CATALOGUE CRM

INDUSTRIELS

2022

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CRM ACID BASE ACCOUNTING

certified values informational values listed in mass % 100 g units

Number	Total S%	Al	Ba	C	CO2	CO3	Ca	Fe	K	Mg	Mn	Na	P	S as SO4	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 /t 3

Number	Paste PH	Acid producing potential		Neutralization potential fizz rating			
				Sobek		Modified Sobek	
		Sobek	Modified Sobek	Slight	Moderate	Slight	Moderate
CAN NBM-1		8.45	8.73	8.46	(49.6)	(70.9)	(46.6)	(52.3)
CAN KZK-1		(8.8)	24.9	(24.6)	59.0	64.8	58.9	(61.6)

CRM AIR PARTICULATE ON FILTER MEDIA

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

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

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

CRM ATTRITION INDEX

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

CRM CALCIUM ALUMINATE

Typical analysis 100 g

Number	Al2O3	CaO	Cr2O3	Fe2O3	K2O	MgO	MnO	MoO3	S	SiO2	SrO	TiO2	V2O5
DH X0101	72.2	26.74	0.006	0.118	.	0.191	0.008	.	0.011	0.17	.	.	<0.005
DH X0103	68.8	23.38	0.028	0.289	0.296	3.53	0.024	0.014	.	0.450	0.009	0.067	2.36

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Number	Al2O3	CaO	Cr2O3	Fe2O3	K2O	MgO	MnO	MoO3	S	SiO2	SrO	TiO2	V2O5
DH X0102	64.30	18.34	0.054	0.708	.	12.54	0.114	.	0.020	2.02	0.024	0.165	1.48

CRM CALCIUM CARBONATE

Certified analysis in mass % and mg/kg Analysis in mg/kg 100 g

Number	CaCO3	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	99.79	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

CEMENT CHART 1 OF 2

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

#	Number	CaO	SiO2	Al2O3	Fe2O3	K2O	MgO	Na2O	P2O5	SO3	SrO	TiO2	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	SRM 1886b	66.05	22.08	3.903	0.297	0.0164	1.526	0.01682	0.0413	2.757	0.0886	0.2054	(2.174)	5 x 5 g
1	NCS DC62103h	65.78	22.07	4.56	3.22	0.69	2.11	0.16	.	0.32	.	0.37	0.60	20 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 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	CCRL 205	64.44	20.91	4.32	3.00	0.545	1.50	0.169	0.071	2.97	0.171	0.24	1.51	30 g
1	SRM 1880b	64.16	20.42	5.183	3.681	0.646	1.176	0.0914	0.2443	2.710	(0.0272)	0.236	(1.666)	4 x 5 g
1	SRM 633a	64.129	22.38	2.911	3.738	0.391	1.1532	0.203	0.14263	2.178	(0.0507)	0.2157	(2.460)	4 x 5 g
1	SRM 1888b	63.13	20.42	4.277	3.062	0.658	3.562	0.1364	0.07307	2.634	0.1099	0.2316	(various)	4 x 5 g
2	CCRL 173	62.45	20.01	4.49	2.62	0.447	3.03	0.309	0.192	4.10	.	0.27	2.02	30 g
2	CCRL 174	62.43	20.75	3.71	3.62	0.430	4.83	0.189	0.067	2.64	.	0.21	1.14	30 g
1	NCS DC62101c	62.23	20.41	4.68	3.20	0.71	2.66	0.12	.	3.16	.	0.27	2.18	20 g
1	CCRL 206	61.90	19.64	5.16	3.37	0.653	3.84	0.148	0.044	3.47	0.087	0.28	1.55	30 g
1	SRM 1885b	61.87	20.05	4.70	3.044	0.497	3.86	0.293	0.0737	2.832	0.0795	0.2361	(2.310)	5 x 5 g

Number	CO2	Free CaO	Cl	Cr2O3	F	Mn	MnO	Mn2O3	S	ZnO	Ins. Res.
BCS 354	.	.	.	.	.	.	.	0.058	.	.	.

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Number	CO2	Free CaO	Cl	Cr2O3	F	Mn	MnO	Mn2O3	S	ZnO	Ins. Res.	
SRM 1886a	.	.	(0.0042)	0.0024	(0.02)	.	.	0.0073	.	(0.001)	(0.23)	
SRM 1886b	.	(0.24)	0.00399	0.00404	(0.0118)	.	.	0.02639	.	(0.00058)	(0.13)	
NCS DC62103h	.	.	.	.	.	.	.	.	.	.	0.12	
NCS DC62117	.	.	.	.	.	.	.	.	.	.	.	
SRM 634a	.	(1.86)	.	(0.0114)	.	.	.	(0.0229)	.	(0.0222)	(0.21)	
BCS 353	.	.	.	.	.	.	.	0.23	.	.	.	
CCRL 205	.	0.74	0.008	0.011	.	.	.	0.121	.	0.010	0.34	
SRM 1880b	.	(2.227)	0.01830	0.01927	(0.0539)	.	.	0.1981	(0.0131)	(0.01054)	(0.487)	
SRM 633a	.	(1.60)	0.0087	(0.0124)	(0.038)	.	BaO:(0.256)	0.1176	(0.049)	0.123	(0.23)	Hg: 0.02470 mg/kg
SRM 1888b	.	(1.42)	0.0143	(0.01021)	(0.048)	.	.	0.0652	(0.15)	(0.01253)	(0.32)	
NCS DC62101c	.	.	.	.	.	.	.	.	.	.	1.20	
CCRL 206	.	0.97	0.014	0.011	.	.	.	0.029	.	0.020	0.22	
SRM 1885b	.	(0.27)	(0.0021)	0.02709	(0.0524)	.	.	0.1282	(0.042)	0.0354	(0.36)	BaO: 0.0149

CEMENT CHART 2 OF 2

= class, where 1 = CRM and 2 = RM

analysis listed in mass %

#	Number	CaO	Ca	SiO2	Al2O3	Fe2O3	K2O	MgO	Na2O	P2O5	SO3	SrO	TiO2	LOI	Units
1	SRM 1884b	61.31	.	19.30	4.851	2.937	0.957	4.74	0.278	0.0965	4.034	0.0258	0.2651	(various)	4 x 4.5 g
1	SRM 1887b	61.15	.	19.59	4.911	2.471	0.961	3.624	0.288	0.1540	4.599	0.2625	0.2034	2.121	5 x 4 g
1	NCS DC62118	60.99	.	21.73	4.75	4.12	0.43	4.37	0.12	.	2.27	.	0.23	0.81	20 g
1	SRM 1889b	60.11	.	18.39	5.79	2.891	1.115	2.82	0.36	0.297	4.3721	0.284	0.260	(3.117)	5 x 5 g
1	NCS DC62102g	57.10	.	21.15	6.01	3.92	0.72	3.67	0.19	.	2.29	.	0.46	3.93	20 g
1	TL 201C	54.48	.	25.63	6.81	2.08	0.73	3.35	0.32	.	3.16	.	.	1.96	40 g
1	TL 200Ca	49.97	.	26.55	8.72	4.07	1.10	2.06	0.21	0.45	2.84	0.13	0.46	(3.30)	40 g
1	SRM 1881b	49.27	.	29.045	8.812	3.365	0.721	2.741	0.790	0.0510	2.72	0.0836	0.3011	(1.699)	4 x 5 g
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 DC62116a	44.73	.	27.12	10.99	3.43	1.10	2.82	0.23	.	2.49	.	0.57	6.00	20 g
1	NCS DC62105g	42.40	.	13.76	3.12	2.13	0.50	2.11	0.14	.	0.21	.	0.18	34.94	20 g
1	NCS DC62104b	39.65	.	12.77	3.66	2.02	0.93	1.20	0.18	.	0.72	.	0.18	38.32	20 g

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#	Number	CaO	Ca	SiO2	Al2O3	Fe2O3	K2O	MgO	Na2O	P2O5	SO3	SrO	TiO2	LOI	Units
1	SRM 1882a	39.29	.	4.01	39.14	14.67	0.051	0.51	0.021	(0.070)	.	(0.024)	1.786	(0.20)	4 x 5 g
1	SRM 1883a	29.52	.	0.24	70.04	0.078	0.014	0.19	0.30	(0.003)	.	(0.019)	(0.020)	(0.59)	4 x 5 g
2	DH X0209	.	48.78	21.95	4.63	0.204	1.01	0.717	0.078	0.043	.	0.051	0.095	.	100 g
2	DH X0212	.	46.48	21.16	4.41	3.94	0.495	0.945	0.084	0.191	.	0.086	0.242	.	100 g
2	DH X0211	.	40.63	25.04	6.86	2.98	0.524	2.79	0.156	0.137	.	0.083	0.319	.	100 g

Number	BaO	Free CaO	Cl	Cr2O3	F	Mn	Mn2O3	S	Unignited SO3	V2O5	ZnO	Ins. Res.
SRM 1884b	.	(0.418)	(0.0065)	0.00791	(0.0394)	.	0.0750	.	.	.	.	(0.159)
SRM 1887b	(0.022)	0.21	0.01001	0.01551	0.101	.	0.0957	0.025	.	.	0.01560	0.26
NCS DC62118	.	.	.	.	.	.	.	.	.	.	.	1.18
SRM 1889b	.	(0.52)	0.0101	0.0083	(0.10)	.	0.084	.	.	.	0.0770	(0.30)
NCS DC62102g	.	.	.	.	.	.	.	.	.	.	.	.
SRM 1881b	0.191	(1.16)	0.0081	0.00949	(0.09)	.	0.1175	.	.	.	0.1198	(16.4)
DH X0210	0.071	.	.	.	.	.	0.327	1.77	.	0.011	.	.
NCS DC62116a	.	.	.	.	.	.	.	.	.	.	.	.
NCS DC62105g	.	.	.	.	.	.	.	.	.	.	.	.
NCS DC62104b	.	.	.	.	.	.	.	.	.	.	.	.
SRM 1882a	.	.	.	(0.113)	.	.	(0.060)	.	.	.	(0.004)	.
SRM 1883a	.	.	.	(0.006)	.	.	(0.003)	.	.	.	.	.
DH X0209	0.028	.	.	.	.	.	0.025	1.19	.	.	.	.
DH X0212	.	.	.	.	.	.	0.062	1.18	.	.	.	.
DH X0211	0.041	.	.	.	.	.	0.172	1.48	.	0.014	.	.

CRM CHLORINE AND FLUORINE IN CEMENT

Number	Description	CaF2	F	Cl-	Units
NCS DC62121a	Cement Raw Meal	.	.	0.016	20 g
NCS DC62122a	Cement	.	.	0.009	20 g
NCS DC62125a	Cement	(0.37)	0.18	.	20 g

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CRM CLASSIC CEMENT CHEMISTRIES

Number	P - Pozzolana	S - Slag	D - Limestone	D1 - CO2	R5 - Unsolved Slag (EDTA)	Description	20g units
NCS DC62119a	9.3	4.5	2.4	(1.50)	.	Ordinary Portland Cement	
NCS DC62120	0.5	18.5	7	3.5	97.5	Portland Blast-Furnace Slag Cement	

CRM CEMENT CLINKER PHASE ABUNDANCE

Number	Alite	Aluminate	Arcanite	Belite	Ferrite	Free Lime	Periclase	Units
SRM 2688	64.95	4.99	.	17.45	12.20	.	.	3x 10 g
SRM 2686b	64.82	3.76	(0.20)	16.68	10.42	(0.53)	3.31	50 g
SRM 2687a	57.88	9.56	.	24.70	6.27	.	.	5x 8 g

CRM PORTLAND CEMENT FINENESS AND BLAINE STANDARD

Number	Remaining after passing through 80 micron sieve	Blaine	Density g/cm3	Units
NCS DC62127f	1.89 %	363.2 m2/kg	(3.05)	200 g

CRM CEMENT FINENESS

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

	Surface Area		45 µm Seive	C2S	C3S	C3A	C4AF	Al2O3	CaO	Fe2O3	K2O	MgO	Na2O	P2O5	SO3	SiO2	TiO2	LOI
Number	Blaine	Wagner	Residue															
ASTM METHOD	C204-96a	C115-96a	C430-96		C	150-02							C	114-02				
SRM 114q	3818 cm2/g	2183 cm2/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 COMPONENT MATERIAL

Analysis listed in mass % — NCS DC61106 : 50g — others : 20g

Number	Material	CaO	T.CaCO3	Al2O3	SiO2	F	Fe2O3	K2O	MgO	Na2O	S	SO3	TiO2	LOI
NCS DC62110a	Portland Blast Furnace Slag	55.21	.	7.24	24.78	.	3.00	0.71	2.64	0.18	.	2.47	0.51	2.70
NCS DC62109	Portland Pozzolanic	47.57	.	6.52	32.67	.	3.54	1.43	1.86	0.85	.	2.59	0.16	2.44
NCS DC62111	Portland Fly Ash	46.52	.	8.93	24.31	.	4.90	0.61	1.90	0.32	.	2.47	0.33	9.09
NCS DC62123	Sulphoaluminate Cement Clinker	43.4	.	32.6	8.56	.	2.21	0.22	1.37	0.09	.	9.55	1.51	0.41
NCS DC62126b	Cement Black Raw Meal	39.28	70.3	.	.	0.15	2.07	.	.	.	.	.	.	38.51

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Number	Material	CaO	T.CaCO3	Al2O3	SiO2	F	Fe2O3	K2O	MgO	Na2O	S	SO3	TiO2	LOI
NCS DC62112	Aluminate	34.56	.	51.15	7.95	.	1.91	0.13	0.63	0.04	0.1	.	2.03	0.68
NCS DC62113a	Blast Furnace Slag	33.72	.	15.89	34.42	.	2.13	0.56	9.39	0.46	0.79	(0.23)	1.87	0.52
NCS DC62124	Sulphoaluminate Cement Raw Meal	33.05	.	22.29	5.09	.	1.34	0.14	1.21	0.06	.	7.07	1.07	28.21
NCS DC62115a	Fly Ash for Cement	4.13	.	33.07	51.38	.	4.58	0.86	1.02	0.33	.	0.24	1.14	2.80
NCS DC62114a	Pozzolana for Cement	2.15	.	20.66	56.86	.	3.52	1.95	0.86	0.83	.	0.50	0.78	11.53
NCS DC61106	Albite Cement	0.48	.	19.62	67.96	.	0.10	0.098	0.015	11.26	.	.	0.054	0.36

COAL CHART 1 OF 2

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

#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb	Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P
1	AR 1715-715617	7.06	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28143	6.40	31.80	14.00	20,650 J	1.82	.	53.28	.	.	.	2.58	.	0.72	.	.
1	AR 1712-712321	5.83	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	AR 1730-730219	5.38	23.64	32.24	10,031 BTU	.	.	.	(44.12)	.	.	.	.	.	.	.
1	AR 1711-711218	5.13	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28009k	4.31	42.34	16.66	18,060 J	1.84	.	45.40	.	.	.	2.63	.	0.80	.	.
1	NCS FC28142	4.35	33.40	14.38	21,050 J	1.76	.	53.63	.	.	.	2.79	.	0.81	.	.
1	AR 1710-710621	4.25	.	.	.	.	.	.	.	.	.	.	.	.	.	.
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	AR 1709-709618	3.54	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28012L	3.42	16.21	12.03	28,960 J	1.53	.	72.57	.	.	.	3.29	.	1.03	.	.
1	NCS FC28210	3.17	25.80	8.77	24,130 J	.	.	.	.	.	.	.	.	.	.	.
1	AR 1729-729320	3.04	19.33	30.37	11,571 BTU	.	.	.	(50.30)	.	.	.	.	.	.	.
1	AR 1708-708221	2.99	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28141	2.92	28.64	11.50	23,040 J	1.70	.	59.60	.	.	.	2.80	.	0.80	.	.
1	NCS FC28008t	2.90	16.72	35.09	27,160 J	1.47	.	65.88	.	.	.	4.33	.	1.17	.	.
1	NCS FC28216	2.79	8.62	10.86	32,300 J	1.44	.	81.27	.	.	.	3.55	.	1.16	.	.
1	AR 1707-707617	2.63	.	.	.	.	.	.	.	.	.	.	.	.	.	.

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#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb	Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P
1	NCS FC28138c	2.46	34.14	13.64	20,850 J	1.73	.	53.69	.	.	.	2.84	.	0.82		
2	COCO 036	2.28	13.38	8.28	30,550 J	.	.	.	.	.	.	.	.	.	.	0.088
1	AR 1726-726122	2.27	42.89	26.30	8,097 BTU	.	.	.	(30.81)	.	.	.	.	.	.	.
1	NCS FC28011L	2.15	22.08	9.54	25,680 J	1.73	.	68.58	.	.	.	2.32	.	0.87	.	.
1	NCS FC28215	2.17	25.2	28.79	24,830 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28112	2.07	8.08	33.70	32,620 J	1.33	.	78.64	.	.	.	5.01	.	1.31	.	.
1	AR 1706-706818	2.04	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28007u	1.95	13.95	32.61	28,150 J	1.47	.	69.05	.	.	.	4.28	.	1.22	.	.
1	SRM 2683C	1.95	.	.	.	.	.	.	.	(0.1127)	.	.	0.0900	.	.	.
1	NCS FC28011M	1.91	20.37	8.06	27,570 J	1.58	.	71.09	.	.	.	2.83	.	1.03	.	.
2	COCO 002	1.89	14.25	21.16	29,200 J	.	.	.	.	.	.	.	last of	stock		0.037
1	NCS FC28217	1.79	8.68	36.06	31,330 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28002z	1.78	15.68	30.18	27,460 J	1.48	.	67.88	.	.	.	4.08	.	1.19	.	.
1	NCS FC28209	1.76	27.33	8.21	23,960 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28144b	1.75	85.72	9.12	2,280 J	2.54	.	5.80	.	.	.	1.03	.	0.27	.	.
1	NCS FC28010t	1.75	16.09	23.64	29,070 J	1.45	.	71.39	.	.	.	4.08	.	1.17	.	.
1	SABS 062	1.74	11.46	5.34	30,170 J	.	.	82.28	.	.	.	2.16	.	1.83	.	0.040
1	NCS FC28005j	1.73	16.90	7.65	28,110 J	1.66	.	74.90	.	.	.	2.36	.	0.99	.	.
1	NCS FC28106a	1.72	8.25	31.68	32,420 J	1.35	.	78.58	.	.	.	4.84	.	1.35	.	.
2	COCO 041	1.67	29.60	17.96	22,870 J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28214a	1.67	26.98	29.30	23,390 J	1.56	.	57.38	.	.	.	3.81	.	1.06	.	.
2	COCO 039	1.67	14.65	17.89	30,240 J	.	.	.	.	.	.	.	.	.	.	0.040
2	COCO 057	1.63	30.23	19.42	22,030 J	.	.	56.31	.	.	.	2.94	.	1.36	.	0.045
2	COCO 046	1.49	16.65	19.36	29,310 J	.	.	.	.	.	.	.	.	.	.	0.039
1	NCS FC28213	1.46	9.87	35.24	30,620 J	.	.	.	.	.	.	.	.	.	.	.
1	AR 1705-051020	1.46	.	.	.	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28002b	1.43	10.02	30.84	30,990 J	1.40	.	75.68	.	.	.	4.50	.	1.36	.	.
1	AR 1724-241014	1.42	17.26	32.27	12,216 BTU	.	.	.	(50.47)	.	.	.	.	.	.	.
1	NCS FC28218	1.35	14.58	6.16	29,260 J	.	.	.	.	.	.	.	.	.	.	.

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2	COCO 030	1.34	25.52	10.06	24,350	.	.	.	.	.	.	.	.	.	.	.
2	COCO 044	1.30	28.20	20.08	23,000 J	.	.	.	.	.	.	.	.	.	.	0.047
1	NCS FC28111A	1.30	23.50	28.96	24,350 J	1.56	.	61.20	.	.	.	3.78	.	1.10	.	.
1	NCS FC28139	1.30	22.70	18.37	27,040 J	1.51	.	67.18	.	.	.	3.68	.	1.05	.	.
1	NCS FC28140	1.28	25.88	30.43	22,500 J	1.62	.	58.12	.	.	.	3.40	.	1.02	.	.
2	COCO 040	1.15	10.52	36.37	30,050 J	.	.	.	.	.	.	.	.	.	.	0.008
1	AR 1704-041220	1.07	.	.	.	.	.	.	.	.	.	.	.	.	.	.

COAL CHART 2 OF 2

#	Number	S	Ash	Volatile Matter	Heat in J/g or BTU/lb	BTU/lb	Density	Moisture	C	Fixed C	Cl	F	H	Hg*	N	O	P
1	SRM 2692C	1.064	(7.499)	.	.		.	.	.	.	(0.1338*)	.	.	0.1790	.	.	.
1	SABS 069	1.06	8.22	6.10	32,060		.	.	85.36	.	.	.	2.66	.	1.89	.	0.018
1	NCS FC28205	1.05	8.62	33.44	30,750	J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28208	1.03	15.47	20.59	29,200	J	1.46	.	72.60	.	.	.	3.98	.	1.14	.	.
1	NCS FC28105a	1.03	11.87	8.99	31,190	J	1.46	.	79.96	.	.	.	3.31	.	1.12	.	.
2	COCO 056	1.01	33.61	19.12	20,590	J	.	.	53.61	.	.	.	2.93	.	1.19	.	0.049
1	NCS FC28004n	1.00	13.23	8.32	30,450	J	1.53	.	78.79	.	.	.	3.01	.	1.18	.	.
1	SABS 028	0.99	27.00	23.10	.		.	.	57.24	.	.	.	2.94	.	1.45	last	0.09
2	COCO 049	0.98	25.23	17.23	24,400	J	.	.	.	.	.	.	.	.	.	.	0.052
1	SABS 065	0.97	8.04	5.70	32,070		.	.	85.60	.	.	.	2.68	.	1.84	.	0.018
2	COCO 054	0.96	22.87	25.36	25,120	J	.	.	63.57	.	.	.	3.56	.	1.43	.	0.033
1	AR 1702-702819	0.76	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	AR 1721-721913	0.52	5.03	29.48	12,572	BTU	.	.	.	(65.49)	.	.	.	.	.	.	.
1	AR 1701-011119	0.48	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	AR 1700-700421	0.35	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	SABS 068	0.95	27.09	21.22	25,600		.	.	63.47	.	.	.	3.57	.	1.46	.	0.038
2	COCO 028	0.95	17.86	volati	28,660		.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28204	0.95	8.11	34.01	31,340	J	1.36	.	76.22	.	.	.	4.93	.	1.45	.	.
2	COCO 024	0.96	15.51	26.76	27,920	J	.	.	.	.	.	.	.	.	.	.	0.031

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2	COCO 011	0.93	18.65	24.31	25,020	J	.	.	.	.	.	.	.	.	.	.	0.008
2	COCO 052	0.92	24.00	23.09	24,540	J	.	.	.	.	.	.	.	.	.	.	0.028
2	COCO 047	0.92	23.59	21.56	24,420	J	.	.	.	.	.	.	.	.	.	.	0.097
1	SABS 055	0.88	14.1	11.5	29,120	J	.	.	75.70	.	.	.	2.93	.	1.93	.	0.031
1	NCS FC28211	0.88	13.41	9.08	30,230	J	.	.	.	.	.	.	.	.	.	.	.
1	AR 1703-031120	0.87	.	.	.		.	.	.	.	.	.	.	.	.	.	.
2	COCO 042	0.85	40.79	21.25	16,700	J	.	.	59.32	.	.	.	2.98	.	1.56	.	.
1	AR 1723-723320	0.85	8.16	45.13	11,278	BTU	.	.	.	(46.71)	.	.	.	.	.	.	.
1	NCS FC28206a	0.84	8.16	33.99	31,150	J	1.38	.	75.55	.	.	.	4.63	.	1.45	.	.
2	COCO 014	0.83	21.88	8.15	27,550	J	.	.	71.25	.	.	.	2.73	.	1.46	.	0.016
1	NCS FC28006j	0.83	9.67	31.12	30,790	J	1.40	.	75.61	.	.	.	4.53	.	1.40	.	.
1	SABS 059	0.82	16.0	11.0	28,330	J	.	.	74.50	.	.	.	2.84	.	1.79	.	0.031
1	AR 1722-722421	0.81	21.02	15.76	11,232	BTU	.	.	.	(63.22)	.	.	.	.	.	.	.
1	NCS FC28110a	0.81	9.62	33.64	29,830	J	1.42	.	74.16	.	.	.	4.44	.	1.38	.	.
1	AR 1702-702819	0.76	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	SABS 039	0.75	24.51	23.34	.		.	.	59.97	.	.	.	2.93	.	1.56	0.079	.
1	SABS 043	0.74	22.31	23.82	.		.	.	61.69	.	.	.	3.03	.	1.56	.	0.071
2	COCO 034	0.74	17.54	21.45	27,590		.	.	.	.	.	.	.	.	.	.	.
2	COCO 038	0.73	15.02	23.63	28,350	J	.	.	.	.	.	.	.	.	.	.	0.090
1	SABS 051	0.72	39.70	20.89	.		.	.	44.44	.	.	.	2.45	.	1.10	.	0.109
1	NCS FC28107a	0.70	10.96	15.62	31,120	J	1.45	.	79.17	.	.	.	3.82	.	1.14	.	.
1	NCS FC28203a	0.69	8.60	29.51	31,600	J	1.39	.	77.23	.	.	.	4.56	.	1.42	.	.
1	SABS 046	0.66	11.86	26.87	.		.	.	74.21	.	.	.	3.77	.	1.76	.	.
2	COCO 025	0.59	23.93	22.60	24,300	J	.	.	.	.	.	.	.	.	.	.	0.036
1	NCS FC28109A	0.59	12.21	11.72	30,350	J	1.49	.	78.45	.	.	.	3.27	.	1.09	.	.
2	COCO 045	0.59	10.70	27.61	29,630	J	.	.	.	.	.	.	.	.	.	.	0.035
1	SABS 066	0.57	15.02	24.11	27,730		.	.	71.97	.	.	.	3.62	.	1.71	.	0.110
1	NCS FC28108	0.57	13.68	30.55	29,530	J	1.42	.	72.65	.	.	.	4.46	.	1.23	.	.

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2	COCO 055	0.54	18.96	23.85	25,820	J	.	.	66.37	.	.	.	3.54	.	1.57	.	0.100
2	COCO 058	0.54	15.71	28.42	27,800	J	.	.	69.67	.	.	.	4.05	.	1.66	.	0.089
1	AR 1721-721913	0.52	5.03	29.48	12,572	BTU	.	.	.	(65.49)	.	.	.	.	.	.	.
1	NCS FC28212a	0.51	9.36	23.27	32,380	J	.	.	.	.	.	.	.	.	.	.	.
1	SABS 058	0.50	31.1	23.1	20,180	J	.	.	53.64	.	.	.	3.06	.	1.33	.	0.023
1	NCS FC28116a	0.50	11.06	23.77	30,000	J	1.44	.	75.34	.	.	.	4.00	.	1.18	.	.
1	SABS CCS 008b	0.49	15.8	25.6	27,550		.	.	71.19	.	.	.	3.85	.	1.70	.	0.111
1	SABS 050	0.48	16.36	24.58	.		.	.	70.79	.	.	.	3.80	.	1.62	.	0.095
1	SABS 049	0.48	16.34	24.31	.		.	.	70.96	.	.	.	3.61	.	1.63	last	0.087
1	SABS 057	0.48	15.49	25.42	.		.	.	71.19	.	.	.	3.85	.	1.70	.	1.093
1	SABS 045	0.49	15.45	24.50	.		.	.	71.24	.	.	.	3.73	.	1.71	.	.
1	SABS 037	0.48	15.26	24.84	.		.	.	71.17	.	.	.	3.67	.	1.72	0.102	.
1	AR 1701-011119	0.48	.	.	.		.	.	.	.	.	.	.	.	.	.	.
2	COCO 053	0.47	14.37	27.71	27,980	J	.	.	71.03	.	.	.	4.00	.	1.68	.	0.129
2	COCO 050	0.45	13.19	27.10	28,350	J	.	.	.	.	.	.	.	.	.	.	0.141
1	NCS FC28001L	0.45	10.53	20.17	31,960	J	1.40	.	79.24	.	.	.	4.22	.	1.36	.	.
1	NCS FC28207	0.43	16.26	7.26	26,100	J	.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28115	0.42	6.38	31.74	30,570	J	1.41	.	77.28	.	.	.	4.47	.	1.19	.	.
1	NCS FC28104	0.40	10.09	11.00	31,860	J	1.45	.	81.45	.	.	.	3.52	.	1.31	.	.
1	NCS FC28201a	0.40	9.70	18.48	31,580	J	1.42	.	78.94	.	.	.	3.98	.	1.36	.	.
2	COCO 001	0.39	14.66	24.58	26,820	J	.	.	.	.	.	.	.	.	.	last	0.079
1	SABS 023	0.37	16.5	25.6	.		.	.	68.25	.	.	.	3.63	.	1.62	.	0.102
1	NCS FC28001M	0.37	8.92	31.76	30,970	J	1.39	.	76.36	.	.	.	4.55	.	1.43	.	.
1	NCS FC28103	0.35	10.51	9.70	31,740	J	1.47	.	81.44	.	.	.	3.40	.	1.26	.	.
1	AR 1700-700421	0.35	.	.	.		.	.	.	.	.	.	.	.	.	.	.
1	NCS FC28003m	0.33	10.10	10.33	32,030	J	1.45	.	81.90	.	.	.	3.45	.	1.33	.	.
1	NCS FC28017g	0.27	9.49	8.14	32,210	J	1.47	.	83.28	.	.	.	3.16	.	1.15	.	.
1	NCS FC28113	0.27	7.06	33.18	29,580	J	1.41	.	74.60	.	.	.	4.47	.	1.02	.	.
2	COCO 048	0.24	4.97	2.33	32,300	J	.	.	91.34	.	.	.	1.31	.	0.91	.	0.018

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1	NCS FC28114	0.20	4.66	33.07	30,280	J	1.42	.	76.69	.	.	.	4.42	.	1.04	.	.
1	NCS FC28101	0.20	3.95	6.97	34,340	J	1.47	.	90.10	.	.	.	3.01	.	0.56	.	.
1	NCS FC28102	0.19	6.40	8.20	33,100	J	1.50	.	87.34	.	.	.	2.86	.	0.58	.	.
1	CZ SF-02-14	0.16	2.80	13.10	33,090	J	14,226 BTU	.	91.84	.	.	.	2.09	.	0.65	.	.
1	CZ SF-03-14	0.14	2.98	1.15	32,060	J	13,783 BTU	.	96.30	.	.	.	0.21	.	0.32	.	.

RM **FUSIBILITY OF COAL**

Analysis listed in mass % 250g units Reducing temperature C°

COCO 005	81.70	4.57	1.44	0.015	1.05	32.90	27.19	7.49	1402	1425	1443	1473
COCO 007	72.55	3.69	1.83	0.036	1.55	28.71	21.60	14.51	1329	1353	1381	1420
COCO 016	56.64	2.64	1.53	0.030	1.86	21.92	18.26	31.32	1284	1317	1346	1387
COCO 035	62.17	2.98	1.71	0.039	1.92	24.16	15.46	27.55	1369	1394	1419	1452
COCO 035	62.17	2.98	1.71	0.039	1.92	24.16	15.46	27.55	1369	1394	1419	1452

SULFUR IN COAL

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

#	Number	S	Units
1	ASCRM 012 D	5.21	125g, last
2	COCO 037	4.74	50 g
1	BCR 336	3.290	20 g
1	BCR 333	1.344	20 g
1	BCR 332	0.961	20 g
1	BCR 331	0.499	20 g

CRM **COAL**

Analysis listed in mass % (T) = Total SARM 20 also contains Ta : 0,00012 , Y : 0,0029

Number	Al2O3	CaO	Fe2O3	K2O	MgO	Mn	Na2O	P	P2O5	S	SiO2	Sr	TiO2	Zr	LOI	Units
SARM 20	11.27	1.87	1.17	0.14	0.43	0.0080	0.27	.	0.14	0.51	17.66	0.0330	0.63	(0.0180)	64.66	120 g

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Number	Al2O3	CaO	Fe2O3	K2O	MgO	Mn	Na2O	P	P2O5	S	SiO2	Sr	TiO2	Zr	LOI	Units
SARM 19	8.01	1.39	1.75	0.24	0.20	0.0157	0.29	0.0130	.	1.49	15.00	0.0126	0.341	0.0351	71.28	120 g
SARM 18	2.57	0.18	0.29	0.145	0.11	0.0022	.	0.0030	.	0.56	6.20	0.0044	0.114	0.0067	90.11	120 g

Analysis listed in mg/kg

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

CRM COAL

Analysis listed in mass % 50g units Analysis listed in mg/kg

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

* SRM 1632d, 1632e and 1635a also detail many other elements, see certificate

Analysis listed in mg/kg

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

CRM COAL

Analysis listed in mass % except * which is mg/kg powder 50g

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

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Number	Al%	Ca%	Cd*	Co*	Cr*	Cu*	Fe%	K%	Mg%	Mn%	Na%	Ni*	P%	Pb%	Si%	Ti%	V*	Zn%
NCS FC28126	0.83	0.65	(<1)	3	5	8	0.32	0.010	0.060	0.008	0.034	5	0.019	.	1.01	0.046	11	.
NCS FC28122	0.25	0.85	.	8	2	2	1.79	0.016	0.24	0.022	0.081	8	0.0029	0.002	0.47	0.010	1	.

CRM COAL

BCR: 40 g units GBW: 50 g units

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

CRM COAL AIR DRIED vs. HEATED DRIED ANALYSIS

20g powder

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

CRM FUSIBILITY OF COAL ASH

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

Atmosphere	Initial deformation			Softening			Hemishpering			Fluid			
Number	MRed	Oxi	SRed	MRed	Oxi	SRed	MRed	Oxi	SRed	MRed	Oxi	SRed	Units
NCS FS91001d	1057	1176	1208	1072	1202	1253	1098	1236	1328	1148	1320	1401	30 g
NCS FS28001	1161	1211	.	1190	1230	.	1198	1239	.	1204	1252	.	5 g

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Atmosphere	Initial deformation			Softening			Hemishpering			Fluid			
NCS FS28002	1217	1356	.	1340	1408	.	1357	1420	.	1369	1445	.	5 g
NCS FS28003	1285	1314	.	1314	1345	.	1322	1360	.	1340	1381	.	5 g

COAL ASH

Analysis listed in mass %

classe where 1 = CRM and 2 = RM

#	Number	SiO2	Al2O3	CaO	Fe2O3	K2O	MgO	Mn	Na2O	P2O5	SO3	TiO2	V2O5	Units	Other
2	COCO ASH 015	55.67	31.44	2.42	3.99	0.65	0.74	MnO2: 0.036	0.13	0.37	1.89	1.78	.	20 g	
2	COCO ASH 013	54.89	32.44	2.16	4.43	0.84	0.54	MnO2: 0.041	0.06	0.33	2.05	1.82	.	20 g	
1	NCS FC28154	53.17	32.02	2.28	6.47	1.37	0.90	MnO: 0.035	0.41	0.19	0.78	1.34	0.027	5 g	
2	COCO ASH 014	52.29	31.67	2.53	6.46	0.85	0.51	MnO2: 0.050	0.07	0.44	2.73	1.86	.	20 g	
2	COCOASHSRM017	51.24	33.96	2.90	4.34	0.55	0.41	MnO2: 0.044	0.11	2.31	0.99	1.70	.	20 g	
1	NCS FC28148	48.03	35.80	3.27	2.81	0.90	0.69	MnO: 0.0073	0.54	0.25	.	1.25	0.049	5 g	
1	NCS FC28150	47.64	26.03	10.44	5.79	1.41	1.87	MnO: 0.097	0.28	0.091	.	1.21	0.042	5 g	
1	SABS 115	44.94	40.13	1.46	2.12	1.87	1.77	.	2.98	0.45	0.78	2.01	.	~25 g	Ash: (16.0)
1	NCS FC28151	43.42	28.53	3.33	15.18	0.64	1.21	MnO: 0.042	0.43	0.12	.	1.22	0.062	5 g	
1	NCS FC28146	37.86	33.71	9.90	4.74	0.30	1.27	MnO: 0.037	1.45	1.44	.	1.52	0.020	5 g	
1	NCS FC28147	37.52	32.78	10.97	4.81	0.24	1.17	MnO: 0.020	1.75	1.00	.	1.31	0.019	5 g	
1	NCS FC28149	35.54	25.92	14.92	7.56	0.20	1.63	MnO: 0.17	0.75	0.72	.	1.26	0.032	5 g	
1	NCS FC28145	15.66	7.34	18.37	39.61	0.30	6.05	MnO: 0.44	1.69	0.10	.	0.26	0.0042	5 g	

* JCFA-1 also contains (in mg/kg) Be: 4.06, Co: 37.4, Cr: 75, Cs: 8.6, Cu: 122, Li: 91, Ni: 32.2, Pb: 47.2, Rb: 54.1, S: 1960, Sb: 2.1, V: 243, and Zn: 63.

* JCFA-1 also contains (in mass %): FeO: 0.88, TFe2O3: 5.2, C: 1.35, H 2 O-: 0.18, H 2 O+: 0.37, Sr: 0.110

CRM **COAL WASTE ROCK**

Analysis listed in mass %

50g units

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

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CRM ASH OF COAL WASTE ROCK

Analysis listed in mass %

5g units

Number	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SiO2	TiO2	V2O5
NCS FC28153	27.71	0.65	5.01	2.09	1.20	0.041	0.27	0.082	60.03	1.01	0.028

CRM COAL FLY ASH

Analysis listed in mass %

Number	As	Al	Ba	Ca	Fe	K	Mg	Mn	Na	Ni	P	S	Si	Ti	Zn	LOI
SRM 2689	(0.0200)	12.94	(0.0800)	2.18	9.32	2.20	0.61	(0.0300)	0.25	(0.0122)	0.10	.	24.06	0.75	(0.0240)	(1.76)
SRM 1633c	0.01862	13.28	0.1126	1.365	10.49	1.773	0.498	0.02402	0.1707	0.0132	(0.192)	(0.110)	(21.30)	0.724	(0.0235)	.
BCR 176R	0.0054	.	(0.4650)	.	1.3100	.	.	(0.0730)	(3.4800)	0.0117	.	.	.	.	1.6800	.
BCR 038	0.00480	.	.	.	3.3800	.	.	0.0479	3.740	(0.0194)	.	.	.	.	0.0581	.
SRM 2691	(0.0030)	9.81	(0.5900)	18.45	4.42	0.34	3.12	(0.0200)	1.09	(0.0053)	0.51	0.83	16.83	0.90	(0.0120)	(0.23)
SRM 2690	(0.0026)	12.35	(0.5800)	5.71	3.57	1.04	1.53	(0.0300)	0.24	(0.0046)	0.52	0.15	25.85	0.52	(0.0120)	(0.53)

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

Number	Ag	Au	Be	Br	Cd	Ce	Co	Cr	Cs	Cu	Eu	Hf	Hg	La
SRM 2689	.	.	(21)	.	(3)	.	(48)	(170)	(11)	.	(3)	(7)	(<0.003)	.
SRM 1633c	.	.	(16)	.	0.758	(180)	42.9	(258)	(9.39)	173.7	(4.67)	.	1.005	(87.0)
BCR 176R	(33.1)	(0.604)	.	(836)	226	(47.7)	26.7	810	(8.27)	1050	(0.868)	(4.85)	(1.60)	(30.2)
BCR 038	.	.	.	.	4.6	.	53.8	(178)	.	176	.	.	.	.
SRM 2691	.	.	(8)	.	(0.9)	.	(26)	(68)	(1)	.	(2)	(10)	(<0.003)	.
SRM 2690	.	.	(8)	.	(0.7)	.	(19)	(67)	(8)	.	(2)	(8)	(<0.003)	.

Number	Pb	Rb	Sb	Sc	Se	Sr	Ta	Th	Tl	U	V	W	Yb	Units
SRM 2689	(52)	.	(9)	(32)	(7)	(700)	.	(25)	.	.	.	.	.	3 x 10 g
SRM 1633c	95.2	117.42	8.56	(37.6)	(13.9)	901	(1.58)	(23.0)	.	(9.25)	286.2	.	(7.7)	75 g
BCR 176R	5000	(102)	850	(2.91)	18.3	.	(2.02)	(5.28)	1.32	.	(35)	(28.3)	.	40 g
BCR 038	262	.	.	.	.	.	.	.	.	.	.	.	.	5 to 6 g
SRM 2691	(29)	.	(3)	(24)	(17)	(2700)	.	(26)	.	.	.	.	.	3 x 10 g
SRM 2690	(39)	.	(6)	(17)	(0.8)	(2000)	.	(25)	.	.	.	.	.	3 x 10 g

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

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COAL FLY ASH

Analysis listed in mass % ACIRS: RM, 80g SABS: CRM, 20g NCS: CRM. 30g

															REDUCING, OXIDIZING, TEMPERATURES,'C			
Number	Al2O3	BaO	CaO	Fe2O3	K2O	MgO	Mn3O4	Na2O	P2O5	SiO2	SO3	SrO	TiO2	Units	Deformation	Spherical	Hemishperical	Flow
NCS FC82016b	34.03	.	6.04	10.05	0.39	0.64	.	0.31	0.35	41.53	3.91	.	1.38	30 g	.	.	.	.
NCS FC82012b	33.83	.	4.00	8.09	1.30	0.53	.	0.44	0.24	47.07	2.24	.	1.00	30 g	.	.	.	.

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

INDUSTRIAL FLY ASH

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

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

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

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CRM COATING THICKNESS

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.

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

CONTINUOUS CASTING POWDER

Analysis listed in mass %

IRSID: RM, 100 g units

NCS: CRM 50 g units

Number	SiO2	Al2O3	C	C.Free	CO2	Ca	F	Fe	K	MgO	Mn	Na	Na2O	P	S	TiO2	LOI
NCS HC26805	41.31	6.93	3.06	1.57	.	21.46	(4.79)	.	.	3.26	.	.	4.07	.	.	.	.
NCS HC26804	34.95	5.30	15.86	14.49	.	19.13	(5.15)	.	.	0.78	.	.	4.99	.	.	.	.
IRSID 2701	32.70	6.10	3.37	(1.78)	(5.59)	22.90	7.58	(0.145)	0.159	2.19	.	9.42	.	(0.014)	(0.055)	(0.048)	(2.08)
NCS HC26803	30.10	2.14	5.98	4.06	.	30.78	(10.59)	.	.	1.30	.	.	0.52	.	.	.	.
IRSID 2702	28.70	12.60	16.54	15.80	(2.53)	17.80	6.08	1.260	(0.750)	(1.47)	0.071	3.61	.	(0.180)	(0.490)	0.564	(1.26)
NCS HC26802	23.08	14.14	12.71	9.94	.	17.93	(3.86)	.	.	5.86	.	.	2.94	.	.	.	.
NCS HC26801	18.96	16.99	19.97	18.14	.	12.89	(4.47)	.	.	1.39	.	.	9.86	.	.	.	.

RM CONTINUOUS CASTING POWDER

Typical analysis listed in mass %

100g units

Number	SiO2	Al2O3	Ca	F	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	S	SrO	TiO2	Other
DH X2802	57.50	3.09	25.15	0.074	0.488	0.830	0.981	0.030	1.097	0.060	0.132	0.020	0.055	ZnO: 0.004
DH X2801	55.0	3.58	23.08	0.047	0.467	1.092	4.80	0.033	1.33	0.044	0.245	0.019	0.069	BaO: 0.019

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RM **COVER POWDER**

Analysis listed in mass %

100g units

Number	Al2O3	CaO	Fe2O3	K2O	MgO	Mn3O4	Na2O	P2O5	S	SiO2	SrO	TiO2
DH 5905	19.32	46.50	0.435	0.321	9.17	0.051	.	0.039	0.074	22.93	.	0.035
DH 5906	14.34	33.29	0.598	0.210	19.38	0.052	0.32	0.037	0.061	30.78	0.015	0.037

COKE

= class, where 1 = CRM and 2 = RM

i = individually certified

#	Number		S	Heat		Vol.Matter	Ash	C	H	N	P	Units
1	AR 2721-211018	Green Petroleum	5.43	.	.		.	.	.	.	.	50 g
1	AR 756-561117	Green Petroleum	5.00	14,204	BTU	6.85	(0.60)	87.89	1.89	1.79	.	50 g
1	SRM 2718a	Green Petroleum	4.690	(35,000)	J/g	.	(1)	(90)	(3.725)	(1)	.	50 g
1	AR 2720-201013	Green Petroleum	4.34	.	.		.	.	.	.	.	50 g
1	AR 747-747919	Green Petroleum	3.66	14,919	BTU	10.97	0.41	88.46	3.11	1.45	0.0019	50 g
1	AR 2719-7192160	Calcined	2.50	.	.		.	.	.	.	.	50 g
2	AR 2716-716703	Green Petroleum	2.47	.	.		.	.	.	.	.	50 g
2	AR 2717-717102	Green Petroleum	2.21	.	.		.	.	.	.	.	50 g
2	COCO SRM012	Metallurgical	2.16	.		7.14	20.45	.	.	.	0.066	100 g
2	COCO SRM011	Metallurgical	1.69	.		5.53	17.56	.	.	.	0.042	100 g
1	NCS FC28015		1.69	.		2.11	7.04	.	.	.	.	75 g
1	NCS FC28014		1.55	.		3.47	27.15	.	.	.	.	75 g
1	AR 724-724517	Metallurgical	1.21	.	.		.	.	.	.	.	50 g
2	AR 2715-715901	Green Petroleum	1.20	.	.		.	.	.	.	.	50 g
1	NCS FC28134		1.19	29,040	J/g	1.95	12.70	.	.	.	0.024	50 g
1	AR 742B-742271	Green Petroleum	1.11	15,697	BTU	12.91	(0.14)	91.58	4.06	1.78	.	50 g
1	NCS FC28133		1.00	29,180	J/g	1.79	12.30	.	.	.	0.024	50 g
1	SRM 2719	Calcined Patroleum	0.8877	(32,900)	J/g	(0.54)	(0.12)	(97.06)	(0.16)	(1.17)	.	50 g
1	AR 2714-714318	Green Petroleum	0.88	.	.		.	.	.	.	.	50 g
1	NCS FC28118a		0.87	29,100	J/g	2.05	12.01	.	.	.	0.022	50 g
2	COCO SRM003	Metallurgical	0.81	.		1.04	13.16	.	.	.	0.030	100 g
1	NCS FC28019B		0.81	28,740	J/g	1.68	13.20	.	.	.	0.022	50 g

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#	Number		S	Heat		Vol.Matter	Ash	C	H	N	P	Units
1	AR 2772-772920		0.80	12,777	BTU	(1.0)	9.19	88.39	(0.15)	1.14	.	50 g
1	AR 734-734920		0.80	12,777	BTU	(1.0)	9.19	.	.	.	.	50 g
1	NCS FC28121a		0.77	28,580	J/g	1.44	13.42	.	.	.	0.018	50 g
1	AR 720-720317	Metallurgical	0.77	.	.		.	.	.	.	.	50 g
1	AR 719-191109		0.61	.	.		.	.	.	.	.	50 g
2	COCO SRM007	Metallurgical	0.76	.		1.40	11.74	.	.	.	0.023	100 g
1	NCS FC28120a		0.68	28,540	J/g	1.48	13.51	.	.	.	0.022	50 g
1	NCS FC59001		0.63	.		1.39	7.22	.	.	.	.	60 g
1	NCS FC28117a		0.60	28,190	J/g	1.62	15.15	.	.	.	.	50 g
1	AR 2771-711014		0.57	13,178	BTU	(0.79)	7.53	89.89	(0.23)	1.08	.	50 g
1	NCS FC28132a		0.50	29,160	J/g	1.40	12.26	.	.	.	0.030	50 g
1	AR 745-745418	Green Petroleum	0.49	14,861	BTU	5.79	(0.09)	95.92	1.91	0.80	.	50 g
1	AR 732-732514	Metallurgical	0.47	13,242	BTU	1.15	6.57	.	.	.	.	50 g
1	NCS FC59002		0.47	.		1.5	12.62	.	.	.	.	60 g
1	AR 723-723110		0.47	.	.		.	.	.	.	.	50 g
2	COCO SRM004	Metallurgical	0.44	.		1.17	11.56	.	.	.	0.019	100 g
2	AR 2712-7120497	Calcined	0.43	.	.		.	.	.	.	.	50 g
2	COCO SRM001	Metallurgical	0.40	.		1.45	11.58	.	.	.	0.020	100 g
2	COCO SRM010	Metallurgical	0.39	.		1.50	11.62	.	.	.	0.022	100 g
2	COCO SRM013	Metallurgical	0.39	.		1.49	11.45	.	.	.	0.021	100 g
2	COCO SRM008	Metallurgical	0.39	.		1.38	11.47	.	.	.	0.019	100 g
2	COCO SRM006	Metallurgical	0.39	.		1.06	11.40	.	.	.	0.016	100 g
2	COCO SRM009	Metallurgical	0.38	.		1.51	11.48	.	.	.	0.020	100 g
2	COCO SRM005	Metallurgical	0.38	.		1.41	11.36	.	.	.	0.017	100 g
2	COCO SRM002	Metallurgical	0.20	.		1.31	9.53	.	.	.	0.013	100 g

Continued analysis for samples with more data

Number	Al	Fixed C	Ca	Cl	Co	F	Fe	Na	Ni	O	Si	V	Zn
AR 756-561117	.	(92.55)	0.0091	.		.	0.0282	.	0.0281	.	0.0343	0.1651	.
SRM 2718a	(0.00154)	.	(0.01655)	.	(0.000571)	.	0.0287	0.00830	(0.01446)	.	(0.0050)	0.0310	.

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Number	Al	Fixed C	Ca	Cl	Co	F	Fe	Na	Ni	O	Si	V	Zn
AR 747-747919	0.0146	(88.62)	0.0241	(0.0031)		(0.0026)	0.0492	0.0051	0.0203	.	0.0418	0.0794	(0.0007)
AR 742B-742271	.	(86.59)	0.0062	.		.	0.0254	.	0.0188	.	0.0156	0.0111	.
SRM 2719	0.00589	.	0.00577	.	(0.0186)	.	0.0216	(0.00151)	0.0204	.	(0.013080)	0.00586	.
AR 2772-772920	.	(89.82)	.	(0.029)		.	.	.	.	(0.33)	.	.	.
AR 734-734920	.	(89.82)	.	.		.	.	.	.	.	.	.	.
AR 2771-711014	.	(91.68)	.	(0.024)		.	.	.	.	(0.7)	.	.	.
AR 745-745418	.	(94.12)	(0.0034)	.		.	0.0227	.	(0.0093)	.	(0.0064)	(0.0040)	.
AR 732-732514	.	(92.28)	.	.		.	.	.	.	.	.	.	.

Continued analysis for samples with more data

Number	Al2O3	BaO	CaO	Cl	Fe2O3	K2O	MgO	MnO	Na2O	NiO	P2O5	PbO	SO3	SiO2	SrO	TiO2	V2O5	ZnO	Ins.Res
AR 2772	27.72	(0.15)	1.77	(0.029)	11.80	(1.89)	(0.97)	(0.13)	0.52	(0.1)	0.35	(0.01)	(1.34)	50.33	(0.14)	(1.59)	(0.2)	(0.02)	.
AR 2771	25.83	(0.21)	2.85	(0.024)	15.88	1.80	1.16	(0.12)	0.81	.	0.34	.	(1.68)	46.99	(0.13)	1.35	.	.	(0.85)

CRM COKE

Analysis listed in mass % unless otherwise noted 50g units

Number	S	P	Heat J/g	Vol.Matter	ASH	Al2O3	As	CaO	Cl	Cr	Cu
NCS FC28023	1.45	0.018	27,550	2.24	16.20	5.27	0.00024	0.57	0.022	0.0021	0.0018
NCS FC28027	0.89	0.026	28,120	1.65	14.83	.	.	.	.	.	.
NCS FC28022	0.81	0.018	29,100	1.68	11.90	3.98	0.0002	0.55	0.049	0.0022	0.002
NCS FC28026	0.79	0.031	28,950	1.36	12.18	.	.	.	.	.	.
NCS FC28020	0.76	0.037	28,260	1.78	14.42	4.95	0.00014	0.52	0.020	0.0022	0.0027
NCS FC28019a	0.67	0.027	28,950	1.42	11.62	4.08	0.00012	0.45	0.026	0.0017	0.0019
NCS FC28025	0.62	0.021	29,320	1.45	11.50	.	.	.	.	.	.
NCS FC28024	0.41	0.041	28,170	1.98	15.43	.	.	.	.	.	.

Continued analysis for samples with more data

Number	Fe2O3	K2O	MgO	MnO	Na2O	Ni	Pb	SiO2	SrO	TiO2	V
NCS FC28023	0.90	0.11	0.099	0.0044	0.067	0.0010	0.0008	8.15	0.0084	0.20	0.0037
NCS FC28022	0.63	0.069	0.16	0.013	0.084	0.0008	0.0008	5.63	0.011	0.18	0.0032
NCS FC28020	1.22	0.079	0.15	0.0052	0.05	0.0008	0.0011	6.52	0.017	0.22	0.0038

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Number	Fe2O3	K2O	MgO	MnO	Na2O	Ni	Pb	SiO2	SrO	TiO2	V
NCS FC28019a	0.58	0.057	(0.10)	0.0055	0.078	0.0009	0.0007	5.48	0.0095	0.18	0.0028

CRM COKE

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

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

COKE ASH

Analysis listed in mass %

Number	Al2O3	CaO	Co3O4	Fe	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SO3	SiO2	SrO	TiO2	V2O5	LOI
NCS FC28137	35.62	2.82	.	.	5.02	0.78	0.53	0.070	0.47	0.24	.	47.81	.	1.38	0.033	.
NCS FC28136	30.66	6.00	.	.	7.51	0.61	1.50	0.16	0.70	0.41	.	41.61	.	1.37	0.050	.
NCS FC28135	29.95	5.67	.	.		7.23	0.76	1.25	0.18	1.18	0.31	.	42.87	.	1.41	0.049
DH 3713	26.33	4.16	0.011	.	8.57	4.120	2.94	0.172	0.568	0.215	S:0.228	49.74	0.056	1.095	0.060	.
DH 3711	13.79	11.60	0.007	7.79	.	3.29	8.69	0.189	3.08	0.607	0.091	43.5	0.103	2.78	0.058	0.52

Number	C.tot	CO2	Cr2O3	CuO	NiO	ZnO	ZrO2	Units	
NCS FC28137	.	.	.	.	.	.	.	CRM, 5 g	
NCS FC28136	.	.	.	.	.	.	.	CRM, 5 g	
NCS FC28135	.	.	.	.	.	.	.	CRM, 5 g	
DH 3713	.	.	0.046	0.037	0.026	0.232	0.028	RM, 100 g	BaO: 0.170 PbO: 0.209
DH 3711	0.039	0.045	0.036	0.009	0.030	0.010	0.041	RM, 100 g	

RM DUST

Typical analysis listed in mass % * samples list Cu as CuO and Ni as No DH 6203-6205 : 20g all others : 100g

Number	Type	Al2O3	C	CO2	CaO	Cl	Cr2O3	CuO	KO	MgO	Na2O	P2O5	PbO	SiO2	TiO2	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

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Number	Type	Al2O3	C	CO2	CaO	Cl	Cr2O3	CuO	KO	MgO	Na2O	P2O5	PbO	SiO2	TiO2	ZnO
DH X2902	Blast Furnace	0.823	.	.	3.12	.	0.037	.	0.84	0.678	0.138	0.165	0.017	3.28	0.053	0.271
DH X2903	Blast Furnace	0.701	.	.	2.00	.	0.040	0.006	0.705	0.502	0.111	0.158	0.018	2.44	0.058	1.19
DH 6205	Cupola	1.30	6.80	3.84	4.91	2.88	0.041	0.163	3.68	1.85	2.26	0.147	2.43	34.52	0.060	21.01
DH 6204 *	Cupola	1.06	8.08	2.02	2.54	3.62	0.072	0.079	4.16	1.53	2.63	0.051	3.48	26.94	0.184	30.65
DH 6206 *	Cupola	0.220	2.57	.	0.090	.	0.048	2.021	0.086	0.020	0.085	0.191	.	0.430	0.014	91.1
DH 6203	Electric Furnace	2.57	4.22	1.01	1.23	2.00	0.004	0.311	2.51	3.10	5.12	0.52	1.05	15.65	0.517	12.32

Continued

Number	F	Fe	Fe2O3	Mn	Mn3O4	MoO3	NiO	S	SO3	SnO2	V2O5	-H2O	
DH X2901	.	59.37	.	0.367	.	.	0.015	0.488	.	.	0.020	.	.
DH X2902	.	61.67	.	0.341	.	.	0.016	0.577	1.44	.	.	.	.
DH X2903	.	63.01	.	0.425	.	.	0.012	0.392	.	.	0.020	.	.
DH 6205	0.096	.	9.49	.	2.57	0.013	.	.	2.70	0.018	0.019	0.107 at	900'C
DH 6204 *	0.247	6.29	.	0.97	.	.	0.0162	1.09	.	.	.	0.055 at	500'C
DH 6206 *	.	.	0.572	0.04	0.061	.	0.297	0.305	.	0.047	.	1.17 at	900'C
DH 6203	0.570	.	36.85	.	4.97	.	.	.	5.29	.	0.004	0.214 at	900'C last of stock

Analysis for DH 6204 continues in mg/kg

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

CRM FURNACE DUST

Analysis listed in mass % 100g units

Number	Ag	Al	As	Bi	C	Ca	Cd	Cl	Co	Cr	Cu	F	Fe	H2O	Hg
ECRM 876-1	.	0.034	0.023	.	.	3.43	.	.	.	0.17	0.42	.	24.85	.	.
ECRM 880-1	.	1.28	.	.	.	3.15	.	0.085	.	0.027	0.005	0.034	31.0	.	.
ECRM 884-1	0.0028	0.379	0.0054	0.0280	(0.82)	5.22	0.0045	0.991	0.0046	1.86	0.1569	0.411	31.67	(0.30)	(0.0002)

Continued

Number	K	Mg	Mn	Mo	Na	Ni	P	Pb	S	Si	Sn	Ti	V	Zn	LOI
ECRM 876-1	1.63	1.31	2.84	.	1.98	0.034	0.128	.	0.87	1.72	.	0.048	.	23.29	.

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

CRM INDOOR DUST

Analysis listed in mass % 8g units

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

CRM ROAD DUST

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

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

Continued analysis listed in mass %

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

CRM USED AUTOMOBILE EXHAUST CATALYST

mg/kg

Number	Pb	+/-	Pd	+/-	Pt	+/-	Rh	+/-	Units
SRM 2557	13931	97	233.2	1.9	1131	11	135.1	1.9	70 g
SRM 2556	6228	49	326.0	1.6	697.4	2.3	512	0.5	70 g
BAM M504b	.	.	1128	9	1159	8	314.2	2.6	200 g

ELECTRONIC SCRAB POWDER

Analysis listed in mass % 200g units

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

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FERROBORON

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

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

FERROCHROMIUM

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

#	Number	Cr	Al	C	Co	Cu	Fe	Mn	N	Ni	P	S	Si	Ti	V	Units
1	IRSID 509-1	72.85	.	0.012	.	.	.	.	0.029	.	(0.019)	.	0.230	.	.	100 g
1	ECRM 580-1	72.18	.	0.019	0.047	.	.	.	0.035	.	0.011	.	0.306	.	0.083	100 g
2	DH 1602	71.20	0.017	8.12	Nb:0.006	.	19.38	0.103	W:0.038	0.304	0.014	Mg:0.049	0.153	0.009	0.102	50 g
1	IPT 65	71.2	9.2	0.051	0.016	.	17.9	0.128	.	0.077	0.006	0.016	0.71	.	.	100 g
1	BCS 203/6	71.01	.	0.0270	0.0442	.	.	0.153	.	0.218	0.0195	0.004	0.381	.	0.0729	100 g
1	SRM 196	70.83	.	0.035	.	.	.	.	.	.	0.020	0.003	0.373	.	.	100 g
1	IRSID 507-1	70.30	.	5.40	.	.	.	0.270	0.049	.	0.017	.	1.20	.	.	100 g
1	NCS HC37618	69.12	.	8.44	.	.	.	.	.	.	0.026	0.026	0.30	.	.	50 g
1	BCS 204/6	68.77	.	8.57	0.0359	.	.	0.225	.	0.289	0.0164	0.0190	0.715	0.0565	0.094	100 g
1	NCS HC93604	68.13	.	0.038	.	.	.	0.103	.	0.260	0.022	0.015	0.466	0.016	.	50 g
1	SRM 64c	68.00	.	4.68	0.051	0.005	24.98	0.16	0.045	0.43	0.020	0.067	1.22	0.002	0.15	100 g
1	NCS HC26607b	65.86	.	7.23	.	.	.	0.38	.	0.29	0.017	0.020	2.18	0.15	.	50 g
1	NCS HC25603b	65.27	.	7.37	0.044	.	24.90	0.31	.	0.39	0.020	0.015	1.27	0.104	0.138	50 g
1	NCS HC37607	64.32	.	0.086	.	.	.	0.35	.	.	0.034	0.005	1.39	.	.	40 g chips
1	NCS HC11606	64.17	.	6.37	.	.	.	0.32	.	.	0.023	0.013	4.29	.	.	100 g

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#	Number	Cr	Al	C	Co	Cu	Fe	Mn	N	Ni	P	S	Si	Ti	V	Units
1	NCS HC37608	64.06	.	0.243	.	.	.	0.34	.	.	0.039	0.019	0.99	.	.	40 g chips
1	NCS HC37615	63.50	.	8.78	.	.	.	.	.	.	0.023	0.025	0.78	0.097	.	50 g
1	NCS HC25635a	63.44	.	0.218	.	.	.	0.44	.	.	0.035	0.0033	1.07	.	0.093	50 g chips
1	NCS HC25651	63.31	.	2.55	.	.	.	0.47	.	.	0.023	0.047	2.04	.	.	50 g
1	NCS HC25636a	62.81	.	0.078	0.16	0.032	35.56	0.39	.	0.34	0.028	0.0052	0.32	.	0.098	50 g chips
1	NCS HC25644	62.57	.	0.0064	.	.	.	.	8.69	.	0.024	0.029	0.75	.	.	50 g
1	NCS HC28621	62.54	.	7.78	.	.	27.09	0.307	.	.	0.026	0.033	1.45	0.166	0.138	50 g
1	NCS HC25653	62.49	.	8.70	.	.	.	0.11	.	.	0.025	0.024	0.15	0.016	.	50 g
1	NCS HC37609	61.54	.	8.49	.	.	.	0.20	.	.	0.024	0.015	2.15	0.24	.	40 g
1	NCS HC25651a	61.07	.	0.81	.	.	.	0.83	.	.	0.028	0.0028	1.25	.	0.11	50 g
1	NCS HC93611	60.42	.	8.13	.	.	.	0.21	.	.	0.022	0.059	0.92	.	.	50 g
1	NCS HC28622	60.00	.	7.72	.	.	28.65	0.340	.	.	0.025	0.033	2.43	0.261	0.153	50 g
1	NCS HC93605	59.71	.	8.00	.	.	.	0.308	.	0.312	0.037	0.037	2.94	0.410	.	50 g
1	NCS HC37617	59.35	.	8.32	.	.	.	.	.	.	0.021	0.040	1.91	.	.	50 g
1	NCS HC11610	58.83	.	0.040	.	.	.	0.313	4.76	.	0.020	0.042	0.525	.	.	70 g
1	NCS HC93609	58.28	.	8.36	.	.	.	0.207	.	.	0.023	0.068	1.15	.	.	50 g
1	NCS HC14615a	57.44	.	8.00	.	.	31.46	0.24	.	0.23	0.017	0.015	1.96	.	0.28	50 g
1	NCS HC28619	56.76	.	7.28	.	.	30.22	0.300	.	.	0.023	0.024	4.25	0.412	0.203	50 g
1	NCS HC14615	56.16	.	8.07	.	.	.	0.23	.	.	0.017	0.045	2.30	.	.	50 g
1	NCS HC14614	55.81	.	7.67	.	.	.	0.28	.	.	0.018	0.032	2.57	.	.	50 g
1	NCS HC28620	55.77	.	7.60	.	.	31.41	0.382	.	.	0.022	0.031	3.95	0.423	0.175	50 g
1	NCS HC14613	54.04	.	7.56	.	.	.	0.18	.	.	0.020	0.032	2.58	.	.	50 g
1	BS 130/1	51.6	.	7.12	.	(0.015)	.	1.25	.	Mo:(0.005)	0.014	0.034	4.41	(0.38)	(0.32)	100 g 17025
1	BS 130/3	49.01	.	6.47	.	(0.01)	.	0.76	.	Mo:(0.003)	0.015	0.028	6.20	(0.41)	(0.38)	100 g 17025
1	SARM 144	49	.	.	.	.	36.9	0.33	.	0.21	.	.	5.31	0.67	0.37	100 g

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FERROMANGANESE

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

#	Number	Mn	Fe	Si	C	P	S	As	Ca	Co	Cr	Cu	Ni	Pb	Ti	V	Zn	Other
2	DH 1207	88.00	8.780	1.113	1.630	0.081	.	.	.	0.038	0.060	0.016	0.022	.	.	0.026	0.009	
1	ECRM 583-1	86.42	.	0.396	0.333	0.146	(0.007)	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629	84.28	.	0.62	0.300	0.196	0.0016	.	.	.	.	.	.	.	.	.	.	
1	NCS HC41601 *	83.35	13.48	0.948	0.86	0.180	(0.003)	0.048	.	0.145	0.335	0.107	0.080	0.068	.	(0.03)	0.12 *	see below
1	NCS HC28629	82.61	16.47	0.475	0.296	0.080	0.0022	0.017	0.0012	.	0.033	0.127	0.032	0.126	.	0.041	0.011	
1	NCS HC15607	82.59	16.59	0.73	0.135	0.033	0.0074	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25619a	81.95	.	0.75	1.18	0.163	0.0018	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25619b	81.74	.	0.75	1.20	0.163	0.0018	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629a	81.68	.	1.06	0.310	0.196	0.0022	.	.	.	.	.	.	.	.	.	.	
1	NCS HC37614	81.11	.	1.71	0.939	0.130	.	.	.	.	.	.	.	.	.	0.075	.	
1	IRSID 503-1	80.8	.	0.865	0.700	0.069	(0.009)	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25629b	80.79	.	0.96	0.560	0.169	0.0024	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25620	80.48	.	0.94	1.50	0.153	0.0030	.	.	.	.	.	.	.	.	.	.	
1	IPT 54	80.4	15.9	1.74	1.20	0.22	0.003	.	.	.	0.043	0.059	0.14	.	.	.	.	
2	DH 1206	80.24	15.91	0.350	1.482	0.229	.	0.158	.	0.167	0.105	0.088	0.140	.	.	0.072	.	Mo: 0.028
1	SRM 68c	80.04	12.3	0.225	6.72	0.19	0.008	0.021	.	.	0.074	.	.	.	.	.	.	
1	IARM FMnP-20	79.7	16.6	0.42	1.13	0.08	(0.008)	B:0.0019		0.019	0.036	0.010	0.015	.	.	.	.	
1	NCS HC25621	79.44	.	1.51	1.40	0.344	0.0029	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25632	78.42	.	0.69	6.68	0.204	0.009	.	.	.	.	.	.	.	.	.	.	
2	DH 1216	78.30	17.03	.	1.44	0.123	.	0.003	.	0.019	0.071	0.005	0.047	.	.	0.019	0.007	
1	ECRM 502-2	77.87	.	.	6.94	0.148	.	.	.	.	0.0265	0.0370	0.0384	0.0179	0.0034	.	.	
1	BCS 208/3	77.91	.	0.603	6.834	0.137	0.006	.	.	.	.	.	.	.	.	.	.	
1	NCS HC28628	76.55	17.86	1.84	1.84	0.265	0.017	0.055	0.0036	.	0.124	0.152	0.132	1.30	0.0065	0.100	0.0017	
1	NCS HC11602b	75.41	.	0.111	6.82	0.134	0.005	.	.	.	.	.	.	.	.	.	.	
1	NCS HC25642	74.02	.	1.70	1.14	0.183	0.0065	.	.	.	.	.	.	.	.	.	.	N: 4.92
1	NCS HC11602a	68.94	.	0.080	6.69	0.143	0.005	.	.	.	.	.	.	.	.	.	.	
1	NCS HC28626	66.44	26.62	0.073	6.26	0.268	0.0014	0.015	0.0054	.	0.032	0.072	0.109	0.106	0.0035	0.133	0.026	
1	NCS HC28627	66.27	26.60	0.208	6.23	0.428	0.0023	0.025	0.0040	.	0.026	0.070	0.087	0.077	0.027	0.110	0.022	

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#	Number	Mn	Fe	Si	C	P	S	As	Ca	Co	Cr	Cu	Ni	Pb	Ti	V	Zn	Other
1	NCS HC11602c	66.20	.	1.88	6.15	0.110	0.013	.	.	.	.	.	.	.	.	.	.	
1	NCS HC28625	65.98	26.42	0.525	6.14	0.805	0.0034	0.047	0.0006	.	0.014	0.065	0.032	0.0092	0.081	0.055	0.0082	
1	NCS HC37611	65.75	.	0.64	6.57	0.382	0.0090	.	.		.	.	.	.	.	.	.	

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

FERROMOLYBDENUM

= class, where 1 = CRM and 2 = RM

#	Number	Mo	Fe	Si	C	Cr	Cu	Mn	N	Ni	O	P	S	W	Units
1	ECRM 578-1	72.23	.	0.208	0.016	.	0.136	.	.	.	.	0.024	0.065	.	100 g
1	BCS 231/6	71.4	.	0.72	0.056	.	0.223	.	.	.	.	0.0211	0.030	.	100 g
1	NCS HC26610a	64.84	.	0.10	0.021	.	0.33	.	.	.	.	0.044	0.077	0.011	50 g
1	NCS HC25602a	62.19	.	0.20	0.020	.	0.159	.	.	.	.	0.031	0.042	.	50 g
1	NCS HC26610b	61.85	.	1.54	0.042	.	0.29	.	.	.	.	0.036	0.059	0.060	50 g
1	BCS 231/5	61.7	.	1.66	0.212	.	0.270	.	.	.	.	0.028	0.042	.	100 g
1	NCS HC37603	61.41	.	0.30	0.054	.	0.126	.	.	.	.	0.046	0.071	.	50 g
1	NCS HC19608	61.20	.	0.32	0.042	.	0.134	.	.	.	.	0.032	0.073	.	50 g
1	NCS HC28624	61.00	37.22	0.367	0.019	0.052	1.07	0.039	.	0.144	.	0.044	0.078	0.047	50 g
1	NCS HC28644	59.36	39.87	0.11	0.017	0.0072	0.133	0.004	.	0.016	.	0.037	0.127	0.144	50 g
1	NCS HC19609	58.13	.	(0.039)	0.039	.	0.36	.	.	.	.	0.041	0.085	.	50 g
1	NCS HC37604	57.65	.	0.71	0.044	.	0.117	.	.	.	.	0.046	0.069	.	50 g
1	NCS HC28645	57.44	41.78	0.033	0.014	0.0065	0.167	0.003	.	0.017	.	0.047	0.110	0.164	50 g
1	NCS HC93606	56.12	.	0.190	0.073	.	0.494	.	.	Sb:0.0036	.	0.037	0.044	.	50 g

# Number	Al	As	Bi	Co	Pb	Sb	Sn	V	Zn
ECRM 578-1	.	.	.	.	.	.	.	.	.
BCS 231/6	.	.	.	.	.	.	.	.	.
NCS HC26610a	.	0.015	.	.	(0.002)	(0.01)	(0.002)	.	.
NCS HC25602a	.	.	.	.	.	.	.	.	.
NCS HC26610b	.	0.008	.	.	.	(0.002)	(0.008)	.	.
BCS 231/5	.	.	.	.	.	.	.	.	.

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# Number	Al	As	Bi	Co	Pb	Sb	Sn	V	Zn
NCS HC37603	.	.	.	.	.	.	.	.	.
NCS HC19608	.	.	.	.	.	.	.	.	.
NCS HC28624	.	0.0078	.	.	0.0022	0.0059	0.0026	.	.
NCS HC28644	.	0.116	.	.	0.0015	0.017	0.040	.	.
NCS HC19609	.	.	.	.	.	.	.	.	.
NCS HC37604	.	.	.	.	.	.	.	.	.
NCS HC28645	.	0.152	.	.	0.0017	0.013	0.049	.	.
NCS HC93606	.	.	.	.	.	.	.	.	.

CRM FERRONICKEL

Number	Ni	N	C	Co	Cr	Cu	Fe	Mn	P	S	Si	V	Units	
NCS HC11617	16.45	.	1.85	0.241	1.87	0.021	.	0.041	0.037	0.213	3.11	.	powder	60 g
NCS HC28059	13.96	.	2.17	0.320	1.71	0.038	.	0.066	0.014	0.276	2.72	0.027	chips	75 g
NCS HC11616	13.34	.	2.12	0.247	1.98	0.022	.	0.051	0.039	0.283	3.25	.	powder	60 g
NCS HC28057	12.25	.	2.15	0.226	2.77	0.022	.	0.065	0.020	0.235	4.10	0.034	chips	75 g
NCS HC25656	12.16	.	3.06	.	3.62	.	.	.	0.046	0.245	1.04	.	powder	50 g
NCS HC11618	10.70	.	1.65	0.198	1.56	0.021	.	0.053	0.032	0.211	2.54	.	powder	60 g
NCS HC28058	10.19	.	2.87	0.236	1.68	0.033	.	0.072	0.110	1.00	2.07	0.027	chips	75 g
NCS HC35609	10.01	.	2.58	0.29	2.25	0.023	.	0.16	0.054	0.288	2.30	.	powder	50 g

FERRONIOBIUM

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

#	Number	Nb	Fe	Si	Al	C	Cr	Cu	Mn	P	Pb	Sn	Ta	Ti	V	W	Zr
1	NCS HC25650	66.34	.	1.01	0.89	0.074	.	0.023	.	0.085	.	.	(0.081)	0.49	.	.	.
1	NCS HC18606	66.24	.	1.09	1.35	0.070	.	.	0.29	0.159	.	.	0.084	0.78	.	.	.
1	NCS HC11609	64.89	.	1.34	0.711	0.114	.	0.059	0.37	0.172	.	.	0.087	0.870	.	.	.
1	NCS HC93607	64.60	.	1.04	1.50	0.101	.	0.038	.	0.194	.	.	0.097	0.585	.	.	.
1	ECRM 579-1	62.87	.	1.03	1.86	0.037	.	.	.	0.064	.	0.344	3.85	0.567	.	.	.

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#	Number	Nb	Fe	Si	Al	C	Cr	Cu	Mn	P	Pb	Sn	Ta	Ti	V	W	Zr
2	DH 2815	60.15	28.77	1.580	4.82	0.043	0.028	0.209	0.842	0.065	0.140	1.38	0.856	0.185	0.013	0.064	0.105
1	ECRM 576-1	43.90	.	1.79	2.53	0.201	.	.	.	.	.	0.195	0.306	1.32	.	.	.

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

CRM FERROPHOSPHORUS

Analysis listed in mass %

Number	P	C	Cr	Mn	S	Si	Ti	Units
NCS HC93622	27.50	0.228	0.226	0.70	0.017	0.156	0.53	50 g
SRM 90	26.2	.	.	.	.	.	.	75 g
NCS HC11614	25.81	0.032	.	0.638	0.0038	0.60	2.14	70 g
NCS HC11615	21.49	0.130	.	1.07	0.061	0.382	0.62	70 g

FERROTITANIUM

= class, where 1 = CRM and 2 = RM

#	Number	Ti	Al	Sol.Al	C	Co	Cr	Cu	Fe	Mn	P	S	Si	V	Zr
2	DH 2409	72.74	2.93	.	.	.	0.384	0.074	19.27	0.192	0.004	.	0.180	1.167	0.383
1	NCS HC15601	70.02	0.3	.	0.057	.	0.039	0.037	26.57	0.106	0.0071	0.0047	1.47	0.011	.
1	NCS HC19604	43.81	10.64	.	0.041	.	.	.	.	1.59	0.051	0.011	3.46	0.158	.
1	NCS HC19605	38.81	8.61	.	0.032	.	.	0.025	.	0.81	0.032	0.009	4.20	0.303	.
1	ECRM 584-1	37.17	7.19	(6.0)	0.044	.	.	.	.	1.13	0.032	0.030	1.80	.	.
1	NCS HC93608	32.22	3.00	.	0.095	.	.	0.281	.	0.255	0.014	0.015	0.30	.	.
1	NCS HC26613	30.24	8.13	.	0.019	.	.	(0.005)	.	1.11	0.020	0.012	1.84	0.19	.

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#	Number	Ti	Al	Sol.Al	C	Co	Cr	Cu	Fe	Mn	P	S	Si	V	Zr
1	NCS HC18604	27.93	5.38	.	0.065	.	.	0.117	.	2.67	0.043	0.013	4.68	.	.
1	NCS HC28638	27.34	7.82	.	0.033	.	0.055	.	.	0.362	0.015	0.0048	4.51	0.15	.
1	IRSID 510-1	26.95	(4.9)	.	0.058	.	.	.	.	.	(0.035)	.	4.65	.	.
1	BS FeTi-1	20.0	12.5	.	0.57	(0.03)	0.33	0.60	.	7.7	(0.05)	(0.009)	2.8	0.69	3.7
1	BS FeTi-2	19.6	12.6	.	0.455	0.037	0.30	0.43	.	7.9	(0.05)	(0.01)	3.2	0.76	3.8

Number	B	Ca	Mg	Mo	N	Nb	Ni	Pb	Sn	W	Zn	Units	
DH 2409	.	.	0.070	0.814	.	0.072	0.047	.	0.246	.	.	50 g	
NCS HC15601	.	.	.	0.028	.	.	0.29	.	.	.	.	50 g	
NCS HC19604	.	.	.	.	.	.	.	.	0.056	.	.	100 g	
NCS HC19605	.	.	.	.	.	.	.	.	0.061	.	.	100 g	
ECRM 584-1	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC96308	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC26613	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC18604	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC28638	.	.	.	.	.	.	.	.	.	.	.	50 g	
IRSID 510-1	.	.	.	.	.	.	.	.	.	.	.	100 g	
BS FeTi-1	0.60	1.14	(0.4)	0.058	0.144	(0.05)	0.17	.	0.11	.	(0.03)	100g	17025
BS FeTi-2	1.10	0.98	(0.4)	0.15	(0.15)	0.036	0.156	.	0.160	.	(0.03)	100g	17025

CRM FERROTUNGSTEN

Number	W	Si	Al(tot)	As	C	Cu	Fe	Mn	Mo	P	Pb	S	Sb	Sn	Units
ECRM 555-1	79.9	1.75	0.14	.	0.025	.	(15.2)	.	.	(0.02)	.	(0.018)	.	0.034	100 g
ECRM 590-1	79.55	1.05	(0.36)	.	0.0250	0.0484	.	0.136	0.101	.	.	.	.	0.045	100 g
NCS HC25606a	76.24	0.34	.	0.041	0.036	0.079	.	0.102	.	0.033	.	0.052	.	0.041	50 g

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FERROVANADIUAM

= class, where 1 = CRM and 2= RM

#	Number	V	Fe	Si	Al	C	Cr	Cu	Mg	Mn	Mo	N	Ni	P	S
1	ECRM 591-2	84.28	13.86	0.246	.	0.0206	.	0.0036	.	0.0207	.	.	0.0086	0.0050	0.0037
1	NCS HC93629	80.90	.	0.86	1.33	0.032	.	.	.	0.046	.	.	.	0.036	0.014
2	DH 2510	80.85	14.25	0.894	0.783	0.120	0.201	0.038	0.010	1.154	0.029	.	0.009	0.051	0.016
1	NCS HC11608	79.27	.	0.653	1.41	0.109	.	0.0089	.	0.106	.	.	0.010	0.021	0.035
1	NCS HC28633	54.02	.	0.682	0.0026	0.285	0.110	0.054	.	0.663	.	.	0.011	0.056	0.0044
1	NCS HC26608c	53.78	.	0.81	(0.0025)	0.17	0.71	.	.	2.00	.	.	.	0.043	0.0040
1	NCS HC19606	51.14	.	0.68	0.084	0.565	0.32	.	.	0.43	.	.	.	0.087	0.010
1	NCS HC26608b	50.57	.	0.84	(0.002)	0.22	0.70	.	.	1.64	.	.	.	0.051	0.0044
1	NCS HC93628	50.24	.	0.730	6.10	0.130	.	.	.	0.474	.	.	.	0.042	0.016
1	ECRM 577-1	50.16	.	1.79	0.414	0.089	.	0.054	.	0.158	.	.	0.053	0.035	0.034
1	NCS HC93628a	50.09	.	0.730	6.03	0.152	.	.	.	0.475	.	.	.	0.043	0.017
1	NCS HC37616	49.72	.	0.50	5.18	0.081	.	.	.	0.58	.	.	.	0.016	0.012
1	NCS HC11607	49.40	.	1.67	.	0.235	.	0.022	.	0.321	.	.	.	0.121	0.010
1	NCS HC18608	48.93	.	0.76	0.158	0.40	.	.	.	0.26	.	.	.	0.049	0.043
1	NCS HC28634	47.32	.	1.89	0.0061	0.475	0.289	0.064	.	0.365	.	.	0.067	0.093	0.014
1	BS FeV 45	45.1	33.7	4.90	0.017	0.241	5.82	0.40	0.014	4.12	0.0079	0.26	4.32	(0.13)	0.334
1	BS FeV 42	42.2	39.2	3.77	(0.05)	0.297	5.18	0.31	0.059	3.37	0.023	0.19	3.87	0.127	0.31

Number	As	Ca	O	Pb	Ti	Units	
ECRM 591-2	0.0045	B:0.00048	.	Zn:0.0181	0.0017	100 g	
NCS HC93629	.	.	.	.	.	25 g	
DH 2510	.	.	.	.	0.071	50 g	Co: 0.008 Nb: 0.013 W: 0.025
VS F40	.	.	.	.	.	100 g	
NCS HC11608	0.0024	.	.	.	.	70 g	
NCS HC28633	0.0017	0.022	.	0.0006	.	50 g	
NCS HC26608c	.	.	.	.	Zn:(0.004)	50 g	
NCS HC19606	.	.	.	.	.	50 g	
NCS HC26608b	.	.	.	.	Zn:(0.0024)	50 g	

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Number	As	Ca	O	Pb	Ti	Units	
NCS HC93628	.	.	.	.	.	30 g	
ECRM 577-1	.	.	.	.	.	100 g	
NCS HC93628a	.	.	.	.	.	30 g	
NCS HC37616	.	.	.	.	.	50 g	
NCS HC11607	0.021	.	.	.	.	70 g	
NCS HC18608	.	.	.	.	.	50 g	
NCS HC28634	0.024	0.115	.	0.0004	.	50 g	
BS FeV 45	(0.013)	0.010	.	.	0.021	100 g	17025, 34
BS FeV 42	(0.01)	(0.052)	.	.	0.033	100 g	17025, 34

CRM RARE EARTH FERROSILICON

Number	RE	Si	Fe	Ca	Mg	Mn	Ti	Al	C	Ce	Cu	La	Units
NCS HC39601	20.09	40.31	20.81	3.21	9.50	2.72	1.50	.	.	.	.	.	100 g
NCS HC28615	20.00	41.02	.	5.60	.	0.390	0.235	.	.	.	.	.	100 g
NCS HC28609	8.66	43.90	(31.67)	1.01	10.20	0.70	0.54	.	.	.	.	.	80 g
NCS HC28612	6.42	43.44	(36.43)	0.90	8.25	0.63	0.435	.	.	.	.	.	80 g
NCS HC28611	5.10	43.22	(40.7)	0.84	5.70	0.55	0.362	.	.	.	.	.	80 g

* VS F31/2 lists Rare Earth Oxides

FERROSILICONIUM, FERROSILICOCALCIUM, FERROSILICOCHROMIUM, FERROSILICOTITANIUM

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

#	Number	Si	Fe	Ca	Cr	Ti	Al	C	Cu	Mg	Mn	Mo	Ni	P	S	V	Zr
2	DH 2902	59.25	24.80	0.220	0.059	11.21	0.613	0.284	0.022	0.234	1.64	0.126	0.043	0.010	0.005	0.154	0.046
2	DH 2901	56.73	26.58	0.200	0.062	12.03	0.597	0.183	0.021	0.210	1.72	0.149	0.044	0.013	0.005	0.161	0.046
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	NCS HC93635	27.36	26.23	.	.	.	38.51	1.90	.	.	0.18	.	.	0.072	0.015	.	.
1	NCS HC93636	26.11	.	.	.	.	36.22	0.11	.	.	1.70	.	.	0.021	0.0071	.	.

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FERROSILICON

= class, where 1 = CRM and 2 = RM

#	Number	Si	Fe	Al	C	Ca	Cr	Cu	Mn	Ni	P	S	Ti
1	BAM 529-1	91.11	6.15	0.86	0.10	0.46	.	0.01	0.04	.	0.013	.	0.09
1	DH 2314	78.33	19.89	0.410	0.031	0.094	0.082	0.049	0.190	0.044	0.028	.	0.067
1	NCS HC25616-78	78.13	.	1.34	0.084	0.65	0.050	.	0.117	.	0.020	0.0042	.
1	NCS HC14612	77.49	22.12	0.0074	0.016	0.0067	0.0044	0.011	0.020	0.016	0.0074	0.0030	0.011
1	NCS HC25647	77.42	.	0.011	0.0068	0.0030	0.010	.	0.074	.	0.012	0.003	0.043
2	DH 2315	77.17	19.88	1.316	0.042	0.357	0.143	0.042	0.159	0.049	0.023	.	0.086
1	IARM FSiP-20	77.0	21.8	0.31	0.026	0.17	0.068	0.052	0.186	0.020	0.015	(<0.0020)	0.057
1	NCS HC25616	76.74	.	1.80	0.081	0.30	0.14	.	0.17	.	0.023	0.004	.
1	NCS HC25627	76.74	.	1.80	0.081	0.30	0.140	.	0.172	.	0.023	0.004	.
1	NCS HC93603	76.53	19.07	1.52	0.095	1.373	0.043	0.025	0.281	0.012	0.019	0.0023	0.085
1	NCS HC25618	76.42	.	0.78	0.066	0.19	0.097	.	0.14	.	0.025	0.003	.
1	NCS HC93617	76.34	19.43	1.75	0.220	1.31	0.027	0.015	0.237	0.0056	0.025	0.0039	0.119
1	DH 2310	75.94	19.42	2.041	0.11	1.019	0.019	0.011	0.139	0.006	0.021	.	0.093
1	NCS HC15602	75.9	23.65	0.011	0.0074	(0.0013)	0.077	0.057	0.149	0.026	0.014	0.0035	0.027
1	JK 39	75.9	21.6	1.45	0.105	0.24	.	0.013	0.165	.	0.018	.	0.116
1	NCS HC93601	75.46	20.23	1.40	0.148	1.15	0.044	0.019	0.588	0.0093	0.021	0.0026	0.097
1	SRM 195	75.3	23.6	0.046	0.034	0.053	0.047	0.047	0.17	0.032	0.017	0.001	0.037
1	NCS HC93602	74.81	20.96	1.28	0.196	0.986	0.052	0.013	1.09	0.0071	0.024	0.0052	0.106
1	NCS HC11611	74.03	1.41	0.035	.	0.208	0.063	.	0.25	.	0.020	0.0023	.
1	NCS HC11601a	73.75	.	1.14	0.073	0.34	0.085	0.031	0.26	.	0.023	0.003	.
1	NCS HC93616	73.61	21.06	2.14	0.208	2.05	0.022	0.019	0.237	0.0069	0.023	0.0033	0.121
1	NCS HC37602	73.29	21.37	2.74	.	0.616	.	.	0.14	.	0.022	.	.
1	SRM 58a	73.20	25.23	0.95	0.014	0.30	0.020	0.024	0.16	0.012	0.009	<0.002	0.051
1	NCS HC18601	72.44	.	2.16	0.19	0.64	0.109	.	0.205	.	0.019	0.010	.
1	NCS HC19602	69.47	23.81	2.45	0.12	2.47	0.077	.	0.308	.	0.027	.	.
1	NCS HC37601	68.91	26.88	2.18	.	.	0.142	.	0.177	.	0.024	.	.
1	NCS HC25616-67	67.18	.	1.28	0.071	0.44	0.285	.	0.301	.	0.025	0.0029	.
1	NCS HC25616-66	66.18	.	1.56	0.070	0.49	0.30	.	0.307	.	0.023	0.0029	.

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#	Number	Si	Fe	Al	C	Ca	Cr	Cu	Mn	Ni	P	S	Ti
1	BS 140/2	51.9	46.1	(0.63)	0.027	(0.033)	(0.25)	(0.141)	0.53	(0.153)	(0.022)	(0.006)	(0.095)
1	NCS HC25652	51.85	.	.	0.35	.	.	.	.	.	0.014	0.003	0.052
2	DH 2311	50.00	9.06	4.36	8.31	7.84	0.024	0.016	0.080	0.007	0.012	0.048	0.070
1	BS 140/4	49.7	47.6	(0.90)	(0.040)	(0.078)	(0.19)	(0.089)	1.01	(0.113)	(0.016)	(0.003)	(0.079)
2	DH 2312	48.30	12.38	3.40	4.96	10.48	0.083	0.020	0.114	0.013	0.011	0.056	0.062
1	SRM 59a	48.10	50.05	0.35	0.046	0.042	0.080	0.052	0.75	0.033	0.016	0.002	.
1	BS 140/3	46.9	51.0	(0.59)	(0.044)	(0.095)	(0.18)	(0.091)	0.60	(0.090)	(0.018)	(0.004)	(0.073)
1	BS 140/1	45.0	52.9	(0.68)	0.031	(0.040)	(0.25)	(0.134)	0.46	(0.153)	(0.022)	(0.004)	(0.086)
1	IPT 70	44.7	54.1	0.21	0.087	0.16	0.046	0.066	0.283	0.022	0.018	(0.006)	0.018
1	SARM 33	15.60	80.2	0.62	1.01	.	0.43	0.29	0.75	0.28	0.043	.	.

Number	As	B	Ba	Co	Mg	Mo	N	O	Sn	Sr	V	Zn	Zr	Units
BAM 529-1	.	.	.	.	0.04	.	.	.	.	.	.	.	.	100 g
DH 2314	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC25616-78	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC14612	.	0.0022	.	0.0012	.	.	.	.	.	.	.	.	.	60 g
NCS HC25647	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
DH 2315	.	.	.	.	0.025	.	.	.	.	.	.	.	0.008	50 g
IARM FSiP-20	.	.	.	(0.0019)	0.008	0.0082	Nb:0.0018	.	.	W:(0.0019)		(0.0022)	0.0043	100 g
NCS HC25616	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC25627	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC93603	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC25618	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC93617	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g
DH 2310	.	.	0.042	.	0.029	.	.	.	.	.	.	.	.	50 g
NCS HC15602	.	.	.	.	.	.	.	.	.	.	0.0036	.	.	50 g
JK 39	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
NCS HC93601	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g
SRM 195	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.011	75 g

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Number	As	B	Ba	Co	Mg	Mo	N	O	Sn	Sr	V	Zn	Zr	Units	
NCS HC93602	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC11611	.	.	.	.	.	.	.	.	.	.	.	.	.	60 g	
NCS HC11601a	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	
NCS HC93616	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
NCS HC37602	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
SRM 58a	.	0.0010	.	<0.01	.	.	.	.	.	.	.	.	0.002	75 g	
NCS HC18601	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC19602	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC37601	.	.	.	.	.	.	.	.	.	.	.	.	.	80 g	
NCS HC25616-67	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
NCS HC25616-66	.	.	.	.	.	.	.	.	.	.	.	.	.	50 g	
BS 140/2	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	17025
NCS HC25652	.	.	.	.	.	.	28.15	.	.	.	.	.	. chips	50 g	
DH 2311	.	.	.	.	1.153	.	.	.	.	.	.	.	.	50 g	
BS 140/4	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	17025
DH 2312	.	.	.	.	0.193	.	.	.	.	.	.	.	.	50 g	
SRM 59a	.	0.058	.	.	.	.	.	.	.	.	.	.	.	50 g	
BS 140/3	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	17025
BS 140/1	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	17025
IPT 70	.	.	.	.	0.016	.	.	.	.	.	.	.	.	60 g	
SARM 33	.	.	.	.	.	.	.	.	.	.	.	.	.	100 g	

CRM GLASS

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

Number	SiO2	Al2O3	B2O	BaO	CaO	Cr2O3	Fe2O3	K2O	Li2O	MgO	Na2O	PbO	SO3	TiO2	ZnO	ZrO2	LOI	Others
SRM 92	(75.0)	(1.5)	0.70	.	(8.3)	.	.	(0.6)	.	(0.1)	(13.1)	.	.	.	(0.2)	.	(0.42)	R2O3=Al2O3
SGT G10	72.7	1.62	.	0.02	10.7	0.020	0.325	0.35	.	1.81	12.2	.	0.05	0.097	.	(0.024)	.	
SGT G7	72.64	1.50	.	.	11.03	.	0.044T	0.43	.	0.14	13.90	.	0.19T	0.042	.	.	0.07	
BCS 525	72.55	0.167	.	0.0041	8.91	.	0.0166	0.087	.	4.28	13.43	.	0.284	Sr	O:0.0038	0.0045	.	Mn3O4: 0.0012
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)	.	

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Number	SiO2	Al2O3	B2O	BaO	CaO	Cr2O3	Fe2O3	K2O	Li2O	MgO	Na2O	PbO	SO3	TiO2	ZnO	ZrO2	LOI	Others
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	.	.	Sb2O3: 0.29
SGT G8	56.34	0.05	0.36	.	<0.02	.	0.010T	11.85	.	<0.02	0.23	30.59	.	0.02	.	.	0.21	As2O3: 0.32T
NCS DC61104	53.98	14.50	8.87	.	16.54	.	0.34	0.59	.	4.40	0.096	.	.	0.19	.	.	0.26	F: 0.54

GLASS

Analysis listed in mass %

= classe, where 1 = CRM and 2 = RM

#	Number	Type	SiO2	Al2O3	B2O3	BaO	CaO	CdO	K2O	MgO	Na2O	PbO	SO3	SrO	TiO3	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	SGT G10D	Soda-Lime	72.7	1.62	.	0.02	10.7	.	0.35	1.81	12.2	.	0.05	.	0.097	.
1	SGT G7D	Soda-Lime	72.64	1.50	.	.	11.03	.	0.43	0.14	13.90	.	0.19	.	0.042	.
1	SRM 620	Soda-Lime	72.08	1.80	.	.	7.11	.	0.41	3.69	14.39	.	0.28	.	0.018	.
1	SGT G11D	Soda-Lime	70.7	1.83	.	0.03	10.3	.	0.69	2.14	13.6	.	0.06	.	0.068	.
1	SGT G4D	Soda-Lime	69.49	3.02	0.19	.	4.24	.	0.57	<0.05	15.45	.	<0.05	.	0.041	3.28
1	SRM 1411	Borosilicate	58.04	5.68	10.94	5.00	2.18	.	2.97	0.33	10.14	.	.	0.09	0.02	3.85
1	SRM 1412	Multicomponent	42.38	7.52	4.53	4.67	4.53	4.38	4.14	(4.69)	4.69	4.40	.	4.55	.	4.48

Number	As2O3	Cl	Cr2O3	F	FeO	Fe2O3	Li2O	ZrO2		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	38 mm x 38	mm x ~6 mm
SGT G10D	.	.	0.020	.	.	0.325	.	(0.024)	1 Disc	40 mm Ø	
SGT G7D	.	.	.	.	.	0.044 (T.Fe)	.	.	1 Disc	40 mm Ø	LOI: 0.07
SRM 620	0.056	.	.	.	.	0.043	.	.	3 Plates	35 mm x	35 mm x 3 mm
SGT G11D	.	.	0.205	.	.	0.342	.	(0.015)	1 Disc	40 mm Ø	
SGT G4D	.	.	.	4.96	.	0.099	.	.	1 Disc	40 mm Ø	LOI: 0.22
SRM 1411	.	.	.	.	.	0.050	.	.	10 Plates	32 mm x 32	mm x 3 mm
SRM 1412	.	.	.	.	.	(0.031)	(4.50)	.	8 Plates	32 mm x	32 mm x 3 mm

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CRM **GLASS DISC**

Analysis listed in mg/kg except % for mass % 38 mm Ø x 4 mm

Number	Al%	As	Ba	Ca%	Cd	Ce	Co	Cr	Cu	Fe	K%	Mg%	Mn	Mo	Na%	Ni	P	Pb	Sb	Se	Si%	Sn	Sr	Ti	V	Zn	Zr
BAM S005C	0.587	81	102	7.43	47	80	33.2	10.8	86	295	0.595	1.37	69.6	215	10.33	41.3	(8.3)	182	103	(2.5)	33.1	72.9	134	101	189	157	544

CRM **GLASS DISC**

~40 mm Ø x ~3 mm	Analysis listed in mass %											Analysis listed in mg/kg									
Number	Si	Al	B	Ba	Ca	K	Li	Mg	Na	Sr	Zn	Ag	As	Cd	Cr	Fe	Ga	P	Pb	S	Sb	Se
SRM 1412a	27.68	4.63	1.23	0.102	2.85	3.27	1.86	2.33	2.93	3.42	3.10	80	84	72	59	88.1	<10	<5	176	(20)	138	(40)

CRM **TRACE ELEMENTS IN GLASS**

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

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 **IRON IN FLAT SODA LIME GLASS**

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

CRM **MULTI-ELEMENT GLASS DISCS**

Listed in mg/kg each unit contains uncertified 72% SiO2, 12% CaO, 14% Na2O, and 2% Al2O3 each sample is 4 wafers ~13 mm Ø

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

3 mm	1 mm	Mn	Nd	Ni	Pb	Rb	Sb	Sc	Sm	Sr	Th	Ti	Tl	U	Yb	Zn
SRM 610	SRM 611	485	.	458.7	426	425.7	.	.	.	515.5	457.2	(437)	(61.8)	461.5	.	(433)

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

CRM URANIUM IN GLASS

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

Number	U	
IRMM 540R	15.0	last

CRM GLASS SAND

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

Number	SiO2	Al2O3	BaO	CaO	Cr2O3	Fe2O3	K2O	MgO	MnO	Mn3O4	Na2O	P2O5	PbO	SO3	TiO2	ZrO2	LOI
BCS 531	99.74	0.0327	0.00112	0.0040	.	0.00636	0.0039	0.00132	0.00014	.	.	0.00082	Sr	O:0.00017	0.0160	.	.
BCS 516	98.73	0.513	0.0040	0.0243	0.0081	0.0596	0.127	0.0387	.	0.0012	0.0195	(0.013)	0.0127	.	0.175	(0.075)	0.24
BCS 528	95.62	2.447	0.0298	0.237	0.0008	0.1111	0.875	0.0887	.	.	0.101	(0.20)	0.0006	.	0.0486	(0.014)	0.271
SRM 1413	82.77	9.90	0.12	0.74	.	0.24	3.94	0.06	.	.	1.75	.	.		0.11	.	.
SRM 89 *	65.3	0.15	1.4	0.19	0.051	0.048	8.32	0.033	0.08	.	5.7	0.23	17.43	0.03	0.013	(0.004)	(0.32)
SRM 81a	.	0.66	.	.	0.0046	0.082	.	.	.	.	.	.	.	.	0.12	0.034	.
SRM 165a	.	0.059	.	.	.	0.012	.	.	.	.	.	.	.	.	0.011	0.006	.

* SRM 89 also contains As 2 O 3 : 0.04, As 2 O 5 : 0.36, Cl: 0.051

RM GRAVEL

Typical analysis listed in mass % 100g units

Number	SiO2	Al2O3	CO2	CaO	Co3O4	Cr2O3	Fe2O3	K2O	MgO	Mn3O4	Na2O	P2O5	S	TiO2	-H2O 900'C
DH 3610	98.80	0.234	.	0.008	.	0.030	0.419	0.014	.	0.009	<0.003	.	0.009	.	0.153
DH 3609	96.44	1.46	0.010	0.047	0.005	0.029	0.703	0.334	0.104	0.020	0.045	0.019	.	0.086	0.48

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HARDGROVE GRINDABILITY INDEX

Class	Set Number	HGI	HGI	HGI	HGI	Units
CRM	NCS AG82001g-4g	sample 1g: 35	sample 2g: 54	sample 3g: 72	sample 4g: 119	250 g of each 1d - 4d

RM **HARDGROVE GRINDABILITY INDEX**

Individually available in 1 kg units

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

CRM **HARDNESS TEST BLOCKS**

For NCS items, please indicate desired hardness when ordering

Number	Scale	Available Range	Units (mm)
NCS HBW	Brinell Hardness W	(8-650)	100 x 80 x 16
NCS HL	Leeb Hardness	(200-900)	90 Ø x 55
NCS HLG	Leeb Type G Hardness	(300-750)	120 Ø x 70
NCS HRA	Rockwell Hardness A	(20-88)	60 x 40 x 10
NCS HRB	Rockwell Hardness B	(20-100)	60 x 40 x 10
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

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Number	Scale	Available Range	Units (mm)
NCS HVM	Vickers Microhardness	(5-1000)	25 x 25 x 6

CRM **IMPACT**

Approximate analysis

Class	Number	Energy	Uncertainty	Temperature		Units	Type	
CRM	LNE 160J	160.0 J	4.8 J	n/a		5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
CRM	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	
CRM	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	
CRM	LNE 120J	121.7 J	3.5 J	n/a		5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
CRM	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	
CRM	LNE 70J	75.3 J	2.8 J	n/a		5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
CRM	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	
CRM	LNE 25J	21.1 J	0.9 J	n/a		5 pcs of 10 mm x 10 mm x 55 mm	CHARPY v-notch	
CRM	SRM 2115	13 - 25 J	1.4 J	21 ‘C	+/- 1’	5 pcs of 10 mm x 10 mm x 75 mm	IZOD beam	last of stock

CRM **LAYER THICKNESS**

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

Number	Material	Thickness	(+/-)	Layer 1	2	3	4	5	6	7	8
BCR 261T	Ta2O5 single layer	1.72 nm	0.07 nm	30 nm	material	.	.	.	.	.	.
BCR 261T	Ta2O5 single layer	5.40 nm	0.12 nm	100 nm	material	.	.	.	.	.	.

CRM **NANOSCALE LAYER THICKNESS**

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

CRM **LEAD PAINT FILMS**

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

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

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RM **ELECTROLYTIC MANGANESE**

Typical analysis 50 g units

Number	Al	C	Co	Cr	Cu	Fe	Mn	Ni	P	S	Si	Zn	-H2O@900'C
DH 7701	(0.0015)	0.120	0.0012	0.411	0.0070	2.07	95.85	0.0068	0.056	0.0160	1.09	0.0011	0.019

CRM **MANGANESE METAL POWDER**

Analysis listed in mass %

Number	Mn	C	Fe	N	P	S	Se	Si	Units
NCS HC25655	97.43	0.080	1.81	.	0.018	0.016	.	0.28	50 g
NCS HC26615	91.56	0.007	0.039	7.84	.	0.031	0.049	0.009	50 g

MELTING POINT

Class	Number	Form	Melting	point 'C
RM	501-951-1002	6 inch nickel wire	1455	
CRM	502-496-1029	6 inch gold wire	1062	17034

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	SiO2 > 99.99%	.	8.7	<0.1	.	.	.	.	0.42	<0.05	.	.	.	0.062
BAM RS 2	Al2O3 = 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)

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Number	Cu	Fe	Ga	Ge	Hg	In	K	La	Li	Mg	Mn	Mo	Na	Ni	Pb
BAM RS 6B	(<6)	71	.	.	.	.	.	.	.	60.17%	5.2	(<10)	.	3.3	(<5)

Continued

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

CRM IRON OXIDE

100g units	Analysis listed in mass %			Analysis listed in mg/kg														
Number	T.Fe	Cl	Mn	Al	Ca	Co	Cr	Cu	K	Mg	Mo	Na	Ni	P	Si	Sn	Ti	Zn
ECRM 686-1	69.44	0.095	0.231	407	97	19	182	38	24	27	7	58	127	78	83	25	14	4

CRM NICKEL OXIDE

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

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

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

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	last of stock

CRM SILICON OXIDE

Analysis listed in mass % except

Number	SiO2	Al2O3	CaO	Fe	MgO	MnO	TiO2	Units
IRSID 608-1	60.39	9.94	8.70	4.00	1.34	0.057	0.714	100 g

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CRM TITANIUM DIBORIDE

Analysis listed in mass %

powder 50g

Number	Ti	B	B2O3	Al	C	Ca	Cr	Fe	Mg	Mn	Mo	Ni	O	V	Zr	InsRes
BAM S012	68.3	30.7	0.35	0.0012	(0.169)	0.0044	0.0097	0.064	0.00016	0.00038	0.00117	0.0023	(0.48)	0.00102	0.0121	(0.22)

CRM VANADIUM PENTOXYDE

Analysis listed in mass %

NCS: 25-50 g units

SARM, VS: 100 g units

Number	V2O5	V2O4	V	Al2O3	C	CaO	Fe	Fe2O3	K	K2O	Na	Na2O	P	S	Si	SiO2	TiO2	Others
NCS HC26612a	98.99	.	.	.	.	.	0.078	.	.	0.12	.	0.58	0.022	(0.001)	0.080	.	.	As: (0.0008)
NCS HC19611	98.80	.	.	.	Cr:0.018	.	0.061	.	.	0.14	.	1.03	0.010	0.011	0.102	.	.	As:(<0.001)
NCS HC19610	96.68	.	.	.	Cr:0.099	.	0.43	.	.	0.18	.	0.96	0.007	0.014	0.40	.	.	As:(<0.001)
SARM 38	95.52	3.07	55.84	0.14	.	.	.	0.119	.	0.600	.	0.22	.	(0.0045)	.	0.11	.	MgO: 0.0037
VS R30	94.3	.	.	.	0.007	0.88	0.51	.	0.053	.	0.032	.	0.0064	0.0072	.	0.43	0.21	MnO: 2.58

CRM PARTICLE SIZE

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

CRM PARTICLE SIZE

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

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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

RM PLASTER

Analysis listed in mass % 100g units

Number	Al2O3	CaO	Fe2O3	K2O	MgO	Na2O	P2O5	SO3	SiO2	SrO	TiO2	LOI
BCS 202A	0.33	37.4	0.10	0.10	0.39	<0.03	<0.01	53	1.38	0.33	0.03	7.0

CRM POROUS MATERIAL

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

CRM POROUS MATERIALS AND SURFACE AREA

Number	Description	Units	ABET (m2/g) BET Specific Surface Area	Vp (cm3/g) Specific Pore Volume	D1 (nm) Hydraulic Pore Diameter	D2 (nm) Most Frequent Pore Diameter	D3 (nm) Most Frequent Pore Diameter	(nm) Median Pore Width
BAM P 109	Activated Carbon	10g	1396	.	.	.	.	.
BAM P 105	Glass Material	10g	198.5	0.2327	4.69	4.38	5.80	.
BAM P 115	Titanium Dioxide	12g	147.3	0.214	5.79	4.75	5.40	.
BAM FD107	Faujasite Zeolite	10g	.	0.217 cm3/g-1	.	.	.	0.86

Number	Description	Units	(nm) Mean Pore Radius	(nm) Most Frequent Pore Radius	(cm /g) Specific Surface Area	(mm /g) Pore Volume 100 Mpa	(mm /g) Pore Volume 195 Mpa	(mm /g) Pore Volume 200 Mpa	(mm /g) Pore Volume 395 Mpa
BAM PM 101	SiO2	10g	.	.	0.177	.	.	.	.
BAM PM 102	Alpha-Al2O3	10g	.	.	5.41	.	.	.	.
BAM FD 120	Alpha-Al2O3	10g	228.0	232.2	.	545.0	546.7	546.8	548.1
BAM FD 121	Porous glass	12g	15.1	15.3	.	621.8	621.9	621.9	624.6
BAM FD 122	Porous glass	15g	139.0	140.2	.	919.7	922.5	922.6	924.4

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REFRACTORIES

= class, where 1 = CRM and 2 = RM

#	Number	SiO2	Al2O3	C	CO2	CaO	Fe2O3	K2O	MgO	MnO	Mn3O4	Na2O	P2O5	S	SO2	TiO2	ZrO2	LOI
1	IPT 63	96.28	0.48	.	.	2.21	0.52	0.043	0.18	0.008	.	0.013	0.013	.	.	0.030	(0.002)	0.17
1	IPT 51	55.0	40.3	.	.	0.06	1.19	0.69	0.20	.	.	0.09	0.09	.	.	2.19	0.070	0.16
1	SRM 76a	54.9	38.7	.	.	0.22	1.60	1.33	0.52	.	.	0.07	0.120	.	.	2.03	.	(0.34)
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
1	SRM 77a	35.0	60.2	.	.	0.05	1.00	0.090	0.38	.	.	0.037	0.092	.	.	2.66	.	(0.22)
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	.	.
1	IPT 57	24.3	71.5	.	.	0.05	1.25	0.83	0.13	.	.	0.35	0.054	.	.	1.19	0.20	0.20
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	SRM 78a	19.4	71.7	.	.	0.11	1.2	1.22	0.70	.	.	0.078	1.3	.	.	3.22	.	(0.42)

Number	Co3O4	CuO	Cr2O3	HfO2	La2O3	Li2O	NiO	SrO	V2O5	WO3	Y2O3	Units
IPT 63	.	.	.	.	.	(0.0005)	.	.	.	.	.	80 g
IPT 51	.	.	.	.	.	0.018	.	.	.	.	.	80 g
SRM 76a	.	.	.	.	.	0.042	.	0.037	.	.	.	75 g
DH 2612	.	.	0.385	.	.	.	0.032	.	0.027	.	.	100 g
SRM 77a	.	.	.	.	.	0.025	.	0.009	.	.	.	75 g
DH 2613	.	0.004	0.140	.	.	.	.	.	0.020	.	.	100 g
IPT 57	.	.	.	.	.	0.008	.	0.009	.	.	.	80 g
DH 2609	.	.	.	.	.	.	.	.	.	.	.	100 g
SRM 78a	.	.	.	.	.	0.12	.	0.25	.	.	.	75 g

RM RICE STRAW ASH - THERMOSTILL

Typical analysis 100g units

Number	SiO2	Al2O3	C	CO2	CaO	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	SO3	TiO2	-H20 900'C
DH 5704	92.49	0.198	3.60	0.008	0.30	0.090	0.97	0.362	0.062	0.070	0.273	0.177	0.004	1.38
DH 5708	86.67	1.15	3.83	0.094	0.97	0.931	0.872	3.10	0.117	0.085	0.226	0.255	0.126	1.70
DH 5705	76.31	0.363	4.33	0.265	2.51	2.89	0.653	9.60	0.245	0.116	0.123	0.409	0.217	2.32

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RM **SAND FOR SLIDING GATES**

Typical analysis listed in mass % 100g units

Number	SiO2	Al2O3	C	CaO	Cr2O3	Fe	K2O	MgO	Mn3O4	Na2O	NiO	P2O5	S	TiO2	V2O5	WO3	ZrO2	-H2O 900°C
DH 4501	72.21	4.92	0.607	0.025	11.53	5.14	0.633	2.40	0.065	0.059	0.053	0.008	.	0.195	0.102	.	.	0.204
DH 4502	65.97	5.69	0.47	0.038	14.75	6.31	0.693	3.24	0.074	0.062	0.033	0.007	0.010	0.203	0.110	.	.	0.177
DH 4507	27.95	11.00	0.326	0.096	33.41	14.51	.	7.29	0.179	.	0.090	.	CO2:0.013	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

SILICA BRICK

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

#	Number	SiO2	Al2O3	BaO	CaO	Cr203	Fe2O3	K2O	Li2O	MgO	MnO	Na2O	P	P2O5	TiO2	LOI
1	ECRM 777-1	95.06	0.795	.	2.826	.	0.330	0.154	.	0.071	.	0.02	.	.	0.444	.
1	ECRM 776-1	62.76	29.28	0.122	0.31	0.022	1.43	2.92	0.019	0.476	.	0.488	.	0.062	1.62	.
1	SRM 198	.	0.16	.	2.71	.	0.66	0.017	0.001	0.07	.	0.012	.	0.022	0.02	0.21
1	SRM 199	.	0.48	.	2.41	.	0.74	0.094	0.002	0.13	.	0.015	.	0.015	0.06	0.17

SILICEOUS MATERIAL

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

#	Number	SiO2	Al2O3	CaO	Cr2O3	Fe2O3	K2O	MgO	MnO	Na2O	P2O5	TiO2	LOI	Units	Other
1	BCS 313/2	99.73	0.068	0.0160	BaO:0.00067	0.0229	0.0108	0.0038	0.00032	0.0057	.	0.0243	.	100 g	SrO: 0.00024
1	NCS DC60116a	98.32	1.10	0.038	0.00030	0.076	0.15	0.026	0.0013	0.076	(0.0069)	0.023	0.14	50 g	
1	GBW 03113	95.74	2.36	0.17	0.00054	0.21	0.67	0.098	(0.0033)	0.25	(0.0076)	0.036	0.35	50 g	
1	SRM 2696	95.61	0.2080	0.426	.	(0.055)	0.652	0.235	0.032	(0.129)	(0.0863)	.	(2.11)	70 g	ZnO:0.051
1	NCS DC60117a	94.41	3.20	0.094	0.00034	0.088	1.26	0.025	0.0011	0.47	(0.0070)	0.019	0.27	50 g	
1	GBW 03114	89.59	5.48	0.34	0.0012	0.48	2.07	0.16	(0.010)	1.09	(0.014)	0.102	0.53	50 g	
2	CERAM CEB1	74.0	16.2	0.52	BaO:0.05	0.48	1.75	0.16	.	0.71	0.14	0.34	5.60	25 or 100g	SrO: 0.02
1	GBW 03117	71.25	2.56	6.37	.	0.18	1.10	3.98	.	13.77	.	0.057	0.44	50 g	

RM **CERAMIC POWDER**

Number	SiO2	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	TiO2	Ba	Co	Cr	Cu	Ni	Sc	Zn	Units
SARM 69	66.6	14.4	2.37	7.18	1.96	1.85	0.129	0.777	0.0518	0.0028	0.0223	0.0046	0.0053	0.0020	0.0068	100 g

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Number	SiO2	Al2O3	CaO	Fe2O3	K2O	MgO	MnO	TiO2	Ba	Co	Cr	Cu	Ni	Sc	Zn	Units

CRM SYNTHETIC SILICATE WITH TRACE ELEMENTS

Analysis listed in mg/kg 70g units

Material base: SiO 2 72%, Al 2 O 3 15%, Fe 2 O 3 4%, CaMg(CO 3) 2 pure dolomite 4%, Na 2 SO 4 2.5%, K 2 SO 4 2.5%

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

Continued

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

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CRM SILICON METAL POWDER

Analysis listed in mass %

IPT: 60 g units NCS: 50 g units SRM: 40 g units

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

CRM SILICON CARBIDE

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)	SiO2(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)
BAM S008	29.9	0.045	.	(<0.03)	(<0.01)	0.0047	0.00030	0.00025	0.000016	0.000010	0.00048	.	0.000007
ECRM 780-1	26.381	.	63.5	.	.	1.86 (T)	.	0.84	.	.	1.30 (T)	(0.0112)	0.051
BCS 360	23.53	(0.085)	60.8	(0.54)	.	6.52	.	0.115	.	.	(0.19)	.	.
BCS 359	23.46	(0.061)	67.6	(0.32)	.	0.118	.	0.108	.	.	0.175	.	.

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

CRM SILICON NITRIDE

Analysis listed in mass % Analysis listed in mg/kg

Number	Si	N	Al	C	Ca	Fe	O	Co	Mg	Cr	Mn	Na	Ni	Ti	W	Zr	â-phase of Si3N4	Units
							INDIVIDUAL											
SRM 8983	.	39.23	.	0.107	.	.	1.20	.		.	.	.	.	.	.	.	.	4.5 g

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Number	Si	N	Al	C	Ca	Fe	O	Co	Mg	Cr	Mn	Na	Ni	Ti	W	Zr	â-phase of Si3N4	Units
NMIJ 8004a	59.226	38.485	0.07397	.	0.00727	0.01969	.	.	10.29	.	2.987	.	2.485	8.519	.	2.146	.	25 g
BAM ED101	.	38.1	0.0469	0.162	0.00141	0.00795	(1.91)	43.5	4.3	.	.	7.59	.	.	41.3	.	7.43	last 50 g

CRM BORON NITRIDE

Analysis listed in mass % T = Total AO = adherent oxyde 50g units

Number	B.T	B.AO	N	Al	C	Ca	Co	Cr	Fe	H2O	Mg	Na	O	Si	Ti
BAM ED103	43.5	0.070	55.6	0.00070	(0.018)	0.0273	(<0.00001)	0.00047	0.00150	(<0.1)	0.0056	0.00123	0.68	0.0017	0.00049

CRM SILICOALUMINIUM

Analysis listed in mass %

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

CRM SILICOBARIUM

Analysis listed in mass % 50g units

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

SILICOCALCIUM

= class, where 1 = CRM and 2 = RM

#	Number	Ca	Si	Al	Ba	C	Cr	Cu	Fe	Mg	Mn	Mo	Ni	P	S	Ti	Units
1	NCS HC93613	31.67	56.20	1.77	.	1.30	.	.	5.58	.	.	.	.	0.018	0.088	.	50 g
1	BS 119	31.3	62.9	0.44	.	0.30	.	.	3.03	.	.	.	.	0.034	0.012	17025	100 g
1	NCS HC37620	30.70	60.09	Sol.Al:1.09		0.68	.	.	.	.	.	.	.	0.017	0.033	.	50 g
1	NCS HC11604a	30.45	56.02	1.97	.	0.94	.	.	6.93	.	0.037	.	.	0.054	0.073	.	50 g
2	DH 0402	28.48	58.68	1.13	.	.	0.010	0.014	6.74	0.049	0.051	.	.	0.014	.	0.055	50 g
1	NCS HC93627	28.02	57.43	1.76		1.02	.	.	6.94	.	.	.	.	0.030	0.045	.	50 g
1	NCS HC11619	27.15	61.11	2.15	.	0.55	.	.	6.61	.	0.053	.	.	0.048	0.029	.	50 g
1	NCS HC37621	25.25	60.19	Sol.Al:1.55		0.71	.	.	.	.	.	.	.	0.031	0.020	.	50 g
1	NCS HC11605	13.22	53.46	2.34	14.02	0.385	0.054	0.079	13.57	0.022	0.075	Sr:0.235	0.023	0.014	0.039	.	60 g

CRM **SILICOCHROMIUM**

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

SILICOMANGANESE

= class, where 1 = CRM and 2 = RM

#	Number	Mn	Si	Fe	C	Co	Cr	Cu	Ni	P	S	Ti	V	Units
1	BS SiMn-1	73.2	16.0	8.2	1.80	(0.051)	0.019	(0.042)	(0.083)	0.278	0.016	(0.19)	(0.04)	100 g
1	NCS HC25605b	69.77	14.20	.	2.21	.	.	.	.	0.153	0.0052	.	.	50 g
1	NCS HC25657	67.96	25.03	.	0.58	.	.	.	.	0.065	0.011	0.18	.	50 g
1	NCS HC26611b	67.44	18.24	.	1.24	.	.	.	.	0.080	0.009	.	.	50 g

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#	Number	Mn	Si	Fe	C	Co	Cr	Cu	Ni	P	S	Ti	V	Units
1	NCS HC28618	67.40	19.34	11.65	1.05	0.017	0.045	0.051	0.036	0.107	0.017	0.255	0.063	50 g
1	NCS HC25605c	67.20	21.87	10.01	0.456	0.020	0.029	0.019	0.013	0.132	0.0076	0.175	0.040	50 g
1	NCS HC37612	67.02	18.96	.	1.10	.	.	.	.	0.178	0.016	0.276	.	50 g
1	NCS HC18603	66.70	17.21	.	1.70	.	.	.	.	0.183	0.025	.	.	50 g
1	NCS HC93619	66.40	17.55	.	1.65	.	.	.	.	0.137	0.025	.	.	50 g
1	NCS HC11603b	66.37	17.63	.	1.34	.	.	.	.	0.065	0.008	.	.	100 g
1	NCS HC25605a	66.30	18.28	.	1.09	.	.	.	.	0.145	0.010	0.18	.	50 g
1	NCS HC19607	66.20	18.41	.	1.56	.	.	.	.	0.126	0.022	.	.	50 g
1	NCS HC25640	65.85	24.74	.	0.181	.	.	.	.	0.104	0.010	.	.	50 g
1	NCS HC93625	65.74	17.19	.	1.66	.	.	.	.	0.151	0.026	.	.	50 g
1	NCS HC93637	65.70	17.54	.	1.80	.	.	.	.	0.023	0.023	.	.	100 g
1	NCS HC11603a	65.67	17.49	.	1.33	.	.	.	.	0.065	0.011	.	.	100 g
1	NCS HC37605	65.51	17.46	.	1.56	.	.	.	.	0.149	0.019	0.164	.	50 g
1	NCS HC25640a	65.50	24.47	.	0.197	.	.	.	.	0.117	0.0079	.	.	50 g
1	NCS HC25654	65.29	19.26	.	0.876	.	.	.	.	0.109	0.0122	0.19	.	50 g
2	DH 0106	65.24	18.38	14.60	1.21	0.013	0.011	0.017	0.042	0.080	0.010	0.121	0.015	50 g
1	NCS HC28617	64.97	17.59	15.16	1.57	0.035	0.055	0.096	0.092	0.127	0.018	0.221	0.060	50 g
1	NCS HC93624	64.86	16.87	.	1.79	.	.	.	.	0.120	0.024	.	.	50 g
1	NCS HC93618	63.91	19.04	.	1.13	.	.	.	.	0.140	0.022	.	.	50 g
1	NCS HC93626	63.80	16.42	.	1.91	.	.	.	.	0.097	0.020	.	.	50 g
1	NCS HC28616	62.53	14.33	20.00	2.28	0.048	0.060	0.080	0.167	0.205	0.020	0.222	0.095	50 g
2	DH 0302	62.17	27.95	8.69	0.092	0.054	0.016	0.031	0.032	0.089	.	0.288	0.015	50 g
1	NCS HC26621	61.49	27.49	.	0.039	.	.	.	.	0.072	0.009	0.24	.	50 g
2	DH 0303	60.60	30.66	7.52	0.029	0.023	0.024	0.016	0.039	0.059	.	0.444	0.015	50 g
1	NCS HC25641	60.29	27.88	.	0.082	.	.	.	.	0.078	0.0069	0.41	.	50 g
1	NCS HC37606b	60.13	13.87	.	2.26	.	.	.	.	0.42	0.040	0.25	.	50 g
1	NCS HC25646	59.34	32.90	.	0.018	.	.	.	.	0.043	0.0034	0.24	.	50 g
1	NCS HC26620	54.97	19.15	.	0.40	.	.	.	.	0.060	0.011	0.24	.	50 g

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The below continuation shows only the samples with more data

Number	As	B	Ca	Pb	Sb	Zr	
BS SiMn-1	(0.010)	(0.014)	(0.05)	(0.0005)	(0.002)	(0.0007)	17025 many more values on certificate
NCS HC28618	0.0099	.	.	0.0007	0.0004	.	
NCS HC25605c	.	0.010	.	.	.	.	
NCS HC25605a	.	0.0063	.	.	.	.	
NCS HC25654	.	0.022	.	.	.	.	
NCS HC28617	0.010	.	.	0.0005	0.0009	.	
NCS HC28616	0.015	.	.	0.0012	0.0025	.	
DH 0302	.	.	.	.	.	0.008	
NCS HC25641	.	0.021	.	.	.	.	
NCS HC25646	.	0.048	.	.	.	.	
NCS HC26620	.	Al:0.015	.	.	Mo:(0.0009)	.	

SILICOZIRCONIUM

Number	Zr	Si	Fe	Al	C	Ca	Cr	Cu	Hf	Mn	N	Ni	P	S	Ti		Units
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 %

100g 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
IRSID 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	SiO2	Al2O3	C	Fe	FeO	K2O	MgO	MnO	Na2O	P2O5	S	TiO2	Units
2	BS Slag 2	44.6	36.9	10.3	(0.2)	0.24	.	0.16	5.9	0.19	0.16	.	1.16	0.204	50 g
1	IRSID 803-1	43.28	36.38	13.19	.	0.613	.	.	4.05	0.713	.	0.270	0.767	0.502	100 g
1	IRSID 802-1 *	42.84	32.43	16.12	.	0.576	.	.	4.76	0.593	.	0.250	0.714	0.611	100 g

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#	Number	CaO	SiO2	Al2O3	C	Fe	FeO	K2O	MgO	MnO	Na2O	P2O5	S	TiO2	Units
1	CAN SL-1	37.48	35.73	9.63	.	.	0.92	(0.51)	12.27	(0.86)	(0.39)	.	1.26	(0.38)	200 g
2	BS 100A	37.0	35.3	10.10	(0.2)	0.29	.	(0.5)	12.85	0.33	(0.2)	0.0034	1.77	0.48	100 g

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

STEEL MAKING SLAG

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

#	Number	CaO	T.Ca	CaF2	SiO2	Al2O3	Cr2O3	F	Fe	FeO	K2O	MgO	MnO	Na2O	P2O5	s.P2O5	S	TiO2	V2O5	
1	JK S11 *	.	60.0	.	26.8	2.85	0.17	(7.9)	.	(0.2)*	.	4.7	0.12	.	(<0.005)	.	0.30	0.95	(<0.01)	
2	BS 101/3	54.4	.	.	18.8	1.42	.	.	10.9	.	0.005	3.0	5.0	0.027	0.74	.	0.18	(0.9)	.	
1	CMSI 1745	.	37.64	1.41	14.91	1.78	.	.	13.38	12.33	.	9.28	1.86	.	1.02	.	0.097	0.42	.	
2	BS 101/1	52.9	.	.	23.3	0.70	.	.	5.8	.	0.008	8.7	3.47	0.013	0.76	.	0.19	0.8	.	
1	BS 101/4	52.5	.	.	16.7	0.86	.	.	(13.3)	.	0.007	4.8	4.79	0.018	0.81	.	0.15	1.16	.	17025
1	BCS 381	49.0	.	.	8.78	0.67	0.33	.	13.3	3.69	.	1.03	3.16	.	15.7	15.2	0.19	0.35	0.94	
1	IRSID 805-1	48.92	.	.	6.63	0.616	.	.	14.87	.	.	1.86	2.05	.	16.20	.	0.092	0.342	0.918	
2	BS 101/2	47.6	.	.	16.9	0.91	.	.	15.1	.	0.008	7.0	4.8	0.031	0.63	.	0.20	(0.8)	.	
1	IRSID 806-1	46.13	.	.	11.72	0.901	.	.	17.89	.	.	3.02	5.94	.	2.25	.	0.110	0.504	0.514	
2	BS 101/5	46.1	.	.	15.2	0.74	.	.	19.4	.	0.0044	5.0	5.7	(0.04)	0.71	.	0.12	1.2	.	
1	ECRM 879-1	43.70	.	.	8.82	0.803	0.477	0.368	18.97	.	.	2.19	4.45	.	8.46	7.59	0.102	0.535	0.738	
1	CMSI 1744	26.73	.	.	8.91	3.92	.	.	34.33	36.55	.	12.15	2.01	.	0.87	.	0.107	0.32	.	
1	VS W4/4	25.5	.	.	16.7	3.62	.	.	23.2	25.5	.	18.3	4.17	.	P: 0.259	.	0.037	1.02	.	
1	SARM 77	3.64	.	.	26.8	27.5	12.5	.	5.31T	.	.	22.99	.	.	.	.	0.32T	.	.	

* JK S11 lists total Fe as FeO

BLAST FURNACE SLAG

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

#	Number	CaO	Ca	SiO2	Al2O3	MgO	Fe	FeO	K2O	Mn	MnO	Na2O	P	P2O5	S	TiO2
2	DH 3226	41.95	.	35.92	13.01	6.37	0.174	.	0.407	0.236	.	0.265	.	0.005	1.17	0.614
2	DH 3227	41.07	.	37.50	12.09	6.314	0.196	.	0.527	0.433	.	.	.	.	0.989	0.700
2	DH 3231	40.85	.	37.31	12.5	6.225	0.252	.	0.43	0.362	.	.	.	.	1.069	0.776

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#	Number	CaO	Ca	SiO2	Al2O3	MgO	Fe	FeO	K2O	Mn	MnO	Na2O	P	P2O5	S	TiO2
2	DH 3225	.	28.59	38.06	12.80	7.63	0.385	.	0.115	0.129	.	0.092	.	.	1.61	0.247
2	DH 3219	.	28.24	39.26	10.00	7.47	0.383	.	0.744	0.981	.	0.299	.	0.026	0.832	0.533
2	DH 3224	.	27.10	37.88	12.86	7.03	2.53	.	0.170	0.145	.	0.102	.	.	1.55	0.265
1	NCS HC15803	39.66	.	35.00	13.93	5.61	1.76	2.16	0.42	.	0.175	0.26	0.0056	.	0.98	0.51
1	NCS HC28805	39.20	.	34.91	12.80	9.27	0.76	.	.	.	0.090	.	.	0.012	0.90	0.42
1	DH 3234	37.26	.	41.51	11.32	5.37	0.742	.	0.890	0.971	.	.	.	.	0.90	0.618
1	NCS HC28804	37.13	.	31.18	16.26	7.52	2.01	.	.	.	1.23	.	.	0.043	0.79	0.58
2	DH 3232	36.59	.	39.03	11.81	8.12	0.417	.	1.228	0.671	.	0.437	.	.	1.06	0.589
2	DH 3233	36.30	.	41.53	11.53	5.27	1.72	.	0.462	0.907	.	0.193	.	0.026	0.804	0.621
1	NCS HC28803	36.26	.	31.82	16.85	9.92	0.92	.	.	.	0.78	.	.	0.018	0.75	0.52
2	DH 3228	35.66	.	38.69	11.93	8.56	0.332	.	1.235	1.342	.	0.388	.	0.014	0.812	0.638
2	DH 3235	34.35	24.55	39.33	15.68	6.289	2.87	.	0.090	0.341	.	0.103	.	0.015	1.539	0.229
1	NCS HC19805	25.57	.	22.67	13.85	9.05	0.80	.	.	.	0.74	.	.	.	0.234	25.28
1	ECRM 883-1 *	.	21.32	16.67	6.55	8.86	0.9820	.	0.393	0.546	.	0.316	0.0033	.	1.0885	1.3331

Number	BaO	C tot.	CO2	Cr2O3	Sr	SrO	V2O5	Zn	Zr	ZrO2	-H2O 900'C
DH 3226	0.093	.	.	.	0.064	.	.	.	.	0.039	.
DH 3227	0.094	.	.	.	.	0.054	.	.	.	0.039	.
DH 3231	.	.	.	.	.	0.055	.	.	.	0.044	.
DH 3219	.	0.028	0.060	.	.	0.045	.	.	.	.	0.07
DH 3224	0.083	.	.	.	.	0.052	.	.	.	0.043	.
DH 3235	0.107	.	.	0.005	.	0.072	0.004	.	.	0.064	.
NCS HC15803	.	.	.	Cu:0.0013	.	.	.	.	.	.	.
NCS HC28805	.	.	.	.	.	.	.	.	.	.	60 g
DH 3234	0.087	.	.	0.018	.	0.048	0.016	.	.	.	.
NCS HC28804	.	.	.	.	.	.	.	.	.	.	60 g
DH 3232	0.087	.	.	.	.	0.076	.	.	.	0.022	.
DH 3233	0.082	.	.	0.021	.	0.047	0.019	.	.	0.046	.
NCS HC28803	.	.	.	.	.	.	.	.	.	.	60 g
DH 3228	0.097	.	.	.	.	0.062	0.007	.	.	0.035	.

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Number	BaO	C tot.	CO2	Cr2O3	Sr	SrO	V2O5	Zn	Zr	ZrO2	-H2O 900'C
DH 3225	0.086	.	.	.	.	0.053	.	.	.	0.046	
NCS HC19805	.	.	.	.	.	.	0.44	.	.	.	.
ECRM 883-1 *	0.0436	.	Ni:0.00053	0.0130	0.0380	.	0.122	.	0.0276	.	.

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

CONVERTER SLAG

= class, where 1 = CRM and 2 = RM

#	Number	CaO	Ca	SiO2	Al2O3	Fe	K2O	MgO	Mn	MnO	Nb2O5	P2O5	S	TiO2	V2O5
2	DH 3911	50.50	.	8.58	0.933	18.51	.	1.54	4.42	.	0.055	2.65	0.160	0.350	0.590
2	DH 3908	47.13	.	12.70	1.096	18.96	0.008	2.513	4.31	.	0.072	1.488	0.110	0.558	0.273
1	NCS HC28810	.	33.35	14.45	1.76	16.52	.	7.10	.	2.78	.	1.60	0.120	1.25	.
1	NCS HC28809	.	32.65	15.40	4.38	13.50	.	7.75	.	2.30	.	1.67	0.195	1.02	.

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

CRM FLURIONE SLAG

100g units

Number	F	T.CaF2	Ca	CaO	AlO3	C	FeO	MgO	MnO	P	SiO2	TiO2	V2O5
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)

MANGANESE SLAG

Analysis listed in mass %

DH: RM, 100 g units VS: CRM, 150 g units

Number	Mn	Mn3O4	Al2O3	C	CaO	CuO	Fe	Fe2O3	K2O	MgO	P	P2O5	S	SiO2	ZnO
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	.

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Number	Mn	Mn3O4	Al2O3	C	CaO	CuO	Fe	Fe2O3	K2O	MgO	P	P2O5	S	SiO2	ZnO
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	CO2	Cr2O3	Na2O	SnO2	SrO	TiO2	Y2O3	ZrO2	-H2O@900'C
DH 7403	(0.475)	0.032	0.007	0.433	.	0.083	0.100	(0.009)	0.039	0.062
DH 7404	0.925	.	0.007	(0.229)	.	0.109	0.164	0.014	0.035	.
DH 7402	.	.	0.086	0.133	0.386	.	0.274	.	0.024	0.077

CRM PHOSPHATE SLAG

Number	total P2O5	citric acid sol. P2O5	CaO	SiO2	Units
BAM 826-1	14.65	10.73	46.48	8.96	100 g
BAM 827-1	20.70	18.79	47.38	6.21	100 g

CRM SLAG

Analysis listed in mass %

Number	Al2O3	C	Ca	CaO	F	Fe	FeO	K2O	MgO	Mn	MnO	Na2O	P	P2O5	S	SiO2	TiO2	V2O5	Units
NCS HC18809	21.94	.	35.21	.	.	0.30	.	.	6.55	.	0.18	.	.	0.024	0.69	16.50	1.03	.	100 g
NCS HC28808	18.05	.	.	35.71	.	0.48	0.55	0.42	10.92	.	0.542	0.36	.	0.027	0.885	29.62	0.753	.	50 g
NCS HC28806	16.92	.	.	37.53	.	0.211	0.35	0.46	10.80	.	0.414	0.39	.	0.013	1.15	30.36	0.762	.	50 g
NCS HC18807	16.48	.	.	35.77	.	1.10	.	.	8.77	.	0.74	.	.	0.009	0.90	33.04	0.73	.	100 g
NCS HC18806	14.11	.	.	38.84	.	0.60	.	.	8.45	.	0.30	.	.	0.008	1.13	32.75	2.63	.	100 g
NCS HC25801	4.91	.	.	7.79	.	1.77	.	.	3.99	35.31	.	.	0.0056	.	0.66	33.47	.	.	50 g
NCS HC28807	3.67	.	32.32	.	0.76	13.54	10.44	0.033	7.27	.	4.06	0.057	.	1.72	0.134	14.54	1.13	.	50 g
NCS HC18808	1.25	.	24.10	.	.	25.55	.	.	11.66	.	3.34	.	.	2.00	0.13	13.44	2.22	.	100 g
NCS HC15804	.	0.014	.	.	.	0.22	.	.	.	44.42	.	.	0.0032	.	0.32	25.16	.	.	100 g

CRM TIN SLAG

Number	Sn	Al2O3	CaO	FeO	SiO2	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

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CRM **TITANIUM SLAG**

100g units

Number	TiO2	Al2O3	CaO	Cr2O3	T.Fe	MgO	MnO	S	SiO2	V2O5
NCS HC19815	94.69	2.62	0.287	.	1.02	2.67	1.21	0.166	1.92	.
NCS HC19814	84.94	3.04	1.83	.	1.08	7.27	0.74	0.247	4.13	.
NCS HC19813	77.66	2.64	1.52	.	6.43	5.28	1.08	0.118	5.50	.

RM **TUNDISH SLAG**

Typical analysis listed in mass %

100g units

Number	CaO	SiO2	MgO	Al2O3	CO2	Fe2O3	K2O	MnO	Mn3O4	Na2O	P2O5	S	SO3	TiO2	-H2O 900°C
DH 6604	1.609	24.75	64.45	1.884	0.35	4.62	0.089	.	0.098	0.516	0.084	.	0.026	0.141	1.02
DH 6606	1.37	27.46	62.63	1.30	0.16	4.93	0.070	0.093	.	.	0.055	0.022	.	0.103	1.15
DH 6605	.	.	.	.	0.40179	.	.	.	.	0.347	.	.	.	.	1.15451

Number	C Tot	Cr2O3	NiO
DH 6604	0.471	0.255	0.165
DH 6606	.	.	.
DH 6605	.	.	.

VACUUM SLAG

= class, where 1 = CRM and 2 = RM

100g units

Number	Al2O3	CaO	Cr	Cr2O3	Fe	K2O	MgO	Nb2O5			S	SiO2	SrO	TiO2	V2O5	ZrO2
2 DH 5121	23.56	51.14	0.039	.	1.27	0.011	11.98	Mn: 0.769	0.109	P2O5: 0.028	0.369	7.63	0.031	0.869	0.012	0.232
2 DH 5120	20.33	52.90	.	0.039	1.55	0.011	11.68	Mn: 1.27	0.202	P2O5: 0.039	0.281	8.13	0.032	1.28	0.016	0.230
1 NCS HC19818	4.05	1.57	.	3.03	28.96	.	3.28	MnO: 7.80	.	P: 0.037	0.053	15.93	.	11.53	17.69	.
1 NCS HC19817	3.84	1.96	.	2.40	30.48	.	3.34	MnO: 6.87	.	P: 0.054	0.054	16.90	.	10.87	16.18	.

CRM **SLUDGE**

Analysis listed in mg/kg except % which is mass % ERM: 30 g 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

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Number	Type	Ag	Al%	As	Ba	Be	Bi	Ca%	Cd	Ce	Cl	Co	Cr	Cu	Fe%	Ga	Hg	In
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 143R	amended soil	.	.	.	.	.	.	.	71.8	.	.	12.3	(577)	130.6	.	.	1.10	.
ERM-CC144	sewage	.	(1.9)	7.7	.	.	.	(3.1)	14.5	.	.	6.5	168	348	3.29	.	5.9	.

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 143R	.	.	.	.	(904)	.	.	.	299	.	179.7	.	.	(0.6)	.	.	.	.	.	1055
ERM-CC144	(0.29)	.	.	(0.38)	352	.	.	(0.18)	91	.	157	.	(P2O	5:3.8%)	(SiO	2:7.3%)	.	(0.15)	.	980

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

RM SODA ASH

Analysis listed in mass % 100g units

Number	Na2CO3	NaCl	Fe2O3	Na2SO4
BCS 526	99.74	0.126	0.0005	0.008

CRM SURFACE AREA

data listed in m2/g

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

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CRM TENSILE CREEP

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

CRM TENSILE STRENGTH AND HARDNESS

Data shows estimates of (material, measurement) uncertainty

Number	ksi Tensile Strength	ksi Yield Strength	% Total Elongation	% Reduction	Hardness	Material	Units
BS TRM-3	98.2 (0.6, 5.5)	44.7 (0.3, 3.1)	52.0 (1.2, 10.8)	57.1 (1.9, 17.3)	HRB 86.3 (0.7, 6.3)	304 steel	sheet 30 cm x 30 cm
BS TRM-1	93.3 (0.3, 2.1)	89.3 (0.5, 3.2)	15.6 (0.2, 1.6)	55.0 (0.4, 2.7)	.	1018 steel	rod 25 mm Ø x 158 mm
BS TRM-4	36.0 (0.1, 0.8)	28.4 (0.1, 0.7)	11.4 (0.1, 1.1)	(37.0)	HR15T 71.9 (0.6, 5.4)	5056 aluminum	sheet 30 cm x 30 cm

CRM TENSILE STRENGTH

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

CRM BORON CARBIDE

Analysis listed in mass %

Analysis listed in mg/kg

100 g

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

CRM CHROMIUM CARBIDE

Analysis listed in mass %

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

CRM SILICON CARBIDE

Analysis listed in mass %

Number	SiC	Free C	Si	SiO2	Al2O3	CaO	Fe2O3	MgO	Units
NCS DC93028	97.87	0.48	0.18	0.55	0.10	0.055	0.39	0.008	50 g
NCS DC93026	84.09	1.71	1.45	6.15	1.41	0.17	0.86	0.082	50 g

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Number	SiC	Free C	Si	SiO2	Al2O3	CaO	Fe2O3	MgO	Units
NCS DC93027	90.86	3.48	0.24	2.00	0.77	0.47	1.12	0.039	50 g

CRM TUNGSTEN CARBIDE

Analysis listed in mass %

SRM 276b: 75 g units all others: 100 g units

Number	Grade	C	Free C	Co	Fe	Mo	Nb	Ni	Ta	Ti
ECRM	783-1 0.0022	W94-C6	6.188	(0.04)	.	.	.	.	.	.
NCS NS51001a		6.118	.	.	.	.	.	.	.	.
SRM 889	W75-Co9-Ta5-Ti4	(6.0)	.	9.50	(<0.05)	(<0.05)	(<0.05)	(<0.05)	4.60	4.03
SRM 887	W83-Co10	(5.5)	.	10.35	(<0.05)	(<0.05)	(<0.05)	(<0.01)	(<0.01)	(<0.05)
SRM 888	W64-Co25-Ta-5	(4.6)	.	24.7	(<0.05)	(<0.05)	(<0.05)	(<0.05)	4.77	(0.04)

CRM URBAN PARTICULATE MATTER

Analysis listed in mass % Org = organic Elem = elemental powder 2g

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

Analysis listed in mg/kg

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

CRM VANADIUM NITROGEN ALLOY

Analysis listed in mass %

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

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CRML ZIRCON CONCENTRATE

DSU = 50g BCS = 100g

Number	ZrO2+HfO2	SiO2	Al2O3	CaO	Fe2O3	K2O	MgO	Na2O	P2O5	SnO2	TiO2	LOI
BCS 204A	53.8	37.6	0.74	0.15	0.18	0.017	0.012	0.014	0.77	1.69	2.22	0.50

CRM ZIRCONIA - YTRIUM STABILIZED ZIRCONIUM OXIDE

Number	Al	Ca	Fe	Hf	Mg	P	Si	Th	Ti	U	Y	monoclinic ZrO2	Units
ERM-ED105	0.0660	0.0242	0.0095	1.535	0.00129	(<0.0075)	0.0195	0.0112	0.0497	0.0292	6.11	(1.94)	powder 47 g

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