

INDEX

BATTERY ALLOY 5

MAGNESIUM 6, 7, 8

ZINC 11, 12, 13
ZINC SPELTER 11
ZINC-CADMIUM 12
ZIRCONIUM 14

CADMIUM 1
CHROMIUM 1, 2
COBALT 1, 2, 3

SILVER 16
SOLDERS 9

GOLD 15

TIN 6, 9
TIN-ANTIMONY ALLOY 9
TITANIUM 10, 11

LEAD 3, 4, 5, 6
LEAD-SILVER ALLOY 4
LEAD-TIN ALLOY 5, 6

XRF 11, 14

CRM CADMIUM

AVAILABLE IN SETS ONLY, AS GROUPED

Number	As	Cu	Ni	Pb	Sb	Sn	Ti	Set Size
VS 18-95	.	0.0023	0.0010	0.0060	.	.	0.0011	
VS 19-95	.	0.0039	0.0018	0.011	.	.	0.0021	
VS 20-95	.	0.0068	0.00044	0.022	.	.	0.0047	40 mm x 40 mm x 25 mm
VS 21-95	.	0.013	0.0043	0.047	.	.	0.0091	
VS 22-95	.	0.024	0.011	0.12	.	.	0.023	
IMN K1	(0.00030)	.	0.0086	.	0.0064	0.0061	.	
IMN K2	0.0012	.	0.018	.	0.0038	0.0032	.	
IMN K3	0.0010	.	0.063	.	0.0010	0.00065	.	40 mm Ø x 25 mm
IMN K4	0.0056	.	0.11	.	0.0011	0.00091	.	
IMN K5	0.0014	.	0.0054	.	0.00017	.	.	

CRM CHROMIUM ALLOY

Number	Cr	Ni	C	Co	Cu	Fe	Mn	Mo	N	P	S	Si	Units
219X 20500	51.09	45.68	0.025	(0.008)	(0.007)	1.24	0.239	0.006	0.122	(0.0026)	0.0052	1.35	43 mm Ø x 20 mm

RM COBALT ALLOYS

cast typical analysis 119X COB1: 45 mm Ø x 20 mm all others: 40 mm Ø x 15 mm

Number	Ni	Cr	W	Fe	C	Si	Mn	B	S	P	Al	Cu	N
119X COB 1	22.8	24.3	11.1	16.4	0.009	0.41	0.52	.	0.0015	(0.001)	0.39	<0.005	0.188
119X COB 2	22.3	24.7	11.5	9.6	.	.	0.50	.	.	.	.	.	.
113X 405	10.79	26.7	7.65	1.30	0.48	0.76	0.68	0.001	0.005	0.002	.	.	.
113X 404	10.76	23.7	7.71	1.28	0.51	0.75	0.69	0.001	0.006	0.002	.	.	.
113X 401	11.74	25.24	7.09	0.73	0.56	1.22	0.20	0.008	.	.	.	.	.
113X 403	10.40	25.03	7.82	1.06	0.52	0.85	0.69	0.006	0.022	0.021	.	.	.
113X 402	9.41	24.86	7.96	2.15	0.38	0.32	1.26	.	0.036	0.045	.	.	.

COBALT ALLOYS

wrought analysis listed in mass %

Number	Grade	Size	C	Ni	Cr	Mo	W	Fe	Mn	Si
CRM										
119X ST3	Stellite 3	40 mm Ø x 15 mm	2.17	2.52	30.43	0.351	11.55	2.45	0.52	0.82
ECRM 378-1D	Stellite	40 mm Ø x 15 mm	1.181	0.617	28.22	0.0503	4.43	0.606	0.0579	1.172
RM										
BS 172A	Alloy 188	38 mm Ø x 9 mm	0.098	23.7	21.85	0.30	14.0	1.76	0.77	0.37
BS 171B	Alloy L605	38 mm Ø x 9 mm	0.087	10.68	20.5	0.65	15.1	1.82	1.90	0.29
BS 173	Alloy CCM	35 or 38 mm Ø x 12 mm	0.046	0.14	27.5	5.62	.	0.19	0.76	0.61
RM typical analysis										
119X 81601	S816	40 mm Ø x 15 mm	0.29	19.6	14.2	3.85	3.75	12.6	1.55	1.17

continued

Number	P	S	Cu	Al	Nb	V	La	B	N	Co	
119X ST3	.	0.013	0.060	.	0.020	0.011	.	0.011	0.094	.	
ECRM 378-1D	(0.0023)	0.0055	.	.	.	.	.	.	.	63.52	
BS 172A	(0.011)	<0.0005	0.027	0.08	0.09	0.007	0.045	(0.003)	.	.	
BS 171B	0.008	<0.001	0.035	0.08	0.046	(0.02)	.	(0.0025)	.	.	
BS 173	(0.003)	0.001	(0.008)	(0.04)	(0.002)	(0.01)	.	(0.001)	0.190	65.0	Ti: (0.004) O: (0.002)
119X 81601	0.03	0.042	.	.	3.9	.	.	.	.	.

CRM

COBALT ALLOYS

31 mm Ø x 2 or 18 mm

Number	Grade	Al	B	C	Co	Cr	Cu	Fe	La	Mg	Mn	Mo	N
IARM 208A	F 75	0.07	0.002	0.28	63.4	27.7	0.021	0.78	.	0.0003	0.68	5.3	0.063
IARM 208B	F 75	0.04	0.005	0.100	60.0	30.0	0.03	1.17	.	(0.0004)	0.75	6.63	0.003
IARM 208C	F 75	0.07	0.002	0.052	64.0	27.55	0.01	0.29	.	0.0002	0.53	6.12	0.169
IARM 207A	MP35N	0.040	0.011	0.007	33.46	19.98	0.017	0.64	.	(0.0005)	0.015	9.62	0.0031
IARM 256A	Provisional	0.17	0.013	0.018	35.5	19.1	.	9.0	.	.	0.014	7.0	0.003
IARM 96B	Stellite 25	0.035	0.0021	0.132	49.4	20.54	0.047	2.29	.	(0.0005)	1.39	1.17	0.007
IARM 96C	Stellite 25	0.08	0.002	0.132	47.1	19.95	0.08	2.93	.	(0.0002)	1.91	1.88	0.031
IARM 96D	Stellite 25	0.23	0.003	0.079	49.8	19.97	0.038	2.17	.	(0.004)	1.40	0.35	0.0084
IARM 95B	Stellite 6B	0.07	(0.002)	0.946	60.9	28.8	0.008	1.10	.	(0.0004)	0.99	0.83	0.0027
IARM 95C	Stellite 6B	0.13	(0.002)	1.10	57.0	29.0	0.014	2.47	.	(0.0004)	1.55	1.37	0.033
IARM 97B	Stellite 188	0.08	(0.002)	0.096	42.5	21.2	0.07	1.92	0.005	<0.002	0.76	0.56	0.014
IARM 97C	Stellite 188	0.19	0.0028	0.130	35.8	22.2	0.027	2.37	.	0.0010	0.82	0.36	0.075
IARM 64B	Ultimet 1233	0.12	(0.001)	0.062	54.2	25.26	0.020	3.02	.	0.005	0.78	4.77	0.12

Number	Nb	Ni	O	P	S	Si	Ta	Ti	V	W	Zr
IARM 208A	0.020	0.80	(0.003)	0.030	0.001	0.77	0.012	0.012	0.012	0.07	(0.001)
IARM 208B	0.06	0.42	0.0015	0.004	0.0009	0.63	0.042	0.029	0.05	0.03	0.002
IARM 208C	0.011	0.63	0.0010	0.008	0.0004	0.62	(0.02)	0.012	0.012	0.02	0.0014
IARM 207A	0.043	35.19	0.0011	0.002	0.0027	0.053	0.007	0.91	0.011	0.028	0.003
IARM 256A	0.5	25.6	.	.	.	.	.	3.0	.	.	.
IARM 96B	0.046	10.04	0.002	0.0063	0.0005	0.16	0.028	0.007	0.012	14.52	0.007
IARM 96C	0.047	10.36	0.001	0.008	0.001	0.31	0.03	0.007	0.012	15.4	0.009
IARM 96D	0.08	10.66	0.0006	0.006	0.005	0.23	0.03	0.046	0.008	14.71	(0.007)
IARM 95B	(0.002)	2.25	(0.001)	0.010	0.0006	0.46	0.03	0.004	(0.002)	3.42	(0.002)
IARM 95C	(0.008)	2.88	(0.004)	0.009	0.001	0.54	0.03	0.004	0.004	3.96	(0.005)
IARM 97B	0.022	19.4	0.003	0.009	(0.001)	0.34	0.019	0.006	0.012	12.9	(0.001)
IARM 97C	0.023	22.8	0.0007	0.011	0.0004	0.47	0.04	0.011	0.010	14.6	(0.007)
IARM 64B	(0.018)	9.06	(0.0009)	0.005	(0.0004)	0.27	(0.028)	0.011	(0.014)	2.12	<0.01

COBALT ALLOYS

Number	Cr	W	Fe	C	Si	Mn	Ni	Mo	Nb	Al	Ta	Cu	Pb	Sn	P	N	S
CRM	cast		14944: 45 mm Ø x 19 mm			14943, 14937: 45 mm Ø x 20 mm			12673: 40 mm Ø x 15 mm								
112X 14943	32.5	(0.09)	0.85	0.233	0.53	1.18	0.12	7.53	(0.063)	<0.01	.	0.116	(0.0067)	(0.0046)	0.006	0.115	0.0137
112X 14944	29.24	<0.02	0.14	0.225	0.71	0.744	0.128	6.29	<0.01	<0.01	.	0.006	(0.0001)	(0.0001)	0.0017	0.148	0.0040
112X 14937 *	24.37	3.17	1.84	0.238	1.48	0.85	3.47	7.1	0.058	1.20	.	0.164	(0.007)	0.011	0.0095	0.11	0.0069
111X 12673	18.8	9.8	1.70	0.001	0.85	0.55	1.70	0.09	2.40	0.02	0.06	0.10	0.005	0.08	.	0.030	0.021
RM	cast		typical analysis			40 mm Ø x 15 mm											
112X 14942	28.47	1.67	1.09	0.090	1.02	0.46	0.29	6.22	.	0.18	.	.	.	.	.	.	.
112X 14941	26.85	0.54	0.76	0.38	0.45	0.14	1.17	4.16	.	0.03	.	.	.	.	.	.	.
112X 14936	23.00	1.12	0.39	0.45	0.23	0.77	1.67	4.65	.	0.48	.	.	.	.	.	.	.
111X 12669	22.04	10.65	1.41	.	0.71	0.57	0.62	.	2.06	.	.	.	.	.	.	.	.
111X 12667	21.0	10.5	1.78	.	0.50	0.49	0.68	.	1.21	.	0.08	0.10	0.009	0.11	.	.	.
111X 12672	20.9	10.0	1.47	.	0.65	0.54	0.71	.	2.04	.	0.07	(0.005)	0.04	0.02	.	.	0.014
111X 12671	20.5	11.8	1.45	.	0.51	0.61	0.88	.	1.95	.	.	.	.	.	.	.	.
111X 12670	19.6	10.7	1.32	0.01	0.60	0.46	1.13	0.08	2.36	(0.003)	0.07	0.06	(0.005)	0.042	0.01	0.008	0.014
111X 12673	18.8	9.8	1.70	0.001	0.85	0.55	1.70	0.09	2.40	0.02	0.06	0.10	0.005	0.08	.	0.030	0.021

* 112X 14937 also contains B: 0.0061 and Zr: (0.015).

CRM LEAD

analysis listed in mg/kg

60 mm x 60 mm x 12 mm blocks

Number	Type	Ag	As	Bi	Cd	Cu	Ni	Sb	Se	Sn	Te	Tl	Zn
BCR 286A	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
BCR 287A	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
BCR 288A	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

RM LEAD

approximate analysis listed mass % except * which is mg/kg

500 g block, 10.5 x 2 x 2 cms

Number	Pb	Melting Pt.	Ag*	Al	Bi*	Cu*	Fe*	Mn	Ni	Sb	Sn	Ti	Zn
BCS 210e	99.996	327.3°C	1	<0.001	8	6	5	<0.001	<0.001	<0.002	<0.002	0.001	<0.005

LEAD

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

Number	Ag	Al%	As	Bi	Ca%	Cd	Cu	Ni	Sb	Sn	Te	Zn
CRM	40 mm Ø x 20 mm											
BAM 101	28.8	0.0257	.	165	0.1436	.	17.3	.	.	0.293%	.	.
BAM 102	24.8	0.0124	.	148	0.0705	.	10.9	.	.	0.895%	.	.
RM	typical analysis 50 mm x 50 mm x 20 mm											
L01.1	24	.	6.7	199	.	1.6	9.3	<0.5	2	5.2	<2	7.7
L01.4	88.5	.	2.4	265	.	15	1.0	2.6	5.7	1.9	7.9	2.2
L01.2	1.3	.	0.95	101	.	22.6	18.0	8	3	(0.7)	7.4	4
L01.3	52	.	1.3	6	.	6.2	24.3	5.1	2.7	(0.7)	6.1	4.5

LEAD

cast analysis listed in mass % 40 mm Ø x 15 mm

Number	Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Te	Fe
CRM											
83X PR8	0.592	0.256	1.14	0.082	0.16	0.553	0.0056	0.259	0.003	(0.0023)	.
83X PR7	0.208	0.83	0.507	0.23	0.052	0.302	0.0021	0.496	0.006	0.0014	(0.0009)
83X PR2	0.095	0.053	0.0177	0.039	0.018	0.053	(0.0004)	0.0021	0.0010	0.0064	*
83X PR3	0.050	0.10	0.10	0.060	0.003	0.001	0.010	0.050	0.003	.	.
RM typical analysis											
83X PR4	0.009	0.012	0.014	0.015	(0.002)	0.014	0.005	0.010	0.013	0.025	<0.005
83X PR1	0.004	0.005	0.080	0.006	0.050	0.088	0.002	0.075	0.001	0.003	0.001
83X PR5	*	0.0005	0.0030	*	*	0.0005	*	*	<0.0001	*	*
83X PBTE/2	**	**	**	**	**	**	**	.	.	0.06	**

Number	Al	Au	In	Ca	Na	Hg	Se	Tl
83X PR8	.	(0.011)	0.733	.	0.017	(0.054)	.	.
83X PR7	.	(0.0016)	0.076	(0.0012)	0.004	(0.011)	(0.01)	.
83X PR2	.	(0.0011)	0.0015	(0.0010)	(0.0003)	0.0024	.	(0.0010)
83X PR3	.	.	.	.	.	.	.	.
83X PR4	0.001	0.002	0.005	0.0026	0.001	(0.001)	0.003	.
83X PR1	0.001	0.008	0.045	0.004	0.01	0.02	<0.002	.
83X PR5	.	.	.	.	.	.	.	.
83X PBTE/2	.	.	.	.	.	.	.	.

In the above chart,
* indicates a value of <0.0005 and
** indicates a value of (<0.001).

LEAD ALLOYS

Number	Sn	Sb	Bi	Cu	As	Ag	Se	S	Ni	Fe	Zn	Cd	Te	Other
CRM cast HRH: 55 mm Ø x 12 mm others: 40 mm Ø x 15 mm														
85X Psn2	1.97	0.0269	0.0508	0.0344	0.0047	0.0033	0.0011	(0.0008)	0.0010	.	0.0005	0.0012	0.0041	
85X ANTH	1.32	6.32	0.059	0.0234	0.0487	0.0058	0.017	(0.0030)	0.0035	0.0041	0.0004	0.0052	0.010	
85X HRH	0.87	1.14	0.090	0.080	0.73	0.247	0.035	(0.0008)	0.001	.	.	0.0002	0.002	Ca: 0.0001
85X 0494Pb3	0.294	3.02	0.038	0.100	0.277	.	.	.	.	.	.	.	.
85X PSb3	0.268	2.80	0.0247	0.045	0.139	0.0049	0.023	(0.0013)	0.0011	.	.	0.0027	0.0015	
85X CADH	0.196	2.03	0.0174	0.029	0.191	0.0043	0.004	<0.001	0.0023	0.0003	0.0035	2.06	0.0021	Te: 0.0021 Mn: <0.0005
85X 0494Pb2	0.155	2.07	0.0018	0.054	0.128	.	0.023	.	.	.	.	.	.
85X 0616Pb1	0.070	1.76	0.026	0.047	0.068	0.0023	0.017	.	0.0010	<0.001	0.0009	0.0022	(0.0016)	
85X 0494Pb1	0.051	0.95	0.0017	0.012	0.049	.	0.004	.	.	.	.	.	.
RM cast typical analysis others: 52 mm Ø x 14 mm														
85X PSb12	0.21	11.4	0.007	0.30	0.11	0.0015	<0.001	.	0.0016	<0.001	0.087	<0.001	<0.005	
85X PSb8	0.085	8.43	0.010	0.032	0.02	0.0016	0.0007	(0.0011)	0.0014	<0.001	(0.0002)	<0.001	<0.001	
85X PSb10	0.080	10.2	0.007	0.13	0.11	0.0015	<0.001	.	0.0013	<0.005	0.014	<0.001	<0.002	
85X PSb5	0.057	5.14	0.022	0.007	0.12	0.0017	0.0008	(0.0070)	0.0025	<0.001	<0.001	<0.001	<0.001	

CRM LEAD-SILVER ALLOY

cast 40 mm Ø x 15 mm

Number	Ag	Sb	As	Bi	Cu	Sn	Zn	In	Cd	Al	Fe
82X PAg6.0R	5.93	0.48	0.021	0.52	0.18	0.50	0.007	0.008	0.010	<0.001	<0.001
82X PAg3.5R	3.54	0.106	0.020	0.290	0.073	0.25	(0.004)	0.037	0.0027	0.0015	<0.001
82X PAg2.5R	2.21	0.25	0.010	0.13	0.26	0.082	0.002	.	.	.	.
82X PAg1.5R	1.55	0.39	0.006	0.062	0.27	0.038	0.004	.	.	.	.

CRM		HARD LEAD		
wrought	SOLD IN SET/6 ONLY	40 mm Ø x 12 mm		
Number	Sn	Sb	Pb	
IMN PE 1	0.59	0.053	Remainder	
IMN PE 2	0.50	0.27	Remainder	
IMN PE 6	0.40	0.53	Remainder	
IMN PE 3	0.38	0.49	Remainder	
IMN PE 4	0.31	0.70	Remainder	
IMN PE 5	0.21	0.89	Remainder	

RM		LEAD BINARY			
cast	40 mm Ø x 15 mm				
Number	Sb	As	Bi	Pb	
CRM					
81X PA12.5	12.72	.	.	Remainder	
81X PA10.0	9.60	.	.	Remainder	
81X PA7.0	7.02	.	.	Remainder	
81X PA3.5	3.53	.	.	Remainder	
81X PA2.0	1.996	.	.	Remainder	
81X PA1.0	0.989	.	.	Remainder	
81X PA0.5	0.481	.	.	Remainder	
RM typical analysis					
81X PA _{s1}	(0.02)	1.25	(0.03)	Remainder	

CRM		HARD LEAD					
AVAILABLE IN SET/6 ONLY		40 mm Ø x 12 mm					
Number	Ag	As	Bi	Cd	Cu	Sb	Sn
IMN PG 1	0.020	0.019	0.082	0.078	0.059	0.76	0.56
IMN PG 2	0.013	0.015	0.071	0.064	0.030	0.23	0.28
IMN PG 3	0.011	0.0096	0.053	0.040	0.030	0.52	0.10
IMN PG 4	0.0076	0.0044	0.032	0.026	0.021	0.042	.
IMN PG 5	0.0024	.	0.017	0.011	0.0078	0.97	.
IMN PG 6	0.0006	.	0.005	0.0074	0.0011	1.45	.

RM		LEAD BASE BINARY ALLOY										
cast	typical analysis	40 mm Ø x 15 mm										
Number	Sn	Sb, Bi, Cu, As, Ag, Fe, Zn, Au, Cd, Ni										
91X S63P	63.0	Each element on each disk is less than 0.001%										
91X S50P	50.0	Balance of the composition is Pb.										
91X S40P	40.0											
91X S30P	30.0											
91X S10P	10.0											

LEAD BASE BATTERY ALLOY

Number	Sn	Zn	Ni	Cd	As	Sb	Bi	Ca	Ag	Cu	Te	Fe	Se	Al	
CRM	chill cast		84X BACM and BAHC: 56 mm Ø x 12 mm				others: 40 mm Ø x 15 mm								
84X BA9	2.97	(0.0002)	.	<0.0005	(0.0008)	0.0008	0.0160	0.098	0.0018	0.0009	<0.0005	.	.	0.0189	
84X BA1	1.054	0.0031	0.0002	0.0026	(0.0004)	0.0018	0.0148	0.099	0.0099	0.0019	(0.0004)	.	.	0.0135	
84X BACM	0.645	0.0002	<0.0001	<0.0001	(0.0001)	(0.0003)	0.0022	0.101	0.0004	0.0004	(0.0002)	<0.0005	<0.0001	0.0123	
84X BA2	0.51	0.019	(0.0002)	0.0052	<0.0005	0.002	0.024	0.062	0.008	0.003	<0.002	.	.	.	
84X BA8	0.293	0.0013	.	0.0010	(0.0004)	0.0009	0.019	0.156	0.0043	0.0007	<0.002	.	.	0.021	
84X BA3	0.233	0.0069	.	0.0032	(0.0007)	0.0049	0.034	0.017	0.0044	0.0042	(0.0003)	.	.	0.0051	
84X BA4	0.108	(0.0003)	0.0007	0.010	(0.0008)	0.061	0.074	(0.0014)	0.003	0.031	0.030	.	.	.	
84X BAHC	<0.0005	(0.00017)	<0.0001	<0.0001	(0.00015)	(0.0001)	0.0130	0.139	0.0005	0.0005	(0.0001)	<0.0001	<0.0001	0.0304	
RM	chill cast		typical analysis			84X: 52 mm Ø x 14 mm		L: 50 mm x 50 mm x 20 mm							
84X BA6	0.73	<0.001	<0.001	(0.0002)	<0.001	0.001	0.008	0.095	0.002	0.0010	<0.001	<0.005	<0.001	.	
84X BA7	0.61	<0.0005	<0.0005	<0.0002	<0.001	0.002	0.009	0.036	0.002	0.0009	<0.001	<0.005	<0.001	.	
L21.04	0.43	0.002	0.0004	0.0007	0.0003	0.001	0.0008	0.11	0.0006	0.001	0.0003	.	.	.	
L21.03	0.34	0.0004	0.0001	0.001	<0.0001	0.0003	0.01	0.10	0.01	0.001	0.0003	.	.	.	
L21.02	0.23	0.0007	0.0001	0.0002	<0.0001	0.0007	0.01	0.02	0.007	0.003	0.0003	.	.	.	
L21.01	0.11	0.001	0.0001	0.001	<0.0001	0.0005	0.02	0.06	0.004	0.007	0.0003	.	.	.	

Pb/Sn/Sb ALLOY

Number	Sn	Sb	As	Bi	Cd	Cu	Fe	Ni	Ag	Zn	In	Te
CRM	cast		40 mm Ø x 15 mm									
93X S30APR3	33.0	0.96	0.018	0.28	0.009	0.008	0.003	0.010	0.021	0.0053	.	.
93X S30APR2	30.68	1.80	0.0178	0.168	0.0061	0.062	0.0026	0.042	0.049	0.028	0.0199	0.0102
93X S30APR1	28.58	2.54	0.010	0.059	0.0014	0.192	(0.012)	0.0010	0.0144	(0.0004)	0.0094	0.0024
RM	cast		typical analysis			40 mm Ø x 15 mm						
93X S50APR3	51.5	2.3	0.02	0.25	0.01	0.1	0.005	0.01	0.02	0.01	.	.
93X S50APR2	50.0	2.8	0.03	0.15	0.005	0.05	0.02	0.005	0.05	0.025	.	.
93X S50APR1	48.5	3.3	0.005	0.05	0.001	0.2	0.015	0.001	0.005	0.002	.	.
93X S40APR3	41.5	1.7	0.02	0.25	0.01	0.1	0.005	0.01	0.02	0.01	.	.
93X S40APR2	40.0	2.2	0.03	0.15	0.005	0.05	0.02	0.005	0.05	0.025	.	.
93X S40APR1	38.5	2.7	0.005	0.05	0.001	0.2	0.015	0.001	0.005	0.002	.	.

CRM LEAD BABBITTS

cast 40 mm Ø x 15 mm

Number	Sn	Sb	Bi	Cu	As	Ag	Ni	Cd	Zn	Fe	Al	In	Pd
86X PSS4	10.69	16.97	0.120	0.328	0.278	(0.006)	0.0031	0.047	<0.002	(0.0013)	<0.001	0.013	(0.007)
86X PSS3	9.01	14.02	0.031	0.608	0.10	0.006	0.0040	0.020	<0.001	(0.0016)	<0.001	0.004	(0.003)
86X PSS2	6.33	8.16	0.054	0.118	1.42	0.004	0.0080	0.069	<0.002	<0.001	<0.0005	(0.002)	(0.001)
86X PSS1	4.42	12.11	0.21	0.028	0.59	0.003	0.0014	0.006	<0.001	(0.0005)	<0.001	0.008	(<0.0005)

LEAD-TIN ALLOY

Number	Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Ni	Au	In	Te	Se	
CRM	cast	40 mm Ø x 15 mm													
91X S63PR4	66.8	0.093	0.030	0.021	<0.002	0.030	<0.005	<0.001	0.021	<0.005	0.05	0.014	0.006	.	
91X S63PR3	64.27	0.253	0.255	0.133	0.0190	0.0222	0.0054	(0.002)	0.0015	0.0196	0.175	0.0087	(0.0002)	.	
91X S63PR2	62.6	0.614	0.162	0.052	0.080	0.057	0.030	0.007	0.0168	0.0073	0.090	0.019	0.009	.	
91X S63PR1	61.30	0.075	0.062	0.252	(0.001)	0.0065	0.012	0.0032	0.0057	0.0010	0.040	0.028	0.0008	.	
91X S63PR0	59.8	0.013	0.007	0.023	0.008	0.010	(0.002)	<0.001	0.012	<0.005	0.018	0.01	<0.001	.	
91X S50PR4	54.6	0.098	0.097	1.58	0.044	0.045	(0.0034)	0.0105	0.0118	0.0114	0.029	0.052	.	0.003	
91X S30PR3	30.88	0.269	0.284	0.102	0.0126	0.024	0.0016	(0.003)	0.0115	0.0269	0.0063	0.0085	.	.	
RM	cast	typical analysis			40 mm Ø x 15 mm										
91X S50PR3	51.5	0.25	0.25	0.10	0.01	0.020	0.005	0.003	0.001	0.015	.	.	.	.
91X S50PR2	50.5	0.60	0.15	0.05	0.03	0.050	0.020	0.025	0.010	0.001	.	.	.	.
91X S50PR1	49.5	0.05	0.05	0.20	0.005	0.005	0.015	0.001	0.005	0.006	.	.	.	.
91X S40PR3	41.5	0.25	0.25	0.10	0.02	0.020	0.005	0.008	0.009	0.010	.	.	.	.
91X S40PR2	40.0	0.60	0.15	0.05	0.03	0.050	0.020	0.025	0.005	0.005	.	.	.	.
91X S40PR1	39.0	0.05	0.05	0.20	0.005	0.005	0.015	0.002	0.001	0.001	.	.	.	.
91X S30PR2	30.2	0.60	0.15	0.076	0.028	0.044	0.04	0.031	0.0070	0.007	.	.	.	.
91X S30PR1	29.0	0.05	0.05	0.20	0.005	0.005	0.015	0.002	0.001	0.001	.	.	.	.
91X S10PR3	11.5	0.25	0.25	0.10	0.02	0.020	0.001	0.008	0.010	0.005	.	.	.	.
91X S10PR2	10.0	0.60	0.15	0.05	0.03	0.050	0.001	0.025	0.005	0.001	.	.	.	.
91X S10PR1	9.0	0.02	0.02	0.02	0.005	0.003	0.001	0.002	0.002	0.010	.	.	.	.

CRM MAGNESIUM

cast unsuitable for glow discharge analysis 45 mm Ø x 20 mm

Number	Ag	Al	Be	Ca	Cd	Ce	Cu	Fe	La	Mn	Ni	Pb	Si	Sn	Zn	Zr
61X MgP4	0.021	0.0243	<0.0001	0.028	0.0071	0.0043	0.0109	(0.0044)	0.0029	0.0102	0.0028	0.0069	0.039	0.0068	0.0158	0.030
61X MgP3	0.0125	0.096	<0.0001	0.053	0.0154	0.0055	0.0296	0.014	0.0038	0.0135	0.0049	0.0148	0.046	0.0154	0.0196	(0.0014)
61X MgP2	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)
61X MgP1	<0.0002	0.0144	<0.0002	<0.001	<0.0002	<0.0005	0.0008	0.027	<0.0005	0.0035	(0.0006)	<0.002	0.005	<0.002	(0.0017)	<0.0005

RM MAGNESIUM WITH RARE EARTHS

cast typical analysis 40 mm Ø x 15 mm

Number	Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Sn	Pb	R.E.*	Th	Ag	Ca
68X MgH6	0.23	0.21	0.17	<0.01	0.11	0.01	0.03	0.01	<0.002	<0.005	(1.0)	.	1.13	.
68X MgL4	0.023	0.19	0.17	<0.005	0.049	0.01	0.017	0.012	0.009	<0.001	1.33	1.32	<0.005	0.006
68X MgH5	0.01	0.15	0.01	<0.01	0.05	<0.005	0.015	0.001	<0.005	<0.001	1.8	.	1.6	0.005
68X MgL2	0.003	<0.002	0.008	0.54	0.012	<0.005	<0.001	<0.002	<0.005	<0.001	1.02	0.69	2.32	0.003
68X MgL3	0.003	<0.002	0.008	0.39	0.029	<0.005	0.002	<0.002	<0.005	<0.001	1.23	1.22	2.91	0.003
67X MgG2	0.003	2.4	<0.01	0.5	0.01	0.01	0.002	0.005	<0.005	0.001	.	2.5	.	0.004
68X MgL1	0.003	<0.002	<0.01	0.6	0.002	<0.005	0.001	<0.002	0.006	<0.001	1.5	0.35	1.4	.
68X MgH4	0.002	0.05	0.01	0.1	0.03	<0.005	0.002	0.001	<0.005	0.008	2.1	.	2.0	0.009
67X MgG3	0.001	2.7	<0.01	0.5	0.02	.	0.002	<0.005	<0.005	<0.001	.	3.0	.	0.005
68x MgH3	<0.002	0.030	0.009	0.36	0.011	<0.005	0.002	0.001	<0.005	0.007	2.6	.	2.4	0.007

* R.E. = The Rare Earths in the 4 series above were added as Neodymium rich R.E.

CRM MAGNESIUM WITH RARE EARTHS

cast

Number	Ag	Al	Ce	Cu	Dy	Er	Eu	Fe	Gd	Ho	La	Li	Lu	Mn	Nd
68X MGH1	3.21	<0.002	0.040	0.0046	.	.	.	<0.002	.	.	0.034	.	.	0.0027	3.05
68X MGH2	2.94	<0.002	0.055	0.0050	.	.	.	(0.0006)	.	.	0.044	.	.	0.0038	2.70
67X MGF1	<0.001	0.0176	1.88	0.0048	.	.	.	0.0024	.	.	1.12	.	.	0.0039	(0.05)
67X MGF2	<0.001	0.0038	1.42	0.0033	.	.	.	(0.001)	.	.	0.98	.	.	0.0047	0.29
67X MGF3	<0.001	(<0.001)	1.17	0.0010	.	.	.	<0.002	.	.	0.84	.	.	0.0040	0.212
67X MGF5	<0.0005	0.094	0.412	0.0735	.	.	.	0.0290	.	.	0.239	.	.	0.171	0.011
67X MGF4	<0.0005	0.079	0.81	0.0302	.	.	.	<0.002	.	.	0.47	.	.	0.0023	0.048
69X MGY1	.	(0.0019)	0.029	(0.0015)	0.313	0.13	(0.004)	0.0021	0.284	0.065	0.166	0.119	0.007	0.0109	2.26

continued

Number	Ni	Pb	Pr	Si	Sm	Sn	Tb	Tm	Y	Yb	Zn	Zr	Units
68X MGH1	(0.0006)	<0.002	(0.014)	<0.005	.	<0.002	.	.	.	.	0.053	0.47	40 mm Ø x 15 mm
68X MGH2	(0.0006)	(0.0021)	(0.013)	<0.002	.	<0.005	.	.	.	.	0.123	0.46	40 mm Ø x 15 mm
67X MGF1	(0.0003)	<0.001	0.48	<0.005	.	<0.002	.	.	.	.	0.501	0.022	40 mm Ø x 17 mm
67X MGF2	0.0008	0.019	0.112	<0.002	.	<0.002	.	.	.	.	1.71	0.30	40 mm Ø x 17 mm
67X MGF3	(0.0006)	0.0140	0.106	(0.001)	.	<0.002	.	.	.	.	3.34	0.53	40 mm Ø x 17 mm
67X MGF5	0.0004	<0.0005	0.100	0.0026	.	<0.001	.	.	.	.	6.29	<0.001	40 mm Ø x 17 mm
67X MGF4	(0.0003)	<0.001	0.195	(0.0014)	.	<0.001	.	.	.	.	5.04	0.024	40 mm Ø x 17 mm
69X MGY1	(0.0005)	0.014	0.059	.	0.09	.	0.045	(0.013)	4.64	0.078	0.121	0.38	40 mm Ø x 16 mm

CRM MAGNESIUM ALLOYS

AVAILABLE INDIVIDUALLY OR IN SETS AS GROUPED

45 mm Ø x 25 mm

Number	Al	Be	Cu	Fe	Mn	Ni	Si	Zn
NCS HS49722-1	5.81	0.00007	(0.0024)	0.0025	0.016	0.0006	0.026	(0.0069)
NCS HS49722-2	4.68	0.00009	0.0036	0.0042	0.077	0.0010	0.024	3.81
NCS HS49722-3	7.18	0.00044	0.087	0.013	0.339	0.0045	0.097	2.99
NCS HS49722-4	6.96	0.0010	0.164	0.023	0.231	(0.013)	0.28	1.94
NCS HS49722-5	11.52	(0.0023)	0.295	(0.20)	(0.68)	0.018	0.176	0.217
NCS HS49722-6	9.07	0.0029	0.0098	0.039	0.61	0.0036	0.43	0.98
NCS HS49723-1	6.10	(0.0020)	0.0029	(0.039)	0.92	0.0012	0.034	0.057
NCS HS49723-2	2.55	0.0009	0.0081	0.0089	0.338	0.0008	0.173	0.237
NCS HS49723-3	7.33	0.00015	0.020	0.015	0.182	(0.0015)	0.27	0.171
NCS HS49723-4	6.29	(0.0010)	0.020	(0.016)	0.428	(0.0068)	0.286	0.271
NCS HS49723-5	4.57	0.0009	0.013	0.025	(0.65)	0.0025	0.239	0.105
NCS HS49723-6	1.36	0.0033	0.010	0.0049	0.130	0.010	0.065	0.492
NCS HS49724-1	3.69	0.00011	0.0084	0.0070	0.59	0.0012	0.54	0.102
NCS HS49724-2	5.82	0.00018	0.0016	0.0077	0.095	0.0012	1.54	0.128
NCS HS49724-3	1.09	(0.0005)	0.16	(0.0034)	(0.50)	(0.0013)	0.68	0.339
NCS HS49724-4	4.37	0.0009	0.103	0.022	0.33	0.0038	1.22	0.25
NCS HS49724-5	2.58	0.0012	0.039	0.033	0.23	0.014	1.83	0.152

MAGNESIUM BASE ALLOYS

Number	Ag	Al	Be	Ca	Cd	Ce	Cu	Fe	La	Mn	Ni	Pb	Si
CRM	cast												
65X MgA4 *	0.0186	11.67	0.0011	0.033	.	.	0.061	0.0092	.	0.0062	0.0036	0.0040	0.025
65X MgA7	<0.0005	9.38	.	.	.	.	0.0010	0.0103	.	0.285	0.0009	<0.002	0.006
65X MgA3 *	.	8.99	0.0007	<0.001	.	.	0.0061	0.004	.	0.152	(0.001)	0.004	0.047
65X MgA5	0.0050	8.01	0.0013	0.012	0.0035	.	0.020	0.006	.	0.399	0.020	0.043	0.110
65X MgA2 *	.	7.31	0.0007	(0.01)	.	.	0.112	0.011	.	0.139	(0.002)	0.007	0.15
65X MgA1 *	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
65X MgB4	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
65X MgB3 *	(0.0024)	3.19	0.0029	0.030	0.012	.	0.0214	(0.004)	.	0.0122	0.0020	0.0037	0.012
65X MgB2	0.0098	2.67	0.0008	0.011	0.0114	0.0009	0.113	(0.010)	0.0007	0.333	0.0027	0.0036	0.069
65X MgB1 *	0.029	2.39	0.0007	0.41	0.070	0.015	0.20	0.016	0.013	0.68	0.013	0.015	0.17
63X MgE1 *	0.015	0.40	<0.0005	0.04	.	.	0.044	0.010	.	0.76	(0.002)	0.010	0.006
63X MgE2	.	0.07	.	0.01	.	.	0.02	0.02	.	1.47	0.005	0.007	0.01
63X MgE3	0.005	0.015	.	0.13	0.001	.	0.012	0.004	.	2.36	0.0023	0.005	0.01
66X MgC4	0.0074	0.039	0.0001	<0.001	.	.	0.0023	0.006	.	0.167	0.001	0.003	0.06
66X MgC3	0.001	0.011	.	.	.	.	0.009	(0.001)	.	0.020	0.006	0.003	(0.003)
66X MgD4	(0.0017)	0.0012	<0.0002	.	.	0.015	0.0041	0.0010	0.014	0.0053	(0.0003)	(0.0009)	<0.001
66X MgC2	0.0031	0.0008	<0.0002	.	.	.	0.033	0.0011	.	0.0078	(0.0005)	0.0058	<0.001
66X MgC1	0.006	<0.002	<0.0002	.	.	.	0.056	(0.0014)	.	0.010	(0.0008)	0.010	<0.005
RM	cast typical analysis												
66X MgD2	.	0.30	.	<0.005	.	.	0.08	0.014	.	0.74	0.008	0.012	0.07
66X MgD1	.	0.1	.	0.009	.	.	0.1	0.01	.	1.5	0.01	0.01	0.1
66X MgD3 *	0.005	0.041	0.0003	(0.07)	.	0.004	0.058	0.023	0.004	0.28	0.002	0.009	0.020

* Unsuitable for Glow Discharge analysis.

Number	Sn	Sr	Ti	Zn	Zr	Units
65X MgA4	0.0102	.	.	0.0050	.	45 mm Ø x 20 mm
65X MgA7	<0.002	0.015	.	0.66	(0.0008)	40 mm Ø x 17 mm
65X MgA3	0.0026	<0.0002	.	0.706	.	45 mm Ø x 20 mm
65X MgA5	0.013	0.00034	.	0.411	.	40 mm Ø x 15 mm or 50 mm Ø x 20 mm
65X MgA2	0.049	0.0005	.	0.97	.	45 mm Ø x 20 mm
65X MgA1	0.072	.	.	1.26	(0.0015)	45 mm Ø x 20 mm
65X MgB4	0.0050	.	(0.0008)	0.333	<0.001	40 mm Ø x 18 mm
65X MgB3	0.0050	.	.	0.608	<0.001	45 mm Ø x 20 mm
65X MgB2	0.0047	.	0.0003	0.95	<0.001	40 mm Ø x 18 mm
65X MgB1	0.011	.	0.009	1.71	(0.003)	45 mm Ø x 20 mm
63X MgE1	0.013	.	.	0.033	(0.013)	45 mm Ø x 20 mm
63X MgE2	0.01	.	.	0.02	<0.002	40 mm Ø x 15 mm
63X MgE3	0.0057	.	(0.0026)	0.022	<0.001	40 mm Ø x 15 mm or 45 mm Ø x 20 mm
66X MgC4	0.021	0.0001	.	6.80	<0.001	40 mm Ø x 15 mm or 50 mm Ø x 20 mm
66X MgC3	<0.002	.	.	4.97	0.13	40 mm Ø x 15 mm
66X MgD4	(0.0008)	.	.	2.77	0.69	40 mm Ø x 15 mm
66X MgC2	(0.0008)	.	.	4.49	0.54	40 mm Ø x 15 mm
66X MgC1	<0.002	.	.	2.54	0.74	40 mm Ø x 15 mm
66X MgD2	0.011	.	.	1.13	<0.01	40 mm Ø x 15 mm
66X MgD1	0.01	.	.	1.0	<0.005	40 mm Ø x 15 mm
66X MgD3	0.007	.	.	1.97	0.029	45 mm Ø x 20 mm

CRM MOLYBDENUM

analysis listed in mg/kg

40 mm Ø x 20 mm

Number	Ag	Al	Be	Bi	C	Cd	Co	Cr	Cu	Fe	Mg	Mn	Ni	Pb	S	Se	Te	Ti	V	Zn
VC Mo	<2	<30	<1	<1	<20	<1	<5	<5	<2	<10	<2	<2	<5	<2	<10	<4	<1	<5	<10	<2

CRM PURE TITANIUM BY POWDER METALLURGY

Available in 2 forms: (disc) 090A: 40 mm Ø x 20 mm or (cubes) 090B: 0.2g cubes, approx. 25g

Number	Al	B	Co	Cr	Cu	Fe	Mn	Mo	Nb	Ni	Sn	V	W	Zr
BCR 090	(0.074)	0.00282	0.0501	0.0533	0.0513	0.0563	0.0314	0.0488	(0.0492)	0.0667	(0.071)	(0.057)	(0.050)	(0.0436)

CRM TITANIUM ALLOY

made by Powder Metallurgy

Number	Al	V	Size
BCR 089	5.97 +/- 0.04	3.976 +/- 0.029	40 mm Ø x 20 mm

TITANIUM ALLOYS

Number	Al	V	Fe	Sn	Mn	Cr	Mo	W	B	Co	Nb	Pd	Ru	Y
CRM														
BS T-5A	6.33	4.10	0.170	0.009	<0.002	0.013	0.004	<0.01	.	.	.	.	.	.
BS T-80	0.0746	0.0446	0.0093	0.0257	0.0244	0.0050	0.0100	0.0174	0.0040	0.0146	0.0367	0.1424	0.0469	0.0010
BS T-81	0.0664	0.0186	0.1144	0.0155	0.0404	0.0294	0.0279	0.0372	0.0082	0.0395	0.0191	0.0398	0.0310	0.0017
BS T-4A	0.040	(0.001)	0.19	0.005	0.003	0.026	0.0006	<0.002	.	.	.	.	.	.
BS T-2A	0.005	<0.002	0.156	0.006	0.003	0.018	0.002	<0.002	.	.	.	.	.	.
RM														
BS T-15	6.23	(0.01)	1.02	0.015	0.02	1.02	3.1	(0.52)	.	.	.	.	.	.
BR Ti7	5.9	4.0	0.11	0.01	0.001	0.01	0.01	.	.	.	.	.	.	.
BS T-14	4.94	0.013	1.90	0.03	0.02	1.98	1.72	0.48	.	.	.	.	.	.
BS T-22	0.004	0.50	1.19	0.019	2.02	1.22	1.15	0.51	.	.	.	.	.	.
BS T-23	0.003	0.93	0.93	0.025	3.70	0.91	0.91	0.87	.	.	.	.	.	.
BS T-24	0.002	1.22	0.54	0.019	4.7	0.54	0.51	0.37	.	.	.	.	.	.
BS T-26	0.002	0.020	0.055	0.025	0.006	0.037	0.028	0.57	.	.	.	.	.	.

contiuned

Number	Ni	Si	Cu	Zr	C	S	O	N	H	P	Units
BS T-5A	0.012	0.02	0.0025	0.003	0.011	<0.001	0.190	0.008	(0.0028)	.	38 mm Ø x 12 mm
BS T-80	0.0156	(0.0035)	0.0375	0.0178	0.0166	.	0.0768	0.0041	0.0059	.	40 mm Ø x 12 mm
BS T-81	0.0090	0.0474	0.0244	0.0163	0.0161	.	0.0669	0.0037	0.0035	.	40 mm Ø x 12 mm
BS T-4A	0.014	0.011	(0.001)	<0.002	0.014	(0.0004)	(0.37)	0.005	(0.0027)	(0.001)	38 mm Ø x 12 mm
BS T-2A	0.021	0.002	(0.001)	<0.003	(0.007)	(0.0004)	(0.12)	(0.0044)	(0.0020)	.	38 mm Ø x 12 mm
BS T-15	0.007	0.02	0.03	<0.002	0.007	(0.002)	(0.08)	(0.007)	.	.	32 mm Ø x 12 mm
BR Ti7	0.005	0.04	0.005	0.005	0.02	.	.	.	.	.	30 mm x 30 mm x 20 mm
BS T-14	0.012	0.04	0.022	(<0.01)	(0.010)	(0.003)	(0.091)	0.006	.	.	32 mm Ø x 12 mm
BS T-22	0.008	(0.02)	0.04	(<0.01)	0.005	(0.002)	(0.09)	(0.01)	.	.	32 mm Ø x 12 mm
BS T-23	0.004	(<0.01)	0.012	(0.002)	0.006	(0.002)	(0.13)	(0.007)	.	.	32 mm Ø x 12 mm
BS T-24	(0.007)	(0.01)	0.020	(0.001)	0.005	(0.002)	(0.09)	0.006	.	.	32 mm Ø x 12 mm
BS T-26	0.002	(0.01)	0.037	0.005	0.005	(0.001)	(0.069)	(0.005)	.	.	32 mm Ø x 12 mm

RM TITANIUM ALLOYS

Number	Grade	Al	C	Cr	Cu	Fe	H	Mo	N	Ni
IARM 174A	TI-CP Grade 4	0.013	0.009	(<0.01)	(<0.01)	0.15	0.0057	(<0.01)	0.0089	.
IARM 177A	TI-6-2-4-2	5.87	0.008	(<0.01)	<0.01	0.045	0.0060	2.00	0.0084	0.007

Number	O	Si	Sn	V	Zr	Units
IARM 174A	0.30	(<0.01)	(<0.01)	.	(<0.01)	31 mm Ø x 2 or 18 mm
IARM 177A	0.15	0.089	1.97	0.006	4.05	31 mm Ø x 2 mm

RM TITANIUM ALLOY XRF SAMPLES

cast typical analysis 32 mm Ø x 8 mm buttons

Number	Al	Mo	Si	Sn	Zr	Cu	V	Fe	Nb	Pd
101P 811	8.0	1.0	.	.	.	.	1.0	0.03	.	.
101P 6242	6.12	2.06	0.08	2.01	3.98	.	.	0.014	.	.
101P 6246	6.05	5.99	0.06	2.00	3.92	.	.	0.055	.	.
101P 685	6.0	0.5	0.3	0.05	5.0	.	.	0.03	.	.
101P 318	6.0	.	.	.	.	.	4.0	0.2	.	.
101P 367	6.0	.	.	.	.	.	.	0.1	7.0	.
101P 829	5.55	0.27	0.30	3.52	3.13	.	.	0.010	1.02	.
101P 317	5.0	.	.	2.5	.	.	.	0.2	.	.
101P 550	4.09	4.18	0.41	2.09	.	.	.	0.036	.	.
101P 551	4.0	4.0	0.5	4.0	.	.	.	0.05	.	.
101P 679	2.42	1.07	0.22	11.08	4.92	.	.	0.018	.	.
101P 205	.	15.0	.	.	.	.	.	0.03	.	.
101P 230	.	.	.	.	.	2.30	.	0.065	.	.
101P 260	.	.	.	.	.	.	.	0.05	.	0.15

These materials have been analyzed by X-Ray Fluorescence only. They are not recommended for Spark Optical Emission Spectrometers due to segregation.

CRM ZINC

cast analysis listed in mg/kg

Number	Al	Cd	Cu	Fe	Pb	Sn	In	Tl	Units
BCR 327	.	301.4	(0.56)	144.0	409.4	.	.	.	80 mm Ø x 20 mm
BCR 326	(<0.7)	203.0	104.8	264.8	307.0	.	.	.	80 mm Ø x 20 mm
ERM-EB325	.	94.7	47.5	56.1	142	46.1	.	36.8	60 mm Ø x 30 mm
ERM-EB324	.	48.6	9.87	58.5	26.1	9.8	.	19.9	60 mm Ø x 30 mm
ERM-EB322	.	15.08	5.89	19.1	15.0	5.6	.	5.28	60 mm Ø x 30 mm
ERM-EB323	.	6.51	18.9	11.3	48.6	18.7	.	10.8	60 mm Ø x 30 mm
BAM M601	<0.05	0.55	1.89	2.20	15.7	.	<0.05	2.25	45 mm Ø x 30 mm
BCR 321	<0.7	(0.23)	(0.97)	(2.2)	4.85	<0.5	(<0.2)	0.78	80 mm Ø x 20 mm

RM ZINC

typical analysis listed in mass %

Number	Pb	Al	Fe	Sb	Cu	Cd	Sn	Mg	Zn	Melt °C	Units
BS SP-5	0.005	0.0003	<0.001	<0.001	<0.001	<0.0004	0.0010	<0.002	.	.	37 mm Ø x 12 mm
BCS 194e	0.002	.	0.001	.	.	.	.	.	99.99	419.5	300 g block, 4.5 x 3.5 x 3 cm

RM ZINC BINARY

cast typical analysis listed in mass %

Number	Mn	Zn	Size
41X ZMn1	1.1	Remainder	50 mm Ø x 20 mm

CRM ZINC SPELTER

Number	Pb	Al	Cd	Fe	Sn	Cu	Ni	Bi	Sb	As	Co	Cr	Mn	Units
41X GLV2	0.214	0.070	0.0026	0.048	0.003	0.0053	0.0071	0.017	0.007	<0.001	.	.	.	50 mm Ø x 20 mm
41X GLV6	0.120	0.474	0.0053	0.0047	0.0152	0.039	0.0008	0.0248	0.0112	0.0014	0.0047	0.0029	0.0013	50 mm Ø x 20 mm
41X GLV7	0.082	0.399	0.00056	0.0031	(0.0006)	0.023	0.0060	0.0108	0.0031	0.0016	(0.0001)	0.0010	0.0025	50 mm Ø x 20 mm
41X GLV1	0.056	0.119	0.0096	0.059	0.010	0.003	0.0141	0.0026	<0.001	<0.001	.	.	.	50 mm Ø x 20 mm
41X CGL	0.046	0.281	(0.0015)	.	(<0.001)	(0.0005)	.	.	.	.	.	.	.	42-48 mm Ø x 20 mm
41X GLV5	0.019	0.014	0.014	0.077	0.020	0.0116	0.0029	0.0105	0.163	0.004	.	.	.	50 mm Ø x 20 mm
41X GLV3	0.0080	0.32	0.021	0.012	0.006	0.019	0.030	0.0011	0.048	<0.001	.	.	.	50 mm Ø x 20 mm
BS SPA	0.003	0.051	.	0.011	<0.001	<0.0005	.	.	0.099	.	.	.	.	38 mm Ø x 14 mm
41X GLV4	0.004	0.205	<0.0005	0.017	(0.002)	0.0009	0.049	0.0053	0.024	<0.001	.	.	.	50 mm Ø x 20 mm

CRM ZAMAK ALLOYS

cast analysis listed in mg/kg except % which is mass % 80 mm Ø x 20 mm

Number	Pb	Mg	Al%	Cd	Fe	Sn	Cu	In	Tl	Ni
ZAMAK 3										
BCR 355	56.9	786	3.443	58.1	.	29.1	1035	24.6	23.25	268
BCR 354	30.8	602	3.727	29.7	.	14.1	312.3	9.8	11.01	83.1
BCR 353	24.4	452.5	3.95	10.44	.	5.6	100.0	2.55	3.95	.
BCR 352	(6.4)	283.0	4.150	2.88	.	3.0	31.26	3.02	3.2	6.74
BCR 351	4.50	131.0	4.355	(0.21)	.	<1	12.13	<0.2	0.74	(1.9)
ZAMAK 5										
BCR 360	73.9	705	3.427	59.5	.	33.0	1.234	29.8	25.9	267
BCR 359	36.2	557	3.711	29.8	119.7	16.93	0.989	15.5	13.34	92.6
BCR 358	22.5	403	3.946	10.22	40.5	7.87	0.793	7.04	6.09	26.98
BCR 357	13.8	273	4.227	2.83	25.7	3.51	0.5849	3.30	2.76	9.82
BCR 356	9.87	132.3	4.434	0.73	31.5	(0.32)	0.3944	<0.2	0.79	3.43
BCR 361	5.31	.	4.068	(0.80)	10.34	46.3	0.798	(<0.2)	37.4	.

RM ZINC-CADMIUM ALLOY

cast typical analysis 40 mm Ø x 15 mm

Number	Ag	Bi	Cd	Cu	Fe	Ni	Pb	Sb	Sn	Zn
44X ZnCd30	0.05	0.05	31.0	0.05	0.002	0.001	0.09	1.03	0.05	Rem.

ZINC ALLOYS

Number	Al	Bi	Cd	Cu	Fe	Mg	Pb	Sb	Sn	Units
CRM AVAILABLE INDIVIDUALLY OR SET/7										
CAN NZA-1	28.70	.	0.00098	1.51	0.046	0.020	0.0030	.	0.0069	50 mm Ø x 12 mm
CAN NZA-2	23.81	.	0.0047	3.00	0.021	0.029	0.0076	.	0.0045	50 mm Ø x 12 mm
CAN NZA-3	25.99	.	0.0064	2.00	0.066	0.0049	0.0045	.	0.0034	50 mm Ø x 12 mm
CAN NZA-4	26.65	.	0.0029	2.45	0.027	0.0106	0.0101	.	0.0087	50 mm Ø x 12 mm
CAN NZA-5	10.85	.	0.0095	1.04	(0.016)	0.021	0.0012	.	0.0017	50 mm Ø x 12 mm
CAN NZA-6	7.54	.	0.0147	3.17	(0.0105)	0.00037	0.0809	.	0.0051	50 mm Ø x 12 mm
CAN NZA-7	13.17	.	0.00020	0.212	(0.016)	0.052	0.0136	.	0.0116	50 mm Ø x 12 mm
CRM SOLD IN SET/5 ONLY										
GBW 02705	4.72	.	0.00081	0.165	.	0.0224	0.0026	.	0.00058	30 mm x 35 mm x 45 mm
GBW 02706	3.92	.	0.0014	0.256	.	0.159	0.0032	.	0.00104	30 mm x 35 mm x 45 mm
GBW 02707	3.91	.	0.0031	0.412	.	0.075	0.0057	.	0.0021	30 mm x 35 mm x 45 mm
GBW 02708	2.92	.	0.0072	0.773	.	0.0368	0.0120	.	0.0040	30 mm x 35 mm x 45 mm
GBW 02709	2.64	.	0.0138	1.37	.	0.0085	0.0235	.	0.0077	30 mm x 35 mm x 45 mm
CRM SOLD IN SET/5 ONLY										
NCS HS52701a-1	.	.	0.000062	0.00012	0.00068	.	0.00089	.	0.00057	28 mm Ø x 26 mm
NCS HS52701a-2	.	.	0.0021	0.00018	0.0018	.	0.0021	.	0.0010	28 mm Ø x 26 mm
NCS HS52701a-3	.	.	0.0041	0.00040	0.0034	.	0.0040	.	0.0013	28 mm Ø x 26 mm
NCS HS52701a-4	.	.	0.0067	0.00074	0.0068	.	0.0068	.	0.0022	28 mm Ø x 26 mm
NCS HS52701a-5	.	.	0.0099	0.0016	0.011	.	0.010	.	0.0028	28 mm Ø x 26 mm
RM AVAILABLE INDIVIDUALLY cast some Sb segregation in below series, typical analysis listed										
44X Z5	20.4	0.004	0.001	0.001	0.010	<0.001	0.010	5.2	0.003	40 mm Ø x 15 mm
44X Z4	20.3	0.016	0.011	0.007	0.011	0.008	0.032	6.7	0.018	40 mm Ø x 15 mm
44X Z3	17.8	0.013	0.012	0.011	0.009	0.005	0.020	8.1	0.019	40 mm Ø x 15 mm
44X Z2	12.6	0.030	0.005	0.003	0.007	0.035	0.053	9.5	0.018	40 mm Ø x 15 mm
44X Z1	8.0	0.024	0.027	0.028	0.007	0.001	0.019	10.6	0.024	40 mm Ø x 15 mm

CRM ZINC ALLOYS

cast														50 mm Ø x 20 mm
Number	Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Ti	Cr	Sb	Bi	Mn	Other
41X 4380 Zn7	1.25	0.0028	0.137	0.015	(0.004)	0.0047	0.012	0.012	0.009	0.0045	0.090	.	.	
41X 4380 Zn8	0.73	0.007	0.225	0.0079	0.003	0.011	0.020	0.024	0.012	0.0017	0.016	0.011	0.0017	
41X 4380 Zn6	0.411	0.0043	0.0051	0.0423	0.018	0.110	0.022	0.00058	0.062	0.0022	0.0359	0.00109	0.024	
41X 4380 Zn4	0.325	0.126	0.144	0.094	0.056	0.038	0.0022	0.0040	0.005	(0.0003)	0.017	0.011	0.0007	
41X 4380 Zn2	0.268	0.0243	0.0153	0.284	0.048	0.0021	0.0288	0.0023	0.0251	0.0027	0.0093	0.0076	0.0087	
41X 4380 Zn3	0.180	0.0220	0.0203	0.0950	0.017	0.080	0.073	0.0120	0.125	0.0029	0.0046	0.0103	0.0180	
41X 4380 Zn5	0.140	0.00165	0.0215	0.0571	0.0120	0.0101	0.071	0.00147	0.339	0.0075	0.0061	0.0308	0.035	
41X 4380 Zn1	0.068	0.0011	0.055	0.376	0.01	0.049	0.175	0.0029	(0.001)	0.002	0.002	0.0017	0.0017	Si: 0.006
41X Z6	0.031	<0.0005	0.0096	0.0093	(0.002)	0.0038	0.0088	0.0002	.	(0.0001)	.	0.0122	0.0002	In: 0.0228 Tl: 0.0004
41X Z5	0.0275	0.0098	0.041	0.0310	0.011	0.0275	0.0296	0.00054	0.00044	.	0.0098	.	0.0138	In: 0.0050 Tl: 0.0073
41X Z4	0.019	0.005	0.030	0.014	0.010	0.013	0.006	0.002	.	.	.	.	.
41X Z3	0.009	0.003	0.010	0.007	0.004	0.006	0.003	0.001	.	.	.	.	.
41X Z2	0.0036	0.0064	0.017	0.0017	0.0028	0.0017	0.016	0.0014	(0.0005)	.	.	.	0.0017	
41X Z1	0.0017	0.0003	0.0002	0.00005	0.0005	<0.0002	0.0005	0.0001	.	.	0.0004	.	0.00018	Tl: 0.0003

CRM ZINC ALLOYS

cast														50 mm Ø x 20 mm
Number	Al	Pb	Mg	Cd	Fe	Sn	Cu	Ni	Mn	Ti	Sb	Cr	Si	Other
43X Z23	31.4	0.0028	0.0133	0.0024	(0.24)	(0.002)	2.74	0.0115	0.0124	0.0026	.	0.036	0.061	
43X Z22	27.4	0.0060	0.022	0.0050	(0.36)	0.0061	2.32	0.027	0.0096	0.0065	.	0.019	0.038	
43X Z21	23.5	0.012	0.047	0.027	0.12	0.0140	1.81	0.043	0.0104	0.013	.	0.0087	0.022	
43X Z11	11.61	0.0305	0.053	0.0224	0.0091	0.0206	0.515	0.0014	0.0089	0.013	0.0091	0.0010	0.020	Bi: 0.0035
43X Z12	10.05	0.0136	0.027	0.0115	0.047	0.0089	0.80	0.004	0.0061	0.0053	.	0.0022	.	
43X Z13	9.55	0.0125	0.0204	0.0100	0.05	0.011	0.981	0.0109	0.0070	.	0.009	.	(0.0048)	
43X Z14	8.23	0.0082	0.0027	0.0067	0.015	0.005	1.23	0.0052	0.0032	0.0011	0.012	0.0045	0.010	Bi: 0.010
43X Z15	7.36	0.0060	0.0022	0.0030	0.009	0.004	1.54	0.0019	0.0020	0.002	.	0.0024	.	
42X Z8	7.03	0.0025	0.0033	0.0003	0.013	(0.0023)	0.0215	0.0019	0.0014	.	.	.	0.013	Ce: 0.0081 La: 0.0079
42X Z9	5.58	0.0021	0.0464	0.0054	0.032	(<0.001)	0.0070	(0.0003)	0.0006	0.020	.	.	(0.004)	Ce: 0.0047 Zr: 0.011 La: 0.0044
43X Z4	4.76	(0.0024)	0.043	0.0025	(0.064)	(0.0023)	3.21	0.0286	0.088	0.0017	0.0043	0.0063	(0.0065)	Bi: 0.012
42X Z1	4.61	0.0022	0.0041	0.0005	0.0024	0.0006	0.0019	0.0017	0.0007	.	(<0.001)	<0.0005	0.0046	Ce: 0.0027 La: 0.0026
43X Z1	4.50	0.0017	0.0145	0.00037	0.0058	(0.0007)	0.501	0.0010	0.0005	0.0014	0.0016	0.0009	(0.0037)	Bi: 0.0031
42X Z7	4.39	0.0097	0.0095	0.030	0.027	0.012	0.0249	0.0067	0.0045	.	.	.	0.006	Ce: 0.053 La: 0.047
42X Z5	4.22	0.0048	0.073	0.0021	0.029	0.0022	0.098	0.0185	0.0068	.	(0.0055)	0.0018	.	Bi: 0.006 In, Tl: 0.005 Ce, La: 0.010
42X Z2	4.04	0.0052	0.0147	0.0010	0.0040	0.0021	0.0186	0.0051	0.0012	.	0.0026	0.0018	0.0089	Ce: 0.0049 La: 0.0044
43X Z6	4.02	0.0016	0.0256	0.0016	0.019	0.0053	2.723	0.029	0.0006	0.0013	0.0045	0.0006	0.012	Bi: 0.0049
43X Z2	3.79	0.0065	0.073	0.0068	0.021	0.003	1.04	0.012	0.0059	.	0.008	0.0021	0.009	Bi, In, Tl: 0.003
42X Z3	3.72	0.0060	0.0288	0.0048	(0.047)	0.0030	0.159	0.0102	0.0252	.	0.003	0.0020	0.015	Ce, La: (0.0003)
42X Z6	3.67	0.0093	0.177	0.0039	0.008	0.0057	0.238	0.00030	0.0157	.	0.0169	0.0034	(0.010)	In: 0.00191 Tl: 0.0021
43X Z3	3.64	0.0132	0.0143	0.0132	0.061	0.0125	1.58	0.0061	0.0125	.	.	0.004	0.005	Bi: 0.018
42X Z4	3.55	0.0113	0.058	0.0076	0.012	0.0060	0.063	0.0177	0.0077	.	(0.0029)	.	.	In: 0.0016 Ce, La: 0.020
41X 0336 Zn4	1.39	2.87	0.179	0.638	(0.018)	2.38	0.874	0.0074	0.038	.	0.048	.	.	Ag: 0.0023 Bi: 0.027 As: 0.0005 In: 0.0035
41X 0336 Zn2	0.99	0.46	0.033	0.171	0.12	0.040	0.196	0.005	0.014	.	.	.	.
41X 0336 Zn3	0.43	0.019	0.134	0.341	0.27	0.111	0.36	.	0.0058	.	.	.	.
41X 0336 Zn6	0.105	1.82	0.0008	0.0140	0.08	0.0023	0.0203	0.0018	0.0010	0.0132	0.234	.	.	Ag: 0.0055 Bi: 0.123 As: 0.0020 In: 0.0123
41X 2951 Zn3	0.078	0.0065	0.0164	0.0062	0.029	(0.006)	1.89	0.0010	0.0018	0.133	.	0.184	.	
41X 0336 Zn5	0.035	0.91	<0.0005	0.056	0.016	0.21	0.023	(0.0005)	(0.0001)	.	0.008	.	.	
41X 2951 Zn2	0.032	0.0040	0.0123	0.0037	0.019	(0.0015)	1.37	0.0027	0.0011	0.209	.	0.142	.	
41X 2951 Zn1	0.029	0.0042	0.0029	0.0005	0.011	(0.0007)	0.79	0.0038	0.0013	0.278	.	0.083	.	
41X 0336 Zn1	0.014	0.95	0.0049	0.0056	0.0124	0.0053	0.0070	(0.0006)	0.0035	.	.	.	.

RM ZIRCONIUM BASE XRF MATERIALS

cast typical analysis 32 mm Ø x 8 mm buttons

Number	Sn	Ni	Cr	Cu	Fe	Mo
121P Zr 20	1.50	0.05	0.10	.	0.15	.
121P Zr 30	.	.	.	0.50	0.05	0.50
121P Zr 40	1.50	.	0.10	.	0.15	.

These materials have only been analyzed by X-Ray Fluorescence. They are not recommended for Spark Optical Emission Spectrometers due to segregation.

These globally recognized standards have been used in national mints and precious metal mines across the world. They originate from the Rand Refinery Ltd. in South Africa.

All of these reference materials will be accompanied by a Certificate of Analysis indicating the values of all elements. The XRF standards are mounted in bakelite TSP with a 31 mm Diameter. Other diameters and sizes are available on request.

Please note that with precious metals, market fluctuations will affect pricing. Quoted prices will be extended for a 30-day period. Prepayment is necessary. Delivery in 8 - 12 weeks.

HIGH PURITY GOLD - all forms

These standards contain certified ppm values for 18 elements and are available in the following forms:

Number	RAN AuDHP 1 OES	RAN AuDHP 1 XRF	RAN AuGHP 1
Form	80 g optical emission disc custom sizes available	18 mm x 2 mm XRF disc	15 g or 25 g of small balls each 200 mg +/- 5 mg

Gold Purity 99.9993%																		impurities listed in mg/kg	
Ag	Rh	Pd	Pt	Sn	Pb	Sb	Bi	Zn	Cu	Ni	Cr	Mn	Fe	Ti	Se	Co	Cd	Mg	As
1	<0.1	0.1	<0.1	<0.2	0.3	<0.1	<0.1	0.2	0.7	<0.1	<0.1	<0.1	1	0.1	<0.5	<0.1	<0.1	0.5	<0.5

REFINED GOLD

Number	Ag	Rh	Pd	Pt	Sn	Pb	Sb	Bi	Zn	Cu	Ni	Cr	Mn	Fe
RAN REFAuGP1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RAN REFAuGP2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
RAN REFAuGP3	3.8	3.3	3.1	2.9	3.3	4.0	3.7	4.0	2.9	4.0	4.0	4.0	3.6	4.0
RAN REFAuGP4	7.2	5.8	6.0	5.6	5.3	6.1	7.0	6.2	4.5	6.2	7.5	5.5	5.5	7.0
RAN REFAuGP5	13	10	12	12	10	13	13	13	7.0	12	13	12	11	14
RAN REFAuGP6	25	22	25	24	24	27	27	27	15	24	26	26	24	24
RAN REFAuGP7	42	42	40	41	40	45	45	45	29	45	45	45	40	40

These standards are available in units of 75 globules at 200 mg +/- 5 mg each.

The concentration of each impurity can be custom added and certified. Otherwise the certified impurities fall within 20% of the following values.

GOLD ALLOYS - XRF only

Number	Au %	Ag %	Cu
RAN REFAuDP1	98.0	2.0	---
RAN REFAuDP2	96.0	2.0	2
RAN REFAuDP3	91.5	---	8.5
RAN REFAuDP4	88.0	8.0	4
RAN REFAuDP5	75.0	18.0	7
RAN REFAuDP7	50.0	20.0	30
RAN REFAuDP8	37.0	10.0	53

These standards are available individually or as a set of 7 standards. The alloys are composed of high purity gold, silver, and copper in a variety of ranges. The 11 trace elements are then custom added as impurities to the alloys. Certified values will be given for all elements including trace elements. The size is 18 mm D x 2 mm H discs mounted on a 31 mm D bakelite TSP.

The following elements may be customized in mg/kg
Bi Cd Fe Mn Pd Pt Pb Sb Se Te Zn

BULLION - disc form

Optical emission discs are 80 g custom sizes, XRF discs are 21.7 mm D x 2 mm H discs mounted on a 31 mm D bakelite TSP. RAN REFBull is produced from high purity gold, silver, and copper, and are available as 3 different standards:

Certified values for Au, Ag, and Cu
Certified values for Au, Ag, and Cu with 6 trace elements (*) including Pt and Pd
Certified values for Au, Ag, and Cu with 19 trace elements

Note that the Au and Ag values for RAN REFBull are mass percent, while Cu and Pd are listed as mg/kg.

Au %	Ag %	Cu	Pd*
99.63	0.329	238	14

The 19 trace elements are all less than 10 mg/kg.

Pt*	Sn	Pb	Sb	Bi*	Zn	Rh*	Ni*	Cr	Mn	Fe*	Ti	Se	Co	Cd	Mg	Zn	As	Al
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TERNARY ALLOYS - XRF only

Number	Au %	Ag %	Cu
RAN REFTA1	98.0	1.5	0.5
RAN REFTA2	96.0	3.0	1.0
RAN REFTA3	95.0	2.5	2.5
RAN REFTA4	93.0	4.5	2.5
RAN REFTA5	90.0	4.0	6.0
RAN REFTA6	83.3	4.0	12.7
RAN REFTA7	81.7	7.2	11.1
RAN REFTA8	80.0	12.5	7.5
RAN REFTA9	58.3	8.0	33.7
RAN REFTA10	58.3	20.0	21.7
RAN REFTA11	58.3	30.0	11.7
RAN REFTA12	50.0	20.0	30.0
RAN REFTA13	37.5	2.0	60.5
RAN REFTA14	37.5	10.0	52.5
RAN REFTA15/01	37.5	16.0	46.5
Number	Au %	Ag %	Cu

These standards are available as a set of 15 standards. The concentrations of the 3 major elements and the 10 trace elements will be certified over the ranges specified. The concentrations of major elements Au, Ag, and Cu in each alloy will fall within 1% of the values specified. Values listed are the mean of the range. Concentrations of custom added trace elements will be included and certified over the range of 1 - 150 mg/kg. Standards can be produced to order on receipt of detailed requirements listing concentration ranges of the trace elements.

The size is 18 mm D x 2 mm H discs mounted on a 31 mm D bakelite TSP.

The following elements may be customized in mg/kg: Bi Fe Mn Ni
Pb Pd Pt Sb Sn Zn

REFINED SILVER

Number	Au	Rh	Pd	Pt	Te	Sn	Pb	Sb	Bi	Zn	Cu	Fe	Ni
RAN REFAGGP1	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
RAN REFAGGP2	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
RAN REFAGGP3	3.5	2.9	3.1	3.0	3.5	3.3	4.5	3.1	3.0	4.0	4.0	4.0	3.0
RAN REFAGGP4	6.4	5.3	5.7	5.9	7.2	5.9	6.1	5.5	6.2	7.8	7.4	8.0	4.5
RAN REFAGGP5	11	7.3	11	12	13	8.7	11	9.6	11	11	14	12	6.0
RAN REFAGGP6	23	16	25	24	25	13	24	16	23	15	30	25	8.9

These standards are available in units of 75 globules at 200 mg +/- 5 mg each.

The concentration of each impurity can be custom added and certified. Otherwise the certified impurities fall within 20% of the following values.

SILVER ALLOYS - XRF only

Number	Ag %	Cu
RAN REFAGDP1	97.0	3
RAN REFAGDP2	94.0	6
RAN REFAGDP3	91.5	8.5
RAN REFAGDP4	80.0	20
RAN REFAGDP5	60.0	40

These standards are available individually or as a set of 5 standards. These contain silver and copper in a variety of ranges with certified values for nine custom trace elements. The size is 18 mm D x 2 mm H discs mounted on a 31 mm D bakelite TSP.

The following elements may be customized in mg/kg

Au Pt Pd As Bi Cd Sb Ni Fe

HALLMARK - XRF only

Entirely customized, these are made to the customer specifications. Certified values will be given for Au, Ag, and Cu. Discs are 22 mm D x 2 mm H mounted on a 31 mm D bakelite TSP. Any desired mix of Au, Ag, or Cu may be supplied with a certificate of analysis. Chosen compositions do not need to use all three of the possible elements.