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## CRM ALUMINUM BASE CHIPS

analysis listed in mass % except \* which is mg/kg

Number	Si	Cr	Cu	Fe	Mg	Mn	Ni	Pb	Sn	Sr	Ti	V	Zn	Zr	Al	B*	Be	Cd	Ga	Units
BAM 201	13.20	.	0.009	0.18	0.0024	0.38	0.046	0.056	0.027	.	0.011	.	0.038	.	.	.	.	.	.	100 g
BCS 182/3	11.03	.	0.037	0.51	0.067	0.26	0.37	0.11	0.10	0.018	0.107	(0.014)	0.128	(0.003)	.	.	.	.	.	100 g
SRM 856a	9.21	0.060	3.50	0.85	0.063	0.35	0.016	0.019	0.010	0.018	0.065	(0.012)	0.96	(0.003)	.	Ca: (0.002)	.	.	.	30 g
SRM 855a	7.07	0.013	0.13	0.14	0.37	0.060	0.016	0.019	0.010	0.018	0.15	(0.012)	0.085	(0.003)	.	Ca: (0.001)	.	.	.	30 g
NCS HC28974-AL	7.03	.	3.73	0.51	0.071	0.062	0.048	0.093	0.057	.	0.005	<0.01	0.385	.	.	.	.	0.020	.	50 g
SRM 87a	6.24	0.11	0.30	0.61	0.37	0.26	0.57	0.093	0.057	.	0.18	<0.01	0.16	.	.	.	.	last	.	75 g
NM 511	6.150	.	0.295	0.790	.	0.195	0.017	0.055	0.016	.	.	.	0.079	.	.	.	.	.	.	100 g
NM 251.1	6.1	.	0.28	0.75	0.63	0.22	0.017	0.055	0.016	.	.	.	0.079	.	.	.	.	.	.	100 g
BCS 268/1	5.49	.	1.35	0.47	0.49	0.24	0.16	0.028	0.031	(0.008)	0.024	.	0.028	.	.	.	.	.	.	100 g
BCS 380/1	1.93	.	0.91	1.24	0.24	0.094	0.16	0.028	0.031	(0.008)	0.024	.	0.025	.	.	.	.	.	.	100 g
SRM 2426	1.925	.	0.454	0.454	.	0.094	0.16	0.028	0.031	(0.008)	0.024	.	38.92	.	58.18	.	.	.	.	40 g
BCS 349	1.19	(<0.001)	3.40	0.154	0.024	0.111	.	0.077	0.074	.	0.034	.	0.299	.	.	.	.	.	.	100 g
SRM 858	0.79	0.0011	0.84	0.078	1.01	0.48	0.0006	0.052	0.052	.	0.042	0.0030	1.04	.	.	<0.0001	.	.	.	35 g
BCS 216/3	0.74	0.110	5.45	0.77	0.76	0.76	0.24	0.052	0.052	.	0.20	.	0.214	0.086	.	.	.	.	.	100 g
BCS 343	0.52	0.14	0.28	0.39	0.70	0.69	0.16	0.052	0.052	.	0.024	.	0.028	.	.	.	.	.	.	100 g
BCS 181/3	0.30	0.04	2.48	0.72	1.57	1.10	2.00	0.101	.	.	0.058	.	2.52	.	.	.	.	.	.	100 g
IARM 111B	0.192	0.205	1.38	0.225	2.20	0.093	0.0098	0.0063	(0.002)	(0.0004)	0.0427	0.0035	5.70	0.0132	.	(0.8)	0.00087	(0.0003)	0.008	100 g
SRM 853a	0.1810	(<0.0005)	0.1504	0.504	1.092	1.251	0.00429	(<0.003)	(0.0003)	(<0.0001)	0.0205	0.01842	0.0514	(0.0023)	.	.	.	.	0.0176	40 g
GW 02202	0.18	.	0.095	0.38	0.021	1.38	0.013	0.032	0.032	.	0.036	.	0.10	.	.	.	.	.	.	100 g
BCS 262/1	0.16	(0.002)	0.039	0.20	10.75	0.084	0.071	(0.05)	(0.04)	.	0.005	.	0.085	.	.	<0.01	.	.	.	100 g
SRM 854a	0.1553	0.0340	0.0494	0.1990	4.474	0.3753	0.0195	.	.	(0.0002)	0.0335	0.0174	0.0505	.	.	.	(0.0006)	0.0185	.	40 g
BCS 300/1	0.14	0.13	1.27	0.24	2.74	0.33	0.24	0.014	.	.	0.09	.	5.87	0.18	.	.	.	.	.	100 g
BAM 300	0.14	0.216	0.040	0.198	2.68	0.018	.	0.014	.	.	0.012	.	0.128	.	.	.	.	.	.	100 g
BCS 263/2	0.14	0.074	0.019	0.26	4.67	0.36	.	.	.	.	0.022	.	0.056	.	.	<0.01	.	.	.	100 g
BAM 301	0.062	.	0.0018	0.054	0.0008	(0.001)	0.0123	0.0072	(0.004)	.	0.046	0.0018	0.036	.	.	.	.	.	.	100 g
IARM 109C	0.616	0.102	0.302	0.529	0.83	0.108	0.0123	0.0072	(0.004)	.	0.0176	0.009	0.121	0.0018	last	(12)	(0.001)	(0.0003)	0.013	100 g
BCS 195G	0.035	.	0.001	0.080	0.001	0.001	0.0053	0.014	(0.003)	(0.0003)	0.056	0.004	0.015	(0.0010)	99.85	(16)	0.00021	.	0.009	100 g
IARM 104B	0.150	0.0088	4.63	0.262	1.56	0.645	0.0053	0.014	(0.003)	(0.0003)	0.056	0.006	0.065	(0.0010)	.	.	.	.	0.011	100 g
BAM M319	0.104	(0.060)	0.0015	0.29	4.96	0.371	(0.037)	<0.001	<0.001	(0.0003)	0.030	(0.0093)	0.073	0.32	.	Sc: 0.84%	.	.	(0.015)	100 g
IARM 343A	0.050	0.0009	2.29	0.084	2.04	(0.002)	(0.005)	0.0012	.	(0.0003)	0.0175	0.0058	8.15	0.152	.	7	(0.0002)	0.012	.	100 g
JSAC 0121-C	0.00110	0.000113	0.000348	0.00094	0.000282	0.000173	.	.	.	.	0.000196	.	0.000203	0.000202	.	1.98	.	.	.	50 g

Number	Si	Cr	Cu	Fe	Mg	Mn	Ni	Pb	Sn	Sr	Ti	V	Zn	Zr	Al	B*	Be	Cd	Ga	Units
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ALUMINUM BASE CHIPS

typical analysis

# = class, where 1 = CRM and 2 = RM

#	Number	Si	Co	Cr	Cu	Fe	Mg	Mn	Ni	Pb	Sn	Ti	V	Zn	Be	Bi	Cd	Ga	Li	Sb	Zr	Units
1	C55XG28J30	17.5	0.345	0.256	1.58	0.50	0.99	0.378	1.81	0.081	0.059	0.073	0.011	0.32	0.0044	0.004						50 g
2	C55XA30J30	16.5	0.194	0.037	4.02	0.286	0.31	0.259	0.072	0.018	0.083	0.144	0.006	0.048	<0.0005							50 g
1	C55XG28J10	14.33	0.119	0.319	1.82	0.678	1.26	0.024	2.47	0.0038	0.182	0.104	0.0095	0.258								50 g
1	C54XG06H50	13.76	<0.005	0.026	0.0229	0.210	(0.0022)	0.85	0.0067	(0.0020)	0.022	0.106	0.008	0.225								50 g
1	C54XG06H40	13.21	0.207	0.120	0.237	0.138	0.134	0.691	0.139	0.040	(0.007)	0.124	0.011	0.131								50 g
1	C54XG13H40 *	12.55	(0.001)	0.0264	0.643	0.405	0.78	0.617	0.84	0.055	0.068	0.083		0.251	0.0048	<0.001					0.021	50 g
1	C55XG02D60	12.4	0.018	0.035	0.48	1.28	0.34	0.64	0.027	0.46	<0.01	0.35		0.083								50 g
1	C54XG06H30	11.27	0.021	0.069	0.327	0.500	1.19	0.445	0.295	0.217	0.047	0.161	0.010	0.072	0.0052							50 g
2	C55XG02D70	10.8		0.09	1.59	0.90	0.52	0.45	0.255	0.217	0.047	0.161	0.007	0.61	0.0006	0.08						50 g
2	C54XG13H30	10.42		0.06	0.82	0.72	1.05	0.38	0.94	0.08	0.09	0.17		0.31								50 g
1	C54XG13H20	10.04	0.004	0.103	1.29	0.767	1.37	0.248	1.15	0.083	0.145	0.166		0.530								50 g
2	C55XG02D80	10.04	0.056	0.052	2.27	0.94	0.21	0.45	0.37	0.33	0.19	0.240	0.025	1.32	0.001							50 g
2	C54XG23H10	9.82		0.089	1.19	0.80	0.45	0.029	0.31	0.145	0.082	0.022		0.60	(0.0002)							50 g
1	C55XG26H30	9.6	0.076	0.130	2.19	1.07	1.01	0.45	0.51	0.228	0.16	0.147	0.020	0.79			0.011	0.006				50 g
1	C55XG26H20	9.36	0.052	0.083	4.14	0.71	1.49	0.52	0.41	0.111	0.110	0.120	0.011	0.64		0.035						50 g
2	C55XG02D40	8.98		0.11	3.16	0.64	0.10	0.18	0.67	0.19	0.26	0.09		2.46								50 g
1	C54XG13H10	8.91	0.0051	0.062	1.87	0.801	2.89	0.0137	1.83	0.240	0.260	0.112		0.37	0.0078	<0.001						50 g
1	C55XG02D90	8.62	0.052	0.11	3.40	0.82	0.21	0.113	0.62	0.106	0.19	0.090	0.007	2.46	0.001							50 g
2	C55XG26H10	7.69	0.022	0.20	4.34	1.78	0.29	0.012	0.012	0.24	(0.008)	0.21	0.012	1.14		0.07						50 g
1	C55XG04H100	7.32	0.043	0.090	1.36	0.52	0.004	0.53	0.023	0.010	(0.01)	0.010	0.007	2.28								50 g
1	C54XG25D40	7.22	0.047	0.019	0.160	0.13	0.072	0.090	0.10	0.162	0.092	0.09	(0.002)	0.11	0.02	0.09						50 g
1	C55XG02D100	6.56	0.059	0.16	4.65	0.186	<0.01	0.015	0.96	(0.004)	0.9	<0.005		4.76	(0.002)	0.09						50 g
1	C55XG04H90	5.99	0.010	0.005	2.64	0.304	0.079	0.304	0.231	0.062	0.031	0.009	0.009	1.89		0.0015						50 g
1	C54XG25D30	5.86		0.062	0.113	0.86	0.20	0.29	0.114	0.074	0.06	0.083	0.011	0.092	0.003							50 g
2	C55XG04H30	5.55		0.06	3.60	0.86	0.17	0.40	0.33	0.10	0.10	0.20	0.33	1.30								50 g
Number		Si	Co	Cr	Cu	Fe	Mg	Mn	Ni	Pb	Sn	Ti	V	Zn	Be	Bi	Cd	Ga	Li	Sb	Zr	Units
1	C54XG25D20	3.93	0.10	0.150	0.130	0.58	0.59	0.48	0.139	0.073	0.042	0.152	(0.006)	0.169	0.049	0.22						50 g
1	C54XG25D10	3.54	0.113	0.14	0.010	0.72	0.65	0.81	0.26	0.004	<0.01	0.098	0.016	0.36	0.001	0.11						50 g
1	C57XG12H10	2.52		0.069	5.54	0.88	0.40	0.032	0.31	0.016	0.095	0.114	0.153	1.03		0.285	0.012	0.008			0.07	50 g
1	C55XG900J40	1.59		0.343	0.249	0.306	0.459	0.75	0.351	0.088	0.153	0.171		0.149								50 g
1	C514X9091J30	0.74		0.106	0.623	0.94	0.149	11.3	0.143	0.114	0.019	0.425									<0.005	50 g
1	C51XG00H20	0.61	0.079	0.100	0.173	0.49	0.089	0.305	0.206	0.115	0.122	0.137	0.070	0.221	0.0024	0.063				0.056		50 g
1	C57XG12H50	0.55	0.054	0.016	12.2	0.192	3.12	0.186	0.108	0.068	0.154	0.079	(0.001)	0.26	0.003	0.55	0.023	(0.017)		0.06	0.045	50 g
1	C55XG900J20	0.44		0.118	0.864	0.378	0.622	0.145	0.133	0.52	0.341	0.054	<0.005	0.309		0.285						50 g
2	C511XG10H40	0.42		0.240	0.32	0.79	2.02	0.012	0.123	0.023	0.179	0.205	0.053	0.47	(0.0002)		0.013					25 g
1	C511X G6063	0.412		0.0021	0.0014	0.185	0.437	0.0239	0.0021	0.0011	(0.0006)	0.0110	0.0087	0.0062								50 g
1	C59XG77J30	0.366	<0.005	0.023	2.42	0.712	2.27	0.594	0.43	0.075	0.137	0.107	0.006	4.57		0.046	0.0115				0.026	50 g
1	C511XG05H20	0.35	0.008	0.30	0.37	0.60	3.12	1.06	0.22	0.062	0.028	0.22	<0.005	0.140	0.004							50 g
2	C511XG3000B30	0.35		0.056	0.120	0.376	0.80	1.06	0.116	0.062	0.028	0.22	<0.005	0.140	0.005							50 g
2	C511XG10H40	0.33		0.15	0.052	0.19	10.4	0.12	0.085	0.10	<0.01	0.097	0.007	0.21	0.023							50 g
2	C59XG77J50	0.30		0.050	0.122	1.32	0.72	0.030	1.38	(0.003)	<0.01	0.058	0.007	7.57								50 g
1	C56XG250J10	0.26	0.008	0.0067	3.82	0.41	0.075	0.040	1.33	0.101	0.125	0.008	0.102	0.28							(0.003)	50 g
1	C511XG05H30	0.24		0.06	0.10	0.54	5.35	0.38	0.09	0.10	0.10	0.07	0.09	0.09								50 g
2	C511XG3000B20	0.23	0.007	0.200	0.20	0.335	0.68	0.81	0.063	0.137	0.105	0.111	<0.005	0.098	0.0017							50 g
1	C58XG50H40	0.11		0.029	0.056	0.14	5.16	0.547	0.040	0.152	0.144	0.048	0.018	0.062						0.324	0.247	50 g
1	C58XG40H60	0.09	0.006	0.005	0.111	0.08	(0.003)	0.004	0.008	<0.002	<0.005	0.064	<0.005	7.55	(0.002)		0.032	(0.004)	<0.0005			50 g
1	C56XG2000J10	0.05		0.005	3.50	0.13	2.75	1.42	0.01	0.01	0.1	0.004	0.021	1.01	0.022					0.076	0.22	50 g
1	C59XG77J10	0.15	0.018	0.24	2.41	0.21	4.83	0.46	0.17	0.125	0.126	0.178	0.005	1.91		0.06						50 g
1	C56XG250J30	0.11	0.264	0.024	4.90	0.079	(0.011)	0.278	0.92	0.024	0.031	0.162	0.036	0.103	0.0014					0.35	0.275	50 g
1	C511XG05H40	0.09		0.029	0.056	0.14	5.16	0.547	0.040	0.152	0.144	0.048	0.018	0.062								50 g
1	C58XG40H60	0.09	0.006	0.005	0.111	0.08	(0.003)	0.004	0.008	<0.002	<0.005	0.064	<0.005	7.55	(0.002)		0.032	(0.004)	<0.0005			50 g
1	C56XG2000J10	0.05		0.005	3.50	0.13	2.75	1.42	0.01	0.01	0.1	0.004	0.021	1.01	0.022							50 g
1	C59XG77J60	0.04		0.0046	1.13	0.054	2.63	0.0024	0.003	(0.005)	0.006	0.023	0.003	11.62	<0.005	<0.002	(0.005)				0.29	50 g
1	C514X9091J10	0.035		<0.005	0.046	0.081	(0.001)	6.93	(0.0026)	0.016	0.013	0.0017	0.016	0.042	0.0004	0.011						50 g
1	C51XG00H10	0.012	0.011	0.027	0.034	0.051	0.039	0.041	0.038	0.018	0.028	0.031	0.016	0.042	0.0004	0.011				<0.005		50 g

**RM ARSENIC**

Number	As	Units
BM As	99.999	50 g chips

**RM ANTIMONY**

Number	Sb	As	Fe	Pb	Si	Sn	Units
BM Sb	99.999	<0.0002	<0.0002	<0.0001	<0.0001	<0.0001	100 g chips

**RM BISMUTH**

Number	Bi	Ag	As	Co	Cu	Fe	Pb	Sb	Zn	Units
BM Bi	99.97	<0.0001	<0.0001	<0.003	<0.0001	<0.001	<0.02	<0.0002	<0.003	100 g chips

**RM CADMIUM**

Number	Cd	Cu	Fe	Pb	Ti	Zn	Units
BM Cd	99.96	<0.01	<0.002	<0.02	<0.003	<0.004	100 g chips

**CRM CHROMIUM**

analysis listed in mass %

BCS: 100 g powder VS: 100 g chips

Number	Cr	Al	C	Ca	Cu	Fe	N	Ni	O	S	Si	V
VS F36/1	99.9	0.0009	0.0030	(0.0003)	0.00023	0.005	0.0026	0.00019	.	0.0023	0.0034	0.0037
BCS 361	.	(0.083T)	0.0039	.	.	0.0920	0.0079	.	0.1010	0.0043	0.0449	.

**CRM COBALT BASE CHIPS**

100 g

Number	Cr	Co	C	Fe	Mn	Mo	N	Nb	Ni	Si	W
IARM CoR30016-22	30.9	57.6	1.10	0.84	1.50	0.97	0.026	0.037	2.86	0.65	4.01
ECRM 378-1C	28.22	.	1.181	0.606	0.0579	0.0503	.	.	0.617	1.172	4.43
IARM CO188-25	22.8	(36.1)	0.111	2.11	0.80	0.013	0.0128	(0.022)	22.7	0.42	14.6
IARM COL605-25	20.6	(49.2)	0.080	2.5	1.79	0.18	0.0162	0.025	10.7	0.27	14.5
BAM 328-1	20.54	41.65	0.390	2.40	1.395	4.41	0.027	3.61	20.54	0.629	4.16
IARM CoElgiloy-18	20.4	40.4	0.008	12.6	2.36	8.6	0.0034	(0.006)	15.9	0.05	(0.008)
SRM 862	20.0	51.5	0.120	1.80	1.59	.	0.026	.	9.74	0.017	15.1
IARM CoMP35N-18	19.9	32.7	0.0049	0.031	0.002	10.1	0.0018	.	36.53	0.012	.

Number	Al	B	Cu	O	P	S	Ta	Ti	V	
IARM CoR30016-22	0.054	0.0021	0.015	0.0012	0.0045	(0.0004)	(0.0151)	0.0076	0.011	
ECRM 378-1C	.	.	.	.	(0.0023)	0.0055	.	.	.	
IARM CO188-25	0.27	0.007	0.013	(0.0008)	(0.006)	<0.001	(0.0001)	0.0070	0.012	La:0.032
IARM COL605-25	0.072	(0.001)	0.016	(0.002)	(0.023)	(0.0001)	(0.007)	(0.007)	0.021	
BAM 328-1	0.070	.	0.013	.	0.005	.	0.18	.	.	
IARM CoElgiloy-18	(0.011)	(0.002)	(0.005)	0.009	0.0019	(0.0018)	(0.01)	(0.004)	(0.009)	
SRM 862	.	.	0.0010	.	0.002	0.0008	.	.	0.005	
IARM CoMP35N-18	0.060	0.009	.	.	0.0022	0.0013	.	0.78	0.006	

**CRM COPPER IN VARIOUS FORMS**

analysis listed in mg/g each of the blow available in 3 forms A: disc 39 mm Ø x 30 mm B: Rod 8 mm Ø x 100 mm C: Chips 50 g

Number	Ag	Al	As	Au	Be	Bi	Cd	Co	Cr	Fe	In	Mg	Mn	Ni	P	Pb	S	Sb	Se	Si	Sn	Te	Ti	Zn	
ERM-EB075	10.8	2.3	3.18	1.46	1.08	1.79	2.69	2.64	1.4	9.3	1.83	7.0	1.35	2.18	2.59	4.8	25	2.93	1.69	2.6	2.13	1.78	3.2	6.51	.
ERM-EB074	1.03	.	1.23	0.52	0.31	0.51	0.4	0.83	0.37	5.8	0.49	2.03	0.93	0.61	1.53	2.7	(3.3)	0.57	0.55	.	(1.5)	0.5	0.97	2.2	(8.8)

**CRM COPPER CHIPS AND PINS**

analysis listed in mg/kg except % which is mass % IMN 001: 50 g of 0.31 g pins all others: chips as noted

Number	Ag	As	Au	Bi	Cd	Co	Cr	Cu%	Fe	Mn	Ni	P	Pb	S	Sb	Se	Si	Sn	Te	Zn	Units
SRM 454	286	46	7.5	19	.	.	.	99.84	.	.	.	.	66	.	24	479	.	2.2	27	7	35 g
SRM 399	117	47	.	10.5	.	0.5	.	99.79	20.0	.	506	.	114	.	30	95	.	.	50	45	50 g
IMN 001	27.59	3.17	.	1.42	(0.11)	2.04	3.55	.	(13.9)	5.18	3.42	.	4.28	(6.0)	2.33	1.38	.	3.31	1.23	4.57	above
IMN 5	10	4.0	.	0.096	.	8.1	.	.	4.5	(1.3)	4.4	.	27	.	(0.92)	.	(2.6)	4.6	.	(13)	200 g

**CRM COPPER CHIPS**

analysis listed in mass % C39X: typical analysis 50 g BAM, BCS, IARM: 100 g IPT: 50 g IMN: 200 g

Number	Cu	Ag	Al	As	Au	B	Be	Bi	C	Cd	Co	Cr	Fe	Mg
IPT 64	99.98	0.0010	<(0.0006)	(0.0002)	.	.	.	<(0.0001)	.	.	.	.	0.00045	.
IARM 70C	99.94	(0.0011)	(0.0014)	.	.	(0.0004)	<0.002	(0.002)	(0.002)	(0.0008)	(0.0014)	(0.0002)	(0.0016)	(0.0003)
BAM M365	99.73	0.0159	.	0.00404	.	.	.	0.00300	.	.	0.000213	.	0.00061	.
BCS 399	REM	.	.	<(0.001)	.	.	.	(0.001)	.	.	(0.003)	.	(0.006)	.
C39X 178700	.	0.0468	0.0012	0.0033	0.0009	.	.	0.0470	.	.	0.0305	0.0017	.	.
C39X 178710	.	0.025	<0.0005	0.029	0.0048	.	.	0.069	.	.	0.0031	0.0008	.	.
C39X 178680	.	0.0249	0.0072	0.0226	0.0101	.	.	0.0308	.	.	0.0130	0.0248	.	0.110
IARM Cu101-18	.	0.00130	.	0.00015	.	.	.	0.00005	.	.	.	.	.	0.00030
IARM Cu110-18	.	0.00130	.	0.00013	.	.	.	.	(0.0018)	.	.	.	(0.00009)	0.00034
C39X 178660	.	<0.001	<0.002	0.037	.	.	.	0.001	.	.	<0.001	0.003	0.002	<0.001

Number	Mn	Ni	O	P	Pb	S	Sb	Se	Si	Sn	Te	Zn
IPT 64	.	0.00018	.	.	0.00006	.	(0.0002)	<(0.0002)	.	<(0.0005)	<(0.0001)	(0.001)
IARM 70C	(0.0002)	(0.0004)	(0.002)	(0.0014)	(0.0013)	0.0008	(0.003)	(0.001)	(0.0006)	0.0005	(0.001)	(0.002)
BAM M365a	.	0.0235	(0.1712)	.	0.0141	.	0.00121	0.0179	.	(0.0029)	0.000127	0.0030
BCS 399	.	(0.002)	.	0.045	(0.002)	.	<(0.001)	.	.	(0.003)	.	(0.003)
C39X 178700	Ge:0.0076	0.0062	In:0.0078	0.0012	0.0447	0.0026	0.0478	0.0261	.	0.0031	0.0011	0.129
C39X 178710	0.0010	0.027	.	<0.0005	0.0092	0.0080	0.017	0.028	<0.0005	.	0.011	.
C39X 178680	0.0123	0.0222	.	0.0507	0.1040	0.022	0.0295	0.0133	.	0.103	0.0206	0.197
IARM Cu101-18	0.00003	0.00027	.	.	0.00012	0.00050	0.00014	.	.	0.00020	.	0.00008
IARM Cu110-18	0.00006	(0.00006)	0.00100	0.00160	(0.00005)	0.00060	(0.00010)	(0.00020)	.	(0.00020)	.	0.00010
C39X 178660	<0.001	0.034	.	<0.002	<0.001	0.003	<0.001	.	<0.005	0.013	<0.001	0.005

**RM PHOSPHORUS DEOXIDIZED COPPER CHIPS**

analysis listed in mass % except \* which is mg/kg 100 g chips

Number	Ag%	Al*	As%	Bi*	Co*	Cu%	Fe*	Mn*	Ni*	P%	Pb%	Sb*	Si%	Sn%	Te%	Zn%
CURM 09.03	0.012	<3	<0.001	<3	<3	99.92	33	<3	<3	0.056	<0.0005	<5	<0.001	<0.001	<0.001	<0.001
CURM 09.01	0.011	<5	<0.001	<3	<3	99.82	19	<3	<3	0.151	<0.0005	<5	<0.001	<0.001	<0.001	0.0008
CURM 09.02	0.0055	<5	<0.001	<5	<5	99.90	42	<5	<5	0.078	<0.001	<5	<0.002	<0.001	<0.001	<0.001

**CRM COPPER ANODE**

analysis listed in mg/kg 425 g chips

Number	Ag	Au	As	Fe	Pb	Sn	Te
CAN CUAR-1	294	2.3	145	76	864	113	33

**COPPER-MAGNESIUM ALLOY**

Class	Number	Mg	Units
CRM	IMN CCE1	0.541	chips 50 g

**CRM COPPER CONCENTRATE POWDER**

analysis listed in mass %								analysis listed in mg/kg		
Number	Cu	Cd	Fe	Pb	S	SiO2	Zn	Ag	Re	Units
VS 2891-84	40.4	0.029	(5.78)	2.25	(15.98)	(21.74)	2.89	7.077	28.2	100 g

**CRM SEBILOY / ENVIROBRASS / FEDERALLOY CHIPS**

analysis listed in mass %													C32X: 50 g units, typical analysis		IARM: 100 g units		
Number	Bi	Se	Sn	Zn	Cu	As	Co	Fe	Ni	P	Pb	Sb	Si				
C32X SEB20	4.35	0.027	9.40	3.75	81.8	0.009	0.013	0.078	0.078	0.014	0.42	0.013	.				
IARM 264A	3.6	(0.001)	3.03	5.33	(87.3)	(0.004)	(0.001)	0.048	0.54	0.027	0.057	0.074	0.003				
IARM 263A	2.55	(0.002)	3.5	15.8	(78)	0.003	0.001	0.047	0.66	0.040	0.022	0.06	0.003				
IARM 265A	2.4	(0.002)	4.4	2.45	(90)	(0.005)	(0.001)	0.013	0.69	0.024	0.011	0.015	0.003				
IARM 266A	2.37	0.001	6.9	3.48	(87)	0.004	(0.001)	0.035	0.46	0.032	0.010	0.010	0.002				
IARM 228A	1.53	0.67	4.1	4.1	89.0	0.003	0.001	0.052	0.45	0.032	0.026	0.010	0.002				
C32X SEB50	1.17	0.512	5.28	6.64	85.5	0.0121	0.0048	0.360	0.308	0.183	0.0149	0.0344	.				

  

Number	Ag	Al	B	C	Cd	Cr	Mn	N	O	S	
C32X SEB20	.	.	.	.	.	.	.	.	.	.	last
IARM 264A	(0.005)	0.003	.	(0.004)	.	(0.002)	(0.002)	.	.	0.0013	
IARM 263A	(0.006)	(0.002)	.	<0.005	.	(0.002)	(0.002)	.	.	(0.002)	
IARM 265A	(0.002)	0.003	.	.	.	(0.001)	(0.002)	.	.	(0.002)	
IARM 266A	(0.001)	0.002	.	(0.002)	.	(0.002)	(0.002)	.	.	(0.002)	
IARM 228A	0.003	0.002	.	0.003	.	0.001	0.001	<0.0005	(0.002)	0.004	
C32X SEB50	.	.	0.0028	.	0.0067	.	.	.	.	.	

**COPPER BASE CHIPS**

# = class, where 1 = CRM and 2 = RM C3x, DH: typical analysis 50 g GBW: 95 g SRM: 50 g others: 100 g

#	Number	Sn	Al	Fe	Mn	Ni	Pb	Zn	Be	Bi	Co	Se
2	DH 0209	11.92	.	.	.	0.265	0.542	.	.	.	.	.
1	BAM 228	9.76	(0.0001)	0.036	(<0.001)	0.109	1.24	3.32	.	0.0086	.	0.0012
2	DH 0201	8.84	0.022	0.677	0.035	0.795	1.17	6.30	.	0.006	.	.
2	DH 0208	4.78	4.15	2.54	0.711	2.82	1.31	1.85	.	.	.	.
2	DH 0206	2.78	0.059	1.79	0.044	0.221	0.891	10.89	.	.	.	.
2	DH 0204	2.16	12.51	5.70	0.057	.	0.58	1.36	.	.	.	.
2	DH 0205	2.14	12.53	5.66	0.056	.	0.76	1.36	.	.	.	.
1	IARM Cu464-21	0.751	0.0006	0.096	0.0115	0.0084	0.066	38.5	.	0.0010	.	.
2	DH 0207	0.74	.	0.936	0.027	0.174	2.16	30.20	.	.	.	.
2	DH 0202	0.381	.	0.911	0.007	0.034	0.139	0.229	.	.	.	.
1	C37X2180	0.018	0.0025	0.075	0.084	2.51	0.0025	0.029	.	.	.	.
1	C36XCBC40	0.01	0.06	0.09	0.003	0.04	0.30	0.02	1.82	.	2.44	.
1	IARM 158B	0.01	0.002	0.090	0.019	0.32	0.01	0.014	.	.	0.002	.
1	IARM 158C	0.01	0.002	0.090	0.019	0.32	0.01	0.014	.	.	0.002	.
1	IARM Cu172-18	0.0009	0.022	0.029	0.0017	0.010	(0.005)	0.008	1.79	.	0.344	.
1	IARM Cu172-19	0.0007	0.032	0.071	0.0019	0.237	.	.	1.89	.	0.0017	.
1	SRM 460	0.006	0.048	0.098	.	0.031	0.258	0.004	1.86	.	0.217	.
1	IARM Cu954-21	0.0053	10.55	3.66	0.393	0.105	0.012	0.029	.	(0.0009)	(0.002)	.
1	SRM 459	0.005	0.044	0.079	.	0.039	0.001	0.002	1.82	.	0.221	.
1	SRM 458	0.004	0.030	0.060	.	1.60	0.002	0.002	0.360	.	0.076	.
2	C36XCBC20	0.004	0.03	0.02	(<0.01)	0.07	0.004	0.03	0.56	.	0.13	.
1	C37X2260	0.0032	0.0020	1.52	0.582	0.0024	(0.001)	2.82	.	.	.	.
2	IARM 160A	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	.	.	(<0.01)	.
2	IARM 159A	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	(<0.01)	.	.	(<0.01)	.
1	IARM Cu182-18	(0.002)	0.0031	0.041	0.0007	0.0007	0.0019	0.010	.	.	0.00013	.
2	C36XCBC30	(<0.002)	0.02	0.04	(<0.01)	0.02	0.003	0.02	1.81	.	.	.
1	IARM Cu182-21	0.0004	(0.004)	0.021	0.0004	(0.0009)	(0.0004)	0.0032	.	(0.0010)	(0.0009)	.

Number	Ag	As	C	Cr	Mg	O	P	S	Sb	Si	Zr	Cu
DH 0209	.	.	.	.	.	.	.	.	.	.	.	87.07
BAM 228	.	0.024	.	.	.	.	0.019	0.036	0.078	.	.	85.34
DH 0201	.	0.076	.	.	.	.	0.046	.	0.104	.	.	81.84
DH 0208	.	.	.	0.009	.	.	0.027	.	0.083	0.052	.	81.67
DH 0206	.	0.025	.	.	.	.	0.017	0.059	0.060	0.043	.	83.05
DH 0204	.	.	.	0.009	.	.	0.007	.	0.336	0.22	.	77.00
DH 0205	.	.	.	.	.	.	0.008	.	0.350	0.22	.	76.82
IARM Cu464-21	0.0040	0.0011	.	.	.	.	0.0012	.	0.0016	.	.	60.7
DH 0207	.	.	.	.	.	.	.	.	0.014	.	.	65.66
DH 0202	.	.	.	0.003	.	.	.	0.037	0.008	.	.	98.15
C37X2180	.	.	(0.002)	0.033	.	.	0.0015	0.006	.	0.56	.	96.60
C36XCBC40	.	.	.	0.01	.	.	.	.	.	0.09	.	.
IARM 158B	(0.01)	(0.001)	0.002	0.85	.	0.002	0.005	0.003	0.002	0.02	.	98.5
IARM 158C	(0.01)	(0.001)	0.002	1.04	.	0.002	0.005	0.003	0.002	0.02	.	98.5
IARM Cu172-18	.	.	.	0.0007	.	.	(0.003)	.	.	0.057	.	97.7
IARM Cu172-19	0.0011	.	.	0.0017	0.112	.	0.0036	0.0010	0.0007	0.045	.	(97.6)
SRM 460	.	.	.	0.005	0.005	.	.	.	.	0.077	.	(97.5)
IARM Cu954-21	0.0012	.	.	0.022	0.0013	.	0.0031	(0.0019)	(0.0019)	0.029	.	85.1
SRM 459	.	.	.	0.005	0.007	.	.	.	.	0.077	.	(97.7)
SRM 458	.	.	.	0.004	0.003	.	.	.	.	0.035	.	(97.9)
C36XCBC20	.	.	.	0.005	.	.	.	.	.	0.05	.	.
C37X2260	.	.	0.006	0.003	.	.	0.0025	0.0005	.	3.54	.	91.58
IARM 160A	3.03	.	0.003	(<0.01)	.	.	(0.004)	(<0.003)	.	(<0.01)	0.40	.
IARM 159A	3.48	.	(0.002)	(<0.01)	.	.	(<0.01)	(<0.01)	.	(<0.01)	.	.
IARM Cu182-18	0.0008	.	.	1.09	0.0019	.	0.0012	0.0018	.	(0.09)	0.063	98.8
C36XCBC30	.	.	.	0.005	.	.	.	.	.	0.06	.	.
IARM Cu182-21	0.0012	0.0009	0.0017	0.96	0.0045	(0.0005)	0.0027	0.0010	(0.001)	0.016	0.106	.

## CUPRO-NICKEL AND COPPER-NICKEL-SILVER CHIPS

# = class, where 1 = CRM and 2 = RM

C3X: 50 g units, typical analysis

others: 100 g units

#	Number	Ni	Zn	Ag	Al	C	Co	Cr	Cu	Fe	Mg	Mn	P	Pb	S	Si
1	C36XCN60	33.46	0.026	.	(0.0024)	0.0180	0.0440	1.10	63.35	0.878	.	0.451	0.031	0.0066	0.0109	0.144
1	IARM Cu715-20	31.0	(0.007)	.	(0.004)	(0.005)	(0.004)	.	67.4	0.51	(0.005)	0.80	(0.009)	(0.001)	(0.002)	0.09
1	BCS 180/2	30.35	.	.	.	0.04	.	.	68.12	0.68	.	0.75	.	(0.003)	0.006	(0.018)
2	C36XCN40	30.2	.	.	.	.	0.04	.	.	0.50	0.003	0.33	.	0.015	.	0.54
1	C36XCN100	29.3	.	.	.	0.064	0.081	1.59	61.01	4.28	0.0026	0.262	(0.020)	0.004	0.055	1.02
2	C36XCN90	28.1	.	.	.	0.02	<0.01	2.19	.	0.93	.	1.20	0.016	0.05	0.002	0.56
1	IARM 298A	19.6	5.8	(0.009)	(0.003)	(0.013)	(0.016)	(0.005)	65.3	0.73	0.0004	0.34	(0.004)	4.0	(0.011)	0.019
1	SRM 880	18.13	27.3	.	.	.	.	.	54.51	(0.004)	.	<0.001	.	(0.002)	.	.
1	C34XNS50	17.16	(23)	0.0102	0.674	.	0.197	0.0014	55.11	0.717	0.704	0.127	0.067	1.29	.	0.158
1	GBW 02104	14.87	20.81	.	.	.	.	.	Rem	0.47	0.033	0.32	0.0048	0.019	.	0.146
IARM	CuH130-18	14.6	0.0015	(0.0010)	2.76	(0.006)	0.0037	(0.002)	80.9	0.84	0.0013	0.449	(0.004)	(0.0020)	(0.0010)	0.024
IARM	CuH191-18	14.5	0.0010	(0.0020)	1.60	(0.004)	(0.002)	(0.0013)	(79.6)	0.96	0.0059	3.79	(0.003)	(0.0030)	(0.002)	(0.017)
1	SRM 875	10.42	0.11	.	.	(0.0035)	.	.	87.83	1.45	(0.0010)	<0.0007	0.0020	0.0092	(0.0011)	(0.0008)
1	SRM 874	10.18	(0.002)	.	.	(0.0023)	.	.	88.49	1.22	(0.0002)	0.0020	(0.002)	<0.0005	(0.0011)	(0.0006)
1	IARM 84C	9.8	0.13	(0.002)	.	(0.003)	(0.006)	.	89.4	0.28	.	(0.04)	(0.06)	0.047	(0.006)	(0.004)
2	CURM 62.12	7.94	0.180	.	.	.	0.081	.	89.42	0.45	0.002	1.59	.	0.053	0.034	0.109

#	Number	Ni	Zn	Ag	Al	C	Co	Cr	Cu	Fe	Mg	Mn	P	Pb	S	Si
	Number	As	B	Bi	N	Nb	O	Sb	Sn	Ti	Zr					
	C36XCN60	.	(0.0015)	0.0058	.	0.514	.	.	0.0307	0.0066	.					
	IARM Cu715-20	.	.	.	.	.	.	.	(0.004)	0.073	.					
	BCS 180/2	.	.	.	.	.	.	.	.	.	.					
	C36XCN40	.	.	.	.	.	.	.	.	.	.					
	C36XCN100	.	0.0029	0.014	.	0.89	.	.	.	0.03	(0.055)					
	C36XCN90	.	0.005	<0.01	.	.	.	.	.	0.12	0.13					
	IARM 298A	(0.004)	<0.005	0.014	<0.001	<0.01	<0.005	(0.04)	4.0	.	<0.01					
	SRM 880	.	.	.	.	.	.	.	.	.	.					
	C34XNS50	.	.	.	.	.	.	.	0.194	.	.					
	GBW 02104	0.0098	.	0.0019	.	.	.	0.0020	.	.	.					
IARM	CuH130-18	(0.0060)	(0.0009)	(0.0020)	(0.0006)	.	(0.0006)	(0.0030)	(0.0010)	(0.0010)	(0.0008)	CRM				
IARM	CuH191-18	.	(0.0030)	(0.0020)	.	.	.	.	(0.0020)	.	.	CRM				
SRM	875	(0.0010)	.	(0.003)	Cd: 0.0022	(0.14)	<0.001	(0.009)	(0.0002)	Se: (0.0004)						
SRM	874	(0.0006)	.	<0.0002	Cd: <0.0002	(0.06)	<0.001	0.007	(0.0001)	Se: 0.00015						
IARM	84C	.	.	.	.	.	(0.0012)	0.13	.	.						
CURM	62.12	.	.	.	.	.	.	0.111	.	.						
	Number	As	B	Bi	N	Nb	O	Sb	Sn	Ti	Zr					

## GUN METAL CHIPS

# = class, where 1 = CRM and 2 = RM

C3X: 50 g units, typical analysis

100 g units

#	Number	Sn	Ni	Pb	Zn	Cu	Ag	Al	As	Bi	Cr	Fe	Mn	P	S	Sb	Si
1	BCS 207/2	9.74	0.28	0.70	1.60	87.35	.	0.013	0.066	0.04	.	0.029	.	(0.018)	.	0.10	0.016
1	C33XGM70	9.23	0.36	0.78	2.06	.	.	0.03	0.12	0.08	.	0.05	0.18	0.067	0.001	0.06	0.09
1	C33XGM60	7.31	1.069	3.11	2.99	84.46	0.0114	0.136	0.175	0.037	0.0019	0.131	0.0912	0.0566	0.07	0.258	0.124
1	BCS 183/4	7.27	1.30	3.15	3.47	84.08	.	(0.002)	0.13	0.005	.	0.056	(0.01)	0.090	0.11	0.23	(0.01)
1	C33XGM290	6.12	0.029	0.052	4.27	89.30	0.0025	(0.0004)	0.0017	0.0020	0.0004	0.011	0.0005	0.136	0.002	0.0015	0.0030
1	CURM 71.33	4.96	0.938	6.84	3.60	83.60	<0.002	<0.001	<0.001	<0.002	<0.0005	0.018	<0.0005	<0.001	<0.001	<0.002	<0.005
1	C33XGM50	4.47	0.697	4.81	5.80	83.38	0.0419	0.084	0.0342	0.0493	Cd: 0.0034	0.254	Co: 0.0453	0.042	0.0697	0.0505	0.0283
2	CURM 71.31	4.06	1.98	6.07	3.98	83.00	0.046	0.023	0.110	0.030	0.039	0.118	0.037	0.060	0.059	0.128	0.020
2	C33XGM80	4.03	0.115	6.78	6.21	82.3	0.105	0.0067	.	0.0138	.	0.298	0.0010	0.0213	0.0055	.	(0.0010)
1	C33XRB20	3.19	0.255	3.85	9.14	82.67	0.0029	0.0362	0.0211	0.101	0.0017	0.493	0.0028	0.0208	0.078	0.019	0.0116
1	C33XGM40	2.50	2.05	5.20	7.17	82.6	0.0062	<0.002	0.021	0.041	.	0.051	(0.0019)	<0.005	0.33	0.042	<0.005

## BRASS CHIPS

# = class, where 1 = CRM and 2 = RM

C31X: 50 g units, typical analysis

GBW: 50-100 g

all others: 100 g

#	Number	Zn	Al	As	Bi	Cu	Fe	Mn	Ni	P	Pb	S	Sb	Si	Sn
1	GBW 02101	Rem	0.26	.	0.0024	58.00	0.89	0.73	.	0.0076	0.19	.	0.0091	.	0.54
1	BAM 224	39.40	0.0012	0.0025	0.0006	57.40	0.136	1.70	0.038	0.0112	1.13	0.0004	0.0026	(0.002)	0.066
1	IPT 40	39.1	0.010	.	.	58.10	0.007	.	0.0012	.	2.45	.	0.023	.	0.18
1	BAM 223	38.82	(<0.002)	0.0084	0.0018	58.74	0.091	(<0.001)	0.0214	0.0003	2.13	0.0021	0.0040	(<0.003)	0.089
1	BCS 390	38.6	0.83	.	.	57.1	0.83	1.30	0.033	.	1.04	.	.	(0.023)	0.34
1	IARM 75C	38.1	(0.003)	(0.005)	(0.0012)	60.7	(0.06)	(0.0024)	(0.013)	(0.004)	0.42	(0.0015)	(0.007)	(0.005)	0.69
1	IARM 75B	38.0	(0.005)	(0.004)	(0.001)	60.63	0.06	(0.003)	0.02	0.003	0.63	(0.001)	(0.004)	(0.003)	0.59
1	BAM 229	36.63	.	0.00217	.	63.334	0.01061	.	0.01114	(0.00106)	0.0192	.	0.00072	.	0.00485
1	BCS 179/2	35.8	2.22	(0.008)	.	58.5	1.02	0.86	0.56	.	0.35	.	.	0.044	0.70
2	CURM 48.01	32.6	<0.001	0.067	0.038	66.98	0.049	<0.001	0.134	0.016	0.106	.	0.047	0.041	0.002
2	CURM 48.02	32.58	0.013	0.025	0.004	67.16	0.053	0.067	<0.001	0.012	0.084	0.007	0.037	0.010	0.035
2	CURM 48.05	31.0	<0.002	<0.001	<0.0005	68.69	0.066	0.016	0.117	0.007	<0.003	0.013	<0.0005	0.026	0.083
1	C31X B40	28.39	.	0.046	0.0076	71.10	0.026	0.0074	0.0571	(0.023)	0.064	0.0091	0.0076	0.025	0.073
2	CURM 48.04	26.99	<0.001	0.034	0.014	72.68	0.008	0.012	0.096	0.006	0.043	0.011	0.026	0.004	0.018
1	C31X B70	14.51	0.0015	0.0030	0.060	85.17	0.100	0.0010	0.0251	.	0.0338	.	0.0089	0.013	0.0876
1	IARM 151B	12.94	0.002	(0.002)	.	84.0	0.025	0.002	0.011	0.003	0.013	<0.001	(0.001)	3.11	0.009
1	C31XB80	9.52	(0.0013)	0.0081	0.031	90.28	0.0267	0.0012	0.0083	.	0.072	.	0.0108	0.0051	0.035
2	C31XB950	.	(0.001)	(0.01)	(0.01)	95.0	(0.01)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(<0.001)	(0.01)	0.5

Number	Ag	B	C	Cd	Co	Cr	Se
GBW 02101	.	.	.	.	.	.	.
BAM 224	.	.	.	.	.	.	.
IPT 40	0.002	.	.	0.049	.	.	.
BAM 223	.	.	.	.	.	.	.
BCS 390	.	.	.	(0.011)	.	.	.
IARM 75C	(0.004)	<0.1	(0.002)	(0.0015)	(0.0007)	0.0009	(0.005)
IARM 75B	(0.005)	.	(0.004)	.	(0.003)	.	.
BAM 229	.	.	.	.	.	0.0034	.
BCS 179/2	.	.	.	(0.003)	.	.	.
CURM 48.01	.	.	.	<0.0003	.	.	.
CURM 48.02	.	.	.	<0.0005	.	0.004	.
CURM 48.05	.	.	.	<0.0003	.	.	.
C31XB40	.	.	.	0.0330	0.033	0.087	.
CURM 48.04	.	.	.	<0.0003	.	.	.
C31X B70	.	0.0029	.	0.0011	0.0124	0.0006	.
IARM 151B	(0.01)	.	0.005	.	.	(0.003)	.
C31XB80	.	0.0021	.	.	.	.	.
C31XB950	.	.	.	.	.	.	.

## BRASS CHIPS

# = class, where 1 = CRM and 2 = RM

C31X: 50 g units, typical analysis

others: 100 g units

#	Number	Cu	Zn	Al	Fe	Mn	Ni	Pb	Sn	As	Bi	Sb	Si
2	CURM 30.09	89.53	<10.47	<0.001	0.0005	<0.0003	<0.003	<0.001	0.001	<0.001	<0.001	<0.001	<0.001
2	CURM 43.02	76.21	20.82	2.40	0.128	0.035	0.068	0.064	0.060	0.083	<0.001	<0.001	0.038
2	CURM 43.01	74.36	22.44	2.75	0.008	0.064	0.121	<0.002	0.116	0.118	<0.002	<0.001	0.063
1	NM 242	70.19	29.47	.	0.062	.	0.05	0.029	0.07	P:0.005	.	.	.
2	CURM 30.05	69.48	30.53	<0.001	<0.003	<0.0005	<0.0005	<0.002	<0.001	<0.001	<0.003	<0.005	<0.001
1	BCS 344	68.98	30.98	.	.	.	.	.	.	.	.	.	.
2	CURM 30.20	61.46	35.71	2.32	<0.005	<0.001	<0.001	<0.002	0.40	<0.001	<0.002	<0.002	0.17
2	CURM 30.15	60.66	<38.88	<0.001	0.50	<0.001	<0.001	<0.005	0.002	<0.005	<0.001	<0.001	<0.005
2	CURM 30.16	60.53	<38.33	<0.001	1.14	<0.001	<0.001	<0.005	0.002	<0.005	<0.001	<0.001	<0.005
1	C31XB20	60.3	.	0.19	0.10	0.31	0.22	0.31	0.18	0.14	0.04	0.10	0.01
2	CURM 30.11	59.86	<38.17	<0.001	0.002	0.23	1.70	0.005	0.002	<0.001	<0.002	<0.001	<0.001
2	CURM 30.24	58.33	<38.32	<0.001	0.001	<0.001	<0.001	3.31	0.002	<0.001	<0.002	<0.001	<0.001
2	CURM 30.21	56.23	40.08	1.44	0.003	<0.001	<0.001	0.004	2.01	<0.001	.	<0.002	0.213
2	DSZU MCX01	Rem	36.3	.	0.01	no uncertainties	0.005	0.0002	0.0001	0.0001	.	0.0005	.

## LEADED AND MANGANESE BRASS CHIPS

# = class, where 1 = CRM and 2 = RM

C31X: 50 g units, typical analysis

others: 100 g units

#	Number	Pb	Mn	Zn	Al	As	Fe	Ni	P	Sb	Si	Sn	Cu
1	IARM Cu844-18	6.7	.	9.5	0.0010	0.0041	0.030	0.209	0.0018	0.037	(0.001)	3.08	80.5
1	IARM Cu836-18	4.9	.	5.09	.	0.0098	0.049	0.423	0.028	0.103	(0.003)	5.02	84.5
2	CURM H36-24	3.02	<0.001	37.32	<0.001	<0.001	0.005	<0.001	.	<0.001	<0.001	<0.001	58.87
1	C31X 783510	2.91	.	35.20	0.0146	0.0011	0.134	0.144	0.0197	0.0047	0.053	0.407	60.96
1	IARM Cu360-18	2.73	0.0131	35.1	(0.010)	0.026	0.27	0.0120	(0.003)	0.012	(0.010)	0.29	61.6
1	NM 241	2.64	0.005	38.92	.	.	0.11	0.04	0.004	.	.	0.14	58.1
1	NM 412	2.56	.	38.99	.	.	0.09	.	.	.	.	0.12	58.18
1	BCS 385	2.24	(0.005)	38.5	(0.005)	.	0.15	0.13	.	(0.01)	.	0.27	58.7
2	C31X 783520	2.08	.	32.88	0.199	0.046	0.077	0.0088	0.0149	0.053	.	0.202	64.34
1	C31X 783550	1.64	.	6.23	0.077	0.104	0.126	0.249	0.018	0.114	.	0.116	91.25
2	C31X MNB10	1.44	0.188	29.37	0.596	.	0.268	0.053	.	.	.	0.105	67.77
1	C31X 783530	1.376	.	37.51	0.163	0.110	0.170	0.251	0.0391	0.084	0.038	0.121	60.07
1	C31X 783540	1.03	.	30.09	0.561	0.206	0.020	0.492	0.125	0.188	.	0.046	67.11
1	C31X MNB20	1.02	2.23	32.19	0.268	.	0.66	0.118	.	.	0.233	0.319	63.02
1	C31X MNB50	0.127	0.243	37.91	3.35	.	0.56	1.31	.	.	0.49	1.75	54.14

Number	Ag	B	Bi	C	Cd	Co	Cr	S	Se
IARM Cu844-18	0.0133	.	0.030	.	(0.0008)	0.0015	.	0.023	0.0040
IARM Cu836-18	0.0292	.	0.035	.	0.0014	0.0026	.	0.041	0.0016
CURM H36-24	.	.	<0.001	.	.	.	.	0. (0.2)	.
C31X 783510	.	0.0005	0.0141	.	.	0.029	.	(0.001)	(0.0045)
IARM Cu360-18	0.011	.	(0.0023)	(0.003)	0.0034	0.0010	(0.003)	.	.
NM 241	.	.	.	.	.	.	.	.	.
NM 412	.	.	.	.	.	.	.	.	last
BCS 385	.	.	.	.	.	.	.	.	.
C31X 783520	.	.	.	.	.	.	.	.	.
C31X 783550	.	.	.	.	.	.	.	.	.
C31X MNB10	.	.	.	.	.	.	.	.	.
C31X 783530	.	(0.0015)	0.0116	.	0.0039	0.0064	.	.	0.004
C31X 783540	.	.	.	.	.	.	.	.	.
C31X MNB20	.	.	.	.	.	.	.	.	.
C31X MNB50	.	.	.	.	.	.	.	.	.

## ADMIRALTY &amp; NAVAL BRASS CHIPS

# = class, where 1 = CRM and 2 = RM

C31X: 50 g units, typical analysis

others: 100 g units

#	Number	Sn	Pb	Zn	Cu	Al	As	Bi	Co	Fe	Mn	Ni	P	S	Sb	Si
2	CURM 42.25	2.72	0.0023	39.20	57.78	0.021	0.118	<0.001	.	0.003	0.169	<0.001	0.050	0.005	<0.001	<0.001
2	C42.25	2.2	<0.01	rem	58.5	0.02	0.10	<0.002	.	<0.005	0.13	<0.005	0.06	0.001	<0.005	<0.002
2	C31XNB40	2.07	0.09	.	63.8	0.29	0.025	0.09	.	0.11	0.02	0.16	0.20	0.002	0.39	0.22
2	CURM 42.23	1.63	0.575	22.13	74.36	0.008	0.168	0.034	.	0.354	0.019	0.168	0.128	0.045	0.356	0.015
1	IARM Cu485-18	0.759	1.76	36.5	60.8	(0.002)	(0.055)	.	.	0.062	0.0013	0.013	.	.	(0.0018)	(0.003)
1	IARM 76D	0.73	1.69	36.8	60.7	(0.002)	(0.004)	0.0011	0.0010	0.013	0.0006	(0.003)	0.0018	0.0012	0.0040	0.0037
1	IARM Cu486-18	0.692	1.31	36.5	61.2	(0.0030)	(0.025)	(0.0004)	Cd:0.0009	0.036	(0.0003)	0.032	(0.004)	(0.0030)	(0.0050)	(0.0020)
2	CURM 42.21	0.60	0.259	31.61	66.78	0.003	<0.003	0.013	.	0.119	<0.001	0.120	0.087	0.034	0.25	0.15
1	IARM 76C	0.66	1.6	37.2	60.4	(0.004)	(0.003)	.	.	0.013	(0.001)	0.003	0.003	(0.001)	(0.004)	(0.003)
2	C42.21	0.54	0.23	rem	66.1	0.005	<0.005	0.012	.	0.06	<0.005	0.096	0.081	0.007	0.19	0.081
1	C31X NB10	0.535	0.504	29.73	68.35	(0.0004)	0.161	0.0065	(0.0006)	0.0367	0.0508	0.520	0.0223	0.0024	0.0057	0.004

## SILICON BRASS CHIPS

# = class, where 1 = CRM and 2 = RM

typical analysis listed in mass % except \* which is mg/kg

50 g units

#	Number	Si	Zn	Cu	Al	Fe	Mn	Ni	Pb	Sn	As	Co	Cr	Mg	P	S	Sb	Bi*	Cd*
1	C31XWSB50	6.07	0.343	90.06	0.218	0.79	0.496	0.492	0.100	1.050	0.0284	0.057	0.0087	0.0012	0.080	0.0081	0.124	298	47
1	C31XWSB10	5.95	7.55	(82.7)	1.90	0.100	0.099	0.076	0.55	0.23	0.13	0.34	0.017	0.003	0.040	<0.002	0.03	.	.
1	C31XWSB40	4.40	5.61	86.09	0.290	0.592	1.45	0.228	0.204	0.802	0.0286	0.096	0.103	0.006	0.042	(0.002)	0.0335	318	12
1	C31XWSB40	4.58	5.05	85.7	0.48	0.77	1.85	0.25	0.168	0.80	0.040	0.109	0.045	(0.0007)	0.060	<0.005	0.067	.	.
1	IARM Cu693-21	3.1	21.9	74.8	0.00043	0.028	0.041	0.0019	0.030	0.022	.	.	0.0006	.	0.099	.	.	.	.
2	C31XWSB60A	2.61	1.12	Rem	0.10	0.05	0.29	0.37	0.96	0.39	0.01	0.05	.	0.004	0.06	0.01	0.10	100g	last
1	C31XWSB60D	2.48	0.881	94.74	0.059	0.032	0.248	0.117	0.95	0.056	0.0051	0.247	0.058	(0.001)	(0.020)	(0.002)	0.007	56	71



## ALUMINUM BRONZE CHIPS

# = class, where 1 = CRM and 2 = RM

C32X: typical analysis

#	Number	Al	Cu	Fe	Mn	Ni	P	Pb	Si	Sn	Zn	As	C	Cr	Mg	Sb	Units
1	C32XALB30	11.56	79.94	4.15	0.374	3.72	0.025	0.11	0.135	0.10	0.325	0.0060	.	0.0089	0.088	.	50 g
2	CURM 52.52	10.69	79.26	6.02	0.145	3.56	.	0.074	0.011	0.044	0.094	.	.	0.004	0.007	.	100 g
1	IARM Cu954-20	10.48	84.7	3.84	0.54	0.30	0.009	0.018	0.029	0.010	0.068	0.0007	.	0.028	0.0012	0.0018	100 g
1	IARM Cu955-18	10.37	80.8	3.50	0.77	4.5	(0.013)	0.006	(0.022)	0.0056	0.038	(0.0020)	(0.0080)	0.0027	Ag:0.0019	Cr:0.008	100 g
1	IARM Cu954-18	10.36	84.7	4.23	0.29	0.134	(0.016)	0.016	0.025	0.047	0.141	(0.0030)	Bi:0.0011	.	(0.0013)	Co:0.017	100 g
1	C32XALB10	10.3	(80.4)	3.00	0.094	5.90	0.016	0.218	0.132	0.025	0.035	(0.002)	.	0.011	0.0013	.	50 g
1	IARM 334B	9.91	80.8	3.7	0.60	4.70	0.005	0.006	0.075	0.019	0.122	(0.003)	0.005	(0.004)	(0.001)	(0.004)	100 g
1	BCS 304/1	9.71	80.23	4.64	0.12	4.82	.	0.010	0.08	0.03	0.31	.	.	.	(<0.01)	.	100 g
1	C32XALB20 *	9.6	(80.7)	4.1	0.055	4.6	0.045	0.26	0.29	0.095	0.25	0.007	0.01	0.003	0.003	.	50 g
2	CURM 51.14	8.42	88.57	0.72	0.55	0.219	0.12	0.003	0.286	0.113	0.656	0.44	.	.	.	.	100 g
1	C32XALB80	8.1	(75.3)	6.70	0.31	6.79	0.14	0.009	0.69	0.58	1.02	0.17	.	0.045	(0.002)	.	50 g
1	C32XALB60	8.05	81.98	2.53	0.904	5.31	0.0101	0.096	0.295	0.147	0.685	0.012	(0.0025)	0.0097	(0.001)	0.0019	50 g
1	C32XALB40	7.87	79.61	3.55	1.028	7.03	0.036	0.120	0.252	0.085	0.264	0.0130	.	0.022	0.153	.	50 g
2	CURM 52.54	7.85	81.59	3.31	1.20	5.40	.	0.086	0.022	0.135	0.39	.	.	<0.005	<0.005	.	100 g
2	C32XALB50	7.6	.	1.95	1.39	5.11	.	0.04	0.03	0.03	0.16	.	.	.	0.018	.	50 g
2	CURM 51.13	7.30	88.79	1.81	0.898	0.057	0.022	0.104	0.174	0.270	0.335	0.215	.	.	.	.	100 g
1	IARM Cu642-18	6.5	90.0	0.039	0.0024	(0.014)	(0.009)	0.104	1.96	0.019	1.19	.	.	.	.	.	100 g
2	CURM 51.12	6.36	88.29	2.87	1.33	0.112	<0.001	0.219	0.005	0.196	0.45	0.111	.	.	.	.	100 g
2	CURM 51.11	5.27	93.95	0.060	<0.001	0.012	0.035	0.33	0.159	0.027	0.111	<0.001	.	.	.	.	100 g

\* Provisional Analysis

## LEADED BRONZE CHIPS

#=class, where 1=CRM and 2=RM

C32X: typical analysis 50 g chips

IPT 74: 60 g chips

IPT 10B: 80 g chips

all others: 100 g chips

#	Number	Pb	Sn	Zn	Cu	Al	As	Bi	Fe	Mn	Ni	P	S	Sb	Si	Other
1	IARM 184A	19.0	6.0	0.37	(74)	0.0016	0.010	(0.03)	(0.003)	(0.002)	0.30	0.008	0.021	0.27	(0.002)	.
1	GBW 02140	17.62	4.24	5.37	72.25	.	.	.	.	.	.	.	.	.	.	.
2	CURM 50.01	11.13	9.01	0.91	75.38	<0.0005	.	0.024	0.074	<0.001	1.93	0.069	0.188	0.50	<0.001	Ag: 0.19
2	CURM 50.02	10.67	10.34	0.006	78.84	<0.001	<0.002	<0.0005	<0.001	<0.0005	<0.0005	0.046	<0.001	<0.0005	<0.002	.
2	CURM 50.04	9.94	11.30	0.66	76.11	0.014	0.06	0.10	0.10	0.028	1.10	0.035	0.14	0.50	0.011	.
1	C32XLB20	9.42	12.38	0.27	(76.8)	0.04	0.017	0.009	0.40	0.22	0.22	0.04	(0.001)	0.023	<0.01	.
2	C32XLB30	9.4	10.3	<0.01	.	<0.01	0.02	0.025	<0.01	<0.01	1.52	0.006	0.020	0.04	.	.
1	BCS 364	9.24	9.36	0.13	80.7	(0.002)	(0.07)	(0.01)	(0.005)	.	0.28	0.057	(0.06)	0.18	(0.005)	.
2	CURM 50.03	8.86	8.41	1.72	77.42	0.005	0.11	0.051	0.018	0.037	2.89	0.159	0.064	0.24	0.005	.
1	C32X LB130	7.59	5.80	0.520	84.87	0.0011	0.131	0.0721	0.0160	0.0005	0.828	0.0161	0.115	0.0186	(0.0035)	Ag: 0.0063
1	IPT 74	6.24	2.84	9.88	80.41	.	0.002	.	0.315	.	0.15	0.002	0.056	0.016	.	Cd: 0.013
1	GBW 02139	6.16	4.08	6.96	81.45	.	.	.	.	.	.	.	.	.	.	.
2	C32X SN10	5.15	11.75	0.804	79.96	(0.002)	.	.	0.0034	0.0018	2.17	0.0025	0.0064	0.006	.	.
1	IPT 10B	4.74	4.61	4.73	85.2	.	0.019	.	0.211	.	0.33	0.003	0.068	0.114	.	.
1	C32X SN20	1.97	13.54	1.28	82.8	0.0004	.	.	0.0332	0.0043	0.104	0.082	0.0326	0.100	.	.
1	C32X SN40	1.059	18.80	0.342	77.88	0.034	0.0468	.	0.060	0.0065	0.556	0.988	0.040	0.102	(0.004)	Co: 0.151
1	C32X SN30	0.270	16.51	0.43	81.32	0.0004	.	.	0.0782	0.0026	0.513	0.297	0.096	0.260	.	.

## PHOSPHOR BRONZE CHIPS

mass % except \* which is mg/kg

C32X: 50g typical analysis

GBW, BCS: 150 g

others: 100 g

#	Number	P	Sn	Zn	Cu	Al	As	C	Fe	Mg	Mn	Ni	Pb	S	Sb	Se*	Si
2	CURM 54.03	0.954	7.30	0.003	91.74	<0.001	0.006	.	0.005	<0.0003	<0.0005	0.0019	0.003	<0.001	0.0007	.	<0.002
2	C32XPB10	0.84	11.0	0.02	.	<0.01	0.05	.	<0.01	<0.01	0.12	0.37	.	.	0.07	.	0.01
1	C32XPB110	0.72	3.00	1.93	89.6	0.068	0.175	.	0.493	<0.002	0.80	1.01	1.02	0.016	0.54	.	0.52
1	BCS 374	0.59	9.80	0.006	89.5	(0.005)	.	.	(0.005)	.	.	0.014	0.064	0.012	(0.01)	.	(0.005)
1	GBW 02133	0.423	5.79	.	93.72	.	.	.	.	.	.	.	.	.	.	.	100g
2	C32XPB120	0.42	4.64	0.49	(92.0)	<0.001	0.098	.	0.31	<0.001	0.39	0.51	0.47	(0.010)	0.024	55	0.01
1	GBW 02136	0.372	5.79	.	93.70	.	.	.	0.011	.	.	.	0.021	.	0.0058	.	0.0012
1	SRM 872	0.26	4.16	4.0	87.36	.	.	.	(0.003)	.	.	.	4.13	.	.	.	.
1	GBW 02134	0.238	6.82	.	92.85	.	.	.	.	.	.	.	.	.	.	.	.
1	C32XPB130	0.22	6.96	0.27	(91.5)	<0.001	0.052	.	0.14	<0.001	0.096	0.26	0.25	(0.03)	0.12	.	<0.005
1	IARM Cu510-18	(0.16)	4.54	0.0034	95.2	(0.0004)	(0.0007)	(0.0018)	(0.0008)	.	Ag:0.0019	(0.017)	(0.0027)	(0.0020)	(0.0008)	.	O:0.011
2	CURM 54.02	0.107	5.53	0.410	92.87	0.020	0.023	.	0.102	0.0020	0.101	0.109	0.663	0.030	0.026	.	0.012
1	GBW 02135	0.106	7.92	.	91.73	.	.	.	.	.	.	.	.	.	.	.	.
1	SRM 871	0.082	8.14	0.025	91.68	.	.	.	<0.001	.	.	.	0.010	.	.	.	.
1	IARM Cu544-18	0.069	4.14	3.80	88.0	.	.	.	(0.010)	.	.	0.019	3.92	.	.	.	.
2	CURM 54.01	0.053	3.17	0.346	95.42	0.040	0.044	.	0.028	0.008	0.158	0.348	0.307	0.023	0.070	.	0.039
1	C32XPB140	0.032	8.58	0.029	91.0	(0.001)	0.021	.	0.005	<0.001	<0.002	0.092	0.051	0.086	0.061	.	<0.005
2	C32XPB100	0.0236	11.93	0.037	87.70	(0.0008)	0.011	.	0.008	0.004	0.0010	0.057	0.055	0.018	0.0051	.	0.0015

**CRM LEAD**

analysis listed in mg/kg

Number	Type	Ag	As	Au	Bi	Cd	Cu	Ni	Sb	Se	Sn	Te	Tl	Zn	Units
VS 2036-2001	Powder	2322	.	32.6	.	.	.	.	.	.	.	.	.	.	100 g powder
BCR 288B	Added impurities	30.5	55.7	.	215.8	33.3	19.3	4.57	32.5	<0.2	30.6	32.8	2.3	8.2	160 g chips
BCR 287B	Thermal refined	15.2	<0.003	.	67.3	0.36	0.98	0.024	0.040	<0.005	<0.05	<0.02	0.73	<0.1	160 g chips
BCR 286B	Electro refined	0.015	<0.0002	.	21.5	0.125	1.49	0.041	0.10	<0.05	<0.05	<0.1	2.5	<0.1	160 g chips

**LEAD BASE CHIPS AND POWDER**

# = class, where 1 = CRM and 2 = RM analysis listed in mass % BCS: 100g powder CX: 50g chips SRM: 150-200g powder others: 100g chips

#	Number	Sn	Sb	Ag	As	Bi	Ca	Cd	Cu	Fe	In	Na	Ni	Se	Te	Zn	Other
1	SRM 1129	62.7	0.13	0.075	0.055	0.13	.	.	0.16	.	.	.	0.010	.	.	.	.
1	SRM 127b	39.3	0.43	0.01	0.01	0.06	.	.	0.011	.	.	.	0.012	.	.	.	.
1	C93X S30APR30	33.0	0.96	0.021	0.018	0.28	.	0.009	0.008	0.003	.	.	0.010	.	.	0.0053	
1	C93X S30APR20	30.68	1.80	0.049	0.0178	0.168	.	0.0061	0.062	0.0026	0.0199	.	0.042	.	0.0102	0.028	
1	C93X S30APR10	28.58	2.54	0.0144	0.010	0.059	.	0.0014	0.192	(0.012)	0.0094	.	0.0010	.	0.0024	(0.004)	
1	GBW 02401	15.97	16.09	.	0.014	0.024	.	.	1.96	.	.	.	0.0031	.	.	.	Pb: 65.72
2	C86X PSS40	10.69	16.97	(0.006)	0.278	0.120	.	0.047	0.328	*1	0.013	.	.	.	.	*	
2	C86X PSS20	6.33	8.16	0.004	1.42	0.054	.	0.069	0.118	*1	(0.002)	.	0.0080	.	.	*	
1	SRM 53e	5.84	10.26	.	0.057	0.052	.	.	0.054	<0.001	.	.	0.003	.	.	.	
1	GBW 02402	5.69	15.02	.	0.012	0.0075	.	.	2.88	.	.	.	.	.	.	.	Pb: 76.22
1	BCS 177/2	5.07	10.1	.	0.05	0.028	.	.	0.12	.	.	.	0.007	.	.	.	Pb: 84.5
2	C85X PSn20	1.87	0.023	0.002	*5	0.0093	.	*1	0.035	.	.	.	*1	0.0058	*1	*	
1	C85X ANTH	1.45	6.05	0.0071	0.217	0.0194	.	0.0046	0.0291	0.010	.	.	0.0062	0.0149	0.0071	(0.0007)	
1	C85X HRH	0.874	1.13	0.247	0.74	0.092	.	(0.0002)	0.080	.	.	.	0.001	0.037	0.002	.	
1	C84X BA10	0.85	*1	0.0088	*1	0.0084	0.106	0.0016	0.0041	.	.	.	.	.	0.006	0.0007	
1	83X PR8D-C	0.604	0.257	0.497	0.134	1.18	Au:0.0106	0.199	0.0448	last	0.293	50g unit	0.0008	(0.0003)	0.0014	0.0004	Hg: 0.086
2	C84X BA20	0.51	0.002	0.008	*05	0.024	0.061	0.0052	0.003	.	.	.	.	.	*	0.019	
1	C84X BA80	0.293	0.0009	0.0043	(0.0004)	0.019	0.157	0.0010	0.0007	.	.	.	.	.	<0.002	0.0013	Al: 0.021
2	C85X PSb120	0.21	11.4	0.0015	0.11	0.007	.	*1	0.30	*1	.	.	0.0016	*1	*5	0.087	
2	C85X PSb30	0.13	2.66	*2	0.14	0.010	.	*1	0.032	*1	.	.	0.0013	0.024	*2	(0.0002)	
2	C84X BA40	0.11	0.061	0.003	(0.0008)	0.074	(0.014)	0.010	0.031	.	.	.	0.0007	.	0.029	(0.0003)	
2	C85X PSb80	0.085	8.43	0.016	0.02	0.010	.	*1	0.032	*1	.	.	0.0014	0.0007	*5	(0.0002)	
2	C85X PSb100	0.080	10.2	0.0015	0.11	0.007	.	*1	0.14	*5	.	.	0.0013	*1	*2	0.014	
2	C85X 0616Pb10	0.070	1.78	0.002	0.070	0.025	.	0.0023	0.048	*1	.	.	0.001	0.018	0.001	0.001	
2	C85X PSb50	0.057	5.14	0.0017	0.12	0.022	.	*1	0.007	*1	.	.	0.0025	0.0008	*1	*1	
1	C83X PR40	0.009	0.012	0.014	(0.002)	0.014	0.0026	0.010	0.015	.	0.005	0.001	0.013	0.003	0.025	0.005	Au: 0.002
2	BM Pb	<0.0005	(5ppm)	<0.0003	<0.0005	<0.004	.	.	<0.0005	.	.	.	<0.0001	.	.	<0.001	Pb: 99.99

\* In the above chart, \* represents <0.00 so that, for example, \*1=<0.001 C83X-86X, C93X: typical analysis

**LEAD-SILVER ALLOY CHIPS**

typical analysis

Class	Number	Ag	Al	As	Bi	Cd	Cu	Fe	In	Sb	Sn	Zn	Units
RM	C82X Ag6.0	6.0	0.002	0.025	0.54	0.010	0.19	0.001	0.006	0.48	0.50	0.008	50 g
RM	C82X Ag3.5	3.48	<0.001	0.022	0.27	0.004	0.075	0.001	0.045	0.11	0.24	0.001	50 g
CRM	C82X Ag1.5	1.55	.	0.006	0.06	.	0.27	.	.	0.39	0.04	0.004	50 g

**RM LEAD BASE BATTERY ALLOY CHIPS**

typical analysis

50 g units

Number	Sn	Ag	As	Bi	Ca	Cd	Cu	Sb	Te	Zn
C84X BA60	0.73	0.002	<0.001	0.008	0.095	(0.002)	0.0010	0.001	<0.001	<0.001
C84X BA70	0.61	0.002	<0.001	0.009	0.036	<0.002	0.0009	0.002	<0.001	<0.0005

CRM	MAGNESIUM CHIPS															typical analysis	
	Number	Ag	Al	Be	Ca	Cd	Ce	Cu	Fe	La	Mn	Ni	Pb	Si	Sn	Zn	Units
C61XMgP30	0.013	0.090	<0.0001	0.053	0.015	0.006	0.030	0.014	0.004	0.015	0.005	0.015	0.050	0.016	0.019	50 g	
C61XMgP20	0.003	0.065	<0.0001	0.014	0.006	0.002	0.012	0.006	0.002	0.012	0.003	0.006	0.031	0.007	0.012	50 g	
C61XMgP10	<0.001	0.013	<0.0005	<0.001	<0.0005	.	(0.0006)	0.027	.	0.0037	<0.002	0.005	0.005	(0.001)	0.002	50 g	

### MAGNESIUM BASE CHIPS

# = class, where 1 = CRM and 2 = RM

BCS: 100 g units

CX: typical analysis 50 g units

#	Number	Al	RE	Ag	Mn	Zn	Be	Ca	Cd	Cu	Fe	Ni	Pb	Si	Sn	Zr	Other
1	BCS 316	8.01	.	.	0.28	0.68	.	.	0.040	0.009	0.004	0.024	0.055	0.005	.	.	
1	C65XMgA10	5.45	.	0.012	0.060	1.26	0.006	0.029	0.013	0.221	0.021	0.021	0.012	0.20	0.072	(0.0015)	Ce: 0.009 La: 0.007
1	C65XMgB30	3.21	.	(0.002)	0.012	0.60	0.0030	0.029	0.011	0.021	0.007	0.0019	0.004	0.011	0.005	.	
1	C65XMgB10	2.39	.	0.03	0.68	1.71	0.0007	0.41	0.07	0.20	0.016	0.012	0.01	0.17	0.011	.	Ce: 0.015 La: 0.013
2	C65XMgB20	2.32	.	.	0.44	0.95	.	0.008	.	0.096	0.015	0.005	0.012	0.06	0.012	.	
2	C65XMgE20	0.056	.	.	1.58	0.04	.	(0.003)	.	0.058	0.009	0.012	0.013	0.035	0.011	.	
2	C65XMgD30	0.041	0.008	0.005	0.28	1.97	0.0003	(0.07)	.	0.058	0.023	0.002	0.009	0.020	0.007	0.029	
1	C63XMgE30	0.015	.	0.005	2.36	0.022	.	0.13	0.001	0.012	0.004	0.0023	0.005	0.01	0.0057	.	
2	C67XMgF30	0.01	2.40	.	0.015	3.18	.	0.006	.	0.03	0.009	0.002	0.017	0.005	0.006	0.48	
1	BCS 307	(0.008)	2.84	.	0.006	2.08	.	.	.	0.005	0.002	.	.	.	.	0.56	
2	C66XMgD40	0.006	.	.	0.02	2.80	.	0.004	.	0.01	0.003	0.002	0.017	0.01	0.003	0.44	
2	C68XMgH40	0.004	2.4	2.05	0.015	0.17	.	.	.	0.03	0.001	0.004	.	0.002	.	0.46	
2	C68XMgL10	0.002	2.09	1.41	0.016	0.009	.	.	.	0.013	0.009	0.005	.	0.001	.	0.54	Th: 0.24

#	Number	Al	RE	Ag	Mn	Zn	Be	Ca	Cd	Cu	Fe	Ni	Pb	Si	Sn	Zr	Other
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RE = Total Rare Earths

### NICKEL POWDER

certified analysis listed in mg/kg except % which is mass %

Number	Ag	Al	Au	C	Cr	Cu	Fe	Ir	Mn	Mo	Ni%	Os	P	Pb	Pd	Pt	Rh	Ru	S	Si	Units
CRM - nickel ore																					
VS 1702-86	23.4	.	0.84	.	.	(3%)	.	0.11	.	.	5.4	0.06	.	.	30.0	8.6	0.98	0.34	.	.	100 g
RM - nickel powder																					
BS HPN-1	(<0.1)	70	.	268	22	2	202	.	2	3	.	.	5	0.2	.	.	.	.	4	6	100 g

continued

informational values

Number	As	B	Ba	Be	Bi	Ca	Cd	Co	Ga	H	In	Mg	N	Na	O	Sb	Se	Sn	Te	Ti	Tl	V	Zn
VS 1702-86	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
BS HPN-1	<0.5	<2	<1	<1	<0.2	3	<0.1	<2	<0.5	70	<0.2	1	17	4	1510	<0.1	<0.2	<1	<0.2	<1	<0.1	<1	<1

**CRM NICKEL CHIPS**

# = class, where 1 = CRM and 2 = RM

100 g units

#	Number	Ag	Al	As	B	Be	Bi	C	Ca	Cd	Co	Cr	Cu	Fe
2	IARM 190A	0.00109	0.0050	0.0028	<0.0005	<0.0001	0.00111	0.0022	<0.0010	0.0005	0.0008	(0.0001)	0.0017	0.0099
2	IARM 189A	0.00024	0.0044	0.00007	<0.0005	<0.0001	0.00026	0.0023	<0.0010	0.00008	0.00031	(0.0010)	0.00090	0.0038
2	IARM 188A	0.00011	0.0024	0.00007	<0.0005	<0.0001	0.00009	0.0022	<0.0010	0.00002	0.00017	(0.0006)	0.00018	0.0019
2	IARM 187A	0.00001	0.0011	0.00001	<0.0005	<0.0001	<0.00001	0.0013	<0.0010	<0.00001	0.00010	(0.0003)	0.00022	0.0019
2	IARM 191A	0.00001	0.00015	0.0013	<0.0005	<0.0001	<0.00001	0.0014	<0.0010	<0.0001	0.0545	0.00021	0.00042	0.00079
1	BAM RS 4	<0.0001	<0.0001	<0.00005	<0.0002	.	<0.00001	0.00094	<0.0001	<0.00002	<0.0001	<0.00005	<0.0002	0.00042
1	IARM 50C	.	(0.004)	.	0.0027	.	.	0.015	.	.	(0.011)	(0.005)	0.028	0.084

Number	Ga	Mg	Mn	Mo	N	Ni	O	P	Pb	S	Sb	Se
IARM 190A	<0.00005	(0.0006)	0.00018	<0.0001	(0.0001)	.	(0.0012)	0.0034	0.00093	0.00033	0.0011	0.00065
IARM 189A	<0.00005	(0.0008)	0.00019	<0.0001	(0.0001)	.	(0.0018)	0.00037	0.00029	0.00018	0.00039	0.00021
IARM 188A	<0.00005	(0.0004)	0.00023	<0.0001	(0.0001)	.	(0.0017)	0.00014	0.00010	0.00018	0.00011	0.00007
IARM 187A	<0.00005	(0.0002)	0.00030	<0.0001	(0.0001)	.	(0.0014)	<0.00010	0.000015	0.00019	<0.00005	<0.00001
IARM 191A	<0.00005	(0.0002)	0.00031	<0.0001	(0.0002)	.	(0.0030)	<0.00010	0.00003	0.00021	<0.00005	0.00019
BAM RS 4	<0.00002	<0.00008	<0.00005	<0.00002	0.00025	99.995	(0.0029)	.	<0.0001	<0.00002	<0.00002	<0.0001
IARM 50C	.	0.005	0.22	.	(0.002)	99.4	.	(0.0014)	.	0.0012	.	.

Number	Si	Sn	Te	Ti	Tl	V	W	Zn
IARM 190A	0.0028	0.00062	0.00089	(0.0006)	0.00058	<0.00005	.	0.00081
IARM 189A	0.0019	0.00022	0.00017	(0.0003)	0.00023	<0.00005	.	0.00028
IARM 188A	0.0018	0.00011	0.00008	(0.0002)	(0.00009)	<0.00005	.	0.00023
IARM 187A	(0.0018)	0.00004	<0.00001	(0.0003)	<0.00002	(0.00008)	.	<0.00005
IARM 191A	(0.0005)	0.00004	<0.00001	<0.0001	<0.00002	<0.00005	.	0.00019
BAM RS 4	<0.00002	<0.00003	<0.00002	.	<0.00002	<0.00002	<0.00001	<0.0004
IARM 50C	0.031	.	.	0.026	.	.	.	.

**NICKEL ALLOY CHIPS**

# = class, where 1 = CRM and 2 = RM

#	Number	Al	C	Co	Cr	Cu	Fe	Mg	Mn	Mo	Nb	Ni	Si	Ti	V	W
1	IARM 52D	2.95	0.125	0.005	(0.004)	29.6	1.38	0.0065	0.59	.	(0.002)	64.5	0.170	0.60	(0.0010)	.
1	SRM 882	2.85	(0.006)	(0.007)	(0.0001)	31.02	(0.009)	(0.001)	0.0007	.	.	65.25	(0.006)	0.57	(0.0001)	.
1	IARM NiB-3-18	0.41	(0.003)	0.142	1.55	(0.014)	1.57	0.010	0.70	28.2	0.15	67.2	(0.021)	(0.007)	(0.007)	(0.07)
1	IARM 63B	0.31	0.0025	0.019	0.47	0.012	1.68	0.005	0.61	27.3	(0.001)	69.6	0.019	0.003	(0.010)	0.060
1	IARMNi244H-18	0.23	0.052	(0.005)	6.9	0.013	39.9	0.0014	10.9	(0.003)	0.70	41.1	0.16	0.20	(0.004)	.
1	IARM 63D	0.13	0.0079	(0.013)	0.153	(0.003)	1.56	(0.0013)	0.76	26.6	(0.04)	70.4	(0.03)	0.14	(0.007)	(0.02)
1	IARM NiB2-23	0.13	0.0030	0.116	0.579	.	1.36	0.0012	0.504	27.1	.	70.2	.	0.021	.	0.0042
1	IARM 51D	0.036	0.139	0.011	0.064	32.6	1.68	0.016	1.03	0.019	(0.006)	64.1	0.16	0.033	.	.
1	BCS 363/1	0.027	0.140	0.032	(0.05)	31.90	1.86	.	1.26	.	.	64.7	0.028	(0.03)	.	.
1	IARM NiR405-20	0.043	0.117	0.040	0.499	31.2	1.71	0.018	0.96	0.102	0.103	64.8	0.161	0.0086	(0.0020)	(0.005)
1	IARM Ni909-18	(0.009)	(0.006)	13.1	(0.010)	(0.007)	42.4	(0.00012)	(0.030)	.	4.6	37.7	0.42	1.62	.	(0.009)
1	BCS 371	.	0.30	0.39	.	.	.	0.060	.	.	.	.	0.34	.	.	.
1	VS N10/4	.	0.0074	.	.	(0.005)	0.399	.	0.237	27.04	.	.	0.093	0.085	1.57	.
1	VS N3/4	.	0.0064	.	2.16	4.98	Rem	.	0.424	.	.	.	0.264	.	.	.
1	VS N4/3	.	0.0057	.	0.070	5.65	5.80	.	0.762	4.87	.	.	0.81	.	.	.

Number	B	N	O	P	Pb	S	Sn	Zr	Units
IARM 52D	(0.0020)	.	.	(0.002)	.	(0.0012)	0.0013	0.026	100 g
SRM 882	(0.0001)	.	.	.	(0.0006)	0.0014	(0.003)	(0.0005)	100 g
IARM NiB-3-18	(0.0020)	0.0027	.	(0.005)	.	(0.0004)	.	.	100 g
IARM 63B	<0.002	0.0041	0.0010	0.004	.	(0.0004)	.	(0.002)	100 g
IARMNi244H-18	(0.002)	0.0087	(0.0009)	(0.003)	.	0.0038	(0.0003)	(0.0008)	100 g
IARM 63D	0.0017	.	.	(0.004)	.	(0.0006)	.	(0.002)	100 g
IARM NiB2-23	0.0018	0.0007	.	.	.	(0.0007)	.	.	100 g
IARM 51D	.	.	.	(0.010)	.	0.0015	.	.	100 g
BCS 363/1	.	.	.	.	.	(0.002)	.	.	100 g
IARM NiR405-20	.	0.0007	(0.0008)	0.011	0.0010	0.040	.	0.006	100 g
IARM Ni909-18	0.0013	0.0026	(0.004)	(0.002)	.	0.0018	.	.	100 g
BCS 371	.	.	.	.	.	0.013	.	.	100 g
VS N10/4	.	.	.	0.0022	.	0.0028	.	.	100 g
VS N3/4	.	.	.	.	.	0.0018	.	.	100 g
VS N4/3	.	.	.	0.0019	.	.	.	.	100 g

Ag: (0.0004) As: (0.0001) Se: (0.0002)  
As: 0.0009 Sb: 0.00012  
Ta: (0.006)

## NICKEL BASE CHIPS AND POWDER WITH Cr &gt; 10 % CONTINUED ON THE NEXT PAGE

# = class, where 1 = CRM, 2 = RM, and 3 = RM with no uncertainties

IARM 718P-18 is powder, all others chips

#	Number	Cr	Mo	Al	C	Co	Cu	Fe	Mn	Nb	Ni	Si	Ti	W
1	IARM 329A	33.7	8.38	0.29	0.0086	0.052	0.065	0.92	0.222	0.131	55.8	0.053	(0.005)	0.021
1	IARM NiG30-22	29.2	5.13	0.186	0.0177	0.18	1.31	15.5	0.96	0.85	44.6	0.47	0.140	1.43
1	IARM Ni690-18	29.1	(0.013)	0.25	0.025	0.013	(0.012)	10.0	0.154	(0.007)	59.8	(0.049)	0.324	(0.003)
1	IARM 372A	28.3	(0.006)	3.28	0.030	0.009	(0.004)	3.12	0.285	0.71	63.6	0.020	0.486	(0.02)
1	VS N11/3	27.04	.	2.83	0.057	.	.	0.47	0.147	.	.	0.263	.	.
1	IARM 357A	27.0	3.48	0.09	0.0199	0.17	0.81	34.3	1.63	0.089	31.9	0.458	0.079	0.108
1	IARM 338A	25.0	0.0017	2.13	0.168	0.035	0.0059	9.74	0.052	(0.004)	62.3	0.020	0.130	.
1	IARM 282A	24.6	0.210	0.085	0.054	0.12	0.0615	35.7	0.81	0.57	37.1	0.63	0.019	0.043
1	VS N14/3	24.35	1.32	0.164	0.012	.	0.0082	2.16	0.385	.	57.0	0.67	0.40	13.47
1	SRM 867	23.4	2.73	(0.062)	(0.021)	0.089	1.74	26.6	0.39	(0.45)	43.5	0.32	0.75	(0.006)
1	IARM Ni825-18	22.4	2.80	0.11	(0.006)	0.55	1.81	29.5	0.49	0.31	40.8	0.17	0.96	0.230
1	IARM Ni625-23	22.27	8.74	0.303	0.031	0.116	0.076	3.98	0.080	3.50	60.4	0.076	0.296	0.088
1	IARM NiX-18	22.0	8.6	0.24	0.080	1.43	0.046	19.2	0.215	(0.024)	46.9	0.49	(0.017)	0.55
1	IARM 366A	22.0	0.079	1.51	0.025	0.041	0.038	14.3	0.205	0.069	60.9	0.19	0.43	0.02
1	IARM Ni617-18	21.9	9.33	1.08	0.079	11.81	(0.009)	1.45	0.24	0.197	53.3	0.21	0.32	(0.02)
1	SRM 865	21.9	8.6	0.21	0.037	(0.072)	0.36	4.5	0.18	3.5	59.5	0.41	0.28	(0.007)
1	IARM 68F	21.9	1.35	0.26	0.101	0.24	0.031	1.50	0.499	0.084	(59.6)	0.381	0.010	14.5
1	IARM 68E	21.88	1.18	0.30	0.099	0.16	0.022	1.06	0.51	0.035	(59.9)	0.39	0.015	14.6
1	IARM 65D	21.5	13.1	0.29	0.0021	1.22	0.050	3.66	0.28	0.033	56.8	0.035	0.005	2.81
1	VS N16/2	21.12	0.49	0.90	0.049	.	0.011	1.11	0.224	0.367	.	0.267	2.71	.
1	IARM 274A	21.0	8.06	0.26	0.007	0.143	0.10	7.60	0.08	3.48	57.5	(0.02)	1.55	0.06
1	IARM Ni155-18	20.9	2.87	0.153	0.116	19.2	0.039	31.4	1.46	1.00	20.1	0.55	0.0026	2.42
1	IARM Ni925-18	20.8	2.82	0.23	0.0114	0.43	1.69	26.4	0.518	0.40	44.2	0.075	2.19	0.27
1	NCS HC41501	20.69	8.37	0.016	0.043	(0.011)	.	3.50	0.124	3.19	63.72	0.071	0.011	.
1	IARM 328A	20.57	3.16	0.189	(0.006)	(0.003)	1.94	22.41	0.017	3.14	47.03	0.021	1.53	(0.015)
1	IARM Ni725-18	20.5	7.9	0.22	(0.008)	0.077	0.103	7.47	0.076	3.47	58.4	0.084	1.55	(0.04)
1	IARM 328B	20.5	3.12	0.116	0.010	0.063	2.0	15.0	0.077	3.99	53.7	(0.05)	1.53	(0.04)
1	IARM Ni686-20	20.4	16.1	0.34	0.0087	0.017	0.039	0.44	0.270	0.13	58.6	0.037	0.058	3.59
1	IARM 362B	20.4	16.1	0.32	0.0079	(0.010)	.	(0.010)	0.229	(0.015)	58.7	(0.04)	0.052	3.90
1	IARMNi256Mo-18	20.3	6.63	0.17	0.0182	(0.02)	1.98	44.0	0.83	(0.010)	25.5	0.41	(0.006)	(0.010)
1	NCS HC23504	20.30	2.06	0.635	0.059	.	0.059	.	0.442	.	.	0.631	0.613	.
1	IARM Ni800-19	20.13	(0.006)	0.44	0.079	(0.0027)	(0.0039)	47.04	0.662	.	30.9	0.34	0.497	.
1	SRM 866	20.1	0.36	0.29	0.082	0.075	0.49	46.1	0.92	(0.09)	30.8	0.17	0.31	(<0.002)
1	VS N5/3	20.03	.	.	0.076	.	.	0.53	0.274	.	.	0.60	0.28	.
1	VS N6/4	20.0	.	0.8	0.008	.	0.8	0.2	.	.	.	0.1	2.7	.
#	Number	Cr	Mo	Al	C	Co	Cu	Fe	Mn	Nb	Ni	Si	Ti	W
1	IARM NiWasp-18	19.7	4.28	1.36	0.038	13.13	0.009	0.69	0.022	0.033	57.8	0.028	3.01	0.030
1	BCS 478	19.69	0.0061	0.54	0.071	.	.	0.51	.	.	30.9	0.290	0.479	.
1	IARM Ni718P-18	19.6	3.13	0.49	0.036	0.097	(0.018)	17.0	0.026	4.95	53.6	0.036	1.01	(0.010)
1	IARM Ni282-18	19.4	8.40	1.57	0.060	10.38	0.012	0.90	0.042	0.058	56.8	0.054	2.20	(0.043)
1	BCS 310/1	19.45	.	1.06	0.068	17.0	.	0.25	0.35	.	58.6	0.46	2.43	.
1	IARM Ni800-18	19.38	0.033	0.421	0.070	0.023	0.068	47.2	0.61	.	31.3	0.42	0.520	.
1	SRM 349A	19.3	4.25	1.23	0.035	12.46	(0.007)	1.15	0.019	(0.05)	58.1	0.018	3.06	(0.06)
1	BCS 351/1	19.14	3.04	0.554	0.0255	0.145	0.0222	17.20	0.0562	5.31	53.35	0.080	0.938	0.0209
1	IARM NiRene41-21	18.98	9.61	1.58	0.081	11.1	(0.0025)	2.92	0.013	0.022	52.6	0.028	3.10	0.006
1	NCS HC41502	18.56	3.28	0.635	0.027	0.111	0.023	18.54	0.057	5.15	52.27	0.080	1.03	.
1	IARM Ni718-20	18.5	3.01	0.54	0.028	0.066	0.025	18.1	0.027	5.24	53.3	0.044	0.94	0.013
1	IARM Ni718-22	18.46	2.91	0.56	0.036	0.253	0.059	18.4	0.071	5.17	52.8	0.108	0.91	0.049
1	IARM Ni330-21	18.18	0.142	(0.008)	0.062	0.057	0.046	43.9	1.382	0.067	34.8	1.35	0.0088	.
1	IARM Ni718-23	18.08	2.90	0.484	0.0258	0.293	0.034	18.10	0.047	5.44	53.4	0.053	1.00	0.038
1	VS N13/4	17.89	4.39	2.83	0.0097	5.52	.	0.268	0.203	.	.	0.407	1.12	6.50
1	VS N9/4	17.44	2.88	1.33	0.0102	.	0.0122	7.63	0.010	0.83	.	0.096	2.10	3.09
1	IARM NiPE16-18	16.6	3.29	1.20	0.052	0.77	(0.053)	34.4	0.122	0.040	42.9	0.13	1.18	0.038
1	BAM 326-1	16.37	(0.025)	.	0.092	0.223	(0.027)	.	0.406	.	61.16	1.46	.	.
1	IARM NiH214-18	16.24	(0.004)	4.28	0.036	0.007	0.0011	3.48	0.185	(0.003)	75.6	(0.020)	(0.003)	(0.02)
1	IARM NiC276-18	15.9	15.4	0.114	0.0032	0.170	0.14	6.09	0.42	(0.061)	58.5	(0.017)	0.007	3.23
1	SRM 864 **	15.74	0.204	0.252	(0.063)	0.0602	0.255	9.63	0.288	(0.126)	73.09	(0.114)	(0.251)	(<0.002)
1	IARM NiS-18	15.62	15.4	0.388	0.012	0.416	.	0.81	0.65	.	65.6	0.49	(0.0023)	0.36
1	VS N12/3	15.49	16.12	.	0.012	.	.	0.085	0.440	.	.	0.107	.	4.08
1	IARM 57E	15.3	0.014	0.74	0.060	0.021	(0.010)	8.01	0.079	1.00	72.1	0.052	2.54	(0.009)
1	IARM 277A	14.35	4.22	4.38	0.080	14.5	0.004	0.16	0.01	0.034	58.9	0.037	3.40	0.047
1	NCS HC23505	14.28	.	1.88	0.038	.	.	.	0.28	.	37.83	0.19	2.89	5.87
1	BCS 350	13.43	4.29	5.97	0.138	0.338	.	1.50	0.019	2.17	70.8	0.110	0.87	0.094
1	BCS 387/1	11.50	6.00	0.20	0.050	0.020	0.020	38.00	0.020	.	41.0	0.050	3.00	.
#	Number	Cr	Mo	Al	C	Co	Cu	Fe	Mn	Nb	Ni	Si	Ti	W

\* Provisional Analysis

\*\* SRM 864 also contains, in mg/kg, Pb: 2.27 Tl:0.0029

## NICKEL BASE CHIPS AND POWDER WITH Cr &gt; 10 % CONTINUED FROM THE PREVIOUS PAGE

IARM 718P-18 is powder, all others chips

Number	Ag	B	Mg	N	O	P	S	Sn	Ta	V	Zr	Units	Other
IARM 329A	0.00007	0.0010	0.0124	0.073	0.0027	0.0059	0.0003	(0.0005)	.	0.009	(0.0012)	100 g	
IARM NiG30-22	.	0.0011	.	0.046	0.0024	0.0108	0.0005	0.0020	.	0.035	.	100 g	
IARM Ni690-18	.	.	0.0030	0.012	.	(0.004)	0.0007	.	.	0.048	.	100 g	
IARM 372A	.	0.0016	0.016	(0.011)	(0.0008)	(0.003)	0.0016	.	.	(0.008)	0.017	100 g	
VS N11/3	.	.	.	.	.	0.0016	0.003	.	.	.	.	100 g	
IARM 357A	.	(0.0014)	(0.005)	(0.011)	(0.005)	0.013	0.0021	.	.	0.091	.	100 g	
IARM 338A	(0.0001)	0.0049	0.0058	0.0276	0.0010	(0.003)	0.0008	0.00037	(0.002)	0.0026	0.081	100 g	Y: (0.06%)
IARM 282A	(0.0001)	0.005	(0.004)	0.207	0.0023	0.016	0.0003	(0.003)	(0.005)	0.052	(0.002)	100 g	
VS N14/3	.	.	.	.	.	0.0020	0.0029	.	.	.	.	100 g	
SRM 867	(<0.0001)	(0.002)	.	(0.017)	(0.006)	(0.018)	(0.002)	.	(0.001)	(0.047)	.	100 g	
IARM Ni825-18	.	0.0023	.	0.0093	(0.0020)	0.013	.	0.0023	(0.0011)	0.047	(0.002)	100 g	
IARM Ni625-23	.	0.0019	0.0008	0.010	.	0.0070	0.0004	.	(0.004)	0.016	.	100 g	
IARM NiX-18	.	0.0038	0.0030	0.042	(0.0012)	0.0107	(0.0050)	.	.	(0.037)	.	100 g	
IARM 366A	.	.	(0.004)	0.0136	(0.0010)	0.008	(0.0003)	.	.	(0.028)	(0.012)	100 g	
IARM Ni617-18	.	0.0023	(0.0011)	0.0082	(0.0010)	(0.004)	(0.0007)	.	.	(0.006)	(0.06)	100 g	
SRM 865	(0.0002)	(<0.001)	.	(0.066)	(0.004)	(0.012)	(0.001)	.	(<0.01)	(0.019)	.	150 g	
IARM 68F	.	(0.0050)	(0.006)	0.045	0.0007	(0.006)	(0.0005)	.	.	(0.007)	.	100 g	
IARM 68E	.	0.007	(0.006)	0.050	0.0007	(0.005)	(0.0005)	.	.	(0.007)	.	100 g	
IARM 65D	.	(0.001)	0.007	0.019	0.0005	0.008	0.0004	(0.001)	(0.01)	0.012	(0.002)	100 g	
VS N16/2	.	0.0066	.	.	.	0.0028	0.0019	.	.	0.030	.	100 g	Sb: 0.00014
IARM 274A	.	0.002	0.0019	0.007	0.0006	0.007	0.0004	0.001	(0.002)	0.019	(0.001)	100 g	
IARM NiN155-18	.	0.0024	.	0.12	.	0.008	(0.0009)	.	.	0.0236	.	100 g	
IARM Ni925-18	.	0.0034	.	0.0033	0.0011	0.012	0.0024	.	.	(0.031)	.	100 g	
NCS HC41501	.	.	.	.	.	0.0023	0.0006	.	(0.001)	.	.	100 g	
IARM 328A	.	0.0011	(0.0008)	0.0056	0.0006	(0.004)	0.0006	(0.0002)	(0.0004)	0.008	(0.004)	100 g	
IARM Ni725-18	.	0.0023	(0.005)	0.008	.	0.0047	(0.0008)	(0.0011)	(0.006)	0.013	.	100 g	
IARM 328B	.	(0.0010)	.	(0.006)	.	(0.005)	(0.0006)	.	.	(0.014)	.	100 g	
IARM Ni686-20	.	.	(0.009)	0.0097	0.0006	(0.003)	0.0005	.	.	0.009	(0.0013)	100 g	
IARM 362B	.	.	0.008	0.0060	(0.0006)	(0.005)	(0.0004)	.	.	(0.010)	.	100 g	
IARMNi256Mo-18	.	0.0009	.	0.022	.	(0.004)	0.0011	.	Ca:0.0014	(0.009)	.	100 g	
NCS HC23504	.	.	.	.	.	0.0182	0.0107	.	.	.	.	100 g	
IARM Ni800-19	.	0.0004	(0.001)	0.0070	0.0041	0.0021	0.0016	.	.	0.0083	(0.0014)	100 g	
SRM 866	(<0.0001)	(<0.001)	.	(0.018)	(0.004)	(0.017)	(0.001)	.	(<0.001)	(0.040)	.	100 g	
VS N5/3	.	.	.	.	.	0.0014	0.0033	.	.	.	.	100 g	
VS N6/4	.	.	.	.	.	0.002	0.003	.	.	.	.	100 g	Pb: 0.004
Number	Ag	B	Mg	N	O	P	S	Sn	Ta	V	Zr	Units	Other
IARM NiWasp-18	.	0.0061	(0.0018)	0.0046	(0.0009)	0.0032	(0.0004)	.	(0.005)	(0.023)	0.058	100 g	
BCS 478	.	.	.	0.007	.	0.0057	0.0010	.	.	.	.	100 g	
IARM Ni718P-18	.	.	.	(0.010)	0.014	(0.006)	(0.0013)	.	(0.006)	0.017	.	75 g	POWDER
IARM Ni282-18	.	0.0014	0.0054	.	.	(0.003)	(0.0006)	.	.	(0.013)	(0.0014)	100 g	
BCS 310/1	.	.	.	.	.	.	.	.	.	.	.	100 g	
IARM Ni800-18	.	0.0025	.	0.0087	(0.002)	0.013	0.0012	0.0017	.	0.028	(0.0013)	100 g	
SRM 349a	.	(0.005)	.	.	.	(0.003)	0.0024	.	.	(0.12)	(0.053)	150 g	
BCS 351/1	.	0.0035	0.0016	0.0077	.	0.0045	0.00037	0.00033	0.0033	0.0101	0.0017	100 g	Sb: 0.00024
IARMNiRene41-21	.	0.0067	0.0019	0.0046	0.0007	.	(0.0002)	.	.	0.012	0.0028	100 g	
NCS HC41502	.	0.0025	.	.	.	0.0033	0.0005	.	(0.008)	.	.	100 g	last
IARM Ni718-20	.	0.0039	0.0025	0.009	.	0.0032	(0.0030)	.	0.006	0.016	.	100 g	
IARM Ni718-22	.	0.0047	.	0.0079	.	0.0088	(0.0005)	0.0013	0.0033	0.035	.	100 g	
IARM Ni330-21	.	0.0016	.	0.032	0.0026	0.015	0.0010	0.0015	.	0.051	(0.0016)	100 g	
IARM Ni718-23	.	0.0039	0.0012	0.0070	(0.0009)	0.0073	(0.0005)	.	0.004	0.026	.	100 g	
VS N13/4	.	0.0098	.	.	.	0.0018	0.0020	.	.	.	.	100 g	Ce: 0.0047
VS N9/4	.	0.0049	.	.	.	.	.	.	.	.	.	100 g	
IARM NiPE16-18	.	0.0028	.	(0.006)	(0.0006)	(0.006)	(0.0007)	.	.	(0.018)	0.019	100 g	
BAM 326-1	.	.	.	.	.	0.0028	.	.	.	.	0.129	100 g	
IARM NiH214-18	.	0.0033	0.0053	0.0026	.	(0.0017)	(0.0004)	.	Y: (0.008)	(0.003)	0.026	100 g	
IARM NiC276-18	.	0.0020	(0.010)	(0.017)	.	(0.008)	(0.0007)	.	.	(0.018)	.	100 g	
SRM 864 **	(<0.0001)	0.00283	0.01383	(0.01)	(0.004)	(0.011)	(0.0028)	(0.00074)	(<0.001)	0.0327	(0.00037)	100 g	
IARM NiS-18	.	0.0061	0.0021	.	.	0.006	(<0.001)	.	.	(0.0027)	.	100 g	La: 0.031
VS N12/3	.	.	.	.	.	0.0021	0.0027	.	.	.	.	100 g	
IARM 57E	.	0.008	(0.0013)	.	.	(0.005)	(0.0009)	.	.	0.021	0.037	100 g	
IARM 277A	.	0.015	0.0021	0.0017	0.0005	0.002	0.0010	<0.003	(0.02)	0.011	0.010	100 g	
NCS HC23505	.	.	.	.	.	0.008	.	.	.	.	.	100 g	
BCS 350	.	0.013	.	.	.	.	.	.	.	.	0.072	100 g	
BCS 387/1	.	.	.	.	.	0.005	0.005	.	.	.	.	100 g	
Number	Ag	B	Mg	N	O	P	S	Sn	Ta	V	Zr	Units	Other

\* Provisional Analysis

\*\* SRM 864 also contains, in mg/kg, Pb: 2.27 Tl:0.0029

**CRM IN 100 TYPE NICKEL ALLOY CHIPS**

analysis listed in mass %

Number	Al	Co	Cr	Mo	Ti	V	B	C	Zr	Units
BCS 345	5.58	14.70	9.93	3.01	4.74	1.00	0.019	0.153	0.044	100 g
BCS 346	(5.5)	(15)	(10)	(3)	(5)	(1)	.	(0.15)	.	100 g

continued

analysis listed in mg/kg

Number	Ag	As	Bi	Ca	Cd	In	Ga	Mg	Pb	Sb	Se	Sn	Te	Tl	Zn
BCS 345	<0.2	(2)	<0.2	(<5)	<0.1	.	8	5	0.2	<2	<0.5	6	<0.2	<0.2	<0.5
BCS 346	35	50	10	(36)	0.4	(19)	(52)	147	21	47	9	91	12	.	29

**CRM TRACE ELEMENTS IN SUPERALLOY CHIPS**

analysis listed in mg/kg

HC11520-4: 150 g chips, others 100 g powder

Number	Ag	As	B	Bi	Ca	Cd	Ce	Cu	Hf	Ga	Ge	In	P	Mg	Pb	Sb	Sc	Se	Sn	Te	Tl	Zn
NCS HC11529	5.4	25	13	1.8	.	.	0.19	53	12	49	27	10	80	.	11	33	0.6	2.2	43	1.3	1.1	13
NCS HC11522	5.3	15	(90)	0.4	11	1.8	(110)	.	.	108	.	30	(40)	15	11	59	.	11	72	2.1	51	105
NCS HC11521	4.6	11	(100)	0.4	21	4.6	(40)	.	.	32	.	2.6	(40)	16	4.1	95	.	16	53	11	22	32
NCS HC11528	4.4	44	24	2.0	.	.	0.28	94	33	52	75	31	131	.	8.2	49	1.2	2.5	45	2.3	3.9	15
NCS HC11520	3.5	17	(100)	4.2	42	7.3	(30)	.	.	29	.	11	(40)	82	12	204	.	43	103	3.0	8.5	24
NCS HC11527	2.5	96	25	1.2	.	.	0.44	172	3.8	38	38	2.6	55	.	4.7	16	1.2	4.1	18	7.5	4.3	14
NCS HC11526	1.0	14	47	0.19	.	.	1.8	363	7.4	34	24	7.2	36	.	3.7	3.3	2.7	12	8.3	31	0.16	13
NCS HC11525	0.78	6.7	90	0.14	.	0.31	0.37	571	3.5	31	13	0.88	41	.	3.4	1.4	1.3	9.8	3.2	28	0.13	12
NCS HC11524	0.7	72	(100)	3.4	5.3	1.6	(10)	.	.	63	.	9.2	(40)	111	91	6.2	.	53	92	83	8.1	6.0
NCS HC11523	0.3	72	(100)	0.5	32	1.9	(10)	.	.	28	.	0.4	(40)	53	2.2	7.4	.	43	1040	0.5	83	20

**CRM TRACE ELEMENTS IN SUPERALLOY CHIPS**

analysis listed in mg/kg

analysis listed in mass %

35 g units

Number	Bi	Pb	Se	Te	Tl	Al	B	C	Co	Cr	Hf	Nb	Ni	Ta	Ti	W	Zr
SRM 897	(0.5)	11.7	9.1	1.05	0.51	(2)	(0.01)	(0.12)	(8.5)	(12)	(1.2)	(0.9)	Rem	(1.75)	(2)	(1.75)	(0.1)
SRM 899	(0.3)	3.9	9.5	5.9	0.252	(2)	(0.01)	(0.12)	(8.5)	(12)	(1.2)	(0.9)	Rem	(1.75)	(2)	(1.75)	(0.1)

**RM TIN CHIPS**

analysis listed in mass %				analysis listed in mg/kg								100 g chips		
Number	C	Sn	Melting Point °C	As	Bi	Cd	Cu	Fe	In	Ni	Pb	S	Sb	Zn
RM Sn	.	99.9999	.	.	<0.5	.	<0.1	<0.1	.	<0.1	<0.3	.	.	<0.4
BCS 192j	0.001	99.996	231.9	<1	<1	<1	<1	<1	<1	<1	<10	2	<10	<1

**CRM TIN POWDER**

analysis listed in mass %												
Number	Ag	As	Cu	Fe	Pb	S	Sb	Zn	SiO2	Sn	WO3	Units
GBW 07231	0.0025	0.574	.	21.33	2.89	0.183	0.024	0.264	.	45.80	.	100 g
GBW 07232	.	0.306	0.043	9.53	1.62	0.090	0.016	0.120	0.93	.	0.182	100 g

**TIN CHIPS AND POWDER**

# = class, where 1 = CRM and 2 = RM      BCS: 100 g powder      GBW: 100 g chips      SRM: 75 g powder      all others: typical analysis 50 g chips

#	Number	Sb	Ag	Cd	Cu	Ni	Pb	Sn	Zn	Al	As	Au	Bi	Co	Fe	In	Te
2	C73XSC70	14.01	0.006	0.0018	6.51	0.008	0.356	.	(0.003)	0.001	0.047	.	0.009	0.0160	0.046	0.014	.
1	GBW 02302	11.81	.	.	6.72	.	1.20	80.27	.	.	0.020	.	0.012	.	.	.	.
2	C73XSC110	11.7	0.06	1.63	10.7	0.48	0.04	.	0.066	<0.005	0.30	.	0.53	.	0.07	.	.
1	BCS 178/2	9.45	(0.002)	0.14	4.58	0.17	3.18	82.2	0.040	.	0.15	.	0.11	.	0.024	.	.
2	C73XSC90	8.18	0.004	0.078	8.47	0.008	0.20	.	(0.003)	<0.001	0.53	.	0.066	0.0030	0.037	0.010	.
1	GBW 02301	7.87	.	.	4.06	.	1.32	86.61	.	.	0.018	.	0.014	.	.	.	.
1	SRM 54d	7.04	0.0032	.	3.62	0.0027	0.62	88.57	.	.	0.088	.	0.044	.	0.027	.	.
2	C73XSC40	6.02	0.042	0.052	3.05	0.017	0.514	.	0.008	0.005	0.005	.	0.218	0.0035	0.011	0.011	.
1	C74XHB	5.00	0.070	0.011	4.75	1.12	0.058	.	0.018	.	0.026	.	0.008	.	0.12	.	.
2	C72XSA50R	4.93	.	0.05	0.018	.	0.08	.	0.035	.	0.015	.	0.006	.	(0.004)	.	.
1	C71XSR20	0.063	0.029	0.042	0.055	0.005	0.13	.	0.010	0.003	0.057	0.008	0.057	.	<0.001	0.051	0.023
1	C71XSR10 *	0.0156	0.0121	0.0104	0.0111	0.0041	0.0324	.	0.0146	(0.0016)	0.0102	0.0014	0.0107	.	(0.0021)	0.0120	0.0112

\* C71XSR10 also contains Ga: 0.0049 and Hg: 0.0142

**CRM TIN-LEAD SOLDER CHIPS AND POWDER**

BAM, BCS: powder      all others: typical analysis chips

Number	Sn	Pb	Ag	As	Au	Bi	Cd	Cu	Fe	In	Ni	Sb	Te	Zn	Units
C91XS63 PR40	66.8	Rem	0.030	<0.002	0.05	0.030	0.021	0.021	<0.005	0.014	<0.005	0.093	0.006	<0.001	50 g
BAM BNM 010	63.40	36.47	(0.014)	(0.012)	(<0.001)	0.0245	0.0016	0.0417	(0.0020)	(<0.001)	0.0021	0.0488	.	(<0.0001)	100 g
C91XS63 PR10	63.0	Rem	0.01	0.007	0.046	0.06	0.006	0.009	0.003	.	0.001	0.28	.	<0.001	50 g
BCS 347	62.6	Rem	0.099	(0.02)	0.037	0.080	0.004	0.169	(0.002)	.	0.0072	0.191	.	0.0015	100 g
C91XS63 PR20	62.6	Rem	0.057	0.080	0.090	0.162	0.0168	0.052	0.030	0.019	0.0073	0.614	0.009	0.007	50 g
C91X S63 PR00 *	60.0	Rem	0.01	0.01	0.015	0.007	0.010	0.02	0.002	0.005	0.002	0.02	0.003	<0.001	50 g
C91XS30 PR30	30.88	Rem	0.024	0.0126	0.0063	0.294	0.0115	0.102	0.0016	0.0085	0.0269	0.269	.	(0.003)	50 g

\* Provisional Analysis

RM		TITANIUM POWDER											typical analysis		powder 50 g	
Number	Ti	Al	Co	Cr	Cu	Fe	Mn	Mo	Ni	P	Pb	Si	W	Zn	Zr	
DH SL2701	98.52	0.018	0.00123	0.046	0.001	0.174	0.009	.	0.029	.	.	0.021	0.011	0.00027	0.00010	
DH SL2703	98.42	0.024	0.00190	0.059	0.002	0.238	0.017	0.016	0.031	<0.006	0.00030	.	0.015	0.00067	0.00020	last

**CRM TITANIUM** IARM: 65 g

Number	Al	B	C	Co	Cr	Cu	Fe	H	Mn	Mo	N	Nb	Ni
IARM TiG2-21	0.024	.	0.008	.	0.016	0.0018	0.140	0.0021	(0.0009)	0.0053	0.005	(0.002)	0.032
IARM 361A	(0.013)	(0.0005)	(0.012)	(<0.002)	0.008	(0.003)	0.095	(0.0027)	(<0.05)	0.288	(0.006)	(0.004)	0.88
IARM TiG7-23	0.007	.	0.012	0.0016	0.007	.	0.085	0.0012	.	(0.003)	0.009	0.004	0.014
IARM TiG4-18	(0.0020)	.	0.053	(0.0006)	0.0017	(0.0012)	0.164	0.0019	0.0011	(0.0007)	(0.003)	(0.002)	0.0023

Number	O	Pd	S	Si	Sn	V	W	Y	Zr
IARM TiG2-21	0.136	.	.	0.006	0.007	0.0094	(0.005)	.	0.0009
IARM 361A	0.15	(0.002)	(<0.004)	(0.012)	(0.004)	(0.006)	(<0.03)	(0.0004)	(0.0016)
IARM TiG7-23	0.166	0.14	0.002	0.015	0.007	0.0021	.	.	0.0018
IARM TiG4-18	0.34	P:0.0010	(0.0014)	.	0.019	(0.0005)	(0.0010)	.	0.0005

**CRM TITANIUM ALLOY CHIPS AND POWDER, chart 1 of 2** I

Number	Al	V	C	Cr	Cu	Fe	Mn	Mo	N	Nb	Si	Sn	Zr
SRM 2433	7.63	0.98	.	.	.	0.063	.	0.99	.	.	.	.	.
TL 3001C	6.471	4.330	0.0098	0.0024	.	0.1993	0.0025	.	.	.	.	.	.
IARM Ti64P-18	6.47	4.24	0.051	.	.	0.216	0.011	.	(0.04)	.	.	0.008	.
C58A CP13005	6.46	5.1	0.01	0.02	0.0099	0.231	0.0064	.	.	.	0.031	0.001	.
IARM Ti64-23	6.31	3.88	0.030	0.019	.	0.216	(0.0026)	0.007	0.0055	.	0.014	(0.005)	.
C58A BT13002	6.29	4.1	0.078	.	.	0.044	.	.	.	.	.	.	.
NCS HC57909a	6.29	4.10	0.078	.	.	0.044	.	.	.	.	.	.	.
IARM Ti64ELI-22	6.26	3.88	0.016	0.0139	0.0020	0.183	(0.0004)	0.0050	0.0061	(0.004)	0.017	(0.006)	0.0021
C58A CP13001	6.25	4.1	.	.	.	.	.	.	.	.	.	.	.
BCS 356	6.25	4.05	(0.0085)	0.0112	0.0055	0.124	.	0.0020	0.0103	.	(0.0200)	.	.
SRM 173C	6.245	4.154	0.027	0.0165	0.0040	0.2130	(0.002)	0.0068	(0.028)	.	(0.019)	(0.010)	0.0053
C58A FG13003	5.85	3.92	.	.	.	0.09	.	.	0.022	.	0.026	.	.
IARM Ti662-18	5.61	5.35	0.007	0.046	0.46	0.510	(0.005)	0.0031	0.021	.	0.011	2.01	(0.0011)
IARM Ti5553-21	5.60	5.04	0.010	2.98	0.0019	0.353	0.0008	4.99	0.0036	.	0.028	.	(0.0018)
IARM Ti662-19	5.58	5.53	0.0084	0.0050	0.47	0.52	0.0013	0.0015	0.022	.	(0.006)	2.03	(0.0008)
BCS 357	5.46	3.53	(0.0072)	0.0521	0.0537	0.202	.	0.053	0.0148	.	(0.0500)	.	.
IARM Ti42515-18	3.99	2.53	0.0067	0.015	(0.0022)	1.58	(0.006)	(0.0014)	0.0026	(0.0016)	0.011	(0.004)	(0.0019)
IARM Ti1023-22	3.38	10.1	0.010	0.014	0.0018	1.70	0.0011	0.0066	0.0058	.	0.029	.	.
SRM 2432	3.15	10.00	0.008	(<0.01)	(<0.005)	1.77	(<0.01)	.	.	.	0.029	.	(<0.01)
C58A BT13007	3.13	14.99	0.015	2.95	.	0.077	.	.	.	.	.	3.15	.
SRM 649	3.08	15.1	0.011	2.96	(<0.001)	0.133	(<0.01)	.	(0.01)	(<0.01)	.	3.04	.
IARM 261E	3.05	2.51	0.012	0.016	0.0025	0.18	(0.001)	0.003	0.006	(0.005)	0.007	0.005	(0.003)
IARM 344B	3.03	14.7	0.0095	2.91	(0.0024)	0.118	(0.003)	(0.006)	(0.016)	(0.003)	(0.03)	3.01	(0.002)

Number	B	Co	H	Ni	O	P	Pd	Ru	S	Ta	Ti	W	Y	Units
SRM 2433	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
TL 3001C	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
IARM Ti64P-18	.	.	(0.0018)	.	(0.15)	.	.	.	(0.0014)	.	.	.	.	75 g <u>powder</u>
C58A CP13005	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
IARM Ti64-23	.	.	0.0023	0.0127	0.175	.	.	.	.	.	(89.5)	.	.	65 g chips
C58A BT13002	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
NCS HC57909a	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
IARM Ti64ELI-22	.	.	(0.0012)	0.017	0.119	.	.	.	(0.0007)	.	.	.	.	65 g chips
C58A CP13001	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
BCS 356	.	.	.	0.0070	.	.	.	.	.	.	.	.	.	50 g chips
SRM 173C	(0.000045)	(0.002)	(0.006)	0.0203	0.164	.	.	(0.0006)	.	.	(89.15)	(0.002)	.	50 g chips
C58A FG13003	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
IARM Ti662-18	.	.	0.0089	0.039	0.19	.	.	.	.	.	85.8	.	.	65 g chips
IARM Ti5553-21	.	.	0.0020	0.0022	0.14	(0.002)	.	.	(0.0008)	.	.	0.002	.	65 g chips
IARM Ti662-19	.	(0.00026)	0.0048	0.0032	0.19	(0.003)	.	.	(0.002)	.	(85.7)	.	.	100 g chips
BCS 357	.	.	.	0.0511	.	.	.	.	.	.	.	.	.	50 g chips
IARM Ti42515-18	.	(0.0020)	0.0018	0.009	0.25	.	.	.	.	.	(91.6)	.	.	65 g chips
IARM Ti1023-22	.	.	0.006	0.013	0.091	.	.	.	.	.	.	.	.	65 g chips
SRM 2432	(<0.001)	.	.	(<0.01)	.	.	.	.	.	.	.	(<0.001)	(<0.001)	50 g chips
C58A BT13007	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g chips
SRM 649	(<0.001)	.	.	(<0.01)	.	.	.	.	.	.	.	.	.	50 g chips
IARM 261E	0.0003	(0.0004)	(0.0005)	0.018	0.084	<0.003	(0.002)	(0.001)	(0.001)	.	(94.1)	(0.001)	(0.001)	65 g chips
IARM 344B	<0.001	<0.004	(0.007)	0.021	0.118	<0.003	<0.03	<0.02	<0.003	<0.04	(76.0)	<0.03	<0.006	65 g chips

TITANIUM ALLOY CHIPS, chart 2 of 2

C101 are RM, all others CRM

C58A FG13002: 25g

IARM: 65g

all others: 50g

Number	Al	V	C	Cr	Cu	Fe	Mn	Mo	N	Nb	Si	Sn	Zr
C58A SY13001-6	7.15	.	0.0098	.	.	0.051	.	2.0	.	2.02	0.253	.	.
C58A BT13003	6.66	.	0.0084	.	.	0.048	.	3.41	.	.	0.293	.	.
C58A BT13001	6.56	.	0.076	.	.	0.05	.	3.41	.	.	0.281	.	.
C58A SY13001-5	6.45	.	0.02	.	.	0.122	.	1.49	.	2.46	0.202	.	.
C58A FG13002	6.43	.	0.019	.	.	0.067	.	3.79	0.014	.	0.29	.	.
C58A FG13005	6.42	.	0.013	1.55	.	0.473	.	2.53	0.01	.	0.28	.	.
C58A ZB13001	6.38	.	0.0074	.	<0.005	0.08	.	3.22	0.01	.	0.26	.	.
C58A FG13004	6.33	.	0.012	.	.	0.057	.	3.4	0.021	.	0.275	.	.
C58A BT13004	6.33	.	0.018	1.49	.	0.464	.	2.66	.	.	0.303	.	.
IARM Ti62222-22	6.27	0.0033	0.009	1.57	(0.0033)	0.021	0.0043	2.86	0.005	1.92	0.073	2.08	2.18
IARM 300E	6.16	(0.03)	(0.008)	(0.007)	<(0.02)	0.17	<(0.02)	(0.0028)	0.0059	6.85	(0.017)	(0.005)	.
IARM Ti6242-18	6.11	.	(0.007)	.	.	0.025	.	2.02	(0.004)	.	0.077	2.06	4.05
IARM 300B	6.09	(0.004)	0.0081	0.0174	(0.014)	0.175	(0.006)	0.0013	0.0030	6.84	0.016	(0.004)	(0.013)
IARM 300D	6.06	(0.03)	(0.010)	(0.006)	(0.003)	0.183	<(0.005)	0.0019	(0.005)	6.82	(0.021)	(0.005)	(0.005)
IARM 300C	5.97	0.030	(0.010)	0.008	(0.003)	0.181	(0.003)	0.0023	0.0061	6.80	0.018	(0.006)	(0.005)
IARM 300A	5.96	(0.005)	0.007	0.0097	0.0039	0.191	0.0012	0.0009	0.0033	6.86	0.018	(0.007)	(0.003)
IARM Ti6246-22	5.95	0.005	0.006	0.005	(0.0029)	0.021	(0.0006)	6.04	0.0026	.	0.052	2.00	4.11
C58A HC13002	5.95	.	.	.	.	0.049	.	1.93	.	.	0.023	2.03	.
SRM 647	5.88	<(0.02)	0.006	<(0.01)	<(0.002)	0.075	<(0.01)	1.96	<(0.01)	<(0.01)	(0.04-0.07)	2.02	3.90
SRM 2431	5.73	<(0.01)	0.006	<(0.01)	<(0.01)	0.056	<(0.01)	6.01	.	.	0.088	1.98	4.06
C58A BT13009	5.6	.	0.0093	.	.	0.235	.	.	.	.	.	2.74	.
C58A SY13001-3	5.55	.	0.06	.	.	0.246	.	0.595	.	3.3	0.1	.	.
C58A CP13002	5.15	.	.	.	.	.	.	.	.	.	.	2.47	.
SRM 648	5.13	<(0.02)	0.011	3.84	<(0.01)	0.15	<(0.01)	3.75	(0.01)	.	0.027	1.98	1.84
IARM 345A	5.12	0.005	0.010	3.89	(0.002)	0.121	0.0009	4.09	0.0025	(0.002)	0.013	1.99	1.90
C58A SY13001-2	5.1	.	0.084	.	.	0.313	.	0.297	.	3.63	0.043	.	.
IARM Ti52244-22	5.09	(0.0029)	0.008	3.97	(0.0017)	(0.0240)	0.0028	4.03	0.0055	.	0.026	2.01	2.03

Number	B	Co	H	Ni	O	P	Pd	S	Ta	Ti	W	Y
C58A SY13001-6	.	.	.	.	.	.	.	.	.	.	.	.
C58A BT13003	.	.	.	.	.	.	.	.	.	.	.	.
C58A BT13001	.	.	.	.	.	.	.	.	.	.	.	.
C58A SY13001-5	.	.	.	.	.	.	.	.	.	.	.	.
C58A FG13002	.	.	.	.	.	.	.	.	.	.	.	.
C58A FG13005	.	.	.	.	.	.	.	.	.	.	.	.
C58A ZB13001	.	<0.001	.	.	.	.	.	.	.	.	.	.
C58A FG13004	.	.	.	.	.	.	.	.	.	.	.	.
C58A BT13004	.	.	.	.	.	.	.	.	.	.	.	.
IARM Ti62222-22	.	.	0.0024	.	(0.1213)	.	.	.	.	.	.	.
IARM 300E	<(0.002)	(0.004)	(0.001)	(0.011)	0.180	<(0.001)	<(0.001)	<(0.001)	(0.006)	(86.5)	<(0.002)	(0.003)
IARM Ti6242-18	.	.	(0.0022)	0.0038	0.121	.	.	.	.	(85.5)	.	.
IARM 300B	(0.0012)	(0.002)	0.0025	0.012	0.171	.	(0.005)	(0.001)	(0.005)	(86.3)	.	.
IARM 300D	(0.001)	(0.004)	(0.001)	0.013	0.166	<(0.002)	<(0.005)	(0.001)	(0.005)	(86.7)	<(0.002)	(0.003)
IARM 300C	(0.0006)	(0.001)	(0.0006)	(0.014)	0.174	<(0.001)	<(0.005)	(0.0005)	(0.005)	(86.7)	<(0.002)	(0.002)
IARM 300A	(0.0008)	(0.001)	0.0018	0.0081	0.162	(0.001)	(0.002)	0.0008	(0.004)	86.71	<(0.002)	(0.0004)
IARM Ti6246-22	.	.	0.0036	0.007	0.114	.	.	.	.	.	.	.
C58A HC13002	.	.	.	.	.	.	.	.	.	.	.	0.004
SRM 647	<(0.002)	<(0.001)	.	<(0.004)	(0.1)	.	.	.	.	.	.	.
SRM 2431	<(0.001)	.	.	<(0.01)	.	.	.	.	.	.	<(0.001)	<(0.001)
C58A BT13009	.	.	.	.	.	.	.	.	.	.	.	.
C58A SY13001-3	.	.	.	.	.	.	.	.	.	.	.	.
C58A CP13002	.	.	.	.	.	.	.	.	.	.	.	.
SRM 648	(0.001)	.	.	<(0.005)	.	.	.	.	.	.	.	.
IARM 345A	(0.001)	(0.002)	0.0040	0.015	0.120	(0.002)	(0.002)	(0.001)	(0.003)	(82.8)	(0.002)	(0.0003)
C58A SY13001-2	.	.	.	.	0.101	.	.	.	.	.	.	.
IARM Ti52244-22	.	.	0.007	.	0.101	.	.	.	.	.	.	.

**CRM TUNGSTEN POWDER**

analysis listed in mg/kg

100 g

Number	Al	Ca	Co	Cr	Cu	Fe	K	Mg	Mn	Mo	Na	Ni	P	Si	Sn
BAM S002	29.4	46	45	47.0	28.4	53	40.0	38.8	16.7	59	41	29	(7.2)	106	42

**ZINC CHIPS**

# = class, where 1 = CRM and 2 = RM analysis listed in mass %

#	Number	Zn	Al	As	Cd	Cu	Fe	Mg	Pb	Sn	Ti	Tl	Units
1	BM Zn	99.99	<0.0003	<0.0005	<0.004	<0.003	<0.004	<0.001	<0.003	<0.001	<0.001	.	100 g
1	41X PZ-19	(99.96)	0.01260	(<0.001)	(0.00008)	0.00180	0.00520	(0.00016)	0.00170	(0.00006)	(0.00004)	0.00030	50 g
2	IMN 1	.	.	.	0.00066	0.00080	0.0012	.	0.011	0.00021	.	.	100 g

**CRM ZINC PELLETS**

Number	Cd	Cu	Fe	Pb	Units
GBW 02701	0.0010	0.00010	0.0010	0.0030	50 grams of 3 mm Ø pellets last of stock

**CRM ZINC PELLETS**

analysis listed in mg/kg

450g of 3mm Ø pellets

Number	Ag	Al	As	Au	Bi	Ca	Cd	Co	Cr	Cu	Fe	Ga	Hg	In	Ir	K	Mg	Mn
SRM 728	1.08	(0.07)	(<0.005)	(<0.02)	(<0.005)	(0.02)	1.14	(1.0)	(<0.03)	5.68	1.84	(<0.05)	(0.05)	(<0.005)	(<0.005)	(<0.01)	(<0.001)	(0.07)

continued

Number	Mo	Na	Nb	Ni	Pb	Pd	Pt	Rh	Ru	Sb	Sc	Si	Sn	Ti	Tl	V	W	Zr
SRM 728	(<0.01)	(0.01)	(<0.01)	(0.45)	11.13	(<0.05)	(<0.01)	(<0.05)	(<0.01)	(0.5)	(<0.001)	(<0.01)	(0.02)	(0.04)	(0.2)	(<0.001)	(0.4)	(<0.01)

**CRM ZINC POWDER**

listed in mg/kg

certified analysis

informational analysis

powder 200 g

Number	Ag	Cd	Cu	Fe	Ni	Pb	Ti	Al	As	Bi	Co	In	Sb	Sn	V
BAM M603	1.00	1.69	3.69	2.18	0.43	15.8	3.81	0.22	<1	0.102	0.041	<0.5	0.04	<0.1	<0.2

**ZINC SPELTER CHIPS**

BS: 50 g units

SRM: 100 g units

Number	Al	Cu	Fe	Pb	Sb	Sn
RM BS SP-D	0.25	<0.0005	0.060	0.038	0.006	<0.001
CRM SRM 2139	0.2049	.	.	0.0302	.	.
RM BS SP-B	0.141	<0.002	0.025	0.021	0.061	<0.001
RM BS SP-C	0.185	<0.0005	0.041	0.005	0.031	<0.001
RM BS SP-A	0.051	<0.0005	0.011	0.003	0.099	<0.001

ZINC ALLOY CHIPS, chart 1 of 2

# = class, where 1 = CRM and 2 = RM

C41X-43X: 50 g typical analysis

FNE: 100 g

NCS, SRM: 150 g

others: 50 g units

#	Number	Al	Cu	Cd	Fe	Mg	Mn	Ni	Pb	Sb	Sn	Bi	Cr	Si	Ti
2	C43XZ230	29.8	2.73	0.002	0.008	0.01	0.002	0.003	0.002	.	0.003	.	.	.	.
1	CAN NZA-1	28.70	1.51	0.00098	0.046	0.020	.	.	0.0030	.	0.0069	.	.	.	.
1	CAN NZA-4	26.65	2.45	0.0029	0.027	0.0106	.	.	0.0101	.	0.0087	.	.	.	.
1	CAN NZA-3	25.99	2.00	0.0064	0.066	0.049	.	.	0.0045	.	0.0034	.	.	.	.
2	C43XZ210	24.9	2.05	0.01	0.05	0.06	0.009	0.002	0.007	.	0.01	.	.	.	.
1	CAN NZA-2	23.81	3.00	0.0047	0.021	0.029	.	.	0.0076	.	0.0045	.	.	.	.
1	CAN NZA-7	13.17	0.212	0.00020	(0.016)	0.052	.	.	0.0136	.	0.0116	.	.	.	.
2	C43XZ110	11.2	0.47	0.014	0.008	0.05	0.01	0.006	0.015	.	0.02	.	.	.	.
1	CAN NZA-5	10.85	1.04	0.0095	(0.016)	0.021	.	.	0.0012	.	0.0017	.	.	.	.
1	C43XZ120	10.05	0.796	0.0114	0.047	0.027	0.0059	0.004	0.0133	0.0039	0.0089	(0.002)	0.0023	(0.008)	0.0054
1	C43XZ130	9.58	0.977	0.0102	0.06	0.020	0.007	0.011	0.012	0.009	0.011	.	.	.	.
1	C43XZ140	8.24	1.23	0.0067	0.015	0.0026	0.0033	0.0052	0.0082	0.011	0.0053	0.010	0.0046	0.010	0.0012
1	CAN NZA-6	7.54	3.17	0.0147	(0.105)	0.00037	.	.	0.0109	.	0.0051	.	.	.	.
1	C43X Z150	7.36	1.53	0.0030	0.009	0.0024	0.0020	0.0019	0.0054	0.005	0.004	0.005	0.0025	(0.011)	0.0020
1	C42XZ80	7.03	0.0215	0.0003	0.013	0.0033	0.0014	0.0019	0.0025	.	(0.0023)	.	(0.0002)	0.013	.
1	NCSHC28974-Zn	4.85	.	.	.	0.083	.	.	.	.	.	.	.	.	.
1	C43XZ40	4.76	3.21	0.0025	(0.064)	0.0434	0.088	0.0286	(0.002)	0.0043	(0.0024)	0.012	0.0063	(0.0065)	0.0017
1	C42XZ70	4.39	0.0249	0.030	0.027	0.0095	0.0045	0.0067	0.0097	.	0.012	.	(0.001)	0.006	.
2	C42XZ10	4.3	0.003	<0.001	0.002	<0.001	<0.001	0.001	0.002	.	0.002	.	.	.	.
1	C43XZ60	4.02	2.72	0.0016	0.019	0.0256	0.0006	0.029	0.0016	0.0045	0.0053	0.049	0.0006	0.012	0.0013
1	C42XZ30	3.72	0.159	0.0048	(0.047)	0.0288	0.0252	0.0102	0.0060	0.003	0.0030	.	0.0020	0.015	.
1	C43XZ40	3.64	1.59	0.0132	0.061	0.0143	0.0125	0.0061	0.0132	0.003	0.0125	0.018	0.004	0.005	.
1	C42XZ40	3.55	0.063	0.008	0.01	0.057	0.008	0.017	0.011	0.002	0.006	.	.	.	.
1	C43XZ50	3.05	6.05	0.0111	0.023	0.041	0.0030	0.0021	0.0045	.	0.0032	.	0.0010	0.003	0.0009
2	C43XZ20	3.2	0.89	0.01	0.02	0.042	0.008	0.003	0.008	0.008	0.01	.	.	.	.
2	C41X0336240	1.39	0.874	0.638	(0.018)	0.179	0.038	0.0074	2.87	0.048	2.38	0.027	.	.	.

#	Number	Ag	As	Ce	In	La	Tl
2	C43XZ230	.	.	.	.	.	.
1	CAN NZA-1	.	.	.	.	.	.
1	CAN NZA-4	.	.	.	.	.	.
1	CAN NZA-3	.	.	.	.	.	.
2	C43XZ210	.	.	.	.	.	.
1	CAN NZA-2	.	.	.	.	.	.
1	CAN NZA-7	.	.	.	.	.	.
2	C43XZ110	.	.	.	.	.	.
1	CAN NZA-5	.	.	.	.	.	.
1	C43XZ120	.	.	.	.	.	.
1	C43XZ130	.	.	.	.	.	.
1	C43XZ140	.	.	.	.	.	.
1	CAN NZA-6	.	.	.	.	.	.
1	C43X Z150	.	.	.	.	.	.
1	C42XZ80	.	.	0.0081	.	0.0079	.
1	NCSHC28974-Zn	.	.	.	.	.	.
1	C43XZ40	.	.	.	.	.	.
1	C42XZ70	.	.	0.053	.	0.047	.
2	C42XZ10	.	.	.	.	.	.
1	C42XZ50	.	.	0.011	0.0048	0.009	0.006
1	C43XZ60	.	.	.	.	.	.
1	C42XZ30	.	.	(0.0003)	.	(0.0003)	.
1	C43XZ30	.	.	.	(0.0019)	.	(0.0035)
1	C42XZ40	.	.	0.020	0.001	0.019	0.003
2	C43XZ20	.	.	.	.	.	.
2	C41X0336240	0.0023	0.0005	.	.	.	.

## ZINC ALLOY CHIPS, chart 2 of 2

# = class, where 1 = CRM and 2 = RM

typical analysis

50 g units

#	Number	Al	Cu	Cd	Fe	Mg	Mn	Ni	Pb	Sb	Sn	Bi	Cr
1	C41XGLV40	0.514	0.0321	0.0006	0.0028	0.0034	0.0089	0.0441	0.0062	0.0287	0.0024	0.0061	0.0007
1	C41XGLV60	0.474	0.0394	0.0053	0.0047	.	0.0013	0.0008	0.120	0.0112	0.0152	0.0249	0.0029
1	C41X0336Z30	0.43	0.361	0.341	0.270	0.134	0.0058	.	0.019	.	0.111	.	.
1	C41XGLV70	0.399	0.023	0.00056	0.0031	.	0.0025	0.0060	0.082	0.0031	(0.006)	0.0108	0.0010
1	C41XGLV30	0.334	0.0260	0.0188	0.0031	0.00145	0.0111	0.0300	0.0091	0.058	0.0060	0.0016	0.00084
2	C41X4380Z80	0.225	0.020	0.0079	0.003	0.007	0.0015	0.024	0.73	0.016	0.011	0.011	0.0019
1	C41X4380Z40	0.144	0.0022	0.094	0.056	0.126	0.0007	0.0040	0.325	0.017	0.038	0.011	(0.0003)
1	C41X4380Z70	0.137	0.012	0.015	(0.0044)	0.0028	.	0.012	1.25	0.090	0.0047	.	0.0045
1	C41XZ50	0.13	0.023	0.024	(0.02)	0.012	0.004	0.0116	0.0235	0.006	0.0213	.	.
2	C41XGLV10	0.115	0.0028	0.0093	0.059	.	.	0.0141	0.056	<0.001	0.010	0.0025	.
1	C41X2951Z30	0.078	1.89	0.0062	0.029	0.0164	0.0018	0.0010	0.0065	.	(0.006)	.	0.184
2	C41XGLV20	0.070	0.0053	0.0026	0.048	.	.	0.0071	0.214	0.007	0.003	0.017	.
1	C41X4380Z10	0.055	0.175	0.376	0.01	0.0012	0.0015	0.0029	0.068	0.002	0.049	0.0017	0.002
1	C41X0336Z50	0.035	0.023	0.058	0.016	<0.0005	(0.0001)	(0.0005)	0.91	0.008	0.21	(0.001)	.
1	C41X2951Z10	0.029	0.79	0.0005	0.011	0.0029	0.0013	0.0038	0.0042	.	(0.0007)	.	0.083
1	C41X0336Z10	0.014	0.007	0.0056	0.0124	0.0049	0.0035	(0.0006)	0.95	.	0.005	.	.
2	C41XGLV50	0.014	0.0116	0.014	0.077	.	.	0.0029	0.019	0.163	0.020	0.0105	.
1	C41XZ40	0.0096	0.0047	0.0066	0.003	0.0019	0.0012	0.0069	0.0092	0.005	0.0070	.	.

#	Number	Ag	As	Co	In	Si	Ti	Tl
1	C41XGLV40	.	(0.0003)	0.0037	.	.	.	.
1	C41XGLV60	.	0.0014	0.0047	.	.	.	.
1	C41X0336Z30	.	.	.	.	.	.	.
1	C41XGLV70	.	0.0016	(0.0001)	.	.	.	.
1	C41XGLV30	.	(0.0007)	0.00150	.	.	.	.
2	C41X4380Z80	.	.	.	(0.005)	0.012	.	.
1	C41X4380Z40	.	.	.	(0.002)	0.005	.	.
1	C41X4380Z70	.	.	.	.	0.009	.	.
1	C41XZ50	.	.	.	0.004	.	.	0.003
2	C41XGLV10	<0.001	.	.	.	.	.	.
1	C41X2951Z30	.	.	.	.	.	.	0.133
2	C41XGLV20	.	<0.001	.	.	.	.	.
1	C41X4380Z10	.	.	.	.	0.006	.	.
1	C41X0336Z50	.	.	.	.	.	.	.
1	C41X2951Z10	.	.	.	.	.	.	0.278
1	C41X0336Z10	.	.	.	.	.	.	.
2	C41XGLV50	.	0.004	.	.	.	.	.
1	C41XZ40	.	.	.	0.0015	.	<0.005	0.003

## CRM ZIRCALOY-4 CHIPS

analysis listed in mass %

Number	Al	B	Co	Cr	Cu	Fe	Hf	Mn	N	Nb	Ni	P
SRM 360c	(0.0020)	0.0000563	0.000512	0.1539	(0.000531)	0.1601	0.00317	(0.00072)	(0.0033)	0.00999	0.00178	(0.00872)
BCR 098	.	.	.	0.0906	.	0.2143	.	.	.	.	.	.

Number	Pb	Sn	Ta	Ti	V	W	Units
SRM 360c	0.000798	1.990	0.01932	(0.00126)	0.001963	0.00221	100 g
BCR 098	.	.	.	.	.	.	10 g

## CRM ZIRCONIUM ALLOYS

analysis listed in mass %

chips 100 g

Number	Al	C	Cr	Cu	Fe	H	Hf	N	Nb	Ni	O	Sn	Ti
IARM Zr702-18	0.014	0.017	(0.009)	.	(0.09)	(0.0011)	0.84	(0.003)	.	.	0.141	(0.04)	(0.004)
IARM Zr704-22	0.006	0.009	0.07	0.0017	0.13	0.0009	0.004	0.0038	(0.0029)	(0.0300)	0.137	1.5	0.15
IARM Zr705-18	.	0.009	0.007	(0.007)	{0.08}	{0.0012}	0.38	{0.005}	2.53	.	0.133	.	.