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	Sobek Moderate	Modified Sobek Slight	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

NIOH: 1 filter, analysis in µg, not for xrf SRM: 2 loaded + 2 blank filters, analysis in ng, good for nondestructive analysis

Number	Al	As	B	Ba	Be	Cd	Co	Cr	Cu	Fe	Mg	Mn	Mo	Na	Ni
NIOH A3	225	7.65	(38)	37.4	1.48	15.0	37.3	47.8	75.0	521	74.5	150	37.6	.	60.3
NIOH B3	110	3.76	(18)	18.4	0.73	7.35	18.3	23.5	36.9	256	36.6	73.6	15.9	.	29.7
SRM 2783 loaded *	23210	11.8	.	335	.	.	7.7	135	404	26500	8620	320	.	1860	68
SRM 2783 blank	(30)	.	.	(0.4)	.	.	(0.04)	(70)	.	.	.	.	.	(15)	(8)

Number	Pb	Pt	S	Sb	Sn	Sr	Ti	Tl	V	W	Zn	Zr
NIOH A3	37.0	35.2	.	37.5	37.7	35.2	37.0	2.61	15.5	(38)	226	37.3
NIOH B3	18.2	17.3	.	18.4	18.6	17.3	17.8	1.28	7.61	(19)	111	18.3
SRM 2783 loaded *	317	.	(1050)	71.8	.	.	1490	.	48.5	(5.0)	1790	.
SRM 2783 blank	(0.4)	.	(100)	.	.	.	.	.	.	.	(50)	.

* SRM 2783 loaded also has certified Ca: 13200, K: 5280; informational Ce: 23.4, Rb: 24.0, Sc: 3.54, Si: 58600, Sm: 2.04, Th: 3.23, and U: 1.234.

RM ASH

typical analysis listed in mass %

Number	Type of Ash	pH	Al	Ca	Cr	Cu	Fe	K	Mg	Na	Ni	Ti	Zn
RT 001	Power Plant	10.98	.	.	0.00291	0.00407	(1.6300)	.	.	.	0.00198	(0.0465)	.
RT 012	Industrial	2.86	0.2160	0.2110	16.2000	0.3020	2.8700	7.3300	0.1510	2.9200	1.3300	.	0.0635
RT 019	Water Incenerator	6.64	(3.2800)	(5.1949)	0.00552	0.0279	(1.2700)	(4.9300)	0.6310	(5.0500)	0.00222	(0.2870)	2.2400

continued analysis listed in mg/kg

Number	As	Ag	B	Ba	Be	Cd	Co	Hg	Mn	Mo	Pb	Sb	Se	Sn	Sr	Tl	V	Units
RT 001	.	.	.	428	.	.	.	.	(306)	.	.	.	.	.	(1010)	.	.	100 g
RT 012	.	54.8	.	18.7	.	362	(22.4)	.	202	.	120	.	.	.	.	.	(51.8)	100 g
RT 019	77.2	7.35	(336)	352	(2)	432	(26)	(2)	(480)	(26)	4540	(223)	4.11	(410)	(173)	(42)	28.9	50 g

CRM ATTRITION INDEX

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

CRM CALCIUM CARBONATE

certified analysis in mg/kg $CaCO_3$ content is 99.79% | informational values | 100 g units

Number	Ba	Cr	Cu	Fe	Mg	Mn	Na	Sr	Zn	Al	B	Cd	Co	Ga	K	La	Ni	Pb	Si	Sn	Ti	Zr
BAM RS 3	45.3	<1	<1	<5	183	3.0	47.5	173	<2	<5	<1	<0.5	<1	<1.5	<20	<0.5	<3	<0.1	<20	<1	<0.5	<0.2

CRM ELECTRODE CARBON

Number	Moisture	Ash	Volatile Matter	Relative Density	Size Analysis +212µm	-212µm to +125µm	-125µm to +63µm	-63µm	Units
ASCRM 003	<1%	<5%	<1%	2.20-2.25	<5%	<26%	10-40%	40-85%	1500 g

CEMENT

= 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	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
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	NCS DC62103	66.68	.	21.96	4.54	2.76	0.56	2.30	0.12	.	0.23	.	0.28	0.42	25 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	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	SRM 1889a	65.34	.	20.66	3.89	1.937	0.605	0.814	0.195	0.110	2.69	0.042	0.227	(3.28)	4 x 5 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	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
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
2	JCA 211R	64.37	.	20.77	5.67	2.65	0.44	1.16	0.22	0.10	2.13	.	0.31	1.86	30 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 1888a	63.23	.	21.22	4.265	3.076	0.526	2.982	0.1066	(0.080)	2.131	0.082	0.263	(1.75)	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
1	NCS DC62101b	62.76	.	20.88	4.48	2.64	0.66	2.05	0.11	.	2.98	.	0.32	3.00	20 g
1	SRM 1885a	62.39	.	20.909	4.026	1.929	0.206	4.033	1.068	0.1220	2.830	0.638	0.195	(1.68)	4 x 5 g
1	GBW 03201a	62.34	.	20.56	5.02	3.16	1.15	1.40	0.18	.	2.29	.	0.21	3.39	25 g
1	SRM 1884a	62.26	.	20.57	4.264	2.695	0.997	4.475	0.2161	0.1278	2.921	0.2984	0.186	(1.06)	4 x 5 g
1	NCS DC62102	61.42	.	20.81	4.54	2.48	0.61	2.62	0.13	.	2.78	.	0.34	3.91	25 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 1887a	60.90	.	18.637	6.202	2.861	1.100	2.835	0.4778	0.306	4.622	0.322	0.2658	(1.43)	4 x 5 g
1	NCS DC62102a	58.67	.	21.19	5.31	3.17	0.91	2.91	0.14	.	2.33	.	0.32	4.50	20 g
1	NCS DC62116	57.86	.	16.34	4.01	2.22	0.55	2.28	0.11	.	2.3	.	0.22	13.86	20 g
1	SRM 1881a	57.58	.	22.26	7.060	3.09	1.228	2.981	0.199	0.1459	3.366	0.036	0.3663	(1.59)	4 x 5 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 CRM103	54.71	.	26.86	7.72	1.77	0.77	4.42	0.33	0.09	2.72	0.070	0.371	0.35	50 g
1	FLX CRM101	48.24	.	30.31	8.81	3.52	2.10	1.70	0.68	0.191	3.16	0.248	0.469	3.84	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	NCS DC62105c	43.94	.	11.77	3.27	2.09	0.59	1.58	0.10	.	0.10	.	0.19	36.18	
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	NCS DC62104a	38.70	.	14.26	3.70	2.45	0.70	1.61	0.28	.	0.39	.	0.24	37.40	25 g
1	DH X0202 *	38.01	.	4.08	39.31	15.83	0.111	0.487	0.033	0.043	0.105	.	1.81	.	100 g
1	SRM 1883a	29.52	.	0.24	70.04	0.078	0.014	0.19	0.30	(0.003)	.	(0.019)	(0.020)	(0.35)	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	MnO	Mn_2O_3	S	Unignited SO_3	V_2O_5	ZnO	Ins. Res.	
BCS 354	.	.	.	.	.	.	.	0.058	.	.	.	.	.	
SRM 1886a	.	.	(0.0042)	0.0024	(0.02)	.	.	0.0073	.	.	.	(0.001)	(0.23)	
NCS DC62103	.	.	.	.	.	.	.	.	.	.	.	.	0.11	
JCA RM 611	.	.	.	.	.	.	0.06	.	.	.	.	.	.	
NCS DC62117	.	.	.	.	.	.	.	.	.	.	.	.	.	
SRM 1889a	.	.	(0.0019)	0.0072	(0.05)	.	.	0.2588	.	.	.	0.0048	(0.66)	
JCA CRM-1	.	.	.	.	.	0.06	.	.	.	.	.	.	.	
SRM 634a	.	(1.86)	.	(0.0114)	.	.	.	(0.0229)	.	.	.	(0.0222)	(0.21)	
BCS 353	.	.	.	.	.	.	.	0.23	.	.	.	.	.	
FLX CRM100	.	.	(0.09)	0.009	.	.	.	0.066	.	.	.	0.051	.	
JCA 211R	.	.	0.009	.	.	0.07	.	.	.	.	.	.	0.08	
SRM 1880b	.	(2.227)	0.01830	0.01927	(0.0539)	.	.	0.1981	(0.0131)	.	.	(0.01054)	(0.487)	
SRM 1888a	.	.	(0.0036)	(0.0186)	(0.11)	.	.	0.1256	.	.	.	0.107	(0.37)	
JCA RM 613	.	.	.	.	.	.	0.08	.	.	.	.	.	.	
JCA RM 612	.	.	.	.	.	.	0.06	.	.	.	.	.	.	
NCS DC62101b	.	.	.	.	.	.	.	.	.	.	.	.	0.75	
SRM 1885a	.	.	(0.0040)	0.0195	(0.13)	.	.	0.0478	.	.	.	(0.0029)	(0.22)	
GBW 03201a	.	.	.	.	.	.	.	.	.	.	.	.	0.98	
SRM 1884a	.	.	(0.0037)	0.0166	(0.11)	.	.	0.0853	.	.	.	(0.0101)	(0.25)	
NCS DC62102	.	.	.	.	.	.	.	.	.	.	.	.	0.68	last
NCS DC62118	.	.	.	.	.	.	.	.	.	.	.	.	1.18	
SRM 1887a	.	.	(0.0104)	(0.009)	(0.09)	.	.	0.1186	.	.	.	0.0667	(0.13)	
NCS DC62102a	.	.	.	.	.	.	.	.	.	.	.	.	0.68	
NCS DC62116	.	.	.	.	.	.	.	.	.	.	.	.	.	
SRM 1881a	.	.	(0.013)	0.0588	(0.09)	.	.	0.1042	.	.	.	0.0489	(5.2)	
JCA CRM-2	.	.	.	.	.	0.15	.	.	(0.32)	(1.91)	.	.	.	
FLX CRM103	.	.	(0.04)	0.007	.	.	.	0.169	(0.33)	.	SO_4:2.26	0.014	.	
FLX CRM101	.	.	(0.05)	0.010	.	.	.	0.118	.	.	.	0.044	.	
DH X0210	0.071	.	.	.	.	.	.	0.327	1.77	.	0.011	.	.	
NCS DC62105c	.	.	.	.	.	.	.	.	.	.	.	.	.	
SRM 1882a	.	.	.	(0.113)	.	.	.	(0.060)	.	.	.	(0.004)	.	
NCS DC62104a	.	.	.	.	.	.	.	.	.	.	.	.	.	
DH X0202 *	.	.	(<0.01)	.	0.009	.	.	0.039	* more certified trace data listed in database					
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	.	.	

CRM CHLORINE and FLUORINE in CEMENT

Number	Description	CaF_2	F	Cl-	Units
NCS DC62121	Cement Raw Meal	.	.	0.029	20 g
NCS DC62122	Cement	.	.	0.012	20 g
NCS DC62125a	Cement	(0.37)	0.18	.	20 g

CRM CLASSIC CEMENT CHEMISTRIES

20 g units

Number	P - Pozzolana	S - Slag	D - Limestone	D1 - CO_2	R5 - Unsolved Slag (EDTA)	Description
NCS DC62119	4.5	5.8	1.2	0.98	.	Ordinary Portland Cement
NCS DC62120	0.5	18.5	7	3.5	97.5	Portland Blast-Furnace Slag Cement

CRM CEMENT COMPRESSIVE STRENGTH

Class	Day Number	3 Strength	7 Strength	28 Strength	Units
CRM	CAN CM-2	.	.	39.8 Mpa	2500 g
RM	JCA 401G	28.1 N/mm^2	45.8 N/mm^2	64.8 N/mm^2	4800 g

CRM PORTLAND CEMENT FINENESS AND BLAINE STANDARD

Number	Remaining after passing through 80 micron sieve	Blaine m^2/kg	Density g/cm^3	Units
NCS DC62127	2.03 %	354.7	3.16	200 g

CRM CEMENT FINENESS

certified analysis | informational analysis listed in mass % | 46H: 10 x 5 g units | 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
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 — 2 x 25 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
TECH 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
TECH 7	3.12	3,440	22	52	12.5	4	5.78	62.73	0.94	2.07	0.43	1.04	0.25	0.10	3.17	22.90	0.32	2.61	1.13

RM CEMENT SET JCA 601A

available in set/15 only — each unit: powder 20 g

Number	CaO	SiO_2	Al_2O_3	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	SO_3	SrO	TiO_2
XRF 3	66.32	20.67	4.57	2.43	0.45	1.53	0.08	0.30	0.13	3.18	0.049	0.28
XRF 6	66.23	20.71	5.02	2.70	0.23	1.81	0.19	0.26	0.05	2.61	0.035	0.24
XRF 4	66.17	20.71	4.73	2.80	0.54	1.37	0.05	0.24	0.40	2.64	0.036	0.26
XRF 5	65.99	20.52	5.07	2.99	0.46	0.94	0.28	0.32	0.10	3.02	0.027	0.25
XRF 2	65.17	21.31	5.29	2.93	0.50	1.77	0.21	0.38	0.11	1.91	0.045	0.31
XRF 9	64.75	23.82	3.40	4.18	0.39	0.78	0.11	0.24	0.06	1.94	0.024	0.16
XRF 7	64.27	22.76	4.26	4.11	0.35	1.03	0.06	0.17	0.06	2.42	0.030	0.25
XRF 8	64.15	23.23	3.82	4.02	0.54	1.52	0.21	0.10	0.19	1.93	0.038	0.27
XRF 1	64.14	22.23	5.35	3.05	0.40	1.75	0.15	0.29	0.06	2.33	0.037	0.33
XRF 10	61.67	22.99	6.29	2.39	0.62	2.71	0.14	0.17	0.13	.	0.043	0.52
XRF 11	59.15	24.43	7.37	2.26	0.51	2.63	0.16	0.26	0.23	.	0.046	0.55
XRF 13	55.36	26.62	9.22	2.02	0.41	2.98	0.61	0.30	0.06	.	0.037	0.41
XRF 14	55.15	25.74	8.70	2.03	0.31	3.98	0.28	0.26	0.04	.	0.051	0.66
XRF 12	54.90	26.34	8.95	1.82	0.44	3.33	0.18	0.23	0.17	.	0.051	0.73
XRF 15	49.28	29.29	10.70	1.32	0.42	5.12	0.48	0.25	0.06	.	0.071	0.64

CRM CEMENT COMPONENT MATERIAL

analysis listed in mass % — 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 DC62110	Portland Blast Furnace Slag	57.4	.	6.26	23.48	.	2.39	0.59	3.31	0.17	.	2.02	0.43	3.68
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	.	4.9	0.61	1.9	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 DC62126	Cement Black Raw Meal	38.89	70.9	.	.	0.15	2.74	.	.	.	.	.	.	37.46
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 DC62115	Fly Ash for Cement	4.42	.	36.62	48.93	.	4.37	0.57	0.84	0.17	.	0.35	1.46	1.76
NCS DC62114	Pozzolana for Cement	2.83	.	24.2	57.53	.	5.1	3.05	1.24	1.42	.	0.08	1.07	2.99

COAL

= class, where 1=CRM and 2=RM analysis listed in mass % unless otherwise noted * Hg in mg/kg AS(C)RM: 250 g SABS: 150 g 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
2	IARM HC-30500B	5.4	22.3	32	(11,600) BTU	.	(1.1)	64.2	(45)	.	.	4.2	.	1.10	3	.
2	IARM HC-30450A	4.72	16.8	39	(11,640) BTU	.	(4.9)	64	(44)	.	.	(4.7)	.	(1.2)	(7.5)	.
1	NCS FC28221	4.04	18.98	32.0	27,790 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28220	4.03	16.52	11.15	28,670 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28008d	3.54	21.65	18.34	27,060 J	1.54	.	66.71	.	.	.	3.63	.	1.19	.	.
1	NCS FC28210	3.17	25.9	8.4	24,470 J	.	.	.	.	.	.	.	.	.	.	.
2	IARM HC-30300B	3.02	8.6	40	(13,900) BTU	.	(1.2)	77	(51.0)	.	.	5.0	.	1.6	5.7	.
1	NCS FC28008c	2.88	12.86	31.87	30,660 J	1.41	.	73.48	.	.	.	4.68	.	1.26	.	.
1	NCS FC28216	2.79	8.7	10.78	32,340 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28011c	2.20	20.41	6.87	27,120 J	1.72	.	72.79	.	.	.	2.09	.	0.51	.	.
1	NCS FC28215	2.17	25.2	28.79	24,830 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28112	2.10	8.08	33.7	33,040 J	1.33	.	78.86	.	.	.	5.01	.	1.31	.	.
1	SRM 2683b	1.955	(9.93)	(36.31)	(30,620)J and (13,163) BTU	.	.	.	(0.15)	.	.	.	0.0900	.	.	.
1	NCS FC28217	1.79	8.68	36.06	31,330 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28209	1.76	27.33	8.21	23,960 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28106	1.70	8.41	31.92	32,870 J	1.35	.	78.98	.	.	.	4.95	.	1.38	.	.
2	IARM HC-30150C	1.72	18.75	34	(12,060) BTU	.	(2.2)	67.3	(47)	.	.	4.50	.	1.39	(6.2)	.
1	NCS FC28214	1.66	27.85	29.21	23,630 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28213	1.49	9.88	36.2	30,760 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28218	1.35	14.58	6.16	29,260 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28140	1.30	25.88	30.31	22,710 J	1.62	.	58.12	.	.	.	3.40	.	1.04	.	.
1	NCS FC28111	1.28	25.19	28.39	24,350 J	1.57	.	60.24	.	.	.	3.73	.	1.04	.	.
1	SRM 2692b	1.170	.	.	.	.	.	.	.	0.1651	.	.	0.1333	.	.	.
1	SABS 038	1.13	29.88	22.17	.	.	.	54.54	.	.	.	2.72	.	1.39	0.084	last
1	NCS FC28105	1.06	9.61	12.21	32,310 J	1.43	.	81.54	.	.	.	3.7	.	1.16	.	.
1	NCS FC28202	1.05	8.65	33.36	30,770 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28208	1.03	15.48	20.57	29,190 J	.	.	.	.	.	.	.	.	.	.	.
2	IARM HC-30100B	1.00	6.96	34	(13,370) BTU	.	(6.3)	77	(58)	.	.	5	.	(1.8)	(9)	.
1	SABS 024	0.96	10.94	33.05	.	.	.	71.01	.	.	.	4.35	.	1.90	0.073	.
1	NCS FC28204	0.96	8.09	34.25	31,340 J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 041	0.94	27.62	22.84	.	.	.	57.61	.	.	.	3.08	.	1.48	.	0.065
1	NCS FC28006h	0.88	14.31	32.10	28,630 J	1.44	.	70.41	.	.	.	4.40	.	1.29	.	.
1	NCS FC28211	0.88	13.41	9.08	30,230 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28110	0.87	8.42	32.94	30,920 J	1.41	.	75.96	.	.	.	4.56	.	1.33	.	.
1	SABS 029	0.86	32.97	23.96	.	.	.	50.86	.	.	.	2.86	.	1.17	0.051	.
1	SABS 040	0.86	26.63	23.00	.	.	.	58.36	.	.	.	3.14	.	1.51	0.058	.
1	NCS FC28206	0.86	14.42	28.56	26,730 J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 042	0.78	26.66	22.40	.	.	.	57.78	.	.	.	2.98	.	1.46	.	0.100
2	IARM HC-30075C	0.76	7.2	36	(13,820) BTU	.	(1.9)	77.4	57	(0.2)	.	5.0	0.24	1.47	(8)	.
1	SABS 039	0.75	24.51	23.34	.	.	.	59.97	.	.	.	2.93	.	1.56	0.079	.

#	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	SABS 043	0.74	22.31	23.82	.	.	.	61.69	.	.	.	3.03	.	1.56	.	0.071
1	SABS 044	0.73	24.01	22.79	.	.	.	60.54	.	.	.	3.06	.	1.54	.	0.093
1	NCS FC28203	0.71	10.36	20.69	31,660 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28107	0.67	10.41	15.3	31,640 J	1.43	.	79.89	.	.	.	3.80	.	1.12	.	.
1	SABS 026	0.65	37.83	22.07	.	.	.	46.63	.	.	.	2.59	.	1.11	0.066	.
1	SABS 030	0.62	8.14	29.26	30,860 J	.	.	77.44	.	.	.	4.43	.	1.91	0.110	.
1	ASCRM 013-12	0.594	9.61	20.26	23,2680 J	1.37	.	80.37	.	0.057	.	4.43	.	1.82	.	0.031
1	NCS FC28109	0.58	11.98	11.30	30,660 J	1.49	.	79.42	.	.	.	3.28	.	1.09	.	.
1	NCS FC28108	0.57	13.68	30.84	29,900 J	1.42	.	72.94	.	.	.	4.46	.	1.26	.	.
1	NCS FC28116	0.54	6.08	32.34	31,820 J	1.39	.	78.68	.	.	.	4.59	.	1.34	.	.
1	NCS FC28212	0.53	8.52	25.65	30,940 J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 001	0.50	14.50	24.50	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28001j	0.50	9.63	24.43	31,470 J	1.41	.	78.35	.	.	.	4.28	.	1.36	.	.
1	SABS CCS 008	0.48	16.33	24.36	27,520 J	.	.	70.50	.	.	.	3.62	.	1.61	.	0.086
1	SABS 037	0.48	15.26	24.84	.	.	.	71.17	.	.	.	3.67	.	1.72	0.102	.
1	NCS FC28201	0.47	10.45	17.7	31,570 J	.	.	.	.	.	.	.	.	.	.	.
1	SRM 2693	0.4571	.	.	.	.	.	.	.	0.03696	.	.	0.0373	.	.	.
1	SABS 032	0.45	13.03	27.18	.	.	.	70.70	.	(0.0037)	(0.0120)	3.86	.	1.68	0.680	.
1	NCS FC28207	0.43	16.26	7.26	26,100 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28115	0.42	6.38	32.22	31,050 J	1.41	.	77.44	.	.	.	4.42	.	1.21	.	.
1	NCS FC28104	0.40	10.09	11.00	32,040 J	1.45	.	81.45	.	.	.	3.52	.	1.34	.	.
1	NCS FC28103	0.36	10.51	9.60	31,800 J	1.47	.	81.55	.	.	.	3.33	.	1.30	.	.
1	NCS FC28205	0.31	14.49	11.39	29,980 J	.	.	.	.	.	.	.	.	.	.	.
2	IARM HC-30025C	0.30	6.3	44	(11,850) BTU	.	(21.3)	70	(50)	<0.01	.	4.7	0.07	0.97	17.9	.
1	NCS FC28003f	0.28	16.29	6.35	26,410 J	1.95	.	78.13	.	.	.	0.95	.	0.23	.	.
1	NCS FC28219	0.28	6.1	31.24	30,090 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28113	0.27	7.06	33.40	30,030 J	1.41	.	74.8	.	.	.	4.47	.	1.02	.	.
1	NCS FC28017	0.21	21.01	5.90	25,010 J	1.97	.	73.64	.	.	.	0.91	.	0.23	.	.
1	NCS FC28114	0.20	4.66	33.20	30,580 J	1.40	.	76.69	.	.	.	4.42	.	1.08	.	.
1	NCS FC28101	0.20	3.95	6.64	34,340 J	1.47	.	90.27	.	.	.	3.01	.	0.59	.	.
1	NCS FC28102	0.19	6.46	7.90	33,100 J	1.50	.	87.47	.	.	.	2.86	.	0.60	.	.
2	ASRM 015	.	.	.	.	1.42	.	.	.	.	.	.	.	.	.	.

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

SULFUR IN COAL

= class, where 1 = CRM and 2 = RM VS: part number matches sulfur analysis listed in mass %

#	Number	S	Units	#	Number	S	Units	#	Number	S	Units
2	IARM-HC20500B	5.4	50 g	2	VS1-1.77	1.77	50 g	2	IARM-HC20075C	0.76	50 g
1	ASCRM 012 D	5.21	125 g	2	IARM-HC20150C	1.72	50 g	2	VS1-0.73	0.73	50 g
1	BCR 335	5.08	20 g	1	BCR 334	1.609	20 g	1	ASRCM 012 B	0.72	250 g
2	IARM-HC20450A	4.72	50 g	2	VS1-1.49	1.49	50 g	2	VS1-0.70	0.70	50 g
2	VS1-4.25	4.25	50 g	1	BCR 333	1.344	20 g	1	BCR 331	0.499	20 g
2	VS1-3.56	3.56	50 g	1	ASCRM 012 C	1.22	125 g	2	VS1-0.40	0.40	50 g
1	BCR 336	3.290	20 g	2	VS1-1.11	1.11	50 g	2	VS1-0.51	0.51	50 g
2	VS1-3.19	3.19	50 g	2	IARM-HC20100B	1.00	50 g	2	VS1-0.55	0.55	50 g
2	IARM-HC20300B	3.02	50 g	1	BCR 332	0.961	20 g	1	ASCRM 012 A	0.33	125 g
2	VS1-2.89	2.89	50 g	2	VS1-0.93	0.93	50 g	2	IARM-HC20025B	0.28	50 g
2	VS1-2.60	2.60	50 g								
2	VS1-2.33	2.33	50 g								
2	VS1-2.07	2.07	50 g								
2	VS1-1.97	1.97	50 g								

RM COAL

typical analysis listed in mass % except Heat values, which are BTU/lb 50 g units

Number	DRY ANALYSIS S	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
VS6-056	3.23	(51.61)	(13,719)	8.12	40.30	20.72	4.15	23.92	1.62	0.72	0.04	0.47	0.43	4.19	41.79	1.01
VS6-046	1.82	(70.69)	(14,004)	10.32	19.00	28.17	1.66	14.79	2.21	0.78	0.02	0.27	0.37	1.36	48.08	1.23
VS6-006	1.60	(50.98)	(12,302)	16.98	31.97	24.27	1.07	10.01	1.96	0.76	0.04	0.15	0.16	1.03	56.34	1.81
VS6-026	1.56	(52.33)	(12,761)	14.50	33.12	27.83	0.74	7.52	3.79	0.98	0.01	0.44	0.09	0.54	54.56	1.43
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
VS6-036	0.65	(76.70)	(14,994)	4.88	18.58	20.73	12.36	15.22	1.51	1.94	0.07	0.46	0.10	11.52	33.39	1.16
VS6-066	0.61	(58.57)	(13,811)	9.27	32.17	26.62	1.03	3.06	2.57	0.84	0.01	0.33	0.08	1.20	60.19	1.62

CRM COAL

analysis listed in mass % BCR: 15 g units SRM 1635: 75 g units other SRM: 50 g units analysis listed in mg/kg

Number	Ash	Volatile Matter	Calorific Value J/g	C	Al	Cl	Fe	H	K	N	Na	S	Hg	Mn	V	Zn
SRM 2685b	(15.94)	.	(26940)	(64.6)	(1.7)	0.0517	(3.9)	(4.5)	(0.26)	(1.1)	(0.08)	4.730	0.1462	(41)	(31)	(17)
BCR 182	12.27	(28.8)	29680	73.29	(1.56)	0.370	(0.73)	(4.22)	(0.43)	1.636	.	.	0.040	195	24.3	33.3
SRM 1632c	(7.16)	(36.0)	(32100)	(77.45)	(0.915)	0.1139	(0.735)	5.11	0.1100	(1.54)	0.02988	1.462	0.0938	13.04	(23.72)	12.1
SRM 2682b	(6.32)	.	(25660)	(66.6)	(0.46)	(0.00161)	(0.24)	(4.3)	(0.01)	(1.0)	(0.10)	0.4917	0.1088	(26)	(15)	(8.6)
SRM 1635	(4.6)	.	.	.	(0.32)	.	0.239	.	.	.	(0.24%)	0.3616	0.0109	21.4	5.2	4.7

contiuned analysis listed in mg/kg

Number	As	Ba	Br	Cd	Ce	Co	Cr	Cu	F	Ni	Pb	Rb	Sb	Se	Sr	Th	U
SRM 2685b	(12)	(105)	(5.6)	.	(18)	(4.6)	(22)	.	.	.	.	(17)	.	(1.9)	.	(2.7)	(0.95)
BCR 182	(1.47)	.	(36.5)	0.057	(17)	(8.7)	(20)	(12.3)	.	(39)	(15.3)	(22)	.	0.68	.	(2.3)	.
SRM 1632c	(6.18)	41.1	(18.7)	(0.072)	(11.9)	3.48	(13.73)	(6.01)	(72.7)	(9.32)	(3.79)	7.52	0.461	1.326	63.8	1.40	(0.513)
SRM 2682b	(1.0)	(382)	(3.7)	.	(10)	(1.7)	(15)	.	.	.	.	(<2)	.	(0.91)	.	(1.5)	(0.52)
SRM 1635	0.42	.	.	0.03	(3.6)	(0.65)	2.5	3.6	25.9	1.74	1.9	.	.	0.9	.	0.62	0.24

CRM COAL

analysis listed in mass % SARM: 120 g units US: 50 g units analysis listed in mg/kg

Number	Type	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	Na_2O	P_2O_5	S	SiO_2	TiO_2	ASH	LOI	As	Ba	Be	Ce	Co
SARM 20	Sasolberg	11.27	1.87	1.17	0.14	0.43	0.27	0.14	0.51	17.66	0.63	.	64.66	4.7	372	2.5	87	8.3
SARM 19	OFS	8.01	1.39	1.75	0.24	0.20	0.29	.	1.49	15.00	0.341	.	71.28	7	304	2.8	56	5.6
SARM 18	Witbank	2.57	0.18	0.29	0.145	0.11	.	.	0.56	6.20	0.114	.	90.11	.	78	4.1	22	6.7
US CLB-1	Maryland	(1.51)	0.22	1.25(T)	0.0760	0.0470	0.0230	(0.0700)	(1.49 T)	(2.51)	(0.0780)	(6.3)	.	(13)	34	.	10	7.0

continued analysis listed in mg/kg

Number	Cr	Cs	Cu	Ga	Ge	Hf	Hg	La	Li	Mn	Mo	Ni	P	Pb	Rb	Sc	Se	Sm	Sr	Ta	Th	U	V	Y	Zn	Zr
SARM 20	(67)	(2)	18	16	.	4.8	0.25	43	.	80	.	25	.	26	10	10	0.8	6.3	330	1.2	18	4	47	29	17	(180)
SARM 19	50	1.4	13	14	13	5.4	(0.2)	27	.	157	.	16	130	20	9	7.6	.	4.9	126	.	12	5	35	.	12	351
SARM 18	16	(1)	5.9	(8)	(8)	1.7	(0.04)	10	.	22	.	10.8	30	(5)	8.1	4.3	.	2.0	44	.	3.4	1.5	23	.	5.5	67
US CLB-1	9.7	.	(10)	(3)	.	.	(0.2)	(5)	(8)	(8)	(9)	18	.	5.1	5.2	2.0	(2)	.	.	.	(1.4)	(0.55)	12	.	48	.

CRM COAL

GBW: 50 g units BCR: 40 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 FUSIBILITY OF COAL ASH

analysis listed in ‘C Red = Reducing Oxi = Oxidizing 5 g units

Atmosphere Number	Initial Deformation Red, Oxi	Softening Red, Oxi	Hemishpering Red, Oxi	Fluid Red, Oxi
NCS FS28001	1161, 1211	1190, 1230	1198, 1239	1204, 1252
NCS FS28002	1217, 1356	1340, 1408	1357, 1420	1369, 1445
NCS FS28003	1285, 1314	1314, 1345	1322, 1360	1340, 1381

COAL ASH

= class, where 1 = CRM and 2 = RM analysis listed in mass % ASRM, JCFA: 100 g NCS FC: 30 g SABS: 25 g

#	Number	SiO_2	Al_2O_3	CaO	FeO	Fe_2O_3	T.Fe_2O_3	K_2O	MgO	Mn	Na_2O	P_2O_5	SO_3	TiO_2	C	H_2O+	H_2O-	Sr
1	SABS 102 **	69.62	17.41	1.28	.	5.11	.	1.10	0.60	MnO_2: 0.06	0.16	0.12	0.89	1.60	** last of stock			
1	NCS FC82015	62.93	17.88	6.11	.	6.04	.	0.87	0.90		1.18	0.85	1.20	0.79	.	.	.	
1	NCS FC82014	53.98	31.70	1.44	.	7.80	.	1.36	1.08		0.22	0.28	0.28	1.17	.	.	.	
1	NCS FC82013	52.35	19.84	4.05	.	17.51	.	0.92	1.07		0.49	0.28	1.83	0.86	.	.	.	
2	ASRM 010-2	52.2	27.1	3.47	.	10.8	.	0.92	1.40	Mn_3O_4: 0.16	0.47	1.13	0.21	1.34	.	BaO: 0.14	.	SrO: 0.11
1	JCFA-1 *	50.56	24.25	8.91	0.88	4.22	5.2	1.27	2.12	MnO: 0.068	2.24	0.586	.	1.31	1.35	0.37	0.18	Sr: 0.110
1	NCS FC82016	50.08	33.78	5.50	.	4.36	.	0.87	0.76		0.41	0.18	1.25	1.77	.	.	.	
1	NCS FC82012	46.77	14.96	21.37	.	5.51	.	1.41	1.73		1.36	0.50	3.94	0.63	.	.	.	
1	NCS FC82017	31.24	10.00	42.40	.	8.16	.	1.28	1.17		0.46	0.04	2.76	0.56	.	.	.	

* 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.

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
IRNT 12-1-01	0.1820	10.8	0.0680	3.42	7.49	1.75	1.17	0.0630	0.551	0.00709	.	.	25.7	0.447	0.0157	.
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 1633b	0.01362	15.05	0.0709	1.51	7.78	1.95	0.482	0.01318	0.201	0.01206	(0.23)	0.2075	23.02	0.791	(0.0210)	
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)
GBW 08401	0.00114	.	(0.1450)	.	7.65	.	.	0.1178	.	.	.	.	.	.	0.0061	.
NCS ZC78006	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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
IRNT 12-1-01	.	.	291	4.30	.	.	98.7	25.7	96.8	118	58.7	.	.	.	0.00706	.
SRM 2689	.	.	.	(21)	.	(3)	.	(48)	(170)	(11)	.	(3)	.	(7)	(<0.003)	.
SRM 1633b	.	.	.	.	.	0.784	.	(50)	198.2	(11)	112.8	(4.1)	.	(6.8)	0.1431	(94)
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)	.
GBW 08401	.	.	.	10.7	.	0.16	.	33.2	60	.	53	.	.	.	.	.
NCS ZC78006	.	.	.	.	.	.	.	.	.	.	.	.	111	.	.	.

Number	Pb	Rb	Sb	Sc	Se	Sr	Ta	Th	Tl	U	V	W	Yb	Units
IRNT 12-1-01	43.1	150	5.28	20.4	.	275	.	.	.	.	195	.	3.49	50 g
SRM 2689	(52)	.	(9)	(32)	(7)	(700)	.	(25)	.	.	.	.	.	3 x 10 g
SRM 1633b	68.2	(140)	(6)	(41)	10.26	1041	.	25.7	.	8.79	295.7	.	(7.6)	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
GBW 08401	33.8	.	.	1.13	.	.	.	.	.	.	95	.	.	30 or 50 g
NCS ZC78006	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g

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 D	92.7	0.58	4.8	0.04	1.2	2.2	0.08	1.4	<0.5	1.3	2.2	4	0.84	0.6	<2	0.030	9	.	1	0.6
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 D	0.014	10	<0.2	0.32	0.06	1	86.5
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.

RM CONTINUOUS CASTING POWDER

typical analysis listed in mass % — 50 g units

Number	SiO_2	Al_2O_3	Ba	Ca	F	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	S	Sr	SrO	TiO_2	Y	Zr
DH 3011	43.23	4.40	.	26.58	5.95	2.122	0.606	5.85	0.033	2.23	0.106	0.058	.	0.029	0.178	0.028	.
DH 3005	43.10	5.14	.	27.35	7.18	0.233	0.376	0.39	0.007	7.93	0.091	0.019	.	.	0.086	.	.
DH 3004	41.35	7.19	.	28.02	6.01	0.318	0.256	0.779	0.043	7.09	0.034	0.033	.	.	0.028	.	.
DH 3012	38.87	6.53	.	28.82	6.97	0.716	0.104	0.750	0.015	7.59	0.071	0.111	0.017	.	0.348	0.034	0.012
DH 3010	38.56	5.05	.	27.06	8.97	2.63	0.155	4.13	0.059	5.479	0.454	0.131	.	.	0.055	.	.
DH 3013	37.70	5.95	0.108	30.73	5.84	0.437	0.288	1.93	0.045	6.43	0.047	0.077	.	.	0.064	.	.

CRM CRYOLITE

SOLD IN SET NCS DC91001 - DC91006 or INDIVIDUALLY — 100 g units

Number	Al	CaO	F	Fe_2O_3	Na	P_2O_5	SO_4^{2-}	SiO_2	LOI
NCS DC91001	17.34	(0.606)	55.45	0.053	21.75	0.0034	0.233	0.087	4.53
NCS DC91002	15.18	(0.597)	54.66	0.032	26.32	0.025	0.199	0.211	2.97
NCS DC91003	13.65	(0.719)	53.89	0.036	29.29	0.013	0.205	0.363	2.25
NCS DC91004	13.16	(0.508)	53.2	0.033	30.26	0.037	0.293	0.389	2.12
NCS DC91005	12.69	(0.0062)	52.14	0.0098	32.01	0.065	0.45	0.485	1.4
NCS DC91006	11.75	0.112	51.21	0.04	33.24	0.051	0.683	0.238	1.6

COKE

= class, where 1 = CRM and 2 = RM i = individually certified ASCRM: 25 g VS: 70g others: 50g

#	Number		S	Heat	Vol.Matter	Ash	C	H	N	Sp.Gravity	Moisture
1	IARM HP-40700A	Green Petroleum	6.7	(15,050) BTU	10.6	0.3	(88)	(3)	(1.7)	.	0.9
1	SRM 2718	Green Petroleum	4.7030	(35,760) J/g	(10.6)	(0.18)	(88.99)	(3.47)	(1.23)	.	.
2	VS2-022	Petroleum	1.7-2.0i	.	.	.	.	.	.	.	.
1	IARM HP-40150A	Green Petroleum	1.54	(15,700) BTU	9.7	0.2	(93)	(4)	(1.6)	.	0.23
1	VS R18/4		1.34	.	.	12.45	.	.	.	.	.
1	SRM 2719	Calcined Petroleum	0.8877	(32,900) J/g	(0.54)	(0.12)	(97.06)	(0.16)	(1.17)	.	.
1	NCS FC28118		0.87	29,250 J/g	1.66	12.08	.	.	.	.	.
1	SRM 2776	Furnace	0.825	.	(0.98)	(8.06)	(89.15)	(0.26)	(1.21)	.	.
1	NCS FC28119		0.81	28,300 J/g	1.34	14.43	.	.	.	.	.
1	NCS FC28121		0.75	28,760 J/g	1.14	13.29	.	.	.	.	.
2	VS2-002	Petroleum	0.70-0.90i	.	.	.	.	.	.	.	.
1	NCS FC28120		0.68	28,550 J/g	1.43	14.05	.	.	.	.	.
1	NCS FC28117		0.63	28,280 J/g	1.3	14.83	.	.	.	.	.
1	SRM 2775	Foundry	0.5816	.	(1.31)	(5.77)	(91.34)	(0.41)	(1.16)	.	.
1	ASCRM 014		0.314	28,260 J/g	1.04	12.23	85.65	0.32	0.82	1.87	.

Number	Al	Ca	Co	Fe	K_2O	Na	Na_2O	Ni	P	Si	V
IARM HP-40700A	.	0.003	.	0.0073	.	0.005	.	0.031	.	0.004	0.15
SRM 2718	0.00165	0.0174	(0.000579)	0.0290	.	(0.00886)	.	0.01391	.	(0.006300)	0.0302
VS2-022	.	.	.	.	.	.	.	.	.	.	.
IARM HP-40150A	.	0.007	.	0.020	.	0.004	.	0.016	.	0.015	0.011
VS R18/4	.	.	.	.	0.128	.	0.051	.	0.037	.	.
SRM 2719	0.00589	0.00577	(0.00186)	0.02016	.	(0.00151)	.	0.0204	.	(0.01380)	0.00586
NCS FC28118	.	.	.	.	.	.	.	.	.	.	.
SRM 2776	.	.	.	.	.	.	.	.	.	.	.
NCS FC28119	.	.	.	.	.	.	.	.	.	.	.
NCS FC28121	.	.	.	.	.	.	.	.	.	.	.
VS2-002	.	.	.	.	.	.	.	.	.	.	.
NCS FC28120	.	.	.	.	.	.	.	.	.	.	.
NCS FC28117	.	.	.	.	.	.	.	.	.	.	.
SRM 2775	.	.	.	.	.	.	.	.	.	.	.
ASCRM 014	.	.	.	.	.	.	.	.	0.09	.	.

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	1.44	0.018	27,560	1.80	16.20	5.28	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 FC28021	0.80	0.031	29,040	1.22	12.29	4.61	0.0001	0.38	0.022	0.0013	0.0014
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 FC28019	0.67	0.027	29,080	1.31	11.64	4.17	0.0001	0.45	0.024	0.0015	0.0018
NCS FC28025	0.62	0.021	29,320	1.31	11.5	.	.	.	.	.	.
NCS FC28018	0.50	0.02	28,910	1.35	12.35	4.30	0.00008	0.56	0.046	0.0018	0.0024
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	0.96	0.11	0.097	0.0044	0.067	0.001	0.0008	8.17	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 FC28021	0.40	0.062	0.046	0.0028	0.038	0.0007	0.0009	6.08	0.01	0.19	0.0021
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 FC28019	0.55	0.058	0.094	0.0049	0.08	0.001	0.0009	5.52	0.01	0.18	0.0027
NCS FC28025	.	.	.	.	.	.	.	.	.	.	.
NCS FC28018	0.64	0.062	0.14	0.0071	0.13	0.0014	0.0007	5.70	0.013	0.18	0.0034
NCS FC28024	.	.	.	.	.	.	.	.	.	.	.

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)
VS E3	Open Hearth Furnace	.	0.25	0.0067	0.082	0.69	0.013	.	0.203	.	0.242	.	52.9	.	.

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
VS E3	1.84	0.86	.	.	0.062	0.083	0.49	2.78	0.43	0.017	.	.	.	4.2	60 g

RM DUST

typical analysis listed in mass % * DH 6206 lists 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 6201	Cupola	1.25	6.75	2.36	4.51	.	0.038	0.155	4.30	1.51	2.56	0.150	3.43	26.38	0.080	30.67
DH 6204	Cupola	1.06	8.08	2.02	2.54	3.62	0.072	0.098	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
DH 6207	Filter	1.03	2.45	0.712	9.11	2.44	0.435	0.269	1.65	4.79	1.65	0.269	2.59	4.19	.	22.74
DH 1501	Iron Ore Sinter	1.23	2.78	2.59	7.11	1.11	.	.	1.59	1.49	0.121	0.104	0.103	6.13	0.107	.

continued

Number	CdO	F	Fe	FeO	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 6201	.	.	6.22	.	.	1.53	.	.	.	1.07	.	.	.	1.79 at 500’C
DH 6204	.	0.377	6.29	.	.	0.97	.	.	0.023	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
DH 6207	.	0.696	.	.	41.84	.	2.26	.	.	.	1.51	.	.	0.770 at 900’C
DH 1501	0.001	0.247	52.32	3.24	71.20	.	0.327	.	.	.	0.830	.	0.051	1.04 at 600’C

continued analysis of DH 6204 and 6207 listed in mg/kg

Number	Ba	Bi	Cd	Co	Ga	In	Li	Mo	Nb	Ni	Sn	Sr	Ti	Tl	V	Zr
DH 6204	.	.	20	.	.	.	.	500	.	.	.	.	.	.	.	.
DH 6207	381.6	87.8	276.6	29.5	52.2	4.0	23.5	50.5	9.1	263.1	392.9	74.8	520.6	2.2	198.1	41.3

CRM NON-FERROUS DUST

analysis listed in mass %

Number	As	Cd	Cu	Fe	H_2O	Hg	Pb	Si	Zn	Units
CAN PD-1	0.76	(0.28)	(7.03)	(12.2)	(0.4)	0.0389	2.75	(3.05)	(35.9)	200 g

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 in mass % — 100 g units

Number	Al	Ca	Cr	Cu	F	Fe	K	Mg	Mn	Na	Ni	P	Pb	S	Si	Ti	Zn	Other
ECRM 880-1	1.28	3.15	0.027	0.005	0.034	31.0	0.108	0.714	0.218	0.041	0.014	0.038	0.017	0.425	3.34	0.081	0.064	Cl: 0.085
ECRM 876-1	0.34	3.43	0.17	0.42	.	24.85	1.63	1.31	2.84	1.98	0.034	0.128	.	0.87	1.72	0.048	23.29	As: 0.023

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 USED AUTOMOBILE EXHAUST CATALYST

analysis listed in mg/kg — powder 250 g units

Number	Pt	+/-	Pd	+/-	Rh	+/-
BAM EB504	1777	15	279	6	338	4

FERROBORON

= class, where 1 = CRM and 2 = RM — DH: 50 g units — all others: 100 g units

#	Number	B	Fe	Al	C	Cr	Cu	Mn	Nb	Ni	P	S	Si	Sn	Ti	V	Zn
2	DH 1701	21.22	75.48	1.54	0.009	0.092	.	0.275	0.033	0.039	0.014	.	0.66	.	0.050	0.177	.
1	VS F21/2	20.91	.	1.546	0.047	.	0.012	.	.	.	0.0119	.	0.73	0.0055	.	.	0.0055
2	DH 1703	18.78	79.36	0.141	0.318	0.080	0.064	0.246	.	0.359	0.018	.	0.326	.	0.017	0.004	.
1	ECRM 587-1	18.67	.	0.047	0.738	0.104	.	0.272	.	.	0.020	.	0.129	.	0.039	0.004	.
1	VS F22/3	8.95	.	7.78	0.161	.	3.43	.	.	.	0.021	0.018	7.82	.	.	.	.

FERROCHROMIUM

= class, where 1 = CRM and 2 = RM — VS F11, F15, F35: chips — all others: powder

#	Number	Cr	Al	C	Co	Cu	Fe	Mg	Mn	N	Ni	P	S	Si	Ti	V	Units
1	VS F14/2	73.2	.	8.06	.	.	.	.	.	.	.	0.012	0.033	0.102	.	.	100 g
1	IRSID 509-1	72.85	.	0.012	.	.	.	.	.	0.029	.	(0.019)	.	0.230	.	.	100 g
1	JK 14B	72.84	.	0.0233	0.044	0.0090	.	.	0.293	0.0432	0.317	0.0143	0.0022	0.652	.	0.097	100 g
1	ECRM 580-1	72.18	.	0.019	0.047	.	.	.	.	0.035	.	0.011	.	0.306	.	0.083	100 g
1	VS F35/1	71.3	.	0.88	.	.	26.74	.	.	.	.	.	0.0022	0.37	.	.	100 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	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 F15/1	68.1	0.3	0.078	.	.	.	.	.	1.78	.	0.036	0.0023	2.1	.	.	100 g
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	VS F11/2	67.9	.	0.139	.	.	29.88	.	0.168	0.043	0.377	0.023	0.0017	1.48	.	0.103	100 g
1	NCS HC25609a	66.78	.	0.074	.	.	.	.	.	.	.	0.027	0.0070	0.20	.	.	50 g
1	NCS HC25631	66.14	.	6.88	.	.	.	.	0.30	.	.	0.019	0.024	1.82	.	.	50 g
1	NM 303	64.95	.	6.43	.	.	.	.	.	.	.	.	.	1.77	.	.	100 g
1	CMSI 1653	64.83	.	0.68	.	.	.	.	0.32	.	.	0.032	0.004	0.94	.	.	50 g last
1	CMSI 1652	64.17	.	0.053	.	.	.	.	.	.	.	0.015	0.011	0.53	.	.	50 g
2	DH 1820	53.76	.	1.98	.	.	41.79	.	0.150	.	0.206	0.037	.	0.888	.	.	50 g
2	BS 130/2	52.61	.	7.76	.	(0.007)	.	.	0.45	.	.	0.013	0.045	2.12	(0.10)	(0.38)	100 g
2	BS 130/1	51.60	.	7.06	.	(0.011)	.	.	1.20	.	.	0.016	0.034	4.46	(0.16)	(0.39)	100 g
1	SARM 74	49.7	.	6.44	0.06	.	37.5	.	0.193	.	0.21	0.018	0.04	4.34	0.47	0.36	100 g
1	ECRM 585-2	49.05	.	5.488	0.0622	.	38.67	.	0.801	0.0127	0.294	0.0255	0.0320	4.69	0.263	0.282	100 g
2	BS 130/3	49.01	.	6.54	.	(0.011)	.	.	0.76	.	.	0.014	0.029	6.25	(0.18)	(0.36)	100 g

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

CRM CARBON IN FERROCHROMIUM

Number	C	Co	Units
VS F39	9.23	.	Powder 100 g
VS F38	4.62	.	Powder 100 g
VS F37	1.1	.	Chips 100 g
VS F12/3	0.289	.	Chips 100 g
VS F10/1	0.021	.	Chips 100 g
VS F10/2	0.018	.	Chips 100 g
VS F9/2	0.012	0.042	Chips 100 g

FERROMANGANESE

= class, where 1 = CRM and 2 = RM analysis listed in mass % DH: 50 g IPT: 120 g JSS: 150 g all others: 100 g units

#	Number	Mn	Fe	Si	C	P	S	As	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	VS F6/2	90.3	5.40	2.00	1.90	0.330	0.0031	.	.	.	0.050	.	.	.	.	.	
2	DH 1203	88.15	8.87	0.863	1.293	0.114	.	.	0.141	0.076	0.051	0.067	0.003	0.001	0.015	0.030	
2	DH 1207	88.00	8.780	1.113	1.630	0.081	.	.	0.039	0.060	0.016	0.022	0.002	.	0.026	0.009	
2	DH 1204	87.19	11.50	0.738	0.057	0.075	.	.	0.041	0.029	0.023	0.020	0.002	.	0.016	.	
1	ECRM 583-1	86.42	.	0.396	0.333	0.146	(0.007)	.	.	.	.	.	.	.	.	.	
1	NM 331	85.48	.	1.74	0.115	0.129	.	.	.	.	.	.	.	.	.	.	
1	VS F29/2	84.6	2.16	.	0.299	0.053	0.032	.	.	.	.	.	.	.	.	.	N: 4.69
2	DH 1202	81.59	15.34	0.791	1.353	0.261	.	.	0.014	0.371	0.007	0.053	0.003	0.001	0.011	0.003	
2	BS 121	81.4	14.9	0.62	1.62	0.38	0.004	.	.	(0.080)	(0.15)	.	.	(<0.001)	.	.	
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)	.	.	.	.	.	.	.	.	.	
2	DH 1205	80.48	16.51	1.04	1.38	0.248	.	.	0.015	0.114	0.008	0.039	0.001	0.001	0.010	0.001	
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	.	0.159	0.166	0.105	0.088	0.140	.	0.004	0.072	0.001	Mo: 0.028
2	DH 1907 *	80.24	15.91	0.350	1.48	0.229	.	0.159	0.166	0.105	0.088	0.140	.	0.004	0.072	0.001	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	.	.	.	.	.	.	.	.	.	
2	DH 1216	78.30	17.03	1.25	1.44	0.123	.	.	0.019	0.071	.	0.047	.	.	0.019	.	Al: 0.033
1	ECRM 502-2	77.87	.	.	6.94	0.148	.	.	.	0.0265	0.0370	0.0384	0.0179	0.0034	.	.	
1	JSS 701-6	74.4	.	(0.03)	6.94	0.112	(0.002)	.	.	.	.	.	.	.	.	.	

* DH 1206 is a reissues of DH 1907

FERROMOLYBDENUM

= class, where 1 = CRM and 2 = RM DH: 50 g all others: 100 g units

#	Number	Mo	Fe	Si	C	Co	Cr	Cu	Mn	N	Ni	O	P	S	V	W	Other
2	DH 2010	78.09	20.66	0.161	.	0.020	0.035	0.464	0.010	.	0.112	.	<0.017	.	.	.	Al: 0.008
2	DH 2006	73.83	24.03	0.252	0.031	0.194	0.018	0.134	0.070	0.006	0.905	0.329	0.086	.	0.007	0.050	Mg: 0.007
2	DH 2008	72.82	25.51	0.71	0.018	.	0.039	0.378	0.088	0.009	0.020	0.216	0.017	0.059	0.022	0.022	
1	ECRM 578-1	72.23	.	0.208	0.016	.	.	0.136	.	.	.	.	0.024	0.065	.	.	
2	DH 2012	69.99	27.82	0.790	0.011	.	.	0.390	0.042	0.014	.	0.534	0.028	0.084	.	.	
1	NCS HC26610	66.52	.	1.20	0.049	.	.	0.52	.	.	.	.	0.035	0.064	.	.	
2	DH 2020	62.20	36.71	0.210	0.028	.	0.057	0.376	0.013	0.026	0.019	0.068	0.034	0.079	.	0.155	
1	VS F17/3 *	61.2	.	0.48	0.42	.	.	0.31	.	.	.	.	0.042	0.085	.	0.022	
2	DH 2013	60.03	38.42	0.284	0.029	0.015	0.050	0.400	0.012	0.029	0.017	0.233	0.039	0.081	.	0.188	
1	NM 321A	59.36	39.06	1.155	0.028	.	.	.	0.023	.	.	.	0.08	0.035	.	.	

* VS F17/3 also contains As: 0.021, Bi: 0.0009, Pb: 0.0051, Sb: 0.024, Sn: 0.0029, and Zn: 0.0038

CRM FERRONICKEL

Number	Ni	As	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	.	powder 100 g
JSS 760-3	19.56	.	1.73	0.504	1.19	0.0219	.	0.162	0.022	0.0093	1.29	chips 150 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	JSS 755-2	68.14	.	1.82	1.79	0.100	.	.	.	0.065	.	0.053	(0.37)	.	.	.	.
2	DH 2804	67.61	28.44	2.28	0.078	0.060	.	0.111	0.077	0.125	0.017	.	0.097	0.077	0.010	.	.
2	DH 2811	67.50	29.29	0.271	1.309	0.080	0.038	.	0.181	0.090	0.038	0.066	0.102	0.695	0.011	.	.
2	DH 2803	66.99	28.38	1.88	1.25	0.076	.	0.062	0.276	0.101	.	.	.	0.141	0.084	.	.
2	DH 2805	65.40	26.50	1.53	1.53	0.047	0.023	0.033	2.52	0.149	0.249	0.079	0.350	0.919	0.025	.	0.015
2	DH 2806	65.05	30.69	2.11	0.061	0.081	0.028	0.341	0.129	0.109	0.034	0.084	0.071	0.044	0.015	0.009	0.005
2	DH 2801	64.69	29.77	1.90	0.800	0.432	0.007	0.011	0.102	0.105	0.058	0.098	0.099	0.439	0.028	0.019	.
2	DH 2808	64.49	24.02	3.17	3.20	0.181	0.038	0.048	0.415	0.071	0.008	0.051	0.171	1.82	1.16	.	0.222
2	DH 2812	64.37	29.84	2.09	1.132	0.135	0.012	0.095	0.441	0.089	0.005	0.052	0.317	0.683	0.052	0.008	0.121
2	DH 2807	64.09	31.93	1.94	0.064	0.099	0.028	0.279	0.136	0.114	0.021	0.012	0.066	0.045	0.014	0.018	.
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 2809	60.12	27.46	3.47	2.22	0.495	0.035	0.037	0.530	0.097	0.010	.	0.217	1.35	0.878	.	0.238
1	ECRM 576-1	43.90	.	1.79	2.53	0.201	.	.	.	.	.	0.195	0.306	1.32	.	.	.

Number	Co	Mg	N	Ni	S	Units
JSS 755-2	.	.	.	.	0.15	150 g
DH 2804	.	.	.	.	.	50 g
DH 2811	.	.	.	0.012	0.085	50 g
DH 2803	.	.	0.010	.	0.36	50 g
DH 2805	0.025	.	.	.	.	50 g
DH 2806	0.004	.	0.583	0.017	0.280	50 g
DH 2801	.	0.016	.	0.003	.	50 g
DH 2808	0.003	.	.	0.012	.	50 g
DH 2812	.	0.012	.	0.006	.	50 g
DH 2807	0.005	.	.	0.015	.	50 g
VS F20/3	0.0056	.	0.067	.	0.0091	100 g
ECRM 579-1	0.005	.	.	.	0.021	100 g
DH 2809	0.003	.	.	0.017	.	50 g
ECRM 576-1	.	.	.	.	.	100 g

FERROPHOSPHORUS

= class, where 1 = CRM and 2 = RM analysis listed in mass % DH, GBW: 50 g units SRM: 75 g units VS: 100 g units

#	Number	P	Fe	Al	C	Ca	Cr	Cu	Mn	Mo	Nb	Ni	S	Si	Ti	V
2	DH 2203	27.40	66.53	0.012	0.015	0.158	0.230	0.13	2.10	0.011	0.026	0.090	0.002	0.479	1.89	0.356
1	SRM 90	26.2	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	GBW 01429	17.90	.	.	0.244	.	.	.	0.47	.	.	.	0.0681	1.87	.	.
1	VS F28/2	16.05	.	.	.	.	.	.	1.20	.	.	.	0.021	1.11	.	.

FERROTITANIUM

= Class, where 1 = CRM and 2 = RM

#	Number	Ti	Al	Sol.Al	C	Co	Cr	Cu	Fe	Mn	P	S	Si	V	Zr
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	VS F30/3	70	3.63	.	0.308	.	0.58	0.113	19.74	0.335	0.0044	0.012	0.4	0.56	0.397
2	DH 2414	68.40	5.34	.	0.132	0.115	0.506	0.146	16.93	0.151	.	0.0152	.	2.32	0.866
1	ECRM 589-1	68.4	5.34	.	0.13	0.11	.	0.15	16.9	0.15	0.010	0.016	0.41	.	(0.89)
1	ECRM 584-1	37.17	7.19	(6.0)	0.044	.	.	.	.	1.13	0.032	0.030	1.80	.	.
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	CMSI 1651	28.76	5.08	.	0.023	.	.	0.012	.	2.54	0.040	0.012	4.68	.	.
1	NCS HC26609	27.47	6.21	.	0.048	.	.	0.102	.	2.36	0.035	0.020	5.61	.	.
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	.	.
2	BS FeTi-1	19.9	12.5	.	0.57	0.028	0.33	0.60	.	7.7	0.050	0.009	2.9	0.69	3.6
2	BS FeTi-2	19.4	12.7	.	0.46	0.04	0.30	0.43	.	7.91	0.053	0.012	3.2	0.81	3.6

Number	B	Ca	Mg	Mo	N	Nb	Ni	Pb	Sn	W	Zn	Units
NCS HC15601	.	.	.	0.028	.	.	0.29	.	.	.	.	50 g
VS F30/3	.	.	.	0.92	0.68	.	0.6	(0.0006)	0.1	.	(0.003)	100 g
DH 2414	.	.	.	0.934	0.64	.	0.663	.	0.550	.	.	50 g
ECRM 589-1	.	.	.	.	0.65	.	.	.	.	.	.	100 g
ECRM 584-1	.	.	.	.	.	.	.	.	.	.	.	100 g
VS F43	.	.	.	0.0036	0.085	.	.	.	0.013	.	0.032	100 g
CMSI 1651	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC26609	.	.	.	.	.	.	.	.	.	.	.	50 g
IRSID 510-1	.	.	.	.	.	.	.	.	.	.	.	100 g
VS F42	.	.	.	0.106	.	.	.	.	.	0.33	0.129	100 g
NM 341	.	.	.	.	.	.	.	.	.	.	.	100 g
BS FeTi-1	0.60	1.12	(0.4)	0.06	0.143	0.05	0.17	.	0.11	.	(0.04)	100 g
BS FeTi-2	1.10	0.96	(0.4)	0.15	0.16	0.03	0.16	.	0.16	.	(0.02)	100 g

CRM FERROTUNGSTEN

Number	W	Si	Al(tot)	As	C	Cr	Cu	Fe	Mn	Mo	P	Pb	S	Sb	Sn	Units
JK 17	80.8	0.2	.	0.08	0.74	.	.	.	.	.	.	.	.	.	0.05	150 g
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
VS F33/1	78.9	0.62	.	0.002	.	0.048	0.06	.	0.089	5.39	0.017	.	0.022	0.0006	0.0017	100 g
CMSI 1650	76.66	0.34	.	.	0.055	.	0.43	.	0.12	.	(0.028)	.	0.048	.	.	150 g
VS F18/2	74.7	0.35	.	0.028	0.075	.	0.105	.	0.095	0.56	0.042	0.00014	0.071	0.0069	0.038	100 g

FERROVANADIUM

= Class, where 1 = CRM and 2 = RM

#	Number	V	Fe	Si	Al	As	C	Co	Cr	Cu	Mg	Mn	Mo	N	Nb	Ni	P	S
1	DH 2506	82.31	10.89	1.42	3.72	.	.	0.011	0.191	0.084	.	0.172	0.171	0.033	0.083	0.030	0.041	.
1	IRSID 511-1	80.7	.	0.341	.	.	0.049	.	.	.	.	.	.	.	.	.	(0.016)	0.018
1	VS F40	80.1	.	1.31	2.12	.	0.096	.	0.185	0.81	.	1.49	.	.	.	.	0.022	0.014
1	ECRM 591-1	79.72	14.59	0.847	3.19	0.0022	0.141	.	.	0.0596	.	0.307	.	(0.308)	.	0.0141	0.0299	0.0153
1	DH 2507	76.14	15.82	0.959	4.04	.	0.289	0.009	.	0.059	.	0.101	0.015	0.30	0.007	0.032	0.031	0.0108
2	DH 2505	76.12	19.99	0.805	0.845	0.007	0.216	0.004	0.119	0.219	0.023	0.326	0.201	.	0.002	0.022	0.036	0.021
1	JSS 750-2	53.40	.	0.52	3.20	.	0.14	.	.	.	.	.	.	.	.	.	0.018	0.0110
1	NM 351	52.10	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
2	DH 2508	51.54	41.26	1.34	0.026	<0.001	0.294	0.019	0.596	0.189	0.059	3.16	0.004	.	0.003	0.049	0.072	.
1	ECRM 577-1	50.16	.	1.79	0.414	.	0.089	.	.	0.054	.	0.158	.	.	.	0.053	0.035	0.034
2	BS FeV 45	45.27	33.8	4.86	(0.013)	.	0.24	.	5.82	0.41	(0.014)	4.14	0.01	0.26	.	4.28	0.12	0.33
1	VS F19/3	42.6	.	1.47	(0.005)	0.0009	0.418	.	1.21	0.204	.	3.30	.	.	.	.	0.059	0.0102
2	BS FeV 42	42.35	39.45	3.81	(0.06)	.	0.30	.	5.21	0.31	(0.06)	3.37	0.024	0.20	.	3.85	0.12	0.31
1	VS F32/3	40.2	(40)	(1.2)	(<0.05)	(<0.001)	(0.4)	.	.	(0.2)	.	3.14	.	7.51	.	.	(0.05)	(0.008)
2	DH 2509	37.63	52.05	3.73	0.480	.	0.216	0.010	2.16	0.315	0.010	2.41	0.136	.	.	0.327	0.034	.

Number	Ca	O	Sn	Ti	W	Units
DH 2506	.	0.441	0.021	0.121	0.090	50 g
IRSID 511-1	.	.	.	.	.	100 g
VS F40	.	.	.	.	.	100 g
ECRM 591-1	.	.	.	.	.	100 g
DH 2507	.	0.60	.	0.047	0.029	50 g
DH 2505	.	.	0.023	0.034	0.031	50 g
JSS 750-2	.	.	.	.	.	150 g
NM 351	.	.	.	.	.	100 g
DH 2508	.	.	0.020	0.011	0.011	50 g
ECRM 577-1	.	.	.	.	.	100 g
BS FeV 45	(0.009)	.	0.022	.	.	100 g
VS F19/3	.	.	.	.	.	100 g
BS FeV 42	(0.042)	.	0.033	.	.	100 g
VS F32/3	.	.	.	.	.	100 g
DH 2509	.	.	.	0.345	0.009	50 g

CRM RARE EARTH FERROSILICON

analysis listed in mass % * VS F31/2 lists Rare Earth Oxides NCS HC28609-28612: 80 g all others: 100 g

Number	RE	Si	Fe	Ca	Mg	Mn	Ti	Al	C	Ce	Co	Cr	Cu	La	Ni	P	S	Se
VS F31/2	36.0*	39	18	1.7	0.3	.	.	8.3	0.03	.	.	.	0.03	.	.	.	.	15.0
NCS HC28614	26.38	38.92	.	6.26	.	0.460	0.416	.	.	.	.	.	.	.	.	.	.	.
NCS HC28613	23.78	40.00	.	5.00	.	0.455	0.280	.	.	.	.	.	.	.	.	.	.	.
NCS HC39602	21.20	37.18	22.18	1.98	10.56	3.43	1.92	.	.	.	.	.	.	.	.	.	.	.
NCS HC39601	20.09	40.31	20.81	3.21	9.50	2.72	1.50	.	.	.	.	.	.	.	.	.	.	.
NCS HC28615	20.00	41.02	.	5.60	.	0.390	0.235	.	.	.	.	.	.	.	.	.	.	.
NCS HC39603	18.10	43.55	21.78	2.65	8.51	2.23	1.35	.	.	.	.	.	.	.	.	.	.	.
NCS HC28609	8.66	43.98	31.67	1.01	10.20	0.66	0.540	.	.	.	.	.	.	.	.	.	.	.
NCS HC28612	6.42	43.54	36.43	0.90	8.25	0.58	0.435	.	.	.	.	.	.	.	.	.	.	.
NCS HC28611	5.10	43.3	40.7	0.84	5.70	0.51	0.362	.	.	.	.	.	.	.	.	.	.	.
NCS HC28610	3.71	42.2	43.4	0.76	5.52	0.42	0.275	.	.	.	.	.	.	.	.	.	.	.
SRM 347	0.86	47.6	.	0.81	4.49	0.53	0.036	0.78	0.017	0.45	0.004	0.14	0.065	0.26	0.082	0.023	0.005	.

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	NCS HC14606	78.96	20.24	0.24	0.024	0.064	0.0053	0.049	0.058	0.035	0.0093	0.0037	0.032
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	DH 2315	77.06	19.86	1.316	0.042	0.357	0.143	0.042	0.159	0.048	0.023	.	0.086
1	CMSI 1655	76.74	.	.	0.081	0.30	0.140	.	0.172	.	0.023	0.004	.
2	DH 2305	76.58	18.62	1.64	0.238	1.45	0.021	0.009	0.070	0.004	0.016	.	0.107
1	JSS 720-4	76.35	.	1.52	(0.045)	.	.	.	0.21	.	0.032	(0.003)	.
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	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	ECRM 582-2	75.2	21.42	1.154	0.150	0.405	0.074	.	0.230	.	0.0184	(0.003)	0.225
1	IPT 143	75.1	22.4	0.57	0.054	0.79	0.0044	0.014	0.110	0.0028	0.025	0.0012	0.068
1	NM 312	74.37	.	1.23	.	1.80	.	.	.	.	0.031	.	.
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	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
2	DH 2306	66.98	30.09	1.42	0.120	0.193	0.155	0.103	0.222	0.075	0.023	.	0.118
1	NCS HC14607	55.73	41.89	0.78	0.19	0.14	0.014	0.060	0.22	0.0063	0.038	0.0048	0.119
2	BS 140/2	51.85	46.12	0.62	(0.03)	0.03	(0.25)	0.14	0.53	0.15	(0.02)	(0.004)	0.10
2	DH 2311	50.00	9.06	4.36	8.31	7.84	0.027	0.016	0.080	0.007	0.011	0.048	0.070
2	BS 140/4	49.80	47.50	0.90	(0.05)	0.09	(0.19)	0.09	1.00	0.11	(0.02)	(0.004)	0.09
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	.
2	BS 140/3	47.20	50.85	0.59	(0.05)	0.09	(0.18)	0.09	0.60	0.09	(0.02)	(0.004)	0.07
2	BS 140/1	45.20	52.80	0.68	(0.03)	0.04	(0.25)	0.13	0.46	0.15	(0.02)	(0.004)	0.09
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 F2/3	44.2	.	1.03	0.027	0.056	0.324	.	0.306	.	0.035	0.0023	.
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

continued

Number	As	B	Ba	Co	Mg	Mo	N	O	Sn	Sr	V	Zn	Zr	Units
BAM 529-1	.	.	.	.	0.04	.	.	.	.	.	.	.	.	100 g
NCS HC14606	0.0012	0.0029	0.0060	0.0031	0.0051	0.0013	.	(0.256)	0.0003	.	0.0024	.	.	70 g
DH 2314	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
VS F3/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
DH 2315	.	.	.	.	0.025	.	.	.	.	.	.	.	.	50 g
CMSI 1655	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
DH 2305	.	.	.	.	0.013	.	.	.	.	.	0.005	.	.	50 g
JSS 720-4	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
DH 2310	.	.	0.042	.	0.029	.	.	.	.	.	.	.	.	50 g
NCS HC15602	.	.	.	.	.	.	.	.	.	.	0.0036	.	.	50 g
JK 39	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
SRM 195	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.011	75 g
ECRM 582-2	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
IPT 143	.	.	0.126	.	0.039	.	.	.	.	0.014	.	.	0.082	50 g
NM 312	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
VS F4/2	.	.	.	.	.	.	(0.02)	.	.	.	.	0.0013	.	100 g
SRM 58a	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.002	75 g
DH 2306	.	.	.	.	0.019	.	.	.	.	.	0.007	.	.	50 g
NCS HC14607	0.0015	0.0032	0.0043	0.0047	0.0068	0.011	.	(0.665)	0.0004	.	0.011	.	.	70 g
BS 140/2	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
DH 2311	.	.	.	.	1.153	.	.	.	.	.	.	.	.	50 g
BS 140/4	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
DH 2312	.	.	.	.	0.193	.	.	.	.	.	.	.	.	50 g
SRM 59a	.	0.058	.	.	.	.	.	.	.	.	.	.	.	50 g
BS 140/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
BS 140/1	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g
IPT 70	.	.	.	.	0.016	.	.	.	.	.	.	.	.	60 g
VS F2/3	.	.	.	.	.	.	.	.	.	.	.	.	.	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

FERROSILICOCALCIUM, FERROSILICOCHROMIUM, and FERROSILICOTITANIUM

= class, where 1 = CRM and 2 = RM DH: 50 g units VS F24: 100 g units VS F25: 125 g units

#	Number	Si	Fe	Ca	Cr	Ti	Al	C	Cu	Mg	Mn	Mo	Ni	P	S	V	Zr
1	VS F25/2	51.5	24.2	20.5	.	.	0.66	.	.	.	.	.	.	0.011	0.0055	.	.
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	.	.
2	DH 2903	61.48	23.14	0.246	0.059	10.01	0.650	0.623	0.025	0.273	1.57	0.130	0.044	0.012	0.010	0.149	0.041
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

WELDING FLUX

Number	Al_2O_3	C	Ca	CaF_2	CaO	F	Fe	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P	P_2O_5	S	SiO_2	TiO_2	ZrO_2	Units
CRM																			
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
RM																			
DH 5307	31.46	.	12.12	.	.	8.78	.	1.707	1.418	18.30	3.676	.	.	0.047	.	18.63	1.127	0.058	100 g

CRM GLASS

BCR: 100 x 100 x 10 mm (300 g) BGIRA-EC: 75 x 75 x 6 mm JCRM: 50 g rods SGT: 25 g pieces SV: 100 g powder or 35 mm Ø x 4 mm disc

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
JCRM R102	80.5	2.27	12.07	.	.	.	0.033	0.029	.	.	4.00	.	.	0.011	.	0.032	.	Cl: 0.057
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)	.	
SV 4005	72.69	1.03	.	0.016	6.03	.	0.050	0.564	.	4.12	15.11	.	0.324	0.035	.	.		
SGT G7	72.64	1.50	.	.	11.03	.	0.044T	0.43	.	0.14	13.90	.	0.19T	0.042	.	.	0.07	
SV 4004	72.45	(0.60)	.	0.010	8.61	.	0.042	0.298	.	3.98	13.49	.	0.236	0.037	.	.	.	
BGIRA EC 1.1	71.94	1.22	.	.	7.70	.	0.077	0.43	.	4.01	14.22	.	0.27	0.029	.	.	.	
SV 4007	71.85	1.49	.	0.026	7.33	0.0040	0.298	0.703	.	4.74	13.34	.	0.038	0.032	.	.	.	
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)	.	
SV 4006	70.14	2.12	.	0.051	9.89	0.0115	0.287	0.938	.	2.82	13.30	.	0.151	0.046	.	0.013	.	
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 G9	56.7	1.4	.	.	0.1	.	0.045T	8.4	.	.	4.0	28.4	.	0.03	.	.	0.4	As_2O_3: 0.4T
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

CRM GLASS DISCS AND PLATES

= 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	.
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	SRM 620	Soda-Lime	72.08	1.80	.	.	7.11	.	0.41	3.69	14.39	.	0.28	.	0.018	.
2	BR 1/S	Float	71.91	1.16	0.0	0.0	6.56	.	0.66	4.45	14.68	0.0	0.45	0.0	0.035	.
1	SRM 621	Soda-Lime	71.13	2.76	.	0.12	10.71	.	2.01	0.27	12.74	.	0.13	.	0.014	.
1	SV 4001	Leaded	69.55	1.87	1.09	0.014	1.80	.	10.43	1.11	5.73	6.53	.	.	0.022	(0.002)
1	SV 4002	Leaded	66.07	0.151	0.82	1.07	2.80	.	13.53	(0.02)	2.57	10.80	.	.	0.022	1.04
1	SV 4003	Leaded	59.49	0.119	(0.02)	(0.003)	(0.014)	.	12.34	(0.006)	1.85	23.97	.	.	0.019	1.55
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
2	BR 25/S	Lead Crystal	58.02	0.15	0.47	2.24	0.015	.	11.47	0.002	2.35	24.74	0.08	0.058	0.0	.
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
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 32 mm x 32 mm x 6 mm
SRM 620	0.056	.	.	.	.	0.043	.	.	3 Plates 35 mm x 35 mm x 3 mm
BR 1/S	0.0	0.049	.	.	.	0.11	.	.	1 Disc 40 mm Ø x 3-5 mm
SRM 621	0.030	.	.	.	.	0.040	.	0.007	3 Discs 38 mm Ø x 5 mm
SV 4001	0.430	.	(0.0026)	(0.85)	.	0.038	.	(0.013)	1 Disc 30 mm or 40 Ø x 3-5 mm
SV 4002	0.311	.	(0.001)	(0.56)	.	0.021	.	0.030	1 Disc 30 mm or 40 Ø x 3-5 mm
SV 4003	0.161	.	(0.0006)	(0.42)	.	0.017	.	0.025	1 Disc 30 mm or 40 Ø x 3-5 mm
SRM 1411	.	.	.	.	.	0.050	.	.	10 Plates 32 mm x 32 mm x 3 mm
BR 25/S	0.47	0.0	.	.	.	0.014	.	.	1 Disc 40 mm Ø x 3-5 mm
SRM 1412	.	.	.	.	.	(0.031)	(4.50)	.	8 Plates 32 mm x 32 mm x 3 mm

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	1.26 g	plate, 6 x 50 x 75 mm
ASCRM 002-99	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 URANIUM IN GLASS

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

Number	U
IRMM 540R	15.0
IRMM 541	49.4

CRM GLASS SAND

SGT: 200 g SRM 89: 45 g other SRM: 75 g IPT, UNS: 100 g units

Number	SiO_2	Al_2O_3	As_2O_3	As_2O_5	BaO	CaO	Cl	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	PbO	SO_3	TiO_2	ZrO_2	LOI
IPT 61	99.79	0.054	.	.	.	(0.004)	.	0.014	(0.007)	(0.003)	.	(0.002)	.	.	.	0.026	0.010	(0.06)
IPT 62	99.62	0.11	.	.	.	(0.004)	.	0.072	(0.007)	(0.004)	.	(0.002)	.	.	.	0.036	0.010	0.10
UNS SPS	99.32	0.248	.	.	.	0.029	.	0.037	0.058	0.0071	.	0.045	.	.	.	0.035	.	0.167
SGT S6	98.66	0.60	.	.	.	<0.02	.	0.032 T	0.40	<0.02	.	<0.02	.	.	.	0.024	.	0.14
SGT S9	97.24	1.35	.	.	.	0.02	.	0.103 T	0.82	0.06	.	0.10	.	.	.	0.044	.	0.24
SGT S8	95.63	2.07	.	.	.	0.06	.	0.26 T	1.06	0.12	.	0.20	.	.	.	0.073	.	0.48
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	0.03	0.36	1.40	0.21	0.05	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	.	.	Cr_2O_3:0.0046		.	0.082	.	.	.	.	.	.	.	0.12	0.034	.
SRM 165a	.	0.059	.	.	.	.	.	0.012	.	.	.	.	.	.	.	0.011	0.006	.

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	MnO	Mn_3O_4	Na_2O	P_2O_5	S	SO_3	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 3608	97.88	0.680	0.056	0.129	.	0.026	0.542	0.097	0.056	.	0.018	0.020	0.010	0.001	.	0.034	0.30
DH 3609	96.35	1.46	<0.025	0.047	0.005	0.029	0.706	0.334	0.104	.	0.020	0.045	0.019	.	.	0.086	0.48
DH 3605	95.42	0.346	0.030	3.33	0.0002	0.020	0.346	0.070	0.079	0.018	.	0.012	0.008	.	0.013	0.044	0.043
DH 3606*	89.34	3.63	0.032	0.036	0.007	0.030	4.07	0.715	0.219	0.033	.	0.031	0.092	.	0.006	0.273	1.42

continued analysis listed in mg/kg analysis listed in mg/kg

Number	BaO	C	CeO_2	CuO	NiO	V_2O_5	ZnO	ZrO_2	Ba	Ce	Co	Cu	La	Li	Nd	Ni	Sr	V	Zn
DH 3610	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
DH 3608	.	0.028	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
DH 3609	.	.	.	.	.	<0.006	.	.	.	.	.	.	.	.	.	.	.	.	.
DH 3605	0.003	0.020	0.0001	0.005	0.065	0.002	0.001	0.004	.	.	.	.	1.6	5.9	.	.	11.2	.	.
DH 3606 *	0.014	0.035	0.004	0.002	0.003	0.006	0.020	0.031	.	.	.	.	16.0	18.0	15.6	.	30.1	.	.

* Last of Stock

HARGROVE GRINDABILITY INDEX

Class	Set Number	HGI	HGI	HGI	HGI	units
CRM	SABS 1001	sample A: 37	sample B: 49	sample C: 55	sample D: 71	4 kg of each sample A - D
CRM	NCS AG82001-4	sample 1: 34	sample 2: 59	sample 3: 88	sample 4: 121	250 g of each sample 1 - 4
CRM	ASCRM 011-12	sample A: 34	sample B: 53	sample C: 67	sample D: 96	2 kg of each sample A - D
RM	ASRM 011-10	sample A: 32	sample B: 50	sample C: 72	sample D: 97	2 kg of each sample A - D

CRM GLASS REFRACTIVE INDEX

Number	High Wavelength	Refractive Index	Low Wavelength	Refractive Index	Certified Data Points	Units
SRM 1822	1082.97 nm	1.507143	404.66 nm	1.532710	15	5 x 12 x 17 mm
SRM 1822a	644.0250 nm	1.517277	480.1254 nm	1.526132	6	25 x 25 x 3 mm

CRM HARDNESS TEST BLOCKS

please indicate desired hardness when ordering

Number	Scale	Available Range	Units (mm)
NCS HBS	Brinell Hardness S	(8-650)	100 x 80 x 16
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
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
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 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-FA014	60.7 J	1.7 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 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

CRM LAYER THICKNESS

BAM L101: BK7 glass plate 30 x 30 x 1 mm NMIJ: 13-15 mm squares
other BAM: 100Cr6 steel disc 30 mm Ø x 5 mm BCR: 2 sets of 4 Tantalum foils, 5 mm x 10 mm

Number	Material		Thickness	(+/-)	Layer 1	2	3	4	5	6	7	8	9	10
BAM L102/002	TiN	single layer	3.14 µm	0.19 µm	.	.	.	.	.	.	.	.	.	.
BAM L105/050	VC	single layer	2.69 µm	0.16 µm	.	.	.	.	.	.	.	.	.	.
BAM L104/050	TiC	single layer	2.57 µm	0.17 µm	.	.	.	.	.	.	.	.	.	.
BAM L103/003	VN	single layer	2.20 µm	0.19 µm	.	.	.	.	.	.	.	.	.	.
BAM L100/001	Ti/Al	multi layer	1.63 µm	0.15 µm	.	.	.	.	.	.	.	.	.	.
BAM L101	TiO_2/SiO_2	multi layer	964 nm	24 nm	(93.6)	(91.5)	(92.1)	(106.2)	(93.5)	(92.4)	(93.7)	(101.7)	(91.4)	(108.4)
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 5204a	SiO_2	single layer	3.49 nm	0.19 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 LENGTH STANDARDS

The following certified length standards are available in different ‘grades.’ These grades specify the standard deviation of the certified length. Each set has certain grades available to choose from.

SET L-D83 - Includes 83 pieces, from 0.5 mm to 100 mm. Choose any grade for the set.
0.5, 1.0, 1.005, 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.09, 1.1, 1.11, 1.11, 1.12, 1.13, 1.14, 1.15, 1.16, 1.17, 1.18, 1.19, 1.2, 1.21, 1.22, 1.23, 1.24, 1.25, 1.26, 1.27, 1.28, 1.29, 1.3, 1.31, 1.32, 1.33, 1.34, 1.35, 1.36, 1.37, 1.38, 1.39, 1.4, 1.41, 1.42, 1.43, 1.44, 1.45, 1.46, 1.47, 1.48, 1.49, 1.5, 1.6, 1.7, 1.8, 1.9, 2, 2.5, 3, 3.5, 4, 4.5, 5, 5.5, 6, 6.5, 7, 7.5, 8, 8.5, 9, 9.5, 10, 20, 30, 40, 50, 60, 70, 80, 90 100

L-D38 - Includes 38 pieces, from 1 to 100 mm. Choose any grade from B to E.
1, 1.005, 1.01, 1.02, 1.03, 1.04, 1.05, 1.06, 1.07, 1.08, 1.08, 1.09, 1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 1.7, 1.8, 1.9, 2, 3, 4, 5, 6, 7, 8, 9,10, 20, 30, 40, 50, 60, 70, 80, 90, 100

L-D10A - Includes 10 pieces, from 1 mm to 1.009 mm. Choose any grade from B to E for the set.
1, 1.001, 1.002, 1.003, 1.004, 1.005, 1.006, 1.007, 1.008, 1.009

L-D10B - Includes 10 pieces, from 0.991 mm to 1 mm. Choose any grade from B to E for the set.
0.991, 0.992, 0.993, 0.994, 0.995, 0.996, 0.997, 0.998, 0.999, 1

L-D8 - Includes 8 pieces, from 125 mm to 500 mm. Choose any grade from B to E for the set.
125, 150, 175, 200, 250, 300, 400, 500

L-D5 - Includes 5 pieces, from 600 mm to 1000 mm. Choose any grade from B to E. Available as a set or individually.
600, 700, 800, 900, 1000

LK-D12 - Includes 12 pieces from 10 mm to 291.8 mm. Choose any grade from B to E for the set.
10, 20, 20H, 41.2, 51.2, 81.5, 101.2, 121.5, 121.8, 191.8, 201.5, 291.8

LQ-D20A - Includes 20 pieces, from 5.12 mm to 100 mm. Choose any grade from B to E for the set.
5.12, 10.24, 15.36, 21.5, 25, 30.12, 35.24, 40.36, 46.5, 50
55.12, 60.24, 65.36, 71.5, 75, 80.12, 85.24, 90.36, 96.5, 100

LQ-D20B - Includes 5 pieces, from 5.12 mm to 25 mm. Choose any grade from B to D for the set.
5.12, 10.24, 15.36, 21.5, 25

LQ-D20C - Includes 6 pieces, from 25 mm to 50 mm. Choose any grade from B to D for the set.
25, 30.12, 35.24, 40.36, 46.5, 50

LQ-D20D - Includes 6 pieces, from 50 mm to 75 mm. Choose any grade from B to D for the set.
50, 55.12, 60.24, 65.36, 71.5, 75

LQ-D20E - Includes 6 pieces, from 75 mm to 100 mm. Choose any grade from B to D for the set.
75, 80.12, 85.24, 90.36, 96.5, 100

The following grades specify the standard deviation (± µm)

Length (mm)	Grade A	Grade B	Grade C	Grade D	Grade E
-10	0.1	0.1	0.2	0.5	1.0
>10-18	0.1	0.2	0.3	0.6	1.0
>18-30	0.1	0.2	0.3	0.6	1.0
>30-50	0.1	0.2	0.4	0.7	1.5
>50-80	0.1	0.3	0.5	0.8	1.5
>80-120	0.2	0.3	0.6	1.0	2.0
>120-180	0.2	0.4	0.8	1.2	2.5
>180-250	0.3	0.5	1.0	1.6	3.5
>300	0.4	0.7	1.2	2.0	4.0
400	0.5	0.8	1.5	2.4	4.5
500	0.5	1.0	1.8	2.8	6.0
600	0.6	1.2	2.2	3.5	7
700	0.7	1.4	2.5	4.0	8
800	0.8	1.6	3.0	4.5	9
900	0.9	1.8	3.5	5	10
1000	1.0	2.0	4.0	6	11

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

MULTIELEMENT OXIDE MATERIAL

analysis listed in mass % BAM: CRM glass disc 39 mm Ø x 5 mm BR: RM powder 5 g units

Number	Al_2O_3	As_2O_3	BaO	CaO	CdO	CeO_2	Cl	CoO	Cr_2O_3	CuO	FeO	Fe_2O_3	K_2O	MgO	MnO	MoO_3	Na_2O
BR 8	1.27	0.172	0.577	0.67	.	0.128	0.49	0.56	0.69	0.50	0.57	.	0.71	0.76	0.46	0.137	0.74
BAM S005A	(1.1)	0.0132	0.0115	(10.5)	0.0062	0.0105	0.0247	0.00494	0.00156	0.0112	.	0.0422	(0.7)	(2.3)	0.0124	0.0343	(13.7)
BAM S005B	(1.1)	0.0132	0.0115	(10.5)	0.0062	0.0105	0.0247	0.00494	0.00152	0.0112	.	0.0422	(0.7)	(2.3)	0.0124	0.0343	(13.7)

continued * estimated value based on synthesis

Number	NiO	PbO	S	SO_3	Sb_2O_3	Se	SiO_2	SnO	SnO_2	SrO	TiO_2	Ti_2O_3	V_2O_5	ZnO	ZrO_2
BR 8	0.66	0.108	0.43	.	0.11997	0.20*	1.31	0.106	.	0.743	0.63	0.112*	0.143	0.137	0.547
BAM S005A	0.00590	0.0202	.	0.1942	0.0132	0.00196	(71)	.	0.0100	0.0151	0.0164	.	0.0350	0.0203	0.0842
BAM S005B	0.00590	0.0202	.	0.1942	0.0132	0.00196	(71)	.	0.0100	0.0151	0.0163	.	0.0349	0.0203	0.0842

analysis listing continued for BR 8 * estimated value based on synthesis

Number	Ag_2O	BeO	Bi_2O_3	Br	Cs_2O	F	Ga_2O_3	Gd_2O_3	GeO_2	Hf_2O_3	I	In_2O_3	La_2O_3	Nb_2O_5	Nd_2O_3	P_2O_5
BR 8	0.118	0.277*	0.095	0.098	0.012	0.51	0.010	0.012	0.11	0.0153	0.39*	0.0066	0.101	0.186	0.115*	1.145

Number	Pr_2O_3	Rb_2O	Ru_2O_3	S	Sc_2O_3	Sm_2O_3	Ta_2O_5	Tb_2O_3	TeO_2	ThO_2	UO_3	WO_3	Y_2O_3
BR 8	0.117*	0.01095	0.0124*	0.43	0.0117	0.00812	0.111	0.0105	0.475*	0.102	0.1002	0.0064	0.0064

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)

RM OXIDES

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

Number	CaO	CO_2	MnO_2	Mn_3O_4	Al_2O_3	BaO	C tot	CaO	Cl (H_2O)	Cl tot	CO_2	Co_3O_4	Cr_2O_3	CuO
DH P0101	55.96	43.95	.	.	.	5.7	.	.	.	.	.	.	.	1.2
DH P0301	.	.	99.947	.	15.9	11.3	.	2.2	.	.	.	59.2	32.7	.
DH P0302	.	.	.	99.986	21	12.3	.	3.2	.	.	.	67.3	37.9	.
DH P0401	Iron Oxide	.	.		22.1	3.1	.	4.6	.	.	70.0	30.7	23.4	.
DH P0402	Iron Oxide	.	.		805	.	107	41	957	.	.	117	575	133
DH P0403	Iron Oxide	.	.		924	.	(113)	46	1360	1373	.	112	591	132

Number	Fe_2O_3	K_2O	MgO	Mn_3O_4	MoO_3	Na_2O	NiO	P_2O_5	SiO_2	SO_3	SrO	TiO_2	WO_3	ZnO	$-H_2O(900'C)$
DH P0101	5.6	.	165.7	.	.	78	.	.	(<20)	(100)	164	.	.	.	.
DH P0301	112.5	.	1.2	.	.	13.3	2	.	76.2	.	1.8	.	.	.	.
DH P0302	129.4	.	1.5	.	.	10.9	2.4	.	81.3	.	1.9	.	.	.	.
DH P0401	.	.	3.7	11.9	5.3	<7	.	2.9	.	16.5	0.12	.	12.6	9.5	173
DH P0402	.	12	12	3226	.	(27)	301	176	138	32	.	89	.	.	.
DH P0403	.	20	13	3522	.	(203)	301	195	376	62	.	87	.	.	.

RM HALFNIUM DIOXIDE

analysis listed in mass — 30 g units

Number	Al_2O_3	CaO	Fe_2O_3	MgO	SiO_2	TiO_2	ZrO_2
OSO HFO-4-95	0.030	0.090	0.028	0.019	0.11	0.20	0.070
OSO HFO-3-95	0.015	0.056	0.016	(0.010)	0.046	0.11	1.03
OSO HFO-2-95	0.0045	0.012	0.0065	0.0031	0.013	0.021	0.44
OSO HFO-1-95	0.0030	0.0023	0.0045	0.0024	0.0035	0.0022	2.12

CRM IRON OXIDE

analysis listed in mass % — 75 g units

Number	Fe2O3	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	(0.006)	(<0.005)	0.292	0.024	(0.04)	0.0110	(0.1)

CRM IRON OXIDE

Number	Total Iron	Al_2O_3	CaO	Cl-	MnO	SiO_2	SO_4^{2-}	Units	
NCS HS41701-7	69.49	0.0030	0.017	0.233	0.212	0.0098	0.019	80 g	last of stock

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 IRON OXIDE and SILICON OXIDE

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

Number	SiO_2	Si	Al_2O_3	Al*	CaO	C	Cr*	Fe	MgO	Mg*	MnO	Mn*	Ni*	S*	TiO_2	LOI	Units
IRSID 608-1	60.39	.	9.94	.	8.70	.	.	4.00	1.34	.	0.057	.	.	.	0.714	.	100 g
JSS 009-3 *	.	(<0.004)	.	(3)	.	(0.02)	9.7	69.84 (tot)	.	(0.3)	.	(0.6)	(0.3)	(1)	.	(0.4)	50 g

* JSS 009-3 contains (<0.0002) of As, Bi, Ca, Co, Cu, K, Na, P, Pb, Sn, Ti, V, and Zn.

CRM NICKEL OXIDE

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

Number	NiO	Al	Co	Cr	Cu	Fe	Mg	Mn	Si	Ti	Bi*	Pb*	Se*
SRM 673	77.7	0.001	0.016	0.0003	0.002	0.029	0.003	0.0037	0.006	0.003	0.06	3.5	0.2
SRM 672	77.1	0.004	0.55	0.003	0.018	0.079	0.020	0.095	0.11	0.009	0.3	38	0.40
SRM 671	76.6	0.009	0.31	0.025	0.20	0.39	0.030	0.13	0.047	0.024	0.07	16	2.0

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
SRM 672	0.3	74, 45	1.7	0.4	0.5	4	<0.2	<0.1	140
SRM 671	0.5	59, 45	0.7	0.8	0.4	2.7	<0.2	<0.1	160

Certified values show concentrations in nickel oxide. To convert values to the percent concentration in total metal present, multiply the values by 1.28 for SRM 671 and 672; for SRM 673 multiply by 1.29.

Where As has two values, the first is atomic absorption and the second is photometric (extraction and distillation.)

CRM TITANIUM DIOXIDE SET

analysis listed in mass % available in SET/8 ONLY 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

CRM VANADIUM PENTOXIDE

analysis listed in mass % NCS: 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 HC26612	98.09	.	.	.	.	.	0.16	.	.	0.15	.	1.11	0.027	0.014	0.17	.	.	As: 0.016
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	Al_2O_3	As	CaO	Cd	Cl	Co	F	Fe	MgO	Ni	Pb	S	Sb	SiO_2	Units
IMN TC/P10	60.6	0.14	.	2.54	.	.	.	.	6.7	1.38	.	2.31	3.07	.	0.56	240 g
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 YTTRIUM OXIDE

analysis listed in mg/kg 10 g units

Number	CeO_2	Dy_2O_3	Er_2O_3	Eu_2O_3	Gd_2O_3	Ho_2O_3	La_2O_3	Lu_2O_3	Nd_2O_3	Pr_6O_{11}	Sm_2O_3	Tb_4O_7	Tm_2O_3	Yb_2O_3
NCS DC93001	2.16	2.14	2.11	2.48	2.15	2.31	2.88	2.02	2.44	2.12	2.16	2.05	2.06	2.21
NCS DC93002	17.22	21.25	21.62	22.6	21.22	21.25	17.54	20.17	21.52	18.84	21.07	20.85	20.34	21.04

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
TECH AA	2,300 cm^2/g	5,000 cm^2/g	0.57	1-64 Ø µm	12.7 Ø µm
TECH 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 — 5 x 2.5 g powder

Number	Weight Percentile	Certified Value	Uncertainty
SRM 659	10	0.48	0.10
	25	0.81	0.10
	50	1.43	0.10
	75	2.08	0.11
	90	2.80	0.13

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 POROUS MATERIALS

Pressure/Volume and Diameter/Volume curves are also certified

Number	Description	Units	(nm) Mean Pore Radius	(nm) Most Frequent Pore Radius	(cm^2/g) Specific Surface Area	(mm^3/g) Specific Pore Volume	(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 PM 103	Al_2O_3 Type 60	10g	3.18	1.93	156.0	0.250	.	.	.	.
BAM PM 104	Al_2O_3 Type 150	10g	5.31	3.23	79.8	0.210	.	.	.	.
BAM PM 120	Alpha-Al_2O_3	10g	228.0	232.2	.	.	545.0	546.7	546.8	548.1
BAM PM 121	Porous glass	12g	15.1	15.3	.	.	621.8	621.9	621.9	624.6
BAM PM 122	Porous glass	15g	139.0	140.2	.	.	919.7	922.5	922.6	924.4

RM PLASTER

analysis listed in mass %

Number	Al_2O_3	Fe_2O_3	CaO	K_2O	MgO	Na_2O	P_2O_5	SiO_2	TiO_2	LOI	Units
BCS 202a	0.32	0.1	37.6	0.1	0.38	0.1	<0.01	1.33	0.02	7.0	100 g

CRM RoHS/WEEE SAMPLES

analysis listed in mg/kg T = total

Number	As	Br	Cd	Cl	Cr	Hg	Pb	S	Material	Units
NMIJ 8116a	.	.	93.67	.	943.7	938.7	940.6	.	ABS resin disc	30 mm Ø x 2 mm
NMIJ 8115a	.	.	9.341	.	94.27	93.81	94.21	.	ABS resin disc	30 mm Ø x 2 mm
ERM EC681k	29.1	770	137	800	100	237	98	630	LDPE granule	Pellets 100 g
ERM EC680k	4.1	96	19.6	102.2	20.2	4.64	13.6	76	LDPE granule	Pellets 100 g
NMIJ 8113a	.	.	93.93	.	943.6	941.5	945.0	.	ABS resin	Pellets 25 g
NMIJ 8112a	.	.	9.383	.	94.47	94.10	94.98	.	ABS resin	Pellets 25 g
JSAC 0602-3	.	.	50.6	.	112.5	12.1	112.1	.	Polyester	Chips 50 g
JSAC 0601-2	.	.	5.2	.	10.8	1.3	11.6	.	Polyester	Chips 50 g
JSAC 0403	199	.	183	.	257 T	11.1	224	.	Soil	Powder 50 g
JSAC 0402	41.6	.	18.5	.	90.5 T	1.3	45.2	.	Soil	Powder 50 g

RoHS/WEEE SETS

sold in sets only, as grouped analysis listed in mass %

Number	As	Br	Cd	Cr	Hg	Pb	Se	Units
CRM plastic set								
JSAC 0631	.	.	0.00225	0.00258	0.00197	0.00245	.	40 mm Ø x 4 mm
JSAC 0632	.	.	0.00461	0.00933	0.00594	0.00929	.	
CRM soil set								
JSAC 0466	0.01093	.	0.01199	0.1483	0.01135	0.1214	0.1175	Powder 25 g
JSAC 0465	0.0550	.	0.06074	0.0738	0.00578	0.6124	0.0587	
JSAC 0464	0.02711	.	0.03010	0.0499	0.00286	0.03027	0.02919	
JSAC 0463	0.01376	.	0.01468	0.0244	0.001476	0.01516	0.01415	
JSAC 0462	0.00715	.	0.00742	0.01496	0.000727	0.00737	0.00716	
JSAC 0461	0.002153	.	(0.000030)	0.00972	0.0000075	0.00244	(0.000044)	
RM polyethylene set								
PE High	.	0.1073	0.0300	0.0999	0.1101	0.1198	.	31 mm Ø x 12 mm
PE Low	.	0.0488	0.0100	0.0400	0.0201	0.0401	.	
PE Blank	.	0	0	0	0	0		
RM polyvinyl chloride set								
PVC High	.	0.1101	0.0300	0.1001	0.1101	0.1201	.	31 mm Ø x 12 mm
PVC Low	.	0.0500	0.0100	0.0400	0.0200	0.0400	.	
PVC Blank	.	0	0	0	0	0		
RM polyethylene packaging set								
PACK High	.	.	0.0100	0.0101	0.0100	0.0101	.	31 mm Ø x 12 mm
PACK Low	.	.	0.0060	0.0031	0.0031	0.0031	.	
PACK Blank	.	.	0	0	0	0	.	

CRM ZINC RoHS/WEEE SAMPLES

cast mass % 50 mm Ø x 20 mm

Number	Cd	Cr	Hg	Pb
41X ZSC6	0.215	<0.0002	0.029	0.0077
41X ZSC3	0.119	0.0148	0.0021	0.0273
41X ZSC5	0.0502	<0.0002	0.147	0.013
41X ZSC1	0.0288	0.0039	0.026	0.06
41X ZSC4	0.0131	0.0299	0.050	0.156
41X ZSC2	0.0016	0.0036	0.0053	0.111

REFRACTORIES

= class, where 1 = CRM and 2 = RM T = Total 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	$-H_20$
1	ASMW FF10	69.66	24.04	.	.	0.36	1.70	1.73	0.31	.	.	0.12	.	.	.	1.49	.	.
2	DH 2611	60.07	36.82	0.033 T	.	0.054	0.509	0.362	0.170	0.011	.	0.055	0.036	.	0.014	1.50	0.047	0.186
1	ASMW FF8	53.79	36.91	.	.	0.36	2.93	1.69	0.54	.	.	0.09	.	.	.	2.54	.	.
2	DH 2608	45.33	41.87	0.257 T	0.343	1.18	2.33	1.14	4.82	.	0.061	0.173	0.129	.	0.102	1.57	0.081	0.447
2	FQZ 2610	43.75	40.21	0.020 T	0.008	11.55	0.94	1.44	0.39	.	0.025	0.141	0.051	<0.001	.	1.01	0.049	0.124
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 2602	34.49	62.82	.	0.004	0.438	1.087	0.24	0.161	.	0.019	.	0.029	.	0.031	0.288	.	0.101
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	VS K6/3	2.02	0.54	.	.	2.92	2.23	.	92.4	.	.	.	.	.	.	.	.	.
1	VS K10/3	(0.2)	97	(0.05)	.	(0.03)	1.82	(0.03)	.	.	.	(0.5)	.	.	.	0.35	.	.

continued

Number	CuO	Cr_2O_3	NiO	V_2O_5
ASMW FF10	.	.	.	.
DH 2611	.	.	.	.
ASMW FF8	.	.	.	.
DH 2608	.	.	.	.
FQZ 2610	.	.	.	.
DH 2612	.	0.385	0.032	0.027
DH 2602	.	.	.	.
DH 2613	0.004	0.140	.	0.020
DH 2609	.	.	.	.
VS K6/3	.	.	.	.
VS K10/3	.	.	.	.

CRM ALUMINA REFRACTORY SET

SOLD IN SET/10 ONLY 20 g units

Number	Al_2O_3	SiO_2	B_2O_3	CaO	Fe_2O_3	K_20	MgO	MnO	Na_2O	TiO_2
JRRM 310	94.7	0.41	.	0.03	0.02	1.32	0.97	0.04	0.08	2.06
JRRM 309	89.8	2.12	.	1.02	1.27	0.92	0.28	0.00	0.42	3.85
JRRM 308	86.5	10.2	.	0.09	0.41	0.10	0.05	0.11	0.26	1.79
JRRM 307	80.1	10.8	.	0.15	2.97	2.36	0.61	0.01	1.08	1.22
JRRM 306	74.1	17.3	.	0.62	1.95	1.75	0.10	0.01	0.99	2.68
JRRM 305	68.6	20.0	.	0.65	2.81	3.11	0.30	0.01	0.80	3.30
JRRM 304	63.0	27.5	.	0.18	3.46	0.38	0.37	0.05	0.27	4.34
JRRM 303	59.2	36.1	.	1.03	1.47	0.20	0.85	0.00	0.69	0.16
JRRM 302	53.9	37.7	.	0.87	4.49	0.66	0.69	0.20	0.56	0.59
JRRM 301	46.8	43.9	(0.87)	0.79	3.52	2.00	0.69	0.01	0.17	1.03

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

Number	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	Li_2O	Na_2O	P_2O_5	TiO_2	ZrO_2	LOI	Units
IPT 63	96.28	0.48	2.21	0.52	0.043	0.18	0.008	(0.0005)	0.013	0.013	0.030	(0.002)	0.17	80 g

CRM SILICA REFRACTORY SET

SOLD IN SET/10 ONLY — 20 g units

Number	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	TiO_2
JRRM 210	97.69	0.16	0.30	0.83	0.00	0.78	0.00	0.02	0.00
JRRM 209	96.22	0.87	1.89	0.37	0.17	0.10	0.06	0.03	0.05
JRRM 208	94.43	0.46	4.19	0.06	0.02	0.05	0.00	0.63	0.00
JRRM 207	94.05	1.70	2.51	0.96	0.21	0.16	0.04	0.04	0.07
JRRM 206	92.88	1.77	1.20	3.20	0.50	0.07	0.01	0.18	0.01
JRRM 205	90.40	3.08	3.11	1.24	0.50	0.09	0.06	0.93	0.32
JRRM 204	89.64	4.49	1.79	2.08	0.90	0.31	0.10	0.31	0.15
JRRM 203	87.33	5.09	3.97	1.78	0.24	0.47	0.11	0.61	0.18
JRRM 202	85.72	7.59	0.81	3.97	0.02	0.02	0.00	1.01	0.56
JRRM 201	84.36	9.71	2.77	1.46	0.14	0.73	0.14	0.31	0.03

CRM ZIRCON-ZIRCONIA REFRACTORY SET

SOLD IN SET/10 ONLY — 20 g units

Number	ZrO_2	SiO_2	Al_2O_3	CaO	Cr_2O_3	Fe_2O_3	HfO_2	K_2O	MgO	Na_2O	P_2O_5	TiO_2	LOI
JRRM 601	92.01	0.26	0.11	5.58	0.00	0.10	1.59	0.00	0.06	0.00	0.00	0.16	(0.07)
JRRM 602	88.25	0.33	0.07	0.22	0.01	1.61	1.52	0.00	5.29	0.76	1.33	0.16	(0.25)
JRRM 603	84.70	0.96	5.29	0.95	0.02	2.85	1.45	0.65	0.96	0.18	0.83	0.93	(0.11)
JRRM 604	79.26	3.04	6.91	0.09	3.06	0.42	1.35	1.93	0.01	1.08	1.99	0.13	(0.23)
JRRM 605	75.36	10.78	4.83	1.93	1.54	0.17	1.31	0.54	1.99	0.45	0.35	0.12	(0.31)
JRRM 606	72.35	22.03	0.53	0.02	0.00	0.93	1.26	0.01	0.32	2.02	0.01	0.11	(0.32)
JRRM 607	61.31	32.75	3.51	0.04	0.00	0.12	1.21	0.04	0.03	0.02	0.08	0.13	(0.56)
JRRM 608	58.84	34.62	0.70	0.52	0.49	0.09	1.21	0.01	3.12	0.03	0.11	0.10	(0.06)
JRRM 609	55.56	40.50	0.88	0.30	0.01	0.15	1.12	0.02	0.15	0.94	0.08	0.15	(0.12)
JRRM 610	48.70	45.66	0.45	3.07	0.00	0.30	0.98	0.01	0.54	0.04	0.11	0.09	(0.07)

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 5706	87.92	0.073	3.62	0.056	1.04	0.125	3.10	0.526	0.271	0.124	0.755	0.593	0.231	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 5707	82.15	0.223	4.03	0.158	1.78	1.50	1.89	5.09	0.259	0.117	0.443	0.524	0.223	1.82
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 4505	58.23	6.62	0.659	0.031	18.41	11.30	0.502	3.98	0.096	0.059	0.045	<0.01	0.022	0.242	0.139	0.114	0.003	.
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 % — CERAM: 25 or 100g — SRM: 45g — VS: 75g — 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 K1/2	96.0	0.6	.	1.37	.	1.2	.	.	0.05	0.03	.	0.010	.	.	.
1	ECRM 777-1	95.06	0.795	.	2.826	.	0.330	0.154	.	0.071	.	0.02	.	.	0.444	.
1	ASMW FF11	92.24	4.14	.	0.10	.	0.49	0.46	.	0.11	.	0.04	.	.	0.40	.
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	.
2	CERAM 2CAS7	49.9	44.4	0.08	0.36	.	2.58	0.54	0.07	0.4	.	0.13	.	.	1.35	0.07
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

analysis listed in mass % — T = Total

Number	Type	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
CRM															
BCS 313/1	High Si	99.78	0.036	0.006	<0.001	0.012	0.005	0.0013	0.0013	0.003	.	0.017	.	100 g	
GBW 03112	High Si	98.51	0.84	0.077	0.00034	0.093	0.061	0.066	(0.0016)	0.021	(0.0041)	0.020	0.24	60 g	
CMSI 1781	High Si	98.38	0.57	0.009	.	0.45	.	0.021	.	.	.	0.20	.	100 g	
GBW 03113	High Si	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	
SRM 2696	Si Fume	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
GBW 03114	High Si	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	
GBW 03117	Si Glass	71.25	2.56	6.37	.	0.18	1.10	3.98	.	13.77	.	0.057	0.44	50 g	
SARM 69 *	Ceramic	66.6	14.4	2.37	Cr:0.0223	7.18T	1.96	1.85	0.129	(0.79)	(0.28)	0.777	(3.6)	100 g	Zn:0.0068 Ba:0.0518
RM															
CERAM CEB1	Earthware	74.0	16.2	0.52	<0.01	0.48	1.75	0.16	.	0.71	0.14	0.34	5.60	25 or 100g	BaO: 0.05

* SARM 69 also contains (in ppm) Co: 28, Cu: 46, Ni: 53, and Sc: 20

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 07707	2.0	200	200	2000	20	20	2.0	200	200	200	200	200	213	2000
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 07707	20	200	200	200	20	20	203	2000	200	20	200	20	200	200
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 SRM: 40 g units

Number	Al	C	Ca	Cr	Cu	Fe	Mg	Mn	Ni	P	S	Ti	V	Zr
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	.

CRM SILICON CARBIDE

Number	SiC	Al	Al_2O_3	C Free	Fe	Fe_2O_3	Units
VS K9/2	99.6	(0.002)	.	.	(0.06)	.	150 g
NCS DC93021	98.73	.	0.11	0.11	.	0.45	100 g
NCS DC93022	88.76	.	1.65	2.14	.	2.14	100 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 S003	29.89	0.0493	.	(0.0481)	(0.0600)	0.0372	0.0063	0.00294	0.00035	0.00015	0.0149	.	0.00063
JRRM 1001	29.81	0.04	.	0.06	.	0.008	.	<0.001	.	.	0.044	.	<0.001
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
JCRM R022	30.4	1.62	68.1	0.31	.	0.058	.	0.025	0.006	.	0.051	.	0.005
JCRM R021	29.9	0.86	68.8	0.57	.	0.039	.	0.007	0.004	.	0.018	.	0.0021
JCRM R023	29.6	0.39	69.3	0.20	.	0.003	.	0.003	0.001	.	0.015	.	0.001

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)	Chips 100 g
NMIJ 8002a	0.000160	0.0109	.	.	.	.	0.00477	.	0.58	.	Beta Phase	Powder 50 g
BAM S003	0.000144	.	(0.0093)	0.00177	0.00329	0.0910	0.0079	0.00414	.	0.00252	green micro F800	Powder 50 g
JRRM 1001	.	.	0.030	.	.	0.048	0.0035	.	.	.	after HF treatment SiC: 99.58%	Chips 50 g
NMIJ 8001a	.	.	.	.	.	.	0.000637	.	0.31	.	Alpha Phase	Powder 50 g
ECRM 780-1	0.029	.	0.325	(0.0502)	.	.	.	.	.	.	n/a	Chips 100 g
JCRM R022	0.001	.	.	.	0.001	0.98	0.003	<0.001	.	0.001	set JCRM R021 - R023 only	Powder 50 g
JCRM R021	<0.001	.	.	.	0.001	1.08	0.010	0.002	.	0.001	set JCRM R021 - R023 only	Powder 50 g
JCRM R023	<0.001	.	.	.	0.001	0.86	<0.001	<0.001	.	<0.001	set JCRM R021 - R023 only	Powder 50 g

CRM SILICON NITRIDE

analysis listed in mass % | analysis listed in mg/kg

Number	Si	N	Al	C	Ca	Fe	Mg	O	Co*	Mn*	Na*	Ni*	Ti*	W*	Zr*	â-phase of Si_3N_4	Units
SRM 8983	.	39.23	.	0.107	.	.	.	1.20	.	.	.	.	.	.	.	.	4.5 g
NMIJ 8004a	59.226	38.485	0.07397	.	0.00727	0.01969	0.001029	.	.	2.987	.	2.485	8.519	.	2.146	.	25 g
BAM ED101	.	38.1	0.0469	0.162	0.00141	0.00795	0.00043	(1.91)	43.5	.	7.59	.	.	41.3	.	7.43	50 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 SILICOALUMINUM

analysis listed in mass % — 50 g units

Number	Al	Si	Fe	Ba	C	Ca	Cr	Cu	Mg	Mn	Ni	P	S
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
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
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
NCS HC13602	32.55	32.01	20.59	7.41	0.27	1.17	.	.	0.85	0.197	.	0.017	0.0096
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
NCS HC14601	1.55	59.24	9.71	16.54	0.21	9.89	0.035	0.13	.	0.067	0.012	0.024	0.051

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
2	DH 0405	32.84	57.48	1.193	.	.	0.006	<0.009	3.47	0.021	0.039	.	0.012	0.014	.	0.055	50 g
2	BS 119	32.3	62.3	0.46	.	0.30	.	.	3.0	.	.	.	.	0.033	0.01	.	100 g
2	DH 0406	30.48	60.79	0.333	.	0.61	<0.009	<0.010	5.17	0.010	0.056	<0.021	<0.007	0.031	0.022	0.019	50 g
1	VS F26/2	29.9	59.5	1.52	.	.	.	.	6.29	.	.	.	.	0.024	0.030	0.156	100 g
2	DH 0403	28.60	60.12	1.59	.	0.40	0.018	0.016	5.56	0.188	0.611	0.003	0.008	0.014	.	0.169	50 g
2	DH 0402	28.48	58.68	1.13	.	.	0.009	0.014	6.74	0.047	0.051	.	.	0.013	.	0.055	50 g
2	DH 0404	26.79	62.53	1.74	.	0.533	0.016	0.020	5.03	0.036	0.094	0.026	0.007	0.011	.	0.238	50 g
1	VS F25	20.5	51.5	0.66	.	.	.	.	24.20	.	.	.	.	0.011	0.0055	.	100 g
1	NCS HC13601	12.70	58.89	1.55	12.61	0.73	.	.	9.26	0.85	0.0741	.	.	0.0129	0.052	.	50 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

SILICOMANGANESE

= class, where 1 = CRM and 2 = RM

#	Number	Mn	Si	Fe	Al	B	C	Ca	Co	Cr	Cu	Ni	P	S	Ti	V	Units
2	DH 0107	77.82	17.36	2.64	.	.	1.65	.	0.030	.	0.012	0.021	0.135	.	0.122	0.015	50 g
1	VS F23/2	73	18.08	.	.	.	1.43	.	.	.	.	.	0.488	0.022	.	.	100 g
2	DH 0103	68.25	17.79	11.11	.	0.0081	1.716	.	0.066	0.009	0.032	0.032	0.100	.	0.191	.	50 g
2	DH 0104	68.20	19.47	9.88	.	0.0052	1.165	.	0.109	0.045	0.042	0.093	0.148	.	0.208	.	50 g
1	NCS HC26611	67.51	17.53	.	.	.	1.67	.	.	.	.	.	0.087	0.023	.	.	50 g
1	ECRM 586-1	62.48	33.96	2.887	0.218	.	0.0252	0.0386	0.0069	0.0440	.	.	0.040	.	.	0.0408	100 g
2	DH 0301	59.06	30.16	9.91	0.016	0.0048	0.015	.	0.028	0.035	0.019	0.033	0.050	.	0.471	0.015	50 g

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	.

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	37.0	10.3	0.20	0.23	.	0.17	5.87	0.19	0.16	.	1.14	0.20	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
2	BS 100A	37.6	35.2	10.13	0.07	0.30	.	0.49	12.9	0.35	0.18	.	1.2	0.50	100 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 Slag 3	37.3	37.44	12.9	0.03	0.25	.	0.81	8.3	1.72	0.26	.	0.81	0.63	50 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
2	BS Slag 1	30.2	36.7	18.5	0.07	0.28	.	0.36	11.01	1.11	0.20	.	1.8	0.42	50 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 — GBW: 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
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	53.7	.	.	18.8	1.47	.	.	11.0	.	(0.006)	3.1	5.2	(0.028)	0.77	.	0.19	0.92	.
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	52.4	.	.	23.7	0.61	.	.	6.3	.	(0.003)	9.2	3.45	0.009	0.78	.	0.18	0.8	.
2	BS 101/4	51.9	.	.	16.5	0.87	.	.	13.4	.	(0.007)	4.6	4.7	(0.023)	0.80	.	0.15	1.21	.
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	GBW 01706	.	35.27	.	19.13	4.73	.	1.52	11.21	.	0.038	5.18	3.63	0.064	1.15	.	0.192	0.445	.
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	47.0	.	.	16.8	0.9	.	.	15.2	.	(0.006)	8.1	4.8	0.031	0.70	.	0.23	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	46.0	.	.	14.9	0.57	.	.	19.2	.	(0.005)	5.5	5.7	(0.043)	0.71	.	0.12	1.1	.
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 147	40.29	.	.	12.87	4.40	0.48	.	19.59	16.11	.	5.20	5.45	.	2.44	.	0.146	0.50	.
1	NH 148	39.76	.	.	6.52	1.62	0.86	.	18.44	0.29	.	4.94	3.78	.	10.84	.	0.112	0.25	.
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	NH 155	34.35	.	.	19.19	10.20	0.68	.	13.17	0.11	.	4.70	3.91	.	4.26	.	0.124	0.38	.
1	NH 142	29.56	.	.	22.16	3.13	0.55	.	16.52	16.89	.	5.38	12.09	.	2.08	.	0.067	0.69	.
1	CMSI 1744	26.73	.	.	8.91	3.92	.	.	34.33	36.55	.	12.15	2.01	.	0.87	.	0.107	0.32	.
1	NH 141	26.22	.	.	22.47	2.74	(0.85)	.	21.37	22.99	.	(4.02)	10.85	.	2.14	.	0.081	0.63	.
1	VS W4/1	25.7	.	.	16.80	3.62	.	.	22.9	24.6	.	17.8	4.23	.	P: 0.265	.	0.036	1.05	.
1	VS W4/4	25.5	.	.	16.7	3.62	.	.	23.2	25.5	.	18.3	4.37	.	P: 0.259	.	0.037	1.02	.
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 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 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 144	20.50	.	.	22.18	2.42	1.32	.	28.47	31.61	.	2.85	9.72	.	2.02	.	0.091	0.55	.
1	NH 153	15.17	.	.	12.12	3.37	36.50	.	7.09	8.05	.	16.68	4.47	.	(0.01)	.	0.036	2.26	.
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

= class, where 1 = CRM and 2 = RM

JSS: 70 g units all others: 100 g units

#	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 905-1	42.1	.	34.2	14.2	6.8	0.17	.	K: 0.308	.	0.22	Na: 0.143	0.008	.	0.558	0.56
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 3229	40.68	.	37.35	12.53	6.15	0.193	.	0.529	0.365	.	.	.	0.008	1.05	0.742
2	DH 3221	40.54	28.97	35.69	10.99	10.00	0.230	.	0.525	0.161	.	0.428	.	.	1.55	0.572
2	DH 3230	40.42	.	37.24	12.64	5.94	0.667	.	0.431	0.402	.	.	.	.	1.044	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 3218	.	28.35	36.86	12.38	7.63	0.358	.	0.557	0.292	.	0.364	.	0.006	1.32	0.480
2	DH 3219	.	28.24	39.26	10.00	7.47	0.383	.	0.744	0.981	.	0.303	.	0.026	0.818	0.533
1	VS W1/2	38.8	.	37.9	8.48	9.35	.	0.47	.	.	0.22	.	.	.	0.69	.
1	NCS HC13810	38.57	.	34.08	7.08	16.97	0.64	0.58	.	.	0.089	.	.	0.037	0.536	0.36
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)
2	DH 3223	.	27.21	38.07	9.39	9.53	0.662	.	1.62	0.726	.	0.391	.	0.012	1.08	0.393
2	DH 3224	.	27.10	37.88	12.86	7.03	2.53	.	0.170	0.145	.	0.102	.	.	1.55	0.265
2	DH 3207	.	26.62	42.09	7.29	9.35	0.872	.	0.600	0.754	.	0.192	.	.	0.65	0.471
1	NCS HC13809	36.50	.	30.95	7.84	20.77	0.78	0.60	.	.	0.077	.	.	0.049	0.535	0.84
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	VS W3/2	31.7	.	30.1	14.5	12.1	.	.	.	.	0.58	.	.	.	0.51	9.62

Number	BaO	C tot.	CO2	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 905-1	.	.	.	.	.	.	.	.	.	.	.
DH 3227	0.094	.	.	.	.	0.054	.	.	.	0.039	.
DH 3231	.	.	.	.	.	0.055	.	.	.	0.044	.
DH 3229	.	.	.	.	.	0.055	.	.	.	0.045	.
DH 3221	.	.	.	.	.	0.066	.	.	.	.	.
DH 3230	0.090	.	.	.	.	0.054	.	.	.	0.042	.
DH 3225	0.086	.	.	.	.	0.053	.	.	.	0.046	.
DH 3218	0.093	.	.	0.008	.	0.086	.	.	.	0.041	.
DH 3219	.	0.028	0.060	.	.	0.045	.	.	.	.	0.07
VS W1/2	.	.	.	.	.	.	.	.	.	.	.
NCS HC13810	.	.	.	.	.	.	.	.	.	.	.
IMZ 276	.	.	.	.	.	.	.	(0.009)	.	.	.
DH 3223	.	.	.	.	.	0.120	.	.	.	.	.
DH 3224	0.083	.	.	.	.	0.052	.	.	.	0.043	.
DH 3207	.	.	.	.	0.030	.	.	.	0.016	.	.
NCS HC13809	.	.	.	.	.	.	.	.	.	.	.
IMZ 277	.	.	.	.	.	.	.	(0.012)	.	.	.
VS W3/2	.	.	.	.	.	.	0.25	.	.	.	.

CRM COPPER CONVERTER SLAG

Number	Ag	Co	Cu	Fe	Ni	Mo	S	V	Units
IMN ZM6	0.0031	0.39	2.12	46.72	0.080	0.021	1.04	0.006	250 g

CONVERTER SLAG

= class, where 1 = CRM and 2 = RM

#	Number	CaO	Ca	SiO_2	Al_2O_3	F	Fe	FeO	K_2O	MgO	Mn	MnO	Na_2O	Nb_2O_5	P_2O_5	S	TiO_2	V_2O_5
2	DH 3917	59.02	.	14.86	1.304	.	10.15	.	.	1.907	2.994	.	.	.	1.89	0.206	0.47	0.54
2	DH 3913	56.31	.	9.87	0.76	.	14.61	.	.	1.07	4.40	.	.	0.077	2.29	0.152	0.423	0.553
2	DH 3918	56.02	.	13.47	1.25	.	12.71	.	.	2.21	3.11	.	.	0.045	1.88	0.218	0.421	0.538
1	NCS HC19808	53.81	.	7.88	1.93	0.294	14.39	.	.	5.04	.	1.39	.	.	.	0.34	1.88	3.57
2	DH 3919	52.95	.	11.94	0.974	.	16.08	.	.	2.235	3.167	.	.	0.044	1.766	0.213	0.368	0.508
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 3921	50.05	.	10.56	4.79	0.500	16.92	.	0.013	2.99	2.31	.	0.020	0.030	1.36	0.196	0.780	0.422
1	VS SH5/3	48.0	.	16.0	1.3	.	17.0	Fe_2O_3: 3.0		3.1	.	4.9	.	.	.	0.20	.	.
1	NCS HC19809	47.6	.	15.74	9.92	0.297	7.64	.	.	3.9	.	3.57	.	.	.	0.244	3.04	2.9
2	DH 3923	46.50	.	11.52	1.27	0.030	20.33	.	0.013	3.23	2.74	.	0.014	0.046	1.73	0.288	1.21	0.522
2	DH 3924	39.62	.	8.90	0.598	0.359	29.99	.	0.015	1.66	2.24	.	0.022	0.036	1.23	0.089	0.559	0.391
1	NCS HC14801	.	40.62	10.24	0.62	2.22	13.6	.	.	6.89	.	1.88	.	.	1.03	0.105	0.565	.
1	NCS HC14802	.	37.39	13.73	1.43	2.06	12.56	.	.	8.33	.	3.03	.	.	1.08	0.126	0.520	.
1	CMSI 1753	.	35.27	19.13	4.73	1.52	11.21	.	0.038	5.18	.	3.63	0.064	.	1.15	0.192	0.445	.
1	NCS HC13813	.	34.55	18.85	1.55	.	12.96	9.75	.	9.27	.	3.10	.	.	0.98	0.096	0.46	.
1	CMSI 1754	.	31.73	26.40	7.75	0.80	5.55	.	0.36	9.24	.	1.93	0.12	.	0.58	0.459	0.531	.
1	CMSI 1755	.	25.90	12.20	3.08	0.85	18.82	.	0.052	11.67	.	1.64	0.030	.	0.95	0.089	0.781	.

Number	CO_2	CaF	Cr	Cr_2O_3	CuO	MoO_3	SrO	Zn	ZnO	Units
DH 3917	.	.	0.108	.	.	.	.	0.002	.	100 g
DH 3913	.	.	0.168	.	0.009	0.007	.	.	.	100 g
DH 3918	.	.	0.120	.	.	.	0.030	.	.	100 g
NCS HC19808	.	.	.	.	.	.	.	.	.	80 g
DH 3919	.	.	0.141	.	.	.	0.028	.	.	100 g
DH 3911	.	.	0.154	.	0.007	.	.	.	0.003	100 g
DH 3921	.	.	0.196	.	0.007	.	.	.	.	100 g
VS SH5/3	.	.	.	.	.	.	.	.	.	100 g
NCS HC19809	.	.	.	.	.	.	.	.	.	80 g
DH 3923	.	.	.	0.216	.	.	.	.	.	100 g
DH 3924	.	.	0.158	.	0.004	.	.	.	.	100 g
NCS HC14801	.	.	.	.	.	.	.	.	.	50 g
NCS HC14802	.	.	.	.	.	.	.	.	.	50 g
CMSI 1753	.	.	.	.	.	.	.	.	.	50 g
NCS HC13813	.	1.03	.	.	.	.	.	.	.	100 g
CMSI 1754	.	.	.	.	.	.	.	.	.	50 g
CMSI 1755	.	.	.	.	.	.	.	.	.	50 g

CRM ELECTRIC FURNACE SLAG

100 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	8.73	0.82	1.89	2.25	15.67	2.39	0.030	0.25	24.77	0.25
CMSI 1756	16.19	4.00	0.17	15.27	13.12	21.18	13.16	0.125	0.036	21.35	0.18
NCS HC13812	15.53	4.10	0.52	24.03	21.08	14.06	5.11	0.41	0.085	23.49	0.44

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	.	.
JK S9	17.3	35.5	39.0	29.1	31.5	0.042	0.04	2.2	0.04	0.005	1.4	0.05	0.11
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	.	.

RM LADLE SLAG

100 g units

Number	Al_2O_3	CaO	Cr_2O_3	F	Fe	K_2O	MgO	MnO	Na_2O	P_2O_5	S	SiO_2	TiO_2	V_2O_5	$-H_2O$ @ 1000'C
FQZ 0107	35.86	41.99	0.161	0.190	4.04	0.021	4.92	4.47	0.119	0.710	0.059	4.29	0.540	0.380	(0.09)
FQZ 0207	35.98	47.40	0.053	0.50	2.72	0.013	5.35	2.09	0.035	0.178	0.114	3.72	0.287	0.119	(0.11)
FQZ 0298	20.93	43.08	0.360	0.128	13.16	0.011	5.69	4.96	0.007	0.59	0.079	4.23	0.251	0.204	0.120
FQZ 0398	1.24	48.58	0.243	0.098	16.69	0.021	1.54	3.76	0.066	1.82	0.068	16.19	0.96	0.91	0.064

Number	Tot. C	CO_2	Nb_2O_5	SrO	ZrO_2
FQZ 0107	0.01	0.018	0.020	.	.
FQZ 0207	0.01	0.018	0.010	.	.
FQZ 0298	0.029	<0.01	0.007	0.018	0.004
FQZ 0398	0.027	<0.01	0.005	0.018	<0.001

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 OPEN HEARTH SLAG

Number	Al_2O_3	CaO	FeO	T.Fe	MgO	MnO	P_2O_5	TiO_2	S	SiO_2	Units
NCS HC13811	4.47	18.11	35.40	29.44	13.19	2.32	0.91	0.51	0.050	23.35	100 g

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 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	Ti_2O_3	Al_2O_3	CaO	Cr_2O_3	T.Fe	Fe_2O_3	MgO	MnO	S	SiO_2	V_2O_5	LOI
SARM 57	85.4	(27.1)	1.23	0.16	0.16	.	11.8	0.98	1.76	.	1.72	0.39	(3.92)
DSZU 123.23-95	85.21	.	3.40	0.76	1.12	3.29	.	0.60	0.24	0.12	2.50	0.30	.
DSZU 123.24-01	85.19	.	3.28	.	0.76	3.69	.	.	0.85	0.12	2.88	0.31	.

RM TITANIUM SLAG SET

available in SET/9 ONLY 20 g units

Number	Al	Ca	Cr	Fe	Mg	MnO	Si	V
OSO 6-88	1.44	0.29	0.64	4.38	0.44	0.70	0.89	0.21
OSO 7-88	1.80	0.26	0.69	3.72	0.30	0.71	1.29	0.22
OSO 8-88	1.91	0.34	0.70	9.10	0.76	0.97	1.96	0.35
OSO 9-88	2.22	0.43	1.19	10.04	1.23	1.27	2.50	0.64
OSO 10-88	2.99	0.67	1.58	8.86	1.59	1.83	1.68	0.53
OSO 11-88	3.18	1.11	1.64	6.68	0.88	2.31	2.03	0.93
OSO 12-88	2.14	1.23	1.95	9.32	2.29	1.14	1.10	1.00
OSO 13-88	3.93	1.23	2.17	2.33	1.07	1.27	2.23	1.21
OSO 14-88	3.95	1.76	3.75	4.50	2.98	1.41	2.82	1.47

RM TUNDISH SLAG

typical analysis — 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	0.043	.	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	.	0.019	.	.	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

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	.	.	.	.	.	.

VACUUM SLAG

= class, where 1 = CRM and 2 = RM — NCS: 80 g units — DH: 100 g units

#	Number	CaO	Al_2O_3	Cr_2O_3	Fe	Met.Fe	K_2O	MgO	Mn	MnO	P_2O_5	S	SiO_2	SrO	TiO_2	V_2O_5
2	DH 5116	55.52	18.05	0.068	1.86	.	0.010	9.98	1.30	.	0.055	.	9.36	0.036	1.38	0.021
2	DH 5111	55.38	30.82	.	0.361	.	<0.006	3.78	0.127	.	<0.006	0.82	7.38	0.037	0.243	.
2	DH 5117	54.57	20.34	0.092	2.13	.	0.010	11.23	1.93	.	0.042	0.28	5.62	0.036	1.18	0.129
2	DH 5118	50.62	24.62	0.111	0.92	.	.	11.58	0.896	.	0.018	0.452	8.65	0.031	0.78	0.012
1	NCS HC19812	3.19	2.05	0.94	32.16	0.24	.	1.86	.	9.05	0.064	0.066	18.26	.	9.15	15.79
1	NCS HC19811	2.48	1.6	1.06	35.64	0.31	.	2.62	.	7.44	0.097	0.042	18.256	.	6.92	15.64
1	NCS HC19810	2.04	1.25	0.93	31.26	0.22	.	1.9	.	10.67	0.046	0.052	18.25	.	10.02	17.2

Number	BaO	Na_2O	Nb_2O_5	NiO	ZrO_2
DH 5116	.	.	0.111	0.004	.
DH 5111	.	0.003	.	.	0.021
DH 5117	0.014	.	0.124	.	.
DH 5118	0.014	.	0.053	.	.
NCS HC19812	.	.	.	.	.
NCS HC19811	.	.	.	.	.
NCS HC19810	.	.	.	.	.

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	.
BCR 144R	domestic	.	.	.	.	.	.	.	1.82	.	.	15.0	104	308	.	.	3.14	.
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-H	water treatment	38.4	2.51	146	772	677	.	4.83	54.7	.	6170	315	1340	3140	1.70	.	31.3	.
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	.
BCR 597		.	.	.	.	.	.	.	.	.	.	.	203	.	.	.	.	.

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
BCR 144R	.	.	.	.	208	.	.	.	47.7	.	106	.	.	.	.	.	.	.	.	932
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-H	0.582	.	11.5	0.570	3660	78.4	.	(0.282)	1140	1.44	2290	1.34	43.0	.	.	20.3	872	.	33.7	6360
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
BCR 597	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.

RM SLUDGE

typical analysis listed in mass % unless otherwise noted

Number	Type of Sludge	pH	Tot.Residue	Tot.Org.C	Kjeldahl N(TKN)	N as NH_3	Tot.P	Oxygen Demand	Units
RT 006	Paint Sludge	10.84	.	.	.	.	.	.	50 g dry
RT 005	Sewage Sludge	7.59	.	.	.	.	(1.01)	.	50 g dry
RT 009	Electroplating	7.99	.	.	.	.	.	.	100 g wet
RT 010	Electroplating	3.86	.	.	.	.	.	.	100 g wet
RT 011	Electroplating	3.46	.	.	.	.	.	.	100 g wet
RT 018	Residential/Industrial	8.07	(55.3)	(15.4)	(2.6)	(0.7170)	(2.29)	.	50 g wet
RT 055	Residential/Industrial	7.61	(92.1)	.	4.11	(0.242)	2.31	0.0771	50 g dry
RT 029	Residential/Industrial	7.2	88.2	(12.3)	2.33	(0.623)	2.04	.	50 g dry
RT 031	Residential/Industrial	6.53	(93)	(15.3)	(4.1)	(0.6950)	(3.51)	.	40 g dry

continued analysis listed in mass %

Number	Al	B	Ba	Ca	Cr	Cu	Fe	K	Na	Ni	Pb	Sn	Zn
RT 006	0.00734	.	0.9970	0.0111	0.00111	.	0.00644	0.8710	0.00913	.	0.0753	.	73.700
RT 005	1.5300	.	0.0853	11.9000	0.00413	0.0465	1.2700	0.6230	0.2490	0.00260	0.00892	.	0.0625
RT 009	(0.0890)	(0.0150)	(0.0050)	(0.1100)	0.00503	12.1000	(0.3800)	(0.0640)	(1.8000)	0.0343	1.4200	(3.8000)	(0.0040)
RT 010	0.0693	.	0.0173	0.0563	0.00795	6.3200	0.2700	.	(0.1580)	0.0194	11.9000	.	0.0183
RT 011	(0.0020)	(1.8000)	(0.0005)	(0.0180)	5.9200	0.0108	(0.4700)	(4.9000)	(2.3000)	4.2000	0.0269	(0.0120)	.
RT 018	2.2400	(0.00258)	0.1100	4.9100	0.00401	0.0840	0.9900	0.2660	0.1000	0.00204	0.0126	.	0.1120
RT 055	1.3200	.	0.0347	4.8000	0.00404	0.0402	2.2500	.	(0.0715)	0.00192	0.00254	.	0.0563
RT 029	1.8200	(0.00166)	0.0806	3.7300	0.0325	0.0665	0.8640	0.2340	0.1110	0.0150	0.0277	.	0.0847
RT 031	2.1700	(0.00175)	0.0906	4.5900	0.00372	0.0805	0.9810	0.2420	0.0880	0.00196	0.0119	0.0134	0.1060

continued analysis listed in mg/kg

Number	Ag	As	Be	Cd	Co	Hg	Mg	Mn	Mo	Sb	Se	Si	Sr	Tl	V
RT 006	.	.	.	32.4	.	.	47.0	.	.	.	.	.	.	.	.
RT 005	36.3	6.91	0.610	13.7	6.18	3.23	6700	172	14.2	.	19.9	.	.	(2.99)	109
RT 009	8.90	(20)	.	(1)	(7)	(1)	(150)	(40)	(20)	(9)	.	.	(30)	(30)	(1)
RT 010	56.4	.	.	.	.	(1.4)	(80)	17.5	.	.	.	.	.	.	.
RT 011	(1)	(20)	.	(4)	(10)	(10)	(50)	(30)	.	(10)	(4)	.	(1)	(20)	(20)
RT 018	72.1	6.63	0.300	5.57	3.22	4.78	4300	200	10.5	(<2)	8.38	(609)	420	(<1)	39.2
RT 055	18	3.3	(1.17)	1.74	2.97	(1.71)	.	232	10.4	3.33	(6.21)	.	.	.	12
RT 029	54	26.5	4.35	537	3.07	4.17	3900	165	8.77	(2.41)	19.0	(782)	(372)	.	30.9
RT 031	101	6.45	88.3	5.74	2.96	5.18	4290	199	11.4	38.4	8.23	.	.	85.9	114

CRM RED SLURRY

analysis listed in mass % 50 g units

Number	Al_2O_3	CaO	Fe_2O_3	Na_2O	SiO_2	TiO_2
available individually						
DSZU 123.41-03	12.7	5.96	57.6	1.12	6.18	4.25
available in SET/6 ONLY						
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

CRM SULFUR

Number	Recommended S Value (%)	95% Confidence Limits Low%	High%	Standard Deviation of Laboratories (%) Between	Within	Number of Sets	Results	Units
CAN HCC-1	33.92	33.80	34.03	0.14	0.095	9	53	50 g
CAN INM-1	22.17	21.97	22.37	0.24	0.051	9	53	50 g

CRM SURFACE AREA

data listed in m^2/g

Number	Multipoint	+/-	Single Point	+/-	Units
SRM 1899	10.67	0.19	10.52	0.62	4 g silicon nitride powder
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

data shows estimates of (material, measurement) uncertainty

Number	ksi Tensile Strength	ksi Yield Strength	% Total Elongation	% Reduction	Material	Units
BS TRM-2	136.3 (0.3, 2.0)	128.9 (0.6, 3.9)	16.1 (0.4, 2.5)	54.6 (0.3, 1.7)	1018 steel	rod 25 mm Ø x 158 mm
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)	600 nickel	rod 25 mm Ø x 158 mm

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 661A	300 ± 7	318 ± 7	750 ± 13	40.9 ± 0.9	60 ± 4	3 rods 14 mm Ø x 150 mm
BCR 661B	300 ± 7	318 ± 7	750 ± 13	40.9 ± 0.9	60 ± 4	1 rod 14 mm Ø x 500 mm

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	.	.	.	.	.
BCS 352/1	W94-C6	6.154	0.036	.	0.0029	.	.	.	.	.
SRM 276b		6.10	.	.	.	.	.	.	.	.
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 ZIRCON CONCENTRATE

analysis listed in mass % DSU: 20 or 50 g units all others: 100 g units

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

* SARM 62 lists Total Fe as Fe_2O_3 and Ti as TiO_2