INDEX

CRM ACID BASE ACCOUNTING

certified values | informational values listed in mass % | 100 g units

Number	Total S%	Al	Ba	C	CO_2	CO_3	Ca	Fe	K	Mg	Mn	Na	P	S as SO_4	Si	Ti	LOI	LOM	Total
CAN NBM-1	0.28	7.86	0.117	0.79	.	0.50	2.30	4.09	2.36	1.39	0.046	2.70	0.10	0.02	28.47	0.335	3.45	0.32	98.38
CAN KZK-1	0.80	7.37	0.27	0.95	3.37	4.22	1.80	3.30	3.55	0.95	0.07	1.18	0.08	0.01	29.38	0.35	.	.	.

values listed in $kgCaCO_3/t$

Number	Paste PH	Acid Producing Potential Sobek	Acid Producing Potential Modified Sobek	Neutralization Potential Fizz Rating Sobek Slight	Neutralization Potential Fizz Rating Sobek Moderate	Neutralization Potential Fizz Rating Modified Sobek Slight	Neutralization Potential Fizz Rating Modified Sobek Moderate
CAN NBM-1	8.45	8.73	8.46	(49.6)	(70.9)	(46.6)	(52.3)
CAN KZK-1	(8.8)	24.9	(24.6)	59.0	64.8	58.9	(61.6)

CRM AIR PARTICULATE ON FILTER MEDIA

SRM 278e is supplied as 2 loaded + 2 blank filters, analysis in ng, good for nondestructive analysis

Number	Al	As	Ba	Ca	Ce	Co	Cr	Cu	Fe	K	Mg	Mn	Na	Ni	Pb
SRM 2783 blank	(30)	.	(0.4)	.	.	(0.04)	(70)	.	.	.	.	.	(15)	(8)	(0.4)
SRM 2783 loaded	23210	11.8	335	13200	(23.4)	7.7	135	404	26500	5280	8620	320	1860	68	317

Number	Rb	S	Sb	Sc	Si	Sm	Th	Ti	U	V	W	Zn
SRM 2783 blank	.	(100)	.	.	.	.	.	.	.	.	.	(50)
SRM 2783 loaded	(24.0)	(1050)	71.8	(3.54)	(58600)	(2.04)	(3.23)	1490	(1.234)	48.5	(5.0)	1790

CRM ATTRITION INDEX

Number	Attrition Index (AI units)	Standard Deviation	Uncertainty @ 95% CL	Units
ASCRM 025	18.8	± 1.3	± 2.6	750 g

RM CALCIUM ALUMINATE

typical analysis | 100 g

Number	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	MnO	MoO_3	S	SiO_2	SrO	TiO_2	V_2O_5
DH X0101	72.2	26.74	0.006	0.118	.	0.191	0.008	.	0.011	0.17	.	.	<0.005
DH X0103	68.8	23.38	0.028	0.289	0.296	3.53	0.024	0.014	.	0.450	0.009	0.067	2.36
DH X0102	64.30	18.34	0.054	0.708	.	12.54	0.114	.	0.020	2.02	0.024	0.165	1.48

CRM CALCIUM CARBONATE

certified analysis in mass % and mg/kg

Number	$CaCO_3$	CO_3	Ca	Ba	Cr	Cu	Fe	Mg	Mn	Na	Sr	Zn
SRM 915b	99.907	59.923	40.0104	(2)	.	.	.	(40)	.	(17)	(150)	.
BAM RS 3	99.79	.	.	45.3	<1	<1	<5	183	3.0	47.5	173	<2

analysis in mg/kg | BAM: 100 g | SRM: 20 g units

Al	B	Cd	Co	Ga	K	La	Ni	Pb	Si	Sn	Ti	Zr
Cl: (8)	P: (3)	S: (30)	.	.	.	(5)	.	.	.			
<5	<1	<0.5	<1	<1.5	<20	<0.5	<3	<0.1	<20	<1	<0.5	<0.2

CRM CASTING POWDER

analysis listed in mass % | powder 30 g

Number	Al_2O_3	BaO	C	CaO	CO_2	Cr_2O_3	F	Fe_2O_3	K_2O	MgO	MnO_2	Na_2O	P_2O_5	SiO_2	TiO_2	ZnO	ZrO_2
FLX CRM127	7.82	0.301	(0.12)	34.85	(0.4)	0.021	8.7	0.57	0.09	2.59	0.032	10.45	0.037	37.27	0.241	0.079	0.016
FLX CRM124	7.36	0.287	(7.10)	32.83	(10.4)	0.009	5.2	1.73	0.36	0.90	3.845	5.84	0.111	28.26	0.337	0.010	0.020
FLX CRM125	7.12	0.207	(9.14)	32.07	(12.0)	0.011	4.6	0.77	0.21	0.95	0.259	3.90	0.065	33.29	0.216	(0.005)	0.018
FLX CRM126	5.49	0.061	(15.83)	23.72	(6.5)	0.008	4.5	(1.19)	0.36	2.47	0.082	7.84	0.066	33.45	0.330	(0.007)	0.020
FLX CRM123	4.63	0.265	(6.30)	29.82	(7.4)	0.018	6.6	1.69	0.41	2.75	0.041	7.84	0.095	35.56	0.202	0.010	0.021

RM PORTLAND CEMENT WITH EXTENSIVE ANALYSIS

analysis listed in mass %

Number	Al_2O_3	BaO	CaO	T.Fe_2O_3	K_2O	MgO	MnO	Ni	P_2O_5	SiO_2	Sr	TiO_2	Zr
IAG OPC-1	4.55	0.0512	62.9	3.19	0.344	2.58	0.404	(0.00870)	(0.044)	21.85	0.01182	0.318	0.00812

continued analysis listed in mg/kg ~35 g units

Number	As	Be	Ce	Co	Cs	Cu	Dy	Er	Eu	Ga	Gd	Hf	Ho	La	Li	Lu
IAG OPC-1	(4.6)	(0.82)	48.9	21.4	1.00	(23.7)	2.87	1.52	1.00	7	3.75	2.12	0.55	25.9	(13.1)	0.20

Number	Nb	Nd	Pb	Pr	Rb	Sb	Sm	Ta	Tb	Th	Tm	U	V	W	Y	Yb	Zn
IAG OPC-1	4.9	24.7	(7.2)	6.2	14.7	0.26	4.5	(0.35)	0.52	3.93	0.21	0.83	(64.0)	(0.7)	15.5	1.34	27.8

CEMENT chart 1 of 2

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

#	Number	CaO	SiO_2	Al_2O_3	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	SO_3	SrO	TiO_2	LOI	Units
1	BCS 354	70.0	21.8	4.84	0.30	0.11	0.42	0.10	0.12	2.25	0.11	(0.04)	.	100 g
2	FLX 138	68.6	19.0	4.39	1.78	0.77	1.09	0.15	0.114	3.44	0.189	0.220	.	30 g
1	FLX CRM110	68.13	22.01	4.70	0.18	0.94	0.65	0.05	0.037	2.88	0.041	0.170	(3.46)	30 g
1	SRM 1886a	67.87	22.38	3.875	0.152	0.093	1.932	0.021	0.022	2.086	(0.018)	0.084	(1.56)	4 x 5 g
1	FLX CRM107	67.19	21.81	4.23	1.29	0.70	0.70	0.18	0.160	3.13	0.151	0.194	(6.59)	30 g
1	FLX CRM109	66.45	20.39	4.25	2.32	1.06	1.59	0.18	0.052	3.11	0.144	0.203	(5.96)	30 g
2	JCA RM 611	66.25	21.84	5.41	3.20	0.34	1.08	0.40	0.59	0.25	0.28	0.30	(0.51)	30 g
1	SRM 1886b	66.05	22.08	3.903	0.297	0.0164	1.526	0.01682	0.0413	2.757	0.0886	0.2054	(2.174)	5 x 5 g
1	FLX CRM106	66.05	20.29	5.70	1.98	0.86	0.96	0.12	0.111	3.01	0.206	0.271	(2.06)	30 g
1	NCS DC62103h	65.78	22.07	4.56	3.22	0.69	2.11	0.16	.	0.32	.	0.37	0.60	20 g
2	TL 1Ca	65.77	20.23	5.24	2.00	0.28	1.13	0.19	0.57	3.06	0.05	0.20	(1.39)	40 g
1	NCS DC62117	65.71	20.49	4.61	0.26	0.05	0.14	0.05	.	1.9	.	0.12	6.43	20 g
1	FLX CRM105	65.24	20.84	4.27	2.50	1.24	1.57	0.21	0.053	3.37	0.146	0.179	(2.61)	30 g
1	JCA CRM-1	65.21	20.99	5.26	2.67	0.56	2.13	0.26	0.28	2.05	0.05	0.35	(0.63)	60 g
1	FLX CRM108	65.15	20.06	4.66	2.97	0.74	2.15	0.09	0.169	3.31	0.083	0.186	(2.68)	30 g
1	SRM 634a	65.07	20.493	5.015	3.362	0.3572	1.0057	0.0842	0.1767	2.780	(0.0735)	0.2463	(1.66)	100 g
1	BCS 353	64.8	20.5	3.77	4.82	0.49	2.42	0.10	0.077	2.25	0.23	0.16	.	100 g
2	FLX 137	64.77	20.78	4.99	3.07	0.769	1.64	.	0.171	3.17	0.076	0.221	.	30 g
1	FLX CRM100	64.51	20.89	5.54	2.62	0.82	1.47	0.23	0.166	2.97	0.286	0.283	2.37	50 g
1	CCRL 205	64.44	20.91	4.32	3.00	0.545	1.50	0.169	0.071	2.97	0.171	0.24	1.51	30 g
2	JCA 211S	64.25	20.57	5.60	2.51	0.40	1.26	0.27	0.14	2.10	.	0.30	2.19	40 g
1	SRM 1880b	64.16	20.42	5.183	3.681	0.646	1.176	0.0914	0.2443	2.710	(0.0272)	0.236	(1.666)	4 x 5 g
1	SRM 633a	64.129	22.38	2.911	3.738	0.391	1.1532	0.203	0.14263	2.178	(0.0507)	0.2157	(2.460)	4 x 5 g
1	FLX CRM113	63.63	20.98	5.06	2.75	0.619	2.49	(0.092)	0.135	2.47	0.064	0.231	(1.53)	30 g
1	SRM 1888b	63.13	20.42	4.277	3.062	0.658	3.562	0.1364	0.07307	2.634	0.1099	0.2316	(various)	4 x 5 g
2	JCA RM 613	63.00	19.51	5.36	2.78	1.20	1.07	0.23	0.15	6.07	0.15	0.35	(3.45)	30 g
2	JCA RM 612	62.95	20.12	5.19	2.81	0.90	1.52	0.52	1.02	4.51	0.045	0.28	(2.52)	30 g
2	CCRL 173	62.45	20.01	4.49	2.62	0.447	3.03	0.309	0.192	4.10	.	0.27	2.02	30 g
2	CCRL 174	62.43	20.75	3.71	3.62	0.430	4.83	0.189	0.067	2.64	.	0.21	1.14	30 g
1	NCS DC62101c	62.23	20.41	4.68	3.20	0.71	2.66	0.12	.	3.16	.	0.27	2.18	20 g
1	CCRL 206	61.90	19.64	5.16	3.37	0.653	3.84	0.148	0.044	3.47	0.087	0.28	1.55	30 g
1	SRM 1885b	61.87	20.05	4.70	3.044	0.497	3.86	0.293	0.0737	2.832	0.0795	0.2361	(2.310)	5 x 5 g
2	CCRL 172	61.78	19.30	4.66	2.93	0.935	4.74	0.267	0.111	3.21	.	0.26	2.09	30 g

Number	CO_2	Free CaO	Cl	Cr_2O_3	F	Mn	MnO	Mn_2O_3	S	ZnO	Ins. Res.	
BCS 354	.	.	.	.	.	.	.	0.058	.	.	.	
FLX 138	.	.	.	.	.	.	.	0.095	.	0.017	.	
FLX CRM110	.	.	(0.008)	0.004	.	.	0.029	.	.	0.003	.	
SRM 1886a	.	.	(0.0042)	0.0024	(0.02)	.	.	0.0073	.	(0.001)	(0.23)	
FLX CRM107	.	.	0.043	0.006	.	.	0.040	.	.	0.013	.	
FLX CRM109	.	.	0.049	0.008	.	.	0.051	.	.	0.042	.	
JCA RM 611	.	.	.	.	.	.	0.06	.	.	.	.	
SRM 1886b	.	(0.24)	0.00399	0.00404	(0.0118)	.	.	0.02639	.	(0.00058)	(0.13)	
FLX CRM106	.	.	0.055	0.008	.	.	0.161	.	.	0.012	.	
NCS DC62103h	.	.	.	.	.	.	.	.	.	.	0.12	
TL 1Ca	.	(0.83)	.	.	.	.	.	.	.	.	(0.21)	
NCS DC62117	.	.	.	.	.	.	.	.	.	.	.	
FLX CRM105	.	.	0.049	0.008	.	.	0.040	.	.	0.054	.	
JCA CRM-1	.	.	.	.	.	0.06	.	.	.	.	.	
FLX CRM108	.	.	0.042	0.007	.	.	0.219	.	.	0.036	.	
SRM 634a	.	(1.86)	.	(0.0114)	.	.	.	(0.0229)	.	(0.0222)	(0.21)	
BCS 353	.	.	.	.	.	.	.	0.23	.	.	.	
FLX 137	.	.	.	.	.	.	.	0.266	.	0.029	.	
FLX CRM100	.	.	(0.09)	0.009	.	.	.	0.066	.	0.051	.	
CCRL 205	.	0.74	0.008	0.011	.	.	.	0.121	.	0.010	0.34	
JCA 211S	.	.	0.022	.	.	.	0.05	.	.	.	0.23	
SRM 1880b	.	(2.227)	0.01830	0.01927	(0.0539)	.	.	0.1981	(0.0131)	(0.01054)	(0.487)	
SRM 633a	.	(1.60)	0.0087	(0.0124)	(0.038)	.	BaO:(0.256)	0.1176	(0.049)	0.123	(0.23)	Hg: 0.02470 mg/kg
FLX CRM113	.	.	.	(0.007)	.	.	.	0.233	(0.137)	0.030	.	SO_4 as SO_3: 2.40
SRM 1888b	.	(1.42)	0.0143	(0.01021)	(0.048)	.	.	0.0652	(0.15)	(0.01253)	(0.32)	
JCA RM 613	.	.	.	.	.	.	0.08	.	.	.	.	
JCA RM 612	.	.	.	.	.	.	0.06	.	.	.	.	
CCRL 173	0.6	1.65	0.023	0.009	.	.	.	0.060	.	0.024	0.36	last, expires 12/31/2014
CCRL 174	.	1.04	0.005	0.006	.	.	.	0.073	.	0.014	0.26	last, expires 12/31/2014
NCS DC62101c	.	.	.	.	.	.	.	.	.	.	1.20	
CCRL 206	.	0.97	0.014	0.011	.	.	.	0.029	.	0.020	0.22	
SRM 1885b	.	(0.27)	(0.0021)	0.02709	(0.0524)	.	.	0.1282	(0.042)	0.0354	(0.36)	BaO: 0.0149
CCRL 172	1.38	1.04	0.008	0.009	.	.	.	0.088	.	0.004	0.44	last, expires 12/31/2014

CEMENT chart 2 of 2

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

#	Number	CaO	Ca	SiO_2	Al_2O_3	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	SO_3	SrO	TiO_2	LOI	Units
1	SRM 1884b	61.31	.	19.30	4.851	2.937	0.957	4.74	0.278	0.0965	4.034	0.0258	0.2651	(various)	4 x 4.5 g
1	SRM 1887b	61.15	.	19.59	4.911	2.471	0.961	3.624	0.288	0.1540	4.599	0.2625	0.2034	2.121	5 x 4 g
1	NCS DC62118	60.99	.	21.73	4.75	4.12	0.43	4.37	0.12	.	2.27	.	0.23	0.81	20 g
1	SRM 1889b	60.11	.	18.39	5.79	2.891	1.115	2.82	0.36	0.297	4.3721	0.284	0.260	(3.117)	5 x 5 g
1	FLX CRM122	59.00	.	21.94	5.60	1.67	0.900	2.02	0.204	0.066	(3.27)	0.131	0.353	(4.86)	30 g
1	NCS DC62102d	57.25	.	23.54	6.60	3.25	0.71	1.88	0.15	.	2.74	.	0.39	3.13	20 g
2	TL 203Ca	57.09	.	18.75	4.78	2.34	0.93	4.80	0.21	(0.13)	3.28	(0.06)	0.24	(7.24)	40 g
1	FLX CRM130	56.60	.	14.35	11.62	2.88	0.682	1.84	0.277	0.067	10.91	0.052	0.563	(5.12)	30 g
1	JCA CRM-2	56.33	.	25.66	8.94	2.08	0.31	3.05	0.24	0.07	(2.59)	0.07	0.50	(0.47)	60 g
1	FLX CRM118	55.47	.	21.57	6.94	3.88	0.983	2.08	0.181	0.163	(2.97)	0.087	0.301	(5.02)	30 g
1	FLX CRM103	54.90	.	26.95	7.75	1.78	0.77	4.44	0.33	0.09	2.73	0.070	0.372	(0.59)	50 g
1	TL 201C	54.48	.	25.63	6.81	2.08	0.73	3.35	0.32	.	3.16	.	.	1.96	40 g
1	FLX CRM117	54.22	.	28.05	7.68	1.37	0.916	2.95	0.223	(0.035)	(3.49)	0.098	0.564	(0.402)	30 g
1	FLX CRM115	53.93	.	27.29	8.13	0.972	0.612	2.93	0.194	0.073	(3.90)	0.117	0.610	(1.56)	30 g
1	FLX CRM119	53.78	.	24.04	7.36	3.04	1.23	1.34	0.292	0.153	(2.43)	0.158	0.347	(6.42)	30 g
1	FLX CRM120	53.63	.	26.51	7.64	1.11	0.692	3.55	0.184	0.086	(4.35)	0.124	0.598	(1.71)	30 g
1	FLX CRM114	51.29	.	28.61	6.94	1.37	0.954	4.93	0.277	0.027	(4.07)	0.108	0.525	(1.28)	30 g
1	FLX CRM116	50.05	.	30.81	9.11	0.86	0.693	4.47	0.201	0.034	(3.14)	0.091	0.690	(-0.394)	30 g
1	TL 200Ca	49.97	.	26.55	8.72	4.07	1.10	2.06	0.21	0.45	2.84	0.13	0.46	(3.30)	40 g
1	SRM 1881b	49.27	.	29.045	8.812	3.365	0.721	2.741	0.790	0.0510	2.72	0.0836	0.3011	(1.699)	4 x 5 g
1	FLX CRM101	48.43	.	30.29	8.86	3.54	2.10	1.72	0.657	0.189	3.12	0.248	0.463	(5.13)	50 g
2	DH X0210	46.72	33.39	30.30	9.99	1.66	0.541	4.96	0.236	0.066	.	0.077	0.421	.	100 g
1	TL 202C	45.12	.	29.61	10.14	3.27	1.05	4.46	0.32	.	3.17	.	.	1.51	40 g
1	NCS DC62116a	44.73	.	27.12	10.99	3.43	1.10	2.82	0.23	.	2.49	.	0.57	6.00	20 g
1	FLX CRM121	44.45	.	30.81	8.78	3.04	2.73	1.41	1.23	0.112	2.55	0.140	0.344	(4.24)	30 g
1	FLX CRM131	42.89	.	8.73	23.10	3.24	0.287	1.62	0.466	0.060	18.19	0.067	1.15	(2.03)	30 g
1	NCS DC62105g	42.40	.	13.76	3.12	2.13	0.50	2.11	0.14	.	0.21	.	0.18	34.94	20 g
1	NCS DC62104b	39.65	.	12.77	3.66	2.02	0.93	1.20	0.18	.	0.72	.	0.18	38.32	20 g
1	SRM 1882a	39.29	.	4.01	39.14	14.67	0.051	0.51	0.021	(0.070)	.	(0.024)	1.786	(0.20)	4 x 5 g
1	SRM 1883a	29.52	.	0.24	70.04	0.078	0.014	0.19	0.30	(0.003)	.	(0.019)	(0.020)	(0.59)	4 x 5 g
2	DH X0209	.	48.78	21.95	4.63	0.204	1.01	0.717	0.078	0.043	.	0.051	0.095	.	100 g
2	DH X0212	.	46.48	21.16	4.41	3.94	0.495	0.945	0.084	0.191	.	0.086	0.242	.	100 g
2	DH X0211	.	40.63	25.04	6.86	2.98	0.524	2.79	0.156	0.137	.	0.083	0.319	.	100 g

Number	BaO	Free CaO	Cl	Cr_2O_3	F	Mn	Mn_2O_3	S	Unignited SO_3	V_2O_5	ZnO	Ins. Res.
SRM 1884b	.	(0.418)	(0.0065)	0.00791	(0.0394)	.	0.0750	.	.	.	.	(0.159)
SRM 1887b	(0.022)	0.21	0.01001	0.01551	0.101	.	0.0957	0.025	.	.	0.01560	0.26
NCS DC62118	.	.	.	.	.	.	.	.	.	.	.	1.18
SRM 1889b	.	(0.52)	0.0101	0.0083	(0.10)	.	0.084	.	.	.	0.0770	(0.30)
FLX CRM122	.	.	.	(0.004)	.	.	0.111	(0.288)	SO_4 as SO_3: 2.62		0.027	.
NCS DC62102d	.	.	.	.	.	.	.	.	.	.	.	.
TL 203Ca	.	(1.23)	.	.	.	.	.	.	.	.	.	(0.58)
FLX CRM130	.	.	.	0.021	.	.	0.062	.	SO_4 as SO_3:(10.18)		0.018	.
JCA CRM-2	.	.	.	.	.	0.15	.	(0.32)	(1.91)	.	.	.
FLX CRM118	.	.	.	0.009	.	.	0.176	(0.131)	SO_4 as SO_3: 2.89		0.053	.
FLX CRM103	.	.	(0.040)	0.007	.	.	0.170	.	.	.	0.014	.
TL 201C	.	.	0.06 Cl-	.	.	.	.	0.31 S_2-	.	.	.	.
FLX CRM117	.	.	.	(0.004)	.	.	0.193	(0.602)	SO_4 as SO_3: 1.80		0.024	.
FLX CRM115	.	.	.	(0.004)	.	.	0.214	(0.611)	SO_4 as SO_3: 2.41		0.008	.
FLX CRM119	.	.	.	0.008	.	.	0.040	(0.029)	SO_4 as SO_3: 2.38		0.040	.
FLX CRM120	.	.	.	(0.005)	.	.	0.188	(0.632)	SO_4 as SO_3: 3.18		0.008	.
FLX CRM114	.	.	.	(0.005)	.	.	0.154	(0.676)	SO_4 as SO_3: 2.50		0.022	.
FLX CRM116	.	.	.	(0.005)	.	.	0.238	(0.737)	SO_4 as SO_3: 1.22		0.015	.
TL 200Ca	.	(0.34)	.	.	.	.	.	.	.	.	.	(17.42)
SRM 1881b	0.191	(1.16)	0.0081	0.00949	(0.09)	.	0.1175	.	.	.	0.1198	(16.4)
FLX CRM101	.	.	.	0.011	.	.	0.116	.	.	.	0.046	.
DH X0210	0.071	.	.	.	.	.	0.327	1.77	.	0.011	.	.
TL 202C	.	.	0.01 Cl-	.	.	.	.	0.20 S_2-	.	.	.	.
NCS DC62116a	.	.	.	.	.	.	.	.	.	.	.	.
FLX CRM121	.	.	.	0.008	.	.	0.111	(0.025)	SO_4 as SO_3: 2.37		0.031	.
FLX CRM131	.	.	.	0.038	.	.	0.029	.	SO_4 as SO_3:(17.85)		0.006	.
NCS DC62105g	.	.	.	.	.	.	.	.	.	.	.	.
NCS DC62104b	.	.	.	.	.	.	.	.	.	.	.	.
SRM 1882a	.	.	.	(0.113)	.	.	(0.060)	.	.	.	(0.004)	.
SRM 1883a	.	.	.	(0.006)	.	.	(0.003)	.	.	.	.	.
DH X0209	0.028	.	.	.	.	.	0.025	1.19	.	.	.	.
DH X0212	.	.	.	.	.	.	0.062	1.18	.	.	.	.
DH X0211	0.041	.	.	.	.	.	0.172	1.48	.	0.014	.	.

RM CEMENT SET JCA 601B

available in set/15 only number 1-14 powder 20 g number 15 powder 30 g

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SO_3	SiO_2	SrO	TiO_2
JCA 601B 1	5.10	59.07	2.37	1.191	1.31	0.404	0.809	1.479	9.83	17.61	(0.38)	0.282
JCA 601B 2	5.98	65.23	2.90	0.370	1.37	0.097	0.272	0.119	2.34	20.75	(0.06)	0.299
JCA 601B 3	4.45	63.18	2.37	0.696	2.36	0.050	0.373	0.758	5.97	19.11	(0.19)	0.222
JCA 601B 4	5.23	66.63	2.77	0.281	0.87	0.090	0.166	0.198	2.70	20.36	(0.04)	0.333
JCA 601B 5	3.28	64.96	3.37	0.355	1.02	0.058	0.199	0.111	1.79	24.41	(0.03)	0.189
JCA 601B 6	3.87	64.15	4.13	0.413	0.83	0.105	0.223	0.126	2.20	23.18	(0.03)	0.201
JCA 601B 7	2.82	63.36	3.14	0.398	0.80	0.037	0.153	0.096	2.57	26.27	(0.03)	0.164
JCA 601B 8	2.73	63.49	3.05	0.304	0.59	0.104	0.186	0.169	2.48	26.61	(0.02)	0.143
JCA 601B 9	7.94	58.91	2.07	0.320	2.49	0.081	0.328	0.110	.	24.53	(0.05)	0.370
JCA 601B 10	9.47	54.60	1.83	0.342	3.22	0.148	0.239	0.154	.	26.50	(0.05)	0.379
JCA 601B 11	8.89	55.64	1.98	0.337	2.96	0.181	0.311	0.283	.	26.11	(0.06)	0.399
JCA 601B 12	8.75	55.78	2.14	0.319	3.13	0.620	0.189	0.085	.	24.75	(0.04)	1.035
JCA 601B 13	11.03	50.51	1.10	0.291	4.20	0.112	0.348	0.055	.	28.61	(0.05)	0.449
JCA 601B 14	16.05	35.85	0.24	0.188	10.21	0.115	0.274	0.011	.	35.03	(0.05)	0.435
JCA 601B 15	2.07	75.62	7.01	0.000	0.01	0.002	0.030	0.003	0.02	14.87	(0.02)	0.004

CRM CHLORINE and FLUORINE in CEMENT

Number	Description	CaF_2	F	Cl-	Units
NCS DC62121a	Cement Raw Meal	.	.	0.016	20 g
NCS DC62122a	Cement	.	.	0.009	20 g
NCS DC62125a	Cement	(0.37)	0.18	.	20 g

CRM PORTLAND CEMENT HEAT OF HYDRATION

Number	Heat of Solution J/g	7 Days J/g	28 Days J/g	Units
JCA 301S	2,483.5	274.0	325.2	600 g

CRM COMPRESSIVE STRENGTH N/mm^2

Number	3 Days	7 Days	28 Days	Units
JCA 401J	29.6	44.4	62.1	4.8 kg

CRM CLASSIC CEMENT CHEMISTRIES

20 g units

Number	P - Pozzolana	S - Slag	D - Limestone	D1 - CO_2	R5 - Unsolved Slag (EDTA)	Description
NCS DC62119a	9.3	4.5	2.4	(1.50)	.	Ordinary Portland Cement
NCS DC62120	0.5	18.5	7	3.5	97.5	Portland Blast-Furnace Slag Cement

CRM CEMENT CLINKER PHASE ABUNDANCE

Number	Alite	Alkali Sulfates	Aluminate	Aphthitalite	Arcanite	Belite	Ferrite	Periclase	Units
SRM 2686a	63.53	0.86	2.46	(0.74)	(0.27)	18.80	10.80	3.40	3 x 10 g
SRM 2687a	57.88	.	9.56	.	.	24.70	6.27	.	5 x 8 g
SRM 2688	64.95	.	4.99	.	.	17.45	12.20	.	3 x 10 g

CRM PORTLAND CEMENT FINENESS AND BLAINE STANDARD

Number	Remaining after passing through 80 micron sieve	Blaine	Density g/cm3	Units	
NCS DC62127e	2.68 %	356.8 m^2/kg	(3.05)	150 g	
TL 201B	.	4,231 cm^2/g	3.03	40 g	
TL 202B	.	4,135 cm^2/g	2.94	40 g	
JCA 102O	.	3,300 cm2/g	.	30 g	expries March 2023
JCA 102N	.	3,300 cm2/g	.	30 g	expired, last of stock

CRM CEMENT FINENESS

certified analysis | informational analysis listed in mass % | 46H: 10 x 5 g | TL, 114q: powder 20 x 5 g units

Number	Surface Area Blaine	Surface Area Wagner	45 µm Seive Residue	C_2S	C_3S	C_3A	C_4AF	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	SO_3	SiO_2	TiO_2	LOI
ASTM METHOD	C204-96a	C115-96a	C430-96	C150-02				C114-02										
SRM 114q	3818 cm^2/g	2183 cm^2/g	0.79 %	14	60	7	10	4.7	64.0	3.2	0.70	2.2	0.07	0.12	2.4	20.7	0.30	1.67
TL 3BGa	3727 cm2/g	.	3.14 %	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
SRM 46h	.	.	7.43 %	15	59	8	8	4.9	63.9	2.8	0.68	1.9	0.19	0.21	2.9	20.6	0.30	1.5

CRM CEMENT FINENESS

particle size analysis detailed on certificates | 40-100 g units

Number	Density g/cm^3	Blaine cm^2/g	C_2S	C_3S	C_3A	C_4AF	Al_2O_3	CaO	F.CaO	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	SO_3	SiO_2	TiO_2	Insol.	LOI
TL 2BGa	3.15	4,206	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
TL 9	3.15	4,175	12	62	7	9	4.66	64.00	1.09	3.01	0.76	2.20	0.26	0.07	2.74	20.47	0.20	0.45	1.46
TL 203BGa	3.05	4,329	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

RM CEMENT FINENESS - SIEVING METHOD

Number	45 µm	32 µm	20 µm	16 µm	10 µm	units	
JCA 701B	10.4	22.8	43.0	52.4	70.1	30 g	last of stock
JCA 701C	10.2	22.1	42.6	51.8	69.9	30 g	

percent remaining, ordinary portland cement

CRM CEMENT COMPONENT MATERIAL

analysis listed in mass % | NCS DC61106: 50g | others: 20 g units

Number	Material	CaO	T.$CaCO_3$	Al_2O_3	SiO_2	F	Fe_2O_3	K_2O	MgO	Na_2O	S	SO_3	TiO_2	LOI
NCS DC62110a	Portland Blast Furnace Slag	55.21	.	7.24	24.78	.	3.00	0.71	2.64	0.18	.	2.47	0.51	2.70
NCS DC62109	Portland Pozzolanic	47.57	.	6.52	32.67	.	3.54	1.43	1.86	0.85	.	2.59	0.16	2.44
NCS DC62111	Portland Fly Ash	46.52	.	8.93	24.31	.	4.90	0.61	1.90	0.32	.	2.47	0.33	9.09
NCS DC62123	Sulphoaluminate Cement Clinker	43.4	.	32.6	8.56	.	2.21	0.22	1.37	0.09	.	9.55	1.51	0.41
NCS DC62126a	Cement Black Raw Meal	39.28	70.3	.	.	0.15	2.07	.	.	.	.	.	.	38.51
NCS DC62113	Granulated Blast Furnace Slag	35.62	.	12.23	34.93	.	1.26	0.54	10.66	0.42	0.61	1.17	1.06	1.05
NCS DC62112	Aluminate	34.56	.	51.15	7.95	.	1.91	0.13	0.63	0.04	0.1	.	2.03	0.68
NCS DC62124	Sulphoaluminate Cement Raw Meal	33.05	.	22.29	5.09	.	1.34	0.14	1.21	0.06	.	7.07	1.07	28.21
NCS DC62115a	Fly Ash for Cement	4.13	.	33.07	51.38	.	4.58	0.86	1.02	0.33	.	0.24	1.14	2.80
NCS DC62114a	Pozzolana for Cement	2.15	.	20.66	56.86	.	3.52	1.95	0.86	0.83	.	0.50	0.78	11.53
NCS DC61106	Albite Cement	0.48	.	19.62	67.96	.	0.10	0.098	0.015	11.26	.	.	0.054	0.36

CRM MAGNETIC CENOSPHERE FROM COAL POWER PLANTS

analysis listed in mass % fine powder concentrate, 100 g units

Number	Al_2O_3	Ba	CaO	CO_2	F%	FeO	$T.Fe_2O_3$	K_2O	MgO	MnO	Na_2O	P_2O_5	S	SiO_2	Sr	TiO_2	Zr	LOI
VS 9234-2008	25.9	0.084	1.19	(0.43)	.	1.67	2.85	2.9	0.86	0.039	0.48	0.076	.	63.7	0.0217	0.74	0.026	(0.92)
VS 9235-2008	19.3	0.089	2.77	0.51	(0.2)	(2.4)	4.04	3.5	1.64	0.049	1.33	0.19	(0.07)	64.1	0.0480	0.78	0.0246	(1.6)
VS 9236-2008	2.6	0.38	8.2	(0.64)	.	(15.4)	(78.4)	0.12	(1.3)	(0.082)	0.27	(0.036)	0.86	7.7	0.17	0.21	0.0039	(0.42)

continued analysis listed in mg/kg except

Number	Ag	As	Be	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	Ga	Gd	Ge	Hf	Ho	La	Li	Lu	Mo	Nb
VS 9234-2008	.	.	4.6	115	7.6	59	12	33	(6)	(3.5)	1.5	(11)	(7.3)	.	7.1	(1.2)	60	(42)	0.56	(16)	19
VS 9235-2008	(0.2)	(11)	2.8	89	11	66	8.6	34	(5.5)	(3.0)	1.4	9.3	(6.7)	(0.9)	(6.9)	(1.1)	46	(55)	0.53	(3.4)	15
VS 9236-2008	.	.	(0.7)	11	23	67	(0.21)	28	(1.0)	(0.6)	(0.5)	(3)	(1.2)	.	0.97	(0.19)	5.7	.	0.10	(4.6)	(3.1)

Number	Nd	Ni	Pb	Pr	Rb	Sb	Sc	Sm	Sn	Ta	Tb	Th	Tl	Tm	U	V	Y	Yb	Zn
VS 9234-2008	48	30	17	(13)	116	(0.5)	13	8.4	(1.6)	(1.5)	(1.1)	19	(0.5)	(0.5)	4.3	60	34	3.5	28
VS 9235-2008	39	35	20	(10)	135	(1.3)	15	7.2	(2.3)	(1.2)	0.92	14	(0.7)	(0.5)	4.6	102	33	3.3	50
VS 9236-2008	(5.3)	62	3.5	(1.3)	3.8	(0.3)	2.5	1.0	(1)	(0.15)	(0.16)	1.4	(0.06)	(0.09)	(1.0)	26	5.6	0.50	38

COAL chart 1 of 2

#=class, 1=CRM and 2=RM mass % except * for mg/kg ACIRS, AS(C)RM, COCO: 50-250 g SABS: 100-150 g USZ: as shown others: 50 g

#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb	Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P
1	NCS FC28143	6.40	31.80	14.00	20,650 J	1.82	.	53.28	.	.	.	2.58	.	0.72	.	.
1	**502-674-18191**	4.89	8.80	.	.	.	.	.	.	.	.	.	.	.	.	**17025**
1	**502-684-18321**	4.77	0.22	14.1	(15,379) BTU	.	.	88.5	(85.7)	.	.	3.91	.	1.40	.	**17025**
1	SRM 2685c	4.72	.	.	Br:(4.94*)	Mg:(0.0814)		Mn:(0.003684)	.	(0.05540)	.	.	0.1494	.	.	.
1	NCS FC28009k	4.31	42.34	16.66	18,060 J	1.84	.	45.40	.	.	.	2.63	.	0.80	.	.
1	NCS FC28142	4.35	33.40	14.38	21,050 J	1.76	.	53.63	.	.	.	2.79	.	0.81	.	.
1	NCS FC28221	4.04	18.98	32.0	27,790 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28220	4.03	16.52	11.15	28,670 J	.	.	.	.	.	.	.	.	.	.	.
2	502-836-10076	3.99	12.57	(39.18)	(13,093) BTU	.	.	(70.18)	.	.	.	4.88	0.097	1.27	.	.
1	NCS FC28012k	3.39	18.15	10.90	27,740 J	1.57	.	71.11	.	.	.	2.97	.	0.94	.	.
2	502-837-10182	3.26	9.00	(38.43)	(13,862) BTU	.	.	(72.64)	.	.	.	4.88	0.058	1.36	.	.
1	**502-673-17041**	3.23	8.04	.	.	.	.	.	.	.	.	.	.	.	.	**17025**
1	NCS FC28210	3.17	25.80	8.77	24,130 J	.	.	.	.	.	.	.	.	.	.	.
1	CZ SF-06-14	3.13	27.21	27.36	23,990 J	10,314 BTU	.	58.28	.	.	.	3.51	.	3.80	.	.
1	NCS FC28141	2.92	28.64	11.50	23,040 J	1.70	.	59.60	.	.	.	2.80	.	0.80	.	.
1	ACIRS S2D	2.877	.	.	.	.	.	.	.	0.010	.	.	0.281	.	.	.
1	NCS FC28216	2.79	8.62	10.86	32,300 J	1.44	.	81.27	.	.	.	3.55	.	1.16	.	.
1	NCS FC28008m	2.68	25.20	27.50	24,490 J	1.57	.	60.26	.	.	.	3.74	.	1.06	.	.
1	CZ SF-07-14	2.52	28.73	38.80	21,337 J	9,173 BTU	.	50.97	.	.	.	4.26	.	1.05	.	.
2	ACIRS M1	2.39	18.68	(32.8)	(28,360) J	1.417	.	(67.4)	.	0.014	0.0160	(4.73)	0.122	(1.34)	.	0.098
2	COCO 036	2.28	13.38	8.28	30,550 J	.	.	.	.	.	.	.	.	.	.	0.088
1	NCS FC28215	2.17	25.2	28.79	24,830 J	.	.	.	.	.	.	.	.	.	.	.
1	**502-672-17101**	2.53	8.01	.	.	.	.	.	.	.	.	.	.	.	.	**17025**
1	NCS FC28011k	2.24	22.20	8.57	25,460 J	1.76	.	68.80	.	.	.	2.07	.	0.86	.	.
1	NCS FC28112	2.07	8.08	33.70	32,620 J	1.33	.	78.64	.	.	.	5.01	.	1.31	.	.
2	502-687-13233	2.06	.	.	.	.	.	.	.	.	.	.	0.130	.	.	.
2	502-839-11060	2.03	7.72	(37.57)	(13,586) BTU	.	(2.37)	(76.19)	.	0.0975	0.0071	5.10	0.0132	1.46	Se:	1.0 ppm
1	NCS FC28002x	1.99	16.47	30.10	27,050 J	1.50	.	66.95	.	.	.	4.05	.	1.19	.	.
1	SRM 2683C	1.95	.	.	.	.	.	.	.	(0.1127)	.	.	0.0900	.	.	.
1	NCS FC28138b	1.92	43.85	11.81	18,090 J	1.82	.	46.46	.	.	.	2.54	.	0.73	.	.
1	NCS FC28007p	1.92	16.26	30.12	27,060 J	1.49	.	67.05	.	.	.	4.06	.	1.21	.	.
2	COCO 002	1.89	14.25	21.16	29,200 J	.	.	.	.	.	.	.	last of stock			0.037
1	NCS FC28217	1.79	8.68	36.06	31,330 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28002z	1.78	15.68	30.18	27,460 J	1.48	.	67.88	.	.	.	4.08	.	1.19	.	.
1	NCS FC28209	1.76	27.33	8.21	23,960 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28144b	1.75	85.72	9.12	2,280 J	2.54	.	5.80	.	.	.	1.03	.	0.27	.	.
1	SABS 062	1.74	11.46	5.34	30,170 J	.	.	82.28	.	.	.	2.16	.	1.83	.	0.040
1	NCS FC28005j	1.73	16.90	7.65	28,110 J	1.66	.	74.90	.	.	.	2.36	.	0.99	.	.
1	NCS FC28106a	1.72	8.25	31.68	32,420 J	1.35	.	78.58	.	.	.	4.84	.	1.35	.	.
2	COCO 041	1.67	29.60	17.96	22,870 J	.	.	.	.	.	.	.	.	.	.	.
2	COCO 039	1.67	14.65	17.89	30,240 J	.	.	.	.	.	.	.	.	.	.	0.040
1	NCS FC28214	1.66	27.85	29.21	23,630 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28010L	1.66	19.64	31.33	27,010 J	1.48	.	65.68	.	.	.	4.24	.	1.19	.	.
2	502-831-14095	1.57	6.99	(34.30)	(12,765 BTU)	FSI:0.78	5.08	(73.08)	.	0.3545	0.0048	4.72	0.117	1.69	Se:0.00013	.
2	COCO 046	1.49	16.65	19.36	29,310 J	.	.	.	.	.	.	.	.	.	.	0.039
1	NCS FC28213	1.46	9.87	35.24	30,620 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28218	1.35	14.58	6.16	29,260 J	.	.	.	.	.	.	.	.	.	.	.
2	COCO 030	1.34	25.52	10.06	24,350	.	.	.	.	.	.	.	.	.	.	.
1	CZ SF-01-14	1.33	44.90	31.72	14,617 J	6,284 BTU	.	36.40	.	.	.	3.31	.	0.60	.	.
1	**502-681-19066**	1.32	9.18	33.2	(13,780) BTU	.	.	77.5	(57.6)	.	.	4.99	.	1.45	.	**17025**
2	COCO 044	1.30	28.20	20.08	23,000 J	.	.	.	.	.	.	.	.	.	.	0.047
1	NCS FC28139	1.30	22.70	18.37	27,040 J	1.51	.	67.18	.	.	.	3.68	.	1.05	.	.
1	NCS FC28140	1.28	25.88	30.43	22,500 J	1.62	.	58.12	.	.	.	3.40	.	1.02	.	.
1	NCS FC28111	1.26	25.50	28.50	23,850 J	1.57	.	59.75	.	.	.	3.73	.	1.01	.	.
2	USZ TTKN	1.21	15.2	29.3	35,260 J	.	.	.	.	.	.	4.88	.	80, 150, or 200 g units		
2	502-685-14005	1.16	.	.	.	.	.	.	.	.	.	.	0.040	.	.	.
1	**502-685-16140**	1.15	.	.	.	.	.	.	.	.	.	.	0.041	.	.	**17025**
2	COCO 040	1.15	10.52	36.37	30,050 J	.	.	.	.	.	.	.	.	.	.	0.008
1	**502-671-18363**	1.14	10.21	.	.	.	.	.	.	.	.	.	.	.	.	**17025**
1	**502-686-17294**	1.09	.	.	.	.	.	.	.	.	.	.	0.042	.	.	**17025**

#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb	Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P

COAL chart 2 of 2

#=class, 1=CRM and 2=RM mass % except * for mg/kg ACIRS, AS(C)RM, COCO: 120-250 g SABS: 100-150 g USZ: as shown others: 50 g

#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb		Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P
1	SRM 2692C	1.064	(7.499)	.	.		.	.	.	.	(0.1338*)	.	.	0.1790	.	.	.
1	SABS 069	1.06	8.22	6.10	32,060		.	.	85.36	.	.	.	2.66	.	1.89	.	0.018
1	NCS FC28202	1.05	8.65	33.23	30,720	J	1.39	.	74.78	.	.	.	4.78	.	1.35	.	.
1	NCS FC28205	1.05	8.62	33.44	30,750	J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28208	1.03	15.47	20.59	29,200	J	1.46	.	72.60	.	.	.	3.98	.	1.14	.	.
1	NCS FC28004k	1.03	12.10	8.59	30,230	J	1.59	.	79.82	.	.	.	2.61	.	1.20	.	.
1	NCS FC28105a	1.03	11.87	8.99	31,190	J	1.46	.	79.96	.	.	.	3.31	.	1.12	.	.
1	SABS 035	1.02	26.81	22.18	.		.	.	58.01	.	.	.	2.98	.	1.52	.	0.05
1	SABS 028	0.99	27.00	23.10	.		.	.	57.24	.	.	.	2.94	.	1.45	last	0.09
2	COCO 049	0.98	25.23	17.23	24,400	J	.	.	.	.	.	.	.	.	.	.	0.052
1	SABS 065	0.97	8.0	5.7	32,070		.	.	85.60	.	.	.	2.68	.	1.84	.	0.020
2	COCO 054	0.96	22.87	25.36	25,120	J	.	.	63.57	.	.	.	3.56	.	1.43	.	0.033
1	SABS 068	0.95	27.09	21.22	25,600		.	.	63.47	.	.	.	3.57	.	1.46	.	0.038
2	COCO 028	0.95	17.86	volati	28,660		.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28204	0.95	8.11	34.01	31,340	J	1.36	.	76.22	.	.	.	4.93	.	1.45	.	.
2	502-838-12185	0.963	6.50	(33.78)	(14,337)	BTU	.	(1.41)	(80.26)	.	0.2161	0.0060	5.17	0.067	1.60	Se: 2.7 ppm	
2	COCO 024	0.96	15.51	26.76	27,920	J	.	.	.	.	.	.	.	.	.	.	0.031
2	COCO 011	0.93	18.65	24.31	25,020	J	.	.	.	.	.	.	.	.	.	.	0.008
2	COCO 052	0.92	24.00	23.09	24,540	J	.	.	.	.	.	.	.	.	.	.	0.028
2	COCO 047	0.92	23.59	21.56	24,420	J	.	.	.	.	.	.	.	.	.	.	0.097
1	SABS 055	0.88	14.1	11.5	29,120	J	.	.	75.70	.	.	.	2.93	.	1.93	.	0.031
1	NCS FC28211	0.88	13.41	9.08	30,230	J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 029	0.86	32.97	23.96	.		.	.	50.86	.	.	.	2.86	.	1.17	0.051	.
2	COCO 042	0.85	40.79	21.25	16,700	J	.	.	59.32	.	.	.	2.98	.	1.56	.	.
1	NCS FC28206	0.85	14.46	28.56	26,720	J	.	.	.	.	.	.	.	.	.	.	.
2	COCO 014	0.83	21.88	8.15	27,550	J	.	.	71.25	.	.	.	2.73	.	1.46	.	0.016
1	SABS 059	0.82	16.0	11.0	28,330	J	.	.	74.50	.	.	.	2.84	.	1.79	.	0.031
1	NCS FC28006f	0.82	9.08	33.09	30,580	J	1.40	.	74.96	.	.	.	4.59	.	1.37	.	.
1	NCS FC28110a	0.81	9.62	33.64	29,830	J	1.42	.	74.16	.	.	.	4.44	.	1.38	.	.
2	USZ SOEN	0.78	6.29	44.8	32,160	J	.	.	76.62	.	.	.	5.41	.	.	80 or 200 g units	
1	SABS 039	0.75	24.51	23.34	.		.	.	59.97	.	.	.	2.93	.	1.56	0.079	.
1	SABS 043	0.74	22.31	23.82	.		.	.	61.69	.	.	.	3.03	.	1.56	.	0.071
2	COCO 034	0.74	17.54	21.45	27,590		.	.	.	.	.	.	.	.	.	.	.
2	COCO 038	0.73	15.02	23.63	28,350	J	.	.	.	.	.	.	.	.	.	.	0.090
1	SABS 051	0.72	39.70	20.89	.		.	.	44.44	.	.	.	2.45	.	1.10	.	0.11
1	NCS FC28203	0.71	10.36	20.69	31,660	J	.	.	.	.	.	.	.	.	.	.	.
2	502-846-13156	0.703	12.19	(5.81)	(13,197)	BTU	.	(2.14)	(81.94)	.	0.0202	0.0086	2.39	0.0112	1.05	Se: 2.5 ppm	
1	NCS FC28107a	0.70	10.96	15.62	31,120	J	1.45	.	79.17	.	.	.	3.82	.	1.14	.	.
2	ACIRS S2B	0.692	(9.1)	(34.0)	(31,050)	J	.	.	(75.4)	.	0.027	0.0037	(4.90)	0.057	(1.79)	Se:(0.4 ppm)	
1	**502-682-19115**	0.676	7.36	40.8	(12,369)	BTU	.	.	71.4	(51.8)	.	.	4.76	.	1.44	.	**17025**
2	502-845-13158	0.665	8.02	(3.83)	(13,573)	BTU	.	(3.15)	(87.33)	.	0.0154	0.0051	1.76	0.0169	0.878	Se: 2.0 ppm	
1	SABS 046	0.66	11.86	26.87	.		.	.	74.21	.	.	.	3.77	.	1.76	.	.
1	SABS 026	0.65	37.83	22.07	.		.	.	46.63	.	.	.	2.59	.	1.11	0.066	.
1	NM 150	0.64	35.88	22.02	4,967	kcal/kg	.	.	.	.	.	.	.	.	.	.	.
1	SABS 047	0.60	13.58	25.45	.		.	.	71.85	.	.	.	3.81	.	1.66	.	0.06
2	COCO 025	0.59	23.93	22.60	24,300	J	.	.	.	.	.	.	.	.	.	.	0.036
2	ACIRS G8	0.590	10.14	20.23	32,357	J	1.382	.	79.44	.	0.052	Se:0.00008	4.40	0.02	1.79	.	0.027
2	ACIRS G6	0.59	10.72	19.93	32,150	J	1.372	CO_2:0.055	79.36	last	0.041	0.0067	4.33	0.026	1.75	Se:0.8ppm	0.023 125g
2	COCO 045	0.59	10.70	27.61	29,630	J	.	.	.	.	.	.	.	.	.	.	0.035
1	NCS FC28109	0.58	11.98	11.42	30,560	J	1.49	.	79.02	.	.	.	3.28	.	1.03	.	.
1	SABS 066	0.57	15.02	24.11	27,730		.	.	71.97	.	.	.	3.62	.	1.71	.	0.110
1	NCS FC28108	0.57	13.68	30.55	29,530	J	1.42	.	72.65	.	.	.	4.46	.	1.23	.	.
2	ACIRS G5	0.568	10.68	20.03	32,186	J	1.381	.	(79.19)	.	0.046	.	(4.34)	.	(1.77)	.	0.0196 last
2	COCO 055	0.54	18.96	23.85	25,820	J	.	.	66.37	.	.	.	3.54	.	1.57	.	0.100
2	USZ BNN	0.54	9.04	46.28	28,950	J	.	.	70.49	.	.	.	5.27	.	.	150 g units	
2	COCO 043	0.54	14.80	23.94	28,490	J	.	.	.	.	.	.	.	.	.	.	0.107
1	**502-670-17354**	0.53	8.30	.	.		.	.	.	.	.	.	.	.	.	.	**17025**
1	NCS FC28212a	0.51	9.36	23.27	32,380	J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 058	0.50	31.1	23.1	20,180	J	.	.	53.64	.	.	.	3.06	.	1.33	.	0.023
1	NCS FC28116a	0.50	11.06	23.77	30,000	J	1.44	.	75.34	.	.	.	4.00	.	1.18	.	.
1	SABS CCS 008b	0.49	15.8	25.6	27,550		.	.	71.19	.	.	.	3.85	.	1.70	.	0.111
1	SABS 050	0.48	16.36	24.58	.		.	.	70.79	.	.	.	3.80	.	1.62	.	0.095
1	SABS 049	0.48	16.34	24.31	.		.	.	70.96	.	.	.	3.61	.	1.63	last	0.087
1	SABS 057	0.48	15.49	25.42	.		.	.	71.19	.	.	.	3.85	.	1.70	.	1.093
1	SABS 045	0.49	15.45	24.50	.		.	.	71.24	.	.	.	3.73	.	1.71	.	.
1	SABS 037	0.48	15.26	24.84	.		.	.	71.17	.	.	.	3.67	.	1.72	0.102	.
1	CZ SF-04-14	0.48	4.43	23.67	34,618	J	14,883	BTU	85.53	.	.	.	4.59	.	1.35	.	.
2	COCO 053	0.47	14.37	27.71	27,980	J	.	.	71.03	.	.	.	4.00	.	1.68	.	0.129
2	502-835-10060	0.469	11.08	(38.20)	(12,604)	BTU	.	.	(70.05)	.	.	.	4.85	0.015	1.75	.	.
1	SRM 2693	0.4571	.	.	.		.	.	.	.	0.03696	.	.	0.0373	.	.	.
2	COCO 050	0.45	13.19	27.10	28,350	J	.	.	.	.	.	.	.	.	.	.	0.141
1	NCS FC28001i	0.45	10.75	19.46	32,080	J	1.39	.	79.24	.	.	.	4.20	.	1.44	.	.
2	ACIRS S2A	0.433	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28207	0.43	16.26	7.26	26,100	J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28115	0.42	6.38	31.74	30,570	J	1.41	.	77.28	.	.	.	4.47	.	1.19	.	.
1	NCS FC28104	0.40	10.09	11.00	31,860	J	1.45	.	81.45	.	.	.	3.52	.	1.31	.	.
1	NCS FC28201a	0.40	9.70	18.48	31,580	J	1.42	.	78.94	.	.	.	3.98	.	1.36	.	.
2	COCO 001	0.39	14.66	24.58	26,820	J	.	.	.	.	.	.	.	.	.	last	0.079
2	502-833-14255	0.383	8.96	(18.20)	(14,175)	BTU	.	(0.862)	(82.03)	.	0.0241	0.0098	(4.19)	0.00595	1.16	Se:1.22*	FSI:(3.6)
1	**502-680-18277**	0.38	8.35	18.6	(14,209)	BTU	.	.	82.3	(73.1)	.	.	4.21	.	1.21	.	**17025**
1	SABS 023	0.37	16.5	25.6	.		.	.	68.25	.	.	.	3.63	.	1.62	.	0.102
1	NCS FC28001h	0.37	8.88	31.87	31,010	J	1.39	.	76.30	.	.	.	4.53	.	1.44	.	.
1	NCS FC28103	0.35	10.51	9.70	31,740	J	1.47	.	81.44	.	.	.	3.40	.	1.26	.	.
1	NCS FC28003m	0.33	10.10	10.33	32,030	J	1.45	.	81.90	.	.	.	3.45	.	1.33	.	.
2	502-834-09112	0.298	12.51	(34.90)	(13,833)	BTU	.	.	(68.45)	.	.	.	4.28	0.037	0.913	.	.
2	502-832-11154	0.288	12.29	(23.00)	(13,239)	BTU	FSI:1.6	1.63	(77.05)	.	0.0063	0.0062	4.12	0.039	1.12	Se:0.77 ppm	
1	NCS FC28113	0.27	7.06	33.18	29,580	J	1.41	.	74.60	.	.	.	4.47	.	1.02	.	.
2	COCO 048	0.24	4.97	2.33	32,300	J	.	.	91.34	.	.	.	1.31	.	0.91	.	0.018
1	NCS FC28017e	0.22	23.83	4.99	24,180	J	2.08	.	72.03	.	.	.	0.68	.	0.36	.	.
1	502-675-15195	0.21	5.02	.	.		.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28114	0.20	4.66	33.07	30,280	J	1.42	.	76.69	.	.	.	4.42	.	1.04	.	.
1	NCS FC28101	0.20	3.95	6.97	34,340	J	1.47	.	90.10	.	.	.	3.01	.	0.56	.	.
1	NCS FC28102	0.19	6.40	8.20	33,100	J	1.50	.	87.34	.	.	.	2.86	.	0.58	.	.
1	CZ SF-02-14	0.16	2.80	13.10	33,090	J	14,226	BTU	91.84	.	.	.	2.09	.	0.65	.	.
1	CZ SF-03-14	0.14	2.98	1.15	32,060	J	13,783	BTU	96.30	.	.	.	0.21	.	0.32	.	.
2	ASRM 015	.	.	.	.		1.42	.	.	.	.	.	.	.	.	.	.

RM FUSIBILITY OF COAL

analysis listed in mass % 250 g units Reducing Temperature ‘C

Number	C	H	N	P	S	MJ/Kg	Volatility	Ash	Deformation	Softening	Hemisphere	Flow
COCO 005	81.70	4.57	1.44	0.015	1.05	32.90	27.19	7.49	1402	1425	1443	1473
COCO 007	72.55	3.69	1.83	0.036	1.55	28.71	21.60	14.51	1329	1353	1381	1420
COCO 016	56.64	2.64	1.53	0.030	1.86	21.92	18.26	31.32	1284	1317	1346	1387
COCO 035	62.17	2.98	1.71	0.039	1.92	24.16	15.46	27.55	1369	1394	1419	1452
COCO 051	55.80	2.91	1.30	0.075	1.12	21,520	21.73	30.98	1359	1373	1390	1448

SULFUR IN COAL

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

#	Number	S	Units	#	Number	S	Units	#	Number	S	Units
1	IARM HC20800A	8.6	50 g	1	BCR 336	3.290	20 g	2	VS1-0.96	0.96	50g, last
1	ASCRM 012 D	5.21	125g, last	2	VS1-1.91	1.91	50g, last	1	IARM HC20075C	0.76	50g, last
2	COCO 037	4.74	50 g	2	ACIRS S1C	1.46	250 g	1	BCR 331	0.499	20 g
2	VS1-4.18	4.18	50g, last	1	BCR 333	1.344	20 g	2	ACIRS S1A	0.42	250 g
				1	BCR 332	0.961	20 g				

RM COAL

typical analysis listed in mass % 50 g units, last of stock

Number	S	DRY ANALYSIS C	Heat BTU/lb	Ash	Volatile Matter	IGNITED ANALYSIS Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO_2	Na_2O	P_2O_5	SO_3	SiO_2	TiO_2
VS6-016	1.41	(47.64)	(12,293)	16.71	35.59	27.07	0.81	7.96	3.56	1.18	0.02	0.38	0.12	0.77	55.62	1.20

CRM COAL

analysis listed in mass % (T) = Total SARM 20 also contains Ta: 0.00012, Y: 0.0029

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Mn	Na_2O	P	P_2O_5	S	SiO_2	Sr	TiO_2	Zr	LOI	Units
SARM 20	11.27	1.87	1.17	0.14	0.43	0.0080	0.27	.	0.14	0.51	17.66	0.0330	0.63	(0.0180)	64.66	120 g
SARM 19	8.01	1.39	1.75	0.24	0.20	0.0157	0.29	0.0130	.	1.49	15.00	0.0126	0.341	0.0351	71.28	120 g
SARM 18	2.57	0.18	0.29	0.145	0.11	0.0022	.	0.0030	.	0.56	6.20	0.0044	0.114	0.0067	90.11	120 g
US CLB-1	(1.51)	0.22	1.25(T)	0.0760	0.0470	(0.0008)	0.0230	.	(0.0700)	(1.49)	(2.51)	.	(0.0780)	.	.	40 g

analysis listed in mg/kg US CLB-1 also contqins informational Ash, Li, Mo, Nb, Nd and Sb

Number	As	Ba	Be	Ce	Co	Cr	Cs	Cu	Ga	Ge	Hf	Hg	La	Ni	Pb	Rb	Sc	Se	Sm	Th	U	V	Zn
SARM 20	4.7	372	2.5	87	8.3	(67)	(2)	18	16	.	4.8	0.25	43	25	26	10	10	0.8	6.3	18	4	47	17
SARM 19	7	304	2.8	56	5.6	50	1.4	13	14	13	5.4	(0.2)	27	16	20	9	7.6	.	4.9	12	5	35	12
SARM 18	.	78	4.1	22	6.7	16	(1)	5.9	(8)	(8)	1.7	(0.04)	10	10.8	(5)	8.1	4.3	.	2.0	3.4	1.5	23	5.5
US CLB-1	(13)	34	.	10	7.0	9.7	.	(10)	(3)	.	.	(0.2)	(5)	18	5.1	5.2	2.0	(2)	.	(1.4)	(0.55)	12	48

CRM COAL

analysis in mass % 50g units analysis in mg/kg

Number	C	Al	Cl	Fe	H	K	N	Na	S	Hg	Mn	V	Zn
SRM 2684c	(76.82)	(0.8730)	(0.0975)	.	(5.17)	(0.0981)	(1.395)	(0.0606)	3.027	0.0688	(20.51)	(16.3)	.
SRM 1635a *	(68.97)	0.5437	(0.0051)	0.2472	3.92	0.01874	(0.946)	0.1031	(0.294)	0.0836	6.69	13.34	7.3
SRM 1632e *	(76)	0.960	(0.0963)	1.42	(4.97)	0.1248	(1.4)	0.0374	2.738	0.1351	(18.4)	(29.2)	13.0

analysis in mg/kg * SRM 1632d, 1632e and 1635a also detail many other elements, see certificate

Number	As	Ba	Br	Cd	Ce	Co	Cr	Cu	F	Ni	Pb	Rb	Sb	Se	Sr	Th	Ti	U
SRM 2684c	.	.	(11.1)	Ca:(3220)		.	.	.	(64)	Mg:(494)	.	.	.	(1.08)	.	.	.	.
SRM 1635a *	0.860	357.8	(1)	0.282	5.45	2.004	3.56	11.42	(63)	5.37	2.85	1.226	0.251	0.662	160	1.299	254	0.4792
SRM 1632e *	(8.55)	(62.8)	(11.9)	.	(12.24)	(3.622)	(16.57)	(5.70)	.	(11.08)	.	8.49	(0.428)	(1.525)	84.1	.	519	(0.636)

CRM COAL

analysis lited in mass % except * which is mg/kg powder 50 g

Number	Al%	Ca%	Cd*	Co*	Cr*	Cu*	Fe%	K%	Mg%	Mn%	Na%	Ni*	P%	Pb%	Si%	Ti%	V*	Zn%
NCS FC28127	3.47	1.88	2	9	23	23	1.02	0.29	0.28	0.019	0.052	16	0.010	.	5.61	0.18	60	0.0040
NCS FC28125	2.27	0.28	(<1)	11	5	17	0.24	0.090	0.050	0.0009	0.048	18	0.013	0.0016	2.69	0.090	33	.
NCS FC28123	1.88	0.74	(<1)	4	10	12	0.35	0.026	0.081	0.0030	0.11	8	0.066	0.0016	1.86	0.096	12	(0.001)
NCS FC28124	1.75	0.79	(<1)	4	7	12	0.34	0.020	0.071	0.0016	0.13	8	0.044	0.0016	1.77	0.079	11	.
NCS FC28128	1.22	0.19		4	8	12	0.86	0.043	0.059	0.0026	0.026	8	0.0044	.	1.64	0.059	28	(<0.001)
NCS FC28126	0.83	0.65	(<1)	3	5	8	0.32	0.010	0.060	0.008	0.034	5	0.019	.	1.01	0.046	11	.
NCS FC28122	0.25	0.85	.	8	2	2	1.79	0.016	0.24	0.022	0.081	8	0.0029	0.002	0.47	0.010	1	.

CRM COAL

analysis listed in mass %

Number	Al_2O_3	C	Fe_2O_3	H	N	P_2O_5	S	SO_3	SiO_2	TiO_2	Units
NM 151	26.09	52.71	6.86	3.30	1.13	0.91	0.64	0.32	59.45	1.70	50 g

CRM COAL

BCR: 40 g units GBW: 50 g units

Number	As mg/kg	P mass %	Cl mass %	F mg/kg
GBW 11115	15	0.031	.	.
GBW 11116	34	0.007	.	.
GBW 11117	51	0.092	.	.
GBW 11118	.	.	0.010	.
GBW 11119	.	.	0.057	.
GBW 11120	.	.	0.110	.
GBW 11121	.	.	.	248
GBW 11122	.	.	.	864
GBW 11123	.	.	.	1496
BCR 460	.	.	(0.0059)	225

CRM COAL AIR DRIED vs. HEATED DRIED ANALYSIS

20 g powder

Number	Heat J/g	Volatile Matter%	Ash%	Moisture%	S%	Expiry
NCS FC62002a	24190, 24980	4.29, 4.43	23.90, 24.68	3.15 (air dried)	0.36, 0.37	August 2019
NCS FC62001c	22840, 25680	28.37, 31.90	11.30, 12.71	11.06 (air dried)	0.63, 0.71	May 2018 H: (3.32%)

CRM FUSIBILITY OF COAL ASH

analysis listed in ‘C MRed = Mildly Reducing, Oxi = Oxidizing, SRed = Strongly Reducing

Atmosphere Number	Initial Deformation MRed	Oxi	SRed	Softening MRed	Oxi	SRed	Hemishpering MRed	Oxi	SRed	Fluid MRed	Oxi	SRed	Units
NCS FS91001d	1057,	1176,	1208	1072,	1202,	1253	1098,	1236,	1328	1148,	1320,	1401	30 g
NCS FS28001	1161,	1211,	.	1190,	1230,	.	1198,	1239,	.	1204,	1252,	.	5 g
NCS FS28002	1217,	1356,	.	1340,	1408,	.	1357,	1420,	.	1369,	1445,	.	5 g
NCS FS28003	1285,	1314,	.	1314,	1345,	.	1322,	1360,	.	1340,	1381,	.	5 g

COAL ASH

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

#	Number	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Mn	Na_2O	P_2O_5	SO_3	TiO_2	V_2O_5	Units	Other
2	COCO ASH 015	55.67	31.44	2.42	3.99	0.65	0.74	MnO2: 0.036	0.13	0.37	1.89	1.78	.	20 g	
2	COCO ASH 013	54.89	32.44	2.16	4.43	0.84	0.54	MnO2: 0.041	0.06	0.33	2.05	1.82	.	20 g	
1	NCS FC28154	53.17	32.02	2.28	6.47	1.37	0.90	MnO: 0.035	0.41	0.19	0.78	1.34	0.027	5 g	
2	COCO ASH 014	52.29	31.67	2.53	6.46	0.85	0.51	MnO2: 0.050	0.07	0.44	2.73	1.86	.	20 g	
2	COCOASHSRM017	51.24	33.96	2.90	4.34	0.55	0.41	MnO2: 0.044	0.11	2.31	0.99	1.70	.	20 g	
1	JCFA-1 *	50.56	24.25	8.91	4.22	1.27	2.12	MnO: 0.068	2.24	0.586	.	1.31	.	100 g	
2	COCO ASH 016	50.18	29.05	6.35	5.82	0.93	1.39	MnO2: 0.061	0.21	0.57	3.23	1.56	.	20 g	
1	NCS FC28148	48.03	35.80	3.27	2.81	0.90	0.69	MnO: 0.0073	0.54	0.25	.	1.25	0.049	5 g	
1	NCS FC28150	47.64	26.03	10.44	5.79	1.41	1.87	MnO: 0.097	0.28	0.091	.	1.21	0.042	5 g	
1	NCS FC28151	43.42	28.53	3.33	15.18	0.64	1.21	MnO: 0.042	0.43	0.12	.	1.22	0.062	5 g	
1	NCS FC28146	37.86	33.71	9.90	4.74	0.30	1.27	MnO: 0.037	1.45	1.44	.	1.52	0.020	5 g	
1	NCS FC28147	37.52	32.78	10.97	4.81	0.24	1.17	MnO: 0.020	1.75	1.00	.	1.31	0.019	5 g	
1	NCS FC28149	35.54	25.92	14.92	7.56	0.20	1.63	MnO: 0.17	0.75	0.72	.	1.26	0.032	5 g	
1	NCS FC28145	15.66	7.34	18.37	39.61	0.30	6.05	MnO: 0.44	1.69	0.10	.	0.26	0.0042	5 g	

* JCFA-1 also contains (in mg/kg) Be: 4.06, Co: 37.4, Cr: 75, Cs: 8.6, Cu: 122, Li: 91, Ni: 32.2, Pb: 47.2, Rb: 54.1, S: 1960, Sb: 2.1, V: 243, and Zn: 63.
* JCFA-1 also contains (in mass %): FeO: 0.88, TFe2O3: 5.2, C: 1.35, H_2O-: 0.18, H_2O+: 0.37, Sr: 0.110

CRM COAL ASH

analysis listed in mass % 100 g units

Number	Al_2O_3	Ba	CaO	CO_2	Org.C	FeO	T.Fe_2O_3	H_2O	H_2O+	K_2O	MgO	MnO	Na_2O	P_2O_5	S	SO_3	SiO_2	TiO_2	LOI
VS 7177-95	27.07	0.028	4.88	.	.	1.59	5.48	(0.13)	.	0.59	1.48	0.059	0.14	(0.064)	.	(0.018)	58.68	0.60	(0.56)
VS 9237-2008	9.7	0.86	43.8	(2.9)	.	(0.3)	5.1	.	.	0.36	5.5	0.22	0.67	(0.024)	3.48	.	15.6	0.59	8.5
VS 7125-94	6.79	0.225	20.91	13.20	(1.33)	0.40	6.28	(2.41)	(5.74)	0.51	6.70	0.094	0.22	0.059	0.17	(0.40)	35.80	0.35	(21.29)

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

Number	Ag	As	Au	B%	Be	Bi	Ce	Co	Cr	Cs	Cu	Dy	Er	Eu	F%	Ga	Gd	Ge	Hf	Hg	Ho	La
VS 7177-95	(0.15)	.	.	(0.044)	11	(2.1)	138	25	99	(3.3)	176	.	.	(2.6)	(0.017)	(21)	.	(2.7)	(13)	.	.	70
VS 9237-2008	(0.2)	(8.0)	.	.	2.9	.	37	26	42	(1.2)	51	(2.7)	(1.4)	(0.8)	.	15	(3.3)	(6)	3.3	(0.1)	(14)	20
VS 7125-94	0.16	(1.0)	(0.003)	0.0097	2.9	.	38	16	45	(1.1)	45	(3.8)	(2.4)	0.9	(0.0230)	9	(4.2)	2.3	2.6	(0.03)	(0.87)	20

Number	Li	Lu	Mo	Nb	Nd	Ni	Pb	Pr	Rb	Sb	Sc	Sm	Sn	Sr%	Ta	Tb	Th	Tl	Tm	U	V	W	Y	Yb	Zn	Zr%
VS 7177-95	96	.	7.4	34	.	66	35	.	22	.	27	(15)	11	0.0403	.	.	(45)	.	.	(15)	145	(3.7)	87	7.8	77	0.033
VS 9237-2008	(9)	0.26	(3.0)	7.8	17	68	22	(4.2)	13	3.0	8.6	3.2	(3.2)	0.83	(0.61)	0.45	7.0	(0.4)	(0.25)	3.1	63	.	15	1.5	76	0.013
VS 7125-94	32	0.40	1.4	8.4	20	49	13	(4.3)	15	.	11	4.1	2.7	0.33	(0.53)	0.68	5.8	.	(0.38)	3.3	61	(1.1)	29	2.6	65	0.0119

CRM COAL ASH

Number	Ash%	C%	S%	Units
CZ SFA-01-14	96.60	3.10	0.029	50 g

CRM COAL WASTE ROCK

analysis listed in mass % 50 g units

Number	Al	Ca	Fe	K	Mg	Mn	Na	P	Si	Ti	V
NCS FC28152	10.76	0.34	2.57	1.27	0.53	0.023	0.15	0.026	20.59	0.44	0.012

CRM ASH OF COAL WASTE ROCK

analysis in mass % 5 g units

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SiO_2	TiO_2	V_2O_5
NCS FC28153	27.71	0.65	5.01	2.09	1.20	0.041	0.27	0.082	60.03	1.01	0.028

CRM COAL FLY ASH

analysis listed in mass %

Number	As	Al	Ba	Ca	Fe	K	Mg	Mn	Na	Ni	P	S	Si	Ti	Zn	LOI
SRM 2689	(0.0200)	12.94	(0.0800)	2.18	9.32	2.20	0.61	(0.0300)	0.25	(0.0122)	0.10	.	24.06	0.75	(0.0240)	(1.76)
SRM 1633c	0.01862	13.28	0.1126	1.365	10.49	1.773	0.498	0.02402	0.1707	0.0132	(0.192)	(0.110)	(21.30)	0.724	(0.0235)	.
IRNT 12-1-02 *	0.00739	16.1	0.1090	1.49	5.17	0.651	0.581	0.0441	0.361	0.0105	.	.	22.9	3.61	0.0221	.
BCR 176R	0.0054	.	(0.4650)	.	1.3100	.	.	(0.0730)	(3.4800)	0.0117	.	.	.	.	1.6800	.
IRNT 12-1-03 *	0.00505	14.7	0.0731	1.86	5.59	1.36	0.788	0.0383	0.303	0.0117	.	.	25.0	1.36	0.0248	.
BCR 038	0.00480	.	.	.	3.3800	.	.	0.0479	3.740	(0.0194)	.	.	.	.	0.0581	.
SRM 2691	(0.0030)	9.81	(0.5900)	18.45	4.42	0.34	3.12	(0.0200)	1.09	(0.0053)	0.51	0.83	16.83	0.90	(0.0120)	(0.23)
SRM 2690	(0.0026)	12.35	(0.5800)	5.71	3.57	1.04	1.53	(0.0300)	0.24	(0.0046)	0.52	0.15	25.85	0.52	(0.0120)	(0.53)

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

Number	Ag	Au	B	Be	Br	Cd	Ce	Co	Cr	Cs	Cu	Eu	F	Hf	Hg	La
SRM 2689	.	.	.	(21)	.	(3)	.	(48)	(170)	(11)	.	(3)	.	(7)	(<0.003)	.
SRM 1633c	.	.	.	(16)	.	0.758	(180)	42.9	(258)	(9.39)	173.7	(4.67)	.	.	1.005	(87.0)
IRNT 12-1-02 *	.	.	.	.	.	.	322	52.4	189	20.1	231	4.99	.	.	.	164
BCR 176R	(33.1)	(0.604)	.	.	(836)	226	(47.7)	26.7	810	(8.27)	1050	(0.868)	.	(4.85)	(1.60)	(30.2)
IRNT 12-1-03 *	.	.	.	.	.	.	183	48.6	191	.	155	.	.	.	.	84.4
BCR 038	.	.	.	.	.	4.6	.	53.8	(178)	.	176	.	.	.	.	.
SRM 2691	.	.	.	(8)	.	(0.9)	.	(26)	(68)	(1)	.	(2)	.	(10)	(<0.003)	.
SRM 2690	.	.	.	(8)	.	(0.7)	.	(19)	(67)	(8)	.	(2)	.	(8)	(<0.003)	.

Number	Pb	Rb	Sb	Sc	Se	Sr	Ta	Th	Tl	U	V	W	Yb	Units
SRM 2689	(52)	.	(9)	(32)	(7)	(700)	.	(25)	.	.	.	.	.	3 x 10 g
SRM 1633c	95.2	117.42	8.56	(37.6)	(13.9)	901	(1.58)	(23.0)	.	(9.25)	286.2	.	(7.7)	75 g
IRNT 12-1-02 *	40.8	69.0	.	.	.	583	.	23.9	.	.	558	.	.	50 g
BCR 176R	5000	(102)	850	(2.91)	18.3	.	(2.02)	(5.28)	1.32	.	(35)	(28.3)	.	40 g
IRNT 12-1-03 *	66.9	141	.	29.2	.	407	.	22.1	.	.	381	.	.	50 g
BCR 038	262	.	.	.	.	.	.	.	.	.	.	.	.	5 to 6 g
SRM 2691	(29)	.	(3)	(24)	(17)	(2700)	.	(26)	.	.	.	.	.	3 x 10 g
SRM 2690	(39)	.	(6)	(17)	(0.8)	(2000)	.	(25)	.	.	.	.	.	3 x 10 g

* IRNT certificates expired, however use and sales continue without problems worldwide

COAL FLY ASH

analysis listed in mass %

ACIRS: RM, 80g SABS: CRM, 20g NCS: CRM. 30g

Number	Al_2O_3	BaO	CaO	Fe_2O_3	K_2O	MgO	Mn_3O_4	Na_2O	P_2O_5	SiO_2	SO_3	SrO	TiO_2	Units	REDUCING, OXIDIZING TEMMPERATURES ‘C Deformation	Spherical	Hemishperical	Flow
SABS 109	37.96	.	2.84	2.54	1.19	1.19	.	2.07	0.31	45.66	2.57	.	1.97	20 g	.	.	.	.
NCS FC82012a	29.45	.	8.73	7.95	1.16	1.03	.	0.79	0.28	46.99	0.69	.	1.28	30 g	.	.	.	.
ACIRS A1 *	28.9	0.18	6.05	14.6	0.46	1.25	0.22	0.43	1.26	44.1	0.32	0.16	1.56	80 g	1257, 1349	1287, 1383	1309, 1398	1367, 1429
NCS FC82013a	28.54	.	5.30	13.43	1.61	0.71	.	0.25	0.11	41.11	5.10	.	2.62	30 g	.	.	.	.
NCS FC82014a	28.09	.	5.15	6.04	1.44	1.05	.	0.52	0.38	54.68	0.49	.	1.14	30 g	.	.	.	.
NCS FC82015a	22.90	.	4.01	6.55	1.53	1.31	.	0.78	0.55	59.66	0.40	.	1.13	30 g	.	.	.	.

* ACIRS A1 also contains Co:(0.0043) Cr:(0.0058) Cu:(0.0099) Ni:(0.0047) Pb:(0.0047) V:(0.0176) Zn:(0.0090)

INDUSTRIAL FLY ASH

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

Number	Al	As	Ca	Cd	Cr	Hg*	Na	Ni	Pb	Cu	Fe	K	Sb	V	Zn	ZnO
ECRM 882-1	0.375	0.0054	10.11	0.0183	0.490	0.75	0.697	0.0263	1.324	0.218	22.20	0.960	0.0116	0.0090	.	28.49
JK 43	(0.2)	.	(12)	0.0023	(8)	3.9	(0.5)	(2)	0.21	(0.2)	(20)	(0.3)	.	(0.02)	4.96	.
JK 44	(0.2)	.	(5)	0.0469	(0.2)	2.8	(1)	(0.02)	2.74	(0.2)	(27)	(1.3)	.	(0.02)	27.3	.
JK 45	(0.1)	.	(7)	0.0047	(0.3)	0.25	(7)	(0.05)	0.11	(0.01)	(40)	(0.4)	.	(0.1)	1.53	.
502-843-1000	.	.	.	.	.	0.827	.	.	.	.	.	.	.	.	.	.

Number	Bi	C	Cl	F	Mg	Mn	S	Si	Sn	Units, Class
ECRM 882-1	0.0026	(1.0)	(2.35)	(0.07)	(0.48)	(2)	(0.5)	(1.05)	(0.02)	100 g, CRM
JK 43	.	.	.	.	.	.	.	.	.	15 g, CRM
JK 44	.	.	.	.	.	.	.	.	.	25 g, CRM
JK 45	.	.	.	.	.	.	.	.	.	15 g, CRM
502-843-1000	.	42.4	.	.	.	.	0.29	.	.	20 g, RM

RM COAL-TAR PITCH

analysis listed in mg/kg except as noted — 60 g units

Number	%C	S%	%H	Ash	Al	As	Br	Ca	Cd	Cl	Cr	Fe	I	K	Mg	Mn	Na	Ni	P	Pb
DOMTAR CTP A	94.0	0.49	4.0	0.27	245	.	1.7	91	.	118	0.87	200	0.33	43	17	2.7	257	2.5	10	91
DOMTAR CTP B	93.4	0.52	4.3	0.22	228	9	4.8	41	2.5	122	1.1	280	0.6	34	<30	3.3	150	.	3	80
DOMTAR CTP C	83.4	4.46	10.31	0.19	9	0.18	0.25	3	<0.05	18	0.4	14	1.4	2.2	<16	0.21	10	76	236	1

continued — informational values listed in mg/kg except as noted

Number	Sb	Si	Sn	Ti	V	Zn	Soft Point ‘C
DOMTAR CTP A	.	358	.	18	1.2	88	115
DOMTAR CTP B	0.57	408	3.7	16	0.89	90	118
DOMTAR CTP C	0.03	20	<0.7	19	170	1	129

CRM COATING THICKNESS

Number	nominal µm coating thickness			
SRM 1361b	6	12	25	48
SRM 1358b	20	80	255	1000
SRM 1362b	40	80	140	205
SRM 1359b	48	140	505	800
SRM 1363b	255	385	505	635
SRM 1364b	800	1000	1525	1935

These samples are designed for calibrating thickness gauges using magnetic principles. Each sample is a set of four 45 mm x 45 mm plates of coated 1010 sheet steel substrate coated with copper and a thin protective layer of chromium.

CONTINUOUS CASTING POWDER

analysis listed in mass % — IRSID: RM, 100 g units NCS: CRM, 50 g units

Number	SiO_2	Al_2O_3	C	C.Free	CO_2	Ca	F	Fe	K	MgO	Mn	Na	Na_2O	P	S	TiO_2	LOI
NCS HC26805	41.31	6.93	3.06	1.57	.	21.46	(4.79)	.	.	3.26	.	.	4.07	.	.	.	.
NCS HC26804	34.95	5.30	15.86	14.49	.	19.13	(5.15)	.	.	0.78	.	.	4.99	.	.	.	.
IRSID 2701	32.70	6.10	3.37	(1.78)	(5.59)	22.90	7.58	(0.145)	0.159	2.19	.	9.42	.	(0.014)	(0.055)	(0.048)	(2.08)
NCS HC26803	30.10	2.14	5.98	4.06	.	30.78	(10.59)	.	.	1.30	.	.	0.52	.	.	.	.
IRSID 2702	28.70	12.60	16.54	15.80	(2.53)	17.80	6.08	1.260	(0.750)	(1.47)	0.071	3.61	.	(0.180)	(0.490)	0.564	(1.26)
NCS HC26802	23.08	14.14	12.71	9.94	.	17.93	(3.86)	.	.	5.86	.	.	2.94	.	.	.	.
NCS HC26801	18.96	16.99	19.97	18.14	.	12.89	(4.47)	.	.	1.39	.	.	9.86	.	.	.	.

RM CONTINUOUS CASTING POWDER

typical analysis listed in mass % — 100 g units

Number	SiO_2	Al_2O_3	Ca	F	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	S	SrO	TiO_2	Other
DH X2802	57.50	3.09	25.15	0.074	0.488	0.830	0.981	0.030	1.097	0.060	0.132	0.020	0.055	ZnO: 0.004
DH X2801	55.0	3.58	23.08	0.047	0.467	1.092	4.80	0.033	1.33	0.044	0.245	0.019	0.069	BaO: 0.019
DH 3005	43.10	5.14	27.35	6.23	0.233	0.376	0.39	0.007	7.93	0.091	0.019	.	0.086	
DH 3010	38.56	5.05	27.06	.	2.63	0.155	4.13	0.059	5.479	0.454	0.131	.	0.055	
DH 3013	37.70	5.95	30.73	5.72	0.437	0.288	1.93	0.045	6.43	0.047	0.077	.	0.064	BaO: 0.121

RM COVER POWDER

analysis listed in mass % — 100 g units

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Mn_3O_4	Na_2O	P_2O_5	S	SiO_2	SrO	TiO_2
DH 5905	19.32	46.50	0.435	0.321	9.17	0.051	.	0.039	0.074	22.93	.	0.035
DH 5906	14.34	33.29	0.598	0.210	19.38	0.052	0.32	0.037	0.061	30.78	0.015	0.037

COKE

= class, where 1 = CRM and 2 = RM i = individually certified

#	Number		S	Heat	Vol.Matter	Ash	C	H	N	Sp.Gravity	Moisture	Units
1	SRM 2718a	Green Petroleum	4.690	(35,000) J/g	.	(1)	(90)	(3.725)	(1)	.	.	50 g
1	NCS FC28015		1.69	.	2.11	7.04	.	.	.	.	.	75 g
1	NCS FC28014		1.55	.	3.47	27.15	.	.	.	.	.	75 g
1	VS R18/4		1.34	.	.	12.45	.	.	.	.	.	70 g
1	NCS FC28134		1.19	29,040 J/g	1.95	12.70	.	.	.	.	.	50 g
1	NCS FC28133		1.00	29,180 J/g	1.79	12.30	.	.	.	.	.	50 g
1	SRM 2719	Calcined Petroleum	0.8877	(32,900) J/g	(0.54)	(0.12)	(97.06)	(0.16)	(1.17)	.	.	50 g
1	NCS FC28118a		0.87	29,100 J/g	2.05	12.01	.	.	.	.	.	50 g
1	SRM 2776	Furnace	0.825	.	(0.98)	(8.06)	(89.15)	(0.26)	(1.21)	.	.	50 g
2	COCO SRM003	Metallurgical	0.81	.	1.04	13.16	.	.	.	.	.	100 g
1	NCS FC28119a		0.80	28,150 J/g	1.39	14.87	.	.	.	.	.	50 g
2	COCO SRM007	Metallurgical	0.76	.	1.40	11.74	.	.	.	.	.	100 g
1	NCS FC28121		0.75	28,760 J/g	1.14	13.29	.	.	.	.	.	50 g
1	**502-683-17167**	Metallurgical	0.749	(12,566) BTU	1.4	9.40	88.88	(0.17)	1.00	.	.	50 g
1	**502-683-18234**	Metallurgical	0.721	(12,471) BTU	1.3	9.85	88.5	(0.18)	1.00	.	.	50 g
1	NCS FC28120a		0.68	28,540 J/g	1.48	13.51	.	.	.	.	.	50 g
1	NCS FC59001		0.63	.	1.39	7.22	.	.	.	.	.	60 g
1	NCS FC28117a		0.60	28,190 J/g	1.62	15.15	.	.	.	.	.	50 g
1	SRM 2775	Foundry	0.5816	.	(1.31)	(5.77)	(91.34)	(0.41)	(1.16)	.	.	50 g
1	NCS FC28132a		0.50	29,160 J/g	1.40	12.26	.	.	.	.	.	50 g
1	NCS FC59002		0.47	.	1.5	12.62	.	.	.	.	.	60 g
1	CZ SF-05-14		0.45	30,410 J/g	1.28	7.84	90.40	0.20	0.98	13,074 BTU/lb		50 g
2	COCO SRM004	Metallurgical	0.44	.	1.17	11.56	.	.	.	.	.	100 g
2	COCO SRM001	Metallurgical	0.40	.	1.45	11.58	.	.	.	.	.	100 g
2	COCO SRM008	Metallurgical	0.39	.	1.38	11.47	.	.	.	.	.	100 g
2	COCO SRM005	Metallurgical	0.38	.	1.41	11.36	.	.	.	.	.	100 g
2	COCO SRM006	Metallurgical	0.39	.	1.06	11.40	.	.	.	.	.	100 g
1	ASCRM 014		0.314	28,260 J/g	1.04	12.23	85.65	0.32	0.82	1.87	.	250 g
2	COCO SRM002	Metallurgical	0.20	.	1.31	9.53	.	.	.	.	.	100 g

Number	Al	Fixed C	Ca	Co	Fe	K_2O	Na	Na_2O	Ni	P	Si	V	
SRM 2718a	(0.00154)	.	(0.01655)	(0.000571)	0.0287	.	0.00830	.	(0.01446)	.	(0.0050)	0.0310	
NCS FC28015	.	.	.	.	.	.	.	.	.	.	.	.	
NCS FC28014	.	.	.	.	.	.	.	.	.	.	.	.	
VS R18/4	.	.	.	.	.	0.128	.	0.051	.	0.037	.	.	
NCS FC28134	.	.	.	.	.	.	.	.	.	0.024	.	.	
NCS FC28133	.	.	.	.	.	.	.	.	.	0.024	.	.	
SRM 2719	0.00589	.	0.00577	(0.00186)	0.02016	.	(0.00151)	.	0.0204	.	(0.01380)	0.00586	
NCS FC28118a	.	.	.	.	.	.	.	.	.	0.022	.	.	
SRM 2776	.	.	.	.	.	.	.	.	.	.	.	.	
COCO SRM003	.	.	.	.	.	.	.	.	.	0.030	.	.	
NCS FC28119a	.	.	.	.	.	.	.	.	.	0.015	.	.	
COCO SRM007	.	.	.	.	.	.	.	.	.	0.023	.	.	
NCS FC28121	.	.	.	.	.	.	.	.	.	.	.	.	
502-683-17167	.	(89.2)	.	.	.	.	.	.	.	.	clearance sale		**17025**
502-683-18234	.	(88.8)	.	.	.	.	.	.	.	.	.		**17025**
NCS FC28120a	.	.	.	.	.	.	.	.	.	0.022	.	.	
NCS FC59001	.	.	.	.	.	.	.	.	.	.	.	.	
NCS FC28117a	.	.	.	.	.	.	.	.	.	.	.	.	
SRM 2775	.	.	.	.	.	.	.	.	.	.	.	.	
NCS FC28132a	.	.	.	.	.	.	.	.	.	0.030	.	.	
NCS FC59002	.	.	.	.	.	.	.	.	.	.	.	.	
CZ SF-05-14	.	.	.	.	.	.	.	.	.	.	.	.	
COCO SRM004	.	.	.	.	.	.	.	.	.	0.019	.	.	
COCO SRM001	.	.	.	.	.	.	.	.	.	0.020	.	.	
COCO SRM008	.	.	.	.	.	.	.	.	.	0.019	.	.	
COCO SRM005	.	.	.	.	.	.	.	.	.	0.017	.	.	
COCO SRM006	.	.	.	.	.	.	.	.	.	0.016	.	.	
ASCRM 014	.	.	.	.	.	.	.	.	.	0.09	.	.	
COCO SRM002	.	.	.	.	.	.	.	.	.	0.013	.	.	

CRM COKE

analysis listed in mass % unless otherwise noted 50 g units

Number	S	P	Heat J/g	Vol.Matter	ASH	Al_2O_3	As	CaO	Cl	Cr	Cu
NCS FC28023	1.45	0.018	27,550	2.24	16.20	5.27	0.00024	0.57	0.022	0.0021	0.0018
NCS FC28027	0.89	0.026	28,120	1.65	14.83	.	.	.	.	.	.
NCS FC28022	0.81	0.018	29,100	1.68	11.90	3.98	0.0002	0.55	0.049	0.0022	0.002
NCS FC28026	0.79	0.031	28,950	1.36	12.18	.	.	.	.	.	.
NCS FC28020	0.76	0.037	28,260	1.78	14.42	4.95	0.00014	0.52	0.020	0.0022	0.0027
NCS FC28019a	0.67	0.027	28,950	1.42	11.62	4.08	0.00012	0.45	0.026	0.0017	0.0019
NCS FC28025	0.62	0.021	29,320	1.45	11.50	.	.	.	.	.	.
NCS FC28024	0.41	0.041	28,170	1.98	15.43	.	.	.	.	.	.

Number	Fe_2O_3	K_2O	MgO	MnO	Na_2O	Ni	Pb	SiO_2	SrO	TiO_2	V
NCS FC28023	0.90	0.11	0.099	0.0044	0.067	0.0010	0.0008	8.15	0.0084	0.20	0.0037
NCS FC28027	.	.	.	.	.	.	.	.	.	.	.
NCS FC28022	0.63	0.069	0.16	0.013	0.084	0.0008	0.0008	5.63	0.011	0.18	0.0032
NCS FC28026	.	.	.	.	.	.	.	.	.	.	.
NCS FC28020	1.22	0.079	0.15	0.0052	0.05	0.0008	0.0011	6.52	0.017	0.22	0.0038
NCS FC28019a	0.58	0.057	(0.10)	0.0055	0.078	0.0009	0.0007	5.48	0.0095	0.18	0.0028
NCS FC28025	.	.	.	.	.	.	.	.	.	.	.
NCS FC28024	.	.	.	.	.	.	.	.	.	.	.

CRM COKE

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

Number	Al%	Ca%	Cd*	Co*	Cr*	Cu*	Fe%	K%	Mg%	Mn%	Na%	Ni*	P%	Pb*	Si%	Ti%	V*	Zn*
NCS FC28131	2.72	0.29	<1	7	11	16	0.51	0.094	0.046	0.008	0.050	13	0.015	.	3.22	0.12	27	18
NCS FC28129	2.34	0.60	.	7	15	21	0.75	0.093	0.11	0.021	0.13	15	0.020	14	2.97	0.12	41	11
NCS FC28130	1.96	0.52	<1	6	12	17	0.63	0.061	0.11	0.015	0.063	12	0.022	.	2.35	0.099	34	11

COKE ASH

analysis lised in mass %

Number	Al_2O_3	CaO	Co_3O_4	Fe	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SO_3	SiO_2	SrO	TiO_2	V_2O_5	LOI
NCS FC28137	35.62	2.82	.	.	5.02	0.78	0.53	0.070	0.47	0.24	.	47.81	.	1.38	0.033	.
NCS FC28136	30.66	6.00	.	.	7.51	0.61	1.50	0.16	0.70	0.41	.	41.61	.	1.37	0.050	.
NCS FC28135	29.95	5.67	.	.	7.23	0.76	1.25	0.18	1.18	0.31	.	42.87	.	1.41	0.049	.
DH 3713	26.33	4.16	0.011	.	8.57	4.120	2.94	0.172	0.568	0.215	S:0.228	49.74	0.056	1.095	0.060	.
DH 3711	13.79	11.60	0.007	7.79	.	3.29	8.69	0.189	3.08	0.607	0.091	43.5	0.103	2.78	0.058	0.52

Number	C.tot	CO_2	Cr_2O_3	CuO	NiO	ZnO	ZrO_2	Units	
NCS FC28137	.	.	.	.	.	.	.	CRM, 5 g	
NCS FC28136	.	.	.	.	.	.	.	CRM, 5 g	
NCS FC28135	.	.	.	.	.	.	.	CRM, 5 g	
DH 3713	.	.	0.046	0.037	0.026	0.232	0.028	RM, 100 g	BaO: 0.170 PbO: 0.209
DH 3711	0.039	0.045	0.036	0.009	0.030	0.010	0.041	RM, 100 g	

CRM DUST

Number	Type	Al	Al_2O_3	As	C	CaO	Co	Cr	Cr_2O_3	Cu	CuO	F	Fe	FeO	K
VS E5	Blast Furnace	.	2.87	.	13	7.9	0.013	.	0.085	.	0.013	0.049	44.3	.	.
VS E4	Blast Furnace	.	2.33	0.0018	13.2	8.8	.	.	.	.	0.034	0.023	44.6	.	.
VS E2	Converter	(0.07)	.	(0.002)	1.383	7.97	(0.003)	(0.1)	.	(0.04)	.	(0.5)	56.4	6.2	(0.2)
VS E1	Electric Furnace	.	3.06	(0.004)	0.684	5.85	(0.03)	.	20.3	(0.1)	.	(0.7)	29.7	(21)	(0.1)

Number	MgO	MnO	Na	Ni	NiO	P	Pb	S	SiO_2	Sn	TiO_2	V	V_2O_5	Zn	Units
VS E5	2.26	0.5	.	.	0.022	0.041	.	0.26	7.17	.	1.63	.	0.39	0.27	150 g
VS E4	0.82	0.47	.	.	.	0.033	0.015	0.44	7.46	.	0.2	.	0.041	1.52	150 g
VS E2	1.64	1.41	(0.1)	(0.03)	.	0.065	0.276	0.116	1.76	(<0.0005)	.	(0.01)	.	0.59	100 g
VS E1	9.3	1.56	(0.1)	.	3.68	(0.02)	(0.05)	0.072	10.3	(<0.0005)	2.79	(0.04)	.	(0.2)	150 g

RM DUST

typical analysis listed in mass % * samples list Cu as CuO and Ni as NiO DH 6203-6205: 20 g all others: 100 g

Number	Type	Al_2O_3	C	CO_2	CaO	Cl	Cr_2O_3	CuO	K_2O	MgO	Na_2O	P_2O_5	PbO	SiO_2	TiO_2	ZnO
DH X2901	Blast Furnace	0.961	.	.	5.28	.	0.038	.	0.778	1.147	0.119	0.153	0.006	4.28	0.068	0.267
DH X2902	Blast Furnace	0.823	.	.	3.12	.	0.037	.	0.84	0.678	0.138	0.165	0.017	3.28	0.053	0.271
DH X2903	Blast Furnace	0.701	.	.	2.00	.	0.040	0.006	0.705	0.502	0.111	0.158	0.018	2.44	0.058	1.19
DH 6205	Cupola	1.30	6.80	3.84	4.91	2.88	0.041	0.163	3.68	1.85	2.26	0.147	2.43	34.52	0.060	21.01
DH 6204 *	Cupola	1.06	8.08	2.02	2.54	3.62	0.072	0.079	4.16	1.53	2.63	0.051	3.48	26.94	0.184	30.65
DH 6206 *	Cupola	0.220	2.57	.	0.090	.	0.048	2.021	0.086	0.020	0.085	0.191	.	0.430	0.014	91.1
DH 6203	Electric Furnace	2.57	4.22	1.01	1.23	2.00	0.004	0.311	2.51	3.10	5.12	0.52	1.05	15.65	0.517	12.32

continued

Number	F	Fe	Fe_2O_3	Mn	Mn_3O_4	MoO_3	NiO	S	SO_3	SnO_2	V_2O_5	$-H_2O$
DH X2901	.	59.37	.	0.367	.	.	0.015	0.488	.	.	0.020	. .
DH X2902	.	61.67	.	0.341	.	.	0.016	0.577	1.44	.	.	.
DH X2903	.	63.01	.	0.425	.	.	0.012	0.392	.	.	0.020	. .
DH 6205	0.096	.	9.49	.	2.57	0.013	.	.	2.70	0.018	0.019	0.107 at 900'C
DH 6204 *	0.247	6.29	.	0.97	.	.	0.0162	1.09	.	.	.	0.055 at 500'C
DH 6206 *	.	.	0.572	0.04	0.061	.	0.297	0.305	.	0.047	.	1.17 at 900'C
DH 6203	0.570	.	36.85	.	4.97	.	.	.	5.29	.	0.004	0.214 at 900'C

analysis for DH 6204 continues in mg/kg

Number	Cd	Li	Mo	Sr	V
DH 6204	197	0.4	510	5.4	2.92

CRM FLUE DUST

informational analysis listed in mass % — 30 g units

Number	Type	Al_2O_3	CO_2	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	SO_3	SiO_2	TiO_2
BL 12-1-11	Sinter Plant	4.00	8.60	6.77	3.18	1.23	2.22	0.03	4.11	1.15	65.58	0.23
BL 12-1-10	Foundry	1.64	5.39	12.80	60.95	0.28	7.59	0.16	0.15	2.22	9.80	0.075

continued certified analysis listed in mg/kg

Number	Ag	As	Ba	Cd	Co	Cr	Cu	Mo	Ni	Pb	Sb	Sn	Sr	V	Zn
BL 12-1-11	.	(8)	160	(3)	8	3910	27	(10)	36	(25)	.	(43)	(58)	56	50
BL 12-1-10	(1)	(8)	(150)	5	31	189	76	(4)	47	56	(3)	(40)	(50)	(33)	86

CRM FURNACE DUST

analysis listed in mass % — 100 g units

Number	Ag	Al	As	Bi	C	Ca	Cd	Cl	Co	Cr	Cu	F	Fe	H_2O	Hg
ECRM 876-1	.	0.034	0.023	.	.	3.43	.	.	.	0.17	0.42	.	24.85	.	.
ECRM 880-1	.	1.28	.	.	.	3.15	.	0.085	.	0.027	0.005	0.034	31.0	.	.
ECRM 884-1	0.0028	0.379	0.0054	0.0280	(0.82)	5.22	0.0045	0.991	0.0046	1.86	0.1569	0.411	31.67	(0.30)	(0.0002)

continued

Number	K	Mg	Mn	Mo	Na	Ni	P	Pb	S	Si	Sn	Ti	V	Zn	LOI
ECRM 876-1	1.63	1.31	2.84	.	1.98	0.034	0.128	.	0.87	1.72	.	0.048	.	23.29	.
ECRM 880-1	0.108	0.714	0.218	.	0.041	0.014	0.038	0.017	0.425	3.34	.	0.081	.	0.064	.
ECRM 884-1	0.979	1.848	5.85	0.208	0.585	0.197	0.079	0.442	(0.49)	2.100	0.0186	0.0230	0.0303	17.50	(2.94)

CRM INDOOR DUST

analysis listed in mg/kg — 8 g units

Number	As	Cd	Cr	Hg	Pb
SRM 2584	17.4	10.0	135.0	5.20	9761
SRM 2583	7.0	7.3	80	1.56	85.9

CRM ROAD DUST

analysis listed in mg/kg except * which is µg/kg

Number	Pd*	Pt*	Rh*	Cd	Co	Hf	Mo	Rb	Sb	Th	V	Y	Units
BCR 723	6.1	81.3	12.8	(2.5)	(29.8)	(2.2)	(40.0)	(75)	(28.2)	(4.8)	(74.9)	(12.5)	25 g

continued analysis listed in mass %

Number	Al	Ba	Cr	Fe	Mn	Ni	Pb	Sr	Ti	Zn	Moisture
BCR 723	(3.75)	(0.046)	(0.0440)	(3.29)	(0.128)	(0.0171)	(0.0866)	(0.0254)	(0.258)	(0.166)	(~3%)

CRM USED AUTOMOBILE EXHAUST CATALYST

mg/kg

Number	Pb	+/-	Pd	+/-	Pt	+/-	Rh	+/-	Units
SRM 2557	13931	97	233.2	1.9	1131	11	135.1	1.9	70 g
SRM 2556	6228	49	326.0	1.6	697.4	2.3	512	0.5	70 g
FLX CRM132	.	.	1673	43	1770	18	295	6	30 g
ERM-EB504a	.	.	1596	11	1414	9	210.0	2.2	200 g
FLX CRM133	.	.	1075	33	465	32	242	4	30 g

RM ELECTRODE CARBON

Number	Size Analysis	Ash	Bulk Density	Relative Density	Moisture	Volatile Matter	Units
ACIRS EC	<1% @ +212 ìm	2.8%	1028 g/L	2.08	0.2%	0.8%	1 kg

ELECTRONIC SCRAP POWDER

analysis listed in mass % — 200 g units

Number	Ag	As	Au	Be	Cd	Cr	Cu	Hg	In	Ni	Pb	Pd	Pt	Sn
BAM M505a	0.0633	0.0372	0.00524	0.00068	0.00164	0.980	16.76	(<0.0005)	(0.0043)	0.694	1.13	0.00480	0.00057	0.468

FERROBORON

= class, where 1 = CRM and 2 = RM typical analysis

#	Number	B	Al	C	Cr	Cu	Fe	Mn	Ni	P	S	Si	Sn	Ti	V	W	Zn	Units
1	VS F21/2	20.91	1.546	0.047	.	0.012	.	.	.	0.0119	.	0.73	0.0055	.	.	.	0.0055	100 g
1	NCS HC11612	20.82	0.018	0.086	.	.	.	0.305	.	0.020	0.0018	0.353	.	.	.	.	.	70 g
1	NCS HC25658	20.58	0.99	0.022	.	.	.	.	.	0.017	0.0016	1.68	.	.	.	.	.	50 g
2	DH 1705	20.23	0.085	0.62	0.925	0.072	75.71	0.416	0.097	0.061	.	1.011	.	0.025	0.006	0.127	.	50 g
1	NCS HC28632	19.33	0.185	0.19	0.26	0.050	.	0.575	0.056	0.027	0.0020	0.65	.	0.030	0.010	.	.	50 g
2	DH 1704	19.13	0.064	0.322	0.038	0.013	79.74	0.299	0.012	0.015	.	0.229	.	0.011	.	0.015	.	50 g
1	NCS HC28631	18.92	0.036	0.40	0.025	0.015	.	0.310	0.013	0.025	0.0023	0.18	.	0.017	0.0090	.	.	50 g
1	NCS HC93623	18.69	0.083	0.45	.	.	.	.	.	0.025	0.0044	0.44	.	0.019	.	.	.	50 g
1	ECRM 587-1	18.67	0.047	0.738	0.104	.	.	0.272	.	0.020	.	0.129	.	0.039	0.004	.	.	100 g
1	NCS HC11613	17.65	0.035	0.181	.	.	.	0.35	.	0.030	0.0023	0.549	.	.	.	.	.	70 g
1	VS F22/3	8.95	7.78	0.161	.	3.43	.	.	.	0.021	0.018	7.82	.	.	.	.	.	100 g

FERROCHROMIUM

= class, where 1 = CRM and 2 = RM — chips as noted — all others: powder

#	Number	Cr	Al	C	Co	Cu	Fe	Mn	N	Ni	P	S	Si	Ti	V	Units
1	IRSID 509-1	72.85	.	0.012	.	.	.	.	0.029	.	(0.019)	.	0.230	.	.	100 g
1	ECRM 580-1	72.18	.	0.019	0.047	.	.	.	0.035	.	0.011	.	0.306	.	0.083	100 g
1	VS F11/4	71.41	.	0.119	.	.	27.20	0.161	0.035	0.362	0.023	0.0021	0.68	.	0.084	100 g
2	DH 1602	71.20	0.017	8.12	Nb:0.006	.	19.38	0.103	W:0.038	0.304	0.014	Mg:0.049	0.153	0.009	0.102	50 g
1	IPT 65	71.2	9.2	0.051	0.016	.	17.9	0.128	.	0.077	0.006	0.016	0.71	.	.	100 g
1	BCS 203/6	71.01	.	0.0270	0.0442	.	.	0.153	.	0.218	0.0195	0.004	0.381	.	0.0729	100 g
1	SRM 196	70.83	.	0.035	.	.	.	.	.	.	0.020	0.003	0.373	.	.	100 g
1	IRSID 507-1	70.30	.	5.40	.	.	.	0.270	0.049	.	0.017	.	1.20	.	.	100 g
1	VS F47	69.8	.	8.80	.	.	.	.	0.020	.	0.025	0.036	0.103	.	.	100 g
2	DFS 1	69.8	.	0.0549	.	H:(0.0024)	.	O:(0.56)	0.0973	.	(0.027)	(0.0017)	(0.87)	.	.	50 g
2	DFS 2	69.6	.	9.03	.	.	.	O:(0.2)	(0.0178)	.	(0.021)	(0.0174)	(0.2)	.	.	50 g
1	JSS 733-1	69.24	.	8.35	.	.	.	.	.	.	0.0219	0.0248	(0.262)	.	.	150 g
1	NCS HC37618	69.12	.	8.44	.	.	.	.	.	.	0.026	0.026	0.30	.	.	50 g
1	VS F45	69.0	0.041	0.071	.	.	.	.	0.082	.	0.027	0.0024	1.10	.	.	100 g
1	VS F35/2	68.9	.	0.79	.	.	28.16	.	0.185	.	0.027	0.0022	0.181	.	.	100 g chips
1	BCS 204/6	68.77	.	8.57	0.0359	.	.	0.225	.	0.289	0.0164	0.0190	0.715	0.0565	0.094	100 g
1	NCS HC93604	68.13	.	0.038	.	.	.	0.103	.	0.260	0.022	0.015	0.466	0.016	.	50 g
1	VS F15/2	68.1	0.30	0.080	.	.	.	.	1.79	.	0.036	0.0019	2.08	.	.	100 g chips
1	SRM 64c	68.00	.	4.68	0.051	0.005	24.98	0.16	0.045	0.43	0.020	0.067	1.22	0.002	0.15	100 g
1	NCS HC26607b	65.86	.	7.23	.	.	.	0.38	.	0.29	0.017	0.020	2.18	0.15	.	50 g
1	NCS HC25603b	65.27	.	7.37	0.044	.	24.90	0.31	.	0.39	0.020	0.015	1.27	0.104	0.138	50 g
1	NCS HC37607	64.32	.	0.086	.	.	.	0.35	.	.	0.034	0.005	1.39	.	.	40 g chips
1	VS F50	64.3	0.168	0.079	.	.	.	.	11.2	.	0.0048	0.0058	1.29	.	.	100 g
2	DFS 3	64.2	.	(0.068)	.	.	.	O:(3)	9.71	.	(0.023)	(0.016)	(0.54)	.	.	50 or 100 g
1	NCS HC11606	64.17	.	6.37	.	.	.	0.32	.	.	0.023	0.013	4.29	.	.	100 g
1	NCS HC37608	64.06	.	0.243	.	.	.	0.34	.	.	0.039	0.019	0.99	.	.	40 g chips
1	NCS HC37615	63.50	.	8.78	.	.	.	.	.	.	0.023	0.025	0.78	0.097	.	50 g
1	NCS HC25635a	63.44	.	0.218	.	.	.	0.44	.	.	0.035	0.0033	1.07	.	0.093	50 g chips
1	NCS HC25651	63.31	.	2.55	.	.	.	0.47	.	.	0.023	0.047	2.04	.	.	50 g
1	NM 230	62.89	.	7.86	.	.	.	0.31	.	.	0.035	0.037	3.46	.	.	100 g
1	NCS HC25636a	62.81	.	0.078	0.16	0.032	35.56	0.39	.	0.34	0.028	0.0052	0.32	.	0.098	50 g chips
1	NCS HC25644	62.57	.	0.0064	.	.	.	.	8.69	.	0.024	0.029	0.75	.	.	50 g
1	NCS HC28621	62.54	.	7.78	.	.	27.09	0.307	.	.	0.026	0.033	1.45	0.166	0.138	50 g
1	NCS HC25653	62.49	.	8.70	.	.	.	0.11	.	.	0.025	0.024	0.15	0.016	.	50 g
1	NCS HC37609	61.54	.	8.49	.	.	.	0.20	.	.	0.024	0.015	2.15	0.24	.	40 g
1	NCS HC93611	60.42	.	8.13	.	.	.	0.21	.	.	0.022	0.059	0.92	.	.	50 g
1	NCS HC28622	60.00	.	7.72	.	.	28.65	0.340	.	.	0.025	0.033	2.43	0.261	0.153	50 g
1	NCS HC93605	59.71	.	8.00	.	.	.	0.308	.	0.312	0.037	0.037	2.94	0.410	.	50 g
1	NCS HC37617	59.35	.	8.32	.	.	.	.	.	.	0.021	0.040	1.91	.	.	50 g
1	NCS HC11610	58.83	.	0.040	.	.	.	0.313	4.76	.	0.020	0.042	0.525	.	.	70 g
1	NCS HC28630	58.65	.	0.45	Ca:0.0012	0.020	.	0.35	As:0.0027	0.242	0.030	0.0015	1.43	Zn:0.010	0.154	50 g
1	NCS HC93609	58.28	.	8.36	.	.	.	0.207	.	.	0.023	0.068	1.15	.	.	50 g
1	NCS HC14615a	57.44	.	8.00	.	.	31.46	0.24	.	0.23	0.017	0.015	1.96	.	0.28	50 g
1	NCS HC28619	56.76	.	7.28	.	.	30.22	0.300	.	.	0.024	0.024	4.25	0.412	0.203	50 g
1	NCS HC14615	56.16	.	8.07	.	.	.	0.23	.	.	0.017	0.045	2.30	.	.	50 g
1	NCS HC14614	55.81	.	7.67	.	.	.	0.28	.	.	0.018	0.032	2.57	.	.	50 g
1	NCS HC28620	55.77	.	7.60	.	.	31.41	0.382	.	.	0.022	0.031	3.95	0.423	0.175	50 g
1	NCS HC14613	54.04	.	7.56	.	.	.	0.18	.	.	0.020	0.032	2.58	.	.	50 g
1	BS 130/2	52.6	.	7.70	.	(0.012)	.	0.44	.	.	0.015	0.045	2.12	(0.18)	(0.36)	100 g
1	**BS 130/1**	51.6	.	7.12	.	(0.015)	.	1.25	.	Mo:(0.005)	0.014	0.034	4.41	(0.38)	(0.32)	100 g **17025**
1	**BS 130/3**	49.01	.	6.47	.	(0.01)	.	0.76	.	Mo:(0.003)	0.015	0.028	6.20	(0.41)	(0.38)	100 g **17025**
1	SARM 144	49	.	.	.	.	36.9	0.33	.	0.21	.	.	5.31	0.67	0.37	100 g
1	VS F38	.	.	4.62	.	.	.	.	.	.	.	.	.	.	.	100 g last
1	VS F12/3	.	.	0.289	.	.	.	.	.	.	.	.	.	.	.	100 g chips
1	VS F10/2	.	.	0.018	.	.	.	.	.	.	.	.	.	.	.	100 g chips
1	VS F9/2	.	.	0.012	0.042	.	.	.	.	.	.	.	.	.	.	100 g chips

#	Number	Cr	Al	C	Co	Cu	Fe	Mn	N	Ni	P	S	Si	Ti	V	Units

FERROMANGANESE

= class, where 1 = CRM and 2 = RM analysis in mass % DH: 50 g NCS: 50-100 g IPT: 120 g JSS, MHCX: 150 g others: 100 g

#	Number	Mn	Fe	Si	C	P	S	As	Ca	Co	Cr	Cu	Ni	Pb	Ti	V	Zn	Other
1	VS F5/3	95.9	2.73	1.25	0.079	0.062	0.0095	.	.	.	.	0.0055	.	.	.	.	.	
1	NCS HC15606	92.92	6.64	0.47	0.047	0.020	0.012	.	.	.	.	.	.	.	.	.	.	
2	DH 1207	88.00	8.780	1.113	1.630	0.081	.	.	.	0.038	0.060	0.016	0.022	.	.	0.026	0.009	
1	MHCX01	87.5	7.32	1.13	1.34	0.25	0.0040	.	.	.	0.16	0.11	0.06	.	0.009	.	.	Al: 0.006
1	VS F29/3	87.5	2.26	.	0.146	0.055	0.031	.	.	.	.	.	.	.	.	.	.	N: 4.63
1	ECRM 583-1	86.42	.	0.396	0.333	0.146	(0.007)	.	.	.	.	.	.	.	.	.	.	
1	NCS HC15605	85.95	13.83	0.19	0.056	0.030	0.011	.	.	.	.	.	.	.	.	.	.	
1	NM 331	85.48	.	1.74	0.115	0.129	.	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629	84.28	.	0.62	0.300	0.196	0.0016	.	.	.	.	.	.	.	.	.	.	
1	NCS HC41601 *	83.35	13.48	0.948	0.86	0.180	(0.003)	0.048	.	0.145	0.335	0.107	0.080	0.068	.	(0.03)	0.12	* see below
1	NCS HC28629	82.61	16.47	0.475	0.296	0.080	0.0022	0.017	0.0012	.	0.033	0.127	0.032	0.126	.	0.041	0.011	
1	NCS HC15607	82.59	16.59	0.73	0.135	0.033	0.0074	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25619a	81.95	.	0.75	1.18	0.163	0.0018	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25619b	81.74	.	0.75	1.20	0.163	0.0018	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629a	81.68	.	1.06	0.310	0.196	0.0022	.	.	.	.	.	.	.	.	.	.	
1	NCS HC37614	81.11	.	1.71	0.939	0.130	.	.	.	.	.	.	.	.	.	0.075	.	
1	NM 332	80.8	.	1.14	6.82	0.19	.	.	.	.	.	.	.	.	.	.	.	
1	IRSID 503-1	80.8	.	0.865	0.700	0.069	(0.009)	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629b	80.79	.	0.96	0.560	0.169	0.0024	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25620	80.48	.	0.94	1.50	0.153	0.0030	.	.	.	.	.	.	.	.	.	.	
1	IPT 54	80.4	15.9	1.74	1.20	0.22	0.003	.	.	.	0.043	0.059	0.14	.	.	.	.	
2	DH 1206	80.24	15.91	0.350	1.482	0.229	.	0.158	.	0.167	0.105	0.088	0.140	.	.	0.072	.	Mo: 0.028
1	SRM 68c	80.04	12.3	0.225	6.72	0.19	0.008	0.021	.	.	0.074	.	.	.	.	.	.	
1	VS F7/4	79.8	12.75	0.269	6.8	0.372	0.0037	.	.	.	.	.	.	.	.	.	.	
1	MHCX02	79.7	8.76	4.71	5.04	0.50	0.0033	.	.	.	0.08	0.05	0.08	.	0.065	.	.	Al: 0.032
1	NCS HC25621	79.44	.	1.51	1.40	0.344	0.0029	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25632	78.42	.	0.69	6.68	0.204	0.009	.	.	.	.	.	.	.	.	.	.	
2	DH 1216	78.30	17.03	.	1.44	0.123	.	0.003	.	0.019	0.071	0.005	0.047	.	.	0.019	0.007	
1	ECRM 502-2	77.87	.	.	6.94	0.148	.	.	.	.	0.0265	0.0370	0.0384	0.0179	0.0034	.	.	
1	BCS 208/3	77.91	.	0.603	6.834	0.137	0.006	.	.	.	.	.	.	.	.	.	.	
1	NCS HC28628	76.55	17.86	1.84	1.84	0.265	0.017	0.055	0.0036	.	0.124	0.152	0.132	1.30	0.0065	0.100	0.0017	
1	JSS 701-6	74.4	.	(0.03)	6.94	0.112	(0.002)	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25642	74.02	.	1.70	1.14	0.183	0.0065	.	.	.	.	.	.	.	.	.	.	N: 4.92
1	NCS HC11602	73.88	18.14	0.43	6.72	0.152	0.005	.	.	.	.	0.080	.	.	.	.	.	
1	NCS HC28626	66.44	26.62	0.073	6.26	0.268	0.0014	0.015	0.0054	.	0.032	0.072	0.109	0.106	0.0035	0.133	0.026	
1	NCS HC28627	66.27	26.60	0.208	6.23	0.428	0.0023	0.025	0.0040	.	0.026	0.070	0.087	0.077	0.027	0.110	0.022	
1	NCS HC28625	65.98	26.42	0.525	6.14	0.805	0.0034	0.047	0.0006	.	0.014	0.065	0.032	0.0092	0.081	0.055	0.0082	
1	NCS HC37611	65.75	.	0.64	6.57	0.382	0.0090	.	.		.	.	.	.	.	.	.	

#	Number	Mn	Fe	Si	C	P	S	As	Ca	Co	Cr	Cu	Ni	Pb	Ti	V	Zn	Other

* NCS HC41601 is 150g chips and also contains N:(0.018), O:(0.12), Sb: 0.015 and Sn: 0.0019

FERROMOLYBDENUM

= class, where 1 = CRM and 2 = RM

#	Number	Mo	Fe	Si	C	Cr	Cu	Mn	N	Ni	O	P	S	W	Units
2	DH 2010	78.09	20.66	0.161	0.026	0.032	0.464	0.010	.	0.111	.	0.016	0.092	.	50 g
1	ECRM 578-1	72.23	.	0.208	0.016	.	0.136	.	.	.	.	0.024	0.065	.	100 g
1	NCS HC26610a	64.84	.	0.10	0.021	.	0.33	.	.	.	.	0.044	0.077	0.011	50 g
1	NCS HC25602a	62.19	.	0.20	0.020	.	0.159	.	.	.	.	0.031	0.042	.	50 g
1	NCS HC26610b	61.85	.	1.54	0.042	.	0.29	.	.	.	.	0.036	0.059	0.060	50 g
1	NCS HC37603	61.41	.	0.30	0.054	.	0.126	.	.	.	.	0.046	0.071	.	50 g
1	NCS HC19608	61.20	.	0.32	0.042	.	0.134	.	.	.	.	0.032	0.073	.	50 g
1	NCS HC28624	61.00	37.22	0.367	0.019	0.052	1.07	0.039	.	0.144	.	0.044	0.078	0.047	50 g
1	VS F17/4	59.2	.	0.54	0.081	.	0.52	.	.	.	.	0.032	0.066	0.021	100 g
1	NCS HC19609	58.13	.	(0.039)	0.039	.	0.36	.	.	.	.	0.041	0.085	.	50 g
1	NCS HC37604	57.65	.	0.71	0.044	.	0.117	.	.	.	.	0.046	0.069	.	50 g
1	NM 232	56.66	.	0.86	0.11	.	.	.	.	.	.	0.040	0.048	.	100 g
1	NCS HC93606	56.12	.	0.190	0.073	.	0.494	.	.	Sb:0.0036	.	0.037	0.044	.	50 g

#	Number	Al	As	Bi	Co	Pb	Sb	Sn	V	Zn
	DH 2010	0.008	.	.	0.018	.	.	.	.	.
	ECRM 578-1	.	.	.	.	.	.	.	.	.
	NCS HC26610a	.	0.015	.	.	(0.002)	(0.01)	(0.002)	.	.
	NCS HC25602a	.	.	.	.	.	.	.	.	.
	NCS HC26610b	.	0.008	.	.	.	(0.002)	(0.008)	.	.
	NCS HC37603	.	.	.	.	.	.	.	.	.
	NCS HC19608	.	.	.	.	.	.	.	.	.
	NCS HC28624	.	0.0078	.	.	0.0022	0.0059	0.0026	.	.
	VS F17/4	.	0.0011	0.00056	.	0.0029	0.0039	0.0023	.	0.0064
	NCS HC19609	.	.	.	.	.	.	.	.	.
	NCS HC37604	.	.	.	.	.	.	.	.	.
	NM 232	.	.	.	.	.	.	.	.	.
	NCS HC93606	.	.	.	.	.	.	.	.	.

CRM FERRONICKEL

Number	Ni	N	C	Co	Cr	Cu	Fe	Mn	P	S	Si	Units
VS F41	91.4	0.058	0.0124	2.04	.	0.47	5.68	.	.	0.132	.	100 g
NCS HC11617	16.45	.	1.85	0.241	1.87	0.021	.	0.041	0.037	0.213	3.11	60 g
NCS HC11616	13.34	.	2.12	0.247	1.98	0.022	.	0.051	0.039	0.283	3.25	60 g
NCS HC25656	12.16	.	3.06	.	3.62	.	.	.	0.046	0.245	1.04	50 g
NCS HC11618	10.70	.	1.65	0.198	1.56	0.021	.	0.053	0.032	0.211	2.54	60 g

FERRONIOBIUM

= class, where 1 = CRM and 2 = RM * notes the total of Nb+Ta

#	Number	Nb	Fe	Si	Al	C	Cr	Cu	Mn	P	Pb	Sn	Ta	Ti	V	W	Zr
1	NCS HC25650	66.34	.	1.01	0.89	0.074	.	0.023	.	0.085	.	.	(0.081)	0.49	.	.	.
1	NCS HC18606	66.24	.	1.09	1.35	0.070	.	.	0.29	0.159	.	.	0.084	0.78	.	.	.
1	NCS HC11609	64.89	.	1.34	0.711	0.114	.	0.059	0.37	0.172	.	.	0.087	0.870	.	.	.
1	NCS HC93607	64.60	.	1.04	1.50	0.101	.	0.038	.	0.194	.	.	0.097	0.585	.	.	.
1	VS F20/3	63.5*	33.3	0.67	0.35	0.136	.	.	.	0.039	.	0.0014	63.5*	0.292	.	.	.
1	ECRM 579-1	62.87	.	1.03	1.86	0.037	.	.	.	0.064	.	0.344	3.85	0.567	.	.	.
2	DH 2815	60.15	28.77	1.580	4.82	0.043	0.028	0.209	0.842	0.065	0.140	1.38	0.856	0.185	0.013	0.064	0.105
1	ECRM 576-1	43.90	.	1.79	2.53	0.201	.	.	.	.	.	0.195	0.306	1.32	.	.	.

Number	Co	Mg	Mo	N	Ni	S	Units
NCS HC25650	.	.	.	.	.	0.028	50 g
NCS HC18606	.	.	.	.	.	0.008	50 g
NCS HC11609	.	.	.	.	.	0.014	70 g
NCS HC93607	.	.	.	.	.	0.013	50 g
VS F20/3	0.0056	.	.	0.067	.	0.0091	100 g
ECRM 579-1	0.005	.	.	.	.	0.021	100 g
DH 2815	.	0.076	0.020	.	0.019	0.056	50 g
ECRM 576-1	.	.	.	.	.	.	100 g

FERROPHOSPHORUS

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

#	Number	P	Fe	Al	C	Ca	Cr	Cu	Mn	Nb	Ni	S	Si	Ti	V	Units
1	NCS HC93622	27.50	.	.	0.228	.	0.226	.	0.70	.	.	0.017	0.156	0.53	.	50 g
1	SRM 90	26.2	.	.	.	.	.	.	.	.	.	.	.	.	.	75 g
1	NCS HC11614	25.81	.	.	0.032	.	.	.	0.638	.	.	0.0038	0.60	2.14	.	70 g
2	DH 2204	25.69	69.2	0.056	0.043	0.681	0.077	0.214	0.964	0.038	0.047	0.023	1.238	0.836	0.150	50 g
1	NCS HC11615	21.49	.	.	0.130	.	.	.	1.07	.	.	0.061	0.382	0.62	.	70 g
1	VS F28/2	16.05	.	.	.	.	.	.	1.20	.	.	0.021	1.11	.	.	100 g

FERROTITANIUM

= Class, where 1 = CRM and 2 = RM

#	Number	Ti	Al	Sol.Al	C	Co	Cr	Cu	Fe	Mn	P	S	Si	V	Zr
2	DH 2409	72.74	2.93	.	.	.	0.384	0.074	19.27	0.192	0.004	.	0.180	1.167	0.383
1	VS F30/4	70.3	3.83	.	0.154	.	0.154	0.065	21.51	0.189	0.0030	0.0054	0.163	2.29	0.231
1	NCS HC15601	70.02	0.3	.	0.057	.	0.039	0.037	26.57	0.106	0.0071	0.0047	1.47	0.011	.
1	NCS HC19604	43.81	10.64	.	0.041	.	.	.	.	1.59	0.051	0.011	3.46	0.158	.
1	NCS HC19605	38.81	8.61	.	0.032	.	.	0.025	.	0.81	0.032	0.009	4.20	0.303	.
1	ECRM 584-1	37.17	7.19	(6.0)	0.044	.	.	.	.	1.13	0.032	0.030	1.80	.	.
1	NCS HC93608	32.22	3.00	.	0.095	.	.	0.281	.	0.255	0.014	0.015	0.30	.	.
1	VS F43	31.9	11.11	.	0.098	.	0.354	0.336	.	1.22	0.038	0.0058	2.50	0.152	0.059
1	NCS HC26613	30.24	8.13	.	0.019	.	.	(0.005)	.	1.11	0.020	0.012	1.84	0.19	.
1	NCS HC18604	27.93	5.38	.	0.065	.	.	0.117	.	2.67	0.043	0.013	4.68	.	.
1	NCS HC28638	27.34	7.82	.	0.033	.	0.055	.	.	0.362	0.015	0.0048	4.51	0.15	.
1	VS F42	27.13	11.41	.	0.55	.	2.22	1.32	.	1.1	0.05	0.023	6.74	.	.
1	IRSID 510-1	26.95	(4.9)	.	0.058	.	.	.	.	.	(0.035)	.	4.65	.	.
1	NM 341	24.91	5.54	.	.	.	.	.	.	.	.	.	2.55	.	.
1	**BS FeTi-1**	20.0	12.5	.	0.57	(0.03)	0.33	0.60	.	7.7	(0.05)	(0.009)	2.8	0.69	3.7
1	**BS FeTi-2**	19.6	12.6	.	0.455	0.037	0.30	0.43	.	7.9	(0.05)	(0.01)	3.2	0.76	3.8

Number	B	Ca	Mg	Mo	N	Nb	Ni	Pb	Sn	W	Zr	Units	
DH 2409	.	.	0.070	0.814	.	0.072	0.047	.	0.246	.	.	50 g	
VS F30/4	.	.	.	0.60	0.38	.	0.053	.	0.077	.	.	100 g	
NCS HC15601	.	.	.	0.028	.	.	0.29	.	.	.	.	50 g	
NCS HC19604	.	.	.	.	.	.	.	.	0.056	.	.	100 g	
NCS HC19605	.	.	.	.	.	.	.	.	0.061	.	.	100 g	
ECRM 584-1	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC96308	.	.	.	.	.	.	.	.	.	.	.	50 g	
VS F43	.	.	.	0.0036	0.085	.	.	.	0.013	.	0.032	100 g	
NCS HC26613	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC18604	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC28638	.	.	.	.	.	.	.	.	.	.	.	50 g	
VS F42	.	.	.	0.106	.	.	.	.	.	0.33	0.129	100 g	
IRSID 510-1	.	.	.	.	.	.	.	.	.	.	.	100 g	
NM 341	.	.	.	.	.	.	.	.	.	.	.	100 g	
BS FeTi-1	0.60	1.14	(0.4)	0.058	0.144	(0.05)	0.17	.	0.11	.	(0.03)	100g	**17025**
BS FeTi-2	1.10	0.98	(0.4)	0.15	(0.15)	0.036	0.156	.	0.160	.	(0.03)	100g	**17025**

CRM FERROTUNGSTEN

Number	W	Si	Al(tot)	As	C	Cu	Fe	Mn	Mo	P	Pb	S	Sb	Sn	Units
ECRM 555-1	79.9	1.75	0.14	.	0.025	.	(15.2)	.	.	(0.02)	.	(0.018)	.	0.034	100 g
ECRM 590-1	79.55	1.05	(0.36)	.	0.0250	0.0484	.	0.136	0.101	.	.	.	.	0.045	100 g
NCS HC25606a	76.24	0.34	.	0.041	0.036	0.079	.	0.102	.	0.033	.	0.052	.	0.041	50 g
VS F48	71.0	0.47	0.64	0.037	0.074	0.096	.	0.695	0.047	0.035	0.0048	0.211	0.014	0.031	100 g

FERROVANADIUM

= Class, where 1 = CRM and 2 = RM

#	Number	V	Fe	Si	Al	C	Cr	Cu	Mg	Mn	Mo	N	Ni	P	S
1	NCS HC93629	80.90	.	0.86	1.33	0.032	.	.	.	0.046	.	.	.	0.036	0.014
2	DH 2510	80.85	14.25	0.894	0.783	0.120	0.201	0.038	0.010	1.154	0.029	.	0.009	0.051	0.016
1	VS F40	80.1	.	1.31	2.12	0.096	0.185	0.81	.	1.49	.	.	.	0.022	0.014
1	NCS HC11608	79.27	.	0.653	1.41	0.109	.	0.0089	.	0.106	.	.	0.010	0.021	0.035
1	NCS HC28633	54.02	.	0.682	0.0026	0.285	0.110	0.054	.	0.663	.	.	0.011	0.056	0.0044
1	NCS HC26608c	53.78	.	0.81	(0.0025)	0.17	0.71	.	.	2.00	.	.	.	0.043	0.0040
1	NM 351	52.10	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS HC19606	51.14	.	0.68	0.084	0.565	0.32	.	.	0.43	.	.	.	0.087	0.010
1	NCS HC26608b	50.57	.	0.84	(0.002)	0.22	0.70	.	.	1.64	.	.	.	0.051	0.0044
1	NCS HC93628	50.24	.	0.730	6.10	0.130	.	.	.	0.474	.	.	.	0.042	0.016
1	ECRM 577-1	50.16	.	1.79	0.414	0.089	.	0.054	.	0.158	.	.	0.053	0.035	0.034
1	NCS HC93628a	50.09	.	0.730	6.03	0.152	.	.	.	0.475	.	.	.	0.043	0.017
1	NCS HC37616	49.72	.	0.50	5.18	0.081	.	.	.	0.58	.	.	.	0.016	0.012
1	NCS HC11607	49.40	.	1.67	.	0.235	.	0.022	.	0.321	.	.	.	0.121	0.010
1	NCS HC18608	48.93	.	0.76	0.158	0.40	.	.	.	0.26	.	.	.	0.049	0.043
1	NCS HC28634	47.32	.	1.89	0.0061	0.475	0.289	0.064	.	0.365	.	.	0.067	0.093	0.014
1	**BS FeV 45**	45.1	33.7	4.90	0.017	0.241	5.82	0.40	0.014	4.12	0.0079	0.26	4.32	(0.13)	0.334
1	VS F19/3	42.6	.	1.47	(0.005)	0.418	1.21	0.204	.	3.30	.	.	.	0.059	0.0102
1	**BS FeV 42**	42.2	39.2	3.77	(0.05)	0.297	5.18	0.31	0.059	3.37	0.023	0.19	3.87	0.127	0.31
1	VS F32/3	40.2	(40)	(1.2)	(<0.05)	(0.4)	.	(0.2)	.	3.14	.	7.51	.	(0.05)	(0.008)

Number	As	Ca	O	Pb	Ti	Units	
NCS HC93629	.	.	.	.	.	25 g	
DH 2510	.	.	.	.	0.071	50 g	Co: 0.008 Nb: 0.013 W: 0.025
VS F40	.	.	.	.	.	100 g	
NCS HC11608	0.0024	.	.	.	.	70 g	
NCS HC28633	0.0017	0.022	.	0.0006	.	50 g	
NCS HC26608c	.	.	.	.	Zn:(0.004)	50 g	
NM 351	.	.	.	.	.	100 g	
NCS HC19606	.	.	.	.	.	50 g	
NCS HC26608b	.	.	.	.	Zn:(0.0024)	50 g	
NCS HC93628	.	.	.	.	.	30 g	
ECRM 577-1	.	.	.	.	.	100 g	
NCS HC93628a	.	.	.	.	.	30 g	
NCS HC37616	.	.	.	.	.	50 g	
NCS HC11607	0.021	.	.	.	.	70 g	
NCS HC18608	.	.	.	.	.	50 g	
NCS HC28634	0.024	0.115	.	0.0004	.	50 g	
BS FeV 45	(0.013)	0.010	.	.	0.021	100 g	**17025, 34**
VS F19/3	0.0009	.	.	.	.	100 g	
BS FeV 42	(0.01)	(0.052)	.	.	0.033	100 g	**17025, 34**
VS F32/3	(<0.001)	.	.	.	.	100 g	

CRM RARE EARTH FERROSILICON

* VS F31/2 lists Rare Earth Oxides

Number	RE	Si	Fe	Ca	Mg	Mn	Ti	Al	C	Ce	Cu	La	Units	
VS F31/3 *	39.0	39.6	16.26	1.76	0.320	.	.	7.60	0.032	15.65	0.51	.	100 g	
NCS HC39602	21.20	37.18	22.18	1.98	10.56	3.43	1.92	.	.	.	.	.	100 g	last
NCS HC39601	20.09	40.31	20.81	3.21	9.50	2.72	1.50	.	.	.	.	.	100 g	
NCS HC28615	20.00	41.02	.	5.60	.	0.390	0.235	.	.	.	.	.	100 g	
NCS HC28609	8.66	43.90	(31.67)	1.01	10.20	0.70	0.54	.	.	.	.	.	80 g	
NCS HC28612	6.42	43.44	(36.43)	0.90	8.25	0.63	0.435	.	.	.	.	.	80 g	
NCS HC28611	5.10	43.22	(40.7)	0.84	5.70	0.55	0.362	.	.	.	.	.	80 g	
NCS HC28610	3.71	42.05	(43.4)	0.76	5.52	0.46	0.275	.	.	(1.86)	.	(0.88)	80 g	

FERROSILICOALUMINUM, FERROSILICOCALCIUM, FERROSILICOCHROMIUM, and FERROSILICOTITANIUM

= class, where 1 = CRM and 2 = RM

DH, NCS: 50 g units VS: 100 g units

#	Number	Si	Fe	Ca	Cr	Ti	Al	C	Cu	Mg	Mn	Mo	Ni	P	S	V	Zr
2	DH 2902	59.25	24.80	0.220	0.059	11.21	0.613	0.284	0.022	0.234	1.64	0.126	0.043	0.010	0.005	0.154	0.046
2	DH 2901	56.73	26.58	0.200	0.062	12.03	0.597	0.183	0.021	0.210	1.72	0.149	0.044	0.013	0.005	0.161	0.046
1	VS F25/3	51.5	23.06	21.3	.	.	0.67	.	.	.	.	.	.	0.011	0.0056	.	.
2	DH 5403	40.46	20.93	0.028	36.93	0.124	0.579	0.034	0.020	.	0.41	.	0.190	0.022	.	0.074	0.005
1	VS F24/2	49.9	.	.	29.2	.	0.9	0.02	.	.	.	.	.	0.03	0.002	.	.
1	NCS HC93635	27.36	26.23	.	.	.	38.51	1.90	.	.	0.18	.	.	0.072	0.015	.	.
1	NCS HC93636	26.11	.	.	.	.	36.22	0.11	.	.	1.70	.	.	0.021	0.0071	.	.

FERROSILICON

= Class, where 1 = CRM and 2 = RM

#	Number	Si	Fe	Al	C	Ca	Cr	Cu	Mn	Ni	P	S	Ti
1	BAM 529-1	91.11	6.15	0.86	0.10	0.46	.	0.01	0.04	.	0.013	.	0.09
1	DH 2314	78.33	19.89	0.410	0.031	0.094	0.082	0.049	0.190	0.044	0.028	.	0.067
1	VS F3/3	77.7	.	1.96	0.049	0.40	0.095	.	0.122	.	0.025	0.0023	0.121
1	NCS HC14612	77.49	22.12	0.0074	0.016	0.0067	0.0044	0.011	0.020	0.016	0.0074	0.0030	0.011
1	NCS HC25647	77.42	.	0.011	0.0068	0.0030	0.010	.	0.074	.	0.012	0.003	0.043
2	DH 2315	77.17	19.88	1.316	0.042	0.357	0.143	0.042	0.159	0.049	0.023	.	0.086
1	CMSI 1655	76.74	.	1.80	0.081	0.30	0.14	.	0.17	.	0.023	0.004	.
1	NCS HC25627	76.74	.	1.80	0.081	0.30	0.140	.	0.172	.	0.023	0.004	.
1	NCS HC93603	76.53	19.07	1.52	0.095	1.373	0.043	0.025	0.281	0.012	0.019	0.0023	0.085
1	NCS HC25618	76.42	.	0.78	0.066	0.19	0.097	.	0.14	.	0.025	0.003	.
1	NCS HC93617	76.34	19.43	1.75	0.220	1.31	0.027	0.015	0.237	0.0056	0.025	0.0039	0.119
1	DH 2310	75.94	19.42	2.041	0.11	1.019	0.019	0.011	0.139	0.006	0.021	.	0.093
1	NCS HC15602	75.9	23.65	0.011	0.0074	(0.0013)	0.077	0.057	0.149	0.026	0.014	0.0035	0.027
1	JK 39	75.9	21.6	1.45	0.105	0.24	.	0.013	0.165	.	0.018	.	0.116
1	NCS HC93601	75.46	20.23	1.40	0.148	1.15	0.044	0.019	0.588	0.0093	0.021	0.0026	0.097
1	SRM 195	75.3	23.6	0.046	0.034	0.053	0.047	0.047	0.17	0.032	0.017	0.001	0.037
1	NCS HC93602	74.81	20.96	1.28	0.196	0.986	0.052	0.013	1.09	0.0071	0.024	0.0052	0.106
1	VS F4/2	74.1	.	0.076	0.023	(0.03)	0.119	0.073	0.14	0.061	0.024	(0.002)	0.094
1	NCS HC11611	74.03	1.41	0.035	.	0.208	0.063	.	0.25	.	0.020	0.0023	.
1	NCS HC11601a	73.75	.	1.14	0.073	0.34	0.085	0.031	0.26	.	0.023	0.003	.
1	NCS HC93616	73.61	21.06	2.14	0.208	2.05	0.022	0.019	0.237	0.0069	0.023	0.0033	0.121
1	NCS HC37602	73.29	21.37	2.74	.	0.616	.	.	0.14	.	0.022	.	.
1	SRM 58a	73.20	25.23	0.95	0.014	0.30	0.020	0.024	0.16	0.012	0.009	<0.002	0.051
1	NM 31.3	72.8	.	1.48	.	0.62	.	.	0.16	.	0.03	.	.
1	NCS HC18601	72.44	.	2.16	0.19	0.64	0.109	.	0.205	.	0.019	0.010	.
1	NCS HC19602	69.47	23.81	2.45	0.12	2.47	0.077	.	0.308	.	0.027	.	.
1	NCS HC37601	68.91	26.88	2.18	.	.	0.142	.	0.177	.	0.024	.	.
1	YSBC25614-97	67.18	.	1.28	0.071	0.440	0.285	.	0.301	.	0.025	0.0029	.
1	**BS 140/2**	51.9	46.1	(0.63)	0.027	(0.033)	(0.25)	(0.141)	0.53	(0.153)	(0.022)	(0.006)	(0.095)
1	NCS HC25652	51.85	.	.	0.35	.	.	.	.	.	0.014	0.003	0.052
2	DH 2311	50.00	9.06	4.36	8.31	7.84	0.024	0.016	0.080	0.007	0.012	0.048	0.070
1	**BS 140/4**	49.7	47.6	(0.90)	(0.040)	(0.078)	(0.19)	(0.089)	1.01	(0.113)	(0.016)	(0.003)	(0.079)
2	DH 2312	48.30	12.38	3.40	4.96	10.48	0.083	0.020	0.114	0.013	0.011	0.056	0.062
1	SRM 59a	48.10	50.05	0.35	0.046	0.042	0.080	0.052	0.75	0.033	0.016	0.002	.
1	**BS 140/3**	46.9	51.0	(0.59)	(0.044)	(0.095)	(0.18)	(0.091)	0.60	(0.090)	(0.018)	(0.004)	(0.073)
1	**BS 140/1**	45.0	52.9	(0.68)	0.031	(0.040)	(0.25)	(0.134)	0.46	(0.153)	(0.022)	(0.004)	(0.086)
1	IPT 70	44.7	54.1	0.21	0.087	0.16	0.046	0.066	0.283	0.022	0.018	(0.006)	0.018
1	VS F2/4	44.3	.	0.83	0.045	0.032	0.242	.	0.302	.	0.031	0.0024	.
1	VS F1/3	24.5	.	0.74	0.499	.	0.361	.	0.510	.	0.042	0.0027	0.072
1	SARM 33	15.60	80.2	0.62	1.01	.	0.43	0.29	0.75	0.28	0.043	.	.

#	Number	Si	Fe	Al	C	Ca	Cr	Cu	Mn	Ni	P	S	Ti

Number	As	B	Ba	Co	Mg	Mo	N	O	Sn	Sr	V	Zn	Zr	Units	
BAM 529-1	.	.	.	.	0.04	.	.	.	.	.	.	.	.	100 g	
DH 2314	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
VS F3/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC14612	.	0.0022	.	0.0012	.	.	.	.	.	.	.	.	.	60 g	
NCS HC25647	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
DH 2315	.	.	.	.	0.025	.	.	.	.	.	.	.	0.008	50 g	
CMSI 1655	.	.	.	.	.	.	.	.	.	.	.	.	.	70 g	
NCS HC25627	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC93603	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC25618	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC93617	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
DH 2310	.	.	0.042	.	0.029	.	.	.	.	.	.	.	.	50 g	
NCS HC15602	.	.	.	.	.	.	.	.	.	.	0.0036	.	.	50 g	
JK 39	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC93601	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
SRM 195	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.011	75 g	
NCS HC93602	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
VS F4/2	.	.	.	.	.	.	(0.02)	.	.	.	.	0.0013	.	100 g	
NCS HC11611	.	.	.	.	.	.	.	.	.	.	.	.	.	60 g	
NCS HC11601a	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC93616	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
NCS HC37602	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
SRM 58a	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.002	75 g	
NM 31.3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC18601	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC19602	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC37601	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
YSBC25614-97	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
BS 140/2	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	**17025**
NCS HC25652	.	.	.	.	.	.	28.15	.	.	.	.	.	.	chips 50 g	
DH 2311	.	.	.	.	1.153	.	.	.	.	.	.	.	.	50 g	
BS 140/4	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	**17025**
DH 2312	.	.	.	.	0.193	.	.	.	.	.	.	.	.	50 g	
SRM 59a	.	0.058	.	.	.	.	.	.	.	.	.	.	.	50 g	
BS 140/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	**17025**
BS 140/1	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	**17025**
IPT 70	.	.	.	.	0.016	.	.	.	.	.	.	.	.	60 g	
VS F2/4	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
VS F1/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
SARM 33	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	

Number	As	B	Ba	Co	Mg	Mo	N	O	Sn	Sr	V	Zn	Zr	Units

CRM WELDING FLUX

Number	Al_2O_3	C	CaF_2	CaO	Fe	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P	S	SiO_2	TiO_2	Units
VS SH15	35.2	.	15.5	18.4	.	0.72	0.22	0.91	15.88	1.28	0.0066	0.011	15.07	5.65	100 g
VS SH7/3	29.8	.	28.5	24	.	0.56	0.94	11.4	0.4	1.41	0.011	0.031	23.4	.	100 g
VS SH8/4	26.5	0.039	68.6	52.7	0.147	.	.	.	.	.	0.013	0.013	1.77	.	100 g
VS SH6/2	3.00	.	7.71	12.72	.	1.3	.	1.6	38.5	.	0.069	0.0092	39.2	.	125 g

CRM GLASS

BCR: 100x100x10mm (300g) BCS: 25g poweder BGIRA-EC: 75 x 75 x 6mm NCS: 50g powder SGT: 25g pieces SRM: 45g powder SV: 30mm Ø x 4mm

Number	SiO_2	Al_2O_3	B_2O_3	BaO	CaO	Cr_2O_3	Fe_2O_3	K_2O	Li_2O	MgO	Na_2O	PbO	SO_3	TiO_2	ZnO	ZrO_2	LOI	Other
SRM 92	(75.0)	(1.5)	0.70	.	(8.3)	.	.	(0.6)	.	(0.1)	(13.1)	.	.	.	(0.2)	.	(0.42)	R_2O_3=Al_2O_3
SGT G6	73.06	1.70	.	.	9.97	.	0.034T	<0.1	.	<0.1	14.65	.	0.20T	0.02	.	.	.	
SGT G10	72.7	1.62	.	0.02	10.7	0.020	0.325	0.35	.	1.81	12.2	.	0.05	0.097	.	(0.024)	.	
SGT G7	72.64	1.50	.	.	11.03	.	0.044T	0.43	.	0.14	13.90	.	0.19T	0.042	.	.	0.07	
BCS 525	72.55	0.167	.	0.0041	8.91	.	0.0166	0.087	.	4.28	13.43	.	0.284	SrO:0.0038		0.0045	.	Mn_3O_4: 0.0012
BGIRA EC 1.1	71.97	1.08	.	.	8.63	.	0.103	0.59	.	3.78	13.41	.	0.23	0.029	.	.	.	
SGT G11	70.7	1.83	.	0.03	10.3	0.205	0.342	0.69	.	2.14	13.6	.	0.06	0.068	.	(0.015)	.	
SGT G4	69.49	3.02	0.19	.	4.24	.	0.099	0.57	.	<0.05	15.45	.	<0.05	0.041	3.28	.	0.22	F: 4.96
BCR 126A	57.80	0.128	.	1.04	1.033	.	0.0055	10.00	0.495	0.512	3.58	23.98	.	.	1.02	.	.	Sb_2O_3: 0.29
SGT G8	56.34	0.05	0.36	.	<0.02	.	0.010T	11.85	.	<0.02	0.23	30.59	.	0.02	.	.	0.21	As_2O_3: 0.32T
NCS DC61104	53.98	14.50	8.87	.	16.54	.	0.34	0.59	.	4.40	0.096	.	.	0.19	.	.	0.26	F: 0.54

GLASS

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

#	Number	Type	SiO_2	Al_2O_3	B_2O_3	BaO	CaO	CdO	K_2O	MgO	Na_2O	PbO	SO_3	SrO	TiO_2	ZnO
1	SRM 93a	Borosilicate	80.8	2.28	12.56	.	0.01	.	0.014	0.005	3.98	.	.	.	0.014	.
2	JCRM R102	Borosilicate	80.5	2.27	12.7	.	.	.	0.029	.	3.99	.	.	.	0.011	.
1	SRM 1831	Soda-Lime	73.08	1.21	.	.	8.20	.	0.33	3.51	13.32	.	0.25	.	0.019	.
1	SRM 1830	Soda-Lime	73.07	0.12	.	.	8.56	.	0.04	3.90	13.75	.	0.26	.	0.011	.
1	SGT G6D	Soda-Lime	73.06	1.70	.	.	9.97	.	<0.1	<0.1	14.65	.	0.20	.	0.02	.
1	SGT G10D	Soda-Lime	72.7	1.62	.	0.02	10.7	.	0.35	1.81	12.2	.	0.05	.	0.097	.
1	SGT G7D	Soda-Lime	72.64	1.50	.	.	11.03	.	0.43	0.14	13.90	.	0.19	.	0.042	.
1	SRM 620	Soda-Lime	72.08	1.80	.	.	7.11	.	0.41	3.69	14.39	.	0.28	.	0.018	.
1	SGT G11D	Soda-Lime	70.7	1.83	.	0.03	10.3	.	0.69	2.14	13.6	.	0.06	.	0.068	.
1	SGT G4D	Soda-Lime	69.49	3.02	0.19	.	4.24	.	0.57	<0.05	15.45	.	<0.05	.	0.041	3.28
1	SRM 1411	Borosilicate	58.04	5.68	10.94	5.00	2.18	.	2.97	0.33	10.14	.	.	0.09	0.02	3.85
1	SRM 1412	Multicomponent	42.38	7.52	4.53	4.67	4.53	4.38	4.14	(4.69)	4.69	4.40	.	4.55	.	4.48

Number	As_2O_3	Cl	Cr_2O_3	F	FeO	Fe_2O_3	Li_2O	ZrO_2	Units
SRM 93a	.	0.060	.	.	0.016	0.028 (T.Fe)	.	0.042	1 Disc 32 mm Ø x 6 mm
JCRM R102	.	0.057	.	.	.	0.033	.	0.032	11 Rods 5 mm Ø x ~95 mm
SRM 1831	.	.	.	.	0.025	0.087 (T.Fe)	.	.	3 Plates 37 mm x 37 mm x 3 mm
SRM 1830	.	.	.	.	0.032	0.121 (T.Fe)	.	.	3 Plates 38 mm x 38 mm x ~6 mm
SGT G6D	.	.	.	.	.	0.034 (T.Fe)	.	.	1 Disc 40 mm Ø, last of stock
SGT G10D	.	.	0.020	.	.	0.325	.	(0.024)	1 Disc 40 mm Ø
SGT G7D	.	.	.	.	.	0.044 (T.Fe)	.	.	1 Disc 40 mm Ø LOI: 0.07
SRM 620	0.056	.	.	.	.	0.043	.	.	3 Plates 35 mm x 35 mm x 3 mm
SGT G11D	.	.	0.205	.	.	0.342	.	(0.015)	1 Disc 40 mm Ø
SGT G4D	.	.	.	4.96	.	0.099	.	.	1 Disc 40 mm Ø LOI: 0.22
SRM 1411	.	.	.	.	.	0.050	.	.	10 Plates 32 mm x 32 mm x 3 mm
SRM 1412	.	.	.	.	.	(0.031)	(4.50)	.	8 Plates 32 mm x 32 mm x 3 mm

CRM GLASS DISC

analysis listed in mass % | analysis listed in mg/kg | ~40 mm Ø x ~3 mm

Number	Si	Al	B	Ba	Ca	K	Li	Mg	Na	Sr	Zn	Ag	As	Cd	Cr	Fe	Ga	P	Pb	S	Sb	Se
SRM 1412a	27.68	4.63	1.23	0.102	2.85	3.27	1.86	2.33	2.93	3.42	3.10	80	84	72	59	88.1	<10	<5	176	(20)	138	(40)

CRM TRACE ELEMENTS IN GLASS

analysis listed in mg/kg glass plate 50 mm x 50 mm x 7 mm

Number	As	Ba	Cd	Cl	Co	Cr	Pb	Sb	Se
BCR 664	5.9	29.1	5.7	68.4	2.77	2.65	53.1	24.3	8.6

CRM FLOAT GLASS FOR DETERMINATION OF ABRADABILITY INDEX

Number	Mass Loss	Units
ASCRM 002-1	1.26 g	plate, 6 x 50 x 75 mm
ASCRM 002-2	13.55 g	plate, 10 x 100 x 100 mm

CRM GLASS CONTAINING HEXAVALENT CHROMIUM

certified analysis listed in mg/kg | informational analysis listed in mass % | 50 g of < 10 mm glass pieces

Number	Hexavalent Cr	Total Cr	Al_2O_3	BaO	CaO	Cr_2O_3	CuO	Fe_2O_3	K_2O	MgO	Na_2O	SO_3	SiO_2	ZnO
BAM S004	94	471	2.15	1.2	9.4	0.07	0.04	0.06	0.16	0.90	14.5	0.17	70.9	0.33
uncertainty	5	25												

CRM IRON IN FLAT SODA LIME GLASS

Number	Fe	FeII	FeII as Fe2O3	FeIII	Units
BAM S052	0.597	0.164	(0.234)	(0.433)	100 mm x 50 mm x 3.2 mm
BAM S051	0.0481	0.0158	(0.0226)	(0.0323)	100 mm x 50 mm x 5.9 mm
BAM S050	0.0084	0.0027	(0.0038)	(0.0057)	100 mm x 50 mm x 3.2 mm

CRM MULTI-ELEMENT GLASS DISCS

listed in mg/kg each unit contains uncertified 72% SiO_2, 12% CaO, 14% Na_2O, and 2% Al_2O_3 each sample is 4 wafers ~13 mm Ø

3 mm	1 mm	Ag	Au	B	Ba	Cd	Ce	Co	Cu	Dy	Er	Eu	Fe	Ga	Gd	K	La
SRM 610	SRM 611	(254)	(25)	(351)	.	.	.	(390)	(444)	.	.	.	458	.	.	(461)	.
SRM 612	SRM 613	22.0	(5)	(32)	(41)	.	(39)	(35.5)	(37.7)	(35)	(39)	(36)	51	.	(39)	(64)	(36)
SRM 614	~~SRM 615~~	0.42	(0.5)	(1.30)	.	(0.55)	.	(0.73)	1.37	.	.	(0.99)	(13.3)	(1.3)	.	30	(0.83)
SRM 616	SRM 617	.	(0.18)	(0.20)	.	.	.	.	(0.80)	.	.	.	(11)	(0.23)	.	29	(0.034)

3 mm	1 mm	Mn	Nd	Ni	Pb	Rb	Sb	Sc	Sm	Sr	Th	Ti	Tl	U	Yb	Zn
SRM 610	SRM 611	485	.	458.7	426	425.7	.	.	.	515.5	457.2	(437)	(61.8)	461.5	.	(433)
SRM 612	SRM 613	(39.6)	(36)	38.8	38.57	31.4	.	.	(39)	78.4	37.79	(50.1)	(15.7)	37.38	(42)	.
SRM 614	~~SRM 615~~	.	.	(0.95)	2.32	0.855	(1.06)	(0.59)	.	45.8	0.748	(3.1)	(0.269)	0.823	SRM 615 SOLD OUT	
SRM 616	SRM 617	.	.	.	1.85	(0.100)	(0.078)	(0.026)	.	41.72	0.0252	(2.5)	(0.0082)	(0.0721)	.	.

CRM URANIUM IN GLASS

analysis listed in mg/kg 12 mm Ø x 5 mm

Number	U
IRMM 540R	15.0 last

CRM GLASS SAND

T = Total SRM 89: 45 g other SRM: 75 g all others: 100 g units

Number	SiO_2	Al_2O_3	BaO	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	MnO	Mn_3O_4	Na_2O	P_2O_5	PbO	SO_3	TiO_2	ZrO_2	LOI
BCS 531	99.74	0.0327	0.00112	0.0040	.	0.00636	0.0039	0.00132	0.00014	.	.	0.00082	SrO:0.00017		0.0160	.	.
UNS SPS	99.32	0.248	.	0.029	.	0.037	0.058	0.0071	.	.	0.045	.	.	.	0.035	.	0.167
BCS 516	98.73	0.513	0.0040	0.0243	0.0081	0.0596	0.127	0.0387	.	0.0012	0.0195	(0.013)	0.0127	.	0.175	(0.075)	0.24
BCS 528	95.62	2.447	0.0298	0.237	0.0008	0.1111	0.875	0.0887	.	.	0.101	(0.20)	0.0006	.	0.0486	(0.014)	0.271
SRM 1413	82.77	9.90	0.12	0.74	.	0.24	3.94	0.06	.	.	1.75	.	.		0.11	.	.
SRM 89 *	65.35	0.18	1.40	0.21	.	0.049	8.40	0.03	0.088	.	5.70	0.23	17.50	0.03	0.01	0.005	0.32
SRM 81a	.	0.66	.	.	0.0046	0.082	.	.	.	.	.	.	.	.	0.12	0.034	.
SRM 165a	.	0.059	.	.	.	0.012	.	.	.	.	.	.	.	.	0.011	0.006	.

* SRM 89 also contains As_2O_3: 0.03, As_2O_5: 0.36, Cl: 0.05

RM GRAVEL

typical analysis listed in mass % 100 g units

Number	SiO_2	Al_2O_3	CO_2	CaO	Co_3O_4	Cr_2O_3	Fe_2O_3	K_2O	MgO	Mn_3O_4	Na_2O	P_2O_5	S	TiO_2	$-H_2O$ 900'C
DH 3610	98.80	0.234	.	0.008	.	0.030	0.419	0.014	.	0.009	<0.003	.	0.009	.	0.153
DH 3609	96.44	1.46	0.010	0.047	0.005	0.029	0.703	0.334	0.104	0.020	0.045	0.019	.	0.086	0.48

HARDGROVE GRINDABILITY INDEX

Class	Set Number	HGI	HGI	HGI	HGI	Units
CRM	NCS AG82001d-4d	sample 1d: 35	sample 2d: 56	sample 3d: 74	sample 4d: 107	250 g of each 1d - 4d last of stock
CRM	NCS AG82001g-4g	sample 1g: 35	sample 2g: 54	sample 3g: 72	sample 4g: 119	250 g of each 1d - 4d
RM	ACIRS H7	sample A : 30.0	sample B : 45.9	sample C : 63.5	sample D : 85.5	1 kg of each A - D
RM	ACIRS H5	sample A : 28	sample B : 46	sample C : 63	sample D : 85	1 kg of each A - D last

RM HARDGROVE GRINDABILITY INDEX

individually available in 1 kg units

Number	HGI	Number	HGI	Number	HGI	Number	HGI	Number	HGI
COCO HGI 007	66	COCO HGI 021	57	COCO HGI 006	54	COCO HGI 018	51	COCO HGI 022	47
COCO HGI 005	64	COCO HGI 019	57	COCO HGI 026	54	COCO HGI 020	51	COCO HGI 023	46
COCO HGI 013	64	COCO HGI 004	56	COCO HGI 014	53	COCO HGI 016	50	COCO HGI 010	31
COCO HGI 008	60	COCO HGI 003	55	COCO HGI 024	52	COCO HGI 015	48		
COCO HGI 009	59	COCO HGI 011	55	COCO HGI 012	51	COCO HGI 027	48		

CRM HARDNESS TEST BLOCKS

for NCS items, please indicate desired hardness when ordering

Number	Scale	Available Range	Units (mm)	
NCS HBW	Brinell Hardness W	(8-650)	100 x 80 x 16	
NCS HL	Leeb Hardness	(200-900)	90 Ø x 55	
NCS HLG	Leeb Type G Hardness	(300-750)	120 Ø x 70	
NCS HRA	Rockwell Hardness A	(20-88)	60 x 40 x 10	
NCS HRB	Rockwell Hardness B	(20-100)	60 x 40 x 10	
BS TRM-3	**Rockwell Hardness B**	**86.3**	**300 x 300 x ~2**	**17025**
NCS HRC	Rockwell Hardness C	(20-70)	60 x 40 x 10	
NCS HR15N	Rockwell Superficial Hardness 15N	(70-94)	60 x 40 x 10	
NCS HR30N	Rockwell Superficial Hardness 30N	(42-86)	60 x 40 x 10	
NCS HR45N	Rockwell Superficial Hardness 45N	(20-77)	60 x 40 x 10	
BS TRM-4	**Rockwell Superficial Hardness 15T**	**71.9**	**300 x 300 x ~2**	**17025**
NCS HR15T	Rockwell Superficial Hardness 15T	(67-93)	60 x 40 x 10	
NCS HR30T	Rockwell Superficial Hardness 30T	(29-82)	60 x 40 x 10	
NCS HR45T	Rockwell Superficial Hardness 45T	(1-72)	60 x 40 x 10	
NCS HSD	Shore Hardness	(5-105)	65 x 52 x 15	
NCS HV	Vickers Hardness	(5-1000)	60 x 40 x 10	
NCS HVM	Vickers Microhardness	(5-1000)	25 x 25 x 6	

CRM INCINERATED WASTE

analysis listed in mg/kg — 30 g powder

Number	As	Ba	Be	Cd	Co	Cr	Cu	Hg	Mo	Ni	Pb	Sb	Se	Sn	Sr	V	Zn
BL 12-1-12	45	3600	(8)	(60)	23	731	375	7.8	(10)	198	(1389)	(67)	4	(815)	(233)	(69)	10450

informational analysis listed in mass %

Number	Al_2O_3	CO_2	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SO_3	SiO_2	TiO_2
BL 12-1-12	(11.92)	(11.05)	(13.68)	(4.44)	(3.23)	(3.41)	(0.46)	(2.56)	(1.77)	(2.22)	(41.78)	(1.14)

CRM IMPACT

approximate analysis

Number	Energy	Uncertainty	Temperature	Units	Type	
SRM 2098	176 - 244 J	8.8 - 12.2 J	21 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
ERM-FA415	155.1 J	4.6 J	20 ‘C +/- 2’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
ERM-FA016	122.0 J	3.6 J	20 ‘C +/- 2’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
SRM 2097	101.9 J	0.572	-40 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
SRM 2096	88 - 136 J	4.4 - 6.8 J	-40 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
ERM-FA015	79.8 J	2.4 J	20 ‘C +/- 2’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
ERM-FA013	28.1 J	0.8 J	20 ‘C +/- 2’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
SRM 2093	15.4 J	0.125	-40 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
SRM 2092	13 - 20 J	1.4 J	-40 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
SRM 2115	13 - 25 J	1.4 J	21 ‘C +/- 1’	5 pcs of 10 mm x 10 mm x 75 mm	IZOD beam	last of stock

CRM LAYER THICKNESS

BCR: 2 sets of 4 Tantalum foils, 5 mm x 10 mm NMIJ: 13-15 mm squares

Number	Material	Thickness	(+/-)	Layer 1	2	3	4	5	6	7	8
NMIJ 5202a	Si, SiO_2 multi layer	n/a nm	0.7 nm	(20.5)	20.0	20.5	19.9	20.4	surface oxide: (1.32)		
NMIJ 5203a	GaAs, AlAs multi layer	n/a nm	0.10 nm	(9.24)	9.65	9.51	9.64	9.51	9.62	.	.
NMIJ 5204b	GaAs, AlAs single layer	3.26 nm	0.41 nm	.	.	.	.	.	.	.	.
BCR 261T	Ta_2O_5 single layer	1.72 nm	0.07 nm	30 nm material		.	.	.	.	.	.
BCR 261T	Ta_2O_5 single layer	5.40 nm	0.12 nm	100 nm material		.	.	.	.	.	.

CRM NANOSCALE LAYER THICKNESS

Number	Certified Values	Informational Data	Units
BAM L200	35 certified lengths from 3.5 - 4642 nm	5 informational lengths 1 - 5 nm	block ~10 x 4 x 5 mm

CRM LEAD PAINT FILMS

sold in SET/6 only, thin paint film on polyester sheets last of stock ~7cm wide and ~10 cm long

Number	film, Pb in mg/kg		film, Pb in mg/kg		film, Pb in mg/kg		film, Pb in mg/kg		film, Pb in mg/kg		film, Pb in mg/kg		film, Pb in mg/kg	
SRM 2579a	2571	3.58	2572	1.527	2572	1.527	2573	1.040	2574	0.714	2575	0.307	2570	<0.001

RM ELECTROLYTIC MANGANESE

typical analysis 50 g units

Number	Al	C	Co	Cr	Cu	Fe	Mn	Ni	P	S	Si	Zn	$-H_2O$@900'C
DH 7701	(0.0015)	0.120	0.0012	0.411	0.0070	2.07	95.85	0.0068	0.056	0.0160	1.09	0.0011	0.019

CRM MANGANESE METAL POWDER

analysis listed in mass %

Number	Mn	C	Fe	N	P	S	Se	Si	Units	
NCS HC25655	97.43	0.080	1.81	.	0.018	0.016	.	0.28	50 g	
NCS HC15604	95.52	0.154	3.37	.	0.032	0.019	.	0.92	100 g	last
NCS HC26615	91.56	0.007	0.039	7.84	.	0.031	0.049	0.009	50 g	

MELTING POINT

Class	Number	Form	Melting point 'C
CRM	501-951	6 inch nickel wire	1455
RM	502-496	6 inch gold wire	1063

CRM OXIDE

analysis listed in mg/kg except % which is mass % — 100 g units

Number	Notes	Ag	Al	As	B	Ba	Be	C	Ca	Cd	Ce	Cl	Co	Cr
BAM RS 1	SiO_2 > 99.99%	.	8.7	<0.1	.	.	.	.	0.42	<0.05	.	.	.	0.062
BAM RS 2	Al_2O_3 = 99.76%	.	.	(<0.5)	(<5)	.	(<0.2)	.	3.1	(<0.5)	(<0.1)	(<10)	<1	<1.5
BAM RS 5	NiO	<1	(<15)	<0.2	.	<1	.	14	2.2	<0.2	.	.	<2	16.1
BAM RS 6A	MgO 100 – 350 µm	.	46	.	.	(<10)	.	(<50)	994	.	.	.	(<5)	9.2
BAM RS 6B	MgO 50 – 100 µm	.	49	.	.	(<20)	.	(<210)	956	.	.	.	(<5)	8.1

continued

Number	Cu	Fe	Ga	Ge	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni	Pb
BAM RS 1	<0.1	0.62	.	<1	<0.05	.	0.48	.	0.25	<0.5	<0.2	.	<2	<0.2	<0.15
BAM RS 2	<2.5	3.3	(<2)	.	.	(<0.5)	(<5)	(<0.3)	<1	<3	<1.5	(<1)	<15	<10	.
BAM RS 5	1.53	41	<0.5	.	.	<1	<2	.	(<2)	<1	<1	<5	<2	78.57%	<2
BAM RS 6A	(<6)	72	.	.	.	.	.	.	.	60.19%	5.4	(<10)	.	3.9	(<5)
BAM RS 6B	(<6)	71	.	.	.	.	.	.	.	60.17%	5.2	(<10)	.	3.3	(<5)

continued

Number	S	Sb	Se	Si	Sn	Sr	Te	Ti	Tl	V	W	Zn	Zr
BAM RS 1	.	.	.	.	.	.	.	1.3	.	.	.	<1.3	<0.1
BAM RS 2	.	.	.	<20	(<1)	.	.	<2	.	(<1)	.	<2	3.2
BAM RS 5	(4)	(<0.1)	<1	(<5)	(<1)	(<1)	(<0.2)	(<2)	(<0.5)	<1	(<1)	3.4	(<1)
BAM RS 6A	.	.	.	.	.	2.0	.	1.3	.	8.4	.	(<6)	(<20)
BAM RS 6B	.	.	.	.	.	2.1	.	1.2	.	7.8	.	(<6)	(<105)

CRM IRON OXIDE

analysis listed in mass % — 75 g units

Number	Fe_2O_3	FeO	Al	C	Ca	Cr	Cu	K	Mg	Mn	Ni	S	Si	Other Impurities
VS P26/2	99.49	(<0.1)	0.026	(0.005)	(0.005)	0.0194	0.0090	(0.001)	(<0.005)	0.292	0.024	(0.04)	0.0110	(0.1)

CRM IRON OXIDE

analysis listed in mass % — analysis listed in mg/kg — 100 g units

Number	T.Fe	Cl	Mn	Al	Ca	Co	Cr	Cu	K	Mg	Mo	Na	Ni	P	Si	Sn	Ti	Zn
ECRM 686-1	69.44	0.095	0.231	407	97	19	182	38	24	27	7	58	127	78	83	25	14	4

CRM NICKEL OXIDE

certified analysis listed in mass % except * which is mg/kg — 25 g units

Number	Al	Co	Cr	Cu	Fe	Mg	Mn	Si	Ti	Bi*	Pb*	Se*
SRM 673	0.001	0.016	0.0003	0.002	0.029	0.003	0.0037	0.006	0.003	0.06	3.5	0.2

continued informational analysis in mg/kg

Number	Ag	As	Cd	Ga	Sb	Sn	Te	Tl	Zn
SRM 673	<0.1	0.4	0.05	<0.1	<0.5	<0.5	0.4	<0.1	1.7

Certified values show concentrations in nickel oxide. To convert values to the percent concentration in total metal present, multiply the values by 1.29.

last of stock

CRM SILICON OXIDE

analysis listed in mass % except

Number	SiO_2	Al_2O_3	CaO	Fe	MgO	MnO	TiO_2	Units
IRSID 608-1	60.39	9.94	8.70	4.00	1.34	0.057	0.714	100 g

CRM TITANIUM DIBORIDE

analysis listed in mass % — powder 50 g

Number	Ti	B	B_2O_3	Al	C	Ca	Cr	Fe	Mg	Mn	Mo	Ni	O	V	Zr	InsRes
BAM S012	68.3	30.7	0.35	0.0012	(0.169)	0.0044	0.0097	0.064	0.00016	0.00038	0.00117	0.0023	(0.48)	0.00102	0.0121	(0.22)

CRM TITANIUM DIOXIDE SET

analysis listed in mass % — ONLY available in SET/8 x 20 g units

Number	Cr	Cu	Fe	Mn	Mo	Ni	Si	Sn	V
GSO 2158-81	0.0010	.	.	.	.	.	0.00054	0.00020	.
GSO 2159-81	0.00035	.	0.00055	.	.	0.00046	0.0010	.	.
GSO 2160-81	0.0013	0.0110	0.0010	0.090	.	0.0120	0.0015	0.0018	0.0014
GSO 2161-81	0.0013	0.0024	0.0023	0.0010	0.0130	0.0088	.	0.0028	.
GSO 2162-81	0.0023	0.0043	0.0180	0.0025	0.0048	0.0029	0.0130	0.0047	0.1800
GSO 2163-81	0.038	0.032	.	0.0180	.	0.0280	0.0030	.	0.0016
GSO 2164-81	.	.	0.0095	.	0.0110	.	0.0180	.	.
GSO 2165-81	.	0.0023	0.0082	0.0040	0.0017	0.0014	.	0.035	0.0040

CRM TITANIUM DIOXIDE

Number	TiO_2	Uncertainty	Units	
SRM 154c	99.591	+/- 0.062	90 g	last

CRM VANADIUM PENTOXIDE

analysis listed in mass % — NCS: 25-50 g units — SARM, VS: 100 g units

Number	V_2O_5	V_2O_4	V	Al_2O_3	C	CaO	Fe	Fe_2O_3	K	K_2O	Na	Na_2O	P	S	Si	SiO_2	TiO_2	Others
NCS HC26612a	98.99	.	.	.	.	.	0.078	.	.	0.12	.	0.58	0.022	(0.001)	0.080	.	.	As: (0.0008)
NCS HC19611	98.80	.	.	. Cr:0.018		.	0.061	.	.	0.14	.	1.03	0.010	0.011	0.102	.	.	As:(<0.001)
NCS HC19610	96.68	.	.	. Cr:0.099		.	0.43	.	.	0.18	.	0.96	0.007	0.014	0.40	.	.	As:(<0.001)
SARM 38	95.52	3.07	55.84	0.14	.	.	.	0.119	.	0.600	.	0.22	.	(0.0045)	.	0.11	.	MgO: 0.0037
VS R30	94.3	.	.	.	0.007	0.88	0.51	.	0.053	.	0.032	.	0.0064	0.0072	.	0.43	0.21	MnO: 2.58

CRM ZINC OXIDE

Number	Zn	CaO	Cd	Cl	F	Fe	MgO	Pb	S	SiO_2	Units
IMN TC9	53.4	6.96	0.0049	0.033	0.055	5.64	3.50	3.77	0.52	5.47	220 g

CRM PAPER

AVAILABLE IN SET/20 ONLY — includes software for data processing — 5 pages per sample, 8.5 x 11" each

dry TAPPI analysis listed in mass %

Number	$CaCO_3$	Kaolin	TiO_2	Talc	Muscovite	Al_2O_3	P_2O_5	Total Filler	400'C Ash	900'C Ash	Base Weight g/m^2
A	9.88	0.28	0.00	1.41	0.00	.	.	11.57	11.88	7.32	75
B	18.20	0.28	0.00	0.00	0.00	.	.	18.48	18.53	10.65	75
C	12.53	0.56	0.00	0.60	0.00	.	.	13.69	13.58	8.11	75
D	18.29	0.00	0.00	0.00	0.00	.	.	18.29	18.76	10.51	75
E	9.45	0.00	0.00	0.00	0.00	.	.	9.45	10.14	5.78	75
F	11.22	0.00	0.39	0.60	0.00	.	.	12.21	12.34	7.49	75
G	12.26	0.18	0.00	0.41	0.00	.	.	12.85	13.08	7.56	75
H	11.19	1.34	0.00	0.38	0.00	.	.	12.91	11.98	8.01	75
I	18.94	0.00	0.00	0.28	0.00	.	.	19.22	19.71	11.11	80
J	14.79	0.51	0.09	1.48	0.00	.	.	16.87	17.11	10.65	75
K	14.12	2.10	0.28	1.88	0.00	.	.	18.38	18.30	12.17	75
L	0.00	7.54	1.75	0.00	0.00	.	.	9.29	8.81	8.38	75
M	0.16	10.91	0.18	0.00	0.00	.	.	11.25	11.16	10.12	75
N	1.74	0.00	1.51	10.74	0.00	.	.	13.99	14.70	13.28	75
O	1.86	12.69	0.00	0.47	7.57	.	.	22.59	22.99	20.34	80
P	25.61	0.35	0.00	0.00	0.00	.	.	25.96	26.93	15.61	105
Q	0.00	0.30	38.60	0.00	0.00	2.70	1.87	43.47	43.39	43.13	85
R	0.13	19.02	0.25	0.00	0.65	.	.	20.05	20.21	17.56	45
S	0.14	32.04	0.42	0.00	1.08	.	.	33.68	33.57	29.43	60
BLANK	0.00	0.00	0.00	0.00	0.00	.	.	0.02	0.02	0.01	75

CRM PARTICLE SIZE and MASS VOLUME in ALUMINA

Number	Permeametry	BET Absorption	Obligatory Porosity	Size Range	Median Size
TL AA	2,300 cm^2/g	5,000 cm^2/g	0.57	1-64 Ø µm	12.7 Ø µm
TL AB	10,300 cm^2/g	31,000 cm^2/g	0.67	1-31.50 Ø µm	2.1 Ø µm

CRM PARTICLE SIZE

analysis listed in µm

Number	Weight Percentile	Certified Value	Uncertainty	Units
SRM 1018b	1.2 - 98.1	220 - 750	0.4 - 2.0	87 g of 0.2 g glass beads

CRM PARTICLE SIZE

Number	Average Diameter, µm	Uncertainty, µm	Material	Units
SRM 1691	0.269	± 0.007	Polystyrene Spheres	5 mL

CRM PARTICLE SIZE

Number	Quartz Form	Certified Property	Size Range in Microns	Unit Size
BCR 066	Powder	Stokes' diameter	0.35 - 3.50	10 g
BCR 070	Powder	Stokes' diameter	1.2 - 20	10 g
BCR 067	Powder	Stokes' diameter	2.4 - 32	10 g
BCR 069	Powder	Stokes' diameter	14 - 90	10 g
BCR 130	Powder	Volume diameter	50 - 220	50 g
BCR 068	Sand	Volume diameter	160 - 630	100 g
BCR 131	Powder	Volume diameter	480 - 1800	200 g
BCR 132	Gravel	Volume diameter	1400 - 5000	700 g

CRM PARTICLE SIZE

Number	Percentage of Particles Under 20 Microns	Standard Deviation	Uncertainty @ 95% CL	Units
ASCRM 026	1.0	± 0.1	± 0.2	210 g

CRM PARTICLE DENSITY, SURFACE AREA, AND SIZE DISTRIBUTION

Number	Particle Density Picnometer Method	Blaine Area With EN 196-6	Particle Size by Laser Diffraction ISO 13320-1	Air Jet Seiving Alpine Test NF X11-640	Units
TL 1BGa	3.11 g/cm^3	3396 cm^3/g	11.4% @ 2.0µm - 99.9% @ 160µm	71.4% @ 31.5µm - 100% @ 160µm	20 x 5 g

CRM pH STANDARDS

Number	PH	Accreditation	Units
TL pH9	9.180	ISO GUIDE 34	10 x 25 mL or as a SET/15 bottles = 5 x pH4, 5 x pH7, 5 x pH9
TL pH7	6.865	ISO GUIDE 34	10 x 25 mL or as a SET/15 bottles = 5 x pH4, 5 x pH7, 5 x pH9
TL pH4	4.005	ISO GUIDE 34	10 x 25 mL or as a SET/15 bottles = 5 x pH4, 5 x pH7, 5 x pH9

RM PLASTER

analysis listed in mass % 100 g units

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	SO_3	SiO_2	SrO	TiO_2	LOI
BCS 202A	0.33	37.4	0.10	0.10	0.39	<0.03	<0.01	53	1.38	0.33	0.03	7.0

RM PLASTIC

analysis listed in mass % 50 g pellets

Number	Al	Ca	Cl	Cr	F	Fe	Mg	Na	P	S	Si	Ti	Zn
JSM P702-1	0.0012	0.0013	(0.0017)	0.0012	.	0.0015	0.0015	0.0012	0.0011	(0.0014)	(0.0008)	0.0009	0.0010
JSM P703-1	0.022	0.023	(0.018)	0.020	(0.018)	0.021	0.029	0.024	0.017	(0.021)	0.018	0.017	0.020

CRM POROUS MATERIAL

Number	Description	Units	Specific Pore Volume	Median Pore Diameter	Density
BAM P 128	Alumina Ceramic	6 Cylinders 7 g total	220 mm3/g	27.6 µm	(3.6405) g/cm3

CRM POROUS MATERIALS and SURFACE AREA

Number	Description	Units	A_{BET} (m^2/g) BET Specific Surface Area	V_p (cm^3/g) Specific Pore Volume	D_1 (nm) Hydraulic Pore Diameter	D_2 (nm) Most Frequent Pore Diameter	D_3 (nm) Most Frequent Pore Diameter	(nm) Median Pore Width
BAM P 109	Activated Carbon	10g	1396	.	.	.	.	.
BAM P 105	Glass Material	10g	198.5	0.2327	4.69	4.38	5.80	.
BAM P 106	Titanium Dioxide	15g	96.6	0.2341	9.69	8.2	11.5	.
BAM FD107	Faujasite Zeolite	10g	.	0.217 cm^3/g^{-1}	.	.	.	0.86

Number	Description	Units	(nm) Mean Pore Radius	(nm) Most Frequent Pore Radius	(cm^2/g) Specific Surface Area	(mm^3/g) Pore Volume 100 Mpa	(mm^3/g) Pore Volume 195 Mpa	(mm^3/g) Pore Volume 200 Mpa	(mm^3/g) Pore Volume 395 Mpa
BAM PM 101	SiO_2	10g	.	.	0.177	.	.	.	.
BAM PM 102	Alpha-Al_2O_3	10g	.	.	5.41	.	.	.	.
BAM FD 120	Alpha-Al_2O_3	10g	228.0	232.2	.	545.0	546.7	546.8	548.1
BAM FD 121	Porous glass	12g	15.1	15.3	.	621.8	621.9	621.9	624.6
BAM FD 122	Porous glass	15g	139.0	140.2	.	919.7	922.5	922.6	924.4

RoHS/WEEE SAMPLES

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

#	Type	Units	Number	As	Br	Cd	Cr	Hg	Pb	Se	Sold As
1	ABS resin	pellets 25 g	NMIJ 8112a	.	.	0.000938	0.009447	0.009410	0.009498	.	individually
1	ABS resin	granules 100g	BAM H010 gran	.	0.0240	0.0093	0.0470	(0.0415)	0.0479	.	individually
1	ABS resin	40 mm Ø x 1 mm	BAM H010 1mm	.	0.0240	0.0093	0.0470	(0.0415)	0.0479	.	individually
1	ABS resin	40 mm Ø x 2 mm	BAM H010 2mm	.	0.0240	0.0093	0.0470	(0.0415)	0.0479	.	individually
1	ABS resin	40 mm Ø x 6 mm	BAM H010 6mm	.	0.0240	0.0093	0.0470	(0.0415)	0.0479	.	individually
1	ABS resin	40 mm Ø x 1-6 mm	BAM H010 set	.	0.0240	0.0093	0.0470	(0.0415)	0.0479	.	set of above 3 discs
1	ABS resin	30 mm Ø x 2 mm	NMIJ 8105a	.	.	0.001070	0.002751	.	0.010828	.	individually
1	plastic	40 mm Ø x 4 mm	JSAC 0631	.	.	0.00225	0.00258	0.00197	0.00245	.	set only
1	plastic	40 mm Ø x 4 mm	JSAC 0632	.	.	0.00461	0.00933	0.00594	0.00929	.	
1	polyester	chips 50 g	JSAC 0602-3	.	.	0.00506	0.01125	0.00121	0.01121	.	individually
1	polyester	chips 50 g	JSAC 0601-3	.	.	0.00050	0.0113	0.000130	0.00121	.	individually
1	low density polyethylene	pellets 100 g	ERM-EC681m	0.00170	0.143	0.0146	0.00451	0.00099	0.00697	also Cl S Sb Sn Zn, individually	
1	low density polyethylene	pellets 100 g	ERM-EC680m	0.00047	0.0181	0.00208	0.00096	0.000256	0.00113	also Cl S Sb Sn Zn, individually	
1	low density polyethylene	pellets 100 g	ERM EC680k	0.00041	0.0096	0.00196	0.00202	0.000464	0.00136	also Cl and S, individually	
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 1	.	0	0	0	0	0	.	set only
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 2	.	0.1300	0.0029	0.0053	0.0053	0.0058	.	
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 3	.	0.0670	0.0059	0.0110	0.0110	0.0120	.	
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 4	.	0.0310	0.0089	0.0320	0.1200	0.0360	.	
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 5	.	0.0110	0.0120	0.0660	0.0620	0.0730	.	
2	low density polyethylene	48 mm Ø x 5 mm	SCAS PE-5E6 6	.	0.0053	0.0350	0.1300	0.0290	0.1400	.	
1	polypropylene resin	30 mm Ø x 2 mm	NMIJ 8136a	.	.	0.00937	0.08906	0.0952	0.09435	.	individually
1	PVC resin	pellets 25 g	NMIJ 8123a	.	.	0.009562	0.09490	0.09370	0.09655	.	individually
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0611	.	.	0.00000	0.00000	.	0.00000	.	set only
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0612	.	.	0.00086	0.00243	.	0.00242	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0613	.	.	0.00219	0.00488	.	0.00485	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0614	.	.	0.00430	0.00966	.	0.00959	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0615	.	.	0.00866	0.01941	.	0.01929	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0621	.	.	.	.	(<0.0001)	.	.	set only
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0622	.	.	.	.	0.00100	.	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0623	.	.	.	.	0.00490	.	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0624	.	.	.	.	0.01211	.	.	
1	polyvinyl chloride	40 mm Ø x 4 mm	JSAC 0625	.	.	.	.	0.0244	.	.	
1	soil	powder 50 g	JSAC 0403	0.0199	.	0.0183	0.0257	0.00111	0.0224	.	individually
1	soil	powder 25 g	JSAC 0466	0.01093	.	0.01199	0.1483	0.01135	0.1214	0.1175	set only
1	soil	powder 25 g	JSAC 0465	0.0550	.	0.06074	0.0738	0.00578	0.6124	0.0587	
1	soil	powder 25 g	JSAC 0464	0.02711	.	0.03010	0.0499	0.00286	0.03027	0.02919	
1	soil	powder 25 g	JSAC 0463	0.01376	.	0.01468	0.0244	0.001476	0.01516	0.01415	
1	soil	powder 25 g	JSAC 0462	0.00715	.	0.00742	0.01496	0.000727	0.00737	0.00716	
1	soil	powder 25 g	JSAC 0461	0.002153	.	(0.000030)	0.00972	0.0000075	0.00244	(0.000044)	
1	zinc	50 mm Ø x 20 mm	41X ZSC6A	.	.	0.215	<0.0002	0.029	0.0077	.	individually
1	zinc	50 mm Ø x 20 mm	41X ZSC3A	.	.	0.119	0.0148	0.0021	0.0273	.	
1	zinc	50 mm Ø x 20 mm	41X ZSC1A	.	.	0.0288	0.0039	0.026	0.06	.	
1	zinc	50 mm Ø x 20 mm	41X ZSC4B	.	.	0.0131	0.0299	0.050	0.156	.	
1	zinc	50 mm Ø x 20 mm	41X ZSC2A	.	.	0.0016	0.0036	0.0053	0.111	.	

| # | Type | Units | Number | As | Br | Cd | Cr | Hg | Pb | Se | Sold As |

REFRACTORIES

= class, where 1 = CRM and 2 = RM T = Total IPT: 80 g VS K6: 75 g VS K10: 125 g all others: 100 g

#	Number	SiO_2	Al_2O_3	C	CO_2	CaO	Fe_2O_3	K_2O	MgO	MnO	Mn_3O_4	Na_2O	P_2O_5	S	SO_3	TiO_2	ZrO_2	LOI
1	IPT 63	96.28	0.48	.	.	2.21	0.52	0.043	0.18	0.008	.	0.013	0.013	.	.	0.030	(0.002)	0.17
2	DH 2612	40.80	36.45	0.437	0.54	1.80	3.10	0.759	13.13	0.125	.	0.242	0.279	0.034	.	1.25	0.163	0.75
2	DH 2613	25.83	42.78	1.779	0.53	2.31	2.57	0.404	21.03	.	0.122	0.118	0.122	0.066	.	1.199	.	.
2	DH 2609	23.41	63.82	0.739 T	0.170	2.25	1.75	0.526	4.17	0.282	.	0.220	0.339	.	0.121	1.27	0.097	.
1	FLX CRM112	12.16	79.81	.	.	0.147	0.326	0.090	0.755	.	0.024	0.267	0.074	.	(0.04)	0.273	5.95	(5.42)
1	VS K6/4	2.12	0.54	.	.	2.95	2.26	.	92.4	.	.	.	.	.	.	.	.	.
1	VS K10/3	(0.2)	97	(0.05)	.	(0.03)	1.82	(0.03)	.	.	.	(0.5)	.	.	.	0.35	.	.

continued

Number	Co_3O_4	CuO	Cr_2O_3	HfO_2	Li_2O	NiO	V_2O_5	WO_3	Units
IPT 63	.	.	.	.	(0.0005)	.	.	.	80 g
DH 2612	.	.	0.385	.	.	0.032	0.027	.	100 g
DH 2613	.	0.004	0.140	.	.	.	0.020	.	100 g
DH 2609	.	.	.	.	.	.	.	.	100 g
FLX CRM112	<0.01	.	0.017	0.099	.	<0.01	.	0.041	80 g
VS K6/4	.	.	.	.	.	.	.	.	100 g
VS K10/3	.	.	.	.	.	.	.	.	125 g

CRM ALUMINA-MAGNESIA REFRACTORY SET

SOLD IN SET/10 ONLY certified values 20 g units informational values

Number	Al_2O_3	MgO	CaO	Fe_2O_3	K_20	Na_2O	P_2O_5	SiO_2	TiO_2	Cr_2O_3	MnO	ZrO_2	LOI
JRRM 801	93.49	3.26	0.14	2.00	0.01	0.19	0.00	0.35	0.21	0.00	0.00	0.00	0.14
JRRM 802	84.25	6.13	2.00	1.03	0.46	0.15	0.95	3.32	1.48	0.00	0.00	0.00	0.06
JRRM 803	74.23	16.20	0.57	4.90	0.00	0.86	0.01	0.58	2.51	0.00	0.00	0.00	0.36
JRRM 804	64.66	20.84	4.76	4.02	0.04	0.08	0.11	5.17	0.13	0.01	0.02	0.00	0.01
JRRM 805	58.03	36.04	0.28	0.73	0.01	0.54	0.68	2.49	1.05	0.00	0.00	0.00	0.17
JRRM 806	48.85	49.43	0.97	0.16	0.00	0.04	0.04	0.51	0.00	0.00	0.02	0.00	0.21
JRRM 807	39.96	55.07	2.75	0.32	0.15	0.32	0.53	0.58	0.19	0.00	0.00	0.00	0.57
JRRM 808	28.68	67.01	0.99	0.56	0.69	0.40	0.22	0.79	0.71	0.00	0.01	0.00	0.84
JRRM 809	19.86	70.11	4.47	0.11	0.98	0.04	1.06	0.36	2.88	0.00	0.00	0.00	0.48
JRRM 810	10.08	78.96	0.18	3.11	0.16	0.75	0.51	4.21	1.91	0.00	0.01	0.00	0.22

CRM ALUMINA-ZIRCONIA-SILICA REFRACTORY SET

SOLD IN SET/10 ONLY certified values 20 g units informational values

Number	Al_2O_3	ZrO_2	SiO_2	CaO	Cr_2O_3	Fe_2O_3	HfO_2	K_20	MgO	Na_2O	TiO_2	MnO	P_2O_5	LOI
JRRM 710	82.29	2.96	5.62	0.22	1.02	1.15	1.51	0.63	0.04	1.41	3.00	0.00	0.04	0.09
JRRM 708	79.52	12.84	0.54	1.17	0.29	0.80	1.03	0.74	1.64	0.08	1.02	0.00	0.00	0.13
JRRM 705	64.14	27.96	1.99	0.19	2.01	0.14	0.48	0.01	0.46	0.30	2.02	0.00	0.01	0.16
JRRM 707	55.78	18.16	21.17	1.08	0.18	1.81	0.36	0.15	0.84	0.19	0.28	0.00	0.05	0.01
JRRM 709	50.35	8.32	34.38	0.52	2.91	0.47	0.18	0.21	1.20	1.03	0.09	0.00	0.00	0.20
JRRM 703	46.34	37.35	14.64	0.03	0.00	0.05	0.72	0.00	0.01	0.53	0.07	0.00	0.03	0.09
JRRM 702	38.14	42.54	9.99	1.55	0.11	0.37	2.08	0.57	1.97	2.02	0.21	0.00	0.02	0.18
JRRM 706	25.95	22.72	39.33	1.58	0.01	0.13	1.19	0.95	0.15	3.49	3.77	0.00	0.01	0.72
JRRM 704	19.58	33.46	42.61	0.15	0.51	0.55	0.68	1.40	0.51	0.22	1.02	0.08	0.13	0.07
JRRM 701	10.09	48.06	28.44	2.07	1.01	2.00	0.85	0.02	0.47	1.84	4.96	0.00	0.02	0.09

CRM BURNT REFRACTORIES

IPT: 80 g units SRM: 75 g units

Number	Al_2O_3	SiO_2	CaO	Fe_2O_3	K_2O	Li_2O	MgO	Na_2O	P_2O_5	SrO	TiO_2	ZrO_2	LOI
SRM 78a	71.7	19.4	0.11	1.2	1.22	0.12	0.70	0.078	1.3	0.25	3.22	.	(0.42)
IPT 57	71.5	24.3	0.05	1.25	0.83	0.008	0.13	0.35	0.054	0.009	1.19	0.20	0.20
SRM 77a	60.2	35.0	0.05	1.00	0.090	0.025	0.38	0.037	0.092	0.009	2.66	.	(0.22)
IPT 51	40.3	55.0	0.06	1.19	0.69	0.018	0.20	0.09	0.09	.	2.19	0.070	0.16
SRM 76a	38.7	54.9	0.22	1.60	1.33	0.042	0.52	0.07	0.120	0.037	2.03	.	(0.34)

CRM CHROME-MAGNESIA REFRACTORY SET

SOLD IN SET/12 ONLY — certified values — informational values — 20 g units

Number	MgO	Cr_2O_3	Al_2O_3	CaO	Fe_2O_3	MnO	SiO_2	TiO_2	NiO	P_2O_5	V_2O_5	ZnO	LOI
JRRM 501	87.60	2.82	2.92	0.92	4.80	0.02	0.92	0.00	0.01	0.03	0.01	0.00	0.13
JRRM 502	76.28	7.49	11.98	0.20	1.02	0.01	3.11	0.01	0.02	0.02	0.02	0.00	0.06
JRRM 503	63.11	13.60	7.14	3.81	3.00	0.03	9.09	0.04	0.03	0.03	0.03	0.01	0.11
JRRM 504	54.85	18.35	17.56	2.60	4.11	0.01	2.18	0.01	0.01	0.03	0.01	0.01	0.12
JRRM 505	50.14	21.74	7.76	0.49	17.76	0.10	1.82	0.11	0.07	0.02	0.07	0.02	0.08
JRRM 506	46.65	28.19	14.69	0.46	7.49	0.07	2.16	0.13	0.09	0.01	0.08	0.01	0.07
JRRM 508	30.86	38.18	3.98	1.03	22.70	0.00	3.08	0.01	0.01	0.01	0.00	0.00	0.05
JRRM 512	24.81	4.98	29.25	4.06	26.01	0.02	10.57	0.04	0.01	0.01	0.01	0.01	0.02
JRRM 507	22.36	32.03	25.02	1.61	12.98	0.11	5.69	0.16	0.20	0.01	0.13	0.03	-0.11
JRRM 509	20.45	42.57	20.28	2.86	10.15	0.08	1.96	1.20	0.04	0.01	0.11	0.03	0.13
JRRM 510	16.86	50.38	12.21	0.29	14.99	0.17	4.91	0.13	0.19	0.01	0.11	0.04	-0.25
JRRM 511	10.62	52.51	6.68	0.07	27.22	0.12	2.90	0.10	0.10	0.00	0.05	0.05	-0.48

CRM FIRECLAY REFRACTORY SET

SOLD IN SET/10 ONLY — 20 g units

Number	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_20	MgO	MnO	Na_2O	TiO_2
JRRM 101	88.57	8.10	1.06	0.31	0.16	0.21	0.11	1.01	0.30
JRRM 102	80.47	13.79	0.04	3.97	0.14	0.67	0.01	0.30	0.45
JRRM 103	80.32	18.07	0.07	0.40	0.35	0.01	0.00	0.12	0.37
JRRM 104	67.35	22.52	0.25	3.24	3.04	0.07	0.01	0.30	2.94
JRRM 105a	69.17	25.35	0.40	0.76	0.81	0.22	0.11	0.65	2.24
JRRM 106	63.61	29.91	0.14	1.92	1.81	0.98	0.02	0.59	0.67
JRRM 107	55.32	37.08	0.71	2.20	2.57	0.49	0.01	0.21	1.15
JRRM 108	55.31	40.08	0.27	1.54	0.80	0.27	0.02	0.20	1.05
JRRM 109	54.23	41.24	0.14	0.89	0.79	0.12	0.01	0.30	1.96
JRRM 110	49.54	46.68	0.10	0.84	0.34	0.16	0.01	0.08	1.66

CRM FIRECLAY REFRACTORY SET

SOLD IN SET/15 ONLY — 20 g units

Number	SiO_2	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_20	MgO	MnO	Na_2O	P_2O_5	TiO_2	ZrO_2	LOI
JRRM 121	86.3	6.07	1.96	0.01	0.40	0.23	0.12	0.02	3.20	0.32	0.05	1.11	(0.05)
JRRM 125	79.2	18.7	0.13	0.01	0.50	0.69	0.08	0.00	0.07	0.04	0.30	0.02	(0.07)
JRRM 123	79.1	13.3	0.13	0.01	4.13	0.10	1.32	0.01	0.29	0.80	0.45	0.00	(0.03)
JRRM 122	78.2	10.2	0.43	0.81	0.24	2.05	0.65	0.20	1.04	4.89	1.03	0.20	(0.12)
JRRM 124	73.9	16.5	1.09	0.11	2.60	1.79	0.10	0.24	0.31	0.19	2.74	0.11	(0.10)
JRRM 127	68.5	23.0	0.18	0.27	0.92	0.54	0.15	0.17	1.75	1.78	2.19	0.04	(0.07)
JRRM 126	66.9	21.3	0.45	0.65	3.34	3.13	0.12	0.03	0.28	0.49	2.84	0.04	(0.17)
JRRM 129	62.2	30.1	0.15	0.10	1.46	1.92	2.23	0.01	0.23	0.20	0.96	0.11	(0.11)
JRRM 128	54.3	26.0	2.80	0.85	4.45	1.84	3.10	0.24	0.37	3.36	1.37	1.01	(0.02)
JRRM 130	53.4	32.7	1.95	1.05	0.53	1.42	0.61	0.37	2.32	0.91	3.35	0.83	(0.11)
JRRM 131	52.7	36.6	0.78	0.07	2.20	2.61	1.02	0.03	0.76	1.61	1.16	0.26	(0.17)
JRRM 132	50.6	39.1	1.29	0.11	1.64	0.79	0.34	0.11	2.16	2.38	0.29	0.75	(0.15)
JRRM 133	50.1	39.0	0.10	1.27	3.69	0.91	2.03	0.01	0.33	0.34	1.93	0.57	(0.08)
JRRM 134	47.2	44.3	0.20	0.24	1.07	0.37	0.20	0.24	0.13	3.83	1.74	0.35	(0.14)
JRRM 135	37.2	48.9	2.36	0.42	3.05	2.77	1.24	0.04	2.87	0.48	0.07	0.20	(0.18)

CRM MAGNESIA REFRACTORY SET

SOLD IN SET/10 ONLY — certified values — informational values — 20 g units

Number	MgO	Al_2O_3	CaO	Fe_2O_3	SiO_2	B_2O_3	Cr_2O_3	K_2O	MnO	Na_2O	P_2O_5	TiO_2
JRRM 410	99.08	0.05	0.59	0.05	0.18	0.02	0.00	0.00	0.01	0.00	0.04	0.00
JRRM 409	98.03	0.20	0.74	0.49	0.53	0.03	0.01	0.00	0.01	0.00	0.02	0.00
JRRM 408	96.19	2.55	0.67	0.13	0.46	0.09	0.00	0.00	0.01	0.00	0.01	0.00
JRRM 407	94.55	0.10	0.67	2.14	2.43	0.02	0.08	0.00	0.01	0.00	0.04	0.00
JRRM 405	91.95	1.37	1.69	1.34	3.47	0.01	0.01	0.01	0.07	0.00	0.12	0.05
JRRM 406	91.85	1.13	4.80	0.87	1.19	0.01	0.00	0.00	0.01	0.00	0.04	0.00
JRRM 404	88.02	6.01	1.78	2.90	1.22	0.01	0.00	0.00	0.03	0.00	0.05	0.00
JRRM 403	85.48	4.06	0.61	1.55	8.14	0.03	0.01	0.00	0.01	0.00	0.04	0.00
JRRM 402	83.77	1.99	3.57	5.05	5.46	0.12	0.00	0.00	0.01	0.01	0.07	0.02
JRRM 401	81.24	8.10	0.20	3.89	6.42	0.01	0.00	0.00	0.01	0.00	0.03	0.01

CRM SILICA REFRACTORY SETS

SOLD IN SETS ONLY, AS GROUPED — 20 g units

Number	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SiO_2	TiO_2	ZrO_2	
JRRM 221	10.03	2.78	0.02	1.57	0.27	0.68	0.15	0.46	0.01	83.8	0.04	0.01	new 2017
JRRM 222	7.66	0.16	0.006	3.86	0.78	0.94	0.05	0.20	0.006	84.8	0.78	0.48	
JRRM 223	5.22	4.14	0.03	2.04	0.37	0.27	0.20	0.69	0.01	86.0	0.04	0.67	
JRRM 224	4.66	1.95	0.30	2.47	0.90	0.29	0.16	0.28	0.68	87.9	0.15	0.003	
JRRM 225	3.22	3.19	0.01	1.27	0.63	0.13	0.07	0.90	0.01	89.9	0.42	0.01	
JRRM 226	2.63	0.97	0.24	2.99	0.47	0.09	0.02	0.19	0.23	91.2	0.29	0.32	
JRRM 227	1.66	2.41	0.45	0.81	0.11	0.05	0.23	0.05	0.003	92.9	0.09	0.88	
JRRM 228	0.39	1.78	0.08	0.08	0.10	0.11	0.03	1.18	0.99	93.8	1.21	0.01	
JRRM 229	1.17	1.41	0.37	0.19	0.07	0.46	0.07	0.07	0.01	95.7	0.12	0.20	
JRRM 230	0.18	0.60	0.05	0.70	0.02	0.01	0.12	0.07	0.38	97.7	0.03	0.001	
JRRM 231	0.63	0.005	0.18	0.04	0.004	0.004	0.004	0.006	0.001	98.6	0.003	0.38	
JRRM 232	0.05	0.004	0.002	0.05	0.004	0.001	0.005	0.005	0.001	99.7	0.002	(0.001)	

CRM SILICON CARBIDE REFRACTORY SET

available in SET/9 ONLY — 50 g

Number	SiC	Tot C	Free C	LOI	Al	Ca	Fe	Mg	N	O	Ti	Free Si
JRRM 1001	99.58	29.81	0.04	.	0.008	<0.001	0.044	<0.001	0.030	0.048	0.0035	0.06
JRRM 1002	0.06	5.03	4.98	5.11	.	.	.	.	.	.	.	.
JRRM 1003	.	10.06	10.01	10.11	.	.	.	.	.	.	.	.
JRRM 1004	.	20.04	19.92	20.01	.	.	.	.	.	.	.	.
JRRM 1005	.	29.93	29.81	29.95	.	.	.	.	.	.	.	.
JRRM 1006	.	49.99	49.97	49.95	.	.	.	.	.	.	.	.
JRRM 1007	89.29	36.75	10.01	.	.	.	.	.	.	.	.	.
JRRM 1008	29.74	14.12	5.21	.	.	.	.	.	.	.	.	.
JRRM 1009	6.18	39.43	37.67	.	.	.	.	.	.	.	.	.

CRM ZIRCON-ZIRCONIA REFRACTORY SET

SOLD IN SET/10 ONLY — 20 g units

Number	ZrO_2	HfO_2	SiO_2	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	TiO_2
JRRM 601	92.0	1.59	0.26	0.11	5.58	0.00	0.10	0.00	0.06	0.00	0.00	0.16
JRRM 602	88.4	1.52	0.33	0.07	0.22	0.01	1.62	0.00	5.30	0.76	1.34	0.16
JRRM 603	84.8	1.45	0.96	5.29	0.95	0.02	2.86	0.65	0.96	0.18	0.83	0.93
JRRM 604	79.4	1.35	3.05	6.93	0.09	3.06	0.43	1.94	0.01	1.09	1.99	0.13
JRRM 605	75.5	1.31	10.8	4.84	1.94	1.55	0.17	0.54	1.99	0.45	0.35	0.12
JRRM 606	72.5	1.26	22.1	0.53	0.02	0.00	0.93	0.01	0.32	2.03	0.01	0.11
JRRM 607	61.6	1.21	32.9	3.53	0.04	0.00	0.12	0.04	0.03	0.02	0.08	0.13
JRRM 608	58.8	1.21	34.6	0.70	0.52	0.49	0.09	0.01	3.12	0.03	0.11	0.10
JRRM 609	55.6	1.12	40.5	0.88	0.30	0.01	0.15	0.02	0.15	0.94	0.08	0.15
JRRM 610	48.7	0.98	45.7	0.45	3.07	0.00	0.30	0.01	0.54	0.04	0.11	0.09

RM RICE STRAW ASH - THERMOSTIL

typical analysis — 100 g units

Number	SiO_2	Al_2O_3	C	CO_2	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SO_3	TiO_2	$-H_2O$ 900'C
DH 5704	92.49	0.198	3.60	0.008	0.30	0.090	0.97	0.362	0.062	0.070	0.273	0.177	0.004	1.38
DH 5708	86.67	1.15	3.83	0.094	0.97	0.931	0.872	3.10	0.117	0.085	0.226	0.255	0.126	1.70
DH 5705	76.31	0.363	4.33	0.265	2.51	2.89	0.653	9.60	0.245	0.116	0.123	0.409	0.217	2.32

RM SAND FOR SLIDING GATES

typical analysis listed in mass % — 100 g units

Number	SiO_2	Al_2O_3	C	CaO	Cr_2O_3	Fe	K_2O	MgO	Mn_3O_4	Na_2O	NiO	P_2O_5	S	TiO_2	V_2O_5	WO_3	ZrO_2	$-H_2O$ 900'C
DH 4501	72.21	4.92	0.607	0.025	11.53	5.14	0.633	2.40	0.065	0.059	0.053	0.008	.	0.195	0.102	.	.	0.204
DH 4502	65.97	5.69	0.47	0.038	14.75	6.31	0.693	3.24	0.074	0.062	0.033	0.007	0.010	0.203	0.110	.	.	0.177
DH 4507	27.95	11.00	0.326	0.096	33.41	14.51	.	7.29	0.179	.	0.090	CO_2:	0.013	0.486	0.270	0.019	.	0.129
DH 4506	10.22	12.93	0.700	<0.017	42.01	25.03	.	8.18	0.703	.	.	.	0.007	0.510	0.382	.	.	0.091

RM FOUNDRY SAND

typical analysis listed in mass % except * which is mg/kg — 100 g units

Number	BaO	CeO_2	Co_3O_4	Cr_2O_3	CuO	La*	Li*	Nd*	NiO	Sr*	TiO_2	V_2O_5	ZnO	ZrO_2
DH 3301	0.015	0.003	0.020	0.538	0.012	14.0	6.7	8.3	0.003	35.0	0.213	0.007	0.015	0.127

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Mn_3O_4	Na_2O	P_2O_5	SO_3	SiO_2
DH 3301	2.76	0.720	3.84	0.169	0.570	0.070	0.297	0.027	0.116	90.36

CRM ZIRCON SAND

Number	$ZrO_2 + HfO_2$	Al_2O_3	Fe_2O_3	SiO_2	TiO_2	LOI	Units
JCRM R501	66.5	0.39	0.06	32.6	0.16	0.11	100 g
JCRM R502	60.3	5.87	0.10	32.8	0.24	0.26	100 g

CRM SILICA POWDER SET

SOLD IN SET/3 ONLY — 100 g units

Number	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Na_2O	SiO_2	TiO_2	LOI
JCRM R405	1.07	0.029	0.053	0.71	0.023	0.060	97.78	0.022	0.13
JCRM R406	1.31	0.016	0.102	0.13	0.005	0.030	96.71	0.564	0.97
JCRM R404	0.0011	0.00002	0.00006	0.00004	<0.00001	0.0001	>99.99	0.0006	0.00

SILICA BRICK

= class, where 1 = CRM and 2 = RM — analysis listed in mass % — NH, VS: 75g — SRM: 45g — others: 100g

#	Number	SiO_2	Al_2O_3	BaO	CaO	Cr_2O_3	Fe_2O_3	K_2O	Li_2O	MgO	MnO	Na_2O	P	P_2O_5	TiO_2	LOI
1	VS K1/3	96.1	0.55	.	1.35	.	1.36	.	.	0.045	0.031	.	0.0122	.	.	.
1	ECRM 777-1	95.06	0.795	.	2.826	.	0.330	0.154	.	0.071	.	0.02	.	.	0.444	.
1	ECRM 776-1	62.76	29.28	0.122	0.31	0.022	1.43	2.92	0.019	0.476	.	0.488	.	0.062	1.62	.
1	VS K2/4	58.6	35.1	.	0.4	.	2.94	0.69	.	0.48	0.06	0.19	.	.	1.91	.
1	VS K3/2	32.3	63.6	.	0.44	.	1.15	0.15	.	0.27	.	0.17	.	.	1.34	.
1	SRM 198	.	0.16	.	2.71	.	0.66	0.017	0.001	0.07	.	0.012	.	0.022	0.02	0.21
1	SRM 199	.	0.48	.	2.41	.	0.74	0.094	0.002	0.13	.	0.015	.	0.015	0.06	0.17

SILICEOUS MATERIAL

= class, where 1 = CRM, 2 = RM — analysis listed in mass % — T = Total

#	Number	SiO_2	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	TiO_2	LOI	Units	Other
1	BCS 313/2	99.73	0.068	0.0160	BaO:0.00067	0.0229	0.0108	0.0038	0.00032	0.0057	.	0.0243	.	100 g	SrO: 0.00024
1	NCS DC60116a	98.32	1.10	0.038	0.00030	0.076	0.15	0.026	0.0013	0.076	(0.0069)	0.023	0.14	50 g	
1	GBW 03113	95.74	2.36	0.17	0.00054	0.21	0.67	0.098	(0.0033)	0.25	(0.0076)	0.036	0.35	60 g	
1	SRM 2696	95.61	0.2080	0.426	.	(0.055)	0.652	0.235	0.032	(0.129)	(0.0863)	.	(2.11)	70 g	ZnO:0.051
1	NCS DC60117a	94.41	3.20	0.094	0.00034	0.088	1.26	0.025	0.0011	0.47	(0.0070)	0.019	0.27	50 g	
1	GBW 03114	89.59	5.48	0.34	0.0012	0.48	2.07	0.16	(0.010)	1.09	(0.014)	0.102	0.53	60 g	
2	CERAM CEB1	74.0	16.2	0.52	BaO:0.05	0.48	1.75	0.16	.	0.71	0.14	0.34	5.60	25 or 100g	SrO: 0.02
1	GBW 03117	71.25	2.56	6.37	.	0.18	1.10	3.98	.	13.77	.	0.057	0.44	50 g	

RM CERAMIC POWDER

Number	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	TiO_2	Ba	Co	Cr	Cu	Ni	Sc	Zn	Units
SARM 69	66.6	14.4	2.37	7.18	1.96	1.85	0.129	0.777	0.0518	0.0028	0.0223	0.0046	0.0053	0.0020	0.0068	100 g

CRM SYNTHETIC SILICATE WITH TRACE ELEMENTS

Material base: SiO_2 72%, Al_2O_3 15%, Fe_2O_3 4%, $CaMg(CO_3)_2$ pure dolomite 4%, Na_2SO_4 2.5%, K_2SO_4 2.5% — 70 g units analysis listed in mg/kg

Number	Ag	As	B	Ba	Be	Bi	Cd	Ce	Co	Cr	Cu	La	Li	Mn
GBW 07701	(0.034)	2.0	2.1	24	0.26	0.31	0.022	2.0	2.6	2.3	2.0	2.1	15	27
GBW 07702	0.064	5.0	5.1	54	0.56	0.61	0.052	5.0	5.6	5.3	5.0	5.1	18	57
GBW 07703	0.11	10	10.0	104	1.1	1.1	0.1	10.0	10.6	10.3	10.0	10	23	107
GBW 07704	0.21	20	20	204	2.1	2.1	0.2	20	20.6	20.3	20.0	20	33	207
GBW 07705	0.51	50	50	504	5.1	5.1	0.5	50	50.6	50	50	50	63	507
GBW 07706	1.0	100	100	1000	10	10	1.0	100	101	100	100	100	113	1000
GBW 07708	5.0	500	500	5000	50	50	5.0	500	500	500	500	500	513	5000
GBW 07709	10.0	.	1000	10000	100	100	10	1000	.	1000	1000	.	1010	10000
GBW 07710	20	.	.	.	200	200	20	.	.	.	2000	.	.	.
GBW 07711	50	.	.	.	500	.	50	.	.	.	5000	.	.	.

continued

Number	Mo	Nb	Ni	Pb	Sb	Sn	Sr	Ti	V	W	Y	Yb	Zn	Zr
GBW 07701	0.21	2.3	2.6	2.5	0.28	0.28	5.0	24	2.8	0.20	2.0	0.2	3.0	2.2
GBW 07702	0.51	5.3	5.6	5.5	0.58	0.58	8.0	54	5.8	0.50	5.0	0.5	6.0	5.2
GBW 07703	1.0	10.3	10.6	10.5	1.1	1.1	13	104	10.8	1.0	10	1.0	11.0	10.2
GBW 07704	2.0	20.3	20.6	20.5	2.1	2.1	23	204	20.8	2.0	20	2.0	21	20
GBW 07705	5.0	50	50.6	50	5.1	5.1	53	504	51	5.0	50	5.0	51	50
GBW 07706	10	100	101	100	10	10	103	1000	101	10	100	10	101	100
GBW 07708	50	500	500	500	50	50	500	5000	500	50	500	50	500	500
GBW 07709	100	.	.	1000	100	100	1000	10000	1000	100	.	100	1000	1000
GBW 07710	200	.	.	2000	200	200	2000	20000	.	200	.	.	2000	.
GBW 07711	500	.	.	5000	500	500	5000	.	.	500	.	.	5000	.

CRM SILICON METAL POWDER

analysis listed in mass % — IPT: 60 g units NCS: 50 g units SRM: 40 g units

Number	Al	C	Ca	Cr	Cu	Fe	Mg	Mn	Ni	P	S	Ti	V	Zr
NCS DC25007	0.24	.	0.31	.	.	0.39	.	.	.	.	.	.	.	.
SRM 57B	0.1690	(0.0200)	(0.00222)	(0.00173)	(0.00172)	0.3400	.	0.00782	0.00153	0.00163	(0.0030)	0.0346	(0.0025)	0.00178
IPT 134	0.085	0.025	0.102	0.0011	0.0014	0.29	0.0048	0.0113	0.0006	0.0033	0.002	0.0097	0.0004	.
IPT 135	0.045	0.018	0.011	0.0006	0.0008	0.125	0.0012	0.0070	0.0005	0.0027	0.002	0.0113	0.0003	.
NCS HC25649	0.032	.	0.060	.	.	0.53	.	.	.	0.0067	.	0.026	.	.
NCS HC25648	0.026	.	0.055	.	.	0.44	.	.	.	0.0065	.	0.023	.	.

CRM SILICON CARBIDE

analysis listed in mass %

Number	SiC	Al	Fe	Units
VS K9/2	99.6	(0.002)	(0.06)	150 g

CRM SILICON CARBIDE

in the chart below, (F) = Free and (T) = Total analysis listed in mass % except * which is mg/kg

Number	C (T)	C (F)	Si (T)	Si (F)	SiO_2 (F)	Al	B	Ca	Cr	Cu	Fe	K	Mg
ECRM 781-1	48.251	(37.22)	35.56	(4.66)	.	4.39 (T)	(0.0149)	(0.0433)	(0.0240)	.	(0.8061)	(0.3765)	(0.0421)
NMIJ 8002a	29.93	.	68.01	.	.	0.0189	.	.	0.00619	0.0115	0.0130	.	.
BAM S008	29.9	0.045	.	(<0.03)	(<0.01)	0.0047	0.00030	0.00025	0.000016	0.000010	0.00048	.	0.000007
NMIJ 8001a	29.80	.	68.31	.	.	0.00832	.	.	.	.	0.00467	.	.
ECRM 780-1	26.381	.	63.5	.	.	1.86 (T)	.	0.84	.	.	1.30 (T)	(0.0112)	0.051
BCS 360	23.53	(0.085)	60.8	(0.54)	.	6.52	.	0.115	.	.	(0.19)	.	.
BCS 359	23.46	(0.061)	67.6	(0.32)	.	0.118	.	0.108	.	.	0.175	.	.

Number	Mn	Mo	N	Na	Ni	O	Ti	V	Y*	Zr	Notes	Units
ECRM 781-1	(0.0274)	.	(0.0282)	(0.0308)	(0.0210)	.	(0.0320)	(0.0216)	.	.	P: (0.0117) Mo: (0.0264)	100 g
NMIJ 8002a	0.000160	0.0109	.	.	.	.	0.00477	.	0.58	.	Beta Phase	50 g
BAM S008	0.000005	0.0018	.	0.000017	0.00009	0.0146	0.0067	0.0275	.	0.00044	(SiC-6H:99.7, SiC-15R:0.23, SiC-4H:0.06)	50 g
NMIJ 8001a	.	.	.	.	.	.	0.000637	.	0.31	.	Alpha Phase	50 g
ECRM 780-1	0.029	.	0.325	(0.0502)	.	.	.	.	.	.	n/a	100 g
BCS 360	.	.	(4.77)	.	.	(4.03)	0.025	.	.	.	Sialon Bonded	100 g
BCS 359	.	.	(7.84)	.	.	(0.53)	0.022	.	.	.	Nitrogen Bearing	100 g

CRM SILICON CARBIDE SET

SOLD IN SET/3 ONLY F = Free T = Total 50 g each

Number	T.Si	F.Si	F.SiO_2	T.C	F.C	Al	Ca	Cl	Cr	Cu	F	Fe	Mg
JCRM R024	68.97	(0.042)	(0.593)	29.85	(0.423)	0.0193	0.0019	(<0.002)	0.0056	(<0.0006)	(<0.001)	0.0219	0.0002
JCRM R025	68.43	(0.014)	(0.356)	30.49	(1.24)	0.0184	0.0008	(<0.002)	0.0097	0.0021	(0.0574)	0.0233	(<0.0001)
JCRM R026	69.03	(0.012)	(0.311)	29.85	(0.598)	0.0059	0.0004	(<0.002)	(<0.0005)	(<0.0006)	0.0686	0.0011	(<0.0001)

Number	Mn	Mo	N	Ni	O	P	S	Ti	V	Zn	Zr
JCRM R024	0.0004	(<0.001)	(0.048)	0.0060	0.97	(<0.01)	(<0.005)	0.0340	0.0013	(<0.0005)	0.0047
JCRM R025	(<0.0003)	0.0126	0.113	0.0011	0.94	(<0.01)	(0.0431)	0.0040	0.0053	(<0.0005)	0.0012
JCRM R026	(<0.0003)	(<0.001)	0.034	(<0.001)	0.71	(<0.01)	(<0.005)	0.0016	0.0018	(<0.0005)	(<0.0005)

CRM SILICON NITRIDE

analysis in mass % analysis in mg/kg

Number	Si	N	Al	C	Ca	Fe	O	Co	Mg	Cr	Mn	Na	Ni	Ti	W	Zr	â-phase of Si_3N_4	Units
INDIVIDUAL																		
SRM 8983	.	39.23	.	0.107	.	.	1.20	.		.	.	.	.	.	.	.	.	4.5 g
NMIJ 8004a	59.226	38.485	0.07397	.	0.00727	0.01969	.	.	10.29	.	2.987	.	2.485	8.519	.	2.146	last	25 g
BAM ED101	.	38.1	0.0469	0.162	0.00141	0.00795	(1.91)	43.5	4.3	.	.	7.59	.	.	41.3	.	7.43	last 50 g
SET ONLY																		
JCRM R006	59.57	38.98	<0.002	0.101	<0.0003	0.0012	1.18	.	<2	<6	<1	.	<8	<4	.	<7	.	20 g
JCRM R007	59.45	39.13	0.0707	0.136	0.0931	0.0169	0.79	.	68	49	28	.	<8	58	.	<7	.	20 g
JCRM R008	59.03	38.46	0.116	0.097	0.225	0.171	1.56	.	12	92	86	.	<8	72	.	9	.	20 g

CRM SILICON NITRIDE

analysis listed in mass % SRM 656 is two 10 g powder units, one á and one ß phase powder

Number	Powder	Mass á	Uncertainty ±	Mass ß	Uncertainty ±	Amorphous	Uncertainty ±
SRM 656	á	87.5	0.59	3.0	0.05	9.5	0.61
SRM 656	ß	16.3	0.81	75.1	2.54	8.6	0.60

CRM BORON NITRIDE

analysis listed in mass % T = Total AO = adherent oxide 50 g units

Number	B.T	B.AO	N	Al	C	Ca	Co	Cr	Fe	H_2O	Mg	Na	O	Si	Ti
BAM ED103	43.5	0.070	55.6	0.00070	(0.018)	0.0273	(<0.00001)	0.00047	0.00150	(<0.1)	0.0056	0.00123	0.68	0.0017	0.00049

CRM SILICOALUMINUM

analysis listed in mass %

Number	Al	Si	Fe	Ba	C	Ca	Co	Cr	Cu	Mg	Mn	Ni	P	S	Sr	Ti	Units
NCS HC14605	36.67	25.94	24.97	9.12	0.13	1.33	.	0.152	0.045	.	0.12	0.167	0.018	0.012	.	.	70 g
NCS HC93615	34.80	29.87	30.47	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC14603	32.84	24.12	33.54	7.57	0.13	0.71	.	0.085	0.061	.	0.14	0.042	0.015	0.015	.	.	70 g
NCS HC14602	32.82	19.21	38.09	6.52	0.14	0.85	.	0.017	0.137	.	0.25	0.014	0.015	0.013	.	.	70 g
NCS HC13602	32.55	32.01	20.59	7.41	0.27	1.17	.	.	.	0.85	0.197	.	0.017	0.0096	.	.	50 g
NCS HC93614	31.91	33.75	27.84	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC93633	29.67	28.31	37.44	0.45	.	.	.	.	.	.	0.426	.	0.023	0.022	.	.	50 g
NCS HC14604	25.44	19.21	49.14	2.64	0.24	0.44	.	0.053	0.172	.	0.25	0.018	0.011	0.011	.	.	70 g
NCS HC28635	16.63	43.60	17.53	1.64	1.00	15.18	.	0.054	0.046	0.027	0.095	0.026	0.051	0.040	0.023	.	50 g
NCS HC14609	14.46	33.41	35.46	7.72	0.22	5.74	.	0.116	0.32	0.18	0.33	0.016	0.018	0.017	0.092	0.055	60 g
NCS HC14610	13.47	40.58	23.25	10.70	0.24	8.25	0.0032	0.032	0.29	0.12	0.23	0.012	0.021	0.025	0.094	0.124	60 g
NCS HC14608	9.14	53.39	14.22	12.39	0.13	8.28	0.0022	0.021	0.176	0.21	0.17	0.0061	0.022	0.021	0.132	0.084	60 g
NCS HC28637	5.42	52.76	10.54	15.33	0.63	11.10	.	0.031	0.017	0.019	0.15	0.0070	0.024	0.073	0.042	.	50 g
NCS HC28636	4.07	50.36	16.68	24.26	0.34	1.44	.	0.083	0.032	0.032	0.11	0.021	0.016	0.038	0.095	.	50 g
NCS HC14611	1.47	56.74	5.77	17.00	1.56	13.61	0.0016	0.0044	0.0097	0.045	0.065	0.0020	0.016	0.14	0.22	0.126	60 g

CRM SILICOBARIUM

analysis listed in mass % 50 g units

Number	Ba	Si	Al	C	Ca	Fe	Mg	Mn	P	S	Sr
NCS HC93632	27.54	47.56	2.78	0.99	.	11.75	.	0.16	0.024	0.13	.
NCS HC93634	14.14	52.62	1.82	0.64	14.08	12.97	0.051	0.104	0.022	0.204	0.063
NCS HC93631	10.00	37.19	13.46	0.78	5.16	27.56	0.098	0.43	0.032	0.044	.

SILICOCALCIUM

= class, where 1 = CRM and 2 = RM

#	Number	Ca	Si	Al	Ba	C	Cr	Cu	Fe	Mg	Mn	Mo	Ni	P	S	Ti	Units
1	NCS HC93613	31.67	56.20	1.77	.	1.30	.	.	5.58	.	.	.	.	0.018	0.088	.	50 g
1	**BS 119**	31.3	62.9	0.44	.	0.30	.	.	3.03	.	.	.	.	0.034	0.012	**17025**	100 g
1	NCS HC37620	30.70	60.09	Sol.Al:1.09		0.68	.	.	.	.	.	.	.	0.017	0.033	.	50 g
2	DH 0406	30.48	60.79	0.333	.	0.61	<0.009	.	5.17	0.010	0.056	.	.	0.031	0.022	0.019	50 g
1	NCS HC11604a	30.45	56.02	1.97	.	0.94	.	.	6.93	.	0.037	.	.	0.054	0.073	.	50 g
1	VS F26/3	29.9	60.1	1.52	.	.	.	.	6.19	.	.	.	.	0.024	0.029	0.161	100 g
1	VS F26/2	29.9	59.5	1.52	.	.	.	.	6.29	.	.	.	.	0.024	0.030	0.156	100 g
2	DH 0402	28.48	58.68	1.13	.	.	0.010	0.014	6.74	0.049	0.051	.	.	0.014	.	0.055	50 g
1	58A CQ42001	28.25	55.31	1.88	.	2.44	.	.	6.08	.	.	.	.	0.019	0.0132	.	50 g
1	NCS HC93627	28.02	57.43	1.76		1.02	.	.	6.94	.	.	.	.	0.030	0.045	.	50 g
1	NCS HC11619	27.15	61.11	2.15	.	0.55	.	.	6.61	.	0.053	.	.	0.048	0.029	.	50 g
1	NCS HC37621	25.25	60.19	Sol.Al:1.55		0.71	.	.	.	.	.	.	.	0.031	0.020	.	50 g
1	VS F25/3	21.3	51.5	0.67	.	.	.	.	23.06	.	.	.	.	0.011	0.0056	.	100 g
1	NCS HC11605	13.22	53.46	2.34	14.02	0.385	0.054	0.079	13.57	0.022	0.075	Sr:0.235	0.023	0.014	0.039	.	60 g
1	VS F44	12.6	49.7	1.68	.	0.166	.	.	19.91	9.6	.	.	V:(2.5)	0.014	0.0066	.	100 g

CRM SILICOCHROMIUM

Number	Cr	Si	Fe	Al	B	C	Co	Cu	Mn	Ni	P	S	Ti	V	Units
SRM 689	36.4	39.5	23.2	0.049	0.0017	0.043	0.034	0.013	0.32	0.20	0.026	0.002	0.40	0.09	100 g
NCS HC25633	33.90	44.06	.	1.00	.	0.045	.	.	0.29	.	0.013	(0.002)	.	.	50 g
NCS HC25643	32.62	49.17	.	1.24	.	0.018	.	.	0.429	.	0.0083	0.0025	.	.	50 g

SILICOMANGANESE

= class, where 1 = CRM and 2 = RM

#	Number	Mn	Si	Fe	C	Co	Cr	Cu	Ni	P	S	Ti	V	Units
2	DH 0107	77.82	17.36	2.64	1.65	0.030	.	0.012	0.020	0.135	.	0.122	0.015	50 g
1	BS SiMn-1	73.2	16.0	8.2	1.80	(0.051)	0.019	(0.042)	(0.083)	0.278	0.016	(0.19)	(0.04)	100 g
1	MHCX04	70.0	22.7	5.31	0.80	0.111	0.103	0.104	0.122	0.149	0.012	0.28	0.085	70 g
1	NCS HC25605b	69.77	14.20	.	2.21	.	.	.	.	0.153	0.0052	.	.	50 g
1	NCS HC25657	67.96	25.03	.	0.58	.	.	.	.	0.065	0.011	0.18	.	50 g
1	VS F23/1	67.53	21.18	.	1.45	.	.	.	.	0.235	0.0155	.	.	100 g
1	NCS HC26611b	67.44	18.24	.	1.24	.	.	.	.	0.080	0.009	.	.	50 g
1	NCS HC28618	67.40	19.34	11.65	1.05	0.017	0.045	0.051	0.036	0.107	0.017	0.255	0.063	50 g
1	NCS HC25605c	67.20	21.87	10.01	0.456	0.020	0.029	0.019	0.013	0.132	0.0076	0.175	0.040	50 g
1	NCS HC37612	67.02	18.96	.	1.10	.	.	.	.	0.178	0.016	0.276	.	50 g
1	NCS HC18603	66.70	17.21	.	1.70	.	.	.	.	0.183	0.025	.	.	50 g
1	NCS HC93619	66.40	17.55	.	1.65	.	.	.	.	0.137	0.025	.	.	50 g
1	NCS HC11603b	66.37	17.63	.	1.34	.	.	.	.	0.065	0.008	.	.	100 g
1	NCS HC25605a	66.30	18.28	.	1.09	.	.	.	.	0.145	0.010	0.18	.	50 g
1	NCS HC19607	66.20	18.41	.	1.56	.	.	.	.	0.126	0.022	.	.	50 g
1	NCS HC25640	65.85	24.74	.	0.181	.	.	.	.	0.104	0.010	.	.	50 g
1	NCS HC93625	65.74	17.19	.	1.66	.	.	.	.	0.151	0.026	.	.	50 g
1	NCS HC93637	65.70	17.54	.	1.80	.	.	.	.	0.023	0.023	.	.	100 g
1	NCS HC11603a	65.67	17.49	.	1.33	.	.	.	.	0.065	0.011	.	.	100 g
1	NCS HC37605	65.64	17.67	.	1.55	.	.	.	.	0.14	0.024	0.46	.	50 g
1	YSBC25616-97	65.54	21.88	.	0.435	.	.	.	.	0.141	0.009	.	.	50 g
1	NCS HC25640a	65.50	24.47	.	0.197	.	.	.	.	0.117	0.0079	.	.	50 g
1	MHCX03	65.5	29.2	4.92	0.04	.	0.20	0.13	0.11	0.047	0.004	0.49	.	100 g
1	NCS HC25654	65.29	19.26	.	0.876	.	.	.	.	0.109	0.0122	0.19	.	50 g
2	DH 0106	65.24	18.38	14.60	1.21	0.013	0.011	0.017	0.042	0.080	0.010	0.121	0.015	50 g
1	NCS HC28617	64.97	17.59	15.16	1.57	0.035	0.055	0.096	0.092	0.127	0.018	0.221	0.060	50 g
1	NCS HC93624	64.86	16.87	.	1.79	.	.	.	.	0.120	0.024	.	.	50 g
1	NCS HC93618	63.91	19.04	.	1.13	.	.	.	.	0.140	0.022	.	.	50 g
1	NCS HC93626	63.80	16.42	.	1.91	.	.	.	.	0.097	0.020	.	.	50 g
1	JSS 705-5	62.69	14.99	.	1.941	.	.	.	.	0.239	(0.0087)	.	.	150 g
1	NCS HC28616	62.53	14.33	20.00	2.28	0.048	0.060	0.080	0.167	0.205	0.020	0.222	0.095	50 g
2	DH 0302	62.17	27.95	8.69	0.092	0.054	0.016	0.031	0.032	0.089	.	0.288	0.015	50 g
1	NCS HC26621	61.49	27.49	.	0.039	.	.	.	.	0.072	0.009	0.24	.	50 g
2	DH 0303	60.60	30.66	7.52	0.029	0.023	0.024	0.016	0.039	0.059	.	0.444	0.015	50 g
1	NCS HC25641	60.29	27.88	.	0.082	.	.	.	.	0.078	0.0069	0.41	.	50 g
1	NCS HC37606b	60.13	13.87	.	2.26	.	.	.	.	0.42	0.040	0.25	.	50 g
1	NCS HC25646	59.34	32.90	.	0.018	.	.	.	.	0.043	0.0034	0.24	.	50 g
2	DH 0301	59.06	30.16	9.91	0.015	0.028	0.035	0.019	0.033	0.050	.	0.471	0.015	50 g
1	58A CQ43001	58.49	15.96	.	1.84	.	.	.	.	0.32	0.026	.	.	50 g
1	NCS HC26620	54.97	19.15	.	0.40	.	.	.	.	0.060	0.011	0.24	.	50 g

the below continuation shows only the samples with more data

Number	As	B	Ca	Pb	Sb	Zr
BS SiMn-1	(0.010)	(0.014)	(0.05)	(0.0005)	(0.002)	(0.0007)
MHCX04	0.004	0.03	(0.010)	0.008	. Zn:0.012	
NCS HC28618	0.0099	.	.	0.0007	0.0004	.
NCS HC25605c	.	0.010	.	.	.	.
NCS HC25605a	.	0.0063	.	.	.	.
MHCX03	.	(0.009)	.	.	.	.
NCS HC25654	.	0.022	.	.	.	.
NCS HC28617	0.010	.	.	0.0005	0.0009	.
JSS 705-5	.	0.0231	.	.	.	.
NCS HC28616	0.015	.	.	0.0012	0.0025	.
DH 0302	.	.	.	.	.	0.008
NCS HC25641	.	0.021	.	.	.	.
NCS HC25646	.	0.048	.	.	.	.
DH 0301	.	0.0048	.	.	.	.
NCS HC26620	.	Al:0.015	.	.	Mo:(0.0009)	.

17025 many more values on certificate
Al: 0.010, Mo: 0.016, Sn: 0.008

SILICOZIRCONIUM

	Number	Zr	Si	Fe	Al	C	Ca	Cr	Cu	Hf	Mn	N	Ni	P	S	Ti	Units
CRM	VS F27/2	51.5	26.1	(12)	7.48	0.111	.	.	1.47	.	.	.	.	0.044	(0.001)	0.215	100 g
RM	DH 3001	36.06	51.14	8.87	0.852	0.338	0.157	0.004	.	0.804	0.210	0.027	0.013	0.033	0.002	0.073	50 g

CRM BASIC SLAG

analysis listed in mass % — 100 g units

Number	Al	B	Ca	Cr	F	Fe	K	Mg	Mn	Na	P	S	Si	Ti	V	Zn
IRSID 802-1	8.53	0.0245	30.62	0.0053	0.243	0.576	0.491	2.87	0.460	0.236	0.109	0.714	15.16	0.366	0.028	0.0025
ECRM 804-1	0.407	.	36.88	.	.	11.92	.	0.88	1.48	.	7.67	0.127	2.59	0.152	0.460	.

CRM FERROALLOY SLAG

100 g units

Number	Al_2O_3	BaO	CaO	Cr_2O_3	Fe_2O_3	K_2O	MgO	MnO	Na_2O	S	SiO_2	SrO	TiO_2
AMIS 0536	8.17	1.72	27.6	0.064	1.69	0.608	5.27	26.0	.	0.85	26.7	0.57	0.35
AMIS 0535	7.51	1.55	27.1	0.071	0.76	0.761	5.89	26.3	0.50	0.76	27.0	0.48	0.34
AMIS 0533	6.99	1.63	26.73	0.119	0.908	0.649	6.31	23.69	0.417	0.827	30.09	0.504	0.338

IRON MAKING SLAG

= class, where 1 = CRM and 2 = RM

#	Number	CaO	SiO_2	Al_2O_3	C	Fe	FeO	K_2O	MgO	MnO	Na_2O	P_2O_5	S	TiO_2	Units
1	NH 7-1-009	49.6	32.8	9.2	.	0.47	.	(0.19)	1.1	0.60	(0.14)	.	1.17	0.38	75 g
2	BS Slag 2	44.6	36.9	10.3	(0.2)	0.24	.	0.16	5.9	0.19	0.16	.	1.16	0.204	50 g
1	IRSID 803-1	43.28	36.38	13.19	.	0.613	.	.	4.05	0.713	.	0.270	0.767	0.502	100 g
1	IRSID 802-1 *	42.84	32.43	16.12	.	0.576	.	.	4.76	0.593	.	0.250	0.714	0.611	100 g
1	NH 7-1-008	42.1	39.1	8.4	.	0.30	.	(0.52)	6.1	0.73	(0.33)	.	(0.65)	0.30	75 g
1	NH 7-1-005	38.8	35.3	10.0	.	0.21	.	(0.19)	12.0	0.47	(0.13)	.	(0.85)	0.32	75 g
1	CAN SL-1	37.48	35.73	9.63	.	.	0.92	(0.51)	12.27	(0.86)	(0.39)	.	1.26	(0.38)	200 g
2	BS 100A	37.0	35.3	10.10	(0.2)	0.29	.	(0.5)	12.85	0.33	(0.2)	0.0034	1.77	0.48	100 g
1	NH 7-1-010	31.2	44.0	7.94	.	5.5	.	(0.59)	0.73	3.40	(0.18)	.	0.14	0.91	75 g
1	NH 7-1-007	31.2	39.0	6.2	.	0.55	.	(0.38)	18.9	0.78	(0.24)	.	(0.57)	0.39	75 g
1	NH 7-1-014	30.1	33.6	24.0	.	1.27	.	(0.07)	9.3	(0.3)	(0.07)	.	(0.02)	(0.07)	75 g
1	NH 7-1-011	29.4	21.9	24.0	.	1.9	.	(0.04)	17.5	1.97	(0.19)	.	(0.03)	(0.09)	75 g
1	NH 7-1-013	28.7	20.3	38.6	.	1.12	.	(0.03)	8.0	0.26	(0.04)	.	(0.03)	0.78	75 g
1	NH 7-1-015	28.0	(44.7)	14.5	.	1.7	.	(0.08)	9.2	0.58	(0.1)	.	(0.02)	(0.08)	75 g

* Oxides Calculated, see previous chart “BASIC SLAG” for actual certified values

STEEL MAKING SLAG

= class, where 1 = CRM and 2 = RM — CMSI, GBW, RH: 50 g units — NH: 75 g units — all others: 100 g units

#	Number	CaO	T.Ca	CaF_2	SiO_2	Al_2O_3	Cr_2O_3	F	Fe	FeO	K_2O	MgO	MnO	Na_2O	P_2O_5	s.P_2O_5	S	TiO_2	V_2O_5	
2	RH02	64.7	.	.	(12.9)	11.0	(0.03)	.	(0.2)	(0.2)	.	3.5	0.024	.	P:0.003	.	(0.9)	0.07	.	
1	JK S11 *	.	60.0	.	26.8	2.85	0.17	(7.9)	.	(0.2)*	.	4.7	0.12	.	(<0.005)	.	0.30	0.95	(<0.01)	
2	BS 101/3	54.4	.	.	18.8	1.42	.	.	10.9	.	0.005	3.0	5.0	0.027	0.74	.	0.18	(0.9)	.	
1	CMSI 1745	.	37.64	1.41	14.91	1.78	.	.	13.38	12.33	.	9.28	1.86	.	1.02	.	0.097	0.42	.	
2	BS 101/1	52.9	.	.	23.3	0.70	.	.	5.8	.	0.008	8.7	3.47	0.013	0.76	.	0.19	0.8	.	
1	**BS 101/4**	52.5	.	.	16.7	0.86	.	.	(13.3)	.	0.007	4.8	4.79	0.018	0.81	.	0.15	1.16	.	**17025**
1	IRSID 804-1	51.60	.	.	5.54	(0.79)	.	.	11.92	.	.	1.46	1.91	.	17.58	.	0.127	0.25	0.82	
1	BCS 381	49.0	.	.	8.78	0.67	0.33	.	13.3	3.69	.	1.03	3.16	.	15.7	15.2	0.19	0.35	0.94	
1	IRSID 805-1	48.92	.	.	6.63	0.616	.	.	14.87	.	.	1.86	2.05	.	16.20	.	0.092	0.342	0.918	
2	BS 101/2	47.6	.	.	16.9	0.91	.	.	15.1	.	0.008	7.0	4.8	0.031	0.63	.	0.20	(0.8)	.	
1	IRSID 806-1	46.13	.	.	11.72	0.901	.	.	17.89	.	.	3.02	5.94	.	2.25	.	0.110	0.504	0.514	
2	BS 101/5	46.1	.	.	15.2	0.74	.	.	19.4	.	0.0044	5.0	5.7	(0.04)	0.71	.	0.12	1.2	.	
1	ECRM 879-1	43.70	.	.	8.82	0.803	0.477	0.368	18.97	.	.	2.19	4.45	.	8.46	7.59	0.102	0.535	0.738	
1	NH 143	42.90	.	.	4.88	(0.50)	0.97	.	14.53	8.62	.	5.29	2.84	.	16.71	.	0.083	0.15	.	
1	NH 146	40.56	.	.	11.38	4.29	0.69	.	20.30	18.47	.	5.47	5.52	.	2.11	.	0.165	0.39	.	
1	NH 151	34.83	.	.	15.97	2.06	0.65	.	14.94	0.14	.	5.05	8.44	.	7.92	.	0.079	0.53	.	
1	NH 156	34.66	.	.	15.20	7.80	0.75	.	16.35	0.14	.	4.66	3.81	.	5.98	.	0.111	0.36	.	
1	CMSI 1744	26.73	.	.	8.91	3.92	.	.	34.33	36.55	.	12.15	2.01	.	0.87	.	0.107	0.32	.	
1	VS W4/4	25.5	.	.	16.7	3.62	.	.	23.2	25.5	.	18.3	4.17	.	P: 0.259	.	0.037	1.02	.	
1	NH 150	21.77	.	.	15.69	3.23	1.74	.	24.23	27.30	.	(14.46)	8.16	.	0.62	.	0.044	0.15	.	
1	NH 152	21.95	.	.	15.91	2.60	28.67	.	14.40	12.79	.	6.17	4.85	.	(0.12)	.	0.028	0.37	.	
1	NH 145	20.85	.	.	22.43	2.39	0.99	.	27.97	30.46	.	2.71	9.26	.	2.05	.	0.089	0.56	.	
1	NH 149	9.85	.	.	8.42	3.36	53.81	.	14.09	8.12	.	2.89	3.74	.	(0.03)	.	0.040	0.22	.	
1	SARM 77	3.64	.	.	26.8	27.5	12.5	.	5.31T	.	.	22.99	.	.	.	.	0.32T	.	.	
1	NH 154	(1.15)	.	.	48.67	3.68	1.54	.	10.65	13.36	.	2.44	(28.0)	.	(0.03)	.	0.074	0.27	.	

#	Number	CaO	T.Ca	CaF_2	SiO_2	Al_2O_3	Cr_2O_3	F	Fe	FeO	K_2O	MgO	MnO	Na_2O	P_2O_5	s.P_2O_5	S	TiO_2	V_2O_5

* JK S11 lists total Fe as FeO

BLAST FURNACE SLAG

analysis in mass % JSS: 70g NCS HC15x, 28x: 80g all others: 100g

#	Number	CaO	Ca	SiO_2	Al_2O_3	MgO	Fe	FeO	K_2O	Mn	MnO	Na_2O	P	P_2O_5	S	TiO_2
1	IMZ 278	51.70	.	17.43	1.49	3.24	12.37	10.96	(0.013)	4.47	.	(0.026)	0.451	.	0.139	(0.178)
1	IMZ 275	44.35	.	40.99	4.71	5.18	0.548	.	1.01	0.598	.	(0.823)	(0.0097)	.	0.368	0.160
1	IMZ 272	43.85	.	41.80	4.74	5.26	(0.93)	.	(0.423)	0.608	.	(0.342)	0.010	.	0.534	(0.170)
1	IMZ 271	43.81	.	41.35	4.76	5.03	1.57	.	0.426	0.615	.	0.350	(0.011)	.	0.535	(0.188)
1	IMZ 273	43.45	.	42.50	7.09	1.98	1.08	.	0.674	0.882	.	0.620	(0.0097)	.	0.572	0.258
1	IMZ 274	43.37	.	38.91	5.25	4.67	3.36	.	0.456	0.635	.	0.331	(0.011)	.	0.563	0.205
1	JSS 905-2	42.8	.	34.4	13.7	5.4	0.33	.	K:0.262	.	0.34	Na:0.144	0.006	.	(0.75)	0.528
2	DH 3226	41.95	.	35.92	13.01	6.37	0.174	.	0.407	0.236	.	0.265	.	0.005	1.17	0.614
2	DH 3227	41.07	.	37.50	12.09	6.314	0.196	.	0.527	0.433	.	.	.	.	0.989	0.700
2	DH 3231	40.85	.	37.31	12.5	6.225	0.252	.	0.43	0.362	.	.	.	.	1.069	0.776
2	DH 3230	40.42	.	37.24	12.64	5.944	0.667	.	0.431	0.402	.	0.215	.	.	1.068	0.729
2	DH 3225	.	28.59	38.06	12.80	7.63	0.385	.	0.115	0.129	.	0.092	.	.	1.55	0.247
2	DH 3219	.	28.24	39.26	10.00	7.47	0.383	.	0.744	0.981	.	0.299	.	0.026	0.832	0.533
1	NCS HC15803	39.66	.	35.00	13.93	5.61	1.76	2.16	0.42	.	0.175	0.26	0.0056	.	0.98	0.51
1	NCS HC28805	39.20	.	34.91	12.80	9.27	0.76	.	.	.	0.090	.	.	0.012	0.90	0.42
1	IMZ 276	38.57	.	10.92	1.02	5.75	25.12	22.11	(0.0062)	4.88	.	(0.017)	0.416	.	0.076	(0.172)
1	DH 3234	37.26	.	41.51	11.32	5.37	0.742	.	0.890	0.971	.	.	.	.	0.90	0.618
1	NCS HC28804	37.13	.	31.18	16.26	7.52	2.01	.	.	.	1.23	.	.	0.043	0.79	0.58
2	DH 3232	36.59	.	39.03	11.81	8.12	0.417	.	1.228	0.671	.	0.437	.	.	1.06	0.589
2	DH 3233	36.30	.	41.53	11.53	5.27	1.72	.	0.462	0.907	.	0.193	.	0.026	0.804	0.621
1	NCS HC28803	36.26	.	31.82	16.85	9.92	0.92	.	.	.	0.78	.	.	0.018	0.75	0.52
2	DH 3228	35.66	.	38.69	11.93	8.56	0.332	.	1.235	1.342	.	0.388	.	0.014	0.812	0.638
1	IMZ 277	35.65	.	16.32	1.61	6.39	23.63	(21.69)	(0.019)	4.04	.	(0.032)	0.392	.	0.065	(0.177)
1	NM 435.2	34.94	.	32.22	20.79	7.63	0.43	0.50	.	.	.	.	0.007	.	0.98	0.88
2	DH 3235	34.35	24.55	39.33	15.68	6.289	2.87	.	0.090	0.341	.	0.103	.	0.015	1.539	0.229
2	DH 3224	.	27.10	37.88	12.86	7.03	2.53	.	0.170	0.145	.	0.102	.	.	1.55	0.265
1	NH 7-1-006	32.7	.	38.5	7.05	16.8	0.59	.	(0.61)	.	1.24	(0.35)	.	.	(0.56)	0.34
1	VS SH14	32.5	.	28.2	15.4	11.9	0.89	.	.	.	0.59	.	.	.	0.45	9.63
1	NCS HC19805	25.57	.	22.67	13.85	9.05	0.80	.	.	.	0.74	.	.	.	0.234	25.28
1	ECRM 883-1 *	.	21.32	16.67	6.55	8.86	0.9820	.	0.393	0.546	.	0.316	0.0033	.	1.0885	1.3331
1	NH 7-1-012	0.57	.	51.4	45.2	(0.21)	1.02	.	(0.02)	.	0.06	(0.52)	.	.	(0.009)	(0.09)

Number	BaO	C tot.	CO_2	Cr_2O_3	Sr	SrO	V_2O_5	Zn	Zr	ZrO_2	$-H_2O$ 900'C
IMZ 278	.	.	.	.	.	.	.	(0.003)	.	.	.
IMZ 275	.	.	.	.	.	.	.	(0.0026)	.	.	.
IMZ 272	.	.	.	.	.	.	.	(0.050)	.	.	.
IMZ 271	.	.	.	.	.	.	.	(0.036)	.	.	.
IMZ 273	.	.	.	.	.	.	.	(0.0026)	.	.	.
IMZ 274	.	.	.	.	.	.	.	0.051	.	.	.
JSS 905-2	.	.	.	.	.	.	.	.	.	.	.
DH 3226	0.093	.	.	.	0.064	.	.	.	.	0.039	.
DH 3227	0.094	.	.	.	.	0.054	.	.	.	0.039	.
DH 3231	.	.	.	.	.	0.055	.	.	.	0.044	.
DH 3230	0.090	.	.	.	.	0.054	.	.	.	0.042	.
DH 3225	0.086	.	.	.	.	0.053	.	.	.	0.046	.
DH 3219	.	0.028	0.060	.	.	0.045	.	.	.	.	0.07
NCS HC15803	.	.	.	Cu:0.0013	.	.	.	.	.	.	.
NCS HC28805	.	.	.	.	.	.	.	.	.	.	60 g
IMZ 276	.	.	.	.	.	.	.	(0.009)	.	.	.
DH 3234	0.087	.	.	0.018	.	0.048	0.016	.	.	.	.
NCS HC28804	.	.	.	.	.	.	.	.	.	.	60 g
DH 3232	0.087	.	.	.	.	0.076	.	.	.	0.022	.
DH 3233	0.082	.	.	0.021	.	0.047	0.019	.	.	0.046	.
NCS HC28803	.	.	.	.	.	.	.	.	.	.	60 g
DH 3228	0.097	.	.	.	.	0.062	0.007	.	.	0.035	.
IMZ 277	.	.	.	.	.	.	.	(0.012)	.	.	.
NM 435.2	.	.	.	.	.	.	.	.	.	.	.
DH 3235	0.107	.	.	0.005	.	0.072	0.004	.	.	0.064	.
DH 3224	0.083	.	.	.	.	0.052	.	.	.	0.043	.
NH 7-1-006	.	.	.	.	.	.	.	.	.	.	.
VS SH14	.	.	.	.	.	.	0.23	.	.	.	.
NCS HC19805	.	.	.	.	.	.	0.44	.	.	.	.
ECRM 883-1 *	0.0436	.	Ni:0.00053	0.0130	0.0380	.	0.122	.	0.0276	.	.
NH 7-1-012	.	.	.	.	.	.	.	.	.	.	.

* ECRM 883-1 is certified for elements only, not any oxides

CONVERTER SLAG

= class, where 1 = CRM and 2 = RM

#	Number	CaO	Ca	SiO_2	Al_2O_3	Fe	K_2O	MgO	Mn	MnO	Nb_2O_5	P_2O_5	S	TiO_2	V_2O_5
2	DH 3911	50.50	.	8.58	0.933	18.51	.	1.54	4.42	.	0.055	2.65	0.160	0.350	0.590
2	DH 3908	47.13	.	12.70	1.096	18.96	0.008	2.513	4.31	.	0.072	1.488	0.110	0.558	0.273
1	NCS HC28810	.	33.35	14.45	1.76	16.52	.	7.10	.	2.78	.	1.60	0.120	1.25	.
1	NCS HC28809	.	32.65	15.40	4.38	13.50	.	7.75	.	2.30	.	1.67	0.195	1.02	.

Number	Cr	CuO	SrO	ZnO	Units
DH 3911	0.154	0.007	.	0.003	100 g
DH 3908	0.331	.	0.028	.	100 g
NCS HC28810	.	.	.	.	80 g
NCS HC28809	.	.	.	.	80 g

CRM ELECTRIC FURNACE SLAG

50 g units

Number	Ca(tot)	Al_2O_3	F	FeO	T.Fe	MgO	MnO	P_2O_5	S	SiO_2	TiO_2
CMSI 1757	28.87	8.72	0.82	1.89	2.26	15.66	2.39	0.030	0.25	24.80	0.25
CMSI 1756	16.22	4.00	0.17	(15.25)	13.11	21.18	13.16	0.125	0.036	21.37	0.18

CRM FLUORINE SLAG

100 g units

Number	F	$T.CaF_2$	Ca	CaO	Al_2O_3	C	FeO	MgO	MnO	P	SiO_2	TiO_2	V_2O_5
JK S10	34.4	70.7	50.8	20.3	0.54	0.022	0.10	0.30	0.03	0.002	7.8	0.05	(<0.01)
IMZ EZP 1	31.62	.	36.76	.	24.85	.	.	(0.85)	.	.	2.61	.	.
IMZ EZP 3	15.78	.	39.53	.	19.13	.	.	8.44	.	.	1.68	.	.
IMZ EZP 2	(0.89)	.	24.03	.	41.38	.	.	16.89	.	.	5.81	.	.

MANGANESE SLAG

analysis listed in mass % DH: RM, 100 g units VS: CRM, 150 g units

Number	Mn	Mn_3O_4	Al_2O_3	C	CaO	CuO	Fe	Fe_2O_3	K_2O	MgO	P	P_2O_5	S	SiO_2	ZnO
VS SH11/1	48.0	.	.	.	.	.	.	.	.	.	0.014	.	.	.	.
DH 7403	4.93	.	19.84	.	15.95	.	0.088	.	1.30	12.34	.	0.002	0.818	43.23	.
DH 7404	2.66	.	24.61	.	26.16	.	0.086	.	0.630	7.04	.	0.003	0.959	37.39	.
DH 7402	.	0.113	5.99	11.92	0.405	7.02	.	3.96	0.164	0.118	.	14.03	0.114	11.01	45.16

Number	Ba	CO_2	Cr_2O_3	Na_2O	SnO_2	SrO	TiO_2	Y_2O_3	ZrO_2	$-H_2O@900'C$
VS SH11/1	.	.	.	.	.	.	.	.	.	.
DH 7403	(0.475)	0.032	0.007	0.433	.	0.083	0.100	(0.009)	0.039	0.062
DH 7404	0.925	.	0.007	(0.229)	.	0.109	0.164	0.014	0.035	.
DH 7402	.	.	0.086	0.133	0.386	.	0.274	.	0.024	0.077

CRM PHOSPHATE SLAG

Number	total P_2O_5	citric acid sol. P_2O_5	CaO	SiO_2	Units
BAM 826-1	14.65	10.73	46.48	8.96	100 g
BAM 827-1	20.70	18.79	47.38	6.21	100 g

CRM SLAG

analysis listed in mass %

Number	Al_2O_3	C	Ca	CaO	F	Fe	FeO	K_2O	MgO	Mn	MnO	Na_2O	P	P_2O_5	S	SiO_2	TiO_2	V_2O_5	Units
NCS HC18809	21.94	.	35.21	.	.	0.30	.	.	6.55	.	0.18	.	.	0.024	0.69	16.50	1.03	.	100 g
NCS HC28808	18.05	.	.	35.71	.	0.48	0.55	0.42	10.92	.	0.542	0.36	.	0.027	0.885	29.62	0.753	.	50 g
NCS HC28806	16.92	.	.	37.53	.	0.211	0.35	0.46	10.80	.	0.414	0.39	.	0.013	1.15	30.36	0.762	.	50 g
NCS HC18807	16.48	.	.	35.77	.	1.10	.	.	8.77	.	0.74	.	.	0.009	0.90	33.04	0.73	.	100 g
NCS HC18806	14.11	.	.	38.84	.	0.60	.	.	8.45	.	0.30	.	.	0.008	1.13	32.75	2.63	.	100 g
NCS HC25801	4.91	.	.	7.79	.	1.77	.	.	3.99	35.31	.	.	0.0056	.	0.66	33.47	.	.	50 g
NCS HC28807	3.67	.	32.32	.	0.76	13.54	10.44	0.033	7.27	.	4.06	0.057	.	1.72	0.134	14.54	1.13	.	50 g
NCS HC18808	1.25	.	24.10	.	.	25.55	.	.	11.66	.	3.34	.	.	2.00	0.13	13.44	2.22	.	100 g
NCS HC15804	.	0.014	.	.	.	0.22	.	.	.	44.42	.	.	0.0032	.	0.32	25.16	.	.	100 g

CRM TIN SLAG

Number	Sn	Al_2O_3	CaO	FeO	SiO_2	Units
NCS HC35801	11.96	7.36	4.12	46.18	19.61	70 g
NCS HC35802	2.32	9.32	19.76	22.22	37.49	70 g

CRM TITANIUM SLAG

100 g units

Number	TiO_2	Al_2O_3	CaO	Cr_2O_3	T.Fe	MgO	MnO	S	SiO_2	V_2O_5
NCS HC19815	94.69	2.62	0.287	.	1.02	2.67	1.21	0.166	1.92	.
DSZU 123.23-95	85.21	3.40	0.76	1.12	3.29	0.60	0.94	0.16	2.50	0.30
DSZU 123.24-01	85.19	3.28	.	0.76	3.69	.	0.85	0.12	2.88	0.31
NCS HC19814	84.94	3.04	1.83	.	1.08	7.27	0.74	0.247	4.13	.
NCS HC19813	77.66	2.64	1.52	.	6.43	5.28	1.08	0.118	5.50	.

RM TUNDISH SLAG

typical analysis listed in mass % — 100 g units

Number	CaO	SiO_2	MgO	Al_2O_3	CO_2	Fe_2O_3	K_2O	MnO	Mn_3O_4	Na_2O	P_2O_5	S	SO_3	TiO_2	$-H_2O$ 900'C
DH 5903	61.81	21.33	10.07	3.70	0.016	1.36	0.599	.	0.046	0.174	0.151	0.194	.	0.183	0.023
DH 5904	39.47	30.68	14.53	12.37	.	0.591	0.622	.	0.076	0.530	0.019	.	.	0.038	.
DH 6604	1.609	24.75	64.45	1.884	0.35	4.62	0.089	.	0.098	0.516	0.084	.	0.026	0.141	1.02
DH 6606	1.37	27.46	62.63	1.30	0.16	4.93	0.070	0.093	.	.	0.055	0.022	.	0.103	1.15
DH 6605	.	.	.	.	0.40179	.	.	.	.	0.347	.	.	.	.	1.15451

Number	BaO	C Tot	Cr_2O_3	F	NiO	SrO
DH 5903	.	.	.	0.046	.	.
DH 5904	0.180	.	.	.	.	0.025
DH 6604	.	0.471	0.255	.	0.165	.
DH 6606	.	.	.	.	.	.
DH 6605	.	.	.	.	.	.

VACUUM SLAG

NCS: CRM, 80 g units DH: RM, 100 g units

Number	CaO	Al_2O_3	Cr	Cr_2O_3	Fe	K_2O	MgO	Mn	MnO	Nb_2O_5	P_2O_5	S	SiO_2	SrO	TiO_2	V_2O_5	ZrO_2	Other
DH 5119	53.43	17.04	.	0.075	2.54	0.012	10.84	2.48	.	0.270	0.102	0.188	8.30	0.033	1.37	0.053	0.240	
DH 5120	52.90	20.33	.	0.039	1.55	0.011	11.68	1.27	.	0.202	0.039	0.281	8.13	0.032	1.28	0.016	0.230	
DH 5121	51.14	23.56	0.039	.	1.27	0.011	11.98	0.769	.	0.109	0.028	0.369	7.63	0.031	0.869	0.012	0.232	
NCS HC19810	2.04	1.25	.	0.93	31.26	.	1.9	.	10.67	.	0.046	0.052	18.25	.	10.02	17.2	.	Met.Fe: 0.22

CRM VANADIUM SLAG

Number	Al_2O_3	CaO	Cr_2O_3	Fe	MgO	MnO	P	SiO_2	TiO_2	V_2O_5	Units
VS SH9/3	1.76	1.61	3.32	28.9	3.53	9.73	0.015	16.63	7.39	22.2	150 g

CRM SLUDGE

analysis listed in mg/kg except % which is mass % — SRM 2781: 40 g SRM 2782: 70 g all others: 40 g units

Number	Type	Ag	Al%	As	Ba	Be	Bi	Ca%	Cd	Ce	Cl	Co	Cr	Cu	Fe%	Ga	Hg	In
SRM 2782	industrial	30.6	1.37	166	254	.	0.67	4.17	1240	.	66.3	109	2594	26.9	35	1.10	238	
BCR 146R	industrial	.	.	.	.	.	.	.	18.8	.	.	7.39	196	838	.	.	8.62	.	
BCR 145R	mixed	.	.	.	.	.	.	.	3.50	.	.	5.61	(313)	696	.	.	2.01	.	
SRM 2781	domestic	98	1.6	7.82	.	.	.	3.9	12.78	.	.	.	202	627.4	2.8	.	3.64	.	
IRNT WT-L *	water treatment	11.9	3.03	8.87	781	3.73	3.73	8.80	1.97	.	.	6.77	79.0	136	1.70	.	4.25	.	
IRNT WT-M *	water treatment	40.4	2.61	9.84	787	72	.	5.15	11.9	.	.	8.20	939	959	1.74	.	14.3	.	
BCR 143R	amended soil	.	.	.	.	.	.	.	71.8	.	.	12.3	(577)	130.6	.	.	1.10	.	

continued SRM 2782 also contains (2.1%) Carbon and trace informational values for Au, Eu, Hf, Rb, Sc, Sm, Ta, Tb, Th, U, Y, and Yb.

Number	K%	La	Li	Mg%	Mn	Mo	N%	Na%	Ni	P%	Pb	S%	Sb	Se	Se	Sn	Sr	Ti	V	Zn
SRM 2782	0.32	58.1	(5.0)	0.26	(300)	10.07	.	1.30	154.1	0.50	574	(0.2)	(2.0)	0.44	(20.3)	.	.	0.0880	80	1254
BCR 146R	.	.	.	.	324	.	.	.	69.7	.	609	.	.	.	.	.	.	.	.	3061
BCR 145R	.	.	.	.	156	.	.	.	247	.	286	.	.	.	.	.	.	.	.	2122
SRM 2781	0.49	.	.	0.59	.	46.7	4.78	0.21	80.2	2.42	202.1	.	.	16.0	5.1	.	.	0.32	.	1273
IRNT WT-L *	(0.695)	.	.	0.781	390	.	.	(0.414)	32.0	0.881	122	1.02	17.8	.	.	.	170	.	41.3	1310
IRNT WT-M *	0.589	.	.	0.613	942	.	.	(0.303)	240	1.58	841	1.03	12.7	.	.	20.3	160	.	34.2	3080
BCR 143R	.	.	.	.	(904)	.	.	.	299	.	179.7	.	.	(0.6)	.	.	.	.	.	1055

* IRNT certificates expired, however use and sales continue without problems worldwide

CRM RED SLURRY SET

analysis listed in mass % 50 g units, SET ONLY

Number	Al_2O_3	CaO	Fe_2O_3	SiO_2	TiO_2
ShK411-01	12.7	5.67	58.7	4.57	4.85
ShK412-01	13.3	7.0	57.3	4.67	4.32
ShK413-01	11.2	11.8	35.6	22.3	2.09
ShK414-01	11.4	3.35	67.2	3.44	3.27
ShK415-01	17.3	4.04	44.4	10.5	7.11
ShK416-01	15.1	5.13	52.1	7.35	5.92

RM SODA ASH

analysis listed in mass % 100 g units

Number	Na_2CO_3	NaCl	Fe_2O_3	Na_2SO_4
BCS 526	99.74	0.126	0.0005	0.008

CRM SURFACE AREA

data listed in m^2/g

Number	Multipoint	+/-	Single Point	+/-	Units
SRM 2206	10.99	0.68	10.73	0.68	5 g granulated glass
SRM 1900	2.85	0.09	2.79	0.07	4 g silicon nitride powder

CRM TENSILE CREEP

Number	Creep Rate at 400 h	Time to 2% Strain	Time to 4% Strain	Units
BCR 425	72 x $10^{-6}h^{-1}$ ± 5	278 h ± 16	557 h ± 30	3 rods 14 mm Ø x 150 mm

CRM TENSILE STRENGTH and HARDNESS

data shows estimates of (material, measurement) uncertainty

Number	ksi Tensile Strength	ksi Yield Strength	% Total Elongation	% Reduction	Hardness	Material	Units
BS TRM-2A	125.6 (0.7, 2.4)	116.2 (0.9, 2.7)	20.1 (0.6, 1.8)	57.7 (0.9, 2.7)	HRB 103 (2, 6)	600 nickel	rod 25 mm Ø x 158 mm
BS TRM-3	98.2 (0.6, 5.5)	44.7 (0.3, 3.1)	52.0 (1.2, 10.8)	57.1 (1.9, 17.3)	HRB 86.3 (0.7, 6.3)	304 steel	sheet 30 cm x 30 cm
BS TRM-1	93.3 (0.3, 2.1)	89.3 (0.5, 3.2)	15.6 (0.2, 1.6)	55.0 (0.4, 2.7)	.	1018 steel	rod 25 mm Ø x 158 mm
BS TRM-1A	83.9 (0.3, 1.7)	70.2 (0.2, 1.5)	18.8 (0.3, 1.8)	56.9 (0.5, 3.2)	.	1018 steel	rod 25 mm Ø x 158 mm
BS TRM-4	36.0 (0.1, 0.8)	28.4 (0.1, 0.7)	11.4 (0.1, 1.1)	(37.0) - -	HR15T 71.9 (0.6, 5.4)	5056 aluminum	sheet 30 cm x 30 cm

CRM TENSILE STRENTH

Number	0.2% Proof Stress (MPa)	0.5% Proof Stress (MPa)	Tensile Strength (MPa)	Elongation Fracture (A in %)	Reduction in Area at Fracture (Z in %)	Units
BCR 661B	300 ± 7	318 ± 7	750 ± 13	40.9 ± 0.9	60 ± 4	1 rod 14 mm Ø x 500 mm

CRM BORON CARBIDE

analysis listed in mass % — analysis listed in mg/kg — 100 g

Number	Tot.B	Sol.B	B Isotopic Abundance	C	N	O	Al	Ca	Co	Cr	Cu	Fe	Mn	Na	Ni	Si	Ti	Zr
BAM ED102	78.47	0.116	19.907	21.01	0.209	0.10	157	97	0.39	5.6	2.2	686	10.4	63	8.0	268	96	48.9

CRM CHROMIUM CARBIDE

analysis listed in mass %

Number	C	Cr	S	Si	Units
NCS HC37619	12.53	83.83	0.008	0.22	50 g

CRM SILICON CARBIDE

analysis listed in mass %

Number	SiC	Free C	Si	SiO_2	Al_2O_3	CaO	Fe_2O_3	MgO	Units
NCS DC93028	97.87	0.48	0.18	0.55	0.10	0.055	0.39	0.008	50 g
NCS DC93026	84.09	1.71	1.45	6.15	1.41	0.17	0.86	0.082	50 g
NCS DC93027	90.86	3.48	0.24	2.00	0.77	0.47	1.12	0.039	50 g

CRM TUNGSTEN CARBIDE

analysis listed in mass % — SRM 276b: 75 g units all others: 100 g units

Number	Grade	C	Free C	Co	Fe	Mo	Nb	Ni	Ta	Ti
ECRM 783-1	W94-C6	6.188	(0.04)	.	0.0022	.	.	.	.	.
SRM 889	W75-Co9-Ta5-Ti4	(6.0)	.	9.50	(<0.05)	(<0.05)	(<0.05)	(<0.05)	4.60	4.03
SRM 887	W83-Co10	(5.5)	.	10.35	(<0.05)	(<0.05)	(<0.05)	(<0.01)	(<0.01)	(<0.05)
SRM 888	W64-Co25-Ta-5	(4.6)	.	24.7	(<0.05)	(<0.05)	(<0.05)	(<0.05)	4.77	(0.04)

CRM URBAN AEROSOLS

analysis listed in mass %

Number	Al	Ba	Ca	Cl	Cu	Fe	K	Mg	Mn	Na	P	Pb	S	Si	Sr	Ti	Zn
NIES 28	5.04	0.0874	6.69	(0.807)	0.0104	2.92	1.37	1.40	0.0686	0.796	(0.145)	0.0403	(3.91)	(14.9)	0.0469	0.292	0.114

analysis listed in mg/kg

Number	As	Be	Cd	Co	Cr	La	Mo	Ni	Rb	Sb	Sc	Se	Sn	Th	U	V	Y	Units
NIES 28	90.2	(5.09)	5.60	(22.0)	(65.6)	(32.7)	(28.4)	63.8	(64.1)	(20.1)	(10.7)	(14.4)	(21.5)	(11.1)	4.33	73.2	(21.9)	1.5 g

CRM URBAN PARTICULATE MATTER

analysis listed in mass % Org = organic Elem = Elemental powder 2 g

Number	Al	C	C.Org	C.Elem	Ca	Cl	Cu	Fe	K	Mg	Mn	Na	Pb	S	Si	Ti	Zn
SRM 1648a	3.43	(12.7)	(10.5)	(2.3)	5.84	0.4543	0.0610	3.92	1.056	0.813	0.0790	0.4240	0.655	5.51	12.8	0.4021	0.4800

analysis listed in mg/kg

Number	Ag	As	B	Br	Cd	Ce	Co	Cr	Cs	Hf	La	Ni	Rb	Sb	Sc	Se	Sm	Sr	Th	V	W
SRM 1648a	6.0	115.5	161	502	73.7	54.6	17.93	402	3.4	(5.2)	39	81.1	51.0	45.4	(6-120)	28.4	4.3	215	(7-107)	127	4.6

CRM VANADIUM NITROGEN ALLOY

analysis listed in mass %

Number	V	N	C	O	Al	Mn	P	S	Si	As	Ca	Cr	Fe	Units
NCS HC28641	78.04	14.13	5.71	(0.6)	0.26	0.0065	0.012	0.0013	0.26	0.0014	0.064	0.082	0.65	25 g
NCS HC28642	77.73	16.64	3.39	(0.6)	0.24	0.0050	0.010	0.0016	0.23	0.0012	0.044	0.082	0.57	25 g
NCS HC93630	77.73	14.57	3.96	.	0.164	0.0082	0.0075	0.0014	0.061	.	.	.	.	25 g
NCS HC28639	77.58	9.44	9.22	(0.5)	0.24	0.0091	0.147	0.0025	0.40	0.0074	0.066	0.0032	1.95	25 g
NCS HC28640	76.73	13.31	6.01	(0.7)	0.28	0.0045	0.142	0.0019	0.40	0.012	0.10	0.019	1.76	25 g
Y 19606	76.57	15.55	3.07	2.26	0.043	0.076	0.011	0.0099	0.24	.	.	.	.	100 g
Y 19607	76.56	15.50	2.93	2.60	0.050	0.050	0.011	0.018	0.23	.	.	.	.	100 g

CRM ZIRCON CONCENTRATE

* SARM 62 lists Total Fe as Fe_2O_3 and Ti as TiO_2 DSU: 20 or 50 g others: 100 g

Number	ZrO_2	ZrO_2+HfO_2	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	HfO_2	MgO	Na_2O	P_2O_5	SnO_2	TiO_2	ThO_2	U_3O_8	LOI
DSZU 123.47-03	.	66.1	.	0.75	.	0.074	.	.	.	.	0.099	.	0.22	.	.	.
SARM 62 *	64.2	.	32.8	0.88	(0.11)	0.07	.	1.31	(0.04)	.	0.12	.	0.13	0.0158	0.0354	.
BCS 204A	.	53.8	37.6	0.74	0.15	0.18	0.017	.	0.012	0.014	0.77	1.69	2.22	.	.	0.50

CRM ZIRCONIA - Yttrium Stabilized Zirconium Oxide

Number	Al	Ca	Fe	Hf	Mg	P	Si	Th	Ti	U	Y	monoclinic ZrO_2	Units
ERM-ED105	0.0660	0.0242	0.0095	1.535	0.00129	(<0.0075)	0.0195	0.0112	0.0497	0.0292	6.11	(1.94)	powder 47 g

CRM ZIRCONIA SET

available in SET/4 only 50 g units

Number	Al_2O_3	CaO	Fe_2O_3	HfO_2	K_2O	MgO	Na_2O	Nb_2O_5	SiO_2	TiO_2	LOI
JCRM R051	.	0.0017	0.0017	1.96	.	0.0004	0.015	.	(0.005)	(0.0005)	0.71
JCRM R052	.	0.019	(0.0004)	1.81	0.0013	0.0042	0.0021	.	0.019	0.0012	0.25
JCRM R053	.	0.021	0.030	1.67	(0.0007)	0.0020	0.028	0.054	0.036	0.127	0.65
JCRM R054	0.136	0.535	0.132	1.60	(0.0003)	0.208	0.0027	0.427	0.300	0.138	0.15