X AGA1 A	Silver Alloy	0.0096	0.0255	1.48	0.194	0.0165	0.0406		19.95	0.039		0.0107	133X AGA1 A	0.0037	0.0061	0.0118	0.207	0.0054	0.0067	0.050	0.0169		0.291	0.0271	0.211
133X AGA2 A	Silver Alloy	0.00019	0.0144	0.507	0.113	0.0113	0.0163		10.00	0.027		0.0047	133X AGA2 A	0.0065	0.0115	0.0264	1.02	0.0076	0.0114	0.192	0.0078		0.520	0.098	0.502
133X AGA3 A	Silver Alloy	(0.0020)	0.008	0.258	0.048	0.0042	0.005		4.91	(0.015)		0.0045	133X AGA3 A	0.0134	0.0098	0.045	1.89	0.0156	0.0256	0.459	0.0044		0.921	0.054	0.816
133X AGQ1 C	Silver Alloy			0.251					2.532				133X AGQ1 C				0.245								
133X AGQ2 C	Silver Alloy			0.978					5.808				133X AGQ2 C				0.469								
133X AGQ3 C	Silver Alloy			1.975					9.612				133X AGQ3 C				0.921								



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Silver Alloy

Silver-Copper Alloy

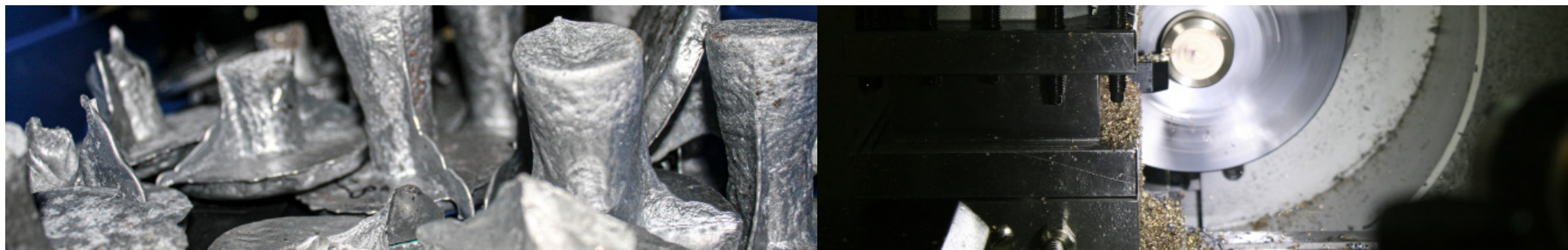
Code	Form	Ag	Cu	Zn
132X 925Zn1 B	Ag-Cu Alloy	92.7	6.09	1.39
132X 925Zn3 B	Ag-Cu Alloy	92.64	4.53	2.88
132X AGB100 C	Ag-Cu Alloy	99.94	0.009	
132X AGB75 C	Ag-Cu Alloy	75.11	24.53	
132X AGB85 C	Ag-Cu Alloy	84.87	15.09	
132X AGB87 B	Ag-Cu Alloy	87.13	12.67	
132X AGB90 B	Ag-Cu Alloy	89.73	10.24	
132X AGB93 B	Ag-Cu Alloy	92.7	7.27	



Code Key: ☺ = X-Ray Only; * = Chips Only; ♦ = Chips and X-Ray Only; † = Not CRM; ** = Provisional Values Subject To Change Upon Certification; + + = Unsuitable for use with glow discharge systems

Tin Alloy

Part Number	UNS	Type	Ag	Al	As	Au	Bi	Cd	Co	Cr	Cu	Fe	Ga	Ge	Hg	In	Ni	P	Pb	S	Sb	Se	Te	Zn
71XSR3F		Sn with Impurities	0.050	(0.0014)	0.097	0.0145	0.123	0.100			0.121	0.0203	0.0339		0.115	0.104	0.0371		0.306		0.128	0.0031	0.070	0.054
71XSR0C		Sn with Impurities	0.0024	0.0414	0.0005	0.0012	0.0029	0.0024	0.0004		0.0073	0.004	0.0054	0.0021	0.0099	0.0088	0.0025	0.0004	0.0457		0.0055	0.0006	0.0021	0.0053
71XPB3A		Sn with Impurities	0.0011		0.0022		0.0103	0.0008			0.0074								2.77		0.0024			0.0016
71XPB4A		Sn with Impurities	0.0047		0.0045		(0.002)	0.0027			0.0014								4.00		0.0059			0.0063
71XSR1F		Sn with Impurities	0.0165	(0.002)	0.0032	0.0022	0.0102	0.0109	0.0016		0.0016	(0.002)		0.011	0.0178	0.0104	0.0058	0.0014	0.0256		0.0203	0.004	0.001	0.0126
71XSR2F		Sn with Impurities	0.0305	0.0022	0.007	0.0077	0.0403	0.0351		0.0031	0.116	0.0133		0.009	0.140	0.0597	0.0183		0.151		0.074		0.0246	0.0058
73XSC2B		White Metal (Pewter, Babbitts)	0.0318		0.0355		0.602	0.0282	0.0217		1.028	0.0037				0.0099	0.0156		0.0457		3.05			(0.0007)
73XSC4B		White Metal (Pewter, Babbitts)	0.0525	(0.002)	0.0268		0.153	0.0085	0.0020		2.63	0.0014				0.0143	0.0130	0.005	0.429		5.94			(0.001)
73XSC5A		White Metal (Pewter, Babbitts)	0.063	0.003	0.013		0.43	0.008	0.011		0.57	0.004				0.036	0.0058		0.136	(0.001)	7.03			0.001
73XSC7B		White Metal (Pewter, Babbitts)	0.0059	(0.001)	0.059		0.013	0.0019	0.0143		5.71	(0.043)				0.0194	0.0160		0.32	(0.001)	13.86			0.0033
73XSC8B		White Metal (Pewter, Babbitts)	0.0253	(0.001)	0.11		0.0531	0.098	0.0267		3.78	0.055				0.0325	0.0351		0.110	0.004	5.52			0.004
73XSC9B		White Metal (Pewter, Babbitts)	0.0055	(0.001)	0.117		0.0825	0.0506	0.0051		8.03	0.053				0.0059	0.0084		0.305		8.31			
73XSC11C		White Metal (Pewter, Babbitts)	(0.056)		0.248		0.554	1.72			11.51	0.0052					0.110	0.025	0.0630		12.98			0.005
73XSC12B		White Metal (Pewter, Babbitts)	0.842	0.0015	(0.034)		0.0301	0.758	0.0210		6.03	0.024					0.115		0.091		7.50			0.0210
73XSC13A		White Metal (Pewter, Babbitts)		(0.01)	0.054		0.0188	0.0021			4.19	0.053						(0.02)	0.259		4.21			0.0126
73XSC13A		White Metal (Pewter, Babbitts)		(0.01)	0.054		0.0188	0.0021			4.19	0.053						(0.02)	0.259		4.21			0.0126



Form Key: C=Cast; CC=Chill Cast; R=Rolled; W=Wrought; HIP=Hot Isostatically-pressed Powder

Solders

Part Number	UNS	Type	Ag	Al	As	Au	Bi	Cd	Co	Cu	Fe	Hg	In	Ni	Pb	Sb	Se	Sn	Te	Zn
95XBIS50P1 B †		Fusible Alloy					49.8	0.022			0.03			0.025				50.0		0.003
95XBIS50P2 B †		Fusible Alloy	0.090	(0.001)	0.005	0.015	49.6				0.01							50.3		
95XBIS70P1 A †		Fusible Alloy	1.10	<0.001	0.025	0.0004	29.6				0.010		0.040	0.029				69.1		
95XBIS50P3 A †		Fusible Alloy	1.50		0.073	0.0025	49.8	0.015			0.003							48.6		0.002
95XBIS40P2 A †		Fusible Alloy	0.005	0.002	0.002	0.0006	55.3	0.0008	0.001	0.003	0.001		0.005	0.002	0.020	0.005		44.7		0.002
95XPBS40P1 A †		Fusible Alloy	0.011	(0.0006)	0.005		13.8	0.0043		0.025	(0.0006)		0.005		(43.6)	0.016		42.6		0.0010
95XBIS40P1 B †		Fusible Alloy	0.035		0.0101		57.4	0.0050		0.0670	(0.001)		0.0164		0.043	0.092		42.3		
95X 117 A †		Fusible Alloy	0.0047				45.3	4.99		0.011			18.6		23.1	0.012		7.99		0.0053
95X 136 A †		Fusible Alloy	0.0057				48.7	0.0091		0.0029			21.5		17.8	0.023		12.05		0.030
95X 158 A †		Fusible Alloy	0.002				50.2	9.6		0.048			0.006		27.0	0.057		13.5		0.044
95X 174 A †		Fusible Alloy	0.0076				57.12	0.0089		0.0029			26.2		0.081	0.082		16.79		0.036
95X 255 A †		Fusible Alloy	0.0019				55.7	0.0065		0.045			0.010		43.7	0.32		0.24		0.035
95XBIS70P2 A †		Fusible Alloy	2.01	<0.001			32.8						0.049					65.0		0.001
95XSC34 A †		Fusible Alloy						(65.99)										34.05		
95XSC36 A †		Fusible Alloy						(63.98)										36.09		
91XS10P D		Sn/Pb Solder	(0.001)	<0.001	(0.001)		(0.006)	<0.0001		(0.001)	<0.001		<0.001	<0.001		(0.002)		10.07		<0.0001
91XS63B1 A		Sn/Pb Solder	0.0592	(0.0015)	<0.002	0.074	0.597	0.0095		0.105	0.0204		0.0067	0.0131		0.470		61.9	0.0012	(0.002)
91XS40PR2 D		Sn/Pb Solder	0.086		0.010		0.154	0.0046		0.085	0.0096			0.0050		0.596		40.68		0.0275
91XS30PR2 C		Sn/Pb Solder	0.060	<0.0005	0.028	0.0017	0.158	0.0060		0.095	0.009			0.0077		0.619		30.17		0.016
91XS63PR3 G		Sn/Pb Solder	0.0193		0.0264	0.169	0.254	0.0009		0.101	0.0078	(0.038)	0.0097	0.0085		0.243		64.01	0.0068	0.0061
91XS62AG2 A		Sn/Pb Solder	2.03	(0.0011)	0.022	0.0020	0.168	0.0016		0.069	0.0065			(0.0016)		0.347		61.68		0.0011
91XS63PR2 K		Sn/Pb Solder	0.0528	0.0005	0.0094	0.082	0.175	0.0089		0.0841	0.0053		0.0157	0.0027		0.531		61.84	0.0036	0.0032
91XS50PR4 B		Sn/Pb Solder	0.0704	(0.0006)	0.0364	0.0355	0.114	0.0123		1.184	0.0025		0.0502	0.0171		0.132	0.003	53.06		0.032
91XS63P J		Sn/Pb Solder	0.0170	(0.0003)	(0.001)	(0.0005)	0.0056	(0.0001)		0.0156	0.0015		0.0064	0.0003		0.011		62.96	(0.0002)	(0.0003)

Solders

Part Number	UNS	Type	Ag	Al	As	Au	Bi	Cd	Co	Cu	Fe	Hg	In	Ni	Pb	Sb	Se	Sn	Te	Zn
91XS63PR0 C**		Sn/Pb Solder	0.020		0.016	0.0005	0.010	0.0125		0.024	0.0015	0.008	0.010	0.004		0.024		60.0	0.0005	0.0004
91XS40P D		Sn/Pb Solder	(0.001)	<0.0005	(0.007)		(0.005)	<0.0001		(0.001)	(0.001)		(0.002)	<0.001		(0.002)		40.00		<0.0001
91XS50P E		Sn/Pb Solder	(0.001)	<0.0005	(0.006)		(0.005)	<0.0001		(0.002)	(0.001)		(0.003)	(0.001)		(0.002)		50.05		<0.0001
91XS10PR1 C		Sn/Pb Solder	0.0078		0.0045		0.0277	0.0029		0.0097	(0.0016)			0.0006		0.0278		9.10		<0.001
91XS63PR1 G		Sn/Pb Solder	0.0061		0.0064	0.0348	0.0588	0.0045		0.214	(0.002)	(0.015)	0.0308	0.0060		0.052		61.45	0.0047	(0.002)
91XS63PR0 B		Sn/Pb Solder	0.0097		0.0094	0.0148	0.0084	0.0097		0.0202	(0.0024)	0.004	0.0048	0.0018		0.018		60.03	0.0034	<0.0005
93XS30APR2 C		Sn/Pb/Sb Solders	0.049		0.0178		0.168	0.0061		0.062	0.0026		0.0199	0.042		1.80		30.68	0.0102	0.028
93XS30APR3 C		Sn/Pb/Sb Solders	0.021		0.018		0.28	0.009		0.008	0.0026			0.010		0.96		33.0		0.005
93XS30APR1 C		Sn/Pb/Sb Solders	0.0144		0.010		0.059	0.0014		0.192	(0.012)		0.0094	0.0010		2.54		28.58	0.0024	(0.0004)



Tin Based, Lead Free Solders

Tin Based, Lead Free Solders

Part Number	UNS	Type	Ag	Al	As	Au	Bi	Cd	Co	Cr	Cu	Fe	Ge	Hg	In	Ni	P	Pb	Sb	Se	Zn
74XAB1 A		Pb-Free Solder	3.58		0.0280	0.0010	0.997	0.0199	0.0032		0.0285	0.0435			0.0262	0.0036		0.0353	0.0111		
74XAMF	L13938	Pb-Free Solder	0.496	(0.001)	0.0038		0.190	0.0061			3.07	(0.001)			0.0082	0.0260	(0.002)	0.126	1.064	(0.001)	(0.006)
74XBZ1 A		Pb-Free Solder	0.004	0.0021	0.0119		3.03	0.0012			0.026	0.011				0.0097		0.0238	0.031		8.27
74XCA1 B		Pb-Free Solder	0.440	0.0262		0.0053	0.0131	0.0071			0.682							0.077	0.0169		
74XCA2 C		Pb-Free Solder	3.50		0.0145	0.0016	0.0298	0.0039	0.0025		0.797	0.0038	0.014	0.0054	0.0084	0.0336	0.005	0.057	0.0806		0.0015
74XCA3 B		Pb-Free Solder	2.98	0.0010	0.0039	0.007	0.0156	0.00045			0.0869	0.006	0.0093		0.0042	0.0077	0.031	0.0491	0.0266		0.0009
74XCA4 D		Pb-Free Solder	3.07		0.0030	0.0020	0.0512	0.0025	0.0005	0.0010	0.552	0.0040		0.0075	0.009	0.0588		0.081	0.0612		0.0051
74XCA5 B		Pb-Free Solder	4.09	(0.001)	0.0125	0.0091	0.0050	0.0023			1.189	0.0021		0.0030	0.0129	0.0149	(0.011)	0.044	0.124	0.0004	(0.002)
74XCA6 B		Pb-Free Solder	0.305	(0.0003)	0.0133	0.0048	0.0098	0.0005			0.602	0.0120		0.0039	0.0243	0.0246	(0.001)	0.0287	(0.010)	(0.0005)	(0.0005)
74XCA7 B		Pb-Free Solder	4.02		0.0085		0.0102	0.0059	(0.002)	0.0045	0.347	0.007		0.049	0.0053	0.0315		0.107	0.0194		0.0501
74XCA8 B		Pb-Free Solder	2.47		0.0144		0.0172	0.0101	0.0202		0.950	0.0043	0.0020	0.101	0.0062	0.0020	0.010	0.084	0.0180		
74XCA9 A		Pb-Free Solder	1.002	0.0007	0.0173	0.0025	0.0364	0.0015			0.097	0.0085	0.0049		0.0165	0.0039	0.011	0.038	0.076		0.0010
74XEF	L13935	Pb-Free Solder	0.667	(0.001)	0.0092		0.0099	0.0003			2.94	0.0008			0.0074	0.0069	(0.001)	0.0248	0.0168	0.0008	(0.005)
74XGE1 A		Pb-Free Solder	0.052	0.065				0.0059			0.662		0.046			0.0289		0.0339			
74XGE2 A		Pb-Free Solder	0.079	0.068				0.0086			0.713		0.479			0.031		0.0467			
74XHA G	L13955	Pb-Free Solder	2.80	(0.002)	0.0032		0.0639	0.0018			0.629	0.0029			0.0090	0.0133	(0.001)	0.077	2.10	(0.001)	2.73
74XHB G	L13952	Pb-Free Solder	0.086	(0.003)	0.045		0.038	0.0103			4.49	0.0138			0.0179	1.22	(0.002)	0.056	4.81	0.0038	(0.02)
74XHNF	L13933	Pb-Free Solder	0.160	0.0011	0.016		0.042	0.0046			4.12	0.020			0.0052	0.195	(0.001)	0.0050	0.038	0.0024	0.0068
74XOA A	L13937	Pb-Free Solder	0.100	(0.001)	0.080	(0.0001)	1.065	0.00063			3.41	0.007			0.0034	0.0025	0.0072	0.128	0.0098		(0.002)
74XTCF	L13931	Pb-Free Solder	0.039	(0.001)	0.024		0.106	0.0150			4.99	0.0031			0.0215	0.0167	(0.002)	0.183	0.124	0.0473	0.004
74XWSA	L13939	Pb-Free Solder	0.298	(0.001)	0.0105	(0.0002)	0.0063	0.00140			4.58	(0.004)			0.0032	0.0048	0.0122	0.037	1.49		0.0009

Setting Up Samples

Part Number	Base	Ag	Al	As	B	Be	Bi	C	Ca	Co	Cr	Cu	Fe	Mg	Mn	Mo	N	Nb	Ni	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr
164X ALSUS7 †	Al					0.1			<0.001	0.2	0.01	4	0.55	0.15	0.06				1.1		0.11											0.18
164X ALSUS8 †	Al	0.09				0.015			<0.001	0.025	0.06	0.75	0.25	0.9	0.45				0.12		0.001											0.025
217A	CS	(0.0002)		(0.003)	(<0.0001)			(0.01)	(0.0001)	(0.004)	(0.01)	(0.001)			(0.003)	(0.01)	(0.0005)	(0.001)	(0.01)	(0.002)	(0.004)	(0.001)	(0.006)		(0.01)	(0.0005)	(0.01)	(0.0001)	(0.002)	(0.005)	(<0.0001)	(0.005)
165X ALB1 SUS †	Cu		9.0	0.005			0.015				0.01	82	2.8	0.04	0.08				5.3	0.015	0.20				0.10	0.03					0.06	
165X MNB5 SUS †	Cu		3.2									55	0.55		0.20				1.1		0.20				0.40	1.6					38	
165X PB10 SUS †	Cu		0.001	0.02			0.02			0.01	0.001	89	0.002		<0.001				0.06	0.002	0.04	0.03	0.15	0.01	0.001	11.0						0.05

Setting Up Samples - Pb, Zn, Sn

Part Number	Base	Ag	Al	As	Au	Bi	Cd	Co	Cr	Cu	Fe	Ge	Hg	In	Ir	Mg	Mn	Ni	Pb	Pd	Pt	Rh	Ru	S	Sb	Si	Se	Sn	Te	Ti	Tl	Zn
168X PBSUS1 †	Lead	0.01		0.37	0.001	0.04	0.015			0.03	0.002			0.01				0.003						0.002	6.2		0.01	1.3	0.01		0.001	0.001
168X PBSUS5 †	Lead	0.2		0.35	0.0005	0.35	0.09			0.06	<0.001		0.02	0.08				0.001						0.0005	0.35			0.9	0.003		0.002	
168X PBSUS6 †	Lead	0.04		0.025	0.001	0.22	0.015			0.10	<0.001			0.01				0.003						0.0005	0.12		0.003	0.15	0.0005		0.03	0.002
168X PBSUS PM1 †	Pb Fire Assay	0.004		0.0002	0.0035	0.01				0.0005	0.0001				0.0002			0.0003		0.002	0.0055	0.0012	0.00001	0.0002	0.0001				0.0001		0.001	
169X ZNSUS1 †	Zn	0.04	0.35			0.005	0.30		0.001	0.35	0.05			0.25		0.002	0.001	0.06	0.60						0.20	0.003		0.30		0.001	0.06	
1611X SNSUS6 †	Tin	0.1		0.3	0.001	0.08	0.01	0.02		0.4	0.03			0.005				0.03	1.0						0.15		0.003		0.001		0.005	0.005
1611X SNSUS7 †	Tin	0.15	<0.001	1.9	0.005	2.4	0.02	0.01		11	(0.06)	0.002		0.05				0.09	0.35						11		0.005		0.005		0.025	(0.001)

Setting Up Samples - Residuals in Aluminum

Part Number	Grade	Ag	As	B	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu	Fe	Ga	Hf	Hg	In	Li	Mg	Mn	Mo	Na	Ni	P	Pb	Zr
220G	QA 10 - SUS	(<0.00001)	(0.000012)	(0.00057)	(<0.00001)	(<0.00001)	(0.000010)	(<0.00001)	(0.00034)	(<0.00001)				(0.00014)	(<0.00001)		(<0.00001)		(0.00087)		(0.000015)	(0.000030)		(0.00060)	(0.000015)	(0.000088)
221B	QA 11 - SUS				(0.005)		(0.03)			(0.2)	(0.2)	(0.6)	(0.2)	(0.03)					(4.8)	(0.4)						
221C	QA 11 - SUS				(0.005)		(0.03)			(0.2)	(0.2)	(0.6)	(0.2)	(0.03)					(4.8)	(0.4)						
221D	QA 11 - SUS				(0.005)		(0.03)			(0.2)	(0.2)	(0.6)	(0.2)	(0.03)					(4.8)	(0.4)						

Powder Standards

Additive Manufacturing Powders

Part Number	Grade	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	H	Hf	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Y	Zn	Zr
Fe316LP-18	AISI 316L	75 g	0.006	(0.001)	(<0.005)	(<0.001)	0.006	(<0.005)	(<0.005)	0.006	17.9	0.0031		(<0.001)	(<0.001)	(<0.005)	1.56	2.81	0.081	(0.001)	13.9	0.043	0.011	(<0.01)	0.0041	(<0.005)	(<0.005)	0.29	(<0.005)	(<0.005)	(<0.008)	0.006	(<0.012)	(<0.001)	(<0.01)	(<0.005)
Ni718P-18	Alloy 718	75 g	0.49	(<0.01)	(0.0007)		0.036	(<0.005)	(<0.008)	0.097	19.6	0.018	17.0	(<0.001)	(<0.002)	(<0.005)	0.026	3.13	0.01	4.95	53.6	0.014	0.006	(<0.02)	0.0013	(<0.01)	(<0.005)	0.036	(<0.005)	0.006	1.01	0.017	0.01	(<0.001)	(<0.01)	(<0.003)
Ti64P-18	Grade 5 (6-4)	75 g	6.44	(<0.005)	(<0.005)	(<0.005)	0.051	(<0.005)	(<0.001)	(<0.011)	(0.004)	(<0.005)	0.215	0.0019	(<0.002)	(<0.01)	0.01	(<0.005)	0.05	(0.0004)	(0.003)	0.14	(0.001)	(0.0003)	0.0012	(0.0003)	(<0.005)	(0.021)	0.008	(<0.005)		4.22	(0.0004)	(<0.002)	(<0.01)	(<0.004)

Gases in Tool Steel

Code	Grade	Type	Al	As	B	Bi	C	Ca	Cd	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Ta	Ti	V	W	Zn	Zr	Zn	Zr
18XD7 A	12% Cr, 4% V, 1% Mo	100 g					2.32									0.0124			0.072			0.0111											0.0029	0.0013



Metal Alloy Proficiency Testing Program (PTP)

Why Choose ARMI | MBH PTP?

- Monitor your analytical performance as stipulated in the ISO/IEC 17025 laboratory accreditation process
- Measure analytical performance against a CRM's "Assigned Value"
- Large library of materials – over 1,400 metal alloys from aluminum to zinc
- Developed as an alternative to typical round-robin style proficiency testing schemes, which measure performance with non-certified materials
- Provides confidential assessment against peer performance
- Results delivered within days, not months, making it easy to implement as part of your laboratory quality program



Our Reports Include:

- Results presented in a one-page report with a single statistical graph
- A color-coded Certificate of Performance which compares your results to the actual benchmarked data
- A color-coded control chart graphically depicting your data compared to the certified average for each element examined
- A Certificate of Analysis confirming that a CRM was used in the test

How it Works:

- Choose the type of material by matrix group and sample configuration (solids or chips)
- Receive your blind sample, selected from our full stock of CRMs
- Analyze the blind sample, and submit your results to us
- Receive your report within days

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Learn More: www.armi.com/armi-ptp

Sample Grinder HK150EX

Manual pendulum grinder with steel cabinet and integrated spark trap and dust exhauster. Clean, powerful sample grinding system with stone – ready to go.

- Floor standing machine, dustproof, covered compartment, halogen spotlight
- Steel cabinet with switch board, dust trap, exhauster and drawer
- Reproducible flat surface, easily operated pendulum arm in taper bearings
- Simple and reliable machine construction
- Specially suitable for hard materials, like white cast irons
- Adaptable to various qualities by special stone cup wheels
- Vertical moving of grinding head by hand wheel with 0.1 mmv

Technical Specifications

Grinder Motor	3 x 400 V/50 Hz, 1.1 kW (three phases, each 230V) 1 x 230 V/50 Hz 3 x 220 V/60 Hz (USA/Canada)
Instrument Dimensions	grinder 400 x 400 x 680 mm cabinet 600 x 600 x 870 mm
Mass	grinder approx. 100 kg, cabinet approx. 50 kg
Revolution Speed	2800 rpm/3440 rpm
Grinding Stone	150 x 80 x 32 mm
Grinding Height	min. 4 mm, max. 90 mm
Lighting	12 V/20 W halogen

Consumables

Part Number	Grade	Quantity	
HKT46J1	Al2O3-grinding stone	1-3 packs	3 pcs/pack
HKT46J2	Al2O3-grinding stone	4-8 packs	3 pcs/pack
HKT46J3	Al2O3-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

Accessories

Part Number	Description
HK150ERS	Spare parts set (bellows, safety glass, lamp, fuses)
HK150MS	Magnetic plate, complete with arm, 100x65mm
HK150VICE	Vice for samples 44-58mm Ø
HKEXFILT	Round filter, exhauster HK150/350, PAS 11-21
HKEXFILT	Round filter, exhauster HK150/350, PAS 10-20
HKDUST	Spark arrester with metal tube for HK150 & HK350

Mobile but sturdy sample preparation machine for spectrometer samples.

- Mobile desk-top model
- For use with self-adhesive grinding paper
- Solid steel cabinet, cast iron disc pan and motor base
- Easy to clean
- Disc pan with exhaust outlet.



Technical Specifications

Power supply	230 V / 50 Hz, 370 W
Instrument dimensions (mm)	270 w x 290 d x 280 h
Grinding disc diameter	205 mm
Alternative power	"230 V / 60 Hz or 115 V / 60 Hz"
Mass	22 kg
Revolution speed	2880 rpm

Sample Holders

Part Number	Description
HKHOLD3	Magnetic sample holder, round, 40-50mm Ø
HKHOLD4	Magnetic sample holder, rectangular, 35x35mm
HKHOLD5	Non-magnetic sample holder, round
HKHOLD6	Magnetic sample holder, rectangular, 50x50mm

Adhesive Grinding Paper

Part Number	Grade	Quantity
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

ColdBlock™ IR Digestion Systems for ICP Sample Preparation

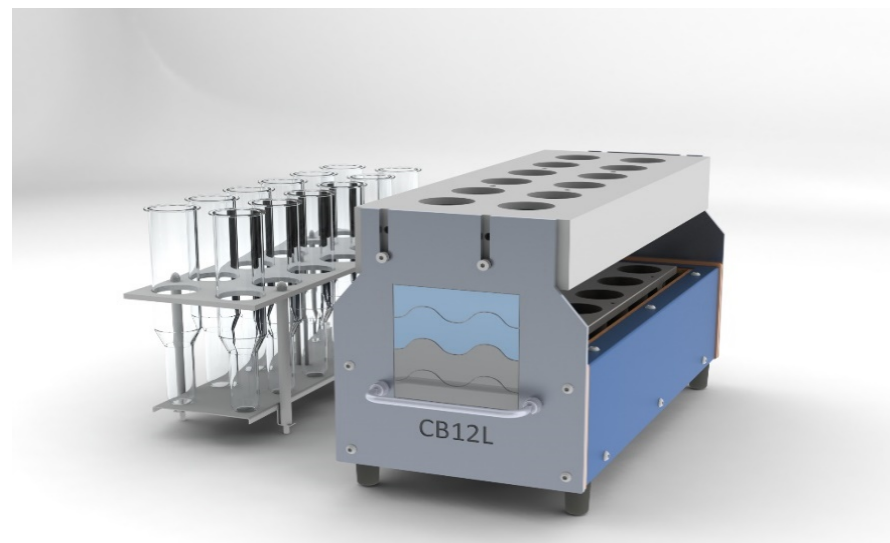
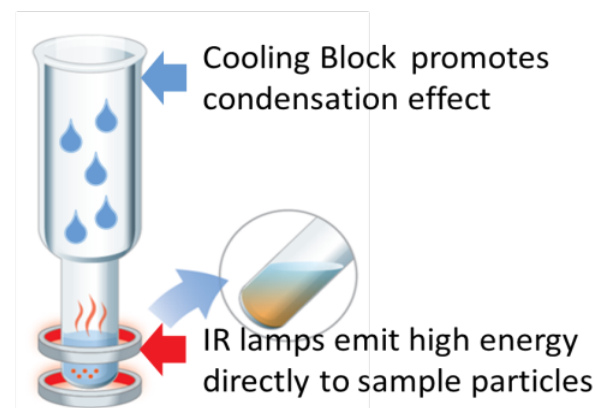
The ColdBlock™ digestion system uses IR radiation to rapidly digest samples for analysis by ICP and AA. The IR radiation directly heats the sample rather than the acid leading to rapid digestion while the cooling block condenses the evolving vapor limits loss of volatile elements.

The ColdBlock™ system offer

- Rapid sample digestion (10-15 minutes)
- Increased safety – reduce or eliminate the need for HF and Perchloric acids
- Cost effective- lower acid volumes required
- Faster sample throughput – faster digestion than microwave digestion or hot block
- Simplify workflows – simple operation and fewer digestion recipes

The ColdBlock™ is available in 6, 12 and 15 position units. The 12 and 15 units are the building blocks for modular expansion of the system for higher throughput.

First Sample Digestion Technology
Using Short-Wave Infrared (IR)



Our Production Facility

Our high-tech production facility in Manchester, NH is accredited to ISO 17034 as a producer of reference materials and ISO 17043 as a proficiency testing provider.

Our technicians utilize cutting-edge machining and engraving equipment to prepare and provide custom packaging for our range of over 1,400 metal alloy CRMs.

Our state-of-the-art analytical lab is accredited to ISO/IEC 17025 and is fully fitted with a wide array of testing equipment, including XRF, ICP-OES and ICP-MS used for homogeneity and composition testing for our products.

Our expertise with various instrumentation allows us to quickly adapt to our customers' needs, create custom sample compositions, and custom reference materials when needed.

We always strive to provide our customers with the best possible service, and are continually expanding our range of product offerings to meet their needs.

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ARMI | MBH

ARMI | MBH reference materials are prepared and certified in Manchester, NH USA. All of our products are produced in our manufacturing facility accredited to ISO 17034 and certified to ISO 9001. They then pass rigorous quality control in our laboratory accredited to ISO/IEC 17025.

We have a state-of-the-art machine shop and an analytical laboratory with a comprehensive array of equipment. Our sales and technical team have extensive knowledge of analysis techniques and reference materials, and are ready to help you choose the right reference material for your specific needs.



Contact us directly at our main production and sales office for your reference material needs, or if you require a custom material.



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