MBH
Reference Materials

MBH

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UKAS QUALITY MANAGEMENT 015
An ISO 9001 Certified Company

Introduction

MBH Analytical Limited is a Reference material producer as defined by ISO Guide 34 and is one of the world's major producers of Certified Reference Materials.

The materials listed in this catalogue are selected to meet most of the requirements for chemical and spectrochemical analysis techniques. These include Optical Emission, Glow Discharge, XRF, ICP and AA spectroscopy as well as photometric and other 'wet' methods. This catalogue contains Reference Materials produced by, or exclusive to, MBH as well as items from other producers around the world. It is not possible for us to list every available Reference Material, however we do maintain an extensive database of materials available worldwide.

Materials detailed in the MBH catalogue are grouped according to their matrix and are further subdivided by general alloy headings or major element chemistry. This allows you to locate and compare the compositions of like materials. The first part of the catalogue is devoted to discs and blocks and the second to chippings, pins and powders. See the Index on Page 1 for a full listing.

With an increasing focus on Quality Assurance programmes MBH has progressively improved its certification programme. The programme now utilises a panel of analysts, from both within the United Kingdom and internationally, most of whom carry UKAS or its equivalent National Laboratory Accreditation.

Throughout the catalogue dimensions or weights appear in the column labelled 'size'. Unless otherwise stated all dimensions are in millimetres and weights in grams.

All data contained in this catalogue is presented with errors and omissions excepted. It is the responsibility of the customer to verify data prior to purchase

Suppliers

Alcan International	Canada	Hydro Aluminium (formerly VAW)	Germany
Alcan Technology & Management Ltd	Switzerland	Hydro Magnesium	Norway
(formerly Alusuisse Tech & Man Ltd)		Industrial Analytical Pvt Ltd	South Africa
Alcoa Alcan International	U.S.A.	Institut de Recherches de las Siderugie	France
Alpha Resources	U.S.A	Institute of Nuclear Chemisrty & Technology	Poland
Analytical Reference Materials Int'l	U.S.A.	Institute of Reference Materials& Measurement	Belgium
ASSO	Russia	Institutet for Metallforskning	Sweden
Brammer Standard Inc.	U.S.A.	Instituto do Pesquisas Tech. do Estado de Sao Paulo	Brazil
British Geological Survey	U.K.	Institutul de Cercetari Metalurgice	Romania
Bundesanstalt fur Material Forschung und Prufung	Germany	Instytut Metali Niezielanych	Poland
Bureau of Analysed Samples	U.K.	Iron & Steel Institute of Japan	Japan
Carpenter Technology	U.S.A.	KM-Europa Metal	Germany
Ceramic Society of Japan	Japan	Eurotest Research	
Central Iron & Steel Research Inst.	China	(formerly Lab Geological Investigations)	Bulgaria
Centre for Mineral & Energy technology	Canada	National Institute of Standards & Technology	U.S.A.
CKD Research Institute	Czech	Nikkei Light Alloys	Japan
Republic		Nilab	Sweden
Centre Technique des Industries de la Fonderie	France	Outokumpu Porricopper Oy	Finland
Ceram Research	U.K.	Seishin Trading Co	Japan
China Metallurgical Standardisation Research Inst.	China	Showa Aluminium, KK	Japan
Cookson Electronic Assembly Materials		Society of Glass technology	U.K.
(formerly Alpha Analytical Labs)	U.S.A.	South African bureau of Standards	South Africa
Coltide	Australia	Standard Samples office	Ukraine
Dillinger	Germany	State Bureau of Technical Supervision	China
Domtar	Canada	Sumitomo Chemical Co Ltd	Japan
Ferroetalon Vaskut	U.S.A.	SUS	Germany
Fulmer Materials Technology	U.K.	The Institute for Certified Reference Materials	Russia
Glass Technology Services	U.K.	The Technical Association of Refractoiries	Japan

Reference Materials Index

Each material within this catalogue has a unique identifier which incorporates the manufacturer's reference material number..

Catalogue numbers are displayed in the format [group] space [group] space {manufacturer's code] e.g., 11 M BSCC-3. The manufacturer's code is BSCC-3. This code will appear on the certificate of analysis.

The alpha-numeric string preceding the manufacturer's code is to assist with placement of the material in the relevant section of the catalogue.

Please Note: If you are unable to locate materials within this catalogue to meet your needs please send the specification of the materials you require. We will search our extensive database of existing materials and offer options for your consideration.

We will quote to manufacture and certify materials to your specification - subject to discussion and feasability.

Conditions of Sale

General Conditions

All materials are sold subject to our conditions of sale which are printed on the reverse of each quotation and order acknowledgement. The text is repeated here for your convenience.

1 All items listed in our catalogue or otherwise offered for sale are subject to availability and any delivery dates that may be quoted are conditional on supplies from manufacturers. We are unable to accept any liability for delay and if any item becomes unavailable during the life of a catalogue we will advise you on suitable alternatives where appropriate.

2 Unless credit facilities have been agreed with us (in which case payment is due on a net monthly basis), payment for items supplied is due either against a pro Forma invoice or by Confirmed irrevocable Letter of Credit through a British Clearing Bank payable on presentation of invoice and despatch documents.

3 We draw the attention of all customers to the notes in our catalogue relating to definitions, Analyses and

Calibration procedures.

4. To the extent that the law may permit, the following condition stands in substitution for all conditions and warranties as to merchantability and fitness for purpose as implied by statute, common law or otherwise.

a. It is the responsibility of the customer to decide on the suitability and fitness for purpose of all items purchased.

b. Any items claimed to be defective must be returned to us (within 3 months of delivery) for examination and analysis and no claims can be entertained if this is not done.

c. We may, at our option, replace any item shown to be defective or refund the price paid. Our liability in respect of any such item will not in any circumstances exceed the amount paid for the item in question and no liability is accepted for consequential loss however arising.

5 These conditions shall apply to all contracts entered into by us to the exclusion of all other conditions and notwithstanding any terms that may appear on any printed stationery of any customer. No variation of these conditions shall be effective unless confirmed by us in writing on or prior to formal acceptance by us of any order.

6 Until such time as we have received full payment, items supplied to customers shall remain our property notwithstanding delivery to the customer and we shall be entitled to enter upon the customer's premises to recover the property if the customer shall go into liquidation, or if a receiver is appointed of the undertaking of the customer or any of his or its property.

7 This contract shall be governed by English law and any disputes shall be referred to the exclusive jurisdiction of the English Courts.

Ordering Procedure

Orders are accepted by mail, fax, e-mail or 'phone. Please ensure any subsequent confirmation of an order is appropriately marked so as to avoid duplication.

Orders placed shall include the following information:

Catalogue Number, Quantity Required, Brief description, Price (if known) and confirmation of Invoicing and Delivery addresses. Unless specifically instructed otherwise all orders are despatched by our chosen, most appropriate, carrier with due regard to destination, security, speed and cost.

Send your order to:

MBH Analytical Ltd
Holland House
Queens Road
BARNET, Herts EN5 4DJ
England

Tel: **+44 (0) 20 8441 2024**
Fax: **+44 (0) 20 8449 0810**
E-mail: **sales@mbh.co.uk**

Ordering Procedure

Prices

The MBH Price List is issued as a separate publication. All prices are stated in pounds sterling and exclude despatch and UK V.A.T. (see below)

Upon request quotations can be provided in US dollars or Euros. However we reserve the right to withdraw quotations made in these currencies in the event of excessive exchange rate movements.

Hazardous Goods

IMPORTANT – Please Note

Some materials listed in this catalogue must be treated as hazardous for the purposes of despatch. For these materials we use special packaging and transport and will gladly confirm the costs involved upon enquiry.

We must follow the International 'dangerous Goods' Regulations, and can only consign these materials by air freight. They CANNOT be despatched by international Courier e.g., FedEx, UPS etc.

Packing, Insurance and Freight

Packing is included in the price of the goods. Insurance and Freight are charged at cost. We will be pleased to forward our quotation detailing these costs upon request.

Value Added Tax (VAT)

All orders delivered to a UK address are subject to VAT at the rate applicable at the time of despatch. European Union customers are also subject to UK VAT. Unless we are advised of your VAT number at the time of placing your purchase order this will be charged at the rate applicable.

Payment

Payment can be made by any of the following:

Visa Purchasing Card or Major Credit/Debit Cards (Visa or Mastercard)

Sterling Prepayment with your order against our Proforma invoice by Bankers Draft or Automated Bank Transfer

Irrevocable Letter of Credit through a London bank, payable at sight upon presentation of despatch documents and invoice

Established customers may apply to receive strictly Net Monthly Account terms, subject to satisfactory bank and trade references.

Our bank details are:

Name of Banker:	**National Westminster Bank plc**
Address:	**181 Darkes Lane** **POTTERS BAR** **Herts EN6 1XT** **England**
Account Name:	**MBH Analytical Limited**
Account No.:	**13140922 (IBAN)GB10NWBK60174913140922**
Bank Code:	**60 17 49**
BIC	**NWBKGB2L**

Payment should be in Sterling and free of all local bank charges. MBH will only accept our own banks charges. Please ensure that we receive the full amount as invoiced.

If paying in currency other than Sterling please remit payment in the currency stated on the invoice to the corresponding currency account. MBH will only accept our own bank charges. Please ensure that we receive the full amount as invoiced.

Bank Account Numbers:	Euro	(IBAN) GB18NWBK60720506848966
	US Dollar	(IBAN) GB71NWBK60730116500466

1.1.1 Low-impurity

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	N		Size (mm) Ø H	
CRM	11 DB E098-1(D)	0.0005	0.0005	0.0003	<0.0001	0.00008	. . .	0.0057	0.0008	. . .	. . .	. . .	. . .	0.00024		36-39 x 26	W
	11 MI 27C	0.0012	(0.001)	0.0021	0.002	(0.001)	0.001	0.001	0.001	0.002	0.0008	<0.001	0.001	0.0005	continued		
CRM	11 A E097-1(D)	0.00025	<0.01	0.0022	0.0016	0.0064	0.0025	0.0016	<0.001	0.0020	<0.0025	. . .	<0.0015	0.0007	continued		

	Continuation from above	V	Nb	B	Co	As	O	Pb	Ca	Size (mm) Ø H	
	11 MI 27C	0.0006	0.001	(0.0004)	0.002	<0.001	0.045	(0.0004)	<0.005	31 x 18	W
	11 A E097-1(D)	<0.001	<0.001	0.0003	0.0037	0.0051	(0.05)	<0.0005	<0.0005	38 x 30	W

1.1.2 Low P

		C	Si	S	P	Mn	Cr	Size (mm) W D H	
CRM	11 A 651/4	2.66	0.541	0.100	0.249	0.92	(1)	50 x 42 x 12	CC
CRM	11 A 652/4	2.34	0.878	0.129	0.071	1.19	(1)	50 x 42 x 12	
CRM	11 A 653/4	3.10	1.22	0.050	0.023	0.110	(1)	50 x 42 x 12	
CRM	11 A 654/4	2.28	1.635	0.170	0.130	0.74	(1)	50 x 42 x 12	
CRM	11 A 655/4	1.90	2.110	0.076	0.180	0.44	(1)	50 x 42 x 12	
CRM	11 A 656/8	2.61	2.59	0.107	0.062	0.823	(1)	50 x 42 x 12	CC
CRM	11 A 657/8	2.93	3.02	0.024	0.100	0.062	(1)	50 x 42 x 12	
CRM	11 A 658/9	3.429	1.982	0.071	0.179	0.508	. . .	50 x 42 x 12	
CRM	11 A 659/8	3.96	1.40	0.039	0.025	1.00	(1)	50 x 42 x 12	
CRM	11 A 660/8	3.62	1.72	0.089	0.146	0.425	(1)	50 x 42 x 12	

1.1.3 High P

		C	Si	S	P	Mn	Cr	B	Size (mm) W D H	
CRM	11 A 661/4	2.56	2.96	0.068	0.84	0.30	(1)	. . .	50 x 42 x 12	CC
CRM	11 A 662/4	2.95	2.33	0.087	0.30	0.76	(1)	. . .	50 x 42 x 12	
CRM	11 A 663/4	3.28	1.97	0.024	0.13	1.04	(1)	. . .	50 x 42 x 12	
CRM	11 A 664/4	2.84	2.71	0.112	0.44	0.57	(1)	. . .	50 x 42 x 12	
CRM	11 A 665/4	3.25	1.66	0.053	1.09	0.24	(1)	. . .	50 x 42 x 12	
									Ø H	
	11 X HPC 1F	3.19	2.37	0.019	0.81	0.48	. . .	(0.003)	40 x 15	CC
CRM	11 X HPC 2J	3.15	1.55	0.055	1.85	0.88	. . .	. . .	40 x 15	
	11 X HPC 3G	3.54	0.91	0.064	2.17	0.83	. . .	(0.005)	40 x 15	
CRM	11 X HPC 4N	3.59	1.00	0.115	1.63	0.943	. . .	(0.001)	40 x 15	

1.1.4 Nodular/Ductile

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Mg	Ti	Al	V	Nb	Co	Others	Size (mm) W D H	
CRM	11 A 666/9	3.39	1.76	(0.005)	. . .	0.101	1.61	(1)	0.095	0.067	0.079	0.066	. . .	0.056	. . .	. . .		40 x 37 x 12	CC
CRM	11 A 667/9	2.85	2.77	(0.003)	. . .	0.190	1.38	(1)	0.003	0.499	0.068	<0.005	. . .	0.086	. . .	. . .		40 x 37 x 12	
CRM	11 A 668/9	3.75	1.48	(0.007)	. . .	0.679	0.15	(1)	0.031	0.772	0.010	0.011	. . .	0.21	. . .	. . .		40 x 37 x 12	
CRM	11 A 669/11	2.973	2.509	. . .	. . .	0.540	0.489	0.992	0.0492	0.201	0.0274	0.0453	. . .	0.479	. . .	. . .	Ce 0.038	40 x 37 x 12	
CRM	11 A 670/11	3.387	2.195	. . .	. . .	0.339	0.846	0.498	0.012	0.949	0.0385	0.0161	. . .	0.0174	. . .	. . .		40 x 37 x 12	
	11 A SIMO 1	2.60	4.05	0.008	0.029	0.323	0.026	0.917	0.740	0.028	0.043	0.003	0.017	0.008	. . .	0.009		40 x 37 x 12	CC
	11 A SIMO 2	2.13	4.73	0.007	0.025	0.356	0.024	0.930	0.459	0.009	0.024	0.004	0.010	0.006	. . .	0.003			
																		Ø H	
	11 M BS 28	2.88	2.16	0.001	0.034	0.22	1.04	0.068	0.002	0.009	0.095	0.01	0.02	0.006	0.036	0.001		32 x 17	CC

1.1.5 Grey

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Ti	V	Al	Co	As	Size (mm) Ø H	
	11 M BS 20E	3.24	2.29	0.044	0.042	0.80	0.156	0.088	0.042	0.23	0.093	0.017	0.007	0.006	0.006	(0.003)	44 x 19	C
	11 M BS 20G	3.33	3.02	0.029	0.028	0.58	0.38	0.086	0.19	0.54	0.12	0.012	0.018	0.008	0.022	0.004	38-47 x 13	
	11 M BS 20K	3.21	2.47	0.025	0.060	0.68	0.28	0.117	0.21	0.56	0.058	0.019	0.013	0.004	0.013	0.004	38-47 x 13	
	11 M BS 20P	3.22	2.62	0.044	0.032	0.63	0.14	0.079	0.033	0.067	0.099	0.018	0.017	0.008	0.018	(0.004)	38-47 x 13	
	11 M BS 20R	3.25	2.72	0.034	0.047	0.62	0.096	0.094	0.053	0.35	0.104	0.015	0.007	0.005	0.006	0.004	38-47 x 13	
	11 M BS 20W	3.27	2.64	0.036	0.045	0.62	0.082	0.092	0.054	0.29	0.086	0.015	0.007	0.004	0.005	0.004	38-47 x 13	

See page 59 for materials in Chippings form

For Setting-Up Samples see section 16

1.1.7 Low Alloy

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	V	Nb	Mg	Co	
11 M BS CC-3	2.99	1.19	0.012	0.065	1.15	0.44	0.306	0.30	0.99	0.053	0.007	0.032	0.115	(0.004)	(0.011)*	0.087	
11 M BS CC-8	2.89	2.37	0.064	0.039	0.44	0.20	0.25	0.097	0.91	0.079	0.033	(0.11)*	0.244	(0.006)	0.0005	0.079	
11 M BS CC-10	2.96	2.02	0.074	0.023	1.76	0.52	0.113	0.46	0.23	0.013	0.033	0.15	0.047	(0.005)	0.0006	0.059	
11 M BS CC-12	(3.01)*	2.54	0.006	0.074	0.17	0.72	0.049	0.006	0.095	0.004	0.025	0.010	0.012	(0.005)	0.110	0.018	
11 M BS CC-14	(4.04)*	0.64	0.003	0.016	(0.01)	0.074	0.031	(0.003)	0.021	0.002	0.006	0.004	0.021	(0.003)	(0.024)*	0.036	
11 M BS CC-16	(2.67)*	3.57	0.045	0.10	0.39	1.94	0.91	1.33	0.11	0.005	(0.004)	0.017	0.014	(0.005)	(0.0004)	0.017	continued
11 M BS CC-18	2.13	4.33	0.082	0.29	0.33	2.66	0.103	0.095	0.14	(0.004)	0.007	0.019	0.006	(0.006)	0.0011	0.009	
11 M BS CC-21	2.66	2.32	0.006	0.85	1.37	0.026	2.68	0.13	0.013	0.006	0.031	0.085	0.051	(0.001)	0.0005	0.012	
11 M BS CC-22	2.87	0.74	0.16	0.274	1.84	0.151	0.98	0.022	0.34	0.079	0.006	0.022	0.25	0.013	<0.001	0.010	
11 M BS CC 23	2.96	0.43	0.082	0.53	0.74	0.56	0.47	0.265	0.31	0.052	0.059	0.091	0.196	<0.003	<0.001	0.090	
11 M BS CC 26	3.38	0.63	0.002	0.005	0.115	1.02	0.016	0.42	0.76	(0.002)	0.009	(0.001)	<0.003	<0.003	0.045	0.043	
11 M BS CC 30	3.06	0.88	0.011	0.021	0.275	0.045	0.073	0.016	0.070	0.005	0.009	0.0022	0.008	<0.002	0.042	0.016	
11 M BS CC 31	3.70	1.23	0.014	0.015	0.386	0.080	1.91	0.023	0.107	0.005	0.007	0.003	0.010	<0.002	0.030	0.012	

Carbon, Sulphur, Titanium, Magnesium and Calcium are inhomogeneous in the materials marked*

11 D 241B	1.84	3.15	0.123	0.007	0.060	0.021	0.683	0.61	0.011	(0.003)	0.003	0.001	0.080	0.003	0.000	0.004	
11 D 242B	2.06	2.81	0.028	0.044	0.189	0.022	0.031	1.21	0.040	0.010	0.042	0.28	0.46	0.009	0.000	0.004	
11 D 243A	2.32	2.39	0.082	0.173	0.422	0.085	0.398	0.262	0.187	0.114	0.013	0.023	0.154	0.019	0.000	0.026	
11 D 244B	2.57	2.06	0.011	0.022	0.68	0.336	0.360	0.056	0.308	0.179	0.019	0.019	0.002	0.006	0.025	0.049	
11 D 245B	2.95	1.59	0.035	0.42	1.38	0.194	0.197	0.115	0.081	0.076	0.038	0.110	0.055	0.029	0.003	0.007	
11 D 246B	2.73	0.76	0.020	0.66	0.354	0.065	1.16	0.009	1.39	0.002	0.101	0.014	0.013	(0.001)	0.016	0.012	continued
11 D 247B	3.09	1.20	0.0034	0.098	1.05	0.437	0.041	0.023	0.822	0.038	0.043	0.067	0.013	0.052	0.056	0.095	
11 D 248C	3.39	1.79	0.0035	0.053	0.281	0.688	0.052	0.001	0.132	0.016	0.028	0.133	0.162	0.003	0.048	0.013	
11 D 249B	4.06	0.47	0.0078	0.26	0.121	1.16	0.102	0.013	0.474	0.007	0.105	0.046	0.019	0.013	0.040	0.013	
11 D 249C	4.06	0.49	0.0075	0.27	0.099	1.21	0.148	0.011	0.486	0.002	0.032	0.026	0.026	0.011	0.042	0.014	
11 D 249D	3.76	0.34	0.008	0.25	0.127	1.42	0.093	0.013	0.479	0.004	0.056	0.095	0.023	0.035	0.051	0.011	

Continuation from above	Pb	As	Zr	Sb	Ce	La	Zn	Bi	Te	B	W	Se	Ca	N	Size (mm) Ø H	
11 M BS CC-3	0.0003	0.032	(0.002)	0.045	(0.001)	(0.0005)	. . .	(0.003)	0.029	0.0116	0.047	. . .	(0.0008)	. . .	32 x 17	c
11 M BS CC-8	0.014	0.040	0.005	0.19	(0.001)	(0.0007)	. . .	(0.002)	0.015	0.026	0.045	. . .	0.0002	. . .	32 x 17	
11 M BS CC-10	0.0007	0.007	(0.003)	0.152	(0.0003)	(0.0002)	. . .	(0.0002)	(0.002)	0.011	(0.006)	. . .	0.0001	. . .	32 x 17	
11 M BS CC-12	0.0002	0.002	(0.001)	0.0010	0.040	0.004	. . .	<0.0005	0.002	(0.0004)	(0.004)	. . .	0.0023	. . .	32 x 17	
11 M BS CC-14	0.0002	<0.001	(0.002)	(0.001)	(0.002)	(0.0007)	. . .	<0.0005	0.005	(0.0003)	(0.003)	. . .	0.0011	. . .	32 x 17	
11 M BS CC-16	0.0002	(0.005)	(0.002)	(0.001)	(0.0004)	(0.0001)	. . .	(0.007)	0.006	0.0005	(0.004)	. . .	(0.0001)	. . .	32 x 17	
11 M BS CC-18	0.0004	0.005	(0.002)	(0.002)	0.034	0.0024	. . .	(0.0004)	0.006	0.0004	(0.002)	. . .	0.0010	. . .	32 x 17	
11 M BS CC-21	0.004	0.045	0.025	(0.004)	<0.002	<0.002	. . .	. . .	(0.009)	0.020	<0.002	. . .	. . .	(0.013)	32 x 17	
11 M BS CC-22	0.001	0.091	0.026	0.059	<0.002	<0.002	. . .	. . .	0.034	0.043	0.012	. . .	. . .	(0.012)	32 x 17	
11 M BS CC 23	0.008	0.017	0.060	0.17	<0.002	<0.002	. . .	. . .	0.033	0.066	<0.01	. . .	. . .	(0.008)	32 x 17	
11 M BS CC 26	<0.002	0.017	<0.002	0.003	0.065	0.045	. . .	(0.001)	(0.004)	0.0045	<0.01	. . .	. . .	(0.008)	32 x 17	
11 M BS CC 30	. . .	(0.002)	<0.002	. . .	. . .	. . .	. . .	. . .	0.01	. . .	<0.003	. . .	0.0014	0.0074	32 x 17	
11 M BS CC 31	. . .	(0.003)	<0.001	. . .	. . .	. . .	. . .	. . .	0.006	. . .	0.012	. . .	0.0011	0.0061	32 x 17	
															W D H	
11 D 241B	0.001	0.002	0.000	0.139	0.000	0.000	0.000	0.000	0.000	(0.001)	0.001	0.0	. . .	. . .	36 x 36 x 21	cc
11 D 242B	0.027	0.009	0.000	0.005	0.000	0.000	0.00	0.020	(0.031)	0.005	(0.002)	(0.002)	. . .	. . .	36 x 36 x 21	
11 D 243A	(0.055)	0.087	0.000	0.086	0.000	0.000	0.018	(0.001)	0.000	0.009	0.029	(0.055)	. . .	. . .	36 x 36 x 21	
11 D 244B	0.002	0.040	0.025	0.004	0.018	0.009	0.026	0.000	0.000	0.093	0.052	0.0	. . .	. . .	36 x 36 x 21	
11 D 245B	0.020	0.006	0.004	0.052	0.00	0.00	0.00	0.009	(0.017)	0.003	0.02	(0.029)	. . .	. . .	36 x 36 x 21	
11 D 246B	(0.002)	0.003	0.000	0.004	0.007	0.003	0.00	(0.001)	0.00	0.000	(0.011)	0.0	. . .	. . .	36 x 36 x 21	
11 D 247B	(0.002)	0.010	0.009	0.005	0.053	0.019	0.012	0.007	(0.008)	0.000	(0.002)	0.0	. . .	. . .	36 x 36 x 21	
11 D 248C	0.013	0.019	0.012	0.017	0.036	0.011	0.008	0.002	(0.003)	0.038	0.001	(0.007)	. . .	. . .	36 x 36 x 21	
11 D 249B	0.013	0.017	0.048	0.005	0.021	0.006	0.006	0.006	0.00	0.016	(0.011)	(0.005)	. . .	. . .	36 x 36 x 21	
11 D 249C	0.009	0.016	0.027	0.005	0.017	0.004	0.006	0.004	0.00	0.017	0.009	(0.002)	. . .	. . .	36 x 36 x 21	
11 D 249D	0.025	0.018	0.039	0.004	(0.08)	(0.023)	0.004	(0.006)	(0.002)	0.018	(0.01)	(0.003)	. . .	. . .	36 x 36 x 21	

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	V	Al	Ti	As	Co	Zn	Size (mm) W D H	
CRM	**11 A 671**	2.865	0.980	0.0499	0.1062	0.835	0.0555	0.0586	0.0182	0.0470	0.0070	0.0105	0.0379	0.0896	0.0220	0.097	0.0004	40 x 37 x 12	
CRM	**11 A 672**	4.079	0.181	0.0379	0.244	0.492	0.0826	0.0236	0.099	0.0684	0.0018	0.1093	0.0075	0.0393	0.0039	0.156	0.0144	40 x 37 x 12	
CRM	**11 A 673**	2.474	1.715	0.0067	0.328	0.1334	0.143	0.0374	0.0057	0.0230	0.0191	0.0586	0.0282	0.0722	0.044	0.0540	0.0004	40 x 37 x 12	
CRM	**11 A 674**	3.322	0.474	0.0810	0.0104	1.457	0.144	0.0211	0.0477	0.1014	0.0140	0.0235	0.0040	0.0233	0.0275	0.0143	0.0187	40 x 37 x 12	
CRM	**11 A 675**	1.916	1.300	0.0724	0.0453	1.798	0.205	0.0794	0.0342	0.0117	0.0062	0.179	0.0072	0.0070	0.0342	0.0230	0.0006	40 x 37 x 12	
CRM	**11 HY 201**	2.77	1.71	(0.009)	0.024	0.74	2.47	2.90	0.13	0.10	(0.31)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	cc
CRM	**11 HY 202**	3.16	1.77	(0.010)	0.024	0.81	2.07	2.36	0.44	0.24	(0.21)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 203**	3.14	1.78	(0.009)	0.024	0.79	1.63	1.79	0.91	0.43	(0.16)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 204**	3.15	1.79	(0.009)	0.023	0.80	1.09	1.22	1.38	0.64	(0.215)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 205**	3.32	1.88	(0.01)	0.025	0.80	0.61	0.64	1.79	0.81	(0.035)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 206**	3.32	1.84	(0.010)	0.027	0.75	0.21	0.12	2.14	1.01	(0.107)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 120**	3.34	1.84	0.18	0.059	0.59	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 121**	3.32	(1.86)	0.17	0.135	0.61	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 122**	3.31	(1.72)	0.20	0.22	0.61	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 123**	3.30	1.87	0.074	0.31	0.69	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 124**	2.97	1.63	0.051	0.50	0.62	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	
CRM	**11 HY 125**	3.20	(1.87)	0.019	0.70	0.73	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 13	

See page 59 for materials in Chippings form

For Setting-Up Samples see section 16

1.1.7 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	V	Nb	Co	
CRM	**11 X C1N**	2.85	1.37	0.045	0.099	1.24	0.592	0.301	0.0213	0.291	0.0253	0.009	0.218	0.120	0.149	0.082	
CRM	**11 X C2R ***	3.25	1.42	0.080	0.33	1.60	1.53	1.21	0.14	0.105	0.055	0.020	0.033	0.30	(0.05)	0.10	
CRM	**11 X C3Y**	3.46	0.87	0.108	0.41	0.60	3.22	2.14	0.20	0.032	0.18	(0.007)	0.025	0.65	0.13	0.28	
	11 X C4P	1.81	3.08	0.060	0.12	0.59	2.57	1.57	0.105	0.10	0.01	0.026	0.074	0.029	0.088	0.022	continued
CRM	**11 X C5T**	2.78	1.80	0.062	0.102	0.774	1.04	1.22	0.50	0.71	0.043	0.219	0.125	0.045	0.010	0.036	
CRM	**11 X C6U**	3.60	0.464	0.034	0.057	0.934	0.123	0.493	1.54	0.87	0.061	(0.014)	0.141	0.0622	0.008	0.086	
	11 X C7M	2.38	0.87	0.022	0.023	1.94	0.23	0.46	0.05	0.056	0.009	0.009	0.014	0.016	(0.05)	0.02	
CRM	**11 X C8S**	3.06	1.42	0.205	0.117	0.371	0.613	0.310	0.201	0.443	0.111	0.010	0.082	0.0374	0.027	0.409	
CRM	**11 X C9A**	3.18	1.31	0.025	0.053	2.05	1.57	1.20	0.147	0.11	0.048	0.023	0.06	0.30	0.06	0.10	

* Target values

Continuation from above	W	Pb	As	Zr	Sb	Bi	Se	Te	Zn	B	Ce	La	N	Size (mm) Ø H	
11 X C1N	0.014	0.011	0.0049	0.0105	0.058	0.018	0.022	0.0055	0.0101	0.039	. . .	. . .	(0.0046)	40 x 15	CC
11 X C2R *	(0.03)	(0.002)	0.04	(0.007)	0.009	0.02	. . .	(0.022)	(0.003)	0.008	(0.014)	<0.005	0.014	40 x 15	
11 X C3Y	(0.04)	. . .	0.084	(0.003)	0.21	(0.0007)	. . .	(0.0013)	0.021	. . .	. . .	. . .	0.006	40 x 18	
11 X C4P	0.14	<0.01	0.009	(0.01)	0.01	0.028	. . .	0.01	0.003	0.020	(0.01)	(0.006)	0.015	40 x 15	
11 X C5T	. . .	0.010	0.019	(0.016)	0.030	(0.011)	0.021	(0.002)	0.011	(0.010)	. . .	. . .	0.008	40 x 17	
11 X C6U	0.016	(0.0007)	0.052	0.0161	0.0024	0.022	0.0179	0.0165	0.029	0.0052	. . .	. . .	(0.0034)	40 x 15	
11 X C7M	0.05	(0.004)	0.01	<0.01	0.02	0.02	. . .	(0.013)	(0.003)	0.008	(0.016)	<0.005	0.01	40 x 15	
11 X C8S	0.041	0.025	0.078	0.0006	0.073	0.023	0.022	0.005	(0.0038)	0.046	. . .	. . .	(0.0046)	40 x 15	
11 X C9A	(0.035)	(0.002)	0.038	. . .	0.10	0.018	. . .	(0.019)	(0.002)	. . .	. . .	. . .	0.015	40 x 15	

* Target values

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	V	Al	Ti	As	Size (mm) Ø H	
11 CM 5081	3.08	1.52	0.058	0.102	1.15	1.51	1.13	0.731	0.632	. . .	0.17	. . .	. . .	. . .	30 x 30	
11 CM 5082	3.33	1.42	0.099	0.264	1.38	1.02	1.4	0.937	1.04	. . .	0.112	. . .	. . .	. . .	each	
11 CM 5083	2.8	2.19	0.055	0.07	0.868	2.01	1.71	0.525	0.419	. . .	0.205	. . .	. . .	. . .		
11 CM 5084	2.34	2.59	0.037	0.04	0.609	2.51	0.527	0.215	0.215	. . .	0.313	. . .	. . .	. . .	Set Only	
11 CM 5085	2.14	3.19	0.015	0.025	0.23	3.11	2.04	0.377	0.049	. . .	0.436	. . .	. . .	. . .		
11 CM 5086	3.6	0.84	0.12	0.288	1.74	0.52	0.865	1.11	1.55	. . .	0.06	. . .	. . .	. . .		
11 RU ChG1/3	3.38	1.04	0.029	0.161	1.09	. . .	(0.08)	. . .	(0.04)	. . .	0.050	. . .	0.0052	(0.002)	38 x 40	CC
11 RU ChG2/3	3.42	0.257	0.058	0.38	0.127	. . .	0.066	. . .	0.071	. . .	0.023	. . .	0.046	0.0037	38 x 40	
11 RU ChG3/3	3.85	0.31	0.043	0.041	0.32	. . .	0.13	. . .	0.084	. . .	0.29	. . .	0.090	0.015	38 x 40	
11 RU ChG4/3	4.05	0.26	0.015	0.020	1.37	. . .	0.14	. . .	0.025	. . .	0.111	. . .	0.056	(0.002)	38 x 40	
11 RU ChG5/3	2.83	0.52	0.023	0.66	1.04	. . .	0.04	. . .	0.050	. . .	0.030	. . .	0.017	0.044	38 x 40	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Ti	V	Te	Co	As	Others	Size (mm) Ø H	
11 T F01	2.1	3.1	0.075	0.062	0.52	0.108	0.08	0.035	0.017	0.33	0.017	0.006	. . .	. . .	. . .		45 x 5 (2 pcs)	CC
11 T F02	2.3	2.37	0.056	0.050	1.20	0.110	0.062	. . .	0.400	0.067	0.020	0.018	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F04	2.81	1.51	0.009	0.58	0.64	0.32	0.17	0.095	0.31	0.013	0.075	0.049	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F05	3.01	1.08	0.024	1.39	0.26	0.215	0.285	0.43	0.18	0.17	0.053	0.075	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F06	3.54	0.57	0.087	0.84	0.74	0.16	0.50	0.205	0.13	0.17	0.042	0.103	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F07	2.47	0.675	0.085	0.84	0.71	0.15	0.455	0.26	0.125	. . .	0.070	0.13	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F08	3.80	1.03	0.020	0.101	0.32	. . .	0.255	. . .	0.029	. . .	0.048	0.01	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F09	2.94	1.58	0.013	0.040	0.74	0.44	0.18	0.12	0.315	0.145	. . .	0.006	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F10	3.50	0.67	0.093	0.17	1.01	0.12	0.407	0.25	0.152	. . .	0.063	0.108	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F11	3.42	1.5	0.10	0.055	0.69	0.235	0.325	0.22	0.215	0.067	0.115	0.11	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F12	3.75	1.86	0.004	0.038	0.44	. . .	. . .	. . .	0.77	0.011	. . .	. . .	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F17	3.01	2.48	0.168	0.470	0.475	0.021	(0.016)	. . .	(0.006)	0.024	0.032	0.018	. . .	0.032	. . .		45 x 5 (2 pcs)	
11 T F18	3.28	1.33	0.132	1.11	0.52	0.18	0.087	0.16	0.09	0.15	0.18	0.17	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T F19	4.04	1.05	0.057	0.032	1.05	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.0005	. . .	. . .		45 x 5 (2 pcs)	
11 T FL 1	2.1	3.2	0.0765	0.118	0.8	0.245	0.06	0.038	0.0195	0.305	0.020	0.015	. . .	. . .	. . .		43 x 5 (2 pcs)	CC
11 T FL 3	2.3	2.1	(0.013)	0.729	0.27	0.553	0.107	0.106	0.102	0.111	0.05	0.049	. . .	(0.022)	. . .	N 0.008	45 x 5 (2 pcs)	
11 T FL 4	2.7	2.9	0.12	0.3	0.5	0.05	0.45	0.09	0.0168	0.0011	0.0296	0.116	. . .	. . .	0.05	N 0.007	45 x 5 (2 pcs)	
11 T FL 5	2.8	2.3	0.004	0.024	0.4	0.05	0.34	0.012	0.52	0.07	0.10	0.012	. . .	0.012	. . .	B 0.002	45 x 5 (2 pcs)	
11 T FL 6	3.1	1.4	0.19	0.01	0.6	1.0	0.15	0.5	0.08	<0.01	0.15	0.03	. . .	. . .	. . .	B 0.006	45 x 5 (2 pcs)	
11 T FL10	3.1	1.3	0.066	0.323	0.85	0.10	(0.07)	0.0335	0.104	0.028	0.045	0.048	(0.001)	. . .	(0.022)	Sb 0.032	45 x 5 (2 pcs)	
11 T FPA1	3.08	0.030	0.0008	0.002	0.108	0.048	0.070	0.0107	0.065	. . .	0.0015	0.0009	. . .	0.0095	0.0111		43 x 5 (2 pcs)	CC
11 T FT1	3	2.14	0.022	0.105	0.685	0.11	0.045	. . .	0.015	. . .	0.205	0.625	. . .	. . .	. . .		43 x 5 (2 pcs)	CC
11 T FT2	3.4	1.42	0.095	0.045	0.80	0.07	0.03	. . .	0.01	. . .	0.10	0.405	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T FT3	3.2	1.55	0.051	0.063	0.345	0.092	0.685	. . .	0.015	. . .	0.23	0.016	. . .	. . .	. . .		45 x 5 (2 pcs)	
11 T FAL1	3.0	1.0	<0.01	0.04	0.2	0.06	0.04	0.015	0.2	. . .	0.01	. . .	. . .	. . .	. . .	Al 2.1	43 x 5 (2 pcs)	CC

	C	Si	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	V	As	Ce	B	Bi	Pb	Size (mm) W D H	
11 A LARM1	(3.0)	(2.0)	(0.3)	0.49	0.50	. . .	2.49	. . .	. . .	0.14	0.11	. . .	0.005	0.006	0.011	. . .	40 x 37 x 12	CC
11 A LARM2	(3.0)	(2.0)	(0.3)	. . .	2.50	0.22	. . .	0.22	0.066	0.33	. . .	0.044	0.008	. . .	. . .	0.007	40 x 37 x 12	
11 A LARM3	(3.0)	(2.0)	(0.3)	1.80	. . .	. . .	1.20	. . .	0.042	. . .	0.55	0.092	. . .	0.003	0.022	. . .	40 x 37 x 12	
11 A LARM4	(3.0)	(2.0)	(0.3)	. . .	1.19	1.00	0.26	0.11	0.014	0.17	. . .	. . .	0.008	. . .	. . .	0.018	40 x 37 x 12	
11 A LARM5	(3.0)	(2.0)	(0.3)	2.46	. . .	0.62	. . .	0.025	. . .	. . .	0.24	0.018	. . .	0.0012	0.0010	0.0005	40 x 37 x 12	

See page 59 for materials in Chippings form

For Setting-Up Samples see section 16

1.1.7 Low Alloy (continued)

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	V	Nb	Co		
11M BS 1C	2.36	2.02	0.060	0.029	1.79	1.99	0.52	0.43	0.133	0.054	0.033	0.083	0.12	0.025	0.24	continued	
11M BS 4C	3.82	0.52	0.001	0.003	0.21	0.068	0.111	0.105	0.014	(0.0004)	0.003	0.002	0.0005	(0.0005)	0.014		

Continuation from above	Pb	As	Zr	Sb	Ce	B	W	Ca	La	Mg	N	O	Te	Zn	Size (mm) Ø H	
11M BS 1C	0.019	0.036	0.014	0.019	0.011	0.0022	0.12	0.0024	0.0020	0.0013	0.0115	(0.002)	(0.002)	(0.0003)	32 x 17	cc
11M BS 4C	(0.0004)	0.007	0.010	0.0012	0.010	0.0002	(0.006)	0.0013	0.002	0.0002	0.008	(0.004)	0.0011	<0.0003	32 x 17	

1.1.8 Abrasion Resistant

	C	Si	S	P	Mn	Ni	Cr	Mo	Al	Cu	Ti	V	Nb	Pb	Typical Alloy Type	Size (mm) Ø H	
11 X AR1L	2.76	1.79	0.062	0.044	1.24	4.1	7.7	...	...	...	...	...	...	...		40 x 15	cc
CRM **11 X AR2L**	3.69	0.92	0.173	0.314	0.76	7.17	9.63	...	...	...	...	...	...	...		40 x 15	
CRM **11 X AR3G**	3.13	0.95	0.046	0.066	0.58	5.08	6.88	...	...	...	...	...	...	...	Ni Hard	40 x 15	
11 X AR4H	2.95	1.28	0.024	0.061	0.50	5.04	7.81	...	...	...	...	...	...	...		40 x 15	
CRM **11 X AR5J**	3.10	1.70	0.0316	0.0299	0.57	5.16	9.73	0.12	(0.018)	0.032	0.0147	0.0586	0.030	(0.003)		40 x 15	

1.1.9 Corrosion Resistant

	C	Si	S	P	Mn	Ni	Cr	Cu	Mo	Sn	Al	Pb	V	Ti	Typical Alloy Type	Size (mm) Ø H	
11 X S/1 Cr1J	2.71	2.42	0.008	0.010	1.73	14.0	1.72	7.55	...	...	...	...	...	...	Ni Resist	40 x 15	cc
11 X S/1 Cr2G	2.7	0.87	0.037	0.063	0.41	18.0	2.5	5.1	...	...	...	...	...	...	BS 3486 F1	40 x 15	
CRM **11 X S/1 Cr3H**	2.92	1.20	0.035	0.093	0.86	14.91	0.96	6.09	...	...	...	...	...	...	ASTM A436/439	40 x 15	
11 X S/1 Cr4D	2.58	2.48	0.10	0.257	0.94	15.9	2.39	6.34	...	...	...	...	...	...	DIN 1694	40 x 15	
CRM **11 X S/1 Cr5F**	2.54	1.26	0.035	0.108	0.75	16.27	3.36	6.31	...	...	...	...	...	...	NFA 32.301	40 x 15	
11 X S/2 Cr1E	2.83	2.85	0.011	0.31	1.68	16.5	2.48	0.02	...	...	...	...	...	...	Ni Resist	40 x 15	cc
11 X S/2 Cr2D	3.03	1.23	0.046	0.14	0.53	18.0	2.35	0.23	...	...	...	...	...	...	BS 3486 F2/S2	40 x 15	
11 X S/2 Cr3E	2.64	2.44	0.012	0.044	0.90	20.9	2.47	0.48	...	...	...	...	...	...	ASTM A436/439	40 x 15	
11 X S/2 Cr4D	2.82	2.59	0.010	0.049	0.97	20.7	1.10	0.24	...	...	...	...	...	...	DIN 1694	40 x 15	
11 X S/2 Cr5D	3.01	2.51	0.042	0.14	0.83	19.5	3.99	0.24	...	...	...	...	...	...	NFA 32.301	40 x 15	
11 X S/2 Cr6D	2.65	3.59	0.009	0.254	0.81	18.0	4.39	0.27	...	...	...	...	...	...		40 x 15	
11 X S/3 Cr1D	2.61	2.52	0.011	0.046	0.7	31.7	0.15	0.19	...	...	...	...	...	...	Ni Resist	40 x 15	cc
11 X S/3 Cr2C	2.30	2.59	0.010	0.045	0.85	31.0	2.62	0.21	...	...	...	...	...	...	BS 3486 F3/S5S	40 x 15	
11 X S/3 Cr3B	2.49	2.44	0.050	0.053	0.66	29.4	4.06	0.23	...	...	...	...	...	...	ASTM A436/439	40 x 15	
11 X S/3 Cr4C	2.51	2.37	0.056	0.081	0.65	29.5	5.30	0.23	...	...	...	...	...	...	DIN 1694	40 x 15	
11 X S/3 Cr5E	2.36	0.99	0.010	0.043	1.15	32.2	2.91	0.04	...	...	...	...	...	...	NFA 32.301	40 x 15	
11 X S/3 Cr6D	2.51	4.50	0.022	0.056	0.42	26.8	3.42	0.25	...	...	...	...	...	...		40 x 15	
11 X 20001J	2.90	1.01	0.143	0.005	0.58	21.4	1.50	0.01	...	...	...	...	...	...		40 x 15	c
11 X 20002J	2.67	2.04	0.045	0.060	1.06	20.0	2.03	0.30	...	...	...	...	...	...	Ni Resist	40 x 15	
11 X 20003K	3.01	3.13	0.013	0.193	1.46	18.0	2.49	0.54	...	...	...	...	...	...		40 x 15	
CRM **11 X 0331.1G**	2.68	2.02	0.17	0.090	1.61	13.31	1.58	7.58	0.294	0.038	0.452	0.056	...	...		40 x 13	cc
CRM **11 X 0331.2H**	2.54	2.78	0.126	0.062	1.32	15.61	1.50	7.42	0.085	0.0220	0.049	0.029	...	...		40 x 13	cc
CRM **11 X 0331.3F**	2.10	2.46	0.061	0.040	1.08	18.03	2.57	6.49	0.061	0.0091	0.055	0.0112	...	...		40 x 13	cc
11 X 0331.4D	2.09	1.40	0.010	0.015	0.41	19.0	2.1	3.9	0.01	<0.01	0.004	0.002	...	...		40 x 13	cc
11 X 0331.5A	2.82	1.20	0.27	0.09	0.72	12.8	0.45	7.46	0.096	0.08	(0.006)	0.02	...	...		40 x 13	c
CRM **11 X 0331.6A**	2.71	2.05	0.0197	0.0473	1.144	14.03	1.13	6.57	0.011	(0.0020)	...	(0.0006)	0.0106	0.025		35 x 6	cc

Note: items which are not chill cast may contain some primary carbon.

1.1.10 Austenitic Iron

	C	Si	S	P	Mn	Ni	Cr	Cu	Mg	Mo	Nb	Ce	Typical Alloy Type	Size (mm) Ø H	
11 T NR1.2S	2.58	3.02	0.0015	0.19	1.54	20.60	2.00	0.11		...	...	...	Spheroidal	43 x 5 (2 pcs)	cc
11 T NR2.2S	2.32	1.43	...	0.062	0.53	36.3	0.51	0.21	0.003	...	...	...		43 x 5 (2 pcs)	
11 T NR3.2S	2.92	2.91	...	0.024	0.77	24.63	3.05	0.33		...	...	...		43 x 5 (2 pcs)	
11 T NR4.2S	2.47	4.87	...	0.145	1.71	18.30	1.50	0.63	to	...	...	...		43 x 5 (2 pcs)	
11 T NR5.2S	1.67	1.97	...	0.035	1.23	27.05	0.24	0.50		...	...	...		43 x 5 (2 pcs)	
11 T NR6.2S	1.81	2.44	...	0.019	0.99	30.75	1.06	0.03	0.25	...	...	...		43 x 5 (2 pcs)	
11 T NR8.2S	3.05	1.41	...	0.124	4.39	14.20	0.191	0.071		...	...	...		43 x 5 (2 pcs)	

Note: Mg levels vary from disc to disc. Actual value will be given on certificate

11 T NR1.2L	2.50	2.99	0.10	0.125	1.34	25.87	1.74	0.49	...	...	...	...	Lamellar	43 x 5 (2 pcs)	cc
11 T NR3.2L	2.99	3.04	0.052	0.088	0.72	21.58	2.97	0.26	...	...	...	...		43 x 5 (2 pcs)	
11 T NR4.2L	2.41	5.89	0.014	0.155	1.495	15.90	1.403	0.758	...	...	...	...		43 x 5 (2 pcs)	
11 T NR5.2L	1.77	2.99	0.083	0.037	1.207	33.89	0.27	0.48	...	...	...	...		43 x 5 (2 pcs)	
11 T NR6.2L	1.76	2.07	0.063	0.031	0.70	30.37	3.49	0.020	...	...	...	...		43 x 5 (2 pcs)	
11 T NR8.2L	2.89	1.74	0.025	0.054	5.19	13.33	0.165	0.075	...	...	...	...		43 x 5 (2 pcs)	
11 T NRCU 1	3.15	1.01	0.076	0.165	1.61	18.2	1.03	5.09	...	...	...	...		43 x 5 (2 pcs)	cc
11 T NRCU 2	2.52	2.07	0.049	0.115	1.07	15.9	2.05	6.50	...	...	...	...		43 x 5 (2 pcs)	
11 T NRCU 3	1.94	3.12	0.016	0.046	0.60	13.3	3.50	8.05	...	...	...	...		43 x 5 (2 pcs)	
11 A NIRM 1	2.05	3.15	0.005	0.055	6.72	11.80	0.246	0.20	0.021	...	...	0.018		40 x 37 x 12	cc
11 A NIRM 2	2.91	1.53	0.011	0.100	2.01	13.88	1.49	5.86	0.037	...	...	0.017		40 x 37 x 12	
11 A NIRM 3	2.51	2.21	0.096	0.208	0.51	17.8	2.43	1.00	...	...	0.09	0.007		40 x 37 x 12	
11 A NIRM 4	1.97	3.03	0.008	0.051	2.37	20.2	3.56	0.52	0.014	...	0.37	0.011		40 x 37 x 12	
11 A NIRM 5	2.93	1.73	0.004	0.126	1.09	22.1	0.50	0.22	0.040	...	0.20	<0.002		40 x 37 x 12	
11 A NIRM 6	2.44	2.43	0.062	0.217	4.00	26.7	1.07	0.10	...	0.45	...	0.003		40 x 37 x 12	
11 A NIRM 7	2.05	3.05	0.020	0.058	0.71	32.9	3.53	0.52	0.019	0.99	...	0.005		40 x 37 x 12	
11 A NIRM 8	1.41	5.47	0.009	0.096	1.56	35.4	2.45	0.20	0.046	0.73	...	0.012		40 x 37 x 12	

See page 59 for materials in Chippings form

For Setting-Up Samples see section 16

1.1.10 Austenitic Iron (continued)

		C	Si	S	P	Mn	Ni	Cr	Cu	Mg	Mo	Nb	Ce	Size (mm) Ø H	
CRM	**11 D 250**	1.12	0.55	0.024	0.014	0.32	17.7	0.61	0.22	. . .	0.005	. . .	. . .	37 x 22	CC
CRM	**11 D 251**	2.25	1.14	0.015	0.015	1.97	19.7	1.07	0.38	0.022	0.12	0.10	0.017	37 x 22	
CRM	**11 D 252**	2.40	2.06	0.008	0.026	1.00	22.0	1.66	0.13	0.125	0.005	. . .	. . .	37 x 22	
CRM	**11 D 253**	2.45	2.28	0.008	0.059	0.74	23.6	2.95	0.29	0.038	0.01	. . .	0.018	37 x 22	
CRM	**11 D 254**	2.78	2.60	0.018	0.043	4.50	14.3	0.24	0.11	0.058	0.41	0.26	0.039	37 x 22	
	11 T NR 4-1G	2.3	5.6	. . .	0.11	1.72	21.3	1.4	0.64	var.	. . .	. . .	. . .	43 x 5 (2 pcs)	CC
	Note: Mg levels vary from disc to disc. Actual value will be given on certificate of sample supplied.													43 x 5 (2 pcs)	

1.1.11 With Cr

		C	Si	S	P	Mn	Ni	Cr	Cu	Mo	Al	Ti	V	W	Co	Pb	Sn	Size (mm) Ø H	
CRM	**11 X 15294S**	2.15	0.49	0.072	0.081	0.52	4.20	31.02	0.174	0.278	. . .	. . .	0.024	0.301	1.05	0.023	0.072	43 x 20	C
	11 X 15295N	2.62	0.80	0.063	0.060	0.74	0.22	27.9	0.21	0.27	. . .	. . .	. . .	0.21	. . .	. . .	. . .	40 x 15	
	11 X 15309Q	3.14	1.52	0.028	0.006	1.10	0.01	25.03	0.01	<0.01	. . .	. . .	. . .	<0.01	. . .	. . .	. . .	40 x 15	
	11 T FCR 1	2.45	0.45	0.007	0.019	0.60	1.30	18.71	0.031	1.41	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	CC
	11 T FCR 2	2.8	1.07	0.055	0.137	0.75	1.87	11.8	0.135	3.88	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCR 3	2.03	0.255	0.035	0.034	0.99	0.652	14.85	0.0490	0.91	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCR 4	2.45	1.40	0.066	0.097	2.05	0.57	24.2	1.32	2.16	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCR 5	3.43	0.30	0.0175	0.052	0.55	2.69	28.5	1.02	3.27	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCR 6	1.4	0.75	0.086	0.20	1.4	0.19	30.8	0.48	0.45	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCRNi 1	1.27	1.63	0.06	0.41	0.71	16.50	26.20	0.02	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	CC
	11 T FCRNi 2	1.98	1.50	0.024	0.185	0.60	13.05	29.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
	11 T FCRNi 3	2.74	0.67	0.011	0.036	0.46	11.05	31.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	43 x 5 (2 pcs)	
																		W D H	
	11 A CRRM 1	1.91	1.56	0.072	0.114	1.43	2.07	11.35	1.97	3.08	. . .	. . .	. . .	. . .	. . .	0.008	. . .	40 x 37 x 12	CC
	11 A CRRM 3	2.68	0.94	0.050	0.054	0.84	1.27	18.28	1.22	1.80	. . .	. . .	. . .	. . .	. . .	0.008	. . .	40 x 37 x 12	
	11 A CRRM 5	3.57	0.39	0.013	0.014	0.30	0.26	30.3	0.21	0.54	. . .	. . .	. . .	. . .	. . .	0.007	. . .	40 x 37 x 12	
	11 A CRRM1/1	1.83	1.53	0.099	0.132	1.45	2.03	11.18	2.01	3.05	0.117	0.096	0.040	. . .	. . .	. . .	. . .	40 x 37 x 12	CC
	11 A CRRM2/1	1.92	1.18	0.079	0.097	1.11	1.61	14.13	1.59	2.44	0.054	0.070	0.063	. . .	. . .	. . .	. . .	40 x 37 x 12	
	11 A CRRM3/1	2.42	0.82	0.059	0.068	0.85	1.28	17.48	1.21	1.65	0.084	0.021	0.022	. . .	. . .	. . .	. . .	40 x 37 x 12	
	11 A CRRM4/1	3.00	0.56	0.039	0.044	0.60	0.62	22.42	0.58	1.19	<0.005	0.027	0.092	. . .	. . .	. . .	. . .	40 x 37 x 12	
	11 A CRRM5/1	3.46	0.25	0.019	0.029	0.32	0.29	29.09	0.23	0.54	0.17	0.026	0.063	. . .	. . .	. . .	. . .	40 x 37 x 12	

1.1.12 With Cu, Ni, Cr, Mo

	C	Si	S	P	Mn	Ni	Cr	Cu	Mo	Size (mm) Ø H	
11 T NH 1	2.98	1.35	0.105	0.060	0.90	1.38	0.83	1.99	1.45	43 x 5 (2 pcs)	CC
11 T NH 2	2.50	1.81	0.058	0.047	1.04	1.78	1.26	1.02	1.01	43 x 5 (2 pcs)	
11 T NH 3	3.47	0.85	0.024	0.36	0.175	2.53	1.76	0.031	0.73	43 x 5 (2 pcs)	
11 T NH 4	2.84	0.49	0.022	0.12	0.28	3.60	2.46	0.09	0.30	43 x 5 (2 pcs)	
11 T NH 5	2.31	0.31	0.04	0.115	0.24	4.90	2.85	0.035	0.017	43 x 5 (2 pcs)	
11 T NH 6	2.70	2.28	0.036	0.066	0.355	7.06	6.60	0.115	0.11	43 x 5 (2 pcs)	
11 T NH 7	3.43	0.95	0.022	0.035	0.63	5.53	9.02	0.105	. . .	43 x 5 (2 pcs)	
11 T NH 8	2.98	0.80	0.076	0.052	0.57	8.16	5.03	0.065	0.125	43 x 5 (2 pcs)	
11 T NH 9	3.13	1.24	0.029	0.087	0.65	4.11	11.70	0.203	0.059	43 x 5 (2 pcs)	
										W D H	
11 A NCRM 1	3.05	0.95	0.156	0.300	1.21	0.57	0.55	2.17	1.02	40 x 37 x 12	CC
11 A NCRM 2	2.97	1.82	0.119	0.068	0.95	2.10	1.99	1.67	0.36	40 x 37 x 12	
11 A NCRM 3	3.24	0.29	0.090	0.125	0.67	3.64	3.95	1.21	0.78	40 x 37 x 12	
11 A NCRM 4	2.66	2.13	0.012	0.203	0.40	5.34	7.94	0.68	0.57	40 x 37 x 12	
11 A NCRM 5	3.70	1.15	0.015	0.025	0.27	6.74	10.44	0.204	0.10	40 x 37 x 12	

1.1.13 With Mn

		C	Si	S	P	Mn	Ni	Cr	Cu	Size (mm) W D H	
CRM	**11 HY 666**	3.52	0.45	0.057	0.083	1.39	0.008	0.019	0.11	30 x 30 x 13	CC
CRM	**11 HY 667**	3.85	0.48	0.020	0.087	4.00	0.005	0.013	0.13	30 x 30 x 13	
CRM	**11 HY 668**	3.63	0.45	0.030	0.085	2.80	0.006	0.015	0.12	30 x 30 x 13	

See page 59 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.1 Plain Carbon

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Nb	V	N	Others	Typical Alloy Type	Size (mm) Ø H	
	12 M BS 56E	0.48	0.24	0.025	0.010	0.72	0.015	0.021	0.005	0.015	0.0006	0.062	<0.002	<0.002	0.0056	Co, As	AISI 1045	35-44 x 19	W
	12 M BS 57F	0.196	0.202	0.027	0.009	0.554	0.07	0.12	0.018	0.197	0.008	(0.002)	. . .	0.063	0.0077		AISI 1020	35-44 x 19	
	12 M BS 64C	0.92	0.22	0.002	0.015	0.22	0.038	0.26	0.008	0.016	0.001	0.005	0.003	0.005	0.0084		AISI 1095	35-44 x 19	
	12 M BS 1931	0.194	0.235	0.018	0.007	0.84	0.42	0.50	0.168	0.116	0.007	0.021	. . .	0.002	0.0079	Co, As	AISI 8620	35-44 x 19	
	12 M BS 1932	0.221	0.208	0.022	0.010	0.84	0.412	0.49	0.158	0.177	0.013	0.024	. . .	0.002	0.0080	Co, As	AISI 8620	35-44 x 19	
	12 M BS 3931	0.420	0.27	0.018	0.010	0.91	0.10	0.97	0.176	0.128	0.008	0.023	. . .	0.003	0.0073	As, O	AISI 4140	35-44 x 19	
	12 M BS 3941	0.41	0.25	0.023	0.016	0.80	0.019	0.068	0.006	0.053	(0.002)	0.002	0.031	0.003	0.0070		AISI 1040	35-44 x 19	
	12 M BS 3942	0.47	0.26	0.032	0.023	0.72	0.14	0.165	0.037	0.281	0.012	0.004	0.019	0.0019	(0.0088)		AISI 1040	35-44 x 19	
	12 M BS 3952	0.208	0.264	0.021	0.011	0.546	0.112	0.105	0.519	0.202	. . .	0.048	. . .	. . .	(0.0005)			35-44 x 19	
	12 M BS 4941	0.490	0.27	0.017	0.012	0.79	0.074	0.96	0.039	0.106	0.006	0.024	. . .	0.164	0.0076	Co, O		41 x 12	
	12 M BS 4942	0.414	0.22	0.021	0.015	0.56	0.16	0.97	0.54	0.165	0.014	(0.004)	. . .	0.28	0.0080	As, Ca	ASTM A193	38 x 12	
CRM	**12 MI 254A**	0.500	0.211	0.024	0.010	0.78	0.044	0.050	0.013	0.091	0.005	0.025	0.001	0.002	0.0096	As, B	AISI 1050	32 x 19	W
CRM	**12 A 432/1**	0.102	0.043	0.039	0.024	1.34	0.14	0.31	(0.02)	(0.04)	. . .	(0.01)	<0.002	. . .	. . .			38 x 19	W
CRM	**12 A 433/1**	0.195	0.18	0.069	0.074	0.60	0.064	0.26	(0.01)	(0.06)	. . .	<0.01	0.02	. . .	. . .			38 x 19	
CRM	**12 A 434/1**	0.41	0.31	0.027	0.50	1.49	0.044	0.055	(0.01)	(0.05)	. . .	<0.01	0.078	. . .	. . .			38 x 19	
CRM	**12 A 435/1**	0.52	0.54	0.031	0.033	0.41	0.06	0.14	(<0.01)	(0.05)	. . .	<0.01	0.039	. . .	. . .			38 x 19	
CRM	**12 A 431/2**	0.0249	0.015	0.0065	0.121	0.902	0.040	0.049	(0.004)	. . .	. . .	. . .	0.0040	. . .	0.0052			38 x 19	W
CRM	**12 A 432/2**	0.0065	0.0822	0.036	0.0171	0.712	0.0196	0.0166	(0.002)	. . .	. . .	. . .	0.0174	. . .	0.0066			38 x 19	
CRM	**12 A 433/2**	0.096	0.0071	0.0083	0.011	1.188	0.037	0.0262	(0.004)	. . .	. . .	. . .	0.0590	. . .	. . .			38 x 19	
CRM	**12 A 434/2**	0.275	0.510	0.0141	0.0611	1.546	0.037	0.238	(0.014)	. . .	. . .	. . .	0.038	. . .	0.0104			38 x 19	
CRM	**12 A 435/2**	0.489	0.328	0.0424	0.0373	0.390	0.133	0.184	(0.018)	. . .	. . .	. . .	0.134	. . .	. . .			38 x 19	
CRM	**12 A 215/3**	0.91	0.23	0.031	0.011	0.68	0.038	0.04	(0.006)	0.052	. . .	0.004	. . .	. . .	. . .			38 x 19	W
CRM	**12 A E057-2(D)**	0.0507	(0.003)	0.0127	0.0120	0.246	0.0096	0.0114	. . .	0.0146	. . .	0.059	. . .	. . .	0.0023			38 x 30	
CRM	**12 A E059-2(D)**	0.721	0.188	0.0084	0.0046	0.495	0.0198	0.0090	0.0018	0.0074	. . .	0.00045	. . .	. . .	0.0051	sol Al 0.00020		38 x 30	
CRM	**12 A E064-1(D)**	0.0026	0.0065	0.0104	0.0091	0.1641	0.0115	0.0184	0.00077	0.0077	0.00051	0.033	0.0146	0.00015	0.0026	Co, As, Ti		38 x 30	
CRM	**12 A E084-1(D)**	0.391	0.265	0.029	0.018	0.860	0.154	. . .	0.033	0.267	0.023	. . .	. . .	. . .	. . .			38 x 30	
CRM	**12 A E086-1(D)**	0.297	0.206	0.0371	0.0238	0.879	0.168	0.150	. . .	0.320	0.0263	. . .	. . .	. . .	. . .	As 0.0230		38 x 30	
CRM	**12 A E090-1(D)**	1.054	0.281	0.0095	0.0128	0.226	0.053	0.121	0.0089	. . .	. . .	. . .	0.00043	0.204	0.0146	Ga, Pb, Sb, Zn		38 x 30	
CRM	**12 A 601/2**	0.102	0.263	0.024	0.034	1.30	(0.03)	(0.14)	(0.006)	(0.04)	. . .	0.033	. . .	(0.002)	. . .			44 x 19	C
CRM	**12 A 602/2**	0.94	0.057	0.031	0.023	0.66	(0.02)	(0.03)	(0.004)	(0.06)	. . .	0.096	. . .	(0.001)	. . .			44 x 19	
CRM	**12 A 603/2**	0.78	0.97	0.056	0.020	0.236	(0.03)	(0.04)	(0.004)	(0.05)	. . .	0.076	. . .	(0.001)	. . .			44 x 19	
CRM	**12 A 604/2**	0.199	0.75	0.072	0.016	1.91	(0.09)	(0.06)	(0.02)	(0.07)	. . .	0.008	. . .	(0.001)	. . .			44 x 19	
CRM	**12 A 605/2**	0.400	0.54	0.015	0.054	0.345	(0.05)	(0.06)	(0.01)	(0.06)	. . .	0.027	. . .	(0.001)	. . .	Zr (0.12)		44 x 19	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	V	W	Ti	Size (mm) Ø H
12 CM 5050	0.108	0.029	0.07	0.0038	1.15	0.252	0.379	. . .	0.276	0.073	. . .	. . .	. . .	35 x 30
12 CM 5051	0.172	0.1	0.012	0.014	1.07	0.210	0.241	. . .	0.14	. . .	. . .	. . .	. . .	each
12 CM 5052	0.29	0.156	0.026	0.032	0.62	0.181	0.153	. . .	0.193	. . .	. . .	. . .	. . .	
12 CM 5053	0.30	0.247	0.04	0.023	0.86	0.065	0.092	. . .	0.097	. . .	. . .	. . .	. . .	Set Only
12 CM 5054	0.44	0.46	0.04	0.039	0.41	0.062	0.275	. . .	0.325	0.40	. . .	. . .	. . .	
12 CM 5055	0.58	0.374	0.0033	0.054	0.163	0.343	0.34	. . .	0.38	0.403	. . .	. . .	. . .	
12 CM 5057	0.181	0.235	0.009	0.0265	0.617	0.426	0.062	0.004	0.256	0.11	. . .	. . .	. . .	35 x 30
12 CM 5058	0.465	0.338	0.037	0.046	0.206	0.174	0.087	0.007	0.086	0.26	. . .	. . .	0.003	each
12 CM 5059	0.276	0.137	0.012	0.0133	0.412	0.245	0.090	0.004	0.034	0.20	. . .	. . .	. . .	
12 CM 5060	0.583	0.387	0.046	0.037	0.11	0.079	0.188	0.007	0.077	0.18	. . .	. . .	0.0034	Set Only
12 CM 5061	0.371	0.467	0.031	0.031	0.394	0.109	0.290	0.007	0.137	0.24	. . .	. . .	0.0035	
12 CM 5062	0.087	0.692	0.01	0.0051	0.209	0.041	0.491	0.004	0.392	0.075	. . .	. . .	0.0046	
12 CM 5063	0.692	0.282	0.126	0.0278	0.712	0.507	0.280	0.160	0.161	0.019	0.108	0.155	0.132	35 x 30
12 CM 5064	0.982	0.368	0.0308	0.0132	0.342	0.394	0.162	0.083	0.091	0.023	0.063	0.248	0.145	each
12 CM 5065	0.369	0.189	0.0026	0.0172	0.02	0.084	0.228	0.229	0.226	0.176	0.173	0.091	0.051	
12 CM 5066	0.056	0.031	0.0257	0.003	0.058	0.025	0.493	0.303	0.283	0.072	0.242	0.382	0.012	Set Only
12 CM 5067	1.27	0.517	0.0252	0.0396	1.27	0.215	0.094	0.014	0.063	0.130	0.049	0.033	0.168	
12 CM 5068	0.189	0.133	0.0374	0.0449	0.226	0.286	0.377	0.399	0.330	0.108	0.286	0.455	0.19	
12 CM 5076	0.034	0.212	0.0013	0.0066	0.136	0.083	0.0133	. . .	0.073	0.369	. . .	. . .	. . .	30 x 30
12 CM 5077	0.013	0.002	0.022	0.0032	0.026	0.019	0.0020	. . .	0.102	. . .	. . .	. . .	. . .	each
12 CM 5078	0.018	0.061	0.0092	0.0073	0.063	0.0202	0.0026	. . .	0.074	0.129	. . .	. . .	. . .	
12 CM 5079	0.087	0.0146	0.016	0.0064	0.40	0.028	0.0053	. . .	0.085	0.014	. . .	. . .	. . .	Set Only
12 CM 5080	0.088	0.032	0.0097	0.167	0.41	0.0107	0.0032	. . .	0.142	0.029	. . .	. . .	. . .	

1.2.1A Ultra-Low Carbon Steels

	C	Si	S	P	Mn	Ni	Cr	Cu	Al		Size (mm) W x D x H	
12 M BS LC-1	0.0036	(0.026)	0.0013	(0.011)	(0.45)	(0.001)	<0.002	(0.002)	(0.058)		44 x 44 x 13	W
12 M BS LC-1R	0.0013	(0.025)	0.0013	(0.012)	(0.43)	(0.002)	(0.001)	(0.002)	(0.033)	12 M BS LC-1R - LC6	44 x 44 x 13	
12 M BS LC-2	0.0040	(0.025)	0.0024	(0.012)	(0.45)	(0.002)	<0.002	(0.002)	(0.038)	sold as a set of 6 pcs	each	
12 M BS LC-3	0.0054	(0.024)	0.0046	(0.012)	(0.45)	(0.002)	(0.002)	(0.001)	(0.044)		Set only	
12 M BS LC-4	0.0077	(0.024)	0.0070	(0.012)	(0.46)	(0.002)	(0.002)	<0.001	(0.035)	LC1R-LC5 are		
12 M BS LC-5	0.0108	(0.022)	0.0087	(0.012)	(0.46)	(0.001)	(0.002)	<0.002	(0.031)	rectangular blocks.	**Ø H**	
12 M BS LC-6	0.0020	(0.051)	0.0008	(0.0007)	(0.47)	(0.006)	(0.002)	(0.001)	(0.036)	LC6 is a cylindrical disc.	38 x 13	

See page 60 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.2 Residuals in Mild Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	W	Ti	V	As	Size (mm) Ø H	
	12 X 12746T	0.032	0.16	0.08	0.068	1.93	0.21	0.23	0.61	0.50	0.11	0.25	0.01	0.12	0.05	0.01	0.075	40 x 15	C
	12 X 12747T	0.06	0.35	0.025	0.045	1.67	0.38	0.43	0.52	0.41	0.21	0.17	0.025	. . .	0.15	. . .	<0.005	40 x 15	
	12 X 12748S	0.10	0.42	0.044	0.040	1.26	0.45	0.43	0.33	0.33	0.39	0.08	0.09	. . .	0.09	. . .	0.12	40 x 15	
	12 X 12749U	0.21	0.53	0.054	0.041	1.40	0.32	0.49	0.22	0.20	0.46	0.03	0.14	. . .	<0.01	. . .	0.07	40 x 15	
	12 X 12750S	0.202	0.57	0.058	0.022	0.54	0.70	0.70	0.11	0.11	0.61	0.22	0.27	. . .	0.11	. . .	0.12	40 x 15	
	12 X 349	0.24	0.26	0.024	0.021	0.69	0.23	0.10	0.06	0.20	0.006	0.16	0.32	0.08	0.085	0.002	0.005	40 x 15	W
	12 X 350	0.18	0.45	0.032	0.029	0.70	0.18	0.31	0.10	0.15	0.005	0.03	0.35	0.29	0.052	0.002	0.07	40 x 15	
CRM	12 X 352B	0.275	0.414	0.126	0.070	0.200	0.376	0.313	0.261	0.140	0.020	0.110	0.257	0.202	0.29	0.029	0.036	continued	
CRM	12 A 111	0.0258	0.0253	0.0054	0.0033	0.155	0.0387	0.0197	0.0008	0.0171	0.0144	0.0015	0.0348	. . .	0.0004	0.0009	0.0017	continued	

Continuation from above	Nb	Pb	Bi	Se	Sb	Zn	Ca	N	Size (mm) Ø H	
12 X 352B	0.104	0.006	0.008	0.006	0.023	0.005	. . .	(0.006)	42 x 17	W
12 A 111	(0.0005)	. . .	. . .	. . .	. . .	. . .	(0.0002)	0.0034	44 x 50	

		C	Si	S	P	Mn	Co	Total Al	Soluble Al	Nb	V	Pb	B	Sb	Zr	Size (mm) Ø H	
	12 X 353A	0.075	0.10	0.007	0.004	1.01	0.025	0.015	. . .	0.12	0.02	. . .	(0.0004)	0.11	0.09	40 x 15	W
	12 X 354A	0.27	0.19	0.015	0.066	0.86	0.03	0.01	. . .	0.07	0.02	. . .	(0.0002)	0.05	0.03	40 x 15	
	12 X 355A	0.20	0.48	0.024	0.028	0.62	0.05	<0.01	. . .	0.02	0.11	. . .	0.001	0.08	<0.01	40 x 15	
	12 X 356A	0.36	0.37	0.031	0.049	0.44	0.12	0.05	. . .	0.02	0.09	. . .	0.007	0.02	0.01	40 x 15	
	12 X 357A	0.45	0.23	0.062	0.016	0.24	0.21	0.06	. . .	<0.001	0.19	. . .	0.014	<0.005	<0.005	40 x 15	
CRM	12 A 456/2	0.112	0.297	0.0221	0.0212	0.220	0.0504	0.0018	<0.002	0.0057	0.0221	0.0189	0.0015	0.0172	(0.013)	38 x 19	W
CRM	12 A 457/2	0.307	0.105	0.0448	0.0098	0.327	0.0217	0.087	0.082	0.0174	0.153	0.0098	0.0046	0.050	0.025	38 x 19	
CRM	12 A 458/2	0.198	0.504	0.0314	0.0281	0.479	0.198	0.055	0.052	0.0510	0.105	0.0140	0.0069	0.089	(0.062)	38 x 19	
CRM	12 A 459/2	0.467	0.640	0.0481	0.0482	0.909	0.0890	0.0154	0.0134	0.0102	0.0585	0.0044	0.0110	0.0121	0.074	38 x 19	
CRM	12 A 460/2	0.383	0.126	0.0099	0.0374	0.616	0.0106	0.0240	0.0193	0.068	0.0322	0.0005	0.0027	0.0006	<0.0005	38 x 19	

1.2.3 Low Alloy

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	N	Typical Alloy Type	Size (mm) Ø H	
	12 M BS 42A	0.52	0.258	0.078	0.012	1.08	0.147	0.8	0.195	0.285	(0.007)	(0.009)	0.025	0.004	0.008	AISI 4140 mod	35-45 x 19	W
	12 M BS 43A	0.49	0.25	0.026	0.008	0.81	0.24	0.93	0.06	0.18	0.008	0.011	0.003	0.15	0.0074	AISI 6150	35-45 x 19	
	12 M BS 45A	0.133	0.69	0.022	0.016	0.46	0.15	1.16	0.52	0.17	0.009	0.011	0.032	0.004	0.0081	ASTM A182-F11	35-45 x 19	
	12 M BS 46A	0.139	0.18	0.030	0.018	0.55	0.20	2.37	0.93	0.13	0.011	0.008	0.022	0.013	0.0140	ASTM A182-F22	35-45 x 19	
	12 M BS 47B	0.122	0.22	0.022	0.014	0.39	0.105	4.78	0.45	0.12	. . .	0.006	0.018	0.004	0.023	ASTM A182-F5	35-45 x 19	
	12 M BS 48A	0.121	0.68	0.011	0.012	0.43	0.29	8.75	0.95	0.13	0.022	0.014	0.018	0.014	0.021	ASTM A182-F9	35-45 x 19	
	12 M BS 49	0.36	0.93	0.014	0.014	0.33	0.2	3.51	2.40	0.070	2.00	. . .	0.004	0.062	0.019		35-45 x 19	
	12 M BS 51F	0.190	0.24	0.018	0.016	0.52	1.68	0.157	0.224	0.23	0.009	0.009	0.021	0.003	0.0060	AISI 4620	35-45 x 19	
	12 M BS 52D	0.436	0.18	0.088	0.068	0.97	0.18	0.16	0.09	0.060	0.012	0.004	0.028	0.002	0.0025	AISI 1140 mod	35-45 x 19	
	12 M BS 58E	0.100	0.29	0.002	0.009	0.63	3.22	1.40	0.110	0.154	0.013	0.003	0.029	0.006	0.0033	AISI 9310	35-45 x 19	
	12 M BS 60D	0.406	0.22	0.009	0.014	0.82	1.76	0.76	0.23	0.075	0.011	0.004	0.032	0.010	0.0070	AISI 4340	35-45 x 19	
	12 M BS 61D	0.216	0.27	0.025	0.009	0.81	0.44	0.51	0.17	0.19	0.006	0.009	0.023	0.002	0.0098	AISI 8620	35-45 x 19	
	12 M BS 68C	0.38	0.305	0.008	0.018	0.60	0.166	1.77	0.36	0.178	0.011	0.008	1.06	0.007	0.0045	Nitriding	35-45 x 19	
	12 M BS 69B	0.26	1.27	0.013	0.008	1.28	1.71	0.28	0.39	0.086	0.035	0.006	(0.024)	0.002	0.0057	AMS 6418	35-45 x 19	
	12 M BSA485-1	0.98	0.62	0.004	0.019	1.10	0.13	1.07	0.029	0.16	0.010	0.011	0.017	0.003	0.0060	ASTM A485-1	39 x 12	
	12 M BS 1972	0.130	0.24	0.017	0.012	0.51	3.28	1.53	0.052	0.089	0.012	0.006	0.014	0.003	0.0096	AISI 3310	39 x 19	
CRM	12 M BS 1981	0.142	0.666	0.016	0.008	0.490	0.129	1.20	0.470	0.152	0.009	0.007	0.022	0.004	0.0085	F-11	39 x 19	
CRM	12 M BS 1982	0.128	0.255	0.026	0.012	0.441	0.197	2.09	0.89	0.177	0.010	0.013	0.021	0.003	0.0097	F-22	39 x 19	
CRM	12 M BS 2001	0.168	0.22	0.030	0.005	0.67	0.083	0.071	0.019	0.305	0.008	0.012	0.002	0.0006	0.0090	AISI 1018	39 x 19	
	12 M BS 2952	1.03	0.32	0.014	0.013	0.33	0.135	1.36	0.044	0.106	0.007	0.006	0.024	0.005	0.0084	E52100	44 x 19	
CRM	12 M BS 2992	0.195	0.210	0.011	0.008	0.72	0.47	0.53	0.164	0.026	0.010	0.0017	0.036	0.001	0.0042	AISI 8620	44 x 19	
	12 M BS 3961	0.215	0.236	0.022	0.016	0.565	1.67	0.510	0.27	0.133	(0.010)	(0.008)	0.022	(0.002)	0.0079	E4320	44 x 19	
	12 M BS 3962	0.168	0.244	0.018	0.007	0.58	1.83	0.138	0.219	0.146	0.007	0.007	0.023	(0.001)	0.0072	AISI 4617	44 x 19	
	12 M BS 6418	0.255	1.54	0.004	0.010	1.42	1.74	0.34	0.42	0.11	0.010	0.006	0.027	0.003	0.0066	AISI 6418	57 x 12	
	12 M BS 8822	0.228	0.26	0.025	0.011	0.92	0.47	0.52	0.34	0.17	0.019	0.011	0.022	0.003	0.0085	AISI 8822	44 x 12	
	12 M BS 1951	0.30	0.33	0.011	0.009	0.78	0.42	0.49	0.17	0.20	0.007	0.008	0.020	0.004	(0.0091)	AISI 8630	35-45 x 19	W
	12 M BS 1962	0.41	0.242	0.011	0.007	0.94	0.16	1.05	0.229	0.224	0.008	0.010	0.018	0.004	0.0095	AISI 4140	35-45 x 19	
	12 M BS 2971	0.187	0.237	0.024	0.015	1.01	0.111	0.152	0.040	0.065	. . .	(0.005)	0.022	(0.002)	0.0084	LF-2	35-45 x 19	
	12 M BS 2972	0.462	0.204	0.016	0.011	0.70	0.129	0.119	0.021	0.270	. . .	(0.026)	(0.002)	0.024	0.0088	AISI 1045	35-45 x 19	
	12 M BS4330V	0.318	0.240	0.0009	0.008	0.91	1.91	0.91	0.475	0.181	0.011	0.010	0.021	0.094	0.0076	AISI 4330 mod	35-45 x 19	
	12 M BS4340M	0.414	1.65	<0.001	0.004	0.74	0.178	0.78	0.35	0.134	0.013	0.008	0.076	0.056	0.002	AISI 300M	35-45 x 19	
	12 M BS4620	0.189	0.25	0.018	0.006	0.57	1.75	0.072	0.24	0.216	0.012	0.013	0.032	(0.0008)	0.0078	AISI 4620	35-45 x 19	
	12 M BS9325	0.25	0.32	0.007	0.008	0.91	3.29	1.48	0.31	0.13	0.010	0.009	0.030	0.004	0.0089	AISI 9325	38 x 12	C
	12 M BS4820	0.188	0.25	0.025	0.010	0.57	3.29	0.12	0.21	0.11	0.008	(0.008)	0.020	(0.002)	0.0079	AISI 4820	38 x 12	
CRM	12DB E035-2(D)	1.277	0.216	0.0111	0.0038	0.305	0.0190	0.0104	0.0056	0.0085	. . .	. . .	0.0193	. . .	0.0230		35 x 30	HIP
CRM	12 A 112	0.394	0.289	0.0026	0.0043	0.436	1.461	1.236	0.190	0.149	0.0175	0.0086	0.0148	0.0088	0.0024		44 x 50	
CRM	12 A E186-1(D)	0.610	1.72	0.035	0.022	0.870	0.190	0.218	0.048	0.281	. . .	. . .	0.014	. . .	. . .		38 x 30	
CRM	12 T 1750	0.359	0.246	0.075	0.0128	1.801	0.187	0.227	0.0433	0.320	. . .	0.0137	0.0175	0.114	0.0107		38 x 25	W
CRM	12 JN 100LA	1.00	0.28	0.018	0.012	0.33	0.027	1.52	0.012	0.019	0.007	. . .	0.005	0.004	0.0046		34 x 20	W
CRM	12 J 24	0.1744	. . .	0.0010	0.0151	. . .	. . .	1.048	0.578	. . .	. . .	. . .	. . .	. . .	. . .		30 x 15	

See page 60 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.3 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	N	Others	Size (mm) Ø H	
	12 X 15217P	0.52	1.47	0.069	0.072	0.97	0.57	1.04	0.30	0.19	0.195	0.05	0.04	0.78	. . .		40 x 15	C
CRM	**12 X 15251S**	0.734	1.81	0.050	0.048	1.19	1.30	0.778	0.270	0.180	0.295	0.012	0.038	0.485	0.009	As, Ti	43 x 20	
	12 X 15252P	0.094	0.26	0.054	0.082	1.03	2.00	0.75	0.24	0.17	0.15	0.05	0.03	0.35	. . .		40 x 15	
	12 X 15253P	0.19	0.42	0.077	0.065	1.31	0.53	1.49	0.54	0.31	0.07	0.13	0.08	0.25	. . .		40 x 15	
CRM	**12 X 15254W**	0.343	1.00	0.058	0.055	1.24	0.392	2.13	0.80	0.141	0.498	0.045	0.480	0.242	0.015	As, Bi, Nb, Pb	43 x 20	
CRM	**12 X 15255N**	0.41	1.04	0.070	0.12	1.21	0.25	1.46	0.19	0.30	0.060	0.12	0.11	0.43	0.026	As, B, Bi, Nb	40 x 15	
	12 X 15256N	0.09	0.16	0.042	0.046	0.51	3.51	0.32	0.07	0.06	0.28	0.15	0.03	0.64	. . .		40 x 15	
	12 X 15258M	0.49	1.05	0.053	0.060	1.10	0.28	0.28	0.22	0.14	0.33	0.06	0.04	0.24	. . .		40 x 15	
	12 X 15259N	0.67	1.83	0.11	0.043	0.31	3.97	0.47	0.42	0.54	0.11	0.089	0.26	0.40	0.005	W, Ti, Nb, Zr	40 x 15	
	12 X 15260U	0.43	0.31	0.064	0.040	2.02	0.69	3.04	0.11	0.11	0.12	0.03	0.60	0.53	. . .		40 x 15	
	12 X 15261Q	0.59	1.57	0.075	0.115	0.56	0.13	0.49	1.41	0.30	0.31	0.03	1.65	0.13	. . .	W	40 x 15	
	12 X 15266S	0.27	0.14	0.055	0.094	1.03	1.27	4.07	0.28	0.21	0.19	0.01	0.47	0.06	. . .		40 x 15	
	12 X LA1A	0.06	0.73	0.045	0.013	1.32	0.21	0.95	<0.01	0.034	. . .	. . .	<0.01	0.41	. . .		40 x 15	W
	12 X LA2B	0.19	0.97	0.043	0.033	0.55	0.74	0.81	0.10	0.44	<0.01	. . .	1.45	0.09	0.006		44 x 15	
	12 X LA3A	0.48	0.13	0.040	0.032	1.50	0.31	0.37	0.30	0.20	. . .	. . .	0.06	0.19	. . .		40 x 15	
	12 X LA4A	0.67	0.28	0.021	0.044	0.24	0.46	0.64	0.46	0.29	. . .	. . .	0.19	0.36	. . .		40 x 15	
	12 X LA5A	0.81	0.67	0.015	0.057	0.98	0.13	0.12	0.19	0.09	. . .	. . .	0.19	0.58	. . .		40 x 15	
	12 X LA6A	0.01	0.06	0.006	0.005	0.10	0.03	0.03	<0.01	0.01	. . .	. . .	<0.01	<0.01	. . .		40 x 15	
CRM	**12 DB 179-2(D)**	0.598	0.579	(0.0006)	0.0267	0.539	0.078	1.08	0.070	0.111	(0.015)	. . .	. . .	0.188	0.0068	W 1.87	35 x 30	W
CRM	**12 DB 187-1(D)**	0.195	0.026	0.025	0.014	1.354	0.096	1.186	0.035	0.161	0.014	0.011	0.046	. . .	0.014	B 0.0004	35 x 30	
CRM	**12 DB 192-1(D)**	0.1875	0.219	0.0010	0.0029	1.377	0.755	0.0717	0.482	0.0453	0.0055	(0.0030)	0.0308	(0.003)	0.0118		35 x 30	
CRM	**12 DB 193-1(D)**	0.139	0.404	0.0086	0.0063	0.972	1.178	0.182	0.347	0.598	0.0073	. . .	0.0257	(0.0019)	0.0108	As 0.0062	35 x 30	

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	N	O	Others	Size (mm) Ø H
CRM	**12 MI 28C**	0.16	0.25	0.011	0.011	0.76	0.24	0.073	0.042	0.23	0.008	0.016	0.010	0.024	0.0084	0.0074	As, B	31 x 18
CRM	**12 MI 28E**	0.169	0.171	0.0026	0.009	0.68	0.145	0.079	0.033	0.120	0.008	0.010	0.011	0.019	0.0088	0.0052	As	31 x 18
CRM	**12 MI 30E**	0.408	0.264	0.0071	0.011	0.92	0.180	1.06	0.209	0.301	0.012	0.017	0.014	0.005	0.0063	0.0014	As	31 x 18
CRM	**12 MI 31D**	0.412	0.264	0.0053	0.009	0.79	1.71	0.830	0.238	0.171	0.012	0.010	0.023	0.005	0.0084	0.0013	As	31 x 18
CRM	**12 MI 32A**	0.20	0.23	0.024	0.011	0.80	0.49	0.45	0.18	0.12	0.007	0.006	0.003	0.068	0.0093	(0.0037)	Nb, Ti	31 x 18
CRM	**12 MI 32B**	0.20	0.25	0.024	0.016	0.81	0.44	0.54	0.15	0.14	0.009	0.011	0.038	0.004	0.0078	0.0030	B, Nb, Ti	31 x 18
CRM	**12 MI 33B**	0.19	0.22	0.014	0.010	0.54	1.68	0.17	0.22	0.15	0.010	0.010	0.022	0.002	0.0070	0.0020	B, Nb, Ti	31 x 18
CRM	**12 MI 33C**	0.184	0.25	0.017	0.009	0.562	1.71	0.133	0.236	0.223	0.008	0.009	0.025	0.0021	0.0078	0.0021	Ti, W	31 x 18
CRM	**12 MI 34A**	0.51	0.22	0.010	0.01	0.78	0.14	0.99	0.044	0.18	0.009	0.009	0.014	0.17	0.0076	(0.0014)	Nb, Ti	31 x 18
CRM	**12 MI 34B**	0.48	0.29	0.021	0.021	0.81	0.14	0.94	0.053	0.21	0.009	0.012	0.024	0.16	0.0089	0.0018	B, Nb, Ti	31 x 18
CRM	**12 MI 35B**	0.13	0.58	0.015	0.006	0.45	0.084	1.12	0.46	0.11	0.008	0.006	0.016	0.005	0.0079	0.0016	B, Nb, Ti	31 x 18
CRM	**12 MI 35C**	0.115	0.56	0.014	0.012	0.44	0.102	1.09	0.52	0.271	0.011	0.017	0.029	0.005	0.0093	0.0016	As, B, Ti	31 x 18
CRM	**12 MI 36A**	0.099	0.22	0.013	0.006	0.55	0.16	2.08	0.93	0.17	0.012	0.009	0.024	0.008	0.0105	(0.0027)	Nb, Ti	31 x 18
CRM	**12 MI 36B**	0.14	0.21	0.038	0.010	0.49	0.18	2.18	0.95	0.13	0.012	0.008	0.030	0.006	0.0102	0.0018	Nb, Ti	31 x 18
CRM	**12 MI 37B**	0.119	0.235	0.016	0.011	0.431	0.11	4.82	0.470	0.137	0.017	0.008	0.025	0.012	0.0155	0.0024	B, Nb, Ti, W	31 x 18
CRM	**12 MI 49C**	1.04	0.26	0.013	0.009	0.31	0.064	1.35	0.015	0.082	0.007	0.005	0.016	0.008	0.0078	(0.0012)	Nb, Ti	31 x 18
CRM	**12 MI 143B**	0.29	0.28	0.009	0.009	0.48	0.14	0.93	0.20	0.13	0.009	0.012	0.018	0.004	0.008	0.0023	B	31 x 18
CRM	**12 MI 143C**	0.297	0.21	0.011	0.006	0.56	0.155	0.95	0.22	0.22	0.011	0.020	0.038	0.003	0.0089	0.0014	As	31 x 18
CRM	**12 MI 200B**	0.452	0.219	0.026	0.013	0.755	0.089	0.132	0.018	0.228	0.007	0.009	0.003	0.024	0.0097	0.004	Ca, Ti	31 x 18
CRM	**12 MI 209A**	0.34	0.20	0.028	0.007	0.82	0.076	0.065	0.017	0.11	0.006	0.007	0.004	0.055	0.0062	(0.0034)	As, Ti	31 x 18
CRM	**12 MI 209B**	0.321	0.25	0.031	0.008	0.66	0.064	0.08	0.011	0.17	0.007	0.008	0.003	0.024	0.0083	0.0039	As	31 x 18
CRM	**12 MI 210A**	0.39	0.22	0.023	0.015	0.82	0.11	0.11	0.022	0.27	0.008	0.011	0.003	0.052	0.0124	(0.0033)	As	31 x 18
CRM	**12 MI 210B**	0.40	0.20	0.005	0.011	0.67	0.028	0.058	0.016	0.020	0.003	0.0013	0.029	0.0014	0.0059	0.0012	As, V	31 x 18
CRM	**12 MI 213A**	0.16	0.15	0.034	0.015	0.66	0.15	0.15	0.048	0.41	0.008	0.018	0.0018	0.002	0.0082	0.011	As, B, Nb, Pb	31 x 18
CRM	**12 MI 229A**	0.218	0.331	0.010	0.008	0.86	0.029	0.015	0.493	0.014	0.011	0.002	0.027	0.006	0.0071	0.0013	B, Nb, Ti	31 x 18
CRM	**12 MI 252A**	0.419	0.248	0.009	0.024	0.91	0.507	0.501	0.206	0.107	0.008	0.007	0.017	0.005	0.0085	(0.001)	B, Pb, Nb	31 x 18
CRM	**12 MI 252B**	0.419	0.236	0.019	0.007	0.91	0.461	0.486	0.223	0.084	0.005	0.021	0.028	0.004	0.0081	0.0016	B, Sb, Pb	31 x 18

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	V	Ti	Al	Nb	
12 MT 051	0.43	0.63	0.031	0.043	1.45	0.97	1.09	0.31	0.48	0.08	0.12	0.12	0.13	0.06	
12 MT 484	0.22	0.42	0.034	0.050	1.28	0.49	1.22	0.27	0.23	0.11	0.14	0.25	0.25	0.22	continued
12 MT 697	0.150	1.49	0.045	0.053	1.51	1.60	1.37	1.03	1.00	0.47	0.44	0.28	0.65	0.20	

Continuation from above	Zr	Ta	B	Sn	Pb	As	Ce	Size (mm) Ø H	
12 MT 051	0.1	. . .	0.006	0.081	. . .	(0.037)	<0.005	various	C
12 MT 484	0.04	0.15	. . .	0.061	0.0026	0.016	0.016		
12 MT 697	0.090	. . .	. . .	. . .	. . .	. . .	. . .		

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	V	W	Al	N	O	Size (mm) Ø H	
CRM	**12 MI 164A**	0.004	0.019	0.070	0.004	1.57	1.29	0.032	0.009	0.88	0.006	0.78	1.44	0.72	0.0003	0.0005	31 x 18	W
CRM	**12 MI 165A**	0.003	0.021	0.086	0.005	1.65	1.43	0.036	0.009	1.40	0.006	1.13	1.57	0.80	0.0004	0.0004	31 x 18	
CRM	**12 MI 166A**	0.003	0.91	0.073	0.005	1.29	0.77	0.014	1.08	0.64	0.004	0.40	1.02	0.55	0.0002	0.0006	31 x 18	
CRM	**12 MI 167A**	0.003	1.08	0.087	0.019	1.36	1.00	0.016	1.25	0.95	0.003	0.59	1.19	0.64	0.0005	0.0007	31 x 18	
CRM	**12 MI 168A**	0.003	0.46	0.064	0.030	0.12	2.32	0.004	0.69	0.009	0.003	0.004	0.52	0.19	0.0002	0.0008	31 x 18	
CRM	**12 MI 169A**	0.31	0.79	0.065	0.033	0.21	2.50	2.19	0.95	0.31	0.005	0.006	0.65	0.30	0.0004	0.0006	31 x 18	
CRM	**12 MI 172A**	0.78	1.29	0.004	0.007	0.010	0.025	3.52	0.014	0.40	0.006	0.003	0.038	0.39	0.0004	0.0006	31 x 18	
CRM	**12 MI 173A**	0.85	1.70	0.004	0.015	0.011	0.024	4.39	0.015	0.72	0.010	0.28	0.041	0.48	0.0006	0.0007	31 x 18	
CRM	**12 MI 180A**	0.007	0.023	0.046	0.004	0.41	1.29	0.037	0.006	0.89	0.004	0.76	1.48	0.76	0.0096	0.0006	31 x 18	
CRM	**12 MI 181A**	0.007	0.026	0.095	0.004	1.76	1.40	0.044	0.009	1.45	(0.004)	1.12	1.65	0.87	0.0185	0.0006	31 x 18	

See page 61 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.3 Low Alloy (continued)															Size (mm)	
	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	V	Ti	Nb	Others	Ø H	
CRM 12 HY K3	1.03	0.32	0.010	(0.02)	0.46	0.18	1.63	. . .	0.09	. . .	. . .	. . .	. . .		32-35 x 19	
CRM 12 HY K4	0.52	0.46	0.025	(0.02)	0.84	(0.1)	1.23	. . .	0.28	. . .	0.20	. . .	. . .		32-35 x 19	
CRM 12 HY K6	0.51	0.30	0.026	(0.02)	0.79	1.72	0.96	0.37	0.26	. . .	. . .	. . .	. . .		32-35 x 19	
CRM 12 HY K9	0.096	0.59	0.018	(0.01)	1.53	0.97	0.64	0.56	0.73	(0.01)	0.27	0.11	(0.04)		32-35 x 19	
12 T 1749	0.4	0.19	0.015	0.01	0.733	0.19	1.734	0.257	0.188	1.034	(0.003)	0.003	. . .		41 x 25	C
12 CM 5127	0.076	1.64	0.0094	0.0072	1.1	0.025	0.013	0.02	0.034	0.019	0.391	0.272	0.012		35 x 25	
12 CM 5128	0.222	1.18	0.037	0.023	0.95	0.224	0.254	0.532	0.148	0.235	0.34	0.574	0.088		each	
12 CM 5129	0.316	0.568	0.013	0.047	0.613	0.782	1.46	0.116	0.239	0.19	0.451	0.299	0.022			
12 CM 5130	0.625	0.548	0.034	0.045	0.758	0.742	1.06	0.212	0.378	0.019	0.195	0.65	0.067		Set Only	
12 CM 5131	0.42	0.127	0.019	0.015	1.39	1.5	0.465	0.333	0.135	0.092	0.029	0.076	0.033			
12 CM 5132	0.847	0.752	0.013	0.027	0.29	0.441	0.753	0.484	0.233	. . .	0.132	. ..	0.041			
12 CM 5133	0.17	0.248	0.025	0.016	1.73	0.077	0.416	0.062	0.116	0.055	0.061	0.12	0.072			
12 CM 5124	1.12	0.815	0.04	0.038	0.1	2.45	1.05	0.03	0.043	0.492	0.479	0.407	. . .	Sn	35 x 30	
12 CM 5125	0.015	0.098	0.013	0.071	2.06	0.048	2.6	1.06	0.498	0.0038	0.0051	0.666	. . .	Sn	each	
12 CM 5126	0.654	1.57	0.059	0.0066	1.06	1.05	0.095	0.532	0.894	0.203	1.02	0.0029	. . .	Sn	Set Only	
12 CM 5112	0.542	0.194	0.007	0.018	0.56	0.011	0.018	. . .	0.015	0.005	. . .	. . .	. . .	N, As	32 x 28	
12 CM 5113	0.07	0.029	0.023	0.011	1.04	0.375	0.355	. . .	0.382	0.019	. . .	. . .	. . .	N, As	each	
12 CM 5114	0.025	0.85	0.0185	0.008	0.134	0.023	0.047	. . .	0.017	0.02	. . .	. . .	. . .	N, As		
12 CM 5115	0.531	0.123	0.022	0.033	1.35	0.192	0.202	. . .	0.197	0.028	. . .	. . .	. . .	N, As		
12 CM 5116	0.108	0.545	0.059	0.049	0.337	0.474	0.512	. . .	0.48	0.033	. . .	. . .	. . .	N, As	Set Only	
12 CM 5117	0.336	0.283	0.01	0.019	0.6	0.312	0.314	. . .	0.316	0.013	. . .	. . .	. . .	N, As		
12 CM 5118	0.549	0.39	0.012	0.02	1.21	0.018	0.41	. . .	0.302	0.036	. . .	. . .	. . .	N, As		
12 CM 5119	0.224	0.7	0.061	0.063	1.02	0.117	0.139	. . .	0.13	0.034	. . .	. . .	. . .	N, As		
12 CM 5120	0.475	0.261	0.03	0.019	0.7	0.0041	0.0077	. . .	0.0064	. . .	. . .	. . .	. . .	N, As		
12 CM 5099	0.367	0.621	0.019	0.026	0.86	0.242	0.901	0.35	0.253	. . .	. . .	. . .	. . .		32 x 28	
12 CM 5100	0.265	0.378	0.04	0.03	1.12	0.135	1.27	0.44	0.303	. . .	. . .	. . .	. . .		each	
12 CM 5101	0.105	0.113	0.01	0.043	1.75	0.064	1.76	0.601	0.113	. . .	. . .	. . .	. . .			
12 CM 5102	0.658	1.55	0.025	0.0042	0.271	0.403	0.313	0.093	0.576	. . .	. . .	. . .	. . .		Set Only	
12 CM 5103	0.454	1.03	0.046	0.012	0.66	0.391	0.597	0.255	0.513	. . .	. . .	. . .	. . .			
12 CM 5011	0.158	1.6	0.038	0.051	1.69	0.271	0.535	0.116	0.492	. . .	0.128	. . .	. . .	W	35 x 30	
12 CM 5012	0.471	0.98	0.051	0.026	0.855	0.386	0.042	0.223	0.301	. . .	0.209	. . .	. . .	W	each	
12 CM 5013	0.294	1.43	0.028	0.039	1.08	0.178	0.146	0.029	0.106	. . .	0.065	. . .	. ..	W		
12 CM 5014	0.221	1.18	0.006	0.014	1.37	0.104	0.31	0.034	0.102	. . .	0.016	. . .	. . .	W	Set Only	
12 CM 5038	0.483	0.194	0.041	0.01	0.343	1.09	0.717	1.02	0.497	0.484	0.3	0.141	0.212	Co, B, Zr, As, Pb	35 x 25	
12 CM 5039	0.658	0.069	0.0018	0.0044	0.12	0.774	0.35	0.266	0.358	1.51	0.447	0.483	0.025	Co, Zr, As, Sn	each	
12 CM 5040	0.106	0.481	0.014	0.022	0.107	1.46	1.45	1.21	0.108	0.08	0.083	0.099	. . .	Co, B, Zr, As, Pb		
12 CM 5041	0.345	0.41	0.052	0.036	0.674	1.94	1.04	0.116	0.999	0.271	0.198	0.242	0.311	Co, B, Zr, As, Pb	Set Only	
12 CM 5042	0.211	0.174	0.021	0.046	1.36	0.487	0.124	0.472	0.233	0.866	0.619	0.812	0.139	Co, B, Zr, As, Sn		
12 CM 5043	0.034	0.663	0.011	0.069	1.96	0.102	1.93	0.674	0.08	0.0093	0.042	0.017	0.218	Co, B, Zr, As, Sn		
12 CM 5069	0.477	0.351	0.031	0.0193	1.15	0.787	0.05	0.088	0.0117	0.471	0.072	0.046	. . .	W, B	32 x 28	
12 CM 5070	0.278	1.7	0.052	0.031	0.295	0.847	1.41	0.58	0.139	0.0092	0.143	0.232	. . .	W, B	each	
12 CM 5071	0.0425	0.919	0.021	0.0068	0.429	0.648	0.92	0.22	0.125	0.066	0.135	0.066	. . .	W, B		
12 CM 5072	0.425	0.204	0.034	0.042	0.405	1.99	0.416	0.49	0.244	0.57	0.234	0.177	. . .	W, B	Set Only	
12 CM 5073	0.541	0.452	0.0036	0.0107	0.63	1.29	0.313	0.38	0.029	0.434	0.15	0.164	. . .	W, B		
12 CM 5074	0.163	0.367	0.04	0.036	1.31	0.521	1.52	0.46	0.179	0.287	0.21	0.126	. . .	W, B		
12 CM 5075	0.347	1.37	0.013	0.046	0.385	3.18	0.62	0.31	0.03	0.281	0.037	0.077	. . .	W, B		

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Al	V	W	Ti	Sn	N	Size (mm) Ø H	
CRM 12 A 404/1	0.74	0.87	0.024	0.057	0.31	0.40	0.48	0.31	0.34	. . .	. . .	0.11	. . .	. . .	. . .	. . .	38 x 19	W
CRM 12 A 401/2	0.935	0.602	0.0078	0.0265	1.197	0.019	0.138	0.495	0.101	0.0042	0.074	0.496	. . .	. . .	. . .	(0.015)	38 x 19	W
CRM 12 A 402/2	1.311	0.111	0.0138	0.0161	0.228	0.808	0.652	0.140	0.302	. . .	0.161	0.194	. . .	. . .	. . .	0.0069	38 x 19	
CRM 12 A 403/2	0.750	0.209	0.0381	0.055	1.677	0.223	0.463	0.088	0.221	. . .	0.0485	0.341	. . .	. . .	. . .	(0.01)	38 x 19	
CRM 12 A 404/2	0.696	1.121	0.0228	0.0479	0.532	0.393	0.774	0.307	0.427	. . .	0.017	0.107	. . .	. . .	. . .	0.0089	38 x 19	
CRM 12 A 405/2	0.044	0.947	0.058	0.0095	0.903	0.102	0.206	0.025	0.022	(0.009)	0.330	0.411	. . .	. . .	. . .	(0.011)	38 x 19	
CRM 12 A 406/2	0.173	0.342	0.043	0.0102	0.447	1.62	2.001	0.98	0.289	(0.006)	0.013	0.010	. . .	. . .	(0.001)	(0.009)	38 x 19	W
CRM 12 A 407/2	0.490	0.66	0.0105	0.038	0.195	0.527	3.03	0.83	0.397	0.0068	0.040	0.19	. . .	. . .	. . .	(0.011)	38 x 19	
CRM 12 A 408/2	0.289	0.237	0.030	0.056	0.557	4.13	0.111	0.098	0.694	. . .	0.154	0.067	. . .	. . .	(0.002)	0.0075	38 x 19	
CRM 12 A 409/2	0.086	1.18	0.0179	0.0141	0.559	3.02	1.318	0.599	0.205	. . .	0.094	0.008	. . .	. . .	. . .	0.0108	38 x 19	
CRM 12 A 410/2	0.428	1.10	0.041	0.074	0.419	2.07	1.684	0.432	0.436	0.0248	0.046	0.44	. . .	. . .	. . .	0.0155	38 x 19	
CRM 12 A 612/1	0.12	0.28	(0.02)	. . .	0.60	0.97	4.14	0.80	(0.06)	. . .	. . .	0.21	. . .	. . .	. . .	. . .	44 x 19	C
CRM 12 A 613/1	0.20	0.58	(0.02)	. . .	0.96	2.01	1.99	1.04	(0.06)	. . .	. . .	0.30	. . .	. . .	. . .	. . .	44 x 19	
CRM 12 A 614/1	0.41	0.39	(0.02)	. . .	1.30	3.05	1.18	0.60	(0.06)	. . .	. . .	0.27	. . .	. . .	. . .	. . .	44 x 19	
CRM 12 A 615/1	0.30	0.17	(0.02)	. . .	1.68	4.01	0.49	0.21	(0.06)	. . .	. . .	0.1	. . .	. . .	. . .	. . .	44 x 19	
12 CM 2111	0.125	0.484	0.0434	0.0103	1.19	0.413	0.63	. . .	0.154	. . .	. . .	. . .	0.90	0.132	. . .	. . .	32 x 28	
12 CM 2112	0.0226	0.581	0.037	0.0104	0.807	0.294	1.40	. . .	0.040	. . .	. . .	. . .	1.22	0.276	. . .	. . .	each	
12 CM 2113	0.345	0.688	0.0226	0.0210	0.554	0.145	0.095	. . .	0.018	. . .	. . .	. . .	1.73	0.066	. . .	. . .		
12 CM 2114	0.500	0.967	0.0059	0.0289	0.420	0.045	0.303	. . .	0.061	. . .	. . .	. . .	2.28	0.060	. . .	. . .	Set Only	
12 CM 2115	0.691	1.098	0.0031	0.0361	0.340	0.044	0.96	. . .	0.017	. . .	. . .	. . .	2.88	0.057	. . .	. . .		

See page 61 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.3 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	Ti	Nb	Zr	Size (mm) Ø H	
CRM	12 HY B1	0.98	1.79	0.020	0.019	0.075	4.08	1.83	. . .	0.50	. . .	. . .	. . .	. . .	. . .	. . .	0.074	32-35 x 19	
CRM	12 HY B1/1	0.97	1.58	0.032	0.017	0.205	3.96	1.66	. . .	0.14	. . .	. . .	. . .	. . .	. . .	. . .	0.001	32-35 x 19	
CRM	12 HY B2/2	0.065	0.38	0.064	0.087	1.22	1.49	. . .	1.06	0.32	. . .	. . .	0.10	0.87	0.25	. . .	. . .	32-35 x 19	
CRM	12 HY B4	0.55	1.72	0.043	0.047	1.07	. . .	. . .	. . .	0.49	. . .	. . .	. . .	. . .	. . .	. . .	0.09	32-35 x 19	
CRM	12 HY B5/1	0.12	0.41	0.054	0.023	1.85	1.99	0.09	1.39	0.15	. . .	. . .	0.35	0.50	0.53	. . .	. . .	32-35 x 19	
CRM	12 E 500	0.106	0.282	0.0048	0.016	0.844	0.018	0.612	0.0013	0.270	0.0046	0.002	0.046	0.0092	0.0014	0.008	. . .	35 x 20	
CRM	12 E 501	0.277	0.208	0.030	0.016	0.723	0.063	1.05	0.210	0.083	0.008	0.008	0.034	0.0076	0.0015	. . .	. . .	35 x 20	
CRM	12 E 502	0.210	0.198	0.026	0.018	0.823	0.408	0.485	0.155	0.121	0.0083	. . .	0.024	. . .	0.0016	. . .	. . .	35 x 20	
	12 M BS12B	0.95	0.365	0.010	0.010	0.081	0.127	1.58	0.30	0.12	0.023	0.024	0.016	0.105	0.055	0.156	0.005		
	12 M BS13B	0.211	0.015	0.005	0.018	0.316	0.43	0.081	0.050	0.023	0.19	0.061	0.016	0.010	0.004	0.003	(0.01)	continued	
	12 M BS14B	0.642	1.26	0.006	0.028	1.71	0.95	0.050	0.004	1.14	0.009	0.097	0.024	0.010	0.030	0.041	<0.001		
	12 M BS15A	0.142	0.058	0.008	0.016	1.12	0.029	0.044	0.008	0.030	0.005	0.002	0.041	0.012	0.008	0.041	0.022		
CRM	12 M BS CCS-2	0.200	0.310	0.040	0.046	0.885	0.314	0.269	0.100	0.096	0.055	0.017	0.038	0.080	0.037	0.049	0.002		
	12 M BS XCCS	0.042	0.010	0.014	0.003	0.32	0.017	0.014	0.005	0.018	0.003	0.006	0.069	<0.002	<0.001	<0.002	<0.002	continued	
	12 M BS XCCT	0.158	0.28	0.011	0.005	0.52	1.27	0.65	0.020	0.027	0.017	0.002	0.006	0.031	0.002	0.001	<0.002		
	12 M BS XCCV	0.44	0.28	0.024	0.012	1.75	0.018	0.041	0.007	0.015	0.006	0.001	0.033	<0.003	0.002	<0.002	<0.002		
	12 CG 01666	0.162	0.191	0.0096	0.044	0.626	3.29	3.03	0.331	0.314	. . .	0.0045	0.033	0.215	0.227	. . .	. . .		
	12 CG 01667	0.137	0.105	0.057	0.058	3.74	4.22	0.864	0.061	0.063	. . .	0.064	0.018	0.503	0.345	. . .	. . .		
	12 CG 01668	0.227	0.324	0.021	0.038	0.771	1.15	2.22	0.577	0.244	. . .	0.010	0.054	0.347	0.335	. . .	. . .		
	12 CG 01669	0.061	0.104	0.020	0.049	2.71	2.86	4.88	1.41	0.342	. . .	0.036	0.012	0.404	0.109	. . .	. . .	continued	
	12 CG 01670	0.193	0.242	0.027	0.030	1.03	1.78	1.42	0.811	0.121	. . .	0.0098	0.043	0.215	0.202	. . .	. . .		
	12 CG 01671	0.273	0.458	0.036	0.034	1.92	0.924	3.59	0.196	0.247	. . .	0.028	0.170	0.301	0.116	. . .	. . .		
	12 CG 01672	0.481	0.920	0.055	0.0072	0.345	0.151	0.194	0.422	0.526	. . .	0.0042	0.440	0.013	0.046	. . .	. . .		
	12 CG 01673	0.435	0.551	0.0007	0.032	0.452	0.177	0.147	0.447	0.539	. . .	0.0072	0.551	0.061	0.051	. . .	. . .		
CRM	12 HY A11/1	0.043	1.46	0.0137	0.011	0.21	0.04	0.02	1.20	0.047	. . .	0.002	0.02	0.46	0.17	0.16	. . .		
CRM	12 HY A12	0.031	1.19	0.082	0.014	0.31	2.43	1.25	0.47	0.18	0.012	. . .	0.18	0.042	0.05	(0.03)	. . .		
CRM	12 HY A13	0.104	0.81	0.073	0.053	0.49	1.93	0.14	0.91	0.166	0.011	0.060	0.042	0.23	0.11	. . .	. . .		
CRM	12 HY A14	0.12	0.73	0.052	0.041	0.75	1.32	0.59	0.25	0.20	0.070	0.10	(0.01)	0.67	0.12	0.044	. . .		
CRM	12 HY A15	0.34	0.70	0.042	0.071	0.99	0.32	0.79	0.55	0.29	. . .	0.13	0.03	0.80	0.09	0.16	. . .	continued	
CRM	12 HY A16/1	0.36	0.55	0.023	0.063	1.13	0.92	1.45	0.062	0.25	. . .	0.007	0.10	0.44	0.085	. . .	. . .		
CRM	12 HY A17	0.78	0.37	0.024	0.039	1.79	0.59	0.24	0.074	0.53	0.039	0.05	0.016	0.15	0.022	0.043	. . .		
CRM	12 HY A18	1.16	0.15	0.007	0.014	1.99	0.125	0.90	. . .	0.066	. . .	0.016	(0.02)	0.10	0.011	0.035	. . .		
CRM	12 HY A19/1	0.22	0.33	0.016	0.019	0.84	0.11	1.04	0.012	0.11	. . .	0.004	0.10	0.34	0.23	0.12	. . .		
CRM	12 HY B3	0.20	0.53	0.025	(0.012)	0.14	. . .	5.94	. . .	0.25	. . .	. . .	. . .	1.16	. . .	. . .	. . .		
CRM	12 HY B12	0.43	0.34	0.048	0.028	0.76	1.62	1.32	0.21	0.41	0.011	0.032	0.007	0.026	0.011	0.022	(0.002)		
CRM	12 HY B14	1.16	1.21	0.005	0.028	0.65	0.16	3.17	1.25	0.107	0.30	. . .	. . .	0.14	0.26	0.41	. . .		
CRM	12 HY B15	0.98	0.80	0.031	0.030	0.69	0.15	3.70	1.20	0.14	0.21	. . .	0.13	0.33	0.32	. . .	. . .	continued	
CRM	12 HY B16	0.16	1.95	0.051	0.068	2.05	3.74	0.26	0.11	0.09	. . .	. . .	(0.037)	0.53	0.075	0.11	. . .		
CRM	12 HY B20	0.008	0.005	0.013	0.012	0.09	0.038	0.03	<0.01	0.034	<0.01	(0.003)	(0.01)	<0.005	<0.002	. . .	. . .		

Continuation from above	Sb	Se	Pb	As	Ca	Ta	B	Ce	W	Mg	N	Zn	O	Size (mm) Ø H	
12 M BS12B	0.014	0.012	0.004	0.002	0.0008	0.024	<0.00005	0.020	0.014	(0.0003)	0.0141	0.0003	(0.007)	32 x 17	cc
12 M BS13B	0.027	0.023	0.0009	0.050	<0.0001	0.005	<0.0002	<0.0005	0.04	(0.00005)	0.0099	0.0003	(0.02)	32 x 17	
12 M BS14B	0.043	0.025	0.021	0.010	0.0012	(0.002)	(0.00002)	0.009	(0.002)	(0.0004)	0.0090	0.0009	(0.005)	32 x 17	
12 M BS15A	(0.003)	. . .	(0.0003)	0.003	(0.0005)	. . .	(0.0002)	(0.003)	(0.004)	. . .	. . .	. . .	. . .	32 x 17	
12 M BS CCS-2	0.024	. . .	0.0032	0.016	(0.0001)	0.02	0.0037	. . .	0.042	. . .	(0.0006)	. . .	(0.0010)	36-41 x 19	w
12 M BS XCCS	0.0006	. . .	<0.002	0.003	. . .	. . .	. . .	. . .	. . .	. . .	0.0047	. . .	0.0027	36-41 x 19	
12 M BS XCCT	0.0004	. . .	<0.001	0.004	. . .	. . .	. . .	. . .	. . .	. . .	0.0076	. . .	(0.005)	36-41 x 19	
12 M BS XCCV	<0.0003	. . .	<0.001	0.002	. . .	. . .	. . .	. . .	. . .	. . .	0.0056	. . .	(0.0018)	36-41 x 19	
12 CG 01666	. . .	. . .	0.0009	0.019	. . .	. . .	0.0061	0.018	0.457	. . .	0.010	. . .	. . .	38 x 30	
12 CG 01667	. . .	. . .	0.0011	0.028	. . .	. . .	0.0005	0.0006	0.109	. . .	0.0079	. . .	. . .	each	
12 CG 01668	. . .	. . .	. . .	0.011	. . .	. . .	0.0044	0.0019	0.755	. . .	0.0054	. . .	. . .		
12 CG 01669	. . .	. . .	. . .	0.016	. . .	. . .	0.0019	. . .	1.99	. . .	0.035	. . .	. . .	Set only	
12 CG 01670	. . .	. . .	0.0018	0.040	. . .	. . .	0.0052	. . .	0.775	. . .	0.026	. . .	. . .		
12 CG 01671	. . .	. . .	0.0007	0.025	. . .	. . .	0.011	. . .	0.210	. . .	0.027	. . .	. . .		
12 CG 01672	. . .	. . .	0.015	0.0047	. . .	. . .	0.030	. . .	0.429	. . .	0.0068	. . .	. . .		
12 CG 01673	. . .	. . .	0.0014	0.0063	. . .	. . .	0.023	0.128	0.237	. . .	0.0044	. . .	. . .		
12 HY A11/1	<0.001	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	w
12 HY A12	0.013	. . .	. . .	0.007	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A13	0.024	. . .	. . .	0.070	. . .	. . .	(0.002)	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A14	0.047	. . .	. . .	0.13	. . .	. . .	0.004	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A15	. . .	. . .	(0.004)	0.06	. . .	. . .	0.008	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A16/1	<0.001	. . .	. . .	0.007	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A17	(0.10)	. . .	. . .	0.032	. . .	. . .	(0.012)	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A18	0.005	. . .	. . .	0.003	. . .	. . .	(0.011)	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY A19/1	<0.001	. . .	. . .	. . .	. . .	. . .	0.006	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1.19	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B12	. . .	. . .	. . .	0.011	. . .	. . .	0.0035	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B14	. . .	. . .	. . .	. . .	. . .	. . .	0.0006	(0.002)	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B16	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	
12 HY B20	. . .	. . .	(0.002)	(0.003)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32-35 x 19	

See page 61 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.3 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ca	Co	
	12 M BS 2931	0.202	0.23	0.025	0.012	0.75	0.106	0.154	0.019	0.23	0.010	0.002	0.0009	0.009	
	12 M BS 4931	0.352	0.27	0.016	0.011	0.80	0.070	0.093	0.024	0.217	0.009	(0.001)	. . .	0.006	
	12 M BS 4932	0.234	0.25	0.015	0.010	0.76	0.080	0.144	0.033	0.15	0.008	(0.001)	0.001	0.005	continued
CRM	**12 M BS 3993**	0.152	0.260	0.094	0.012	1.16	0.045	0.072	0.010	0.111	0.006	0.002	(0.0002)	0.006	
	12 M BS LF3	0.183	0.206	0.018	0.006	0.52	3.36	0.098	0.056	0.08	0.006	0.017	(0.0001)	0.056	
	12 M BS 230	0.387	0.302	0.027	0.016	0.86	0.052	0.81	0.22	0.030	0.001	0.042	. . .	0.007	
	12 M BS 231	0.84	0.39	0.051	0.036	1.42	0.105	0.135	0.145	0.054	0.027	0.020	<0.001	0.117	
	12 M BS 232	0.032	1.11	0.018	0.154	0.44	0.058	0.112	0.55	0.049	0.007	0.085		0.007	
	12 M BS 233	0.071	0.28	0.0043	0.022	2.00	0.018	0.031	0.006	0.013	(0.001)	0.040	(0.002)	0.005	continued
	12 M BS 3972	0.195	0.106	0.056	0.083	1.30	1.19	0.108	0.032	0.082	0.012	0.031	. . .	0.010	
	12 M BS 4971	0.251	0.215	0.033	0.050	0.56	0.088	0.402	0.027	0.106	0.010	0.03	<0.0005	0.02	

Continuation from above	As	V	N	O	B	Ti	Nb	Sb	W	Typical Alloy Type	Size (mm) Ø H	
12 M BS 2931	0.007	0.002	0.0119	0.005	. . .	. . .	. . .	. . .	. . .	AISI 1018	37-38 x 19	W
12 M BS 4931	0.005	0.058	0.008	0.0034	. . .	(0.002)	. . .	. . .	. . .	AISI 1035	37-38 x 19	
12 M BS 4932	(0.005)	0.06	0.008	0.0028	. . .	. . .	. . .	. . .	. . .	AISI 1026	37-38 x 19	
12 M BS 3993	0.004	0.002	0.0071	(0.003)	. . .	(0.0008)	. . .	. . .	. . .	AISI 1117	37-38 x 19	
12 M BS LF3	0.006	(0.002)	0.0054	0.004	0.0001	. . .	. . .	. . .	. . .	ASTM A350	37-38 x 19	
											W D H	
12 M BS 230	0.004	0.004	0.0048	0.0024	. . .	(0.001)	<0.002	. . .	(0.002)		32 x 32 x 19	
12 M BS 231	0.022	0.108	0.0045	(0.004)	0.0028	0.001	0.006	0.050	0.001		32 x 32 x 19	
12 M BS 232	0.008	0.088	0.0056	(0.002)	0.0005	0.26	(0.002)	(0.002)	<0.003		32 x 32 x 19	
12 M BS 233	0.004	0.103	0.0107	. . .	. . .	0.0017	0.040	. . .	<0.005		32 x 32 x 19	
12 M BS 3972	0.012	0.191	0.0065	0.0038	0.0104	0.163	(0.001)	. . .	<0.008		35 x 35 x 19	
12 M BS 4971	0.008	0.015	0.0099	0.004	. . .	0.027	0.033	. . .	(0.001)		35 x 35 x 19	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	Ti	Co	V	Size (mm) Ø H
12 RI 103	0.045	1.53	0.030	0.021	1.36	0.200	1.20	0.18	0.110	0.043	0.080	0.029	0.590	45 x 20
12 RI 104	0.250	1.62	0.020	0.039	2.05	1.425	0.71	0.98	0.450	0.178	0.185	0.077	0.380	45 x 20
12 RI 107	0.140	0.15	0.024	0.025	2.37	6.310	0.29	0.28	0.200	0.98	0.063	0.007	0.105	45 x 20
12 RI 108	0.520	0.48	0.019	0.020	0.57	0.250	0.22	0.04	0.105	0.020	. . .	0.008	0.020	45 x 20

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	Ti	Nb	
CRM	**12 D 180B**	(0.003)	0.001	0.0038	0.004	0.047	0.018	0.013	0.001	0.006	0.003	0.0011	(0.001)	0.000	0.000	(0.0001)	
CRM	**12 D 181A**	0.225	0.435	0.007	0.039	0.971	0.725	0.660	0.385	0.093	0.050	0.113	0.016	0.302	0.149	0.058	
CRM	**12 D 182A**	1.38	0.123	0.006	0.008	0.370	2.82	0.122	0.011	0.293	0.171	0.004	0.023	0.027	0.004	0.001	
CRM	**12 D 183A**	0.047	1.02	0.012	0.009	1.74	1.09	0.204	0.036	0.568	0.119	0.051	0.15	0.004	0.003	0.006	
CRM	**12 D 184A**	1.013	0.348	(0.01)	0.028	2.23	0.250	2.33	0.016	0.089	0.007	0.008	0.022	0.017	0.010	0.013	continued
CRM	**12 D 185A**	0.566	0.23	(0.02)	0.024	0.715	3.84	0.032	0.123	0.179	0.032	0.003	0.060	0.178	0.022	0.20	
CRM	**12 D 186A**	0.393	1.41	0.007	0.013	1.315	1.58	1.51	0.255	0.227	0.006	0.018	0.042	0.021	0.047	0.004	
CRM	**12 D 187A**	0.119	0.567	0.018	0.035	0.525	0.085	3.51	0.565	0.036	0.071	0.013	0.019	0.558	0.087	0.028	
CRM	**12 D 188A**	0.332	0.775	0.033	0.006	0.169	0.445	5.11	1.28	0.057	0.006	0.005	0.093	0.802	0.034	0.122	
CRM	**12 D 189A**	0.175	0.286	0.051	0.032	0.262	5.34	1.065	0.837	0.060	0.007	0.029	0.041	0.054	0.326	0.017	

Continuation from above	Zr	Sb	Pb	As	Ta	B	W	Bi	N	Size (mm) Ø H
12 D 180B	0.000	0.0004	. . .	0.001	. . .	. . .	. . .	. . .	(0.0028)	45 x 30
12 D 181A	0.001	0.016	0.0005	0.027	0.039	0.0069	0.188	. . .	(0.005)	45 x 30
12 D 182A	0.001	0.001	. . .	0.005	0.000	0.0003	0.016	. . .	0.0049	45 x 30
12 D 183A	0.078	0.001	. . .	0.005	. . .	0.0005	0.354	0.0000	0.0036	45 x 30
12 D 184A	(0.002)	0.002	. . .	0.006	0.000	0.0005	(0.001)	. . .	0.0104	45 x 30
12 D 185A	0.002	0.011	0.002	0.022	0.085	0.0116	(0.001)	. . .	0.0051	45 x 30
12 D 186A	(0.002)	0.002	. . .	0.007	0.009	0.0009	0.054	. . .	(0.005)	45 x 30
12 D 187A	0.013	0.023	0.003	(0.007)	0.015	0.0006	0.67	0.003	0.0122	45 x 30
12 D 188A	0.052	0.006	0.001	(0.005)	0.022	0.0047	0.091	. . .	0.0076	45 x 30
12 D 189A	0.005	(0.003)	0.002	0.080	(0.005)	0.0030	1.30	. . .	(0.004)	45 x 30

	C	Si	S	P	Mn	Ni	Cr	Cu	Soluble Al	Total Al	Sn	V	Ti	Zr	Sb	B	N	Size (mm) Ø H
12 CG 01385	0.022	4.14	0.0091	0.076	1.88	0.182	0.289	0.559	1.18	1.19	0.071	0.0046	0.072	0.021	0.0008	0.022	0.0046	37 x 30
12 CG 01386	0.063	1.50	0.017	0.062	1.42	0.368	0.222	0.250	0.46	0.464	0.033	0.0061	0.032	0.084	0.0012	0.013	0.0061	each
12 CG 01387	0.106	1.03	0.029	0.045	0.547	0.569	0.186	0.146	0.777	0.783	0.019	0.0058	0.026	0.018	0.0011	0.012	0.0058	
12 CG 01388	0.120	0.163	0.037	0.040	0.257	0.836	0.090	0.157	1.46	1.47	0.017	0.0024	0.014	0.014	0.0004	0.0087	0.0024	Set only
12 CG 01389	0.040	4.16	0.031	0.020	1.10	0.101	0.043	0.063	0.066	0.069	0.0055	0.0025	0.011	0.0034	0.021	0.0055	0.0025	
12 CG 01390	0.033	3.39	0.0087	0.019	2.08	0.060	0.627	0.350	0.0047	0.0067	0.105	0.0050	0.036	0.0035	0.0011	0.022	0.0050	
12 CG 01391	0.036	2.47	0.011	0.061	1.75	0.159	0.495	0.278	1.17	1.18	0.072	0.0042	0.043	0.023	0.0008	0.021	0.0042	

	C	Si	S	P	Mn	Ni	Cr	Cu	Mo	Co	V	W	Al	Sn	As	Sb	B	Size (mm) Ø H
12 MI 194A	0.517	0.49	0.025	0.039	1.04	0.79	0.70	0.26	0.40	0.052	0.333	0.13	0.102	0.017	0.031	0.015	0.0058	44 x 25
12 MI 195A	0.255	1.16	0.007	0.018	1.85	1.01	0.214	0.52	0.052	0.102	0.083	0.38	0.013	0.084	0.021	0.013	0.0040	44 x 25
12 MI 195B	0.255	1.16	0.005	0.018	1.84	1.00	0.216	0.52	0.052	0.101	0.082	0.38	0.029	0.084	0.021	0.011	0.0039	44 x 25
12 MI 196A	1.08	0.35	0.014	0.040	2.40	0.61	2.35	0.25	0.129	0.013	0.157	0.189	0.015	0.033	0.025	0.006	0.0017	44 x 25

See page 61 for materials in Chippings form

For Setting-Up Samples see section 16

1.2.3 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Cu	Soluble Al	Total Al	Sn	V	Ti	Zr	Sb	
	12 JH ST1	0.0010	0.006	0.0012	<0.001	0.005	0.001	0.006	0.001	0.001	0.002	0.001	0.001	0.001	0.001	0.001	
	12 JH ST2	0.101	0.60	0.0025	...	0.13	0.04	3.89	0.09	...	...	0.066	0.40	0.025	...	0.011	
	12 JH ST3	0.149	0.41	0.0032	...	0.72	0.10	3.21	0.70	0.009	0.010	0.044	0.017	0.092	...	0.017	
	12 JH ST4	0.20	0.076	0.016	0.012	1.93	0.51	2.53	0.12	0.075	0.076	0.025	...	0.29	...	0.052	
	12 JH ST5	0.25	0.27	...	0.017	1.59	1.05	2.03	0.06	0.038	0.039	0.010	0.30	0.018	...	0.065	continued
	12 JH ST6	0.35	0.38	...	0.057	1.30	1.57	1.51	0.50	0.021	0.022	...	0.053	0.056	0.008	0.1	
	12 JH ST7	0.50	0.33	0.025	0.043	1.02	2.11	1.03	0.21	0.035	0.036	...	0.11	0.20	0.014	...	
	12 JH ST8	0.65	0.17	0.020	0.030	0.53	2.61	0.52	0.32	0.12	0.121	...	0.16	0.17	0.027	...	
	12 JH ST9	0.84	0.23	...	0.020	0.34	3.31	0.09	0.15	0.061	0.062	...	0.22	...	0.053	...	
	12 JH ST10	1.09	0.22	0.007	0.005	0.14	4.05	0.06	0.07	0.11	0.111	...	0.51	...	0.079	...	

	Continuation from above	B	Mo	Co	Nb	W	Ta	Pb	As	Ca	Ce	Size (mm) Ø	H
	12 JH ST1	0.0001	0.001	0.001	<0.001	0.001	0.001	0.001	0.001	0.0001	0.001	34 x	20
	12 JH ST2	...	0.52	0.024	0.095	...	0.21	...	...	...	0.034	each	
	12 JH ST3	...	0.40	0.16	0.066	...	0.10	...	0.010	...	0.018		
	12 JH ST4	...	0.30	0.053	0.021	...	0.042	...	...	...	0.022		
	12 JH ST5	...	0.095	0.104	0.040	...	0.010	...	0.018	0.0004	0.010		
	12 JH ST6	...	0.19	0.20	0.012	...	...	0.045	0.052	0.0010	...	Set Only	
	12 JH ST7	0.0024	0.60	...	...	0.05	0.41	0.025	...	0.0019	...		
	12 JH ST8	0.0028	1.04	...	...	0.10	...	0.072	...	0.0021	...		
	12 JH ST9	0.0043	0.85	...	...	0.19	...	0.13	...	0.0026	...		
	12 JH ST10	0.0066	0.051	...	...	0.16	...	0.15	...	0.0016	...		

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	Ti	Nb	
CRM	12 B 1761	1.03	0.18	0.035	0.04	0.678	1.99	0.22	0.103	0.30	(0.028)	(0.05)	0.06	0.053	0.18	0.02	
CRM	12 B 1762	0.337	0.35	0.03	0.034	2.00	1.15	0.92	0.35	0.12	0.062	0.046	0.069	0.200	0.095	0.07	
CRM	12 B 1763	0.203	0.63	0.023	0.012	1.58	0.51	0.50	0.50	0.43	0.095	0.011	0.043	0.30	0.31	0.10	
CRM	12 B 1764	0.592	0.057	0.012	0.02	1.21	0.202	1.48	0.20	0.51	(0.01)	(0.02)	0.009	0.106	0.028	0.042	continued
CRM	12 B 1765	0.006	(0.004)	0.0038	0.0052	0.144	0.154	0.051	0.005	0.0013	0.0012	0.002	(0.006)	0.004	0.0055	0.0004	
CRM	12 B 1766	0.015	0.01	0.0024	0.002	0.067	0.021	0.024	0.0035	0.015	0.002	0.001	0.012	0.009	0.0005	0.005	
CRM	12 B 1767	0.052	0.026	0.009	0.0031	0.022	0.002	0.0015	0.02	0.0014	0.005	0.006	0.004	0.033	0.011	0.01	

	Continuation from above	Zr	As	B	W	Ta	N	ppm Ca	ppm Pb	ppm As	ppm Bi	ppm Mg	ppm Sb	ppm Te	ppm Ce	Size (mm) Ø	H	
	12 B 1761	0.01	0.011	0.0020	(0.02)	0.05	0.0044	...	...	...	...	...	...	...	...	34 x	19	W
	12 B 1762	0.03	0.018	0.0049	(0.01)	0.02	0.0022	...	...	...	...	...	...	...	...	34 x	19	
	12 B 1763	0.04	0.055	0.0054	(0.03)	0.01	0.0044	...	...	...	...	...	...	...	...	34 x	19	
	12 B 1764	0.0015	0.010	0.0010	<0.01	0.029	0.0023	...	...	...	...	...	...	...	...	34 x	19	
	12 B 1765	(0.0002)	0.0010	0.0009	...	(0.004)	0.0010	...	3	2	...	<1	10	(30)	...	34 x	19	
	12 B 1766	(0.0004)	0.0035	0.00012	(0.001)	(0.006)	0.0033	...	30	5	...	<5	5	(30)	(20)	34 x	19	
	12 B 1767	(0.004)	0.0005	0.0010	...	(0.002)	0.0008	(3)	(1)	8	(20)	<1	...	(3)	...	34 x	19	

1.2.4 Calcium Treated Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	B	Al	Nb	V	As	Ca	N	Size (mm) Ø	H	
	12 M BS CA3A	0.351	0.33	0.008	0.022	1.46	0.270	0.044	0.009	0.025	0.047	0.0017	0.036	0.044	0.105	0.014	0.001	(0.0133)	32 x	17	CC
	12 M BS CA4A	0.252	0.31	0.006	0.034	1.12	0.017	0.068	0.046	0.032	0.034	0.0013	0.011	0.068	0.014	0.029	0.0001	(0.0101)	32 x	17	
	12 M BSCSN.2D	0.467	0.17	0.031	0.012	0.60	0.071	0.072	0.008	0.073	0.0046	...	0.046	...	0.004	0.004	0.0033	0.0173	35 x	20	W
	12 M BS 54D	0.688	0.46	0.046	0.023	0.75	0.202	0.20	0.153	0.153	<0.001	0.0010	0.030	0.030	0.102	<0.001	0.0017	0.0009	35 x	20	
	12 M BS 3932	0.321	0.33	0.018	0.016	0.54	0.19	1.00	0.229	0.200	0.012	...	0.020	...	0.005	0.004	0.0043	0.0070	37 x	19	
CRM	12 M BS 4972	0.460	0.335	0.024	0.015	0.74	0.056	0.058	0.012	0.220	0.028	0.0002	0.002	<0.002	0.012	0.005	0.0013	0.0089	37 x	19	
CRM	12 A E096-2(D)	0.1050	0.262	0.0016	0.0128	1.320	0.0253	0.0243	0.0020	0.0170	...	...	0.0460	0.0252	...	...	0.0020	...	38 x	30	W
CRM	12 A E195-1(D)	(0.73)	0.466	0.0121	0.0160	0.571	0.327	1.566	0.768	0.0355	...	...	...	...	0.312	...	0.0017	0.0100	38 x	30	
CRM	12 MI 155B	0.207	0.313	0.028	0.009	0.635	3.57	0.149	0.239	0.152	0.008	0.0002	0.027	0.0024	0.003	0.0038	0.0026	0.0080	31 x	18	W
CRM	12 DB E194-1(D)	0.1532	0.431	0.00059	0.0097	1.188	0.3417	0.733	0.2857	0.0751	...	0.0020	0.0837	...	0.0243	0.0042	0.0026	0.0115	35 x	30	W
CRM	12 TI 1667	0.679	0.240	0.0017	0.0135	0.668	0.0188	0.235	(0.0013)	0.0115	...	(0.0002)	0.0216	...	0.0012	0.0016	0.0019	0.0048	37 x	25	W

1.2.5 Structural Alloy Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	V	As	Pb	Sb	Bi	Size (mm) Ø	H
	12 CG 01364	0.285	0.236	0.012	0.030	0.315	0.102	2.37	1.27	...	0.0085	0.351	0.024	0.00029	0.0058	0.00005	32 x	28
	12 CG 01365	0.282	0.265	0.016	0.024	0.466	0.248	1.62	1.09	...	0.030	0.252	0.019	0.0015	0.0058	0.0002	each	
	12 CG 01366	0.318	0.325	0.025	0.034	0.348	0.204	1.93	1.19	...	0.014	0.301	0.037	0.0037	0.0086	0.0022		
	12 CG 01367	0.244	0.400	0.050	0.017	0.505	0.292	1.50	0.987	...	0.033	0.193	0.042	0.0036	0.0084	0.0027	Set Only	
	12 CG 01368	0.325	0.179	0.0080	0.040	0.264	0.059	2.51	1.47	...	0.016	0.164	0.019	0.0056	0.0047	0.0052		
	12 CM 5021	0.440	1.37	0.033	0.013	1.35	2.29	1.21	0.035	0.346	0.206	0.303	0.283	...	...	...	33 x	33
	12 CM 5022	0.141	0.161	0.036	0.026	0.216	1.02	1.52	0.374	0.073	0.222	0.242	0.082	...	0.034	0.017	each	
	12 CM 5023	0.329	0.819	0.015	0.023	0.701	1.16	1.08	0.166	0.162	0.104	0.162	0.172	...	0.02	0.0092		
	12 CM 5024	0.293	0.398	0.019	0.022	1.02	1.53	1.14	0.162	0.197	0.172	0.128	0.149	...	0.017	0.021	Set Only	
	12 CM 5025	0.214	0.392	0.0031	0.012	1.05	1.46	0.581	0.094	0.236	0.291	0.199	0.231	...	0.0068	0.0024		
	12 CM 5026	0.481	1.11	0.0034	0.034	0.511	0.518	1.52	0.253	0.111	0.202	0.131	0.117	...	0.041	0.0067		
	12 CM 5027	0.589	1.77	0.031	0.046	0.805	0.229	1.95	0.294	0.302	0.070	0.052	0.053	...	0.029	0.014		

See page 62 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.2 Austenitic

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Ti	Nb	N	Size (mm) Ø H
	13 M BS 80F	0.062	0.63	0.35	0.036	1.76	8.58	17.10	0.48	0.41	0.16	0.010	0.001	. . .	0.016	0.035	
	13 M BS 81V-1	0.032	0.55	0.0012	0.023	1.76	9.13	19.14	0.134	0.10	0.056	0.003	0.003	0.002	0.011	0.048	
	13 M BS 82E	0.062	0.58	0.001	0.027	1.61	12.49	22.38	0.31	0.26	0.12	0.006	0.006	0.003	0.062	0.072	
	13 M BS 84J	0.017	0.57	0.025	0.035	1.46	10.34	17.12	2.08	0.46	0.23	0.007	(0.002)	(0.002)	0.024	0.059	
	13 M BS 85D	0.049	0.55	0.024	0.025	1.69	10.03	17.09	0.59	0.45	0.97	(0.006)	0.13	0.48	0.065	0.016	
	13 M BS 87F	0.055	0.67	0.025	0.024	1.64	10.12	17.30	0.29	0.28	0.17	0.004	0.004	0.004	0.57	0.037	
	13 M BS 316A	0.065	0.74	0.026	0.029	1.48	10.15	17.25	2.05	0.35	0.16	0.008	0.004	(0.003)	0.029	0.045	
	13 M BS 316B	0.047	0.31	0.028	0.033	1.27	10.09	16.21	2.03	0.35	0.18	0.012	0.003	(0.002)	0.007	0.044	
	13 M BS 317L	0.027	0.67	0.0014	0.029	1.17	13.53	18.16	3.07	0.23	0.14	0.005	(0.005)	. . .	0.031	0.056	continued
	13 M BS 321A	0.061	0.48	0.012	0.030	1.22	9.38	17.20	0.20	0.284	0.15	0.010	0.038	0.51	0.021	0.0075	
	13 M BS 321C	0.037	0.58	0.022	0.025	1.72	10.58	17.16	0.30	0.28	0.048	0.006	0.044	0.38	0.008	0.0082	
	13 M BS 347A	0.051	0.54	0.020	0.026	1.50	9.20	17.44	0.326	0.31	0.054	0.007	(0.002)	(0.002)	0.79	0.044	
	13 M BS 347B	0.051	0.51	0.026	0.028	1.57	9.16	17.24	0.38	0.15	0.05	0.006	0.002	(0.002)	0.71	0.056	
	13M BS SS3951	0.014	0.61	0.031	0.023	1.56	9.18	18.17	0.303	0.22	0.16	0.007	0.002	(0.002)	0.085	0.077	
	13M BS SS3952	0.017	0.53	0.017	0.029	0.82	10.04	18.06	0.28	0.38	0.11	0.017	0.004	0.002	0.005	0.017	
	13 M BS 9722	0.031	0.55	0.0014	0.020	1.70	9.15	19.13	0.128	0.108	0.054	. . .	. . .	. . .	. . .	0.047	
CRM	13 M BS 9841	0.067	0.54	0.024	0.024	1.69	19.55	24.30	0.57	0.356	0.116	0.006	<0.006	(0.002)	0.07	0.064	
CRM	13 M BS 9842	0.059	0.99	0.0016	0.025	1.50	20.02	24.19	0.111	0.147	0.237	0.005	0.014	0.003	0.026	0.037	
CRM	13 M BS 9941	0.021	0.33	0.024	0.027	1.78	13.68	18.48	3.24	0.424	0.178	0.007	0.004	(0.002)	0.015	0.036	
CRM	13 M BS 9942	0.021	0.49	0.006	0.025	1.84	13.55	18.21	3.30	0.305	0.086	0.006	0.004	(0.002)	0.005	0.071	
	13 TI 1819	0.112	0.616	0.0112	0.023	0.903	7.1	17.31	0.11	0.064	0.117	. . .	. . .	. . .	. . .	0.029	
	13 TI 1820	0.021	0.428	0.0079	(0.021)	1.61	9.07	19.51	0.115	0.045	0.151	. . .	. . .	. . .	. . .	0.064	continued
	13 TI 1821	0.037	0.542	(0.004)	(0.025)	1.72	10.42	17.04	2.04	0.058	0.266	. . .	. . .	0.297	. . .	0.0125	
	13 TI 1824	0.124	0.444	(0.0033)	0.027	1.70	19.02	25.01	0.205	0.20	0.193	. . .	0.062	0.066	(0.014)	. . .	
	13 JH ST21	0.13	0.18	0.026	0.003	0.40	4.03	27.02	(0.001)	(0.003)	(0.003)	. . .	. . .	(0.003)	<0.001	. . .	
	13 JH ST22	0.036	0.39	0.005	0.028	0.57	19.85	25.00	(0.001)	(0.004)	(0.009)	. . .	. . .	(0.010)	<0.001	. . .	
	13 JH ST23	0.094	0.78	0.019	0.010	1.59	10.01	22.50	0.98	0.047	(0.020)	. . .	. . .	(0.002)	(0.003)	. . .	
	13 JH ST24	0.084	0.58	0.015	0.004	0.78	13.93	20.20	1.50	0.029	(0.008)	. . .	. . .	(0.002)	<0.001	. . .	continued
	13 JH ST25	0.025	1.35	0.025	0.003	1.35	8.76	18.40	2.47	0.012	0.058	. . .	. . .	(0.003)	<0.001	. . .	
	13 JH ST26	0.044	1.01	0.008	0.021	1.19	17.62	16.18	0.49	(0.008)	0.21	. . .	. . .	0.075	0.29	. . .	
	13 JH ST27	0.057	1.19	0.011	0.019	1.00	15.74	13.39	0.008	(0.007)	0.014	. . .	. . .	0.24	1.53	. . .	
	13 JH ST28	0.016	0.12	0.003	0.034	0.23	29.62	10.34	(0.001)	(0.006)	(0.002)	. . .	. . .	0.49	0.72	. . .	
															W	Pb	
CRM	13 CM 2157	0.061	0.644	0.027	0.0085	0.663	10.35	15.36	0.62	0.152	0.074	0.0082	0.044	0.072	0.32	0.0055	33 x 33 W
CRM	13 CM 2158	0.164	0.413	0.016	0.037	0.981	11.52	12.46	0.35	0.363	0.093	0.093	0.074	0.21	0.61	0.026	each
CRM	13 CM 2159	0.241	0.96	0.018	0.04	1.98	13.12	9.32	0.69	0.276	0.13	0.0057	0.038	0.51	0.71	0.019	
CRM	13 CM 2160	0.184	0.92	0.02	0.028	1.57	16.12	7.40	0.50	0.303	0.16	0.049	0.24	1.03	0.49	0.022	Set only
CRM	13 CM 2161	0.096	0.732	0.038	0.018	0.654	9.05	17.16	0.26	0.126	0.059	0.035	0.26	0.57	0.25	0.0077	
CRM	13 CM 2162	0.017	0.171	0.0025	0.0049	0.156	6.93	20.76	0.079	0.049	0.0133	0.041	0.034	0.31	0.0055	. . .	
CRM	13 CM 2163	0.101	1.08	0.0015	0.01	0.356	7.82	16.90	0.17	0.098	0.028	0.021	0.20	0.71	0.17	0.0078	

Continuation from above	V	W	B	Ca	As	Pb	Ta	Soluble Al	Insoluble Al	O	Typical Alloy Type	Size (mm) Ø H
13 M BS 80F	0.087	0.047	0.0012	. . .	. . .	. . .	. . .	. . .	. . .	0.0058	AISI 303	35-45 x 12 W
13 M BS 81V-1	0.072	0.023	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	AISI 304	35-45 x 12
13 M BS 82E	0.064	0.041	0.0024	0.0014	. . .	. . .	. . .	. . .	. . .	. . .	AISI 309	35-45 x 12
13 M BS 84J	0.09	0.054	0.0005	0.0010	. . .	. . .	. . .	. . .	. . .	0.0063	AISI 316	35-45 x 12
13 M BS 85D	0.134	0.06	0.0006	0.0004	0.006	. . .	. . .	. . .	. . .	0.0014	AISI 321	35-45 x 12
13 M BS 87F	0.13	0.050	0.0006	0.0007	0.004	. . .	. . .	. . .	. . .	0.005	AISI 347	35-45 x 12
13 M BS 316A	0.130	0.10	0.0004	0.0015	(0.003)	. . .	. . .	. . .	. . .	0.0041	AISI 316	35-45 x 12
13 M BS 316B	0.059	0.023	0.0005	0.0003	. . .	. . .	. . .	. . .	. . .	0.0063	AISI 316	35-45 x 12
13 M BS 317L	0.09	0.018	0.0013	(0.001)	(0.003)	. . .	. . .	. . .	. . .	0.007	AISI 317L	35-45 x 12
13 M BS 321A	0.066	0.06	(0.0005)	(0.0002)	(0.006)	. . .	(0.002)	. . .	. . .	0.0013	AISI 321	35-45 x 12
13 M BS 321C	0.079	(0.03)	(0.0005)	(0.0001)	(0.004)	. . .	. . .	. . .	. . .	(0.0011)	AISI 321	35-45 x 12
13 M BS 347A	0.10	(0.03)	(0.0004)	(0.0002)	(0.003)	. . .	(<0.004)	. . .	. . .	0.0047	AISI 347	35-45 x 12
13 M BS 347B	0.04	(0.005)	0.0036	(0.0005)	(0.003)	. . .	(<0.004)	. . .	. . .	0.005	AISI 347	35-45 x 12
13 M BS SS3951	0.067	0.04	(0.0006)	0.0005	(0.003)	. . .	. . .	. . .	. . .	0.0074		35-45 x 12
13 M BS SS3952	0.045	0.023	(0.0005)	0.0014	0.004	. . .	. . .	. . .	. . .	0.005	AISI 304L	35-45 x 12
13 M BS 9722	0.076	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	AISI 304	35-45 x 12
13 M BS 9841	0.070	0.06	0.0026	(0.0002)	(0.003)	(0.001)	. . .	. . .	. . .	(0.011)	AISI 310	35-45 x 12
13 M BS 9842	0.075	0.011	0.0025	0.001	(0.002)	. . .	. . .	. . .	. . .	(0.0044)	AISI 310	35-45 x 12
13 M BS 9941	0.062	0.068	0.0025	(0.0003)	(0.01)	. . .	. . .	. . .	. . .	(0.0058)	AISI 317L	35-45 x 12
13 M BS 9942	0.072	0.032	0.0014	0.0014	(0.004)	. . .	. . .	. . .	. . .	(0.0023)	AISI 317L	35-45 x 12
												W D H W
13 TI 1819	. . .	. . .	(0.0004)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		45 x 45 x 20
13 TI 1820	. . .	. . .	(0.0003)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		45 x 45 x 20
13 TI 1821	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		45 x 45 x 20
13 TI 1824	0.084	(0.066)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		45 x 45 x 20
												Ø H W
13 JH ST21	. . .	. . .	. . .	. . .	(0.001)	<0.001	<0.001	(0.001)	<0.001	. . .		35 x 18
13 JH ST22	. . .	. . .	. . .	. . .	(0.001)	<0.001	<0.001	0.092	0.003	. . .		each
13 JH ST23	. . .	. . .	. . .	. . .	0.110	0.012	(0.002)	0.029	0.008	. . .		
13 JH ST24	. . .	. . .	. . .	. . .	0.056	0.013	<0.001	0.021	0.002	. . .		Set Only
13 JH ST25	. . .	. . .	. . .	. . .	0.004	0.067	<0.001	0.002	0.002	. . .		
13 JH ST26	. . .	. . .	. . .	. . .	(0.001)	(0.023	0.40	0.004	0.002	. . .		
13 JH ST27	. . .	. . .	. . .	. . .	(0.001)	(0.009	0.24	0.016	0.002	. . .		
13 JH ST28	. . .	. . .	. . .	. . .	(0.001)	(0.002)	0.060	0.013	<0.001	. . .		

See page 62 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.2 Austenitic (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	Ti	Al	Nb	N	Others	Size (mm) Ø H	
	13 X 17001B	0.114	0.34	0.016	0.080	1.73	6.05	14.89	0.12	0.037	0.15	. . .	. . .	0.01	0.76	0.040	B, Sn	40 x 15	C
	13 X 17002C	0.08	0.51	0.029	0.047	0.98	8.24	17.79	0.22	0.06	0.08	. . .	. . .	. . .	0.43	. . .		40 x 15	
	13 X 17003A	0.10	0.78	0.035	0.037	0.85	11.9	11.89	0.27	0.08	0.07	. . .	. . .	. . .	0.34	. . .		40 x 15	
	13 X 17004A	0.06	1.32	0.048	0.024	0.62	16.06	21.78	0.31	0.11	0.05	. . .	. . .	. . .	0.23	. . .		40 x 15	
	13 X 17005B	0.005	1.79	0.051	0.011	0.246	19.97	24.7	0.49	0.09	0.03	. . .	. . .	. . .	0.10	0.007		40 x 15	
	13 X 19001A	0.10	1.20	0.080	0.031	0.92	5.14	14.95	1.54	0.19	. . .	. . .	. . .	. . .	0.04	. . .		40 x 15	C
	13 X 19003A	0.050	0.60	0.029	0.050	1.47	12.8	19.2	2.49	0.074	. . .	. . .	. . .	. . .	0.12	. . .		40 x 15	
	13 X 19004B	0.066	0.36	0.014	0.069	1.96	17.9	22.8	3.62	0.022	. . .	. . .	. . .	. . .	0.18	. . .		40 x 15	
	13 X 18001A	0.22	0.32	0.057	0.022	1.40	6.41	15.92	0.80	0.16	0.04	. . .	. . .	. . .	0.57	. . .		40 x 15	C
CRM	**13 X 18002B**	0.114	0.46	0.048	0.028	0.95	7.98	17.7	0.199	0.112	0.056	. . .	. . .	. . .	1.51	0.011		40 x 15	
	13 X 18003A	0.19	0.96	0.037	0.066	1.37	10.93	19.84	0.42	0.09	0.20	. . .	. . .	. . .	1.07	. . .		40 x 15	
	13 X 18004A	0.07	1.44	0.012	0.094	2.1	12.55	21.64	0.63	0.04	0.18	. . .	. . .	. . .	0.83	. . .		40 x 15	
CRM	**13 HY K7**	0.063	0.89	0.012	0.026	1.44	10.45	17.8	. . .	0.20	. . .	. . .	0.27	. . .	. . .	. . .		32-35 x 19	W
CRM	**13 HY K8**	0.061	1.38	0.017	0.026	1.10	. . .	23.5	. . .	(0.18)	. . .	. . .	. . .	1.53	. . .	. . .		32-35 x 19	
CRM	**13 HY K10**	0.155	0.88	0.02	0.022	1.77	11.2	17.5	2.98	0.16	. . .	. . .	. . .	. . .	0.98	. . .		32-35 x 19	

															As	Pb	Sn		
	13 CG 01659	0.025	0.253	0.053	0.044	0.707	6.03	25.16	0.056	0.378	0.018	0.054	0.051	0.255	0.033	0.0007	0.0068	38 x 30	
	13 CG 01660	0.080	0.734	0.023	0.023	0.836	13.88	14.48	0.436	0.288	0.223	0.435	0.191	0.191	0.027	0.0008	0.035	each	
	13 CG 01661	0.126	0.368	0.013	0.011	0.929	18.49	11.64	0.639	0.197	0.794	0.680	0.061	0.061	0.024	0.0005	0.031		
	13 CG 01662	0.147	0.283	0.040	0.034	0.622	12.39	20.52	0.322	0.148	0.592	0.163	0.074	0.074	0.012	. . .	0.013		
	13 CG 01663	0.215	0.923	0.0072	0.0077	1.57	20.19	7.94	0.675	0.078	0.789	0.724	0.032	0.032	0.0059	0.0014	0.052	Set only	
	13 CG 01664	0.052	0.576	0.041	0.034	1.15	8.79	17.01	0.164	0.276	0.392	0.251	0.039	0.039	0.016	0.0026	0.015		
	13 CG 01665	0.214	1.02	0.039	0.025	1.48	8.83	17.29	0.715	0.054	0.112	0.739	0.021	0.021	0.0025	0.0015	0.031		

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	Ti	Al	Ta		
	13 X 12533Y	0.03	0.37	0.032	0.011	1.13	5.04	18.8	1.05	0.18	0.055	. . .	0.14	0.011	(0.17)		
	13 X 12534T	0.07	0.81	0.043	0.014	0.54	8.10	17.56	2.02	0.10	0.05	. . .	0.21	0.02	. . .		
CRM	**13 X 12535BC**	0.219	1.04	0.0656	0.071	0.29	15.05	17.80	4.15	0.081	0.055	. . .	0.43	0.037	. . .		continued
	13 X 12536R	0.165	0.65	0.13	0.053	0.47	11.9	14.8	2.53	0.048	0.09	. . .	0.47	0.11	0.15		
	13 X 12537R	0.054	1.09	0.028	0.11	0.91	10.05	19.9	3.03	0.03	0.12	. . .	0.49	0.056	0.24		
	13 X 12853J	0.050	0.99	0.016	0.016	1.17	11.92	17.2	2.74	0.114	0.06	0.12	0.027	. . .	0.03		
	13 X 12854J	0.05	1.06	0.015	0.012	1.06	11.92	17.32	2.83	0.22	0.11	0.16	0.03	. . .	0.05		continued
	13 X 12855K	0.109	1.00	0.016	0.014	1.04	12.1	17.2(5)	2.78	0.40	0.16	0.21	0.043	. . .	0.11		
CRM	**13 JH 500HA**	0.041	0.72	0.0120	0.024	1.54	11.00	16.93	2.73	0.182	0.139	. . .	. . .	. . .	. . .		continued
CRM	**13 DB E284-2(D)**	0.0201	0.537	0.0237	0.0258	1.745	10.72	16.81	2.111	0.183	0.0525	(0.018)	0.191	0.0027	. . .		continued
CRM	**13 MI 2F**	0.041	0.27	0.028	0.043	1.48	8.09	18.37	0.20	0.40	0.070	0.021	0.001	0.003	. . .		
CRM	**13 MI 3B**	0.058	0.46	0.0034	0.027	1.68	12.62	22.41	0.49	0.282	0.093	0.047	0.004	0.009	. . .		
CRM	**13 MI 5D**	0.021	0.458	0.020	0.040	1.78	10.38	16.56	2.11	0.168	0.143	0.016	0.008	0.005	(0.0064)		
CRM	**13 MI 6C**	0.038	0.61	0.0087	0.038	1.73	9.23	17.61	0.090	0.130	0.139	0.013	0.22	0.064	. . .		
CRM	**13 MI 6D**	0.048	0.27	0.0007	0.024	1.52	9.42	17.45	0.358	0.302	0.182	0.09	0.63	0.110	. . .		
CRM	**13 MI 8B**	0.054	0.48	0.024	0.025	1.43	9.06	17.61	0.50	0.26	0.097	0.031	0.003	0.004	. . .		
CRM	**13 MI 8C**	0.060	0.43	0.027	0.030	1.50	9.15	17.53	0.70	0.46	0.146	0.140	0.002	0.003	. . .		continued
CRM	**13 MI 8D**	0.054	0.36	0.027	0.029	1.76	9.19	17.30	0.437	0.472	0.141	0.079	0.003	0.004	(0.01)		
CRM	**13 MI 153A**	0.024	0.33	0.002	0.03	1.61	14.11	18.13	2.99	0.23	0.16	0.027	0.002	0.009	. . .		
CRM	**13 MI 153B**	0.015	0.28	0.0082	0.031	1.58	13.19	18.13	3.12	0.408	0.115	0.020	0.002	0.006	. . .		
CRM	**13 MI 162A**	0.015	0.36	0.024	0.023	1.69	8.56	18.31	0.27	0.34	0.084	0.026	0.002	0.003	. . .		
CRM	**13 MI 163B**	0.0138	0.516	0.025	0.027	1.36	11.14	16.78	2.04	0.475	0.128	0.036	0.005	0.005	. . .		
CRM	**13 MI 241A**	0.059	0.43	0.020	0.025	1.43	8.08	18.21	0.076	0.142	0.083	0.014	0.002	0.004	. . .		
CRM	**13 MI 241B**	0.023	0.53	0.022	0.025	1.76	8.12	18.46	0.369	0.389	0.121	0.037	0.042	0.005	. . .		

Continuation from above	Sn	B	Sb	Zr	Bi	V	Nb	N	O	Typical Alloy Type	Size (mm) Ø H	
13 X 12533Y	(0.03)	(0.01)	. . .	. . .	. . .	. . .	. . .	(0.014)	. . .		40 x 15	C
13 X 12534T	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40 x 15	
13 X 12535BC	0.017	. . .	. . .	. . .	. . .	0.048	. . .	0.056	. . .		43 x 20	
13 X 12536R	0.018	0.022	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40 x 15	
13 X 12537R	0.08	0.006	. . .	. . .	. . .	. . .	. . .	0.044	. . .		40 x 15	
13 X 12853J	. . .	0.003	0.02	0.009	(0.007)	. . .	. . .	(0.011)	. . .		40 x 15	C
13 X 12854J	. . .	0.005	0.09	<0.01	0.005	. . .	. . .	. . .	. . .	AISI 316	40 x 15	
13 X 12855K	. . .	0.021	0.19	<0.01	<0.005	. . .	. . .	. . .	. . .		40 x 15	
13 JH 500HA	. . .	. . .	. . .	. . .	. . .	0.074	0.023	0.115	(0.0120)		38 x 20	HIP
13 DB E284-2(D)	0.0047	0.0026	. . .	. . .	. . .	0.0425	(0.003)	0.0151	0.0099		35 x 30	W
13 MI 2F	0.008	0.0004	. . .	. . .	. . .	0.036	0.003	0.057	0.0087	AISI 304	31 x 18	W
13 MI 3B	0.008	(0.0004)	. . .	. . .	. . .	0.066	0.077	0.079	0.0044	AISI 309	31 x 18	
13 MI 5D	0.004	(0.0005)	. . .	. . .	. . .	0.029	(0.004)	0.056	0.0097	AISI 316	31 x 18	
13 MI 6C	0.005	(0.0003)	. . .	. . .	. . .	0.039	0.003	0.027	0.0021	AISI 321	31 x 18	
13 MI 6D	0.013	0.0037	. . .	(0.002)	. . .	0.128	0.039	0.0095	0.001	AISI 321	31 x 18	
13 MI 8B	0.01	0.003	. . .	. . .	. . .	0.071	0.63	0.0324	0.0056	AISI 347	31 x 18	
13 MI 8C	0.011	(0.0008)	. . .	. . .	. . .	0.047	0.67	0.054	0.0054	AISI 347	31 x 18	
13 MI 8D	0.007	0.0005				0.062	0.72	0.0151	0.0043	AISI 347	31 x 18	
13 MI 153A	0.008	. . .	. . .	. . .	. . .	0.065	0.022	0.0496	(0.0040)	AISI 317L	31 x 18	
13 MI 153B	0.014	0.0022	. . .	. . .	. . .	0.031	0.008	0.0158	0.0052		31 x 18	
13 MI 162A	0.012	. . .	. . .	. . .	. . .	0.072	0.012	0.077	0.0039	AISI 304L	31 x 18	
13 MI 163B	0.006	0.0026	. . .	. . .	. . .	0.075	0.007	0.046	0.0043		31 x 18	
13 MI 241A	0.005	0.0003	. . .	. . .	. . .	0.065	0.004	0.051	0.0050	AISI 302	31 x 18	
13 MI 241B	0.022	0.0007	. . .	. . .	. . .	0.057	0.007	0.065	0.008	AISI 302	31 x 18	

See page 62 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.2 Austenitic (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Nb	Pb	As	B	Others	Size (mm) Ø H	
CRM	13 A 461/1	0.0103	0.374	0.0051	0.0053	0.686	6.124	14.727	0.0138	0.0091	(0.004)	. . .	. . .	. . .	. . .	. . .		38 x 19	W
CRM	13 A 462/1	0.0345	0.463	0.0041	0.0053	0.722	12.55	11.888	0.0304	0.0112	. . .	. . .	. . .	. . .	. . .	. . .		38 x 19	
CRM	13 A 463/1	0.019	0.270	0.019	0.025	1.400	10.20	18.46	0.265	0.276	0.116	. . .	. . .	. . .	. . .	0.0022	N	38 x 19	
CRM	13 A 464/1	0.086	0.57	0.028	0.020	0.791	20.05	25.39	. . .	. . .	0.054	. . .	. . .	0.0004	(0.003)	. . .		38 x 19	
CRM	13 A 465/1	0.066	0.405	0.012	0.021	1.380	9.24	17.31	0.092	0.098	0.053	. . .	. . .	<0.001	. . .	0.0006	Ti, V	38 x 19	
CRM	13 A 466/1	0.062	0.505	0.016	0.020	0.698	8.61	17.65	2.19	. . .	. . .	0.005	0.029	0.0014	0.017	0.0024		38 x 19	
CRM	13 A 466/2	0.0141	0.480	0.0009	0.0105	1.314	10.20	17.84	2.772	0.0278	(0.02)	<0.001	(0.001)	<0.0001	0.0020	0.0039	Al, N, V	38 x 19	
CRM	13 A 467/1	0.082	0.52	0.019	0.018	0.788	9.21	18.09	. . .	. . .	. . .	. . .	0.99	0.004	0.004	. . .	Ta	38 x 19	
CRM	13 A 468/1	0.143	1.41	0.020	0.014	1.70	8.90	17.96	. . .	. . .	0.018	. . .	. . .	. . .	. . .	. . .		38 x 19	
CRM	13 A 474	0.022	0.17	0.020	0.008	1.70	14.74	19.06	3.55	0.35	(0.02)	. . .	. . .	. . .	0.03	. . .	V	38 x 19	
CRM	13 A 475	0.050	0.21	0.008	0.037	0.89	5.66	14.14	1.59	1.94	0.22	0.015	0.22	. . .	. . .	. . .		38 x 19	
CRM	13 A E287-1(D)	0.016	0.569	0.0014	0.027	1.48	10.35	18.61	0.247	0.203	0.148	. . .	. . .	. . .	. . .	0.89	N 0.019	38 x 30	W
CRM	13 A E292-1(D)	0.0367	0.402	0.0055	0.0175	1.744	10.09	18.00	0.0464	0.0391	0.0255	. . .	0.571	. . .	(0.008)	(0.0003)	N 0.0640	38 x 30	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb	Ti		Size (mm) Ø H
13 CM 5093	0.028	0.493	0.035	0.019	1.97	7.85	14.15	1.99	3.06	0.292	0.054	0.099	0.192	0.268		
13 CM 5094	0.044	0.601	0.037	0.035	0.99	13.99	16.05	1.33	3.44	0.030	0.0247	0.108	0.047	0.62		
13 CM 5095	0.110	0.220	0.019	0.0068	2.42	11.15	18.82	3.44	1.05	0.199	0.0094	0.092	0.098	0.146	continued	
13 CM 5096	0.079	0.92	0.016	0.013	0.567	11.91	17.02	3.69	2.54	0.115	0.0169	0.097	0.071	0.67		
13 CM 5097	0.026	0.359	0.038	0.048	1.91	17.83	12.14	1.73	2.95	0.0080	0.035	. . .	. . .	0.050		
13 CM 5098	0.088	0.672	0.013	0.017	1.53	13.06	17.90	2.51	1.78	0.053	0.0152	0.051	0.047	0.125		

Continuation from above	V	W	B	As	Pb	Sb	Zn	Size (mm) Ø H
13 CM 5093	0.110	0.42	0.0034	0.021	0.0026	0.0032	0.0058	35 x 35
13 CM 5094	0.041	0.067	0.0117	0.0121	0.0018	0.0132	0.0076	each
13 CM 5095	0.098	0.25	0.0017	0.0094	0.0037	0.0031	0.0073	
13 CM 5096	0.081	0.22	. . .	0.010	0.0030	0.0034	0.0068	Set Only
13 CM 5097	. . .	. . .	0.0080	0.0226	0.0012	0.0224	0.0064	
13 CM 5098	0.066	0.12	0.053	0.0099	0.0015	0.0081	0.0064	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	V	Nb	Sn	Ag	N	Typical Alloy Type	Size (mm) Ø H	
13 MT 304	0.063	0.56	0.023	0.026	0.78	9.60	18.57	0.33	0.34	0.20	0.037	0.043	0.017	0.0007	. . .	AISI 304	various	W
13 MT 305	0.067	0.55	0.022	0.025	1.85	11.95	18.58	0.45	0.29	0.22	0.078	. . .	. . .	. . .	. . .	AISI 305		
13 MT 316	0.061	0.69	0.023	0.029	1.67	12.61	17.60	2.45	0.25	0.14	0.051	. . .	0.006	0.0005	. . .	AISI 316		
CRM 13 S 650-13	0.053	0.30	(0.0048)	0.024	0.48	0.18	16.70	0.013	0.020	0.017	. . .	. . .	. . .	. . .	0.0084		35 x 30	W
CRM 13 S 651-13	0.018	0.42	0.0027	0.026	1.81	10.20	18.42	0.24	0.16	0.13	. . .	. . .	. . .	. . .	0.0507		each	
CRM 13 S 652-13	0.044	0.42	0.0027	0.031	1.73	11.38	16.56	2.13	0.20	0.18	. . .	. . .	. . .	. . .	0.0084			
CRM 13 S 653-13	0.044	0.40	0.0006	0.033	1.80	13.96	22.43	0.20	0.16	0.20	. . .	. . .	. . .	. . .	0.0554		Set only	
CRM 13 S 654-13	0.046	0.40	0.0006	0.026	1.69	19.42	24.79	0.23	0.15	0.15	. . .	. . .	. . .	. . .	0.0200			
CRM 13 S 655-13	0.036	0.62	0.0043	0.028	1.81	9.52	17.34	0.22	0.20	0.17	. . .	0.55	. . .	. . .	0.0101			

1.3.3 Maraging

	C	Si	S	P	Mn	Ni	Cr	Mo	Co	Al	Ti	B	Cu	N	Others	Typical Alloy Type	Size (mm) Ø H	
13 X 14933R	0.008	0.05	0.014	0.023	0.17	16.8	0.022	3.83	11.4	<0.005	0.029	. . .	. . .	. . .	. . .		40 x 15	C
13 X 14934P	0.009	0.13	0.014	0.028	0.30	17.8	0.16	4.7	8.5	0.022	0.67	. . .	. . .	. . .	. . .		40 x 15	
13 X 14935S	0.03	0.31	0.052	0.040	0.32	18.93	0.26	5.40	7.05	0.26	0.94	. . .	. . .	. . .	. . .		40 x 15	
CRM 13 M BS 161A	0.004	0.032	0.0007	0.004	0.031	18.40	0.12	4.82	9.22	0.14	0.65	0.0023	0.22	(0.002)	. . .		38 x 12	W
CRM 13 A E285-2(D)	0.0018	0.0117	0.0025	0.0053	0.0168	18.07	0.0236	4.99	7.76	0.1067	0.520	0.0009	0.0094	0.0007	Zr 0.0050		38 x 30	W
13 MT 250	0.002	0.008	0.002	0.003	0.006	18.44	0.008	4.88	7.54	0.058	0.41	0.0024	0.008	. . .	. . .	Maraging 250	38 x 14	W
13 MT 300	0.005	0.030	0.004	0.005	0.032	18.51	0.034	4.97	9.07	0.12	0.69	0.0020	0.047	. . .	. . .	Maraging 300	38 x 14	
CRM 13 MT 045A	0.228	<0.010	0.0004	0.001	0.002	11.38	3.12	1.18	13.39	. . .	. . .	. . .	0.006	. . .	Fe 70.70	Aermet 100-type	38 x 14	
CRM 13 MI 99B	0.005	0.022	0.0005	0.005	0.036	18.46	0.081	4.88	9.24	0.095	0.74	0.0026	0.094	0.0011	W 0.016	Maraging 300	31 x 18	W

1.3.4 Martensitic

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	N	Nb	V	Typical Alloy Type	Size (mm) Ø H	
13 X 12547K	0.35	0.15	0.087	0.069	1.08	0.64	16.63	0.83	0.44	0.35	. . .	. . .	0.39	. . .		40 x 15	C
13 X 12548L	0.18	0.32	0.224	0.027	0.75	1.12	12.91	1.30	0.26	0.37	. . .	. . .	0.56	. . .	AISI 414	40 x 15	
13 X 12549K	0.16	0.43	0.29	0.092	0.34	1.26	11.70	1.49	0.10	0.52	. . .	. . .	0.23	. . .		40 x 15	
13 X 14775R	0.05	0.63	0.054	0.053	1.37	1.75	17.7	0.47	0.21	0.15	. . .	. . .	0.75	. . .		40 x 15	C
13 X 15023U	0.12	0.19	0.012	0.013	1.43	0.78	10.75	1.49	0.06	0.05	. . .	. . .	1.20	. . .		40 x 15	
13 X 15024W	0.12	0.77	0.028	0.030	0.57	2.84	14.94	0.24	0.36	0.10	. . .	. . .	0.10	. . .		40 x 15	
13 X 15035T	0.10	0.68	0.069	0.054	0.93	2.66	13.94	0.45	0.31	0.21	. . .	. . .	0.63	. . .		40 x 15	
13 X 15059N	0.057	0.48	0.020	0.015	1.22	1.30	15.97	0.63	0.14	0.26	(0.02)	0.049	0.8(1)	0.06		40 x 15	
CRM 13 A 469	0.279	0.421	0.020	0.015	0.598	0.246	11.93	. . .	(0.02)	(0.01)	. . .	. . .	. . .	(0.02)		38 x 19	W
CRM 13 A 470	0.153	0.335	0.035	0.024	0.235	0.369	17.68	. . .	(0.02)	(0.02)	. . .	. . .	. . .	(0.02)		38 x 19	
CRM 13 A 471	0.095	0.326	0.023	0.018	0.417	0.96	23.85	. . .	(0.02)	(0.02)	. . .	. . .	. . .	(0.03)		38 x 19	
CRM 13 A 472	0.227	1.05	0.029	0.032	1.02	1.95	15.82	0.661	(0.02)	(0.02)	. . .	. . .	. . .	(0.02)		38 x 19	
CRM 13 A 473	0.172	0.604	0.030	0.019	0.494	(0.06)	9.06	0.95	(0.03)	(0.01)	. . .	. . .	. . .	(0.02)		38 x 19	

												Ti	W			
13 CG 01605	0.040	0.223	0.0028	0.0062	0.130	0.500	14.26	0.064	0.056	0.016	. . .	0.041	0.058	0.059		32 x 28
13 CG 01606	0.245	0.420	0.032	0.0103	0.337	0.343	11.03	0.353	0.284	0.054	. . .	0.079	0.27	0.151		each
13 CG 01607	0.159	0.568	0.017	0.0165	0.495	0.207	12.52	0.157	0.171	0.036	. . .	0.091	0.19	0.089		
13 CG 01608	0.340	0.772	0.0054	0.0262	0.740	0.461	9.37	0.244	0.374	0.078	. . .	0.371	0.38	0.201		Set Only
13 CG 01609	0.472	0.487	0.041	0.043	0.983	0.771	7.84	0.487	0.522	0.116	. . .	0.187	0.5	0.287		

See page 62 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.4 Martensitic (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	N	Nb	V	Others	Typical Alloy Type	Size (mm) Ø H	
	13 M BS 91E	0.066	0.52	0.002	0.017	0.42	0.17	16.58	0.035	0.05	0.02	0.004	0.032	(0.004)	0.09		AISI 430	35-44 x 12	W
	13 M BS 92B	0.15	0.42	0.003	0.021	0.42	2.12	15.92	0.17	0.13	0.04	0.006	0.073	(0.006)	0.07		AISI 431	35-44 x 12	
	13 M BS 93E	1.02	0.9	0.001	0.022	0.52	0.35	17.33	0.5	0.12	0.048	0.003	0.0359	0.005	0.24		AISI 440C	35-44 x 12	
	13 M BS 94C	0.057	0.62	0.002	0.024	0.45	0.43	25.9	0.2	0.056	0.042	0.006	0.065	0.032	0.12		AISI 446	35-44 x 12	
	13 M BS 97	0.216	0.39	0.0004	0.021	0.71	0.76	11.82	1.05	0.066	0.041	(0.003)	0.030	0.007	0.21	Al, W, O	AISI 422	35-44 x 12	
	13 M BS 98	0.309	0.72	0.0014	0.019	0.48	0.21	13.35	0.034	0.098	0.020	0.006	0.0181	0.003	0.075	Al, W, O	AISI 420	35-44 x 12	
	13 M BS 178	0.436	3.08	0.001	0.016	0.43	0.21	8.17	0.044	0.12	0.018	(0.007)	0.014	(0.002)	0.041	Al, W, O		35-44 x 12	
	13 M BS 410A	0.134	0.37	0.0009	0.017	0.46	0.23	13.17	0.207	0.027	(0.011)	(0.004)	0.036	...	0.021		AISI 410	35-44 x 12	
	13 M BS 410B	0.131	0.30	0.003	0.018	0.38	0.26	11.58	0.077	0.090	(0.021)	...	0.020	...	0.038		AISI 410	35-44 x 12	
CRM	13 M BS 0021	0.128	0.354	0.008	0.021	0.420	0.100	12.00	0.016	0.040	0.015	0.003	0.029	(0.001)	0.029		AISI 410	35-44 x 12	
CRM	13 M BS 0022	0.050	0.62	0.011	0.018	0.41	0.23	12.36	0.117	0.036	0.017	0.004	0.033	0.007	0.034	Al, As, B	Custom 410	35-44 x 12	
	13 M BS SS4951	0.333	0.62	0.0012	0.016	0.58	0.15	13.55	0.009	0.033	0.013	0.003	0.0127	0.006	0.032	O 0.0127		35-44 x 12	
	13 M BS SS4952	0.347	0.66	0.003	0.016	0.41	0.23	13.15	0.049	0.045	0.03	0.004	0.027	0.004	0.089	O 0.005		35-44 x 12	
CRM	13 M BS 9905	0.107	0.327	0.008	0.008	0.333	0.123	8.22	0.90	0.115	0.016	...	0.055	0.076	0.236			35-44 x 12	
CRM	13 MI 9B	0.13	0.29	0.006	0.019	0.54	0.30	11.97	0.064	0.054	0.016	0.004	0.0468	0.028	0.048	O 0.0019	AISI 410	32 x 18	W
CRM	13 MI 11B	0.077	0.59	0.009	0.019	0.50	0.26	17.59	0.030	0.051	0.023	(0.010)	0.083	(0.007)	0.055	O, W	AISI 430	32 x 18	
CRM	13 MI 13B	1.02	0.72	0.001	0.015	0.39	0.14	16.78	0.48	0.030	0.016	0.004	0.0290	0.003	0.041	O, W	AISI 440C	32 x 18	
CRM	13 MI 14B	0.016	0.51	0.0015	0.022	0.426	0.29	23.60	0.095	0.071	0.030	0.005	0.043	0.006	0.11	O, W	AISI 446	32 x 18	
CRM	13 MI 38B	0.130	0.78	0.013	0.023	0.427	0.15	8.84	0.94	0.119	0.017	0.010	0.0192	0.007	0.014	O, Ca, B, As		32 x 18	
CRM	13 MI 154A	0.39	0.35	0.003	0.018	0.47	0.19	12.82	0.052	0.044	0.021	0.004	0.0294	0.004	0.045	O, W	AISI 420	32 x 18	
CRM	13 MI 154B	0.35	0.45	0.0004	0.017	0.405	0.223	12.20	0.079	0.087	0.020	0.006	0.020	0.003	0.067	O, W	AISI 420	32 x 18	

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Nb	Ti	As	W	V	Soluble Al	Insoluble Al	Size (mm) Ø H	
CRM	13 HY H2	0.42	0.42	(0.003)	0.020	0.91	0.31	15.00	...	0.35	...	...	(0.05)	...	0.50	...	...	...	32-35 x 20	W
CRM	13 HY H5	0.12	0.70	(0.003)	0.017	0.48	0.20	21.8	...	0.22	...	...	0.03	...	0.10	...	...	...		
CRM	13 HY H6/1	0.20	0.67	0.024	0.021	0.49	0.15	18.9	...	0.10	...	...	0.10	...	(0.12)	...	...	...		
CRM	13 HY H7/1	0.062	0.42	0.022	0.018	0.35	0.10	9.07	...	0.085	...	...	0.21	...	0.15	...	...	...		
	13 JH ST31	0.063	1.22	0.006	0.018	0.50	3.96	11.12	0.75	0.20	0.21	1.02	0.32	0.089	...	...	0.078	0.003	34 x 20	W
	13 JH ST32	0.036	0.49	0.008	0.028	1.22	2.52	12.69	1.02	0.014	0.008	0.062	0.063	0.006	...	...	0.011	0.003	each	
	13 JH ST33	0.087	0.77	0.003	0.023	1.02	0.51	16.93	0.53	0.053	0.053	0.11	0.114	0.010	...	...	0.046	0.002		
	13 JH ST34	0.042	0.30	0.025	0.004	0.31	0.99	15.04	1.25	0.10	0.10	0.30	(0.006)	(0.001)	...	...	0.026	0.002		
	13 JH ST35	0.22	0.59	0.029	0.001	1.38	0.069	24.98	0.028	(0.006)	(0.004)	(0.006)	(0.005)	(0.002)	...	...	0.062	0.002	Set Only	
	13 JH ST36	0.16	0.16	0.012	0.014	0.42	0.10	22.84	0.051	(0.004)	(0.003)	<0.001	(0.004)	(0.001)	...	...	0.002	0.003		
	13 JH ST37	0.11	0.97	0.019	0.007	0.74	0.21	20.00	0.20	(0.005)	(0.003)	(0.001)	(0.004)	(0.001)	...	...	(0.002)	<0.001		
	13 JH ST38	0.26	0.41	0.014	0.009	0.21	0.016	26.92	(0.002)	(0.004)	(0.002)	(0.001)	(0.003)	(0.001)	...	...	(0.002)	<0.001		
	13 CM 5033	0.057	0.344	0.008	0.048	0.362	0.293	15.66	0.085	0.028	0.238	...	0.0062	...	...	...	...	...	32 x 28	
	13 CM 5034	0.174	0.541	0.008	0.034	0.505	0.351	13.61	0.171	0.075	0.181	...	0.0065	...	...	...	...	...	each	
	13 CM 5035	0.261	0.748	0.069	0.028	0.648	0.090	11.91	0.367	0.188	0.291	...	0.0064	...	...	...	...	...		
	13 CM 5036	0.366	0.936	0.024	0.024	1.151	0.188	8.75	0.359	0.230	0.138	...	0.0074	...	...	...	...	...	Set Only	
	13 CM 5037	0.502	1.38	0.042	0.016	1.17	0.240	7.85	0,460	0.263	0.103	...	0.0068	...	...	...	...	...		
CRM	13 A 70	0.18	0.35	0.020	0.024	0.38	0.40	16.35	...	(0.06)	...	...	...	...	...	...	...	...	44 x 13	W
CRM	13 A E296-1(D)	0.1166	0.242	0.0026	0.0178	0.676	2.790	11.82	1.700	0.1498	0.0218	...	...	0.0139	...	0.363	0.0275	...	38 x 30	W
CRM	13 DB E288-1(D)	2.08	0.260	(0.0012)	0.024	0.292	0.298	12.00	0.103	0.060	0.018	...	0.020	...	(0.682)	0.055	...	...	35 x 30	W
CRM	13 DB E291-1(D)	0.903	0.907	0.0087	0.0168	0.808	0.563	17.10	2.10	0.0711	0.0233	...	...	...	...	0.388	...	...	35 x 30	
	13 TI 1823	0.09	0.275	0.320	0.024	0.99	0.240	16.9	0.219	0.093	(0.026)	...	...	...	...	...	...	...	W D H	W
	13 TI 1825	0.305	0.336	0.022	0.019	1.590	0.308	12.90	0.052	0.10	0.026	...	...	...	...	...	...	...	45 x 45 x 20	
	13 MT 410	0.11	0.27	0.023	0.015	0.48	0.34	12.04	0.053	0.079	0.023	...	0.015	...	...	0.025	...	...	38 x 14	W

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	V	Al	As	Ti	Sb	B	N	Size (mm) Ø H	
CRM	13 X 8110F B	0.247	0.13	0.015	0.017	0.12	2.08	9.71	1.51	0.040	0.010	0.1	(0.002)	(0.008)	0.006	...	...	0.017	40 x 15	CC
	13 X 8110I A	0.07	0.15	0.010	0.011	0.05	1.24	10.24	0.97	0.024	<0.005	0.03	0.004	0.011	<0.005	0.004	...	...	40 x 15	
	13 X 8110K A	0.10	0.34	0.008	0.009	0.07	1.80	13.66	2.12	0.18	0.02	0.11	0.08	<0.001	0.28	0.02	...	...	40 x 15	
CRM	13 X 8110L B	0.792	0.96	0.110	0.059	0.772	4.11	12.33	2.71	0.286	...	0.207	0.009	0.085	0.055	...	1.09	0.024	40 x 15	
	13 X 58191A	0.46	0.50	0.011	0.018	1.21	0.29	14.4	0.17	0.02	0.033	0.42	0.02	0.012	<0.01	...	(0.001)	(0.040)	40 x 15	CC
	13 X 58192A	0.443	0.63	0.007	0.018	1.27	0.28	14.0	0.12	0.025	0.07	0.43	0.04	0.025	0.056	...	(0.0016)	(0.040)	40 x 15	
	13 X 58193A	0.46	0.55	0.008	0.013	1.24	1.03	14.2	0.09	0.12	0.06	0.41	0.019	0.024	0.050	...	<0.002	0.038	40 x 15	
	13 X 58194A	0.49	0.56	0.007	0.013	1.15	1.22	14.1	0.11	0.030	0.05	0.40	0.04	0.02	0.07(4)	...	(0.0008)	0.040	40 x 15	
	13 X 58195A	0.40	0.57	0.005	0.013	1.31	2.03	14.0	0.15	0.021	0.03	0.41	0.05	0.007	0.15	...	<0.001	0.026	40 x 15	

1.3.5 Special Stainless

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Nb	Ti	Size (mm) Ø H	
CRM	13 HY S12/A	0.10	0.43	(0.010)	0.026	1.35	18.1	16.7	1.17	0.05	...	(0.02)	32-35 x 19	W
CRM	13 HY S15	0.043	0.26	0.013	(0.02)	0.38	3.90	16.7	2.46	1.54	0.064	...	32-35 x 19	
CRM	13 HY S19	0.26	2.32	0.021	0.012	0.32	12.8	7.00	0.11	0.19	0.81	0.048	32-35 x 19	
CRM	13 HY S20	0.097	1.80	0.025	0.011	1.50	18.2	2.06	3.15	0.44	1.22	(0.01)	32-35 x 19	
CRM	13 HY S21	0.37	1.26	0.021	0.017	0.19	22.3	3.99	4.12	0.11	...	0.50	32-35 x 19	
CRM	13 HY S22	0.014	0.61	0.008	0.009	0.34	28.2	1.00	0.82	(0.02)	...	0.13	32-35 x 19	
CRM	13 HY S23	0.007	0.12	0.008	0.007	0.82	33.4	0.13	0.021	0.04	...	...	32-35 x 19	
CRM	13 HY S24	0.65	0.76	0.036	0.062	0.94	9.19	10.28	0.41	0.12	1.65	0.27	32-35 x 19	
CRM	13 HY S25	0.067	1.49	0.015	0.045	1.90	13.8	15.6	1.77	0.07	0.07	0.46	32-35 x 19	
CRM	13 HY S26	0.076	0.67	0.026	0.027	0.99	3.31	18.9	2.59	0.14	0.07	0.11	32-35 x 19	
CRM	13 HY S27/1	0.61	(1.20)	0.030	0.025	2.01	6.20	25.22	0.14	0.09	(0.12)	(0.50)	32-35 x 19	

See page 63 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.5 Special Stainless (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Nb	W	Ti	N	Sn	V	Others	Size (mm) Ø H	
CRM	13 MI 4C	0.064	0.454	0.0017	0.029	1.69	19.3	23.95	0.224	0.230	0.098	0.013	0.024	0.003	0.039	0.007	0.078		31 x 18	W
CRM	13 MI 100B	0.100	0.400	0.0006	0.010	1.07	21.16	22.32	3.13	0.049	18.03	0.130	2.48	0.005	0.132	<0.005	0.043		31 x 18	
CRM	13 MI 239A	0.028	0.40	0.0015	0.023	1.01	6.07	25.74	3.14	1.63	0.037	0.010	0.027	0.003	0.253	<0.01	0.05		31 x 18	
	13 X 12538J	0.04	0.64	...	...	0.78	6.07	23.72	1.53	...	...	...	...	...	...	...	...		40 x 15	C
	13 X 12539G	0.15	0.85	...	...	0.80	5.45	25.55	1.10	...	...	...	...	...	...	...	...		40 x 15	
	13 X 12540L	0.15	1.05	...	...	0.44	5.17	27.88	0.54	...	...	...	...	...	...	...	...		40 x 15	
	13 X 14207J	0.06	1.55	0.011	0.011	1.04	12.48	19.97	0.23	0.24	0.01	0.26	3.05	...	...	...	...		40 x 15	C
	13 X 14211P	0.112	1.75	0.018	0.016	0.65	12.8	25.7	0.31	0.28	0.056	0.15	2.80	...	...	...	...		40 x 15	
	13 X 14212P	0.11	2.59	0.036	0.035	0.29	9.0	22.1	0.46	0.49	0.10	0.59	3.57	0.10	...	...	0.12		40 x 15	
CRM	13 X 14215K	0.126	0.56	0.016	0.016	1.08	15.70	23.8	0.046	0.03	0.016	(0.016)	2.89	0.08	...	...	0.06		40 x 15	
CRM	13 X 14216N	0.089	1.54	0.034	0.026	0.748	12.61	22.03	0.228	0.210	0.232	0.27	2.00	(0.005)	0.142	...	0.04		43 x 20	
	13 X 14219J	0.08	1.48	0.048	0.047	0.48	12.39	21.71	0.19	0.23	...	0.19	4.07	...	...	...	...		40 x 15	
CRM	13 A E276-2(D)	0.399	1.034	0.0189	0.0093	0.365	0.203	4.975	1.134	0.183	...	...	...	...	0.0116	0.0133	0.296		38 x 30	W
CRM	13 A E295-1(D)	0.0166	0.418	0.0003	0.0167	1.758	24.60	19.51	3.996	1.481	0.045	...	...	...	0.0615	0.0025	0.0456	Sb, Fe, Al		
	13 TI 1826	0.0176	0.312	0.0008	0.0246	0.40	5.36	22.79	2.93	0.197	0.097	(0.005)	0.015	0.0024	0.1522	...	0.116	Ca, As, Sb	45 x 45 x 20	W

1.3.6 Precipitation Hardening Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	V	Ti	Nb	B	N	Typical Alloy Type	Size (mm) Ø H	
CRM	13 X PH 1M	0.107	0.236	0.031	0.053	1.49	5.21	16.17	0.172	3.11	0.004	(0.006)	...	0.071	...	0.238		43 x 20	C
	13 X PH 2K	0.07	0.51	0.020	0.025	0.89	3.79	16.7	0.94	4.11	...	...	...	0.17	...	(0.013)		40 x 15	
	13 X PH 3K	0.15	1.94	0.032	0.011	0.44	3.16	15.13	0.78	6.28	...	...	...	0.49	...	0.073	17/4 PH	40 x 15	
	13 X PH 4K	0.039	0.85	0.065	0.048	0.80	4.13	14.73	0.25	5.22	...	...	...	0.35	...	0.10		40 x 15	
	13 X PH 5J	0.122	1.03	0.015	0.065	0.98	4.51	17.85	0.51	4.42	...	...	...	0.58	...	0.046	FV 520	40 x 15	
CRM	13 X PH 6E	0.115	2.09	0.014	0.041	0.655	6.33	12.35	1.45	2.08	0.135	0.167	...	0.538	...	0.027		43 x 20	
	13 X PH 7E	0.10	1.40	0.021	0.031	1.49	5.58	13.15	2.53	0.79	...	...	...	0.29	...	0.060		40 x 15	
	13 MT 450	0.036	0.29	0.006	0.014	0.39	6.36	15.20	0.80	1.49	0.16	...	...	0.67	...	0.028		38 x 19	W
	13 MT 455	0.012	0.13	0.005	0.010	0.074	8.22	11.37	0.027	2.32	...	...	1.18	0.28	0.0024	0.002		38 x 19	
	13 MT 630	0.036	0.63	0.013	0.018	0.39	4.20	15.94	0.11	3.25	0.11	...	...	0.36	0.0018	0.028		38 x 19	

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Nb	Co	Al	N		
	13 M BS 17PHA	0.018	0.40	0.022	0.023	0.85	4.69	15.40	0.34	3.30	0.204	0.072	0.004	0.022		
	13 M BS 17PHB	0.042	0.42	0.024	0.021	0.56	4.53	15.60	0.11	3.35	0.31	0.040	0.035	0.046		
	13 M BS SS1961	0.009	0.056	0.0038	0.008	0.049	8.31	11.61	0.02	2.11	0.26	0.036	0.069	0.0025		
	13 M BS SS1962	0.008	0.06	0.0025	0.006	0.06	8.32	11.42	0.008	2.22	0.27	(0.015)	0.067	0.0025		
CRM	13 M BS 9811	0.027	0.36	0.0010	0.016	0.380	6.55	14.87	0.744	1.63	0.62	0.055	(0.003)	0.0196		
CRM	13 M BS 9812	0.031	0.43	0.004	0.018	0.485	6.61	14.82	0.76	1.65	0.645	0.110	(0.002)	0.0195	continued	
	13 M BS 184A	0.035	0.08	0.001	0.007	0.06	8.34	12.66	2.20	0.041	(0.006)	0.036	1.00	0.0045		
	13 M BS 185A	0.033	0.38	0.002	0.022	0.49	4.43	14.46	0.30	3.41	0.32	0.026	0.002	0.027		
CRM	13 M BS 192	0.074	0.387	0.0005	0.025	0.835	7.11	16.44	0.430	0.412	0.168	0.104	1.17	0.0290		
CRM	13 M BS 192A	0.066	0.300	<0.002	0.021	0.768	7.01	16.44	0.28	0.334	0.208	0.114	0.98	0.029		
	13 M BS 9621	0.035	0.468	0.0011	0.017	0.31	4.61	14.93	0.063	3.42	0.27	0.029	0.003	0.013		
	13 M BS 9622	0.032	0.42	0.004	0.019	0.63	4.34	14.34	0.27	3.34	0.33	0.040	0.002	0.028		
CRM	13 MI 15B	0.047	0.33	0.001	0.013	0.39	6.94	14.53	0.82	1.53	0.65	0.24	0.006	0.0355		
CRM	13 MI 16B	0.0067	0.039	0.0025	0.007	0.026	8.28	11.44	0.016	2.23	0.25	0.027	0.062	0.0022		
CRM	13 MI 21B	0.038	0.047	0.003	0.006	0.059	8.17	12.32	2.11	0.032	0.008	0.020	1.04	0.0039		
CRM	13 MI 22B	0.045	0.41	0.001	0.022	0.53	4.81	14.29	0.35	3.25	0.301	0.08	0.004	0.012	continued	
CRM	13 MI 23B	0.034	0.40	0.022	0.022	0.81	4.10	15.21	0.19	3.67	0.22	0.038	0.003	0.0334		
CRM	13 MI 152A	0.075	0.39	0.001	0.026	0.83	7.21	16.37	0.44	0.40	0.18	0.11	1.18	0.0277		
CRM	13 MI 234B	0.103	0.54	0.0011	0.004	1.35	8.05	17.99	0.004	3.01	0.094	0.20	0.29	0.067		

Continuation from above	Ti	V	W	Ta	Sn	B	As	Pb	Ca	O	Typical Alloy Type	Size (mm) Ø H	
13 M BS 17PHA	(0.002)	0.043	0.04	(0.002)	0.007	0.0016	...	...	0.0009	0.006	17-4PH	35-44 x 12	W
13 M BS 17PHB	0.005	0.059	(0.01)	(0.002)	0.012	0.0036	...	...	(0.0003)	(0.0021)	17-4PH	35-44 x 12	
13 M BS SS1961	1.16	0.074	(0.01)	(0.01)	0.004	0.0022	0.004	(0.0003)	(0.0004)	(0.002)		35-44 x 12	
13 M BS SS1962	1.11	0.071	(<0.02)	<0.02	0.004	0.0018	0.002	...	(0.0005)	(0.001)		35-44 x 12	
13 M BS 9811	(0.003)	0.086	0.013	...	0.004	(0.0003)	(0.003)	...	0.0014	(0.006)	Custom 450	35-44 x 12	
13 M BS 9812	(0.005)	0.088	0.025	...	0.004	(0.0003)	(0.005)	...	0.0012	(0.007)	Custom 450	35-44 x 12	
13 M BS 184A	0.051	0.014	0.032	...	(0.002)	(0.0004)	...	...	(0.0003)	(0.0003)	PH 13-8 Mo	35-44 x 12	
13 M BS 185A	(0.001)	0.048	(0.014)	(0.002)	0.007	0.0017	...	...	(0.0002)	(0.0021)	15-5 PH	35-44 x 12	
13 M BS 192	0.076	0.124	0.05	(0.001)	0.008	(0.0003)	(0.005)	...	0.0007	0.0014	17-7PH	35-44 x 12	
13 M BS 192A	0.083	0.077	0.048	...	0.008	(0.0003)	(0.0035)	...	(0.0006)	(0.0006)	17-7PH	35-44 x 12	
13 M BS 9621	(0.001)	0.096	(0.01)	(0.002)	0.003	0.0004	<0.002	...	(0.0001)	...	15-5PH (VA	35-44 x 12	
13 M BS 9622	(0.001)	0.074	(0.02)	...	0.006	0.0004	...	...	...	...	15-5PH	35-44 x 12	
13 MI 15B	0.005	0.033	0.12	...	0.009	...	...	...	...	...		31 x 18	W
13 MI 16B	1.11	0.067	0.011	...	0.004	(0.0018)	...	...	...	0.0011		31 x 18	
13 MI 21B	0.012	0.011	0.010	...	0.002	...	...	...	...	0.0010	PH13-8MO	31 x 18	
13 MI 22B	0.003	0.054	0.028	...	0.010	(0.0007)	...	...	...	0.001	15-5PH	31 x 18	
13 MI 23B	0.002	0.059	0.020	...	0.009	0.0007	...	...	...	0.0035	17-4PH	31 x 18	
13 MI 152A	0.077	0.12	0.051	...	0.008	...	...	...	...	(0.0021)	17-7PH	31 x 18	
13 MI 234B	0.002	(0.003)	0.014	(0.004)	0.002	0.0005	...	...	...	0.0005	AISI 302HQ	31 x 18	

See page 63 for materials in Chippings form

For Setting-Up Samples see section 16

1.3.7 High Nitrogen Stainless Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	Co	Nb	V	W	N	Typical Alloy Type	Size (mm) Ø H	
	13 M BS 177	0.344	0.79	0.010	0.029	3.26	7.40	23.28	0.30	0.32	0.001	0.10	0.042	0.10	0.05	0.32		30-44 x 12	W
	13 M BS 180A	0.018	0.32	0.001	0.012	5.05	13.19	21.09	2.04	0.067	0.012	0.039	0.20	0.20	(0.01)	0.334	Nitronic 50	30-44 x 12	
	13 M BS 181A	0.071	4.03	0.001	0.019	8.16	8.15	16.52	0.21	0.18	0.022	0.072	0.017	0.094	0.04	0.148	Nitronic 60	30-44 x 12	
CRM	13 MI 17B	0.032	0.38	0.003	0.033	5.12	13.36	21.34	2.30	0.17	(0.003)	0.080	0.22	0.20	0.093	0.33	Nitronic 50	31 x 18	W
CRM	13 MI 18B	0.085	3.67	0.0012	0.032	8.58	8.50	16.37	0.31	0.362	0.006	0.124	0.004	0.058	0.020	0.157	Nitronic 60	31 x 18	
CRM	13 MI 19B	0.021	0.48	0.0020	0.021	9.31	6.83	19.98	0.275	0.174	0.010	0.098	0.057	0.102	0.022	0.250	Nitronic 40	31 x 18	
CRM	13 MI 157A	0.023	0.39	0.001	0.014	0.35	23.8	20.7	6.18	0.14	0.021	0.045	0.019	0.044	0.023	0.20	AL6XN	31 x 18	
CRM	13 MI 212A	0.015	0.41	0.002	0.025	1.43	5.69	22.27	3.08	0.21	(0.002)	0.13	0.012	0.079	0.027	0.14	Duplex 2205	31 x 18	
CRM	13 MI 214A	0.018	1.00	0.002	0.033	18.3	2.33	12.36	0.44	0.36	(0.002)	0.021	0.23	0.04	0.02	0.27	NMS-100	31 x 18	
CRM	13 JN 501 HA	0.0138	0.68	0.0028	0.020	0.86	17.69	19.79	6.14	0.76	(0.0026)	0.16	0.007	0.044	(0.0426)	0.224		38 x 20	HIP
	13 X NSA 1E	0.07	0.4	...	...	0.42	7.9(6)	20.3	2.47	...	...	...	...	...	...	0.040		40 x 15	C
CRM	13 X NSA 2G	0.142	0.805	0.0083	...	0.808	10.24	18.71	1.89	...	...	...	...	...	...	0.163		40 x 15	CC
	13 X NSA 3J	0.16	0.57	...	...	1.07	12.0	16.1	2.8	...	...	...	...	...	...	0.20		40 x 15	W
	13 X NSB 1D	0.17	0.58	...	...	0.44	10.0	19.1	0.11	...	...	...	...	...	...	0.04		40 x 15	W
	13 X NSB 2D	0.06	0.66	...	...	0.62	11.1	18.2	0.21	...	...	...	...	...	...	0.095		40 x 15	
	13 X NSB 3F	0.101	0.73	...	...	1.07	9.05	17.10	0.49	...	...	...	...	...	...	0.29		40 x 15	
CRM	13 X NSC 1L	0.368	0.76	0.0103	...	7.28	5.08	17.89	0.254	0.348	0.13	...	1.43	0.510	...	0.063		40 x 17	CC
CRM	13 X NSC 2M	0.719	0.89	0.0234	...	8.45	5.65	20.04	0.90	0.98	0.07	...	2.12	0.252	...	0.390		40 x 17	CC
CRM	13 X NSC 3S	1.76	1.76	0.013	...	11.26	3.14	27.01	...	...	...	...	2.66	...	...	0.61		40 x 15	CC
CRM	13 X NSC 4B	0.565	1.95	0.0115	...	8.78	7.05	32.20	0.98	0.17	0.03	0.195	1.95	0.19	0.17	0.86		43 x 20	C
CRM	13 X NSC 5A	0.493	1.16	0.0095	...	2.49	4.16	22.47	0.002	0.745	0.315	...	2.31	0.026	...	0.257		40 x 17	CC
CRM	13 X NSD 1A	0.077	0.56	0.0067	...	22.59	0.100	24.97	1.10	0.023	...	...	...	...	...	1.09		38 x 15	W
CRM	13 X NSD 2A	0.253	1.50	0.0027	...	17.01	0.104	23.94	1.06	0.054	...	...	...	...	...	0.801		38 x 15	
														Ti				38 x 15	
	13 AU No 1	0.039	0.026	0.0008	0.0085	8.01	1.02	20.71	0.131	0.161	0.012	...	...	0.0024	0.093	0.106		35 x 30	
	13 AU No 2	0.075	0.297	0.020	0.010	14.52	1.91	17.23	0.124	0.169	0.066	...	...	0.048	0.156	0.173		each	
	13 AU No 3	0.125	0.52	0.0006	0.029	16.41	1.51	13.91	0.890	0.074	0.065	...	...	0.012	0.040	0.350			
	13 AU No 4	0.414	0.71	0.013	0.045	10.11	3.01	14.85	0.361	0.310	0.015	...	...	0.0043	0.134	0.222		Set only	
	13 AU No 5	0.517	0.294	0.032	0.024	11.87	4.09	11.84	0.514	0.355	0.012	...	...	0.0044	0.185	0.176			
	13 AU No 6	0.790	1.00	0.0094	0.0096	12.87	4.87	8.91	0.802	0.311	0.019	...	...	0.006	0.323	0.023			

1.3.8 Various High Alloy Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb		
	13 M BS 86F	0.054	1.22	0.0011	0.021	1.30	34.99	18.74	0.24	0.23	0.098	0.004	(0.007)	0.19		
	13 M BS 183A	0.172	0.37	0.004	0.016	0.35	1.85	12.14	0.12	0.093	0.036	0.003	0.002	0.006		
	13 M BS 186A	0.040	0.19	0.005	0.008	0.72	35.86	0.16	0.003	0.016	0.028	(0.002)	(0.001)	<0.002		
	13 M BS 187C	0.020	0.77	<0.002	0.024	0.77	32.93	20.16	2.07	3.17	0.096	0.004	0.1	0.36		continued
	13 M BS 188A	0.050	0.15	0.0049	0.015	0.139	24.61	14.02	1.10	0.099	0.18	0.002	0.19	0.050		
	13 M BS 189	0.030	0.39	0.0007	0.014	0.26	23.78	20.58	6.19	0.61	0.047	(0.001)	0.007	0.023		
	13 M BS 253	0.094	1.81	<0.001	0.018	0.58	10.89	20.68	0.21	0.14	0.15	0.006	0.016	0.017		
	13 M BS 318	0.020	0.48	0.002	0.019	1.39	5.61	22.30	3.31	0.17	0.101	0.004	0.006	...		
CRM	13 MI 7B	0.062	1.38	(0.001)	0.018	1.47	35.84	19.32	0.19	0.21	0.069	...	0.023	0.023		
CRM	13 MI 20B	0.18	0.40	0.004	0.019	0.35	1.94	12.42	0.32	0.069	0.030	...	0.006	0.010		
CRM	13 MI 20C	0.18	0.35	0.007	0.018	0.30	1.93	12.15	0.12	0.060	0.031	...	(0.004)	0.010		continued
CRM	13 MI 24A	0.055	0.27	0.001	0.01	0.76	36.07	0.17	0.01	0.08	0.056	...	(0.002)	(0.01)		
CRM	13 MI 25B	0.022	0.37	0.001	0.015	0.36	33.31	19.42	2.06	3.25	0.14	...	0.006	0.52		
CRM	13 MI 26B	0.050	0.16	0.002	0.013	0.19	25.06	14.76	1.24	0.038	0.24	...	0.25	0.021		
CRM	13 J 37D	0.0133	0.141	0.0009	0.018	1.73	30.82	26.72	3.55	0.94	0.58	...	0.008	...		continued
CRM	13 MT 123A	0.003	0.031	<0.0005	0.007	0.035	11.10	11.67	0.92	0.010	0.016	...	0.027	<0.001		continued
	13 MT 20Cb-3	0.034	0.38	0.003	0.017	0.19	33.55	19.63	2.25	3.28	0.035	0.003	...	0.86		
CRM	13 DB E289-1(D)	0.0489	0.531	0.0027	0.0114	1.016	24.68	14.63	1.102	...	0.065	0.111	0.199	...		continued

Continuation from above	Ti	V	W	Ta	N	B	Se	Ce	As	Pb	Ca	O	Fe	Typical Alloy Type	Size (mm) Ø H	
13 M BS 86F	(0.006)	0.061	0.03	...	0.035	0.0026	...	...	(0.003)	(0.001)	(0.001)	...	...	RA330	31-44 x 12	W
13 M BS 183A	0.002	0.090	2.6	<0.003	0.0256	<0.0005	...	...	(0.002)	(0.0003)	0.002	0.0065	...	Greek Ascoloy	31-44 x 12	
13 M BS 186A	<0.003	0.001	<0.03	...	0.0026	...	0.229	...	...	...	...	...	...	Invar 36	31-44 x 12	
13 M BS 187C	(0.001)	0.059	...	<0.002	0.022	(0.0019)	...	(0.004)	...	...	(0.0004)	0.0024	...	Carpenter 20 Cb3	31-44 x 12	
13 M BS 188A	2.21	0.24	0.055	...	0.0029	0.0065	...	...	...	<0.001	...	0.0012	...	A-286	31-44 x 12	
13 M BS 189	(0.003)	0.092	(0.005)	...	0.208	(0.0012)	...	(0.019)	(0.002)	...	0.0007	...	...	UNS NO8367	31-44 x 12	
13 M BS 253	0.005	0.050	0.03	...	0.146	...	...	0.044	0.005	...	...	...	...	253MA	31-44 x 12	
13 M BS 318	(0.003)	0.064	<0.02	...	0.159	(0.0004)	...	...	...	...	(0.0004)	(0.004)	...	2205/UNS S31803	31-44 x 12	
13 MI 7B	(0.005)	0.048	(0.031)	...	0.0130	(0.002)	...	...	...	...	...	0.0026	...	AISI 330	31 x 18	W
13 MI 20B	0.004	0.17	3.52	...	0.0434	...	...	...	...	...	...	0.0056	...	Greek Ascoloy	31 x 18	
13 MI 20C	(0.003)	0.086	2.59	...	0.0222	...	...	...	...	...	...	0.0068	...	Greek Ascoloy	31 x 18	
13 MI 24A	<0.005	0.024	(0.035)	(0.18)	(0.0026)	...	(0.165)	...	...	...	...	(0.009)	...	Invar-36	31 x 18	
13 MI 25B	(0.005)	0.098	(0.021)	...	0.0227	0.0026	...	...	...	...	...	0.0056	...	Carpenter 20Cb3	31 x 18	
13 MI 26B	2.03	0.28	0.068	...	0.0064	0.0046	...	...	...	...	...	0.0032	...	Alloy A-286	31 x 18	
13 J 37D	...	0.075	...	...	0.0344	0.0012	...	0.123	...	...	...	...	...		37 x 20	W
13 MT 123A	1.58	0.014	...	...	0.003	...	...	...	...	...	...	...	74.72		38 x 19	
13 MT 20Cb-3	...	0.053	...	...	...	0.0023	...	...	...	0.002	...	...	...		38 x 19	W
13 DB E289-1(D)	2.01	0.26	...	...	...	0.0044	...	...	(0.0056)	(0.0008)	...	...	...		35 x 30	W

See page 63 for materials in Chippings form

1.3.9	Calcium Treated Stainless	Alloy Types AISI 304, 316L																	Size (mm)	
		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb	Ca	O	N	Others	Ø H	
	13 M BS CA316-1	0.023	0.46	0.019	0.026	1.54	11.21	17.44	2.08	0.43	0.31	0.013	0.004	0.021	0.0057	0.0033	0.046		35-41 x 12	W
	13 M BS CA316-2	0.023	0.46	0.019	0.026	1.54	11.21	17.44	2.08	0.43	0.31	0.013	0.004	0.021	0.0046	. . .	(0.047)		35-41 x 12	
	13 M BS CA316-3	0.018	0.49	0.024	0.027	1.60	11.26	17.49	2.04	0.43	0.22	0.010	0.004	0.031	0.003	0.0026	0.058		35-41 x 12	
	13 M BS CA316-4	0.018	0.46	0.027	0.028	1.43	11.00	17.60	2.03	0.42	0.24	(0.012)	(0.008)	0.012	0.0056	0.009	0.045		35-41 x 12	
	13 M BS CA304-1	0.045	0.71	0.016	0.026	1.06	8.57	18.3	0.34	0.34	0.20	0.010	0.003	0.026	0.0045	0.0041	0.083	Ti, V, W, B	35-41 x 12	W
	13 M BS CA304-2	0.041	0.69	0.020	0.025	1.06	8.63	18.31	0.50	0.30	0.19	0.009	0.004	0.016	0.0041	0.0044	0.086	Ti, V, W, B	35-41 x 12	
	13 M BS CA304-3	0.038	0.70	0.024	0.027	0.97	8.59	18.39	0.41	0.42	0.22	0.010	0.003	0.020	0.0047	0.0049	0.094	Ti, V, W, B	35-41 x 12	
CRM	13 J 27A	0.0477	0.0411	0.0168	0.0222	1.589	12.04	16.76	2.531	0.199	0.089	. . .	0.0169	. . .	0.0033	. . .	0.0629		35 x 20	W

1.4.1	Tool Steel																	Typical	Size (mm)	
		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	W	V	N		Alloy Type	Ø H	
	14 M BS 33E	0.49	0.20	0.005	0.022	0.29	0.08	1.25	0.045	0.038	0.006	. . .	. . .	2.75	0.19	. . .		S-1	37-41 x 12	W
	14 M BS 35D	0.879	0.22	0.024	0.021	1.13	0.13	0.495	0.035	0.14	0.012	0.006	(0.005)	0.46	0.18	. . .		O-1	37-41 x 12	
	14 M BS 36D	0.97	0.27	0.007	0.021	0.68	0.089	5.25	0.96	0.060	0.01	0.016	0.01	0.028	0.29	0.0108		A-2	37-41 x 12	
	14 M BS 38C	0.60	2.08	0.012	0.011	0.81	0.24	0.28	0.41	0.26	0.036	0.022	0.015	0.004	0.21	0.0081		S-5	37-41 x 12	
	14 M BS 39B	0.67	0.21	0.019	0.009	0.62	1.45	0.79	0.17	0.16	(0.02)	(0.011)	0.011	. . .	(0.01)	. . .		L-6	37-41 x 12	
	14 M BS 40B	0.71	0.35	0.006	0.020	2.28	0.089	1.18	1.07	0.076	0.02	0.005	0.002	0.11	0.1	0.0076		A-6	41 x 19	
	14 M BS 41A	1.50	0.97	0.001	0.004	0.93	0.17	0.20	0.19	0.034	0.006	0.002	0.01	<0.003	(0.003)	0.0077		O-6	41 x 19	
	14 M BS 49	0.36	0.93	0.014	0.014	0.33	0.20	3.51	2.40	0.070	2.00	(0.004)	0.004	0.31	0.62	0.019			41 x 19	
	14 M BS A10	1.41	1.15	0.022	0.016	1.75	1.82	0.24	1.53	0.16	(0.010)	(0.010)	0.006	<0.005	(0.004)	. . .		A-10	38-41 x 12	W
	14 M BS 10V	2.46	0.89	0.079	0.019	0.52	0.08	5.19	1.30	0.076	0.009	0.003	<0.002	0.013	9.71	0.064			38-41 x 12	HIP
CRM	14 MI 39B	0.99	0.35	0.003	0.017	0.54	0.14	4.79	1.01	0.10	0.014	0.004	0.006	(0.026)	0.22	0.0096		A2	31 x 18	W
CRM	14 MI 40B	0.68	0.39	0.003	0.012	1.98	0.096	1.04	1.22	0.050	0.015	0.004	(0.006)	0.013	0.014	0.0107		A6	31 x 18	
CRM	14 MI 41B	1.49	0.30	0.005	0.021	0.36	0.095	(12.51)	0.80	0.035	0.025	0.004	0.014	(0.022)	0.76	0.0128		D2	31 x 18	
CRM	14 MI 42B	0.38	0.99	0.005	0.014	0.36	0.18	5.10	1.23	0.089	0.013	0.005	0.013	0.012	0.94	0.0105		H13	31 x 18	
CRM	14 MI 43A	0.68	0.24	0.034	0.009	0.61	1.34	0.66	0.20	0.15	0.016	0.008	0.030	(0.02)	0.008	0.0089		L6	31 x 18	
CRM	14 MI 43B	0.711	0.251	0.013	0.008	0.56	1.39	0.651	0.206	0.180	0.012	0.013	0.021	<0.005	0.0035	0.0093		L6	31 x 18	
CRM	14 MI 44B	0.84	0.39	0.006	0.014	0.27	0.18	3.86	4.79	0.072	0.41	(0.008)	. . .	5.98	1.83	0.0251		M2	31 x 18	
CRM	14 MI 45A	1.39	1.02	0.012	0.014	0.88	0.11	0.13	0.25	0.049	0.004	0.005	0.011	. . .	0.005	0.0079		O6	31 x 18	
CRM	14 MI 45B	1.42	0.92	0.008	0.010	0.90	0.024	0.061	0.24	0.018	0.004	0.008	0.010	(0.004)	0.003	0.0080		O6	31 x 18	
CRM	14 MI 46A	0.49	0.94	0.012	0.023	0.48	0.30	1.31	0.16	0.083	0.015	0.024	0.011	1.84	0.16	0.0144		S1	31 x 18	
CRM	14 MI 47A	0.58	1.92	0.010	0.015	0.80	0.23	0.29	0.41	0.25	0.009	0.031	0.017	(0.02)	0.22	0.0084		S5	31 x 18	
CRM	14 MI 47B	0.59	1.96	0.006	0.017	0.79	0.090	0.23	0.20	0.17	0.007	0.008	0.014	(0.016)	0.17	0.0092		S5	31 x 18	
CRM	14 MI 48B	0.74	0.28	0.023	0.020	0.28	0.080	4.14	0.093	0.070	(0.040)	(0.009)	(0.006)	(17.26)	1.12	0.0096		T1	31 x 18	
CRM	14 S 620-1	0.95	0.24	0.0095	0.0082	0.96	0.038	0.90	0.051	0.022	. . .	. . .	. . .	0.66	(0.009)	. . .		SKS3	35 x 30	W
CRM	14 S 621-1	1.05	0.22	0.0065	0.015	0.69	0.109	0.75	0.107	0.092	. . .	. . .	. . .	1.13	0.064	. . .		SKS2	each	
CRM	14 S 622-1	1.22	0.31	0.0069	0.017	0.45	0.16	0.36	0.16	0.037	. . .	. . .	. . .	3.44	0.16	. . .		SKS11		
CRM	14 S 623-1	0.30	0.28	0.0161	0.013	0.54	0.20	2.56	0.27	0.014	. . .	. . .	. . .	5.55	0.39	. . .		SKD4	Set Only	
CRM	14 S 624-1	0.38	0.89	(0.012)	0.018	0.30	0.044	4.92	1.19	0.21	. . .	. . .	. . .	0.103	0.42	. . .		SKD6		
CRM	14 S 625-1	0.57	0.101	0.0165	0.016	0.88	1.51	0.87	0.36	0.16	. . .	. . .	. . .	(0.004)	(0.007)	. . .		SKT4		
	14 CM 5134	0.374	1.04	0.0079	0.0085	0.335	0.085	5.11	1.23	0.133	. . .	. . .	. . .	. . .	0.91	. . .			38 x 19	W
CRM	14 RI MAW 1	0.071	0.380	0.032	0.022	1.04	0.64	2.40	0.064	0.36	. . .	. . .	0.099	1.51	0.077	. . .			45 x 20	
CRM	14 RI MAW 5	0.49	0.66	0.032	0.042	0.33	1.09	0.073	0.130	0.160	. . .	. . .	0.111	0.29	0.39	. . .			45 x 20	
CRM	14 RI MAW 6	0.063	0.100	0.016	0.031	0.13	0.39	0.22	0.160	0.26	. . .	. . .	. . .	1.04	0.043	. . .			45 x 20	
	14 MT A2	0.95	0.40	0.004	0.010	0.72	0.10	5.13	1.05	0.06	. . .	. . .	. . .	. . .	0.22	. . .			38 x 19	W
	14 MT D2	1.53	0.40	0.005	0.013	0.48	0.10	11.46	0.75	0.04	0.02	. . .	. . .	<0.01	0.89	. . .			38 x 19	
	14 MT H13	0.39	1.05	0.005	0.015	0.30	0.10	5.23	1.36	0.061	. . .	. . .	. . .	. . .	1.02	. . .			38 x 19	
	14 MT M1	0.80	0.22	0.005	0.012	0.30	0.12	3.91	8.22	0.087	. . .	. . .	. . .	1.58	1.05	. . .			38 x 19	
	14 MT M10	0.88	0.30	0.004	0.015	0.27	0.14	3.97	7.89	0.061	0.012	. . .	. . .	<0.05	1.99	. . .			38 x 19	
	14 MT M2	0.82	0.27	0.004	0.012	0.33	0.25	4.03	4.96	0.06	0.05	. . .	. . .	6.47	1.81	. . .			38 x 19	
	14 MT M7	1.00	0.34	0.003	0.012	0.29	0.10	3.60	8.49	0.066	. . .	. . .	. . .	1.78	2.02	. . .			38 x 19	
	14 MT O1	0.91	0.36	0.004	0.009	1.27	0.06	0.49	0.07	0.05	. . .	. . .	. . .	0.51	0.25	. . .			38 x 19	

1.4.2	High Speed Steel																Size (mm)	
		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	V	N	Sn	Al	Ø H	
	14 CM 5044	0.492	0.075	0.0032	0.034	0.047	0.070	1.85	1.98	0.087	. . .	9.34	2.44	. . .	. . .	0.285	30 x 25	
	14 CM 5045	0.802	0.134	0.0085	0.072	0.353	0.187	2.57	2.81	0.476	. . .	8.8	1.99	. . .	. . .	0.044	each	
	14 CM 5046	0.634	0.768	0.059	0.038	0.168	0.044	3.31	3.50	0.390	. . .	7.34	1.6	0.0211	. . .	0.135		
	14 CM 5047	0.903	0.615	0.039	0.026	0.430	0.370	4.05	4.14	0.250	. . .	5.91	1.25	. . .	. . .	0.042	Set Only	
	14 CM 5048	0.670	1.22	0.0231	0.011	0.562	0.405	4.83	4.92	0.045	. . .	4.59	0.831	. . .	. . .	0.196		
	14 CM 5049	0.993	0.365	0.0089	0.051	0.262	0.192	5.49	5.69	0.136	. . .	3.42	0.428	0.0146	. . .	1.63		
	14 CM 5104	0.757	0.065	0.0043	0.0042	0.069	0.073	2.55	0.160	0.046	. . .	18.68	0.154	. . .	. . .	. . .	30 x 25	
	14 CM 5105	0.731	0.207	0.022	0.022	0.286	0.156	2.96	0.42	0.249	. . .	15.99	0.44	. . .	. . .	. . .	each	
	14 CM 5106	0.909	0.309	0.026	0.025	0.244	0.203	3.25	0.88	0.223	. . .	14.41	0.84	. . .	. . .	0.079		
	14 CM 5107	0.821	0.443	0.024	0.025	0.307	0.383	3.54	1.57	0.211	. . .	11.71	1.23	. . .	. . .	0.059	Set Only	
	14 CM 5108	1.11	0.349	0.036	0.049	0.313	0.196	3.90	2.51	0.348	. . .	9.27	2.03	. . .	. . .	0.101		
	14 CM 5109	1.09	0.352	0.034	0.034	0.405	0.201	4.26	3.75	0.248	. . .	6.85	2.77	. . .	. . .	. . .		
	14 CM 5110	0.996	0.648	0.026	0.026	0.293	0.224	5.19	6.52	0.203	. . .	1.8	4.51	. . .	. . .	0.128		
	14 CM 5111	0.917	0.281	0.041	0.020	0.616	0.245	4.59	4.93	0.148	. . .	4.33	3.56	. . .	. . .	. . .		

See page 64 for materials in Chippings form

For Setting-Up Samples see section 16

1.4.2 High Speed Steel (continued)

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	V	N	Sn	Others	Typical Alloy Type	Size (mm) Ø	H	
CRM	**14 X HS 1C**	0.72	0.23	0.020	0.018	0.29	0.28	4.00	0.36	0.07	0.25	17.2	1.04	0.023	(0.035)		T-1	40 x	15	W
CRM	**14 X HS 2C**	0.78	0.21	0.014	0.020	0.24	0.20	4.15	0.44	0.105	5.10	18.1	1.20	0.021	(0.03)		T-4	40 x	15	W
CRM	**14 X HS 3K**	0.92	0.35	0.031	0.016	0.632	0.354	5.60	1.33	0.128	10.73	19.6	1.31	0.030	(0.014)	As 0.017	T-5/6	40 x	15	C
	14 X HS 4B	1.01	0.11	0.012	0.010	0.13	0.05	3.68	0.42	0.03	2.04	9.8	0.47	. . .	. . .			40 x	15	W
	14 X HS 5C	0.59	0.30	0.022	0.015	0.29	0.16	3.4	3.54	0.13	8.02	6.0	1.37	. . .	. . .		M-36	40 x	15	W
	14 X HS 6B	0.70	0.14	0.032	0.026	0.17	0.06	3.94	5.47	0.08	0.26	6.63	1.95	. . .	. . .		M-2	40 x	15	W
	14 X HS 7B	1.33	0.38	0.028	0.032	0.32	0.07	4.19	5.00	0.10	0.77	14.28	1.83	. . .	. . .			40 x	15	C
	14 X HS 8C	0.97	0.14	0.022	0.020	0.28	0.16	3.55	9.47	0.09	9.04	1.81	1.20	. . .	. . .		M-33	40 x	15	W
	14 X 14944D	0.62	0.17	0.011	0.016	0.23	0.19	2.87	0.14	0.10	0.15	15.5	1.00	. . .	. . .			40 x	15	C
	14 X 14945D	0.67	0.26	0.041	0.033	0.72	0.33	3.97	0.23	0.12	0.22	16.84	0.55	. . .	. . .			40 x	15	
	14 X 14946D	0.85	0.46	0.048	0.051	0.53	1.06	5.06	0.21	0.25	0.44	16.9(7)	1.03	. . .	. . .		T-1	40 x	15	
	14 X 14948C	0.83	0.26	0.017	0.011	0.65	0.29	4.04	0.14	0.04	0.16	18.8	0.65	. . .	. . .			40 x	15	
	14 X 14952D	0.90	0.32	0.054	0.054	0.64	0.34	4.93	0.32	0.02	0.02	18.0	1.24	. . .	. . .			40 x	15	
	14 X 14890K	0.81	0.69	0.028	(0.012)	0.58	0.08	3.60	5.59	0.09	0.32	5.30	1.99	. . .	. . .			40 x	15	C
	14 X 14891L	0.67	0.43	0.043	0.014	0.23(5)	1.02	4.83	4.49	0.14	0.07	7.22	1.47	. . .	. . .		M-2	40 x	15	
	14 X 14892K	0.83	0.23	0.047	0.054	0.23	0.23	3.99	4.99	0.20	0.16	6.30	1.76	. . .	. . .			40 x	15	
	14 M BS 30C	0.76	0.28	0.022	0.026	0.29	0.27	4.19	0.35	0.10	0.39	17.58	1.09	0.025	0.021	As 0.03	T-1	37-41 x	12	
	14 M BS 32D	0.85	0.25	0.0022	0.027	0.30	0.053	4.14	4.92	0.039	0.01	6.15	1.82	0.018	(0.005)		M-2	37-41 x	12	
CRM	**14 S 606-8**	0.76	0.28	0.0008	0.016	0.31	0.065	4.0	0.58	0.027	0.12	17.16	0.83	0.0290	. . .		SKH2	35 x	30	W
CRM	**14 S 607-8**	0.78	0.3	0.0031	0.026	0.35	0.052	3.97	0.54	0.025	4.59	17.48	0.84	0.0270	. . .		SKH3	each		
CRM	**14 S 608-8**	0.8	0.36	0.0028	0.025	0.33	0.044	3.99	0.41	0.017	9.09	17.03	0.99	0.0320	. . .		SKH4A			
CRM	**14 S 609-8**	0.89	0.32	0.0007	0.027	0.31	0.12	3.98	4.85	0.053	4.63	6.10	1.87	0.0465	. . .		SKH55	Set Only		
CRM	**14 S 610-8**	1.23	0.28	0.0015	0.026	0.31	0.18	3.96	3.09	0.066	9.60	8.94	3.25	0.0348	. . .		SKH57			
CRM	**14 S 611-8**	0.86	0.37	0.0013	0.025	0.30	0.13	3.97	4.88	0.046	0.40	6.27	1.88	0.0548	. . .		SKH9			
CRM	**14 A 481/1**	0.68	0.15	0.022	0.023	0.25	(0.09)	3.40	0.28	. . .	0.31	14.0	0.56	. . .	. . .			38 x	19	W
CRM	**14 A 482/1**	0.67	0.14	0.027	0.027	0.26	(0.16)	3.95	0.40	. . .	0.29	17.8	1.04	. . .	. . .			38 x	19	
CRM	**14 A 483/1**	0.65	0.16	0.023	0.023	0.22	(0.08)	2.90	0.18	. . .	2.06	9.28	0.22	. . .	. . .			38 x	19	
CRM	**14 A 485/1**	0.94	0.3	0.039	0.043	0.41	(0.14)	4.02	0.66	. . .	4.97	17.8	1.02	. . .	0.019			38 x	19	
CRM	**14 A 486/1**	0.74	0.27	0.021	0.029	0.21	(0.06)	4.54	5.20	. . .	0.08	5.80	1.82	. . .	0.014			38 x	19	
CRM	**14 A 487/1**	1.02	0.18	0.029	0.022	0.26	(0.14)	3.91	9.41	. . .	7.95	1.80	1.14	. . .	(0.006)			38 x	19	
CRM	**14 DB E290-1(D)**	0.911	0.072	0.0160	0.0160	0.244	0.329	4.18	4.83	0.081	5.12	6.27	1.91	0.0325	. . .			35 x	30	W

1.4.4 Case Hardening Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	V	Typical Alloy Type	Size (mm) Ø	H	
CRM	**14 S 512-6**	0.106	0.16	0.021	0.015	0.43	0.023	0.039	0.008	0.009	0.024	. . .	S9CK	35 x	30	W
CRM	**14 S 513-6**	0.151	0.19	0.0162	0.010	0.76	0.019	1.12	0.005	0.008	0.031	0.006	SCr415	each		
CRM	**14 S 514-6**	0.21	0.22	0.0153	0.013	0.78	0.020	1.02	0.21	0.009	0.038	(0.004)	SCM420			
CRM	**14 S 515-6**	0.171	0.25	0.0094	0.009	0.59	2.24	0.30	0.011	0.022	0.029	(0.002)	SNC415	Set Only		
CRM	**14 S 516-6**	0.21	0.28	0.130	0.012	1.03	3.05	1.70	0.41	0.083	0.031	0.011	SNCM24			
CRM	**14 S 517-6**	0.171	0.25	0.0118	0.013	1.11	3.00	1.60	0.52	0.072	0.029	0.008	SNCM616			

1.4.5 High Manganese Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	V	Sn	N	Nb	Others	Size (mm) Ø	H	
	14 M BS 17A	0.588	0.22	0.005	0.043	19.38	0.060	1.37	0.52	0.135	0.052	0.016	0.012	0.038	0.06		32 x	17	C
	14 M BS 18A	1.13	0.64	0.043	0.019	11.3	0.36	0.22	0.049	0.029	0.019	0.32	0.007	0.042	0.05		32 x	17	
	14 M BS 19A	1.57	1.46	0.009	0.092	8.76	1.48	3.75	1.97	0.51	0.057	0.10	0.037	0.039	0.040		32 x	17	
	14 M BS 190	0.022	0.46	0.001	0.015	9.72	6.74	19.57	0.15	0.072	(0.004)	0.11	0.003	0.255	(0.004)	Ca, Co, B, Ti, W, O.	38 x	12	W
	14 M BS 191	0.098	3.66	0.023	0.024	5.71	5.34	16.33	0.36	0.33	(0.002)	0.083	(0.006)	0.117	0.024	Co, Ca, O, Ta, Ti, W.	38 x	12	
	14 M BS 193	0.104	0.66	0.002	0.018	12.11	1.82	18.48	0.21	0.088	(0.003)	0.107	0.004	0.37	0.014	B, Ca, Co, Ti.	38 x	12	
CRM	**14 X MN1AF**	0.500	0.610	0.0069	0.019	17.95	0.308	1.587	0.543	0.055	0.024	0.015	(0.0023)	0.076	0.168		40 x	15	C
CRM	**14 X MN2P**	0.70	1.00	0.014	0.013	8.84	0.49	0.29	1.45	0.034	(0.007)	0.07	0.08	0.018	. . .		40 x	15	
CRM	**14 X MN3P**	1.10	0.88	0.009	0.07	11.01	0.23	0.44	0.18	0.09	<0.005	0.05	0.024	0.02	. . .		40 x	15	
CRM	**14 X MN4W**	1.303	0.77	0.019	0.046	15.35	1.16	2.14	0.805	0.320	0.055	0.034	0.028	0.038	0.054		40 x	15	
CRM	**14 X MN5Q**	1.58	1.55	0.040	0.042	7.70	1.60	3.64	2.00	0.55	0.105	0.018	0.009	0.026	. . .		40 x	15	
	14 X 15195P	1.64	1.45	0.018	0.062	12.06	0.09	0.11	0.30	0.12	0.08	0.33	0.05	. . .	. . .		40 x	15	C
	14 X 15196S	1.08	1.64	0.012	0.037	10.16	0.25	0.26	0.22	0.22	0.13(5)	0.21	0.10(5)	. . .	. . .		40 x	15	
	14 X 15197Q	1.25	1.43	0.041	0.093	13.7	0.42	0.25	0.12	0.32	0.39	0.11	0.18	. . .	. . .		40 x	15	
CRM	**14 A 491/2**	0.994	1.101	0.0112	0.0494	16.73	0.0745	1.482	0.608	(0.04)	0.110	0.0839	. . .	0.0215	. . .		50 x	10	C
CRM	**14 A 492/2**	1.165	0.133	0.0042	0.0468	9.18	3.833	1.059	1.295	. . .	0.186	(0.01)	. . .	. . .	. . .		50 x	10	
CRM	**14 A 493/2**	0.875	0.782	0.0118	0.098	11.74	3.010	0.178	0.955	. . .	0.0375	(0.017)	. . .	. . .	. . .		50 x	10	
CRM	**14 A 494/2**	1.398	0.373	0.0032	0.0421	13.37	0.732	0.668	0.101	0.166	0.0022	(0.025)	. . .	0.0146	. . .		50 x	10	
CRM	**14 A 495/3**	0.813	0.595	0.0203	0.079	14.05	1.585	2.03	0.304	. . .	0.0093	(0.028)	. . .	. . .	. . .		50 x	10	
CRM	**14 MT 035A**	0.102	0.59	0.002	0.023	12.04	1.81	18.48	0.28	0.17	<0.004	0.058	0.003	0.33	0.004	Fe 65.91	various		
CRM	**14 MT 129A**	0.030	0.40	<0.001	0.022	9.31	6.86	19.62	0.25	0.152	0.014	0.144	. . .	0.264	0.025	Fe 62.62			

See page 64 for materials in Chippings form

For Setting-Up Samples see section 16

1.4.7 Leaded Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Pb	W	Others	Typical Alloy Type	Size (mm) Ø H	
	14 M BS 70B	0.40	0.27	0.022	0.009	0.90	0.25	1.00	0.205	0.13	. . .	(0.024)	0.135	. . .	Te 0.034	AISI 41L40	41 x 13	w
	14 M BS 72B	0.497	0.26	0.029	0.029	0.87	0.17	0.98	0.19	0.21	0.014	0.020	0.174	. . .	N 0.0081	AISI 41L50	41 x 13	
	14 M BS 73B	0.020	0.250	0.030	0.009	0.83	0.416	0.512	0.170	0.141	0.008	0.022	0.139	<0.002	N 0.0113	AISI 86L20	41 x 13	
	14 M BS 74E	0.079	0.002	0.308	0.065	1.04	0.007	0.020	0.002	0.006	(0.001)	(0.001)	0.234	<0.002	Te 0.045	AISI 12L14+Te	41 x 13	
		14 M BS 74 is recommended for XRF spectrometry only; unsuitable for O.E. spectrometry due to high S and Pb.																
CRM	**14 MI 182A**	0.20	0.25	0.023	0.028	0.90	0.50	0.56	0.18	0.23	0.012	0.020	0.14	(0.008)	Co, Nb, N	86L20	31 x 18	w
CRM	**14 MI 183A**	0.072	(0.01)	0.31	0.070	1.01	0.006	0.010	0.002	0.006	<0.005	(0.002)	0.24	<0.01	Co, N, O	12L14	31 x 18	

1.4.8 Free-machining and Resulfurised Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Co	V	N	Others	Typical Alloy Type	Size (mm) Ø H	
	14 M BS 65C	0.150	0.24	0.115	0.007	1.19	0.063	0.066	0.012	0.24	0.02	(0.007)	0.002	0.0084		AISI 1117	41-44 x 19	w
	14 M BS 66B	0.418	0.02	0.11	0.018	1.57	0.033	0.094	0.014	0.031	0.001	0.005	0.002	(0.006)		AISI 1141	41-44 x 19	
	14 X MSFM1H	0.032	0.65	0.34	0.09	1.58	0.27	1.75	0.21	0.20	0.03	0.25	0.23	0.007			40 x 15	c
CRM	**14 X MSFM2H**	0.269	0.505	0.193	0.060	1.83	0.040	0.060	0.291	0.0085	(0.003)	0.0033	(0.0008)	(0.003)			40 x 15	
	14 X MSFM3F	0.55	0.52	0.087	0.060	2.10	. . .	. . .	0.27	. . .	. . .	. . .	. . .	. . .			40 x 15	
CRM	**14 A E058-2(D)**	0.424	0.1080	0.1712	0.0098	1.186	0.199	0.1211	0.0589	0.261	. . .	. . .	. . .	0.0107			38 x 19	w
CRM	**14 A E085-1(D)**	0.067	0.008	0.336	0.062	0.977	. . .	. . .	. . .	0.291	. . .	0.019	0.0021	. . .			38 x 19	
CRM	**14 MI 10C**	0.128	0.37	0.29	0.026	0.35	0.24	12.25	0.08	0.155	0.009	0.022	0.024	0.015	Al, Nb, O	AISI 416	31 x 18	w
CRM	**14 MI 29C**	0.18	0.28	0.13	0.011	1.20	0.075	0.076	0.016	0.15	0.008	(0.01)	0.003	0.010	Al, As, O	C-1117	31 x 18	
CRM	**14 MI 29D**	0.17	0.050	0.1153	0.018	1.07	0.042	0.076	0.016	0.085	0.0072	(0.023)	0.0018	0.0057	Al, As	C-1117	31 x 18	
CRM	**14 MI 199A**	0.44	0.16	0.27	0.008	1.47	0.10	0.10	0.031	0.11	0.007	0.007	0.003	0.0071	Nb, O	C-1144	31 x 18	
CRM	**14 MI 199B**	0.45	0.18	0.29	0.009	1.45	0.035	0.048	0.008	0.089	0.005	0.007	0.003	0.0059	Al, As, B	C-1144	31 x 18	
CRM	**14 MI 206A**	0.068	(0.019)	0.26	0.069	0.90	0.044	0.041	0.012	0.098	0.005	0.009	0.002	0.0119	Al, As, B	C-1215	31 x 18	
CRM	**14 MI 253A**	0.041	0.50	0.0089	0.140	1.50	9.17	17.90	0.348	0.223	0.01	0.088	0.106	0.0373	Se 0.21	AISI 303 Se	31 x 18	
	14 M BS 90F	0.085	0.58	0.328	0.023	0.53	0.3	13.01	0.14	0.12	0.005	0.021	0.076	0.037		AISI 416	31-45 x 12	w
	14 M BS 150	0.048	0.43	0.33	0.020	1.71	0.19	18.61	1.97	0.042	(0.003)	0.024	0.054	0.029		182FM	31-45 x 12	
	14 M BS 151	0.090	0.65	0.018	0.021	0.41	0.24	13.19	0.088	0.11	0.005	0.018	0.046	0.022	Se 0.328	AISI 416 Se	31-45 x 12	
	14 M BS 152	0.320	0.44	0.275	0.022	0.36	0.14	13.41	0.061	0.050	0.003	0.015	0.051	0.020		AISI 420F	31-45 x 12	
	14 M BS 153	0.026	0.53	0.28	0.018	0.41	0.14	17.38	0.30	0.052	0.002	0.017	0.045	0.021		AISI 430F	31-45 x 12	
	14 M BS 154	0.030	1.26	0.302	0.027	0.40	0.25	17.58	0.31	0.063	(0.005)	0.019	0.046	0.039		AISI 430F mod	31-45 x 12	
	14 M BS 155	1.00	0.40	0.145	0.014	0.35	0.13	16.64	0.46	0.035	(0.003)	0.019	0.10	0.032		AISI 440F	31-45 x 12	
	14 M BS 156	1.06	0.47	0.007	0.022	1.15	0.35	16.87	0.50	0.09	(0.004)	0.047	0.13	0.041	Se 0.142	AISI 440F Se	31-45 x 12	
	14 M BS 4142Se	0.428	0.17	0.031	0.015	0.85	0.081	0.84	0.164	0.13	0.015	0.012	0.003	0.0087	Se 0.042	AISI 4142 Se	31-45 x 12	
	14 M BS 53Mod	1.01	0.26	0.012	0.011	0.36	0.072	1.37	0.024	0.07	0.008	0.007	0.005	0.0086	Bi 0.102	AISI E52100	38 x 12	w
	14 M BS 4140A	0.40	0.21	0.076	0.021	0.84	0.15	0.97	0.16	0.15	0.011	0.010	0.004	0.0098	Bi 0.105	AISI 4140 + Bi	38 x 12	
	14 M BS 4140B	0.43	0.20	0.037	0.027	0.76	0.012	0.84	0.16	0.006	(0.002)	0.005	0.005	0.0064	Bi 0.087	AISI 4140 + Bi	38 x 12	
	14 M BS 4150Mod	0.47	0.21	0.079	0.024	0.90	0.15	1.01	0.21	0.19	0.013	0.012	0.008	0.0087	Bi 0.070	AISI 4150 + Bi	38 x 12	
	14 M BS 8620A	0.184	0.21	0.079	0.008	0.80	0.44	0.48	0.16	0.15	0.009	0.010	0.004	0.0107	Bi 0.073	AISI 8620 + Bi	38 x 12	
	14 M BS 8620B	0.202	0.23	0.029	0.014	0.84	0.44	0.59	0.17	0.135	0.009	0.011	0.003	0.0100	Bi 0.105	AISI 8620 + Bi	38 x 12	
	14 MT 303	0.070	0.58	0.31	0.029	1.64	9.08	17.78	0.41	0.49	0.007	0.16	0.044	. . .		AISI 303	38 x 19	w
	14 MT 416	0.088	0.63	0.36	0.018	0.52	0.24	13.15	0.065	0.004	0.005	0.019	0.025	. . .		AISI 416	38 x 19	

1.4.9 Silicon Steel

		C	Si	S	P	Mn	Ni	Cr	Cu	Total Ti	Total Al	Total As	Total Ca	N	Typical Alloy Type	Size (mm) Ø H	
CRM	**14 HY T1**	0.10	5.29	0.013	0.014	0.14	0.036	0.065	<0.03	0.02	. . .	. . .	. . .	. . .		32-35 x 19	w
CRM	**14 HY T2/1**	0.026	3.24	0.017	0.009	0.18	0.11	0.03	0.09	. . .	. . .	. . .	. . .	. . .		32-35 x 19	
CRM	**14 HY T2/2**	0.039	3.84	0.020	0.012	0.28	0.074	0.065	0.075	0.037	. . .	. . .	. . .	. . .	Transformer	32-35 x 19	
CRM	**14 HY T3**	0.090	0.66	0.033	0.058	0.60	0.11	0.40	0.10	<0.01	. . .	. . .	. . .	. . .	Steel	32-35 x 19	
CRM	**14 HY T4**	0.17	1.97	0.041	0.012	0.23	0.077	0.24	0.16	<0.005	. . .	. . .	. . .	. . .		32-35 x 19	
CRM	**12 DB E191-1(D)**	0.013	3.140	0.0017	0.011	0.025	0.018	0.025	0.0080	0.009	0.397	0.0031	. . .	0.0026		35 x 30	w
CRM	**14 J E196-1(D)**	0.0039	1.908	0.0005	0.0076	0.365	. . .	. . .	. . .	. . .	0.201	. . .	0.0005	0.002		38 x 25	w

1.4.10 Special Alloys

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Al	Ti	Nb	Others	Typical Alloy Type	Size (mm) Ø H	
	14 M BS 203Mn	0.048	0.46	0.30	0.026	5.99	5.50	16.75	0.18	1.88	0.06	(0.001)	(0.002)	(0.004)			38 x 12	w
	14 M BS 9-4-30	0.316	0.06	<0.002	0.008	0.22	7.25	1.00	1.01	0.088	4.46	0.004	(0.002)	(0.007)	V 0.09	AMS 6526	35 x 12	
CRM	**14 MI 98A**	0.019	0.10	0.002	(0.002)	0.24	(29.09)	0.12	0.05	0.05	(17.50)	0.04	<0.01	<0.01		Kovar	31 x 18	w
	14 X ALNICO 1A	0.08	0.31	0.007	. . .	0.26	17.1	. . .	. . .	6.1	15.1	9.03	0.50	. . .	Zr 0.2	AlNiCo	40 x 15	c
	14 MT 070A	0.014	0.32	<0.001	0.003	0.015	24.47	5.54	0.006	0.010	29.00	0.47	0.82	4.63				
	14 MT 098A	0.025	0.39	<0.0005	0.003	0.037	37.53	0.099	0.021	0.026	14.46	0.050	1.54	5.06			various	

1.4.11 High-Ni Calibration Series

		C	Si	S	P	Ni	Co	Cr	Cu	Al	Fe	Size (mm) Ø H	
	14 X FeNi20	0.012	1.59	0.0024	0.006	19.9	0.98	(0.015)	0.06	(0.002)	rem	40 x 15	cc
	14 X FeNi35	0.056	0.149	0.093	0.030	34.7	0.345	0.08	0.039	(0.001)	rem	40 x 15	c
	14 X FeNi40	0.074	0.068	1.22	0.014	40.3	1.02	0.05	0.063	2.61	rem	40 x 15	cc
	14 X FeNi45	0.0056	1.04	0.021	0.041	46.0	0.62	0.11	0.077	1.10	rem	40 x 15	cc
	14 X FeNi50	0.149	0.47	0.137	0.016	51.1	0.53	0.089	0.107	0.40	rem	40 x 15	cc

See page for materials in Chippings form

For Setting-Up Samples see section 16

2.1.1 High-Purity Ni

All Elements ppm

		Ag	Al	As	B	Be	Bi	C	Ca	Cd	Co	Cr	Cu	Fe	Ga	Mg	Mn	
CRM	21 MI 187A	0.1	11	0.1	<5	<1	<0.1	13	<10	<0.1	1.0	(3)	2.2	19	<0.5	(2)	3.0	
CRM	21 MI 188A	1.1	24	0.7	<5	<1	0.9	22	<10	0.2	1.7	(6)	1.8	19	<0.5	(4)	2.3	
CRM	21 MI 189A	2.4	44	0.7	<5	<1	2.6	23	<10	0.8	3.1	(10)	9.0	38	<0.5	(8)	1.9	continued
CRM	21 MI 190A	10.9	50	28	<5	<1	11.1	22	<10	5	8	(1)	17	99	<0.5	(6)	1.8	
CRM	21 MI 191A	0.1	1.5	13	<5	<1	<0.1	14	<10	<0.1	545	2.1	4.2	7.9	<0.5	(2)	3.1	
CRM	21 MI 192A	0.1	2.3	62	<5	<1	0.8	11	<10	0.4	1400	3.1	45	15	<0.5	(2)	5.2	

Continuation from above		Mo	N	O	P	Pb	S	Sb	Se	Si	Sn	Te	Ti	Tl	V	Zn	Size (mm) Ø H	
	21 MI 187A	(<1)	(1)	(14)	<1	0.15	1.9	<0.5	<0.1	(18)	0.4	<0.1	(3)	<0.2	(0.8)	<0.5	31 x 18	W
	21 MI 188A	<1	(1)	(17)	1.4	1.0	1.8	1.1	0.7	18	1.1	0.8	(2)	(0.9)	<0.5	2.3	31 x 18	
	21 MI 189A	(<1)	(1)	(18)	3.7	2.9	1.8	3.9	2.1	19	2.2	1.7	(3.3)	2.3	<0.5	2.8	31 x 18	
	21 MI 190A	(<1)	(1)	(19)	34	9.3	3.3	11	6.5	28	6.2	8.9	(6)	5.8	<0.5	8.1	31 x 18	
	21 MI 191A	(<1)	(2)	(30)	<1.0	0.3	2.1	<0.5	1.9	(5)	0.4	<0.1	<1	<0.2	<0.5	1.9	31 x 18	
	21 MI 192A	(<1)	(1)	(42)	1.1	2.8	165	1.0	2.8	(7)	1.1	<0.1	<1	<0.2	<0.5	11	31 x 18	

2.1.2 Residuals in Nickel

		Si	Mn	Cu	Fe	Cr	Co	Ti	Al	Mg	C	S	Sn	Pb	B	N	Size (mm) Ø H	
	21 X 17518H	0.05	0.43	<0.001	0.52	0.05	1.05	0.032	0.15	0.034	0.007	(0.001)	(0.002)	(0.002)	(0.002)	<0.001	40 x 15	C
	21 X 17519J	0.17	0.35	0.06	0.28	0.06	0.77	0.07	0.19	0.20	...	...	...	...	...	...	40 x 15	
	21 X 17520H	0.20	0.18	0.09	0.25	0.10	0.48	0.08	0.04	0.06	...	...	...	...	...	...	40 x 15	
	21 X 17521J	0.28	0.11	0.16	0.24	0.16	0.26	0.12	0.03	0.03	...	...	...	...	...	...	40 x 15	
	21 X 17522G	0.32	0.02	0.21	0.06	0.23	0.05	0.32	0.03	<0.005	...	...	...	...	...	...	40 x 15	

		C	Si	S	P	Mn	Cu	Fe	Cr	Co	Ti	B	Mg	Al	Mo	Pb	V	Size (mm) Ø H	
	21 M BS 200A	0.077	0.007	0.004	<0.003	0.15	0.004	0.076	(0.001)	0.057	0.043	0.0044	0.013	0.029	<0.002	<0.0005	0.001	38 x 12-20	W
	21 M BS 200-1	0.042	0.039	0.001	(0.002)	0.113	0.008	0.050	0.001	0.090	0.021	0.0033	0.031	0.005	0.001	0.0012	0.001	38 x 12-20	
	21 M BS 200-2	0.051	0.06	0.007	(0.003)	0.242	0.052	0.120	0.010	0.104	0.020	0.0040	0.036	0.006	0.001	0.0007	0.002	38 x 12-20	
	21 M BS 200-3	0.014	0.011	0.004	0.002	0.16	0.108	0.142	0.009	0.103	0.024	0.0041	0.023	(0.005)	(0.001)	0.0009	0.001	38 x 12-20	
	21 M BS 200-4	0.11	0.100	0.008	0.003	0.31	0.049	0.290	0.130	0.091	0.019	0.0037	0.030	(0.007)	(0.002)	0.0010	0.003	38 x 12-20	
CRM	21 MI 50B	0.010	0.059	0.0002	0.002	0.20	(0.001)	0.079	0.010	0.069	0.002	(0.0002)	(0.001)	0.031	(0.003)	...	0.016	31 x 18	

2.2 Ni/Cr

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Mg	V	Nb	B	Ni	Typical Alloy Type	Size (mm) Ø H	
	22 X 754D	0.07	0.66	0.53	0.21	2.22	19.65	0.21	0.23	0.49	0.18	0.002	...	...	...	...		40 x 15	C
	22 X 755D	0.05	0.27	1.07	0.50	1.15	19.69	0.49	0.07	0.83	0.36	0.003	...	...	...	...		40 x 15	
	22 X 801D	0.14	0.51	0.56	0.22	0.57	20.75	0.25	0.25	2.19	1.33	0.03	...	...	...	...		40 x 15	C
	22 X 802C	0.20	0.50	0.49	0.19	0.55	18.90	0.23	0.28	2.13	1.26	0.02	...	...	...	...		40 x 15	
	22 X 803E	0.06	1.05	0.22	0.007	0.33	19.85	0.50	0.50	1.93	1.60	0.0002	...	...	...	...	Nimonic 80A	40 x 15	
	22 X 804D	0.07	0.56	0.54	0.21	0.66	19.72	0.09	0.20	2.34	1.33	0.004	...	...	...	...		40 x 15	
	22 X 805D	0.20	0.22	1.01	0.54	1.06	19.82	0.10	0.22	2.71	1.06	...	...	...	...	...		40 x 15	
CRM	22 MT 122A	0.061	0.012	0.007	0.007	1.31	19.89	0.015	0.007	2.55	1.62	...	0.118	...	0.0036	74.07	Nimonic-type	38 x 19	
CRM	22 RU NG1/2	(0.02)	(0.3)	0.77	0.009	0.84	17.2	(0.2)	...	0.39	1.98	...	0.49	0.40	...	...		40 x 28	
CRM	22 RU NG2/2	(0.04)	(0.4)	1.86	0.147	0.90	17.0	(0.1)	...	2.17	0.20	...	0.160	...	...	...		40 x 28	
CRM	22 RU NG3/2	(0.02)	1.01	(0.3)	0.086	1.02	18.2	(0.1)	...	1.32	0.135	...	(0.3)	...	...	...		40 x 28	
CRM	22 RU NG4/2	(0.02)	0.152	0.305	0.046	(0.06)	18.4	0.100	...	0.98	0.52	...	(0.06)	0.62	...	...		40 x 28	

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Sn	Pb	W	B			
	22 X 806D	...	0.02	<0.01	<0.01	0.10	20.13	0.08	0.30	2.08	1.36	<0.0005	0.0019	0.015	0.006			
	22 X 808C	...	0.10	0.05	<0.01	0.11	19.73	<0.01	0.03	2.14	1.41	0.030	0.007	0.11	0.014	continued		

Continuation from above		Zr	V	Ag	Te	Bi	As	Sb	Size (mm) Ø H	
	22 X 806D	<0.005	<0.01	<0.0001	<0.0001	<0.0001	<0.001	<0.0002	40 x 15	C
	22 X 808C	0.035	0.05	0.007	0.008	0.002	0.013	0.017	40 x 15	

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Mg	S	Typical Alloy Type	Size (mm) Ø H	
	22 X 901B	0.11	0.51	0.50	0.10	0.57	20.80	0.26	17.02	2.28	1.29	0.020	...		40 x 15	C
	22 X 902B	0.15	0.50	0.51	0.13	0.61	18.80	0.22	17.08	2.26	1.31	0.02	...		40 x 15	
	22 X 903C	0.08	1.09	0.25	0.01	0.83	19.84	0.07	17.60	1.86	1.67	0.002	...	Nimonic 90	40 x 15	
	22 X 904C	0.08	0.52	0.50	0.10	0.25	19.9	0.21	16.9	2.26	1.29	0.005	...		40 x 15	
	22 X 905C	0.19	0.22	1.08	0.23	1.15	19.89	0.53	16.45	2.92	1.03	...	...		40 x 15	
	22 X 1051C	0.15	0.51	0.19	0.14	0.58	14.28	4.59	18.95	1.21	4.49	0.02	...		40 x 15	C
	22 X 1052C	0.19	0.51	0.26	0.13	0.65	15.7	4.48	18.6	1.09	4.08	0.002	...		40 x 15	
	22 X 1053C	0.06	1.02	0.55	0.24	0.31	13.97	5.12	17.92	1.74	4.92	(0.0003)	...	Nimonic 105	40 x 15	
	22 X 1054B	0.22	0.59	0.23	0.11	0.88	14.44	4.66	19.13	1.24	4.95	0.004	...		40 x 15	
CRM	22 X 1055D	0.274	0.24	0.03	0.02	1.26	14.9	3.87	19.9	0.52	3.97	(0.008)	0.009		40 x 15	

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	B	Typical Alloy Type	Size (mm) Ø H	
CRM	22 X 9013F	0.103	1.23	0.103	0.025	0.67	0.23	rem	10.00	7.1	1.26	2.9	0.36	42.2	0.017	Nimonic 901	40 x 15	C
	22 X 9014D	0.08	0.49	0.013	0.014	0.25	0.06	rem	13.22	6.08	0.18	2.37	0.16	45.7	0.013		40 x 15	
	22 X 9015D	0.08	0.38	0.021	0.023	0.25	0.11	rem	13.0	5.85	0.21	2.18	0.29	43.3	0.015			
CRM	22 A 387/1	0.033	0.06	0.0028	0.0033	0.025	0.0076	38.4	11.35	5.83	0.020	3.00	0.24	41.2	0.017	Nimonic 901	38 x 19	W

See page 65 for materials in Chippings form

For Setting-Up Samples see section 16

2.3 Fe/Ni/Cr

	C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	P	S	Typical Alloy Type	Size (mm) Ø H	
23 X 8001F	0.09	0.21	1.07	0.07	rem	20.43	0.52	1.03	0.51	0.47	31.4	. . .	. . .		40 x 15	C
23 X 8002E	0.06	0.47	0.68	0.28	rem	20.48	0.34	0.54	0.32	0.29	32.1	. . .	. . .		40 x 15	
23 X 8003F	0.01	0.79	0.28	0.51	rem	20.17	0.12	0.12	0.11	0.08	32.7	. . .	. . .	'Incoloy 800'	40 x 15	
23 X 8004E	0.06	0.53	0.70	0.30	rem	19.72	0.33	0.53	0.34	0.31	31.8	. . .	. . .		40 x 15	
23 X 8005E	0.07	0.46	0.73	0.28	rem	20.81	0.34	0.50	0.35	0.22	32.2	. . .	. . .		40 x 15	
23 X DS 1E	0.10	2.47	1.59	0.08	rem	17.87	0.08	1.04	0.09	0.07	36.4	. . .	. . .		40 x 15	C
23 X DS 2E	0.06	2.07	1.00	0.30	rem	17.81	0.30	0.48	0.17	0.04	37.4	. . .	. . .		40 x 15	
23 X DS 3E	0.05	1.61	0.58	0.63	rem	17.95	0.63	0.13	0.35	(0.02)	38.1	. . .	. . .	Incoloy 800DS	40 x 15	
23 X DS 4E	0.08	1.99	1.06	0.41	rem	16.88	0.32	0.56	0.20	0.035	37.15	. . .	. . .		40 x 15	
23 X DS 5E	0.080	1.98	1.04	0.30	rem	18.64	0.30	0.50	0.17	0.08	36.6	. . .	. . .		40 x 15	
23 RI INC 1	0.037	0.30	0.20	0.67	. . .	22.89	. . .	0.022	0.45	0.36	31.36	0.018	0.003		35 x 20	
23 RI INC 2	0.068	0.67	0.51	0.84	. . .	23.92	. . .	0.021	0.73	0.68	30.21	0.020	0.003		35 x 20	
23 RI INC 3	0.188	1.11	0.83	0.5	. . .	21.14	. . .	0.023	0.67	0.33	33.42	0.017	0.010		35 x 20	
23 RI INC 4	0.129	0.72	1.17	0.28	. . .	18.73	. . .	0.033	0.161	0.054	28.48	0.028	0.027		35 x 20	
23 RI INC 5	0.137	0.50	1.47	0.40	. . .	17.31	. . .	0.035	0.075	0.009	36.67	0.047	0.015		35 x 20	

2.4 Ni/Cr/Co/Mo

	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	C	P	Typical Alloy Type	Size (mm) Ø H	
24 X 14939E	0.42	0.63	0.52	0.57	21.0	6.62	19.58	1.88	0.76	rem	. . .	. . .		40 x 15	C
24 X 10999D	0.15	0.47	0.15	0.52	20.38	5.84	19.53	2.50	0.46	rem	. . .	. . .		40 x 15	
24 X 11001D	0.57	0.53	0.17	0.51	20.44	6.06	19.67	2.06	0.58	rem	. . .	. . .	C263	40 x 15	
24 X 11002F	0.40	0.21	0.11	0.20	20.32	6.29	20.48	2.65	0.37	rem	. . .	. . .		40 x 15	
24 X 11005F	0.39	0.65	0.72	0.81	20.21	5.93	18.74	2.45	0.41	rem	. . .	. . .		40 x 15	
24 M BS 263	0.26	0.38	0.029	0.47	19.84	5.66	19.96	2.25	0.47	. . .	0.071	0.005		38-50 x 12	W

Waspalloys

	C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Nb	B		
24 X WASP 1B	0.01(3)	0.59	0.011	0.019	0.13	0.08	2.16	16.64	6.14	12.8	3.13	1.64	0.055	0.007		
24 X WASP 2B	0.09	0.35	0.018	0.009	0.24	0.11	1.66	18.5	4.22	14.6	3.53	1.00	0.12	0.008		
CRM **24 X WASP 3D**	0.118	0.208	0.026	0.014	0.542	0.735	0.96	20.84	1.96	13.77	5.52	2.99	0.163	0.0087	continued	
CRM **24 X WASP 4C**	0.052	0.21	(0.01)	<0.005	0.53	(0.004)	1.48	19.7	7.51	11.01	2.25	2.16	0.25	0.014		
24 M BS 199A	0.033	0.05	<0.001	0.006	0.014	0.022	1.05	19.25	3.99	13.47	3.07	1.26	0.040	(0.004)	continued	

Continuation from above

	V	W	Zr	Ta	Ni	Mg	Pb	Sn	As	Ag	Sb	Typical Alloy Type	Size (mm) Ø H	
24 X WASP 1B	0.03	0.18	0.12	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40 x 15	C
24 X WASP 2B	0.06	0.14	0.07	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40 x 15	
24 X WASP 3D	0.123	0.064	0.059	0.021	51.76	(0.002)	0.008	0.014	0.007	0.010	0.022	Waspalloy	43 x 20	
24 X WASP 4C	0.145	0.25	0.08	. . .	54.3	. . .	0.004	(0.005)	. . .	. . .	. . .		43 x 20	
24 M BS 199A	0.020	. . .	. . .	. . .	57.8	. . .	. . .	. . .	. . .	. . .	. . .		38-50 x 12	

2.5 Ni/Cr/Nb/Mo

	Si	Mn	Cu	Fe	Cr	Mo	Co	W	Nb	Ni	Typical Alloy Type	Size (mm) Ø H	
25 X 10221F	0.45	0.28	0.11	0.62	20.0	6.57	0.26	2.23	7.43	rem		40 x 15	C
25 X 10225G	0.25	0.29	0.12	0.55	18.27	5.95	0.30	1.74	7.00	rem		40 x 15	
25 X 10230G	0.34	0.35	0.12	0.76	21.9	6.06	0.59	3.83	7.04	rem	PE 10	40 x 15	
25 X 10231D	0.14	0.13	0.06	0.55	20.58	6.00	0.11	2.67	6.76	rem	MC 102	40 x 15	
25 X 10235E	0.56	0.53	0.26	1.26	19.87	5.85	0.53	3.14	7.25	rem		40 x 15	
25 X 10219E	0.20	0.33	0.13	0.65	20.36	5.01	0.25	2.67	6.62	rem		40 x 15	

2.6 Ni/Cr/Mo

	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	Typical Alloy Type	Size (mm) Ø H	
26 X 11381D	0.30	0.43	0.008	0.70	19.76	9.47	(0.047)	2.48	0.41	rem		40 x 15	C
26 X 11383D	0.29	0.19	0.08	0.49	22.50	9.37	0.05(5)	2.84	0.67	rem	C130	40 x 15	
26 X 11384E	0.15	0.13	0.12	0.98	20.5(3)	10.2	0.30	2.6(1)	0.50	rem	ANC12	40 x 15	
26 X 14182D	(0.01)	<0.005	0.006	0.09	21.61	10.11	0.06	2.75	0.76	rem		40 x 15	

2.7 Ni/Cr/Mo/Co

	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	Typical Alloy Type	Size (mm) Ø H	
27 X 14184F	0.38	0.38	0.064	0.35	21.64	10.8	10.6	0.01	<0.01	rem		40 x 15	C
27 X 14188D	0.33	0.30	(0.003)	0.44	21.17	10.3	10.4	0.03	<0.01	rem	C242	40 x 15	
27 X 14386C	0.38	0.39	0.02	1.50	20.73	10.47	10.51	0.06	0.02	rem	ANC11	40 x 15	
27 X 14387E	0.21	0.30	(0.005)	1.00	21.0	10.7	9.9	<0.01	<0.01	rem		40 x 15	

2.8 Ni/Cr/Fe

	C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Mg	Nb	Typical Alloy Type	Size (mm) Ø H	
28 X 6001G	. . .	0.95	. . .	. . .	0.12	0.83	6.33	16.38	. . .	1.02	0.58	0.02	0.01	. . .		40 x 15	C
28 X 6002F	. . .	0.25	. . .	. . .	0.65	0.02	8.24	16.23	. . .	0.22	0.12	0.18	0.004	. . .		40 x 15	
28 X 6003E	. . .	0.74	. . .	. . .	0.47	0.42	7.1	15.56	. . .	0.62	0.22	0.025	0.01	. . .	Inconel 600	40 x 15	
28 X 6004E	. . .	0.65	. . .	. . .	0.38	0.42	7.17	16.21	. . .	0.77	0.27	0.05	0.008	. . .		40 x 15	
28 X 6005E	. . .	0.60	. . .	. . .	0.39	0.39	6.98	16.93	. . .	0.62	0.28	0.06	0.002	. . .		40 x 15	
28 X X7501F	0.15	0.55	. . .	. . .	1.56	0.51	5.08	15.22	0.54	. . .	2.35	1.00	. . .	1.57		40 x 15	C
28 X X7502D	0.10	0.33	. . .	. . .	1.03	0.22	6.70	14.93	0.35	. . .	2.60	0.74	. . .	0.96		40 x 15	
28 X X7503E	0.08	0.14	. . .	. . .	0.56	0.06	9.24	15.02	0.11	. . .	2.90	0.56	. . .	0.63	Inconel X750	40 x 15	
28 X X7504D	0.03	0.39	. . .	. . .	1.09	0.22	6.42	14.22	0.46	. . .	2.59	0.70	. . .	0.95		40 x 15	
28 X X7505D	0.11	0.34	. . .	. . .	1.04	0.22	6.25	16.08	0.33	. . .	2.33	0.80	. . .	1.07		40 x 15	

See page 65 for materials in Chippings form

For Setting-Up Samples see section 16

2.8 Ni/Cr/Fe (Continued)

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Mg	Nb	V	Ni	Typical Alloy Type	Size (mm) Ø H	
	28 M BS 600-2	0.071	0.23	0.004	0.006	0.31	0.089	6.8	16.36	0.007	0.1	0.37	0.16	0.012	(0.02)	0.028	. . .	Inconel 600	38-50 x 12	W
	28 M BS 600-3	0.020	0.19	0.005	0.008	0.28	0.24	8.88	14.77	0.007	0.1	0.2	0.09	0.012	(0.02)	0.02	. . .	Inconel 600	38-50 x 12	
	28 M BS 600-4	0.034	0.22	0.004	0.007	0.20	0.08	8.4	14.72	(0.002)	0.09	0.2	0.06	0.02	(0.015)	0.023	. . .	Inconel 600	38-50 x 12	
	28 M BS 600-5	0.047	0.26	<0.002	0.005	0.21	0.10	8.36	15.59	0.049	0.029	0.23	0.19	0.004	(0.03)	0.054	. . .	Inconel 600	38-50 x 12	
	28 M BS 600-6	0.083	0.31	0.001	0.007	0.21	0.24	7.33	14.86	0.12	0.066	0.24	0.278	0.022	0.14	0.03	. . .	Inconel 600	38-50 x 12	
	28 M BS 600C	. . .	0.39	0.001	0.009	0.50	0.05	9.31	15.64	0.03	0.033	0.21	0.21	. . .	. . .	0.03	. . .	Inconel 600	38-50 x 12	
	28 M BS 617	0.079	0.14	<0.001	0.007	0.057	0.062	1.76	22.44	9.64	12.42	0.28	1.20	(0.02)	0.123	0.022	. . .	Inconel 617	38-50 x 12	
	28 M BS 625B	0.023	0.12	<0.003	0.010	0.10	0.22	4.51	21.28	9.58	0.24	0.20	0.33	0.003	3.53	0.015	. . .	Inconel 625	38-50 x 12	
	28 M BS 718B	0.036	0.12	0.001	(0.006)	0.125	0.044	19.64	17.60	2.93	0.19	0.95	0.57	. . .	5.29	(0.03)	52.1	Inconel 718	38-50 x 12	
	28 M BS 800	0.075	0.55	0.0006	0.016	0.79	0.32	(45.8)	19.92	0.19	0.056	0.475	0.28	(0.0028)	0.020	0.073	. . .	Inconel 800	38-50 x 12	
	28 M BS 825C	0.024	0.24	0.0004	0.013	0.49	1.64	35.1	20.06	2.70	0.13	0.74	(0.10)	(0.002)	(0.04)	(0.03)	38.7	Inconel 825	38-50 x 12	
CRM	**28 A 351**	0.025	0.14	0.0006	(0.006)	0.037	0.016	18.26	18.12	3.06	0.136	1.06	0.55	. . .	5.20	. . .	. . .	IN 718	41 x 13	W
CRM	**28 TI E377-1(D)**	0.0202	0.077	0.0006	0.0036	0.0225	0.0110	3.77	21.72	8.94	0.0348	0.255	0.216	. . .	3.50	. . .	. . .		40 x 20	
CRM	**28 X 6251K**	0.039	0.47	(0.0013)	(0.0014)	0.172	0.051	3.12	20.52	9.88	0.023	(0.01)	0.16	. . .	2.70	. . .	. . .			
CRM	**28 X 6252L**	0.077	0.61	0.0039	(0.010)	0.281	0.145	4.13	21.49	8.77	0.197	(0.025)	0.21	. . .	3.39	. . .	. . .			
CRM	**28 X 6253M**	0.122	1.28	0.013	(0.018)	0.54	0.30	5.43	21.90	7.86	0.39	0.044	0.32	. . .	4.25	. . .	. . .	continued		
CRM	**28 X 6254K**	0.037	0.53	0.0046	0.004	0.093	0.027	6.46	21.1	5.89	0.22	0.30	0.05	. . .	3.53	. . .	. . .			
CRM	**28 X 6255K**	0.045	0.15	0.024	0.022	0.405	0.423	1.06	22.46	8.57	0.309	0.12	0.11	(0.0025)	4.35	. . .	. . .			
	28 X 7181H	0.008	0.71	0.005	(0.003)	0.108	0.013	(19.5)	18.71	2.94	0.01	0.025	(0.007)	. . .	4.97	0.02	. . .			
CRM	**28 X 7182L**	0.035	0.47	0.0066	0.004	0.184	0.117	17.0	21.30	0.88	0.64	1.13	0.34	. . .	4.76	0.05	. . .			
CRM	**28 X 7183S**	0.296	0.52	0.0023	0.003	0.36	0.26	(19.6)	18.85	1.31	0.94	1.21	1.21	. . .	6.25	0.047	. . .	continued		
CRM	**28 X 7184J**	0.149	0.36	0.023	0.012	0.192	0.11	18.2	16.65	3.41	0.211	(0.28)	0.34	. . .	5.67	0.101	. . .			
CRM	**28 X 7185J**	0.050	0.13	0.0109	0.008	0.34	0.30	16.95	21.80	2.54	0.320	(0.16)	0.32	0.021	4.88	0.05	. . .			
	28 X 7186H	0.007	0.65	0.014	0.016	0.253	0.091	(16.5)	17.85	2.88	0.40	0.20	0.32	. . .	5.15	0.012	. . .			
CRM	**28 MI 53B**	0.064	0.11	0.0008	0.008	0.25	0.13	9.75	14.55	0.12	0.057	0.33	0.17	0.005	0.073	0.024	. . .			
CRM	**28 MI 53C**	0.070	0.33	<0.001	0.006	0.21	0.045	7.16	14.95	0.047	0.035	0.34	0.21	0.008	0.024	0.029	. . .			
CRM	**28 MI 54B**	0.022	0.083	0.0009	0.006	0.051	0.11	2.32	21.64	9.43	0.29	0.21	0.37	0.003	3.55	0.011	. . .			
CRM	**28 MI 56C**	0.025	0.049	0.0003	0.009	0.064	0.016	18.39	18.02	2.94	0.011	0.99	0.521	0.0007	5.18	0.027	. . .			
CRM	**28 MI 56D**	0.041	0.119	0.0003	0.010	0.200	0.063	18.10	18.37	3.06	0.298	0.99	0.60	0.0051	5.22	0.033	. . .	continued		
CRM	**28 MI 58A**	0.076	0.26	<0.001	0.011	0.65	0.03	(44.90)	20.71	0.17	0.10	0.49	0.53	<0.001	(0.03)	0.03	. . .			
CRM	**28 MI 59B**	0.032	0.23	0.0028	0.010	0.45	2.48	31.25	21.20	3.05	0.049	0.96	0.18	(0.002)	(0.005)	0.048	. . .			
CRM	**28 MI 60B**	0.063	0.87	0.0003	0.013	1.54	0.05	17.7	25.3	2.9	3.02	(0.005)	0.05	0.0022	(0.01)	0.069	. . .			
CRM	**28 MI 201A**	0.019	0.15	(0.0004)	0.005	0.19	0.008	9.09	29.9	0.018	0.009	0.30	0.37	0.006	0.009	0.011	. . .			

Continuation from above	Ta	W	B	Zr	As	Sn	Sb	Pb	Bi	Ag	Zn	Ni	N	O	Typical Alloy Type	Size (mm) Ø H	
28 X 6251K	. . .	. . .	0.0047	. . .	(0.003)	(0.004)	. . .	(0.003)	. . .	(0.0024)	(0.001)	62.3	0.211	. . .		43 x 20	C
28 X 6252L	. . .	. . .	0.014	. . .	(0.009)	(0.009)	. . .	. . .	(0.010)	(0.0086)	(0.008)	59.9	0.322	. . .		43 x 20	
28 X 6253M	. . .	. . .	0.023	. . .	(0.019)	0.022	(0.028)	(0.022)	(0.017)	(0.020)	(0.019)	56.67	0.35	. . .	Inconel 625	43 x 20	
28 X 6254K	(0.012)	. . .	0.0014	. . .	. . .	(0.003)	. . .	. . .	. . .	. . .	. . .	(61.3)	0.065	. . .		43 x 20	
28 X 6255K	0.25	. . .	(0.009)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	61.67	0.194	. . .		43 x 20	
28 X 7181H	. . .	. . .	0.0010	. . .	(0.005)	0.003	. . .	(0.005)	. . .	. . .	. . .	52.6	0.233	. . .		43 x 20	C
28 X 7182L	0.011	0.10	(0.0010)	. . .	. . .	(0.005)	. . .	. . .	. . .	. . .	. . .	52.7	0.033	. . .		43 x 20	
28 X 7183S	0.02	0.08	0.0016	. . .	. . .	(0.006)	. . .	. . .	. . .	. . .	. . .	48.96	0.04	. . .	Inconel 718	43 x 20	
28 X 7184J	0.08	0.20	0.0062	0.017	(0.005)	0.011	(0.007)	(0.007)	. . .	(0.007)	. . .	54.00	. . .	. . .		43 x 20	
28 X 7185J	0.035	0.096	0.012	(0.024)	. . .	(0.004)	(0.002)	(0.005)	. . .	. . .	. . .	51.84	0.24	. . .		43 x 20	
28 X 7186H	. . .	. . .	0.0047	. . .	(0.008)	(0.014)	0.025	0.016	. . .	. . .	. . .	54.84	0.077	. . .		43 x 20	
28 MI 53B	. . .	0.018	0.005	<0.01	. . .	0.0007	. . .	. . .	. . .	. . .	. . .	74.2	0.0095	. . .	Inconel 600	31 x 18	W
28 MI 53C	. . .	(0.008)	0.004	<0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	76.5	0.0079	. . .	Inconel 600	31 x 18	
28 MI 54B	(0.004)	0.12	0.002	<0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	61.6	0.0142	. . .	Inconel 625	31 x 18	
28 MI 56C	0.008	0.02	0.0029	(0.004)	. . .	<0.002	. . .	. . .	. . .	. . .	. . .	53.68	0.0089	0.0004	Inconel 718	31 x 18	
28 MI 56D	0.007	0.064	0.0044	(0.001)	. . .	0.0019	. . .	. . .	. . .	. . .	. . .	52.8	0.0084	0.0014	Inconel 718	31 x 18	
28 MI 57B	<0.01	0.013	0.0015	0.020	. . .	. . .	. . .	. . .	. . .	. . .	. . .	71.2	0.0054	0.0032	Inconel 750	31 x 18	
28 MI 58A	. . .	<0.01	<0.001	<0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	32.01	. . .	. . .	Inconel 800	31 x 18	
28 MI 59B	. . .	(0.012)	. . .	(0.005)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40.01	0.0079	0.0030	Alloy 825	31 x 18	
28 MI 60B	. . .	3.1	0.0018	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	45.1	0.029	0.0035	RA 333	31 x 18	
28 MI 201A	. . .	<0.01	<0.002	<0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	59.9	0.0053	. . .	Inconel 690	31 x 18	

See page 65 for materials in Chippings form

For Setting-Up Samples see section 16

2.10 Ni/Co/Cr/Al/Ti

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Zr	V	Ni	N	Typical Alloy Type	Size (mm) Ø H	
	210 X 11774F	0.09	0.16	0.04	0.16	0.23	10.25	3.41	13.67	5.30	5.56	0.08	0.94	rem	. . .		40 x 15	C
CRM	210 X 11775G	0.024	0.36	0.127	(0.008)	1.02	10.42	3.19	14.83	5.76	7.0	0.070	0.47	(56.6)	(0.003)		45 x 20	
	210 X 11979G	0.025	0.30	0.13	0.07	0.56	8.07	3.28	14.32	5.22	3.76	0.04	0.82	rem	. . .	IN100	40 x 15	
	210 X 11980G	0.013	0.38	0.18	0.015	0.67	9.47	3.02	14.98	4.07	3.97	0.02	0.83	rem	. . .	AMS 5397	40 x 15	
	210 X 11981F	0.09	0.33	0.21	0.10	0.93	11.81	3.66	14.65	4.83	5.07	0.11	0.73	rem	. . .			

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Zr	V	Ni	B		
	210 X 11982D	0.15	0.30	0.19	0.07	0.84	9.54	3.09	14.50	5.7	5.07	0.04	1.20	rem	0.027	continued	
	210 X 11999A	0.014	0.40	0.18	0.012	0.66	9.42	3.03	14.96	4.20	4.08	0.033	0.82	rem	. . .		
CRM	210 A 345	0.153	. . .	. . .	. . .	. . .	9.95	3.01	14.71	(5)	5.58	0.044	1.00	rem	. . .	continued	
CRM	210 A 346A	(0.15)	. . .	. . .	. . .	. . .	(10)	(3)	(15)	(5)	(5.5)	. . .	(1)	rem	. . .		

Continuation from above	ppm Ag	ppm Mg	ppm Pb	ppm Sn	ppm Cd	ppm Zn	ppm As	ppm Se	ppm Bi	ppm Sb	ppm Te	ppm Ca	ppm Ga	ppm Tl	Typical Alloy Type	Size (mm) Ø H	
210 X 11982D	<1	60	5	6	<0.5	9	76	<2	<0.5	2	<1	. . .	. . .	. . .	IN 100	40 x 15	C
210 X 11999A	1.3	5.5	3.7	6.2	0.1	7.8	<5	<1	<1	1	<1	. . .	. . .	. . .		40 x 15	
210 A 345	<0.2	5	0.2	6	<0.1	<0.5	(2)	<0.5	<0.2	<2	<0.2	<5	8	<0.2	IN 100	41 x 13	C
210 A 346A	42	130	22	93	0.4	29	51	6	10	45	9	(20)	(50)	(2)		41 x 13	

2.11 Ni/Cr/Al

		Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Nb	Ta	Zr	B	C	Ni	Typical Alloy Type	Size (mm) Ø H	
	211 X 11221F	0.08	0.27	0.09	0.22	13.83	3.80	1.27	1.22	6.26	2.76	0.08	0.08	. . .	. . .	rem		40 x 15	C
	211 X 11222F	0.23	0.32	0.11	0.17	14.18	4.03	0.12	1.05	5.47	2.89	0.08	0.12	. . .	. . .	rem		40 x 15	
	211 X 11224F	0.24	0.09	0.34	0.46	14.03	4.02	0.32	1.27	6.07	2.92	0.32	0.12	. . .	. . .	rem	IN 713	40 x 15	
	211 X 11233E	0.14	0.20	0.21	0.39	12.67	4.10	0.63	1.32	6.03	2.61	0.23	0.13	. . .	. . .	rem	AMS 5377	40 x 15	
	211 X 11236E	0.21	0.21	0.16	0.46	15.98	4.02	0.64	1.33	6.14	2.73	0.10	0.05	. . .	. . .	rem		40 x 15	
CRM	211 A 350	0.110	0.019	. . .	1.50	13.43	4.29	0.338	0.87	5.97	2.17	. . .	0.072	0.013	0.138	70.8	IN 713	41 x 13	

2.12 Ni/Cu

		C	Si	S	Mn	Cu	Fe	Cr	Pb	Co	Ti	Al	Mg	Zr	P	Ni	Typical Alloy Type	Size (mm) Ø H	
	212 X 4001L	0.090	1.45	0.020	3.01	27.4	0.50	0.04	0.06	0.11	0.11	0.11	0.12	. . .	. . .	(66.8)		40 x 15	C
	212 X 4002K	0.046	0.10	0.071	1.99	31.5	0.99	0.023	0.05	0.09	0.06	0.055	0.017	. . .	. . .	(64.8)	Monel 400	40 x 15	
	212 X 4003H	0.02	0.27	0.024	1.04	30.6	2.00	0.07	0.05	0.03	0.03	0.03	0.04	. . .	. . .	65.7	Monel 500	40 x 15	
	212 X 4004J	0.12	0.52	0.010	0.55	30.1	3.11	0.13	0.03	0.10	0.60	1.03	0.07	. . .	. . .	63.6	Monel 505	40 x 15	
CRM	212 X 4005D	0.074	2.44	0.0255	1.45	21.31	3.36	0.350	0.020	0.107	0.613	1.85	(0.0002)	. . .	(0.0025)	68.38	Monel 506	43 x 20	
	212 X 4006D	0.064	4.62	0.054	0.78	24.7	2.02	0.113	0.02	0.06	1.32	3.99	0.04	. . .	. . .	(62.3)		40 x 15	
CRM	212 A 363/1	0.140	0.028	(0.002)	1.26	31.90	1.86	(0.05)	. . .	0.032	(0.03)	0.027	. . .	. . .	. . .	64.7	Monel 400	38 x 19	W
	212 M BS 400C	0.160	0.18	0.001	1.05	31.68	1.61	0.48	0.0007	0.053	0.056	0.056	0.009	. . .	0.012	64.55	Monel 400	38-50 x 12	
	212 M BS 500D	0.15	0.07	<0.002	0.69	29.7	0.73	0.21	. . .	0.033	0.45	2.98	0.01	. . .	0.009	(64.9)	Monel 500	38-50 x 12	
	212 M BS 400-1	0.109	0.16	0.008	1.07	30.97	1.27	0.033	0.002	0.37	0.007	0.004	0.048	. . .	0.022	66.0		38-50 x 12	
	212 M BS 400-2	0.170	0.17	0.008	1.17	30.75	1.42	0.091	(0.001)	0.46	0.0011	0.006	0.033	. . .	0.027	65.9		38-50 x 12	
	212 M BS 400-3	0.153	0.063	0.006	0.85	31.25	1.6	0.21	(0.0015)	0.46	0.004	0.001	0.012	. . .	0.026	65.4		38-50 x 12	
	212 M BS 405	0.13	0.04	0.041	1.03	31.80	1.34	0.006	. . .	0.025	0.003	0.1	0.026	. . .	0.010	65.49		38-50 x 12	
CRM	212 MI 51B	0.16	0.105	0.002	1.01	31.70	1.60	0.32	. . .	0.029	0.05	0.004	0.015	<0.01	0.011	64.9	Monel 400	31 x 18	W
CRM	212 MI 52B	0.154	0.09	0.0010	0.77	30.22	0.77	0.047	0.0002	0.004	0.50	3.02	0.012	0.039	0.009	64.3	Monel 500	31 x 18	
CRM	212 MI 202A	0.13	0.046	0.032	1.03	32.3	1.31	0.008	. . .	0.020	0.005	0.080	0.024	0.010	0.011	64.8	Monel R405	31 x 18	

	C	Si	S	P	Mn	Cu	Fe	Mg	Pb	Typical Alloy Type	Size (mm) Ø H	
212 X NA2G	0.07	2.50	0.023	0.019	1.06	29.6	1.53	0.008	0.02	Monel H	40 x 15	C
212 X NA3G	0.37	3.66	0.008	0.022	0.52	29.2	1.42	0.74	0.05		40 x 15	

2.14 Ni/Cu/Sn

	C	Si	S	P	Mn	Cu	Fe	Mg	Sn	Zn	Ni	Size (mm) Ø H
214 N N50.02	0.22	0.02	0.30	2.0	1.1	28.2	3.9	0.006	14.0	0.39	rem	50 x 10
214 N N50.03	0.10	0.02	0.16	0.9	0.80	33.2	2.3	0.02	11.0	0.36	rem	50 x 10
214 N N50.05	0.02	0.03	0.19	0.05	2.0	42.0	<0.01	0.06	10.1	<0.01	rem	50 x 10

See page 66 for materials in Chippings form

For Setting-Up Samples see section 16

2.15 Ni/Co/Cr/Fe/Mo

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	V	W	Ni	N	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	**215 X HB1M**	0.068	0.246	0.049	0.005	1.25	0.035	7.46	2.04	33.9	1.12	0.63	. . .	rem	0.031	Al, Ti, Sn	BS 3146	43 x 20	C
CRM	**215 X HB2F**	0.045	0.48	0.039	0.011	0.925	(0.004)	2.43	1.63	32.1	0.51	0.52	. . .	61.2	0.006		ANC 15	43 x 20	
	215 X HB3F	0.10	1.26	0.020	0.004	1.09	. . .	4.98	0.675	29.1	0.83	0.51	. . .	rem	. . .		AMS 5396	40 x 15	
	215 X HB4E	0.138	1.38	(0.008)	(0.026)	0.89	. . .	6.07	0.70	26.6	1.76	0.34	. . .	rem	. . .		ASTM A494	40 x 15	
	215 X HB5J	0.147	1.30	0.002	0.053	0.44	0.05	3.05	0.03	26.0	2.47	0.14	. . .	rem	0.008	Al, Ti	Hastelloy B	43 x 20	
CRM	**215 X HC1K**	0.031	0.58	0.006	0.003	1.18	0.057	4.31	15.2	19.5	2.44	0.144	3.22	53.2	0.121	Ti	BS 3146	43 x 20	C
	215 X HC2H	0.066	1.02	0.003	0.012	0.97	0.023	3.62	15.7	18.9	1.7	0.38	3.91	rem	0.18	Al, Ti	ANC 16	43 x 20	
CRM	**215 X HC3J**	0.105	1.06	0.027	0.025	0.79	0.157	5.38	17.2	18.0	0.97	0.40	4.31	51.3	0.146	Al, B, Ti	AMS 5388	43 x 20	
CRM	**215 X HC4H**	0.245	1.86	0.032	0.035	0.56	0.025	8.15	20.85	17.35	0.495	0.745	5.78	43.8	. . .	Al, Ti, B	A 494	43 x 20	
CRM	**215 X HC5R**	0.243	1.35	0.033	0.053	0.322	0.265	6.81	18.81	14.37	0.093	0.53	4.87	50.09	0.162	Al, Ti, Mg	Hastelloy C	43 x 20	
	215 M BS H1B	0.006	0.049	0.0005	0.003	0.81	(0.01)	1.00	<0.01	26.52	<0.02	<0.01	. . .	(71.4)	. . .				
	215 M BS H3B	0.078	0.63	0.0005	0.013	0.11	0.27	19.92	22.23	8.84	1.96	0.06	0.49	44.9	. . .	continued			
	215 M BS H6A	0.005	(0.03)	<0.002	0.010	0.31	0.070	4.34	21.37	13.37	1.11	0.17	3.09	rem	. . .				
CRM	**215 MI 55B**	0.004	0.021	0.0010	0.005	0.323	0.013	1.12	8.25	24.62	0.036	0.005	0.12	65.4	. . .				
CRM	**215 MI 65B**	0.0054	0.030	0.0005	0.006	0.29	0.054	3.63	21.32	13.02	0.59	0.155	2.87	57.3	. . .				
CRM	**215 MI 66B**	0.0044	0.028	0.0003	0.008	0.47	0.086	5.80	15.86	16.06	0.90	0.16	3.42	56.65	. . .	continued			
CRM	**215 MI 67B**	0.008	0.24	0.0010	0.012	1.12	1.74	14.26	28.54	4.98	3.69	0.054	3.10	41.1	. . .				
CRM	**215 MI 69B**	0.074	0.38	0.0004	0.013	0.68	0.11	17.84	21.90	8.78	1.58	0.10	0.78	47.37	. . .				

Continuation from above	Nb	Al	Ti	Ta	Zr	B	Sn	Mg	N	O	Typical Alloy Type	Size (mm) Ø H	
215 M BS H1B	<0.005	0.12	0.11	(0.005)	. . .	0.003	. . .	. . .	. . .	. . .	Hastelloy B-2	38-41 x 12	W
215 M BS H3B	0.28	0.14	0.020	(0.005)	. . .	0.0052	. . .	. . .	. . .	. . .	Hastelloy X	38-41 x 12	
215 M BS H6A	0.029	0.24	0.007	. . .	. . .	0.0012	0.003	. . .	. . .	. . .	Hastelloy C-22	38-41 x 12	
215 MI 55B	0.08	0.09	0.002	(0.08)	(0.005)	0.002	<0.001	0.011	0.016	0.0009	Haynes 242	31 x 18	W
215 MI 65B	0.029	0.283	0.005	(0.06)	<0.001	(0.002)	(0.001)	0.009	0.046	0.0013	Hastelloy C22	31 x 18	
215 MI 66B	0.019	0.40	0.006	. . .	0.02	0.0020	. . .	0.004	0.0108	0.0010	Hastelloy C276	31 x 18	
215 MI 67B	0.73	0.26	0.005	(0.03)	(0.002)	(0.001)	(0.002)	0.007	0.060	0.0014	Hastelloy G30	31 x 18	
215 MI 69B	0.11	0.20	0.011	. . .	0.005	(0.0007)	. . .	0.006	0.0155	0.0011	Hastelloy X	31 x 18	

2.19 Various Nickel Alloys

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Ni	Nb	Y		Size (mm) Ø H	
	219 X NY1A	. . .	1.10	. . .	. . .	. . .	. . .	. . .	29.2	. . .	. . .	1.12	9.9	rem	. . .	0.24		40 x 15	C
	219 X NY2A	. . .	1.64	. . .	. . .	. . .	. . .	. . .	20.8	. . .	. . .	0.6	13.1	rem	. . .	0.69		40 x 15	
CRM	**219 X 20500A**	0.025	1.48	0.004	0.002	0.22	0.002	1.26	51.2	0.002	0.002	. . .	. . .	45.7	. . .	. . .		43 x 20	C
	219 M BS 197A	0.050	0.96	<0.001	0.021	1.56	0.12	18.07	25.11	2.99	3.06	0.017	0.18	. . .	0.20	. . .			
	219 M BS 725	0.010	0.02	0.002	0.004	0.08	0.014	8.0	20.72	7.97	0.02	1.52	0.13	58.0	3.52	. . .	continued		
	219 M BS 750B	0.052	0.14	<0.001	0.006	0.09	0.05	7.23	15.7	0.21	0.35	2.58	0.72	71.92	1.06	. . .			
	219 M BS 925	0.011	0.11	0.0020	0.016	0.50	1.74	26 92	20.82	3.0	0.34	2.2	0.17	43.53	0.23	. . .			
	219 X 1837A	0.004	0.053	0.001	0.002	0.003	. . .	0.1	9.98	3.0	10.04	5.28	5.63	rem	<0.01	. . .	continued		
	219 X 1867B	0.12	0.15	0.024	0.014	0.195	0.04	(1.78)	7.2	6.0	10.7	2.5	7.9	rem	0.1	. . .			
CRM	**219 MI 203A**	0.005	0.41	0.0009	0.006	0.023	0.050	40.6	0.72	0.090	12.88	1.58	0.066	38.44	5.00	. . .	continued		
CRM	**219 MI 207A**	0.007	0.053	0.0027	0.002	0.015	0.017	0.64	19.98	9.62	33.46	0.91	0.040	35.19	0.043	. . .			
CRM	**219 MT 133A**	0.014	0.145	<0.001	0.003	0.51	4.41	13.75	0.037	4.17	0.003	. . .	. . .	76.99	. . .	. . .		32 X 19	

Continuation from above	V	Ta	W	Zr	Mg	B	Re	Hf	N	Typical Alloy Type	Size (mm) Ø H	
219 M BS 197A	0.051	. . .	2.79	. . .	(0.003)	0.0019	. . .	. . .	(0.052)	RA 333	38 x 12	W
219 M BS 725	(0.01)	. . .	. . .	. . .	(0.002)	(0.002)	. . .	. . .	0.0051	Inconel 725	38 x 12	
219 M BS 750B	0.04	(0.01)	(0.05)	(0.01)	. . .	0.003	. . .	. . .	(0.002)	Nickel 750	38 x 12	
219 M BS 925	0.03	. . .	0.47	. . .	. . .	0.002	. . .	. . .	0.0042	Inconel 925	38 x 12	
219 X 1837A	. . .	<0.01	0.012	0.027	. . .	0.11	. . .	. . .	. . .	High B Alloy	40 x 15	C
219 X 1867B	. . .	3.4	0.63	0.45	. . .	. . .	0.31	(0.008)	. . .	B1900-type	40 x 15	
219 MI 203A	<0.01	. . .	(0.02)	<0.01	<0.002	. . .	. . .	. . .	0.001	Inconel 909	31 x 18	W
219 MI 207A	0.011	0.007	0.028	0.003	. . .	0.011	. . .	. . .	0.0031	MP35N	31 x 18	

2.21 Ni/B Hardfacing Alloys

	C	Si	S	Mn	Cr	Mo	Cu	B	Fe	Ni	Size (mm) Ø H	
221 X HF1A	0.144	4.61	0.006	0.130	13.1	0.018	0.029	2.12	0.33	rem	40 x 15	C
221 X HF2A	0.91	2.29	0.0095	0.32	9.5	0.16	0.70	2.83	0.33	rem	40 x 15	
221 X HF3A	1.24	3.34	0.004	0.036	10.6	0.06	0.095	1.80	1.21	rem	40 x 15	
221 X HF4A	0.54	5.97	0.014	0.109	14.7	0.09	0.044	1.26	6.58	rem	40 x 15	

See page 66 for materials in Chippings form

For Setting-Up Samples see section 16

3.1 Brass - Cu/Zn Binaries

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Cu	As	Bi	Sb	B	Size (mm) Ø H	
CRM	31 X B1M	(0.003)	(0.007)	43.4	(0.01)	(0.005)	<0.002	<0.005	<0.001	56.6	<0.005	<0.001	<0.005	. . .	40 x 15	CC
CRM	31 X B2K	(0.005)	(0.006)	37.70	(0.016)	(0.007)	<0.0005	<0.001	<0.0005	62.18	<0.0005	<0.0005	<0.0005	. . .	40 x 15	
CRM	31 X B3J	(0.007)	(0.034)	33.64	(0.017)	(0.008)	<0.002	<0.001	<0.0005	66.27	<0.0005	<0.0005	<0.0005	. . .	40 x 15	
CRM	31 X B4K	0.0075	0.0071	30.40	0.016	0.0119	<0.002	<0.005	0.0003	69.46	0.0015	(0.0009)	(0.0009)	0.0015	42 x 18	
CRM	31 X B5J	(0.015)	(0.016)	23.90	(0.015)	(0.015)	<0.002	<0.001	<0.0005	76.01	<0.0005	<0.0005	<0.0005	. . .	40 x 15	
	31 X B6J	<0.005	<0.005	19.4	(0.01)	<0.005	<0.005	<0.005	<0.005	80.6	<0.005	<0.005	<0.005	. . .	40 x 15	
CRM	31 X B7J	0.101	0.010	15.01	0.018	0.020	<0.005	<0.005	0.0002	84.80	0.0016	0.066	0.0019	0.0030	42 x 18	
CRM	31 X B8H	0.035	0.072	9.52	0.0267	0.0083	(0.0013)	0.0051	0.0012	90.28	0.0081	0.031	0.0108	0.0021	42 x 18	
CRM	31 X B9K	(0.0025)	0.0051	4.79	0.0028	0.0101	<0.002	(0.0006)	(0.0001)	95.20	(0.0005)	<0.001	<0.001	(0.0007)	42 x 18	
	31 X B95	0.45	<0.001	4.99	(0.007)	<0.001	<0.005	(0.01)	<0.001	94.4	(0.008)	(0.007)	<0.001	<0.001	40 x 15	CC
CRM	31 PN MB1	. . .	. . .	39.39	. . .	. . .	. . .	. . .	. . .	60.66	. . .	. . .	. . .	. . .	40 x 20	W
CRM	31 PN MB2	. . .	. . .	32.80	. . .	. . .	. . .	. . .	. . .	67.17	. . .	. . .	. . .	. . .	each	
CRM	31 PN MB3	. . .	. . .	26.67	. . .	. . .	. . .	. . .	. . .	73.26	. . .	. . .	. . .	. . .		
CRM	31 PN MB4	. . .	. . .	21.20	. . .	. . .	. . .	. . .	. . .	78.77	. . .	. . .	. . .	. . .	Set only	
CRM	31 PN MB5	. . .	. . .	15.63	. . .	. . .	. . .	. . .	. . .	84.25	. . .	. . .	. . .	. . .		
CRM	31 PN MB6	. . .	. . .	9.95	. . .	. . .	. . .	. . .	. . .	90.07	. . .	. . .	. . .	. . .		
CRM	31 PN MB7	. . .	. . .	4.99	. . .	. . .	. . .	. . .	. . .	95.00	. . .	. . .	. . .	. . .		

3.1.1 Alloyed Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Cu	As	Bi	Sb	P	S	Size (mm) Ø H	
CRM	31 X B10K	(0.012)	(0.032)	36.7	1.83	1.51	0.63	(0.003)	0.217	59.3	(0.003)	<0.001	<0.001	. . .	. . .	40 x 15	CC
CRM	31 X B11G	(0.010)	(0.041)	34.2	0.88	1.01	0.334	(0.001)	1.09	62.2	(0.003)	<0.001	<0.001	. . .	. . .	40 x 15	
CRM	31 X B12F	(0.008)	(0.053)	35.1	0.45	0.55	0.148	(0.001)	2.16	61.4	(0.002)	<0.001	<0.001	. . .	. . .	40 x 15	
CRM	31 X B13F	(0.005)	(0.033)	42.3	0.187	0.196	0.051	(0.001)	2.75	54.4	<0.001	<0.001	<0.001	. . .	. . .	40 x 15	
CRM	31 X B14F	0.52	(0.025)	36.2	0.019	0.0049	4.22	0.055	(0.0009)	58.9	<0.005	<0.005	<0.002	. . .	. . .	42 x 18	CC
CRM	31 X B15G	1.04	(0.014)	37.7	0.018	0.005	3.19	0.095	(0.0008)	57.8	<0.005	<0.005	<0.002	. . .	. . .	42 x 18	
CRM	31 X B16G	2.17	(0.04)	37.4	(0.02)	(0.01)	2.04	0.20	(0.01)	58.0	(0.006)	<0.001	<0.001	. . .	. . .	40 x 15	
CRM	31 X B17F	0.010	(0.05)	(33.9)	(0.02)	(0.01)	6.05	(0.007)	<0.001	60.0	(0.015)	<0.001	<0.001	. . .	. . .	40 x 15	
CRM	31 X B18H	<0.01	1.00	39.9	(0.012)	(0.005)	<0.002	<0.02	<0.001	59.0	<0.005	<0.002	<0.005	. . .	. . .	40 x 15	CC
CRM	31 X B19M	<0.005	2.27	37.6	<0.01	(0.003)	<0.002	<0.02	<0.001	60.0	<0.01	<0.005	<0.005	. . .	. . .	40 x 15	
	31 X B20M	(0.06)	5.39	(36.4)	<0.01	<0.005	<0.005	<0.005	<0.005	57.9	<0.005	<0.01	<0.005	. . .	. . .	40 x 15	
CRM	31 X B21C	0.12	0.14	(28.6)	0.103	0.122	0.029	0.04	0.23	70.6	0.10	0.07	0.06	0.06	(0.0014)	40 x 15	CC
CRM	31 X B22D	0.186	0.146	14.6	0.098	0.179	0.207	0.15	0.147	83.4	0.136	0.22	0.173	0.140	0.135	40 x 15	
	31 X B23C	0.055	0.039	(10.0)	0.049	0.041	0.081	0.05	0.057	89.1	0.056	0.058	0.054	0.046	0.055	40 x 15	
CRM	31 X B24C	0.016	0.017	4.17	0.017	0.021	0.010	(0.009)	0.013	95.5	0.021	0.022	0.020	0.010	0.051	40 x 15	
	31 X B25A	0.49	0.32	rem	0.08	0.19	0.39	0.09	0.12	58.5	0.037	0.054	0.044	0.01	<0.005	40 x 15	
CRM	31 X B26C	1.566	1.08	29.68	1.29	1.48	1.123	0.46	0.337	62.60	0.108	0.123	0.075	0.0374	(0.0013)	42 x 18	
	31 X B27A	0.92	0.24	(19.9)	0.31	0.042	0.031	0.053	0.045	78.2	0.03	0.055	0.037	0.046	<0.001	40 x 15	
CRM	31 MI 74A	0.50	0.02	38.14	0.01	0.01	<0.01	<0.01	<0.01	rem	<0.01	. . .	<0.01	0.006	0.001	31 x 18	
CRM	31 MI 74B	0.70	0.017	38.9	0.011	0.006	0.003	0.003	<0.01	60.4	<0.01	<0.005	0.003	(0.008)	(0.003)	31 x 18	
	31 A 43.01-4	0.116	<0.002	22.44	0.008	0.121	2.75	0.063	0.064	74.36	0.118	<0.002	<0.001	. . .	. . .	50 x 12	
	31 A 43.02-4	0.060	0.064	20.82	0.128	0.068	2.40	0.038	0.035	76.21	0.083	<0.001	<0.001	. . .	. . .	50 x 12	
	31 T L1	0.046	0.06	39.7	0.017	0.106	0.01	0.36	. . .	59.7	. . .	. . .	. . .	0.08	. . .	60 x 5	CC
	31 T L2	0.48	0.408	35.55	0.216	0.71	0.485	0.202	0.350	61.55	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T L3	1.50	1.02	32.75	0.36	0.90	0.91	0.034	0.205	62.30	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T L4-1	0.693	2.017	34.60	0.466	0.227	0.104	0.12	0.109	61.70	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T L5	1.01	3.01	33.65	(0.65)	0.705	0.200	(0.50)	0.395	59.40	0.14	. . .	0.15	0.16	. . .	60 x 5	
	31 T L6	0.250	0.205	30.26	0.085	1.21	0.139	1.25	0.055	66.55	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T L7	0.038	0.71	42.45	0.031	0.020	0.308	0.13	0.62	55.60	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T L20	0.56	0.27	13.10	0.115	0.205	0.008	0.035	0.043	85.55	0.122	. . .	. . .	. . .	. . .	60 x 5	
	31 T L21	1.50	0.209	15.40	0.086	0.156	. . .	0.036	0.004	82.50	0.103	. . .	. . .	. . .	. . .	60 x 5	
	31 T L22	1.05	0.123	15.0	0.15	0.105	. . .	0.05	<0.001	83.0	. . .	. . .	0.088	0.06	. . .	60 x 5	
	31 T L23	0.20	0.058	17.90	0.246	0.033	. . .	0.280	. . .	81.20	0.051	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH1	0.15	0.15	17.02	4.55	0.50	7.93	0.17	5.25	64.18	. . .	. . .	. . .	. . .	. . .	60 x 5	CC
	31 T LH2	0.055	0.080	22.05	2.98	3.00	6.20	0.086	3.65	61.88	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH5	0.12	0.18	25.43	1.18	1.57	4.26	0.11	1.23	65.92	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH6.1	0.257	0.25	19.04	3.13	3.19	6.09	0.20	4.54	63.18	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH7.1A	0.227	0.327	26.85	(2.35)	0.70	3.16	0.055	2.96	63.40	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH10	0.203	1.76	28.90	(1.0)	1.49	2.66	1.30	3.57	59.05	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH11	0.44	1.26	26.20	0.36	2.91	0.46	0.88	0.71	66.80	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH12	0.83	0.21	33.15	(1.2)	0.505	1.13	(0.06)	0.125	62.75	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LH13	1.19	0.67	31.8	(2.0)	3.22	2.00	0.21	3.14	55.75	. . .	. . .	. . .	. . .	. . .	60 x 5	
	31 T LS1	0.243	0.213	16.3	0.448	0.55	(0.02)	4.35	0.039	77.7	. . .	. . .	. . .	0.128	. . . all values	60 x 5	CC
	31 T LS3	0.15	0.6	19	0.08	0.1	0.4	3.2	0.15	75	0.07	. . .	0.1	0.01	. . . approximate	60 x 5	

See page 67 for materials in Chippings form

For Setting-Up Samples see section 16

3.1.2 Brass - Trace Elements

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	C	B	Cu	Size (mm) Ø H	
	31 X TB1H	0.22	0.27	(35.9)	0.070	0.23	0.18	0.088	0.19	0.35	0.053	0.13(6)	. . .	. . .	. . .	62.2	40 x 15	CC
CRM	31 X TB2G	0.105	0.107	37.16	0.072	0.093	0.084	0.042	0.101	0.088	0.031	0.051	. . .	0.0040	<0.0005	61.97	42 x 18	
CRM	31 X TB3H	0.033	0.046	36.9	0.028	0.020	(0.0022)	0.019	0.029	0.038	0.010	0.026	. . .	. . .	. . .	62.8	40 x 15	
CRM	31 X TB4F *	0.01	0.02	rem	0.02	0.01	<0.01	<0.01	<0.01	<0.001	<0.001	<0.002	. . .	. . .	. . .	62.5	42 x 18	
	* Target values																	
CRM	31 PN MD1	0.0013	0.19	rem	0.043	0.021	. . .	0.078	0.0015	0.097	0.0026	0.0096	0.0082	. . .	. . .	67.92	40 x 30	W
CRM	31 PN MD2	0.0054	0.015	rem	0.18	0.050	. . .	0.059	0.072	0.082	0.0025	0.0011	0.0061	. . .	. . .	68.99	each	
CRM	31 PN MD3	0.010	0.010	rem	0.085	0.070	. . .	0.097	0.055	0.062	0.0018	0.012	0.0043	. . .	. . .	69.43		
CRM	31 PN MD4	0.21	0.054	rem	0.018	0.091	. . .	0.0066	0.038	0.015	0.00053	0.0038	. . .	. . .	. . .	71.53	Set only	
CRM	31 PN MD5	0.021	0.0023	rem	0.081	0.064	. . .	0.016	0.018	0.017	. . .	0.0065	0.00089	. . .	. . .	71.06		
CRM	31 PN MD6	0.019	0.044	rem	(0.0013)	0.039	. . .	. . .	. . .	0.00073	0.00004	0.00058	. . .	. . .	. . .	70.77		
CRM	31 PN WC1	0.0032	0.046	rem	0.031	. . .	0.0034	0.26	0.0043	. . .	0.0028	0.0034	0.015	. . .	. . .	75.10	40 x 30	W
CRM	31 PN WC2	0.0025	0.031	rem	0.015	. . .	0.0016	0.41	0.0024	. . .	0.0020	0.0023	0.011	. . .	. . .	75.05	each	
CRM	31 PN WC3	0.0011	0.0085	rem	0.021	. . .	0.0018	0.89	0.0011	. . .	0.00093	0.0010	0.0058	. . .	. . .	75.28		
CRM	31 PN WC4	0.0010	0.0051	rem	0.0067	. . .	0.00096	0.76	. . .	. . .	0.00047	0.00080	0.0048	. . .	. . .	75.32	Set only	
CRM	31 PN WC5	0.0044	0.0055	rem	0.18	. . .	0.00084	0.48	0.0022	. . .	0.0019	0.0011	. . .	. . .	. . .	75.03		
CRM	31 PN WC6	0.0028	0.0036	rem	0.051	. . .	0.0019	0.58	0.00097	. . .	0.0012	0.00057	0.0037	. . .	. . .	75.32		

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	Cd	Ag	Be	Te	Cu	Size (mm) Ø H	
CRM	31 PN MH1	0.140	0.0065	rem	0.017	0.26	0.0010	0.074	0.067	0.035	0.0037	0.0004	0.016	0.026	0.0029	0.0088	0.0004	65.93	40 x 25	W
CRM	31 PN MH2	0.097	0.021	rem	0.027	0.22	0.019	0.054	0.041	0.011	0.0022	0.024	0.0055	0.018	0.011	0.0015	0.0015	68.25	each	
CRM	31 PN MH3	0.024	0.078	rem	0.081	0.10	0.0081	0.031	0.016	0.085	0.0011	0.013	0.0035	0.0089	0.0065	0.0003	0.0046	71.28		
CRM	31 PN MH4	0.011	0.33	rem	0.13	0.052	0.0027	0.016	0.0011	0.0017	0.0006	0.017	0.0022	0.0029	. . .	0.0045	0.0035	69.94	Set only	
CRM	31 PN MH5	0.0021	0.20	rem	0.19	0.0072	0.014	0.0039	0.0038	0.072	. . .	0.0035	0.0011	0.0012	0.025	0.00004	0.0047	72.87		
CRM	31 PN MI1	0.15	0.0060	3.57	0.25	0.0059	0.040	0.0032	0.072	0.0030	0.00063	0.000044	0.028	0.023	0.0038	0.000091	0.0065	95.69	40 x 25	W
CRM	31 PN MI2	0.1	0.016	6.19	0.16	0.018	0.055	0.012	0.054	0.0081	0.00056	0.0019	0.022	0.016	0.0090	0.00085	0.011	93.35	each	
CRM	31 PN MI3	0.067	0.042	8.01	0.086	0.073	0.015	0.031	0.034	0.035	0.0026	. . .	0.015	0.011	0.020	0.0019	0.0031	91.46		
CRM	31 PN MI4	0.013	0.070	11.13	0.041	0.14	0.0079	0.060	0.0031	0.050	0.0026	0.0006	0.0073	0.0054	0.026	0.0065	0.0021	88.35	Set only	
CRM	31 PN MI5	0.004	0.096	4.44	0.015	0.25	0.0021	0.082	0.015	0.069	0.0043	0.0096	0.0026	0.0012	0.033	0.0072	. . .	94.71		

3.1.3 Naval Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	S	Cu	Typical Alloy Type	Size (mm) Ø H	
	31 X NB1G	0.48	0.54	(29.1)	0.014	0.10	<0.005	<0.005	0.16	0.13	<0.005	<0.005	0.033	<0.005	69.4		40 x 15	CC
CRM	31 X NB2G	1.06	0.293	28.82	0.095	0.065	0.085	0.096	0.105	0.116	0.052	0.115	0.091	<0.002	68.93		40 x 15	
CRM	31 X NB3H *	1.50	0.10	25.1	0.18	0.03	0.11	0.15	0.05	0.11	0.06	0.25	0.17	<0.001	72.4		40 x 15	
CRM	31 X NB4H	2.06	0.08	(33.3)	0.226	0.166	0.20	0.20	<0.005	0.006	0.14	0.35	0.31	(0.001)	62.8		40 x 15	
	* Target values																	
	31 M BS 464	0.62	0.056	38.73	0.013	0.004	(0.001)	<0.01	<0.002	0.0002	. . .	(0.001)	0.012	0.001	60.6		38 x 12	
	31 M BS 482A	0.65	0.50	38.8	0.020	(0.007)	(0.003)	(0.002)	<0.002	<0.002	. . .	0.0012	<0.003	<0.002	60.0		38 x 12	
CRM	31 PN WK1	0.11	0.17	rem	0.28	0.28	0.11	0.30	. . .	0.13	0.014	0.024	0.030	. . .	59.97		40 x 25	W
CRM	31 PN WK2	1.34	0.33	rem	0.16	0.21	0.080	0.29	. . .	0.088	0.011	0.018	0.017	. . .	60.54		each	
CRM	31 PN WK3	0.49	0.11	rem	0.066	0.13	0.045	0.16	. . .	0.046	0.0088	0.012	0.017	. . .	62.09			
CRM	31 PN WK4	1.04	0.050	rem	0.085	0.070	0.013	0.082	. . .	0.020	0.0052	0.0056	0.010	. . .	63.28		Set only	
CRM	31 PN WK5	0.47	0.0062	rem	0.0092	0.0055	0.0042	0.0064	. . .	0.0056	0.0011	0.0027	0.0056	. . .	64.92			
CRM	31 MI 83B	0.85	0.017	39.3	0.97	0.010	0.002	(0.003)	. . .	0.13	. . .	(0.004)	0.004	(0.001)	58.7	CDA 675	32 x 18	

3.1.4 Aluminium Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	Cr	Mg	Cd	Cu	Size (mm) Ø H	
CRM	31 PN WO1	0.012	0.15	rem	0.13	0.0045	1.40	0.044	0.057	0.014	0.00028	0.0077	0.0025	0.011	0.00068	0.013	79.09	40 x 32	
CRM	31 PN WO2	0.058	0.098	rem	0.049	0.027	1.77	0.014	0.041	0.15	0.0016	0.0013	0.0086	0.0092	0.0068	0.032	77.88	each	
CRM	31 PN WO3	0.0071	0.053	rem	0.028	0.10	2.14	. . .	0.014	0.051	0.0046	0.0036	0.0056	0.0026	0.0046	0.038	77.63		
CRM	31 PN WO4	0.13	0.020	rem	0.022	0.067	2.50	0.0016	0.030	0.074	0.0094	0.0059	0.013	0.00034	0.013	0.0064	76.21	Set only	

3.1.6 Bismuth Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	S	Cu	Se	Cd	Size (mm) Ø H	
CRM	31 X BIB1B	0.540	0.284	37.06	0.203	0.309	0.125	0.206	0.0335	0.0112	2.03	0.0054	0.014	(0.0034)	59.13	0.004	0.0053	40 x 18	CC
CRM	31 X BIB2A *	0.30	0.041	rem	0.35	0.21	0.25	0.28	0.096	0.09	3.00	0.11	0.011	<0.001	61.6	. . .	. . .	40 x 18	
CRM	31 X BIB3B	0.111	0.149	32.46	0.099	0.098	0.0298	0.061	0.057	0.243	4.05	0.0417	0.0175	(0.0005)	62.48	0.003	0.0029	40 x 18	
	* Target values																		

3.1.7 Leaded Brass

		Sn	Pb	Zn	Fe	Ni	Al	P	As	Sb	Ag	Co	Si	Mn	Se	Bi	Cu	Size (mm) Ø H	
CRM	31 X 7835.1N	0.407	2.91	35.20	0.134	0.144	0.0146	0.0197	0.0011	0.005	. . .	0.029	0.053	. . .	(0.0045)	0.0141	60.96	42 x 18	CC
CRM	31 X 7835.2H	0.202	2.08	32.88	0.077	0.0088	0.199	0.0149	0.047	0.053	. . .	. . .	. . .	. . .	. . .	. . .	64.34	40 x 18	
CRM	31 X 7835.3E	0.113	1.35	36.50	0.381	0.253	0.386	0.0378	0.097	0.096	. . .	0.0070	0.055	. . .	0.003	0.025	60.67	40 x 18	
CRM	31 X 7835.4H	0.046	1.03	30.09	0.020	0.492	0.561	0.125	0.206	0.188	. . .	. . .	. . .	. . .	. . .	. . .	67.10	40 x 15	
CRM	31 X 7835.5A	0.116	1.64	6.23	0.126	0.249	0.078	0.018	0.104	0.114	. . .	. . .	. . .	. . .	. . .	. . .	91.25	40 x 18	
							See also section 3.1.1 products 31 X B18-20.												
CRM	31 MI 76B	0.69	1.94	36.71	0.060	0.015	(0.005)	0.005	(0.003)	0.006	0.005	0.0007	. . .	. . .	. . .	. . .	60.5	31 x 18	
CRM	31 MI 87B	0.78	1.58	36.1	0.29	0.095	0.20	0.008	0.007	0.014	(0.01)	0.007	0.004	0.006	. . .	0.003	60.9	31 x 18	
	31 M BS 857B-1	1.14	1.22	34.91	0.30	0.61	0.35	0.004	(0.001)	(0.002)	. . .	. . .	. . .	. . .	. . .	. . .	61.3	38 x 12	W
CRM	31 DB 375	0.2090	2.90	38.02	0.207	0.1053	0.0270	(0.00086)	0.0231	0.0122	0.0166	0.01964	. . .	0.0222	. . .	. . .	58.32	40 x 30	
CRM	31 PN WN1	1.00	0.51	rem	0.23	0.29	0.33	0.031	0.035	0.099	. . .	. . .	0.16	0.57	. . .	0.023	58.44	40 x 25	W
CRM	31 PN WN2	0.68	1.58	rem	0.29	0.19	0.24	0.051	0.011	0.10	. . .	. . .	0.22	0.73	. . .	0.035	60.38	each	
CRM	31 PN WN3	0.39	2.62	rem	0.062	0.098	0.14	0.034	0.032	0.020	. . .	. . .	0.12	0.39	. . .	0.020	62.32		
CRM	31 PN WN4	0.13	0.86	rem	0.11	0.050	0.047	0.014	0.021	0.061	. . .	. . .	0.036	0.13	. . .	0.0094	57.97	Set only	
CRM	31 PN WN5	0.019	3.78	rem	0.0085	0.0049	(0.0004)	0.0051	0.030	0.0035	. . .	. . .	(0.0013)	0.0020	. . .	0.0028	64.36		

See page 67 for materials in Chippings form

For Setting-Up Samples see section 16

3.1.8 Manganese Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	As	Sb	P	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	31 X MNB1C	0.105	1.44	29.37	0.268	0.053	0.599	0.128	0.188	. . .	. . .	. . .	67.77		40 x 18	CC
CRM	31 X MNB2C	0.319	1.02	32.19	0.66	0.118	0.268	0.233	2.23	. . .	. . .	. . .	63.02		40 x 15	
CRM	31 X MNB3D	0.53	0.45	24.7	1.35	0.28	0.98	1.37	2.80	0.005	0.005	0.015	67.5		40 x 15	
CRM	31 X MNB4E	1.06	0.63	27.6	1.80	3.12	2.30	1.00	4.05	0.006	0.010	0.020	58.9		40 x 15	
CRM	31 X MNB5L	1.75	0.127	37.91	0.56	1.31	3.35	0.49	0.243	. . .	. . .	. . .	54.14		42 x 18	
	31 X MNB6B	0.007	0.04	(28.0)	0.27	0.26	0.005	(0.007)	0.84	. . .	. . .	. . .	70.8		40 x 15	
	31 M BS 675A	0.80	0.074	39.1	1.12	0.019	<0.002	(0.005)	0.32	0.003	0.0011	0.010	58.5	CDA 675	38 x 12	W

3.1.9 Silicon Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	P	Mg	Sb	Co	Cr	Bi	Cu	Size (mm) Ø H	
CRM	31 X WSB 1H	0.209	0.84	8.96	0.249	0.045	1.82	5.45	0.109	0.049	0.0151	0.0318	0.019	0.405	0.116	0.035	81.61	43 x 20	C
CRM	31 X WSB 2D	0.390	0.62	12.80	0.312	0.150	0.95	4.01	0.069	0.730	0.033	0.018	0.042	0.199	0.018	. . .	79.6	43 x 20	
CRM	31 X WSB 3C	0.60	0.39	9.66	0.51	0.36	0.70	3.48	0.053	1.44	0.044	0.004	0.067	0.052	0.05	. . .	(82.4)	43 x 20	
CRM	31 X WSB 4L	0.83	0.204	5.49	0.90	0.255	0.417	4.48	0.025	1.72	0.048	. . .	0.080	0.074	0.044	. . .	85.4	43 x 20	
	31 X WSB 5B	1.00	0.068	0.13	0.99	0.49	0.085	7.08	0.03	0.45	0.072	0.002	0.13	0.053	0.022	. . .	(89.5)	43 x 20	
CRM	31 X WSB 6C	0.053	0.61	1.00	0.048	0.115	0.31	2.42	0.009	0.32	(0.008)	. . .	0.003	0.25	(0.04)	. . .	94.7	43 x 20	
CRM	31 X WSB 7A	1.91	0.054	6.80	1.73	3.05	3.83	4.82	0.076	3.19	0.212	. . .	0.61	(0.002)	0.014	0.191	73.3	43 x 20	
	31 M BS 655A	0.07	0.008	0.02	0.075	0.008	(0.002)	3.14	<0.002	0.91	(0.004)	. . .	<0.002	. . .	. . .	. . .	95.74	38 x 12	W
CRM	31 MI 151B	0.009	0.013	12.94	0.025	0.011	0.002	3.11	(0.002)	0.002	0.003	. . .	(0.001)	. . .	(0.003)	. . .	84.0	32 x 18	W
CRM	31 PN WB1	0.13	0.20	rem	0.049	0.032	0.062	4.80	0.013	0.69	0.00098	. . .	0.025	. . .	. . .	0.0076	78.41	40 x 28	W
CRM	31 PN WB2	0.0041	0.42	rem	0.13	0.096	0.072	3.86	0.043	0.64	0.0084	. . .	0.055	. . .	. . .	0.0094	78.97	each	
CRM	31 PN WB3	0.22	0.23	rem	0.28	0.025	0.035	3.55	0.026	0.44	0.023	. . .	0.010	. . .	. . .	0.0029	79.45		
CRM	31 PN WB4	0.018	0.099	rem	0.35	0.051	0.083	3.06	0.020	0.14	0.060	. . .	0.031	. . .	. . .	0.0056	80.48	Set only	
CRM	31 PN WB5	0.27	0.012	rem	0.46	0.019	0.018	2.79	0.0075	0.050	0.083	. . .	0.0038	. . .	. . .	0.0023	80.88		
CRM	31 PN WB6	0.049	0.0037	rem	0.66	0.0068	0.0075	1.99	0.0043	0.011	0.12	. . .	0.0025	. . .	. . .	0.0011	81.11		
CRM	31 PN WB7	0.39	0.098	rem	0.033	0.068	0.041	3.95	0.052	0.88	0.017	. . .	0.031	. . .	. . .	0.0084	77.69		
CRM	31 PN BH1	0.044	0.74	2.03	1.67	0.96	0.027	4.77	0.0047	0.25	0.0047	0.0065	0.066	. . .	. . .	0.018	rem	40 x 25	W
CRM	31 PN BH2	0.21	0.57	2.99	1.28	0.74	0.079	4.14	0.015	0.54	0.023	0.0066	0.042	. . .	. . .	0.014	rem	each	
CRM	31 PN BH3	0.37	0.40	3.84	0.96	0.53	0.14	3.07	0.022	1.00	0.039	0.0075	0.026	. . .	. . .	0.0091	rem		
CRM	31 PN BH4	0.55	0.24	4.91	0.55	0.28	0.22	2.29	0.054	1.46	0.059	0.0057	0.016	. . .	. . .	0.006	rem	Set only	
CRM	31 PN BH5	0.69	0.015	5.58	0.093	0.047	0.29	1.45	0.071	1.80	0.073	0.0024	0.0054	. . .	. . .	0.0019	rem		
CRM	31 PN BH6	0.32	0.017	6.27	0.35	0.39	0.32	1.51	0.078	0.80	0.078	0.01	0.056	. . .	. . .	0.018	rem		

3.2.1 Phosphor-Bronze

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Sb	P	S	Mg	Bi	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	32 X PB10K	11.93	0.054	0.0362	0.009	0.0567	<0.0005	0.0015	0.010	0.0009	0.0050	0.0240	0.0189	0.0035	0.0239	87.77		42 x 18	CC
CRM	32 X PB11D	3.05	1.01	1.10	0.50	1.01	0.0082	0.43	0.200	0.77	0.50	0.86	0.0015	0.064	0.0009	90.41		42 x 18	CC
CRM	32 X PB12C	4.64	0.47	0.49	0.31	0.51	<0.001	0.01	0.098	0.39	0.24	0.42	(0.010)	<0.001	. . .	(92.0)		43 x 20	C
CRM	32 X PB13B	6.96	0.25	0.27	0.14	0.26	<0.001	<0.005	0.052	0.096	0.12	0.22	(0.03)	<0.001	. . .	(91.5)		43 x 20	C
CRM	32 X PB14C	8.95	0.086	0.23	0.041	0.099	<0.005	0.050	0.026	0.035	0.039	0.050	0.069	<0.0005	0.15	(90.1)	CDA 521	43 x 20	C
CRM	32 X PB20A	4.54	0.0045	0.0067	0.0016	0.0088	<0.001	0.0048	0.0011	(0.0006)	0.0012	0.197	0.0032	. . .	. . .	95.03		38 x 17	W
CRM	32 X PB23A	7.58	0.0042	0.0020	(0.0005)	0.0032	(0.0004)	0.0017	0.0011	<0.001	0.0025	0.325	0.0017	. . .	. . .	92.05		45 x 17	
CRM	32 MI 89B	8.17	0.089	3.96	0.013	0.15	<0.01	<0.01	. . .	<0.01	<0.01	0.087	0.018	. . .	. . .	. . .	CDA 903	31 x 18	
CRM	32 MI 90B	6.44	1.66	2.98	0.019	0.69	<0.01	<0.01	. . .	<0.01	0.060	0.054	0.035	. . .	. . .	. . .	CDA 922	31 x 18	
	32 M BS 510A	4.6	0.016	0.21	0.005	0.020	<0.002	<0.003	0.0008	<0.002	(0.003)	0.11	0.008	. . .	. . .	96.10	CDA 510	38 x 12	W
CRM	32 DB 374	7.60	0.00083	0.00404	0.0040	0.00327	<0.0001	<0.001	(0.00043)	0.00043	(0.00063)	0.1697	(0.0013)	. . .	. . .	92.22		40 x 30	

3.2.2 Leaded Bronze

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	S	Ag	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	32 X LB10C	9.7	12.2	0.32	0.21	1.85	(0.010)	0.05	0.223	0.116	0.066	0.112	0.05	(0.002)	. . .	(75.0)	CDA 946D	40 x 15	CC
CRM	32 X LB11B	10.6	10.3	0.31	0.019	1.09	<0.002	(0.003)	0.094	0.005	0.034	0.061	0.008	0.047	. . .	77.3	CDA 937B	40 x 15	
CRM	32 X LB12C *	11.5	9.77	0.29	0.05	0.20	<0.005	<0.005	0.007	0.09	0.013	(0.006)	(0.002)	0.11	. . .	(78.3)	CDA 935B	40 x 15	
CRM	32 X LB13B	6.03	8.17	0.58	0.025	1.29	0.013	0.022	0.116	<0.001	0.035	0.028	0.063	0.100	. . .	83.58		40 x 15	
CRM	32 X LB14D	2.84	15.7	0.36	0.027	0.092	0.040	(0.01)	0.102	0.002	1.80	0.039	0.014	0.029	. . .	rem		40 x 15	
CRM	32 X LB15B	1.89	21.3	0.089	(0.001)	0.103	<0.002	<0.005	0.008	<0.001	0.008	0.053	<0.001	(0.012)	. . .	(76.5)	CDA 941C	40 x 15	
	* Target values																		
CRM	32 MI 92B	9.75	9.50	0.28	0.009	0.36	<0.01	<0.01	. . .	<0.01	. . .	0.35	0.028	0.036	(0.031)	. . .	CDA 937	31 x 18	
	32 M BS 937B-1	9.7	9.23	0.044	0.004	0.35	<0.003	<0.004	(0.008)	<0.002	. . .	0.18	0.012	0.032	. . .	80.2	CDA 937	41 x 12	
	32 M BS 938-1	7.16	14.8	0.26	0.015	0.49	<0.002	<0.004	(0.004)	(0.001)	. . .	0.033	0.059	0.009	. . .	77.1	CDA 938	41 x 12	

See page 67 for materials in Chippings form

For Setting-Up Samples see section 16

3.2.3 Aluminium Bronze

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	P	Mg	Cr	Cu	Size (mm) Ø H	
CRM	**32 X ALB 1M**	0.023	0.223	0.032	3.04	6.03	10.09	0.13	<0.001	0.088	0.017	0.084	0.012	80.2	43 x 20	C
CRM	**32 X ALB 2H**	0.08	0.09	0.229	4.60	4.64	9.52	0.302	0.0114	0.393	0.027	0.0104	0.0261	80.0	43 x 20	C
CRM	**32 X ALB 3Q**	0.10	0.11	0.325	4.15	3.72	11.56	0.135	0.0060	0.374	0.025	0.088	0.0089	79.4	43 x 20	C
CRM	**32 X ALB 4G**	0.093	0.149	0.305	4.68	7.02	7.96	0.335	0.010	1.20	0.028	0.297	0.0275	(77.91)	43 x 20	C
CRM	**32 X ALB 5H**	0.10	0.20	0.28	2.45	4.10	7.50	0.08	0.008	1.05	0.030	0.008	0.006	(84.2)	43 x 20	C
CRM	**32 X ALB 6H**	0.126	0.060	0.19	3.06	5.62	8.42	0.30	(0.021)	1.41	0.036	0.0026	(0.004)	80.7	43 x 20	C
CRM	**32 X ALB 7B**	0.351	0.029	0.513	4.97	4.87	3.97	0.41	0.048	0.575	0.051	0.013	0.094	83.98	43 x 20	C
CRM	**32 X ALB 8D ***	0.50	0.005	0.75	5.7	6.5	7.2	0.6	0.15	1.5	0.15	0.05	0.05	bal	42 x 18	CC
CRM	**32 X ALB 9A**	0.032	0.285	0.040	3.79	0.773	12.79	0.160	(0.001)	0.069	0.019	0.0023	0.013	81.3	43 x 20	C

* Target values

	Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Mg	Cd	Cu		Size (mm) Ø H	
32 T CA10	0.16	0.16	0.067	4.55	3.39	10.10	0.46	0.333	0.007	. . .	80.70		60 x 6	CC
32 T CA11	0.25	0.1	0.2	1.3	2.0	10	0.25	0.8	0.07	. . .	85	CA11 values are approximate	60 x 6	
32 T CA12	0.036	0.047	0.45	2.77	1.385	8.0	0.058	3.09	. . .	. . .	84.1		60 x 6	
32 T CA13	(0.01)	0.0230	0.65	3.82	0.50	11.20	0.11	1.22	. . .	. . .	82.45		60 x 6	
32 T CA20	0.19	0.18	0.41	0.79	1.18	8.00	0.17	1.85	. . .	0.05	87.15		60 x 6	
32 T CA21	0.07	0.05	0.100	3.45	3.09	10.82	0.07	0.30	. . .	0.0095	81.9		60 x 6	
32 T CA22	0.30	0.0243	0.605	2.51	4.54	10.45	0.32	0.745	. . .	. . .	80.50		60 x 6	
32 T CA25	0.177	0.03	0.252	6.10	5.74	7.97	0.084	0.51	. . .	. . .	79.12		60 x 6	
32 T CA26	0.005	0.058	0.038	4.36	4.87	9.10	0.035	0.188	. . .	0.034	81.25		60 x 6	
32 T CA27	0.054	0.11	0.428	2.81	3.88	10.25	0.127	1.195	. . .	0.012	81.10		60 x 6	
32 T CA30	0.099	0.142	0.066	5.2	3.10	7.55	0.15	2.05	. . .	. . .	81.6		60 x 6	
32 T CA31	0.063	0.020	0.145	3.18	7.51	9.15	0.064	3.27	0.02	. . .	76.5		60 x 6	
32 T CA35	0.30	0.10	0.56	6.1	3.80	11.4	0.25	1.6	. . .	. . .	75.6		60 x 6	
32 T CA36	0.2	0.02	0.25	3.0	6.5	12.6	0.1	0.12	0.1	. . .	78	CA36 values are approximate	60 x 6	
32 T 3298-A	0.04	0.04	0.635	6.05	6.90	10.60	0.065	1.60	. . .	. . .	74.15		60 x 6	CC
32 T 3018-F	0.06	0.02	0.06	4.45	4.50	7.25	0.085	1.57	. . .	. . .	81.90		60 x 6	
32 T 4149-G	0.34	0.15	0.37	2.00	1.96	9.84	0.18	0.21	. . .	. . .	84.95		60 x 6	
32 T 4065-P	0.18	0.03	0.03	3.40	3.18	11.85	0.034	0.075	. . .	. . .	81.20		60 x 6	
32 T 3610-Q	0.25	0.23	0.51	3.98	5.40	7.10	0.065	0.045	. . .	0.090	82.32		60 x 6	
32 T 2151-R	<0.01	<0.005	<0.01	4.48	0.56	9.43	0.015	0.73	. . .	. . .	84.75		60 x 6	
32 T 2152-S	. . .	<0.005	<0.01	3.99	0.68	9.78	0.015	0.42	. . .	. . .	85.05		60 x 6	
32 T 2154-V	<0.01	<0.005	0.01	3.05	0.41	11.25	0.015	0.12	. . .	. . .	85.00		60 x 6	
32 T 2158-W	0.01	<0.005	0.01	2.53	0.10	11.95	0.015	0.26	. . .	. . .	85.00		60 x 6	
32 T 3297-Y	0.10	0.11	0.27	1.88	. . .	10.00	0.15	0.03	. . .	. . .	87.45		60 x 6	
32 T 3301-Z	0.03	0.032	0.06	4.00	0.125	8.10	0.06	0.26	. . .	. . .	87.30		60 x 6	
32 T 2504-E	0.51	0.59	0.55	3.55	6.4	8.1	0.075	0.65	. . .	. . .	79.5		60 x 6	
32 T 3011-G	0.125	0.10	0.25	1.98	2.00	10.35	0.16	0.165	. . .	. . .	84.80		60 x 6	
32 T 2805-X	0.34	0.105	0.26	0.79	1.04	6.95	0.03	6.42	. . .	. . .	84.05		60 x 6	

	Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	P	Cr	C	Cu	Typical Alloy Type	Size (mm) Ø H	
32 A 51.11-4	0.027	0.33	0.111	0.060	0.012	5.27	0.159	<0.001	<0.001	0.035	0.013	. . .	93.95		50 x 12	
32 A 51.12-4	0.196	0.219	0.45	2.87	0.112	6.36	0.005	0.111	1.33	<0.001	0.013	. . .	88.29		50 x 12	
32 A 51.13-4	0.270	0.104	0.335	1.81	0.057	7.30	0.174	0.215	0.898	0.022	0.013	. . .	88.79		50 x 12	
32 A 51.14-4	0.113	0.003	0.656	0.72	0.219	8.42	0.286	0.44	0.55	0.012	0.013	. . .	88.57		50 x 12	
CRM **32 MI 80B**	0.018	0.009	0.078	3.31	4.69	10.19	0.030	(0.004)	0.54	0.009	0.012	(0.01)	81.2	CDA 630	31 x 18	
CRM **32 MI 93B**	0.009	0.012	0.17	3.87	0.088	10.33	0.024	<0.01	0.024	(0.002)	(0.007)	0.007	85.4	CDA 954	31 x 18	
CRM **32 MI 94A**	<0.01	0.009	0.09	4.04	4.37	10.63	<0.01	(<0.01)	0.16	<0.01	. . .	(0.014)	(80.68)	CDA 955	31 x 18	
CRM **32 MI 94B**	(0.003)	0.004	0.14	3.99	4.31	10.80	0.028	<0.01	0.071	0.011	0.017	(0.006)	80.6	CDA 955	31 x 18	
CRM **32 MI 204A**	0.005	0.004	0.22	3.87	1.95	10.55	0.034	(<0.01)	0.052	0.007	0.008	0.006	83.3	CDA 954 mod	31 x 18	
32 M BS 954A	0.07	0.047	0.10	3.90	1.38	10.20	0.07	(0.005)	0.27	0.012	. . .	(0.005)	83.9	CDA 954	38 x 12	C
32 M BS 955B	0.025	0.046	0.10	3.91	4.25	10.08	0.085	<0.002	0.32	0.019	. . .	0.005	81.1	CDA 955	38 x 12	
32 M BS 955mod	0.096	0.035	1.05	5.46	6.38	10.37	0.054	<0.003	1.61	<0.002	. . .	. . .	(74.9)		40 x 17	
32 M BS 623A	0.002	0.001	0.008	2.19	0.146	9.12	0.014	(0.006)	0.273	<0.002	. . .	(0.002)	88.13	CDA 623	38 x 12	W
32 M BS 630A	0.019	0.0069	0.17	3.73	4.81	10.05	0.037	0.002	0.11	<0.01	. . .	0.005	81.0	CDA 630	38 x 12	
32 M BS 642A	0.018	0.001	0.011	0.17	0.025	6.70	1.80	<0.002	0.005	0.001	. . .	0.001	91.0	CDA 642	38 x 12	

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For Setting-Up Samples see section 16

3.2.4 Bismuth Bronze

		Sn	Pb	Zn	Fe	Ni	As	P	Sb	Co	Se	Bi	Cd	B	Cu	Size (mm) Ø H	
CRM	**32 X SEB 1B**	3.83	0.564	11.57	0.059	0.118	0.051	0.025	0.354	0.0108	0.895	5.77	. . .	. . .	(76.7)	42 x 18	CC
CRM	**32 X SEB 2C**	9.34	0.424	3.73	0.078	0.028	0.0094	0.013	0.0120	0.0121	0.026	4.36	. . .	. . .	(81.8)	40 x 15	
CRM	**32 X SEB 3C**	2.07	0.109	0.85	0.082	1.52	0.0161	0.040	0.054	0.025	1.42	(5.4)	0.0016	0.0021	(88.4)	42 x 18	
CRM	**32 X SEB 4C**	9.26	0.011	8.60	0.366	0.0091	0.0012	(0.006)	0.0056	0.48	0.105	2.65	0.0004	0.0021	78.6	42 x 18	
CRM	**32 X SEB 5B**	5.28	0.0149	6.64	0.360	0.308	0.0121	0.183	0.0344	0.0048	0.512	1.17	0.0067	0.0028	85.5	42 x 18	
CRM	**32 X SEB 6B** *	6.74	0.083	5.21	0.42	0.86	0.082	0.034	0.085	0.202	0.32	0.60	. . .	. . .	85.2	40 x 15	

* Target values

3.2.5 Si/Mn Bronze

		Sn	Pb	Zn	Fe	Ni	Mn	Si	P	Cu	Size (mm) Ø H	
CRM	**32 PN BE1**	0.014	0.028	0.52	0.047	0.012	1.69	2.34	0.051	rem	40 x 25	W
CRM	**32 PN BE2**	0.041	0.023	0.027	0.078	0.29	1.35	2.82	0.024	rem	each	
CRM	**32 PN BE3**	0.13	0.012	0.19	0.10	0.10	1.10	3.26	0.039	rem		
CRM	**32 PN BE4**	0.11	0.0061	0.13	0.19	0.048	0.51	3.91	0.0070	rem	Set only	
CRM	**32 PN BE5**	0.30	0.0052	0.36	0.23	0.20	1.20	2.08	0.013	rem		

3.2.9 Bronzes

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Sb	P	S	Cr	Cd	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	**32 X SN1D**	11.75	5.17	0.804	0.0034	2.17	<0.002	<0.001	. . .	0.0018	0.006	0.0025	0.0064	. . .	. . .	79.93		42 x 18	CC
CRM	**32 X SN2H**	13.54	1.97	1.28	0.0332	0.104	0.0004	0.0028	. . .	0.0043	0.100	0.082	0.0326	. . .	. . .	82.80		42 x 18	
CRM	**32 X SN3E**	16.51	0.270	0.43	0.0782	0.513	0.0004	(0.002)	. . .	0.0026	0.260	0.297	0.096	. . .	. . .	81.32		42 x 18	
CRM	**32 DB 377**	5.92	0.00449	0.01006	0.01042	0.01074	0.00451	(0.013)	<0.001	0.00921	0.00130	<0.001	. . .	0.00669	<0.0001	94.04		40 x 30	
CRM	**32 DB 378**	5.74	0.00042	. . .	0.0182	0.00183	<0.0001	<0.001	0.00995	. . .	0.00861	0.00602	0.00091	0.0311	0.01007	94.13		40 x 30	
	32 M BS 903B	7.9	0.10	4.39	0.049	0.50	(0.001)	0.002	0.003	0.0004	0.003	0.073	0.006	. . .	. . .	86.7	CDA 903	41 x 12	
	32 M BS 905A-1	10.25	0.030	2.27	0.015	0.018	<0.003	<0.004	(0.001)	<0.0003	0.004	0.055	. . .	. . .	. . .	87.3	CDA 905	41 x 12	
	32 M BS 922B-3	5.8	1.33	3.83	0.008	0.61	(0.001)	(0.001)	0.01	(0.002)	0.002	0.026	. . .	. . .	. . .	88.4	CDA 922	41 x 12	
	32 T B1	15.0	0.2	1.0	0.05	0.05	0.15	0.05	. . .	. . .	0.4	0.02	0.02	. . .	. . .	83.05		60 x 6	CC
	32 T B2	13.5	0.02	0.11	0.05	<0.01	<0.01	0.2	. . .	. . .	<0.01	0.17	0.05	. . .	. . .	85.9		60 x 6	
	32 T B3	12.8	1.6	2.2	0.02	1.5	0.10	0.07	. . .	0.2	0.20	0.45	0.04	. . .	. . .	80.2		60 x 6	
	32 T B4	10.8	2.5	1.2	<0.05	0.6	. . .	<0.05	. . .	. . .	0.1	0.5	0.02	. . .	. . .	84.0		60 x 6	
	32 T B5	9.9	0.5	0.4	0.18	2.3	0.04	0.05	. . .	0.08	0.5	0.04	0.07	. . .	. . .	86.0		60 x 6	
	32 T B10	6.60	4.03	2.55	0.17	0.97	0.17	<0.001	0.009	<0.001	1.09	0.015	0.05	. . .	. . .	83.90		60 x 6	CC
	32 T B11	8.04	1.93	2.05	0.168	2.0	. . .	0.13	. . .	. . .	0.70	0.056	0.09	. . .	. . .	84.85		60 x 6	
	32 T B12	9.6	0.2	0.6	0.2	2.6	0.1	0.05	0.1	0.25	0.1	0.5	0.01	. . .	. . .	85.7		60 x 6	
	32 T B13	10.05	0.99	1.09	(0.25)	0.5	0.016	0.085	0.065	0.046	0.243	0.215	0.07	. . .	. . .	86.35		60 x 6	
	32 T B14	11.0	0.5	0.15	0.1	0.302	. . .	0.07	0.039	<0.02	0.072	0.7	0.021	. . .	. . .	87.0		60 x 6	
	32 T B20.1	6.35	5.1	3.77	0.165	0.51	0.04	0.055	. . .	. . .	0.520	0.072	0.115	. . .	. . .	83.35		60 x 6	
	32 T B21	5.13	3.79	6.22	0.285	1.21	0.13	. . .	. . .	. . .	0.18	(0.004)	0.047	. . .	. . .	83.0		60 x 6	
	32 T B22.1	3.5	6.0	4.0	<0.10	2.5	. . .	<0.1	. . .	. . .	0.05	. . .	0.03	. . .	. . .	83.0		60 x 6	
	32 T B23.1	7.18	7.20	1.46	(0.040)	0.086	0.020	0.025	. . .	. . .	0.384	0.070	0.019	. . .	. . .	83.45		60 x 6	
	32 T B30	9.80	10.00	1.05	0.115	0.97	0.063	0.066	. . .	0.150	0.22	0.063	0.048	. . .	. . .	77.45		60 x 6	
	32 T B31	7.65	11.79	0.79	(0.015)	0.489	(0.031)	(0.047)	. . .	. . .	0.475	. . .	0.028	. . .	. . .	78.65		60 x 6	
	32 T B32	5.96	16.10	1.21	0.11	1.49	0.085	0.075	0.0056	. . .	0.13	0.041	0.027	. . .	. . .	74.65		60 x 6	
CRM	**32 PN WL1**	0.22	0.013	3.53	0.072	0.44	0.082	0.057	0.0010	0.0041	. . .	0.012	0.020	. . .	0.0017	95.54		40 x 25	
CRM	**32 PN WL2**	0.32	0.011	1.56	0.13	0.32	0.057	0.046	0.0078	0.0038	0.0050	0.016	0.0070	. . .	0.0023	97.49		each	
CRM	**32 PN WL3**	0.37	0.00083	2.21	0.20	0.22	0.0034	0.0037	0.020	0.38	0.0085	0.021	0.0088	. . .	0.010	96.51			
CRM	**32 PN WL4**	0.55	0.0066	2.97	0.012	0.019	. . .	0.0019	0.0034	. . .	. . .	. . .	0.0050	. . .	0.0068	96.41		Set only	
CRM	**32 PN WL5**	0.73	0.0030	1.61	0.0025	0.0014	0.0014	0.0009	0.0011	0.00073	0.0006	. . .	0.0019	. . .	0.0038	97.62			
CRM	**32 PN WL6**	0.80	0.016	2.48	0.31	0.091	0.10	0.13	0.024	0.14	0.011	0.032	0.017	. . .	0.025	95.76			
CRM	**32 PN BL1**	2.58	0.25	0.68	0.38	0.25	0.11	0.059	0.058	0.062	0.053	0.49	(0.0081)	. . .	0.060	rem		40 x 27	
CRM	**32 PN BL2**	4.04	0.14	0.40	0.21	0.37	0.15	0.031	0.039	0.055	0.039	0.29	(0.0063)	. . .	0.040	rem		each	
CRM	**32 PN BL3**	6.12	0.065	0.15	0.10	0.13	0.019	0.015	0.025	0.026	0.021	0.084	. . .	. . .	0.022	rem			
CRM	**32 PN BL4**	8.38	0.013	0.017	0.014	0.015	. . .	0.011	0.0089	0.0092	0.0095	0.010	(0.022)	. . .	0.0092	rem		Set only	
CRM	**32 PN BL5**	11.05	0.0069	0.0078	0.0061	0.0074	0.00052	. . .	0.00057	0.0011	0.0039	0.0042	(0.031)	. . .	0.0015	rem			

		Sn	Pb	Zn	Fe	Ni	As	Sb	P	Bi	Ag	Size (mm) Ø H	
CRM	**32 PN CM1**	0.61	0.012	0.021	0.019	0.0086	0.0098	0.012	0.0088	0.010	0.010	40 x 30	W
CRM	**32 PN CM2**	0.84	0.0067	0.0061	0.0064	0.0055	0.0068	0.0068	0.0058	0.0072	0.0061	each	
CRM	**32 PN CM3**	1.06	0.0038	0.0060	0.012	0.0031	0.0036	0.0040	0.0041	0.0033	0.0029		
CRM	**32 PN CM4**	1.30	0.0023	0.0020	0.0042	0.0011	0.0011	0.0019	0.0009	0.00093	0.0011	Set only	
CRM	**32 PN CM5**	1.14	0.019	0.013	0.0094	0.014	(0.015)	0.018	0.015	0.014	. . .		

Cu Binaries

	Sn	Size (mm) Ø H	
32 X 14953C	1.37	40 x 15	C
32 X 14954B	3.15	40 x 15	
32 X 14955B	5.25	40 x 15	
32 X 14956B	7.35	40 x 15	
32 X 14957B	9.30	40 x 15	

See page 68 for materials in Chippings form

For Setting-Up Samples see section 16

3.3 Gun Metal

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	Cr	Ag	S	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	33 X GM 4W	2.50	5.20	7.17	0.051	2.05	<0.002	<0.005	0.021	(0.0019)	0.041	0.042	<0.005	<0.001	0.0062	0.33	82.6		40 x 15	CC
CRM	33 X GM 5J	4.89	4.20	6.8	0.32	1.82	0.033	0.079	0.026	0.019	0.074	0.058	0.054	<0.001	0.011	0.108	81.2		40 x 15	
CRM	33 X GM 6H	7.31	3.11	2.99	0.131	1.069	0.136	0.124	0.175	0.0912	0.037	0.258	0.0566	0.0019	0.0114	0.070	84.46		42 x 18	
CRM	33 X GM 7G	10.35	1.17	2.93	0.008	0.550	0.144	0.090	0.136	0.396	0.119	0.163	0.044	(0.04)	0.074	0.015	83.8		40 x 15	
CRM	33 X GM 8E	4.03	6.78	6.21	0.298	0.115	0.0067	(0.0010)	(0.0051)	0.0010	0.0138	<0.002	0.0213	<0.001	0.105	0.0055	82.3		42 x 18	
CRM	33 X GM 24A	3.85	3.35	3.67	0.0083	0.0087	. . .	0.0028	0.0010	<0.0005	0.0009	0.0012	0.190	(0.0013)	0.0046	0.003	88.88		44 x 17	W
CRM	33 X GM 29A	6.12	0.050	4.23	0.0102	0.0289	. . .	0.0027	0.0017	(0.0005)	0.0019	0.0015	0.138	(0.0004)	0.0026	0.0024	89.36		33 x 19	
CRM	33 X RB 1A	2.137	5.02	7.95	0.928	0.0539	0.0048	0.063	0.0030	0.0167	0.0029	0.432	0.020	0.0013	0.0174	0.0044	83.24		42 x 18	CC
CRM	33 X RB 2A	3.19	3.85	9.14	0.493	0.255	0.0352	0.0116	0.0211	0.0028	0.101	0.019	0.0208	0.0017	0.0029	0.078	82.67		42 x 18	
	33 M BS 836A-1	4.59	5.32	4.52	0.023	0.46	(0.001)	0.003	0.008	(<0.002)	. . .	0.068	0.08	. . .	0.023	0.042	84.64	CDA 836	41 x 12	C
	33 M BS 544A	4.42	4.16	3.42	0.092	0.16	. . .	<0.002	0.011	<0.002	. . .	0.040	0.021	. . .	. . .	0.038	88.4	CDA 544	41 x 12	
	33 M BS 932E	7.33	7.3	2.86	0.029	0.16	<0.001	<0.005	0.048	0.0001	. . .	0.145	0.022	. . .	. . .	0.053	82.15	CDA 932	38 x 12	

3.4 Nickel Silver

		Sn	Pb	Zn	Fe	Ni	Si	Mn	P	S	Mg	Co	C	Cr	Ag	As	Sb	Bi	Cu	Size (mm) Ø H	
CRM	34 X NS 1E	0.004	(0.01)	32.8	0.014	8.23	<0.01	0.060	<0.002	(0.002)	0.007	. . .	. . .	. . .	. . .	. . .	. . .	. . .	58.8	40 x 15	CC
CRM	34 X NS 2E	0.009	0.057	26.0	0.065	13.12	0.06	0.145	0.005	0.018	<0.0005	. . .	. . .	. . .	. . .	. . .	. . .	. . .	60.6	40 x 15	
CRM	34 X NS 3E	0.031	0.155	17.99	0.201	14.86	0.018	0.129	0.013	0.063	0.0011	0.102	0.014	0.0022	0.111	. . .	. . .	. . .	66.30	40 x 15	
CRM	34 X NS 4D	0.007	0.53	17.6	0.35	17.18	0.06	0.189	0.018	0.023	0.043	. . .	. . .	. . .	. . .	. . .	. . .	. . .	63.8	40 x 15	
CRM	34 X NS 5E	0.124	1.13	24.2	0.56	19.4	0.051	0.096	0.044	0.017	0.0015	. . .	. . .	. . .	. . .	. . .	. . .	. . .	54.3	40 x 15	
CRM	34 PN WH1	. . .	. . .	rem	0.0052	5.70	0.010	0.56	0.0029	(0.0055)	. . .	0.0061	(0.0046)	. . .	. . .	. . .	. . .	. . .	68.16	40 x 25	W
CRM	34 PN WH2	. . .	. . .	rem	0.038	6.34	0.038	0.36	0.0072	(0.0071)	. . .	0.017	(0.0058)	. . .	. . .	. . .	. . .	. . .	69.14	each	
CRM	34 PN WH3	. . .	. . .	rem	0.11	3.44	0.072	0.25	0.013	(0.011)	. . .	0.031	(0.0070)	. . .	. . .	. . .	. . .	. . .	70.18		
CRM	34 PN WH4	. . .	. . .	rem	0.13	4.14	0.12	0.11	0.015	(0.017)	. . .	0.048	(0.0075)	. . .	. . .	. . .	. . .	. . .	71.15	Set only	
CRM	34 PN WH5	. . .	. . .	rem	0.22	4.89	0.17	0.011	0.017	(0.021)	. . .	0.028	(0.0087)	. . .	. . .	. . .	. . .	. . .	72.28		
																				W D H	
	34 CG 02111	. . .	0.0072	20.76	0.85	14.77	0.033	0.068	. . .	. . .	0.0071	. . .	. . .	. . .	. . .	0.013	0.0118	0.0070	(rem)	35 x 45 x 30	
	34 CG 02112	. . .	0.0098	21.20	0.64	14.96	0.43	0.15	. . .	. . .	0.018	. . .	. . .	. . .	. . .	0.0070	0.0063	0.0040	(rem)	each	
	34 CG 02113	. . .	0.021	20.82	0.45	14.85	0.140	0.205	. . .	. . .	0.029	. . .	. . .	. . .	. . .	0.034	0.0021	0.0021	(rem)		
	34 CG 02114	. . .	0.030	21.08	0.231	14.86	0.0281	0.505	. . .	. . .	0.058	. . .	. . .	. . .	. . .	0.0041	0.0036	0.0014	(rem)	set only	
	34 CG 02115	. . .	0.049	21.17	0.112	14.91	0.089	0.82	. . .	. . .	0.101	. . .	. . .	. . .	. . .	0.055	0.0015	0.00074	(rem)		

3.5 Phosphorus Deoxidised Copper

		P	Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	Co	Ag	Te	S	Se	Cu	Size (mm) Ø H	
	35 A C09.01-4	0.151	<0.001	<0.0005	0.0008	0.0019	<0.0005	<0.0005	<0.001	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	0.011	<0.001	. . .	. . .	99.82	50 x 12	CC
	35 A C09.02-4	0.078	<0.001	<0.001	<0.001	0.0042	<0.0005	<0.0005	<0.002	<0.002	<0.0005	<0.0005	<0.0005	<0.0005	0.0055	<0.001	. . .	. . .	99.90	50 x 12	
	35 A C09.03-4	0.056	<0.001	<0.0005	<0.001	<0.0033	<0.0005	<0.0005	<0.001	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.012	<0.001	. . .	. . .	99.92	50 x 12	
	35 A C09.04-4	0.0174	<0.001	<0.001	<0.001	<0.0047	<0.0005	<0.0005	<0.002	<0.001	<0.0005	<0.0005	<0.0005	<0.0005	0.0033	<0.001	. . .	. . .	99.96	50 x 12	
	35 X CUP 8A	8.9	0.18	0.006	0.017	. . .	0.019	<0.002	<0.005	<0.002	<0.002	<0.005	(0.003)	. . .	. . .	. . .	0.015	. . .	90.7	40 x 15	CC
CRM	35 PN CO2	11.60	0.35	0.070	0.15	0.096	0.013	. . .	. . .	0.0050	. . .	0.0049	0.065	. . .	. . .	0.0055	. . .	0.0045	. . .	40 x 25	W
CRM	35 PN CO3	8.56	0.037	0.10	0.24	0.11	0.10	. . .	. . .	0.011	. . .	0.015	0.14	. . .	. . .	0.0080	. . .	0.0073	. . .	each	
CRM	35 PN CO4	5.54	0.13	0.29	0.029	0.29	0.25	. . .	. . .	0.016	. . .	0.0086	0.092	. . .	. . .	0.012	. . .	0.010	. . .		
CRM	35 PN CO5	9.45	0.55	0.044	0.061	0.11	0.0082	. . .	. . .	0.0023	. . .	0.00095	0.034	. . .	. . .	0.0023	. . .	0.0015	. . .	Set only	

3.6.1 Cupro-Nickel

		Sn	Pb	Fe	Ni	Co	Si	Mn	Mg	S	P	Bi	B	C	Cr	Ti	Nb	Zn	Cu	Size (mm) Ø H	
CRM	36 X CN1M	0.006	0.008	2.41	9.31	0.131	0.058	2.27	. . .	0.010	0.008	. . .	(0.0008)	0.008	0.118	. . .	(0.019)	0.331	85.3	40 x 15	CC
	36 X CN2H	0.06	0.036	1.45	15.1	0.11	0.44	1.41	0.005	0.043	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	rem	40 x 15	C
CRM	36 X CN3L	0.063	0.053	1.07	19.95	0.072	0.490	0.920	0.012	0.029	0.032	. . .	0.0064	0.035	0.050	. . .	0.15	0.80	76.3	40 x 15	CC
	36 X CN4J	<0.005	0.02	0.52	25.8	0.04	0.75	0.43	0.005	0.001	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(72.4)	40 x 15	C
CRM	36 X CN5N	0.015	0.027	0.791	32.26	0.018	0.80	0.090	0.014	0.074	0.041	. . .	0.0091	0.0253	0.118	. . .	0.441	0.232	65.1	40 x 15	CC
CRM	36 X CN6G *	. . .	0.009	0.73	35.3	0.031	0.24	0.43	. . .	0.005	0.012	0.027	0.056	0.024	1.15	0.002	. . .	. . .	61.9	40 x 15	CC
	36 X CN7E	. . .	0.040	1.01	32.1	0.060	0.36	0.75	. . .	0.046	0.021	0.009	0.006	0.029	1.40	<0.005	. . .	. . .	64.2	40 x 15	CC
CRM	36 X CN8G	0.03	0.067	0.34	31.7	0.114	0.37	1.17	. . .	0.10	0.02	0.11	0.009	0.013	1.33	0.029	0.43	0.21	(64.0)	40 x 15	CC
	36 X CN9G	(0.003)	0.04	1.25	28.00	0.018	0.61	1.156	. . .	0.009	0.034	0.019	. . .	0.011	2.11	0.77	1.21	0.014	64.2	40 x 15	CC
CRM	36 X CN10A	(0.009)	0.004	4.28	29.3	0.081	1.02	0.262	0.0026	0.055	(0.020)	0.014	0.0029	0.064	1.59	0.03	0.89	0.026	61.01	40 x 15	CC
	* Target values																				
CRM	36 MI 85B	0.014	0.005	0.53	29.60	0.034	<0.01	0.53	. . .	0.010	0.007	. . .	. . .	0.011	. . .	. . .	. . .	. . .	. . .	31 x 18	
	36 DB 367	0.0105	0.0298	1.443	9.72	. . .	. . .	0.723	0.0347	0.0162	0.0124	. . .	. . .	. . .	. . .	. . .	. . .	0.0715	87.88	40 x 30	
	36 A 62.12-4	0.111	0.053	0.45	7.94	0.081	0.109	1.59	0.002	0.034	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.180	89.42	50 x 12	
	36 M BS 706	0.006	0.006	1.56	10.9	. . .	<0.002	0.61	. . .	0.009	0.009	. . .	. . .	(0.004)	. . .	. . .	. . .	0.054	87.00	38 x 12	
	36 M BS 715A	0.008	(0.007)	0.61	30.22	. . .	0.10	0.82	. . .	0.001	0.006	. . .	. . .	0.03	. . .	. . .	. . .	0.10	68.0	38 x 12	
															Al	Cd	Sb				
CRM	36 PN NB1	0.0038	0.011	0.11	23.77	0.010	0.093	0.029	0.017	0.0019	0.025	0.011	. . .	0.040	0.071	0.016	0.0025	0.052	75.71	40 x 25	W
CRM	36 PN NB2	0.014	0.014	0.085	24.38	0.023	0.13	0.46	0.0059	0.0084	0.030	0.0082	. . .	0.019	0.043	0.0053	0.0036	0.037	74.73	each	
CRM	36 PN NB3	0.040	0.011	0.14	25.87	0.017	0.068	0.23	0.013	0.011	0.019	0.0070	. . .	0.034	0.12	0.0082	0.0057	0.20	73.20		
CRM	36 PN NB4	0.065	0.0084	0.21	25.78	0.013	0.024	0.015	0.028	0.015	0.0085	0.0040	. . .	0.018	0.013	0.0064	0.0092	0.33	73.45	Set only	
CRM	36 PN NB5	0.10	0.0060	0.28	24.94	0.0067	0.0057	0.57	0.036	0.028	0.0036	0.0010	. . .	0.012	0.0014	0.0012	0.012	0.57	73.42		

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For Setting-Up Samples see section 16

3.6.2 Cu/Al

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Cu	Size (mm) Ø H	
	36 T 2794-H	0.105	<0.01	<0.01	0.82	0.69	8.0	0.048	<0.01	90.3	60 x 6	CC
	36 T 3299-J	0.106	0.110	0.19	0.38	0.21	10.10	0.136	1.12	87.60	60 x 6	
	36 T 3296-L	0.06	0.30	0.62	0.07	0.41	9.40	0.20	0.37	88.55	60 x 6	
	36 T 3300-M	0.205	0.205	0.085	0.45	0.205	8.73	0.415	0.165	89.5	60 x 6	
	36 T CA3	0.20	0.15	0.30	0.80	0.80	10.9	. . .	0.06	86.5	60 x 6	CC

3.6.3 Cu/Mg

		Mg	P	Ag	S	Al	Co	Cr	Size (mm) Ø H	
CRM	**36 X CMG10A**	0.379	0.027	0.076	0.0024	0.024	0.042	0.038	36-38 x 16	CC
CRM	**36 X CMG11A**	0.771	0.079	0.151	0.0019	0.043	(0.0001)	<0.0005	36-38 x 16	
CRM	**36 X CMG12A**	1.16	0.09	0.192	0.0020	0.0076	0.089	0.074	36-38 x 16	

3.6.4 Cu/Be/Co

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Cr	Be	Co	Ag	Cu	Typical Alloy Type	Size (mm) Ø H	
CRM	**36 X CBC2E**	0.009	0.0099	0.0103	0.0208	0.0472	0.0231	0.0205	0.0015	0.0044	0.450	2.47	0.0020	96.96	C17500	40 x 17	
CRM	**36 X CBC5A**	0.01	0.009	0.038	0.028	1.69	0.021	0.036	(0.001)	0.006	0.32	0.14	. . .	97.6	C17510	40 x 15	
	36 T 4583	0.25	0.084	0.094	(0.15)	2.02	0.029	0.08	0.064	. . .	0.84	(0.002)	. . .	96.35		60 x 6	CC
	36 T 4584	0.022	(0.002)	0.022	0.120	0.015	0.033	0.166	(0.002)	. . .	2.53	0.04	. . .	97.05		60 x 6	
	36 T 4594	(0.002)	(0.003)	(0.004)	(0.10)	0.055	0.030	0.116	. . .	0.067	0.142	3.00	0.978	95.50		60 x 6	
	36 T 4640	0.053	0.056	0.055	0.125	1.07	0.099	0.166	0.063	(0.1)	0.69	1.36	0.495	95.67		60 x 6	
	36 T 4763	0.042	0.043	0.058	0.031	0.105	0.048	0.125	. . .	. . .	0.79	2.13	1.53	95.10		60 x 6	
	36 T 4766	0.100	0.053	0.070	0.160	0.203	0.027	0.110	0.008	(0.2)	1.58	0.64	. . .	96.83		60 x 6	
	36 T 4868	0.022	0.023	0.056	0.204	0.038	0.044	0.211	0.019	. . .	2.92	0.246	. . .	96.15		60 x 6	
	36 T 4872	0.044	0.019	0.119	0.104	0.103	0.059	0.16	0.008	(0.04)	1.93	0.400	. . .	97.00		60 x 6	
	36 T 4873	(0.007)	(0.003)	(0.003)	0.078	0.049	0.094	0.088	(0.002)	0.105	0.17	0.98	. . .	98.40		60 x 6	
	36 M BS172Be-1	0.033	(0.002)	0.007	0.052	0.039	(0.02)	0.055	0.001	0.003	1.89	0.206	. . .	97.68	CDA 172	38 x 12	

3.6.5 Cu/Cr

		Sn	Fe	Ni	Si	Mn	Cr	Zr	Pb	Zn	Al	S	Mg	Co	Cd	Ag	Cu	Size (mm) Ø H	
	36 X CCR1C	<0.005	0.015	<0.005	0.01	<0.001	0.855	0.11	0.002	0.003	0.014	0.002	0.001	. . .	. . .	. . .	. . .	45 x 20	W
CRM	**36 X CCZ A**	0.0045	0.033	0.0084	0.0031	0.0008	0.667	0.049	0.0023	0.0076	0.0003	0.001	. . .	0.0012	0.0027	0.0019	99.22	50 x 17	
CRM	**36 X 274A**	0.014	0.0779	2.54	0.594	0.0148	0.531	<0.005	0.0021	0.0395	0.0013	0.0035	. . .	0.0028	. . .	. . .	96.23	46 x 17	

3.6.6 Cu/Ag

		Ag	Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Zr	S	P	N	O	Typical Alloy Type	Size (mm) Ø H	
CRM	**36 MI 159A**	3.48	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	(0.0003)	(0.0006)	NARLOY-A	31 x 18	
CRM	**36 MI 160A**	3.03	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.4	<0.003	(0.004)	(0.0002)	(0.003)	NARLOY-Z	31 x 18	

3.6.7 Cu/Cd

		Cd	Sn	Zn	Ag	Size (mm) Ø H	
CRM	**36 X CCD 1A**	1.01	<0.001	(0.0017)	(0.0014)	30 x 15	W
CRM	**36 X CCD 2A**	1.18	0.200	(0.0019)	(0.0012)	30 x 15	
CRM	**36 X CCD 3A**	1.10	0.473	(0.0018)	(0.0011)	30 x 15	

3.6.8 Cu/Mn

		Sn	Pb	Zn	Fe	Mn	Ni	Si	As	P	Sb	Ag	Size (mm) Ø H	
CRM	**36 PN CK1**	0.13	0.0021	0.24	0.029	1.06	0.44	0.049	0.013	0.0011	0.0049	0.012	40 x 30	W
CRM	**36 PN CK2**	. . .	0.0062	0.14	0.11	1.51	0.38	0.091	0.010	0.0022	0.0015	0.0094	each	
CRM	**36 PN CK3**	0.075	0.0098	0.095	0.17	1.78	0.27	0.033	0.0095	0.0043	0.0026	0.0066		
CRM	**36 PN CK4**	0.042	0.017	0.065	0.26	1.91	0.13	0.0025	0.0055	0.0056	0.0041	0.0041	set only	
CRM	**36 PN CK5**	0.0048	. . .	0.033	0.29	2.30	0.011	0.011	0.0015	. . .	0.0051	. . .		
CRM	**36 PN CK6**	0.025	. . .	0.034	0.40	2.64	0.073	0.21	0.0039	0.013	0.0052	0.0012		

3.7.1 Various Copper Alloys

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	P	S	C	Cr	Co	Zr	Cu	Size (mm) Ø H	
CRM	**37 X 218A**	0.015	0.0025	0.027	0.070	2.51	0.0022	0.58	0.084	0.0014	0.007	0.002	0.030	0.0013	. . .	96.50	38 x 17	W
CRM	**37 X 226A**	0.0032	(0.001)	2.82	1.52	0.0024	0.0023	3.54	0.58	0.0023	0.0005	0.006	0.0024	. . .	(0.0003)	91.58	57 x 17	
	37 T UN 3S	0.215	0.20	1.62	0.30	3.45	0.11	1.24	0.073	. . .	. . .	. . .	. . .	. . .	. . .	92.65	60 x 6	CC
	37 X HK7	2.30	5.32	0.38	1.72	30.7	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	59.3	40 x 11	CC
	37 X HK8	10.4	21.0	0.17	0.23	5.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	63.2	40 x 10	

These two alloys are for XRF use only

3.8 Residuals in Pure Copper - Wire

All elements ppm

		Pb	Zn	Fe	Ni	As	Bi	Sb	Co	Ag	Cd	Te	Mn	Sn	Cr	Se	S	O	Size (mm) Ø H	
	38 X C1A	0.4	1.5	2	0.8	<1.0	0.2	<1.0	<1.0	7.8	<0.1	0.4	<1.0	0.7	<1.0	0.7	. . .	. . .		Wire
	38 X C1B	0.8	0.45	1.2	1.0	0.8	0.1	0.6	0.03	13	<0.01	0.3	1.2	<0.3	0.06	. . .	. . .	. . .	3 X 400	
CRM	**38 X C1C**	(0.05)	<0.1	1.7	0.27	0.19	0.10	0.10	. . .	11	<0.01	(0.21)	(0.005)	(0.01)	<0.005	(0.25)	2.0	266	in packs of	
	38 X C2A	2.7	3.6	9.1	1.4	3.8	1.5	2.6	2.6	12	2.5	1.6	3.1	1.1	1.0	. . .	. . .	. . .	5 x 80mm pcs	
	38 X C4	23.0	22.0	19.0	29.0	19.0	5.0	9.0	3.0	21.0	8.0	8.0	2.7	21.0	3.0	. . .	. . .	. . .		
	38 X C6	111.0	40.0	107.0	166.0	98.0	22.0	45.0	33.0	104.0	32.0	30.0	0.3	120.0	1.0	. . .	. . .	. . .		
	These reference materials are in wire form, intended for globule arc work.																			
CRM	**38 PN CF1**	33.0	57.0	42.0	29.0	6.7	12.5	24.0	. . .	45.0	. . .	. . .	. . .	21.0	. . .	. . .	. . .	. . .	6 x 100	Wire
CRM	**38 PN CF2**	0.6	2.2	2.8	0.7	1.1	. . .	1.4	. . .	9.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	each	
CRM	**38 PN CF3**	8.9	3.4	20.0	6.4	1.8	. . .	2.2	. . .	3.2	. . .	. . .	. . .	3.2	. . .	. . .	. . .	. . .		
CRM	**38 PN CF4**	1.1	31.0	3.7	7.8	43.0	1.2	11.0	. . .	18.0	. . .	. . .	. . .	1.0	. . .	. . .	. . .	. . .	Set only	
CRM	**38 PN CF5**	3.2	4.7	98.0	3.0	2.3	0.25	1.9	. . .	12.0	. . .	. . .	. . .	1.3	. . .	. . .	. . .	. . .		
CRM	**38 PN CF6**	1.8	. . .	1.0	(0.4)	0.32	(0.012)	0.2	. . .	12.0	. . .	. . .	. . .	(0.06)	. . .	. . .	. . .	. . .		
CRM	**38 A SSC-1**	65.3	33.3	39.2	17.6	1.16	1.1	2.64	. . .	18.8	. . .	4.57	. . .	54.9	. . .	7.28	19.6	216	8 x 300	Wire

3.9 Residuals in Pure Copper - Discs

All elements ppm

		Sn	Pb	Zn	Fe	Ni	As	Bi	Sb	Co	Ag	Cd	Si	Mn	Al	
CRM	**39 X 17866AD**	2100	240	340	101	548	400	63	58	229	61	327	(7)	1.6	<10	
CRM	**39 X 17867AA**	450	290	440	270	440	430	290	46	720	62	550	1150	221	390	
CRM	**39 X 17868AD**	350	380	390	470	330	294	430	330	480	250	330	1000	580	1390	continued
CRM	**39 X 17869AC**	150	500	100	180	150	130	450	380	125	430	85	80	15	8	
CRM	**39 X 17870AE**	170	590	130	440	70	43	750	470	120	460	97	(20)	200	<10	
CRM	**39 X 17871A**	. . .	92	(8)	(20)	270	290	690	170	8	250	31	. . .	10	<5	
	39 M BS 110A	20	30	(10)	30	20	(10)	. . .	4	. . .	. . .	. . .	10	<3	20	continued
	39 FO Cu166	1.2	1.3	1.2	(9.5)	2.3	1.8	1.1	1.3	1.0	10.8	0.93	3.2	1.3	1.5	
	39 FO Cu167	1.3	1.6	1.0	2	1.5	1.6	1.6	1.9	0.8	11.9	0.4	1.4	1.5	1.5	
	39 FO Cu168	4	4.2	3.2	5.3	6.2	4.8	3.5	4.6	4	14	3.8	5.8	3.0	3.1	
	39 FO Cu169	4	4.0	2.9	5.1	4.9	3.5	3.6	3.8	2.9	13	2.3	4.1	3.0	3.7	
	39 FO Cu170	10	11	8.4	12	13.5	11.1	11	9.3	9.5	14	5.8	12.4	10	8.4	
	39 FO Cu171	100	93	<0.1	99	2.4	100	0.11	33.5	<0.02	33	<0.05	<1	0.2	25	continued
	39 FO Cu172	<0.1	32	32	33	32	4.7	97	94	<0.02	104	<0.05	96	<0.2	<0.2	
	39 FO Cu173	30	1.6	0.4	3.7	3.0	3.5	28	0.85	30	18	<0.05	4	0.3	91	
	39 FO Cu174	0.08	1.1	60	1	99	29	0.1	0.54	0.05	11	77	31.4	100	1.2	
	39 FO Cu175	0.30	0.91	1.3	0.8	2.5	2.4	0.1	0.70	99	16	15	1	1.3	3.1	
	39 FO Cu176	0.22	0.32	0.17	1.3	0.5	1.0	0.2	1.39	<0.02	21	0.01	<1	<0.2	<0.3	
	39 FO Cu182	<0.05	0.05	1.14	2.7	0.35	0.28	<0.02	0.25	0.02	10.9	<0.01	<1	0.11	0.5	
CRM	**39 DB 366**	111	10.8	15.6	23.4	3.2	1.11	<0.3	0.99	. . .	7.9	0.27	. . .	. . .	. . .	continued
CRM	**39 DB 376**	247.3	236	217.3	234.6	209	199.9	200	202	207.9	163.0	186.1	. . .	205.9	(181.5)	

Continuation from above	Mg	S	P	Cr	Au	Se	Be	Te	B	Zr	In	Li	Ti	C	% Cu	Size (mm) Ø H	
39 X 17866AD	2	510	160	15	. . .	30	(1)	53	. . .	. . .	. . .	. . .	(2)	. . .	. . .	40 x 17	CC
39 X 17867AA	49	580	170	2560	85	115	3	210	(10)	(10)	. . .	. . .	. . .	. . .	. . .	40 x 17	
39 X 17868AD	470	176	410	2000	220	40	13	320	30	(50)	. . .	. . .	. . .	. . .	. . .	40 x 17	
39 X 17869AC	4	130	150.0	4	90	80	1	350	. . .	. . .	. . .	. . .	(10)	. . .	. . .	40 x 17	
39 X 17870AE	4	194	490	(20)	730	76	<1	160	(3)	. . .	23	. . .	. . .	. . .	. . .	40 x 17	
39 X 17871A	(2)	80	<5	(3)	48	280	(4)	110	. . .	<5	. . .	. . .	. . .	. . .	. . .	40 x 17	
39 M BS 110A	. . .	8	10	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	18	99.97	38 x 12	
39 FO Cu166	1	2	1.1	1.3	. . .	1.2	. . .	1.3	1.2	0.8	. . .	2.4	1.1	. . .	. . .	40 x 25	
39 FO Cu167	1.9	12	1.5	1.5	. . .	9.7	. . .	7.2	2.6	0.7	. . .	(6.4)	<0.5	. . .	. . .	40 x 25	
39 FO Cu168	3.7	3.5	3.4	3.4	. . .	4	. . .	3.2	3.7	2.3	. . .	7.8	4	. . .	. . .	40 x 25	
39 FO Cu169	3.1	3.5	3.1	4.5	. . .	2.9	. . .	3.6	3.1	2.1	. . .	(9)	1	. . .	. . .	40 x 25	
39 FO Cu170	7.9	12	11	9.6	. . .	7.9	. . .	(10)	5.2	8	. . .	8	<0.5	. . .	. . .	40 x 25	
39 FO Cu171	0.4	6	<0.5	100	. . .	<0.5	. . .	33	. . .	23	. . .	. . .	. . .	. . .	. . .	40 x 25	
39 FO Cu172	0.2	7	<0.5	0.7	. . .	<0.5	. . .	<0.1	. . .	<0.05	. . .	. . .	78	. . .	. . .	40 x 25	
39 FO Cu173	100	3.8	89	29	. . .	<0.5	. . .	0.1	. . .	0.10	. . .	69	. . .	. . .	. . .	40 x 25	
39 FO Cu174	0.8	35	0.35	0.48	. . .	38	. . .	0.2	. . .	(80)	. . .	. . .	20	. . .	. . .	40 x 25	
39 FO Cu175	26	89	31.5	0.25	. . .	90	. . .	85	30	0.12	. . .	125	2.5	. . .	. . .	40 x 25	
39 FO Cu176	1.0	10.5	<0.5	0.08	. . .	<0.5	. . .	0.12	. . .	4.3	. . .	. . .	. . .	. . .	. . .	40 x 25	
39 FO Cu182	0.2	2	<0.1	0.19	. . .	0.16	. . .	0.05	. . .	(0.03)	. . .	<0.1	. . .	. . .	. . .	40 x 25	
																40 x 25	
39 DB 366	. . .	8.7	263	. . .	. . .	<1.1	. . .	<0.3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 30	
39 DB 376	124	133	203	(400)	. . .	210	. . .	215	. . .	42.2	. . .	. . .	(4.5)	. . .	. . .	40 x 30	

See page 69 for materials in Chippings form

For Setting-Up Samples see section 16

3.9 Residuals in Pure Copper - Discs (continued)

All elements ppm

		Ag	As	Bi	Cd	Cr	Fe	Mn	Ni	Pb	Sb	Si	Sn	Al	Be	
CRM	39 F 074A	12.8	0.78	(0.10)	<0.02	<0.1	1.14	1.27	1.04	0.97	0.58	. . .	<0.07	. . .	. . .	continued
CRM	39 F 075A	12.2	3.74	1.44	2.57	0.89	9.0	3.23	1.45	3.27	2.56	. . .	1.09	. . .	. . .	
	39 DK 4700	465	100	66	50	14	93	2	21	656	11	156	1	<1	<1	
	39 DK 4701	394	16	27	95	22	35	36	120	6	186	53	568	17	<1	
	39 DK 4702	201	24	<1	10	5	319	3	194	514	137	102	28	<1	<1	
	39 DK 4703	293	41	49	<1	69	686	7	106	418	3	10	36	<1	<1	
	39 DK 4705	66	103	10	<1	58	8	66	563	191	95	41	91	<1	<1	
	39 DK 4707	51	204	<1	1	36	199	1	79	52	29	2	270	<1	72	continued
	39 DK 4708	39	385	88	44	19	85	12	376	22	3	34	347	38	<1	
	39 DK 4709	22	291	2	17	39	60	107	30	11	11	13	440	16	46	
	39 DK 4711	98	79	7	138	279	49	205	93	3	41	478	4	341	178	
	39 DK 3563	9	<5	<5	<5	<5	7	<5	<5	<5	<5	<5	<5	<5	<5	
	39 DK 4875	586	495	82	411	385	510	287	600	607	222	255	590	324	140	
CRM	39 PN CP1	12	0.4	1.0	0.6	0.3	10	1.3	3.4	1.7	11	. . .	5.6	. . .	. . .	
CRM	39 PN CP2	36	140	. . .	72	0.5	8.1	5.9	20	120	160	(4)	4,8	. . .	. . .	
CRM	39 PN CP3	60	63	47	35	45	15	30	13	81	120	(8)	17	. . .	. . .	continued
CRM	39 PN CP4	110	14	13	11	86	44	55	3.4	28	48	(3)	40	. . .	. . .	
CRM	39 PN CP5	31	65	9.4	2.5	48	77	49	39	13	27	(82)	2.1	. . .	. . .	
CRM	39 PN CP6	20	0.85	. . .	. . .	0.3	6.4	0.6	2.7	2.7	0.4	. . .	0.7	. . .	. . .	
CRM	39 PN CS1	53.05	2.27	1.08	0.99	0.33	18.39	28.98	46.79	60.48	3.03	(3.0)	52.93	. . .	. . .	
CRM	39 PN CS2	45.62	7.85	6.23	7.37	35.83	30.54	35.28	26.65	38.64	7.51	(9.38)	33.65	. . .	. . .	
CRM	39 PN CS3	38.90	13.83	12.17	13.40	10.93	28.27	12.58	11.11	13.26	12.97	(22.2)	13.34	. . .	. . .	continued
CRM	39 PN CS4	237	42.18	39.64	35.48	6.96	82.0	8.32	7.15	7.58	36.76	(46.48)	6.21	. . .	. . .	
CRM	39 PN CS5	320	70.5	59.7	66.1	1.03	90.9	4.25	4.39	4.99	63.9	(54.8)	0.85	. . .	. . .	
CRM	39 PN CS6	8.48	0.22	<0.2	(0.059)	0.24	20.83	0.71	0.80	(0.36)	1.02	. . .	10.6	. . .	. . .	continued
CRM	39 PN CS7	13.70	0.81	<0.9	(0.019)	19.72	4.90	2.15	4.37	0.86	0.93	<1	0.49	. . .	. . .	

Continuation from above	All elements ppm Co	Mg	P	S	Se	Zn	Zr	Te	B	Size (mm) Ø H
39 F 074A	<0.05	. . .	. . .	. . .	0.37	0.46	. . .	(0.21)	. . .	40 x 30
39 F 075A	2.50	. . .	. . .	. . .	1.26	3.47	. . .	1.52	. . .	40 x 30
39 DK 4700	202	26	<1	22	126	75	<1	53	87	40 x 35-40
39 DK 4701	19	<1	463	47	14	65	<1	9	<1	40 x 35-40
39 DK 4702	40	<1	163	210	23	5	<1	2	<1	40 x 35-40
39 DK 4703	66	<1	156	94	49	150	<1	25	<1	40 x 35-40
39 DK 4705	211	15	9	38	187	139	<1	160	<1	40 x 35-40
39 DK 4707	542	93	446	28	93	415	<1	113	<1	40 x 35-40
39 DK 4708	636	<1	22	17	9	18	<1	45	<1	40 x 35-40
39 DK 4709	312	64	593	14	<1	2	135	76	<1	40 x 35-40
39 DK 4711	11	239	23	26	<1	8	181	110	14	40 x 35-40
39 DK 3563	<5	<5	<5	8	<5	<5	<5	<5	. . .	40 x 35-40
39 DK 4875	451	270	506	68	172	331	123	290	<2	40 x 35-40
39 PN CP1	0.2	. . .	2.0	6.3	<1	1.9	. . .	3.0	. . .	40 x 23
39 PN CP2	39	. . .	11	35	77	92	. . .	12	. . .	each
39 PN CP3	20	. . .	44	60	43	33	. . .	46	. . .	
39 PN CP4	4.2	. . .	130	94	10	17	. . .	75	. . .	Set only
39 PN CP5	34	. . .	110	21	35	38	. . .	7.8	. . .	
39 PN CP6	<1	. . .	1.7	7.5	<1	1.4	. . .	. . .	. . .	
39 PN CS1	0.6	. . .	57.66	65.91	61.53	24.13	. . .	2.11	(1.1)	40 x 25
39 PN CS2	3.6	. . .	33.75	44.88	38.99	8.91	. . .	5.62	(2.83)	each
39 PN CS3	7.4	. . .	12.11	18.79	15.41	31.30	. . .	10.56	(4.19)	
39 PN CS4	24.3	. . .	6.3	41.3	6.68	44.02	. . .	32.86	(21.73)	Set only
39 PN CS5	37.5	. . .	2.04	12.00	0.94	100.6	. . .	49.8	(35.2)	
39 PN CS6	(0.19)	. . .	(1.47)	5.39	<1	1.43	. . .	<0.05	<0.5	40 x 25
39 PN CS7	0.093	. . .	(2.4)	7.02	<1	1.24	. . .	<0.05	<0.5	40 x 25

See page 69 for materials in Chippings form

For Setting-Up Samples see section 16

4.1 Residuals in Pure Zinc

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	In	Tl	Bi	Sb	Ti	Typical Alloy Type	Size (mm) Ø H	
CRM	41 X Z1M	0.0018	0.00025	. . .	0.00005	0.0005	<0.0002	0.0005	0.0001	0.00017	<0.0005	. . .	. . .	. . .	. . .		50 x 20	C
CRM	41 X Z2L	0.0036	0.0064	0.017	0.0017	0.0028	0.0017	0.016	0.0014	0.0017	(0.0002)	(0.0023)	. . .	(0.0011)	(0.0005)		50 x 20	
CRM	41 X Z3K	0.0052	0.0009	0.0081	0.0044	0.002	0.0039	0.0019	0.0031	0.0007	0.0007	(0.0025)	. . .	0.0037	0.0012	BS 3436	50 x 20	
CRM	41 X Z4K	0.0091	0.0019	0.0096	0.0066	0.003	0.0070	0.0047	0.0069	0.0012	0.0015	(0.0037)	. . .	0.005	<0.0005		50 x 20	
CRM	41 X Z5M	0.0280	0.0105	0.041	0.032	0.011	0.031	0.031	0.0005	0.014	0.0055	0.0005	. . .	0.009	0.0005		50 x 20	
CRM	41 X Z6A	0.031	<0.0005	0.0096	0.0093	(0.002)	0.0038	0.0088	0.0002	0.0002	0.0228	0.0004	0.0122	. . .	. . .		50 x 20	
CRM	41 PN ZE1	0.018	. . .	0.012	0.0019	0.020	0.0018	0.011	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40 x 25	
CRM	41 PN ZE2	0.0078	. . .	0.0035	0.0031	0.0052	0.0074	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		each	
CRM	41 PN ZE3	0.0052	. . .	0.025	0.0050	. . .	0.015	0.0032	. . .	. . .	. . .	. . .	. . .	. . .	. . .			
CRM	41 PN ZE4	0.0012	. . .	. . .	0.00023	. . .	0.0017	0.013	. . .	. . .	. . .	. . .	. . .	. . .	. . .		Set only	
CRM	41 PN ZE5	0.0004	. . .	0.0011	0.0060	0.011	0.00045	0.0049	. . .	. . .	. . .	. . .	. . .	. . .	. . .			
CRM	41 F 321	0.00047	. . .	<0.0001	. . .	. . .	<0.0005	. . .	. . .	. . .	<0.00002	0.00008	. . .	. . .	. . .		80 x 20	
CRM	41 F 322 R	0.00150	. . .	. . .	0.00151	0.00191	0.00056	0.000589	. . .	. . .	. . .	0.00053	. . .	. . .	. . .		60 x 30	
CRM	41 F 323 R	0.00486	. . .	. . .	0.00065	0.00113	0.00187	0.00189	. . .	. . .	. . .	0.00108	. . .	. . .	. . .		60 x 30	
CRM	41 F 324 R	0.00261	. . .	. . .	0.00486	0.00585	0.00098	0.000987	. . .	. . .	. . .	0.00199	. . .	. . .	. . .		60 x 30	
CRM	41 F 325 R	0.0142	. . .	. . .	0.00947	0.00561	0.00461	0.00475	. . .	. . .	. . .	0.00368	. . .	. . .	. . .		60 x 30	
CRM	41 F 326	0.0307	. . .	. . .	0.0203	0.0265	. . .	0.0105	. . .	. . .	. . .	. . .	. . .	. . .	. . .		80 x 20	
CRM	41 F 327	0.0409	. . .	<0.0001	0.0301	0.0144	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		80 x 20	
	41 CM 4320-1	0.00044	. . .	. . .	0.00045	0.00043	0.00022	0.000058	. . .	. . .	. . .	. . .	. . .	. . .	. . .		28 x 20	
	41 CM 4320-2	0.0015	. . .	. . .	0.0011	0.0013	0.00042	0.00018	. . .	. . .	. . .	. . .	. . .	. . .	. . .		each	
	41 CM 4320-3	0.0030	. . .	. . .	0.0031	0.0033	0.00071	0.00047	. . .	. . .	. . .	. . .	. . .	. . .	. . .			
	41 CM 4320-4	0.0082	. . .	. . .	0.0079	0.0065	0.0012	0.00099	. . .	. . .	. . .	. . .	. . .	. . .	. . .		set only	
	41 CM 4320-5	0.021	. . .	. . .	0.020	0.011	0.0019	0.0020	. . .	. . .	. . .	. . .	. . .	. . .	. . .			
	41 A 194e	0.002	. . .	. . .	. . .	0.001	<0.001	<0.0005	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Zn 99.99	300g block	

4.1.1 Zinc with Impurities

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Mn	Ni	Sb	Bi	In	Tl	Ag	As	Size (mm) Ø H	
CRM	41 X 0336Zn1K	0.95	0.0049	0.014	0.0056	0.0124	0.0053	0.0070	0.0035	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50 x 20	C
CRM	41 X 0336Zn2K	0.46	0.033	0.99	0.171	0.12	0.040	0.196	0.014	0.005	. . .	. . .	. . .	. . .	. . .	. . .	50 x 20	
CRM	41 X 0336Zn3J	0.019	0.134	0.43	0.341	0.27	0.111	0.36	0.0058	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50 x 20	
CRM	41 X 0336Zn4B	2.87	0.179	1.39	0.638	(0.018)	2.38	0.874	0.038	0.0074	0.048	0.027	0.0035	(0.004)	0.0023	0.0005	50 x 20	
CRM	41 X 0336Zn5A	0.91	<0.0005	0.035	0.056	0.016	0.21	0.023	(0.0001)	(0.0005)	0.008	(0.001)	. . .	. . .	. . .	. . .	50 x 20	
CRM	41 X 0336Zn6A	1.82	0.0008	0.105	0.0140	0.08	0.0023	0.0203	0.0010	0.0018	0.234	0.123	0.0123	0.0132	0.0055	0.0020	50 x 20	

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Mn	Ni	Ti	Cr	Ce	La	Sb	Bi	Si	Size (mm) Ø H	
CRM	41 X 4380Zn1C	0.068	0.0011	0.055	0.376	0.01	0.049	0.175	0.0015	0.0029	(0.001)	0.002	. . .	. . .	0.002	0.0017	0.006	50 x 20	C
	41 X 4380Zn2B	0.26	0.015	0.030	0.29	0.23	0.0015	0.030	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 15	
	41 X 4380Zn3B	0.21	0.052	0.17	0.18	(0.05)	0.087	0.092	. . .	. . .	0.18	0.004	0.037	(0.023)	. . .	. . .	. . .	40 x 15	
CRM	41 X 4380Zn4C	0.325	0.126	0.144	0.094	0.056	0.038	0.0022	0.0007	0.0040	0.005	(0.0003)	. . .	. . .	0.017	0.011	(0.002)	50 x 20	
CRM	41 X 4380Zn5C	0.15	0.0018	0.022	0.064	0.012	0.009	0.072	0.036	0.0014	0.33	0.0075	. . .	. . .	0.0052	0.031	<0.0005	50 x 20	
CRM	41 X 4380Zn6C	0.42	0.0045	0.0048	0.047	0.017	0.110	0.020	0.025	0.0005	0.062	0.0020	. . .	. . .	0.034	0.0010	<0.0005	50 x 20	
CRM	41 X 4380Zn7C	1.25	0.0028	0.137	0.015	(0.0044)	0.0047	0.012	. . .	0.012	0.009	0.0045	. . .	. . .	0.090	. . .	. . .	50 x 20	
CRM	41 X 4380Zn8C	0.73	0.007	0.225	0.0079	0.003	0.011	0.020	0.0015	0.024	0.012	0.0019	. . .	. . .	0.016	0.011	(0.005)	50 x 20	
																		W D H	
CRM	41 B 631	(0.001)	(<0.001)	0.50	0.0002	0.005	0.0001	0.0013	0.00015	<0.0005	. . .	0.0001	. . .	. . .	. . .	. . .	(0.002)	44 x 44 x 19	C

4.1.2 Galvanizing Alloys

		Pb	Al	Cd	Fe	Sn	Cu	Ni	Bi	Sb	As	Cr	Mn	Co	Size (mm) Ø H	
CRM	41 X GLV1A	0.056	0.115	0.0093	0.059	0.010	0.0028	0.0141	0.0025	<0.001	<0.001	. . .	. . .	. . .	50 x 20	C
CRM	41 X GLV2A	0.214	0.068	0.0025	0.048	0.003	0.0052	0.0070	0.017	0.006	<0.001	. . .	. . .	. . .	50 x 20	
CRM	41 X GLV3A	0.0080	0.31	0.021	0.012	0.006	0.0188	0.0301	0.0011	0.048	. . .	. . .	. . .	. . .	50 x 20	
CRM	41 X GLV4A	0.0038	0.201	(0.0001)	0.017	<0.005	0.0009	0.049	0.0051	0.025	<0.002	. . .	. . .	. . .	50 x 20	
CRM	41 X GLV5A	0.0187	0.014	0.0138	0.076	0.020	0.0116	0.0030	0.0105	0.162	0.0041	. . .	. . .	. . .	50 x 20	
CRM	41 X GLV6A	0.120	0.474	0.0053	0.0047	0.0152	0.039	0.0008	0.0248	0.0112	0.0014	0.0029	0.0013	0.0047	50 x 20	
CRM	41 X GLV7A	0.082	0.399	0.00056	0.0031	. . .	0.023	0.0060	0.0108	0.0031	0.0016	0.0010	0.0025	(0.0001)	50 x 20	
CRM	41 X CGL F	0.046	0.28	(0.0015)	. . .	<0.001	(0.0005)	. . .	. . .	. . .	. . .				42-48 x 20	C
CRM	41 B 1736	0.0029	0.3076	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	C
CRM	41 B 1737	0.0029	0.6302	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	
CRM	41 B 1738	0.0101	0.1014	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	
CRM	41 B 1739	0.0302	0.2049	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	
CRM	41 B 1740	0.0691	0.4177	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	
CRM	41 B 1741	0.1571	0.5242	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	
CRM	41 B 1742	0.0081	0.7917	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	51 X 13	

4.1.3 Binaries

		Mn	Ni	Pb	Mg	Al	Cd	Fe	Cu	Size (mm) Ø H	
	41 X ZMn1A	1.058	(0.0009)	(0.0026)	(0.0001)	(0.0001)	(0.0002)	(0.0025)	(0.0005)	50 x 20	C

4.1.4 Specialty Alloys

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Ti	Cr	Typical Alloy Type	Size (mm) Ø H	
CRM	41 X 2951Zn1A	0.0042	0.0029	0.029	0.0005	0.011	(0.0007)	0.79	0.0038	0.0013	0.278	0.083		50 x 20	C
CRM	41 X 2951Zn2A	0.0040	0.0123	0.032	0.0037	0.019	(0.0015)	1.37	0.0027	0.0011	0.209	0.142	ILZRO16	50 x 20	
CRM	41 X 2951Zn3A	0.0065	0.0164	0.078	0.0062	0.029	(0.006)	1.89	0.0010	0.0018	0.133	0.184		50 x 20	

See page 70 for materials in Chippings form

For Setting-Up Samples see section 16

4.2 Zn/Al

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Cr	Si	Sb	Ce	La	Typical Alloy Type	Size (mm) Ø H	
CRM	42 X Z1H	0.0022	0.0041	4.61	0.0005	0.0024	0.0006	0.0019	0.0017	0.0007	<0.0005	0.0046	(0.0009)	0.0027	0.0026	BS 1004 A	50 x 20	c
CRM	42 X Z2H	0.0052	0.0147	4.04	0.0010	0.0040	0.0021	0.0186	0.0051	0.012	0.0018	0.0089	0.0026	0.0049	0.0044	ASTM 13	50 x 20	
CRM	42 X Z3H	0.0060	0.0288	3.72	0.0048	(0.047)	0.0030	0.159	0.0102	0.0252	0.002	0.015	0.003	(0.0003)	(0.0003)	ASTM AG40A	50 x 20	
CRM	42 X Z4H	0.0113	0.058	3.55	0.0076	0.012	0.0060	0.063	0.0177	0.0077	. . .	. . .	(0.0029)	0.020	0.02		50 x 20	
CRM	42 X Z5J	0.0048	0.073	4.22	0.0021	0.029	0.0022	0.098	0.0185	0.0068	0.0018	. . .	(0.0055)	0.0109	0.009		50 x 20	
CRM	42 X Z6A	0.0090	0.180	3.60	0.0041	0.005	0.006	0.240	0.0003	0.016	0.0036	0.010	0.0155	. . .	. . .		50 x 20	
CRM	42 X Z7A	0.0097	0.0095	4.39	0.030	0.027	0.012	0.0249	0.0067	0.0045	. . .	0.006	. . .	0.053	0.047	GALFAN	50 x 20	c
CRM	42 X Z8A	0.0025	0.0033	7.03	0.0003	0.013	(0.0023)	0.0215	0.0019	0.0014	. . .	0.013	. . .	0.0081	0.0079		50 x 20	
CRM	42 X Z9A	0.0021	0.0464	5.58	0.0054	0.032	. . .	0.0070	(0.0003)	0.0006	. . .	(0.004)	. . .	0.0047	0.0044		50 x 20	
																	W D H	
CRM	42 B 625	0.0014	0.070	3.06	0.0007	0.036	0.0006	0.034	0.0184	0.031	0.0128	0.017	. . .	. . .	. . .	ASTM AG40A	44 x 44 x 19	c
CRM	42 B 626	0.0022	0.020	3.56	0.0016	0.103	0.0012	0.056	0.047	0.048	0.0395	0.042	. . .	. . .	. . .	ASTM AG40A	44 x 44 x 19	
CRM	42 B 627	0.0082	0.030	3.88	0.0051	0.023	0.0042	0.132	0.0029	0.014	0.0038	0.021	. . .	. . .	. . .	ASTM AG40A	44 x 44 x 19	
CRM	42 B 628	0.0045	0.0094	4.59	0.0040	0.066	0.0017	0.611	0.030	0.0091	0.0087	0.008	. . .	. . .	. . .	ASTM AC41A	44 x 44 x 19	
CRM	42 B 629	0.0135	0.094	5.15	0.0155	0.017	0.012	1.50	0.0075	0.0017	0.0008	0.078	. . .	. . .	. . .	ASTM AC41A	44 x 44 x 19	
CRM	42 B 630	0.0083	0.030	4.30	0.0048	0.023	0.0040	0.976	0.0027	0.0106	0.0031	0.022	. . .	. . .	. . .	ASTM AC41A	44 x 44 x 19	

		ppm Pb	ppm Mg	% Al	ppm Cd	ppm In	ppm Sn	ppm Cu	ppm Ni	ppm Tl	Typical Alloy Type	Size (mm) Ø H	
CRM	42 F 351	4.5	131	4.355	(0.21)	<0.2	<1	12.13	(1.9)	0.74		80 x 20	c
CRM	42 F 352	(6.4)	282	4.150	2.88	3.02	3.0	31.26	6.74	3.2		80 x 20	
CRM	42 F 353	24.4	452.5	3.950	10.44	2.55	5.6	100	. . .	3.95	Zamak 3	80 x 20	
CRM	42 F 354	30.8	602	3.727	29.7	9.8	14.1	312.3	83.1	11.01		80 x 20	
CRM	42 F 355	56.9	786	3.443	58.1	24.6	29.1	1035	268	23.25		80 x 20	

4.3 Zn/Al/Cu

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Si	Cr	Ti	Sb	Bi	Typical Alloy Type	Size (mm) Ø H	
CRM	43 X Z1J	0.0017	0.0145	4.50	0.00037	0.0058	(0.0007)	0.501	0.0010	0.0005	(0.0037)	0.0009	0.0014	0.0016	0.0031	BS 1004 B	50 x 20	c
CRM	43 X Z2K	0.0066	0.0739	3.80	0.0068	0.020	0.0036	1.04	0.0124	0.0059	0.009	0.0021	. . .	0.008	0.0019	ASTM 11	50 x 20	
CRM	43 X Z3L	0.0132	0.0143	3.64	0.0132	0.061	0.0125	1.58	0.0061	0.0125	0.005	0.0045	. . .	(0.0030)	0.018	ASTM AG41A	50 x 20	
CRM	43 X Z4B	(0.0024)	0.043	4.76	0.0025	(0.064)	(0.0023)	3.21	0.0286	0.088	(0.0065)	0.0063	0.0017	0.0043	0.012	ZL2	50 x 20	
CRM	43 X Z5A	0.0045	0.041	3.05	0.0111	0.023	0.0032	6.05	0.0021	0.0030	0.003	0.0010	0.0009	. . .	. . .	ACuZinc5	50 x 20	
CRM	43 X Z6A	0.0016	0.0256	4.02	0.0016	0.019	0.0053	2.72	0.029	0.0006	0.012	0.0006	0.0013	0.0045	0.0049		50 x 20	
CRM	43 X Z11E	0.0305	0.053	11.61	0.0224	0.0091	0.0206	0.515	0.0014	0.0089	0.020	0.0010	0.013	0.0091	0.0035		50 x 20	c
CRM	43 X Z12D	0.0133	0.027	10.05	0.0114	0.047	0.0089	0.796	0.0035	0.0059	(0.008)	0.0023	0.0054	0.0039	(0.002)	ASTM B669	50 x 20	
CRM	43 X Z13D	0.0125	0.0204	9.55	0.0100	0.05	0.0111	0.981	0.0109	0.0070	(0.0048)	. . .	. . .	0.009	. . .	ZA8	50 x 20	
CRM	43 X Z14D	0.0082	0.0026	8.24	0.0067	0.015	0.0053	1.23	0.0052	0.0033	0.010	0.0046	0.0012	0.011	0.010	ZA12	50 x 20	
CRM	43 X Z15C	0.0054	0.0024	7.36	0.0030	0.009	0.004	1.53	0.0019	0.0020	(0.011)	0.0025	0.0020	0.005	0.005		50 x 20	
CRM	43 X Z21C	0.012	0.047	23.5	0.027	0.12	0.0140	1.81	0.043	0.0104	0.022	0.0087	0.013	. . .	. . .	ASTM B669	50 x 20	c
CRM	43 X Z22C	0.0060	0.022	27.4	0.0050	(0.36)	0.0061	2.32	0.027	0.0096	0.038	0.019	0.0065	. . .	. . .	ZA27	50 x 20	
CRM	43 X Z23C	0.0028	0.0133	31.4	0.0024	(0.24)	(0.002)	2.74	0.0115	0.0124	0.061	0.036	0.0026	. . .	. . .		50 x 20	
CRM	43 A NZA-1	0.0030	0.020	28.70	0.00098	0.046	0.0069	1.51	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-2	0.0076	0.029	23.81	0.0047	0.021	0.0045	3.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-3	0.0045	0.0049	25.99	0.0064	0.066	0.0034	2.00	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-4	0.0101	0.0106	26.65	0.0029	0.027	0.0087	2.45	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-5	0.0012	0.021	10.85	0.0095	(0.016)	0.0017	1.04	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-6	0.0809	0.00037	7.54	0.0147	(0.0105)	0.0051	3.17	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	
CRM	43 A NZA-7	0.0136	0.052	13.17	0.00020	(0.016)	0.0116	0.212	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50 x 12	

		ppm Pb	ppm Mg	% Al	ppm Cd	ppm Fe	ppm Sn	% Cu	ppm Ni	ppm In	ppm Tl	Typical Alloy Type	Size (mm) Ø H	
CRM	43 F 356	9.87	132.3	4.434	0.73	31.5	(0.32)	0.394	3.43	<0.2	0.79		80 x 20	c
CRM	43 F 357	13.8	273	4.227	2.83	25.7	3.51	0.5849	9.82	3.3	2.76		80 x 20	
CRM	43 F 358	22.5	403	3.946	10.22	40.5	7.87	0.793	26.98	7.04	6.09	Zamak 5	80 x 20	
CRM	43 F 359	36.2	557	3.711	29.8	119.7	16.93	0.989	92.6	15.5	13.34		80 x 20	
CRM	43 F 360	73.9	705	3.427	59.5	. . .	33.3	1.234	267	29.8	25.9		80 x 20	
CRM	43 F 361	5.31	. . .	4.068	(0.8)	10.34	46.3	0.798	. . .	<0.2	37.4		80 x 20	

4.4 High-Alloy Zinc

	Al	Sb	Mg	Cu	Pb	Cd	Bi	Sn	Fe	Zn	Ni	Ag	Size (mm) Ø H	
44 X Z1A	8.0	10.6	0.001	0.028	0.019	0.027	0.024	0.024	0.007	rem	. . .	. . .	40 x 15	c
44 X Z2A	12.6	9.5	0.035	0.003	0.053	0.005	0.030	0.018	0.007	rem	. . .	. . .	40 x 15	
44 X Z3A	17.8	8.1	0.005	0.011	0.020	0.012	0.013	0.019	0.009	rem	. . .	. . .	40 x 15	
44 X Z4A	20.3	6.7	0.008	0.007	0.032	0.011	0.016	0.018	0.011	rem	. . .	. . .	40 x 15	
44 X Z5A	20.4	5.2	<0.001	0.001	0.010	0.001	0.004	0.003	0.010	rem	. . .	. . .	40 x 15	
Note: the above series has some Sb segregation, and must therefore be used with caution													40 x 15	
44 X ZnCd30A	. . .	1.03	. . .	0.05	0.09	31.0	0.05	0.05	0.002	rem	0.001	0.05	40 x 15	c

4.5 Zn/Al 'Galvalume'

	Zn	Si	Fe	Cu	Sn	Pb	Mg	Ti	Ca	Li	Al	Size (mm) Ø H	
45 X ZnAl1A	24.5	2.72	0.28	0.065	0.020	0.020	0.013	0.022	(0.018)	(0.0022)	(72.6)	60 x 6	cc
45 X ZnAl2A	36.1	2.58	0.20	0.048	0.008	0.010	0.007	0.025	(0.009)	(0.0034)	(60.9)	60 x 6	
45 X ZnAl3A	45.8	1.00	0.127	0.021	0.003	0.0046	0.003	0.0087	(0.006)	(0.0006)	(53.0)	60 x 6	
45 X ZnAl4A	54.65	0.67	0.095	0.013	0.0023	0.003	<0.0005	0.0038	(0.0023)	(0.0002)	(44.5)	60 x 6	
45 X ZnAl5A	40.8	1.88	0.050	0.0035	(0.0024)	0.004	0.030	0.003	(0.009)	(0.005)	(57.0)	60 x 6	

See page 70 for materials in Chippings form

For Setting-Up Samples see section 16

5.1 High Purity

All Elements ppm

	Ag	As	B	Ba	Be	Bi	Ca	Cd	Ce	Co	Cr	Cu	Fe	Ga	Hg	In	La	
51 S HP1000	<0.5	. . .	<0.05	<0.01	<0.01	<0.1	0.1	<0.1	. . .	<0.1	0.3	0.2	0.2	<0.1	. . .	<0.1	. . .	
51 S HP2000	<1	. . .	<1	<1	4.4	(<1)	2.6	<1	. . .	<1	4.5	5.3	6.6	4.9	. . .	<1	. . .	
51 S HP3000	5.1	. . .	5.4	0.7	<1	8.1	<1	4.9	. . .	4.9	<1	6.6	6.2	<1	. . .	4.8	. . .	continued
51 S HP4000	<1	. . .	<1	<1	27.0	<1	25.0	<1	. . .	<1	29.0	31.0	39.0	28.0	. . .	<1	. . .	
51 S HP5000	30	. . .	33	6.6	<1	48	1	30	. . .	29	<1	42.0	37.0	(1.0)	. . .	28	. . .	
51 ZA 113/03	. . .	. . .	100	. . .	<1	5	1	<2	. . .	5	<1	2	40	<1	. . .	. . .	. . .	
51 ZA 114/02	. . .	. . .	210	. . .	<1	10	1	33	. . .	9	5	12	55	3	. . .	. . .	. . .	
51 ZA 115/02	10	. . .	6	<1	<1	15	<1	22	. . .	31	27	41	67	21	. . .	20	. . .	continued
51 ZA 116/03	20	13	3	<1	4	16	<1	10	7	20	52	71	115	23	41	21	13	
51 ZA 117/01	. . .	. . .	18	1	4	19	3.5	7	22	16	12	23	153	12	. . .	. . .	12	
51 ZA 122/04	145	53	0.4	(53)	(8)	152	(10)	53	100	150	180	170	590	250	96	154	130	continued

Continuation from above	Li	Mg	Mn	Na	Ni	P	Pb	Sb	Si	Sn	Sr	Ti	V	Zn	Zr	Size (mm) Ø	H	
51 S HP1000	<0.1	0.2	0.04	<0.5	<0.1	<0.2	0.1	<0.5	0.6	<0.1	<0.01	0.5	0.05	0.5	<0.01	58	25	
51 S HP2000	<1	2.7	5.4	8.8	5.0	<2	<1	<2	5.4	<1	<1	5.3	5.2	5.0	5.2	58	25	
51 S HP3000	1.0	<1	<1	<1	<1	0.6	9.0	4.2	5.1	4.5	1.8	<1	<1	<2	<1	58	25	
51 S HP4000	<1	26.0	31.0	13.0	29.0	<2	<1	<2	36	<1	<1	31.0	31.0	32.0	30.0	58	25	
51 S HP5000	<1	<2	<1	0.9	<1	2.2	54	25	35	27	2.4	<1	<1	<5	<1	58	25	
51 ZA 113/03	<0.5	4	<1	<1	<1	7	7	7	12	5	. . .	<1	6	2	6	60	25	CC
51 ZA 114/02	<0.5	15	27	<1	5	11	14	12	33	10	. . .	5	12	13	11	60	25	
51 ZA 115/02	1	40	33	<1	32	10	10	11	70	10	<1	6	10	34	25	60	25	
51 ZA 116/03	0.7	37	52	<1	50	20	15	32	117	22	<1	17	23	56	15	60	25	
51 ZA 117/01	(2)	19	12	(7)	12	15	20	17	148	20	2	0	24	12	26	60	25	
51 ZA 122/04	(8)	200	160	(47)	175	70	81	99	380	100	<1	180	175	185	150	60	25	CC

5.1.1 Residuals in Al

	Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Ga	V	Zr	Be	Others	Size (mm) Ø	H	
CRM **51 X G00H1D**	0.0132	0.054	0.143	0.835	0.0074	0.230	0.249	0.0021	0.097	0.0135	0.0062	. . .	0.0080	0.0008	. . .	Bi 0.024	40x15 or 50x20		C
51 X G00H2D	0.18	0.05	0.45	0.4	0.20	0.11	0.18	0.15	0.01	0.10	0.08	. . .	. . .	. . .	. . .		40	15	
51 X G00H3C	0.29	<0.01	0.75	0.2	0.4	<0.01	0.03	0.06	0.08	<0.01	0.12	. . .	. . .	. . .	. . .		40	15	
CRM **51 X G00H4A**	0.035	0.039	0.12	0.052	0.041	0.039	0.042	0.018	0.028	0.031	0.027	. . .	0.016	. . .	0.0004	continued			
CRM **51 X G00H5A**	0.173	0.088	0.61	0.49	0.303	0.206	0.219	0.116	0.122	0.136	0.100	. . .	0.070	. . .	0.0024				
51 S NDC4	0.0005	0.495	0.423	0.197	0.0005	0.0002	0.0004	<0.0001	<0.0001	0.0003	0.0001	0.0002	0.0002	<0.0001	<0.0001				
51 S NDC5	0.0021	0.582	0.527	0.3	0.0017	0.001	0.0012	0.0013	0.0018	0.0005	0.0013	0.0044	0.001	0.0008	0.0004	continued			
51 S NDC7	0.0041	0.398	0.209	0.298	0.0055	0.0046	0.0052	0.0007	0.0012	0.016	0.0045	0.01	0.0052	0.044	0.0001				
51 ZA 133/02	0.0105	0.0058	0.050	0.20	0.0115	0.021	0.021	0.0015	0.0012	0.0130	0.020	0.031	0.023	0.0048	0.00020	continued			
51 ZA 135/02	0.020	0.020	0.052	0.29	0.020	0.016	0.0080	0.0023	0.0052	0.023	0.015	0.013	0.0062	0.0050	. . .				
51 ZA 136/02	0.050	0.040	0.24	0.36	0.050	0.031	0.041	0.0024	0.0022	0.032	0.032	0.020	0.0340	0.0090	0.0005				
51 ZA 141/01	0.020	0.0110	0.41	0.40	0.022	0.0060	0.0140	0.010	0.010	<0.001	0.0040	. . .	0.0010	. . .	. . .				
51 ZA 142/02	0.040	0.044	0.50	0.49	0.042	0.041	0.083	0.0052	0.0039	0.043	0.045	(0.010)	0.038	0.0090	. . .				
51 ZA 143/04	0.0028	0.0060	0.150	0.62	0.0069	0.0020	0.0136	0.0032	0.0030	0.0019	0.020	0.014	0.0030	0.0048	0.00010	continued			
51 ZA 144/01	0.20	0.160	0.65	0.73	0.100	0.022	0.055	0.0600	0.0050	0.053	0.034	. . .	0.036	0.007	. . .				
51 ZA 145/01	0.150	0.059	0.81	0.86	0.050	0.010	0.033	0.0030	0.0023	0.012	0.010	. . .	0.024	0.0030	. . .				
CRM **51 DB 310**	0.00169	0.994	0.0797	0.0705	0.00307	0.00244	0.0086	0.00347	0.00238	0.00301	0.00090	0.01152	0.00444	0.00135	0.000128	continued			
CRM **51 DB 312**	0.0419	0.410	0.415	0.185	0.0416	0.00452	0.0290	0.00439	(0.002)	0.0288	0.0276	0.0115	0.00615	0.00101	. . .				

Continuation from above	Ca	Co	Bi	Ba	Li	Na	Sr	B	Cd	Sb	Ag	Size (mm) Ø	H	
51 X G00H4A	. . .	0.012	0.011	. . .	. . .	. . .	. . .	. . .	. . .	<0.005	. . .	40	15	C
51 X G00H5A	. . .	0.079	0.062	. . .	. . .	. . .	. . .	. . .	. . .	0.057	. . .	40	15	
51 S NDC4	<0.0001	<0.0001	<0.0001	0.0003	<0.0001	<0.0001	<0.0001	0.0001	. . .	. . .	. . .	50-60	25	
51 S NDC5	0.0003	0.0004	0.0009	0.001	0.0002	0.0005	0.0004	0.0006	. . .	. . .	. . .	50-60	25	
51 S NDC7	0.0001	0.0002	0.0004	0.0008	0.0002	0.0003	0.0008	0.0022	. . .	. . .	. . .	50-60	25	
51 ZA 133/02	0.00010	<0.0001	0.00010	. . .	0.00003	0.0007	<0.0001	0.00005	0.0010	0.0010	. . .	60	25	C
51 ZA 135/02	. . .	0.0010	0.0020	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	60	25	
51 ZA 136/02	0.00025	<0.0001	0.00010	. . .	0.00003	. . .	<0.0001	0.0002	0.00050	0.0020	. . .	60	25	
51 ZA 141/01	. . .	0.0090	. . .	. . .	. . .	. . .	. . .	0.0150	. . .	0.010	. . .	60	25	C
51 ZA 142/02	. . .	0.00010	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.0046	. . .	60	25	
51 ZA 143/04	<0.0001	. . .	. . .	. . .	0.00010	(0.0003)	. . .	. . .	. . .	. . .	. . .	60	25	
51 ZA 144/01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.010	60	25	
51 ZA 145/01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	60	25	
51 DB 310	0.00073	(0.0009)	. . .	. . .	0.000366	(0.0003)	. . .	(0.0006)	0.00237	. . .	. . .	60	25	
51 DB 312	. . .	. . .	0.0023	. . .	. . .	. . .	0.00082	. . .	0.00226	. . .	. . .	60	25	

See page 71 for materials in Chippings form

For Setting-Up Samples see section 16

5.4 Al/Si

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Be	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	54 X G25D1L	0.010	0.67	3.37	0.721	0.815	0.262	0.359	(0.0033)	<0.005	0.099	0.140	0.016	0.0011	Bi 0.112		40x15 or 50x20	C
CRM	54 X G25D2K	0.130	0.59	3.93	0.576	0.479	0.139	0.169	0.073	0.042	0.152	0.150	(0.006)	0.049	Co, Bi, Cd	LM 8	40x15 or 50x20	
CRM	54 X G25D3R	0.117	0.208	5.97	0.454	0.289	0.111	0.092	0.074	0.054	0.078	0.061	0.011	0.0032	Ga 0.016	LM 16	40x15 or 50x20	
CRM	54 X G25D4M	0.162	0.075	7.34	0.125	0.093	0.098	0.111	0.160	0.092	0.09	0.020	(0.0022)	0.019	Co, Bi, Cd	LM 18	40x15 or 50x20	
CRM	54 X G25D5L	0.273	(0.0011)	8.14	0.191	(0.0046)	0.0082	0.020	0.273	0.130	0.0068	0.0097	(0.0025)	0.022	Co 0.0024	LM 25	40x15 or 50x20	
CRM	54 X G06H1R	0.630	0.489	8.43	1.08	0.022	0.611	0.60	0.082	0.133	0.248	0.084	0.01	. . .	Co, Bi, Cd		40x15 or 50x20	C
CRM	54 X G06H2S	0.54	0.40	10.19	0.640	0.234	0.55	0.47	0.213	0.116	0.179	0.130	0.018	. . .	Co 0.0086, Bi 0.027		40x15 or 50x20	
CRM	54 X G06H3N	0327	0.179	11.27	0.500	0.445	0.295	0.072	0.065	0.050	0.084	0.069	0.010	. . .	Co, Ga, Cd	LM 6	40x15 or 50x20	
CRM	54 X G06H4Q	0.237	0.134	13.21	0.138	0.691	0.139	0.131	0.040	(0.007)	0.124	0.120	0.011	. . .	Co 0.207	LM 9	40x15 or 50x20	
CRM	54 X G06H5L	0.0229	(0.0022)	13.76	0.210	0.85	0.0067	0.225	(0.0020)	0.022	0.0106	0.026	0.008	. . .	Co <0.0005	LM 20	40x15 or 50x20	
CRM	54 X G13H1N	1.87	2.89	8.91	0.801	0.0137	1.83	0.37	0.240	0.260	0.112	0.062	. . .	0.0078	Co 0.0051		40x15 or 50x20	C
CRM	54 X G13H2M	1.29	1.37	10.42	0.767	0.248	1.15	0.530	0.083	0.145	0.166	0.103	. . .	. . .	Co 0.004		40x15 or 50x20	
CRM	54 X G13H3M	0.82	0.89	10.2	0.79	0.43	0.95	0.42	0.050	0.092	0.152	0.060	. . .	0.0075	Co 0.009	LM 13	40x15 or 50x20	
CRM	54 X G13H4N	0.643	0.78	12.55	0.405	0.617	0.84	0.251	0.055	0.068	0.083	0.0264	. . .	0.0047	Zr, Sb, Sr		40x15 or 50x20	
	54 X G13H5K	0.39	0.35	13.0	0.29	0.80	0.41	0.02	0.02	0.009	0.044	<0.01	. . .	. . .			40 x 15	
CRM	54 X G231H1C	1.19	0.45	9.82	0.80	0.029	0.31	0.60	0.145	0.082	0.022	0.089	. . .	(0.0002)			40x15 or 50x20	C
	54 X G231H2B	0.91	0.20	11.6	0.84	0.27	0.20	0.47	0.13	0.13	0.07	0.05	. . .	. . .			40 x 15	
	54 X G231H3B	0.43	0.08	13.5	0.63	0.55	0.11	0.26	<0.01	0.01	0.12	0.10	. . .	. . .		231.0	40 x 15	
	54 X G231H4B	0.24	0.03	13.7	0.34	0.65	0.01	0.13	0.05	0.07	0.18	0.01	. . .	. . .		A413	40 x 15	
CRM	54 X GS20J1E	0.308	0.186	18.8	0.79	0.097	0.159	0.43	0.120	0.130	0.129	0.115	. . .	(0.00012)			40x15 or 50x20	C
CRM	54 X GS20J2E	0.168	0.178	18.7	0.56	0.059	0.091	0.305	0.066	0.075	0.082	0.066	. . .	<0.0001			40x15 or 50x20	
CRM	54 X GS20J3D	0.079	0.118	23.9	0.328	0.302	(0.003)	0.030	0.077	(0.012)	0.0055	0.0017	. . .	<0.0001			40x15 or 50x20	
CRM	54 X GS20J4D	(0.0037)	0.0050	25.5	0.227	0.146	0.265	0.224	0.0014	(0.0021)	0.107	0.194	. . .	0.0017			40x15 or 50x20	
															Ga			
	54 ZA 411/03	0.0112	0.0125	9.54	0.094	0.0241	0.0112	0.0126	0.0050	0.0050	0.0142	0.0119	0.0132	. . .	. . .			
	54 ZA 414/04	0.103	0.544	11.90	0.43	0.25	0.013	0.100	0.0022	0.0015	0.071	0.011	0.013	. . .	. . .	continued		
	54 ZA 415/03	0.054	0.500	12.80	0.180	0.096	0.050	0.036	0.051	0.048	0.055	0.0300	0.020	. . .	0.0088			

Continuation from above	Ca	Na	Sr	Zr	Sb	P	Co	Bi	Cd	Size (mm) Ø H
54 ZA 411/03	0.00054	0.0047	. . .	0.0095	. . .	0.0020	. . .	. . .	. . .	60 x 25
54 ZA 414/04	0.0030	0.00010	0.054	0.010	0.0026	0.0021	. . .	. . .	. . .	60 x 25
54 ZA 415/03	0.018	(0.007)	0.0006	. . .	0.017	0.0020	0.050	0.0084	. . .	60 x 25

5.5 Al/Si/Cu

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Li	Co	V	Others	Typical Alloy Type	Size (mm) Ø H	
	55 X G900J1E	1.02	0.94	0.14	0.81	0.008	0.005	0.26	0.35	0.32	<0.005	0.002	. . .	. . .	. . .			40x15 or 50x20	C
CRM	55 X G900J2F	0.86	0.62	0.44	0.38	0.145	0.133	0.309	0.52	0.34	0.054	0.118	. . .	. . .	. . .	Bi 0.55	HE 9	40x15 or 50x20	
	55 X G900J3F	0.41	0.38	0.82	0.29	0.56	0.21	0.39	0.14	0.15	0.16	0.25	. . .	0.070	. . .		HE 20	40x15 or 50x20	
CRM	55 X G900J4F	0.249	0.459	1.39	0.306	0.75	0.351	0.149	0.088	0.153	0.171	0.343	. . .	. . .	(0.010)	Bi 0.285	HE 30	40x15 or 50x20	
	55 X G900J5E	0.024	0.009	1.65	0.18	1.16	0.41	0.023	0.014	0.006	0.33	0.46	. . .	. . .	. . .			40x15 or 50x20	
CRM	55 X G04H6E	5.56	0.151	3.30	0.83	0.028	0.77	0.199	0.221	0.181	0.126	0.126	0.019	0.0024	0.014	Bi, Cd		40x15 or 50x20	C
CRM	55 X G04H7E	4.65	0.263	4.43	0.633	0.212	0.500	0.537	0.227	0.174	0.0476	0.035	0.0066	0.030	0.0057	Bi, Sb, Cd		40x15 or 50x20	
CRM	55 X G04H8H	3.34	0.17	5.39	0.663	0.410	0.35	1.28	0.166	0.075	0.18	0.051	. . .	0.021	0.0105	Cd 0.0056	LM 4	40x15 or 50x20	
CRM	55 X G04H9D	2.62	0.078	6.00	0.303	0.301	0.229	1.89	0.063	0.030	0.31	0.005	. . .	0.010	0.008	Cd 0.0015	LM 21	40x15 or 50x20	
CRM	55 X G04H10D	1.36	0.004	7.21	0.512	0.532	0.0232	2.26	(0.0074)	<0.01	0.0097	0.090	. . .	0.043	0.008	Bi, Ga	LM 22	40x15 or 50x20	
	55 ML SS-308	4.50	0.08	5.50	0.65	0.10	0.10	0.25	. . .	. . .	0.06	<0.005	. . .	. . .	. . .	Sr 0.02		64 x 25	C
	55 ML SS-319	3.80	0.10	6.20	0.85	0.40	0.20	0.35	0.20	0.20	0.15	0.01	. . .	. . .	0.02	Sr, Bi		64 x 25	
	55 ML SS-332	3.20	1.00	9.20	0.70	0.25	0.50	0.25	0.10	0.10	0.14	<0.005	. . .	. . .	0.02	Sr 0.02		64 x 25	
	55 ML SS-336	1.00	1.20	12.00	0.65	0.06	2.50	0.05	. . .	. . .	0.04	<0.005	. . .	. . .	. . .	Sr, P		64 x 25	
	55 ML SS-390	4.50	0.60	16.50	0.90	0.25	0.10	0.50	0.08	0.08	0.10	0.05	. . .	. . .	. . .	Sr <0.005		64 x 25	
	Note: all values given for this series are nominal. Exact values will be given on the certificate.																		
	55 X G26H1F	4.34	0.29	7.69	1.78	0.015	0.012	1.14	0.24	(0.008)	0.21	0.20	. . .	0.022	0.012	Bi 0.07		40x15 or 50x20	C
CRM	55 X G26H2F	4.14	1.49	9.36	0.71	0.52	0.41	0.64	0.111	0.110	0.120	0.083	. . .	0.052	0.011	Bi 0.035		40x15 or 50x20	
	55 X G26H3F	2.19	1.01	9.6	1.07	0.45	0.51	0.79	0.23	0.16	0.147	0.130	0.006	0.076	0.020	Ga 0.011	LM 26	40x15 or 50x20	
CRM	55 X G26H4D	3.75	1.65	10.33	0.51	0.165	0.895	0.285	0.123	0.234	0.295	0.062	. . .	0.003	0.018	Bi 0.025		40x15 or 50x20	
	55 X G26H5D	1.41	1.48	10.7	0.21	0.58	1.28	0.02	(0.005)	0.073	(0.005)	0.029	. . .	. . .	. . .			40 x 15	
CRM	55 X G02D6J	0.487	0.336	12.3	1.27	0.65	0.027	0.083	0.46	<0.005	0.34	0.035	0.0055	0.018	. . .	Ca 0.006	LM 2	40x15 or 50x20	C
CRM	55 X G02D7K	1.59	0.52	10.74	0.90	0.45	0.249	0.614	0.219	0.046	0.160	0.094	<0.001	0.093	0.007	Be, Bi		40x15 or 50x20	
CRM	55 X G02D8H	2.26	0.205	9.91	0.94	0.453	0.366	1.29	0.335	0.186	0.240	0.0527	<0.001	0.058	0.024	Be 0.0008	LM 24	40x15 or 50x20	
CRM	55 X G02D9H	3.42	0.206	8.61	0.81	0.114	0.62	2.46	0.106	0.177	0.091	0.109	(0.008)	0.053	0.0059	Be, Ga		40x15 or 50x20	
CRM	55 X G02D10K	4.68	(0.006)	6.52	0.178	0.015	0.95	4.80	(0.0034)	0.87	(0.0020)	0.162	. . .	0.059	. . .	Be, Bi		40x15 or 50x20	
CRM	55 X A30J1H	5.75	1.03	14.6	1.07	0.132	0.014	0.233	0.135	0.006	0.194	0.031	. . .	0.091	0.0114	Be, Bi		40x15 or 50x20	C
CRM	55 X A30J2K	4.51	0.554	14.9	1.27	0.160	0.008	0.360	0.014	0.134	0.110	0.0071	. . .	0.196	0.0064	Be 0.0058	LM 30	40x14 or 50x18	
CRM	55 X A30J3J	4.02	0.31	16.5	0.29	0.259	0.072	0.048	0.018	0.083	0.144	0.037	. . .	0.194	0.006	Be, Bi		40x15 or 50x20	
CRM	55 X A30J4G	3.22	0.50	16.5	0.515	0.355	0.162	0.065	0.025	0.018	0.023	0.075	. . .	0.002	0.020	P (0.003)		40x14 or 50x18	

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For Setting-Up Samples see section 16

5.5 Al/Si/Cu (continued)

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Co	V	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	55 X G28J1Z	1.82	1.26	14.33	0.678	0.024	2.47	0.258	0.0036	0.182	0.104	0.319	0.119	0.0095	P (0.0048)		40x15 or 50x20	C
	55 X G28J2S	1.56	0.99	17.5	0.49	0.38	1.81	0.32	0.081	0.058	0.07	0.26	0.35	0.012	Be 0.0042	LM 28	40x15 or 50x20	
	55 X G28J3U	1.45	1.30	21.6	0.43	0.33	1.47	0.30	0.07	0.11	0.07	0.09	. . .	. . .		LM 29	40x15 or 50x20	
CRM	55 X G28J4S	1.07	0.60	19.2	0.124	0.615	1.17	0.040	0.108	0.062	0.03	0.139	0.032	. . .	B (0.005)		40x15 or 50x20	
CRM	55 X G28J4T	0.82	0.60	20.4	0.52	0.45	0.84	0.32	0.094	0.041	0.28	0.040	0.079	0.010			40x15 or 50x20	
	55 X G28J5Y	0.69	0.73	27.6	0.26	0.67	0.43	0.015	0.18	0.03	0.24	0.009	. . .	. . .			40 x 15	
CRM	55 X G28J6A	(0.035)	(0.032)	27.15	(0.26)	(0.12)	<0.01	(0.052)	(0.008)	<0.002	(0.024)	(0.006)	. . .	. . .	Sr (0.038), Ca (0.007)		65 x 30	SC

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Zr	Ga	Ca	P	Size (mm) Ø H	
	55 ZA 471/02	4.90	0.637	15.8	0.84	0.113	0.102	0.115	0.054	0.053	0.178	0.052	0.077	0.058	0.0098	0.0050	0.0019	60 x 25	C
	55 ZA 472/02	4.02	0.344	17.7	1.43	0.321	0.498	0.321	0.117	0.094	0.103	0.035	0.057	0.0192	0.0113	0.0070	0.0022	60 x 25	
	55 ZA 473/02	0.96	1.08	19.6	0.194	0.062	1.20	0.51	0.086	0.29	0.059	0.013	0.020	0.0076	0.008	0.0020	0.0043	60 x 25	
	55 ZA 475/01	0.59	0.86	23.0	0.72	0.11	2.21	0.060	0.0010	0.010	0.111	0.012	0.070	0.0012	. . .	. . .	0.0039	60 x 25	
CRM	55 DB 306	2.636	0.293	8.57	1.140	0.330	0.296	0.887	0.180	0.096	0.152	. . .	. . .	. . .	. . .	. . .	. . .	60 x 25	
CRM	55 DB 314	2.071	0.1805	11.49	0.757	0.400	0.221	1.195	0.221	0.199	0.1638	0.0517	0.0192	0.00552	0.0154	. . .	. . .	60 x 25	

5.6 Al/Cu

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Co	Zr	Sb	Others	Typical Alloy Type	Size (mm) Ø H	
	56 X G14H2C	4.61	0.97	0.18	0.31	0.48	1.82	0.16	0.03	0.07	0.20	0.08	. . .	. . .	. . .			40 x 15	C
	56 X G14H4B	3.78	1.80	0.69	0.62	0.17	2.21	0.12	0.12	0.03	0.09	0.03	. . .	. . .	. . .			40 x 15	
	56 X G14H5C	3.02	2.19	0.76	0.81	0.01	2.56	0.01	0.15	0.02	0.01	0.01	. . .	. . .	. . .			40 x 15	
CRM	56 X G250J1C	3.82	0.075	0.26	0.41	0.040	1.33	0.28	0.101	0.125	0.008	0.0067	0.008	(0.003)	(0.003)	V 0.102		40x15 or 50x20	C
CRM	56 X G250J2D	4.81	0.060	0.211	0.346	0.225	1.10	0.155	(0.0016)	(0.004)	0.210	0.063	0.195	0.247	0.324	V 0.018		40x15 or 50x20	
CRM	56 X G250J3C	4.90	(0.001)	0.11	0.079	0.278	0.92	0.103	0.024	0.031	0.162	0.024	0.264	0.275	0.35	V, Be		40x15 or 50x20	
	56 X G250J4B	7.0 (6)	<0.01	0.05	0.17	0.54	0.80	0.05	0.09	0.16	0.16	0.04	0.12	<0.01	0.06		BSL 119	40 x 15	
CRM	56 X G250J5D	4.36	0.022	0.205	0.535	0.150	1.77	0.086	0.076	0.097	0.051	0.047	0.34	0.22	0.076	V, Be		40x15 or 50x20	
	56 X G250J6C	5.96	0.01	0.16	0.27	0.10	1.93	0.31	0.08	0.13	0.12	0.12	<0.01	0.22	<0.01			40 x 15	
	56 X G250J7A	5.14	0.06	0.23	0.43	0.17	1.30	0.185	<0.01	<0.01	0.247	0.09	1.48	<0.01	0.24			40 x 15	
	56 ML SS-242	4.0	1.5	0.50	0.55	0.08	2.0	0.10	<0.005	<0.005	0.12	0.03	. . .	. . .	. . .	Bi <0.005		64 x 25	C
	56 ML KA-242	3.6	1.8	0.25	0.40	0.02	2.2	0.03	0.02	0.02	0.06	<0.005	. . .	. . .	. . .	Bi 0.02		64 x 25	
	56 ML KB-242	4.4	1.2	0.40	0.20	0.05	1.8	0.05	0.05	0.05	0.15	<0.005	. . .	. . .	. . .	Bi 0.05		64 x 25	

Note: all values given for this series are nominal. Exact values will be given on the certificate.

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Zr	Bi	V	Ag	Typical Alloy Type	Size (mm) Ø H	
CRM	56 X G2000J1C	3.28	1.80	0.095	0.085	1.24	0.006	0.87	0.0023	0.098	0.0053	0.001	0.275	0.006	0.009	0.005	2007	40x15 or 50x20	C
	56 X G2000J2B	4.01	1.28	0.96	0.23	0.94	0.07	0.23	0.031	0.073	0.064	0.047	0.18	0.052	0.005	. . .	2014	40 x 15	
CRM	56 X G2000J3C	4.75	1.06	0.765	0.380	0.57	0.088	0.113	0.365	0.015	0.190	0.058	0.026	0.150	0.010	0.010	2017	40x15 or 50x20	
CRM	56 X G2000J4C	5.02	0.535	1.35	0.700	0.267	0.087	0.014	0.83	0.008	0.135	0.056	0.105	0.002	0.013	0.012	2030	40x15 or 50x20	
CRM	56 X G2000J5C	5.52	0.39	0.321	0.98	0.007	0.204	0.368	0.69	<0.005	0.063	0.0078	0.064	0.136	0.027	. . .	2124	40x15 or 50x20	
	56 AU E111	1.88	0.692	1.25	0.825	1.24	0.161	0.401	. . .	. . .	0.121	0.092	0.191	. . .	. . .	. . .		62 x 30	
	56 AU E112	2.89	0.298	0.893	0.657	0.932	0.113	0.343	. . .	. . .	0.169	0.223	0.250	. . .	. . .	. . .		each	
	56 AU E113	4.03	0.481	0.552	0.427	0.561	0.045	0.236	. . .	. . .	0.047	0.157	0.137	. . .	. . .	. . .			
	56 AU E114	5.47	0.108	0.236	0.188	0.241	0.089	0.125	. . .	. . .	0.078	0.193	0.048	. . .	. . .	. . .		Set only	
	56 AU E115	0.658	0.922	1.59	1.08	1.54	0.22	0.051	. . .	. . .	0.225	0.311	0.0064	. . .	. . .	. . .			
	56 AU E116	6.61	0.035	0.101	0.122	0.071	0.0095	0.566	. . .	. . .	0.018	0.011	0.319	. . .	. . .	. . .			
	56 ML SS-2011	5.5	0.04	0.3	0.55	0.04	0.04	0.10	0.5	. . .	<0.005	0.04	. . .	0.5	0.01	. . .		64 x 25	C
	56 ML WA-2011	4.9	0.02	0.2	0.70	0.06	0.02	0.15	0.4	. . .	<0.005	0.06	. . .	0.6	0.01	. . .		64 x 25	
	56 ML WB-2011	6.0	0.06	0.1	0.25	0.02	0.06	0.05	0.6	. . .	<0.005	0.02	. . .	0.4	0.01	. . .		64 x 25	

Note: all values given for this series are nominal. Exact values will be given on the certificate.

5.7 Al/Cu/Si

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Co	V	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	57 X G12H1C	5.54	0.40	2.52	0.88	0.032	0.31	1.03	0.016	0.095	0.114	0.069	0.113	0.15	Zr, Be, Cd, Li		40x15 or 50x20	C
	57 X G12H2B	8.5	0.32	2.57	1.30	0.15	0.35	0.71	0.17	0.27	0.15	0.03	. . .	. . .			40 x 15	
	57 X G12H3B	9.75	0.25	1.57	0.89	0.32	0.63	0.60	0.09	0.19	0.21	0.04	. . .	. . .		LM 12	40 x 15	
	57 X G12H4B	12.8	0.18	1.26	0.37	0.58	0.17	0.40	0.01	0.04	0.06	0.07	. . .	. . .			40 x 15	
	57 X G12H5G	12.2	0.028	0.55	0.19	0.073	0.11	0.072	0.068	0.067	0.036	0.016	0.054	0.033	Zr, Be, Ga, Cd		40x15 or 50x20	

5.8 Al/Zn

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Zr	Co	Be	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	58 X G40H6B	0.111	(0.003)	0.09	0.08	0.004	0.008	7.55	<0.002	<0.005	0.065	0.005	(0.004)	0.006	(0.002)	Cd 0.032		40x15 or 50x20	C
CRM	58 X G40H7B	0.050	0.304	0.161	0.101	0.078	0.142	7.16	0.054	0.067	0.0045	0.0018	0.0030	0.026	0.0012	Sb, Cd		40x15 or 50x20	
	58 X G40H8B	0.14	0.69	0.1	0.30	0.20	0.22	6.5	0.090	0.010	0.063	0.22	(0.004)	. . .	. . .		LM 31	40x15 or 50x20	
	58 X G40H9B	0.19	1.12	0.24	0.47	0.046	0.048	5.0	0.40	0.14	0.25	0.37	0.17	. . .	. . .		7000	40 x 15	
	58 X G40H10B	0.23	1.28	0.19	0.61	0.31	0.22	3.85	0.15	0.10	0.19	0.62	0.23	. . .	. . .			40 x 15	

5.9 Al/Zn/Mg/Cu

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Zr	Cd	Others	Typical Alloy Type	Size (mm) Ø H	
	59 X G77J1F	2.41	4.83	0.15	0.21	0.46	0.17	1.91	0.125	0.126	0.178	0.24	0.01	0.004	V, Co, Mo, Bi, As		40x15 or 50x20	C
CRM	59 X G77J2E	2.35	3.05	0.212	0.295	0.245	0.52	3.35	0.125	0.006	0.015	0.096	0.153	0.0025	V 0.0155		40x15 or 50x20	
CRM	59 X G77J3E	2.42	2.27	0.37	0.71	0.594	0.43	4.57	0.075	0.137	0.107	0.023	0.026	0.0115	V 0.006, Bi 0.046	RR 77	40x15 or 50x20	
CRM	59 X G77J4E	0.81	1.47	0.59	1.04	0.224	0.0037	5.30	0.073	0.219	0.119	0.071	0.080	0.00054	V 0.0067		40x15 or 50x20	
	59 X G77J5D	0.122	0.72	0.30	1.32	0.030	1.38	7.57	(0.003)	<0.01	0.058	0.050	. . .	0.012	Ga 0.020		40x15 or 50x20	
CRM	59 X G77J6A	1.13	2.63	0.04	0.054	0.0024	0.003	11.6	(0.005)	0.006	0.023	0.0046	0.29	. . .			50 x 25	W
	59 ML SS-7001	2.1	3.1	0.10	0.15	0.04	0.01	7.6	. . .	. . .	0.03	0.21	. . .	. . .	Ga, V		64 x 25	C
	59 ML SS-7005	0.1	1.3	0.15	0.20	0.50	0.02	4.5	. . .	. . .	0.02	0.10	0.14	. . .	Ga, V	7000	64 x 25	
	59 ML SS-7021	0.08	1.5	0.12	0.30	0.05	<0.005	5.4	. . .	. . .	0.04	0.03	0.13	. . .	Ga, V		64 x 25	
	59 ML SS-7050	2.4	2.3	0.08	0.15	0.03	0.02	6.2	<0.003	<0.001	0.04	0.02	0.12	<0.001	Ga, V		64 x 25	
CRM	59 DB 308	1.315	2.290	0.0707	0.1634	0.0342	0.0122	5.67	. . .	. . .	0.0285	0.1962	0.0078	. . .	Be 0.00022		60 x 25	

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For Setting-Up Samples see section 16

5.11 Al/Mg

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Be	Li	Others	Typical Alloy Type	Size (mm) Ø H	
CRM	**511 X G05H1H**	0.32	2.02	0.42	0.79	0.012	0.125	0.47	0.023	0.178	0.204	0.242	(0.0002)	. . .	V, Cd		40x15 or 50x20	C
CRM	**511 X G05H2G**	0.37	3.12	0.35	0.60	0.186	0.22	0.26	0.068	0.154	0.079	0.30	0.004	. . .	Cd, Ga		40x15 or 50x20	
	511 X G05H3H	0.093	3.97	0.21	0.41	0.40	0.090	0.092	0.107	0.096	0.25	0.095	0.0074	. . .		LM 5	40x15 or 50x20	
	511 X G05H4F	0.056	5.1	0.11	0.14	0.55	0.040	0.062	0.15	0.14	0.048	0.029	0.014	. . .			40x15 or 50x20	
	511 X G05H5E	0.007	7.87	0.05	0.11	0.87	(0.002)	0.010	0.21	(0.004)	<0.005	<0.005	. . .	. . .			40 x 15	
	511 X G10H4B	0.052	10.4	0.33	0.19	0.12	0.085	0.21	0.10	0.051	0.097	0.15	0.023	<0.0005	B 0.004	LM 10	40 x 15	C
	511 X G10H5A	0.02	13.7	0.19	0.18	0.21	0.07	0.02	0.19	<0.01	<0.01	<0.01	0.013	. . .			40 x 15	
CRM	**511 X G3000B1C**	0.288	0.250	0.785	0.678	0.750	0.142	0.035	0.148	0.157	0.033	0.097	<0.0001	. . .	Ga 0.048, V 0.052		40x15 or 50x20	C
CRM	**511 X G3000B2B**	0.20	0.68	0.23	0.335	0.81	0.063	0.098	0.137	0.105	0.111	0.200	0.0017	0.017	Co, Ga		40x15 or 50x20	
CRM	**511 X G3000B3B**	0.120	0.80	0.35	0.376	1.06	0.116	0.140	0.062	0.028	0.22	0.056	0.005	. . .	Co, Ga	3000	40x15 or 50x20	
	511 X G3000B4B	0.10	1.39	0.12	0.88	1.14	0.04	0.11	0.03	0.04	0.11	0.04	. . .	. . .			40 x 15	
	511 X G3000B5B	0.054	1.55	0.05	0.93	0.79	0.007	0.009	<0.01	0.008	0.19	0.003	. . .	. . .			40 x 15	
	511 ML SS-3004	0.15	1.1	0.18	0.5	1.1	<0.005	0.05	0.001	<0.001	0.02	<0.005	. . .	<0.001	V, Bi, Ga, Cd		64 x 25	
	511 ML WA-3004	0.10	1.3	0.22	0.6	1.3	0.01	0.15	0.006	. . .	<0.005	0.01	. . .	. . .	V, Bi, Ga, Cd	3004	64 x 25	
	511 ML WB-3004	0.20	0.9	0.10	0.4	0.9	0.02	0.10	0.020	. . .	0.05	0.02	. . .	. . .	V, Bi, Ga, Cd		64 x 25	

Note: all values given for this series are nominal. Exact values will be given on the certificate.

	511 AU E232	0.092	5.44	0.291	0.351	0.365	0.048	0.146	. . .	. . .	0.044	0.195	0.0028	. . .			62 x 30	
	511 AU E233	0.132	6.33	0.361	0.440	0.520	0.073	0.165	. . .	. . .	0.082	0.140	0.0051	. . .			each	
	511 AU E234	0.124	6.83	0.477	0.581	0.688	0.178	0.613	. . .	. . .	0.118	0.241	0.00087	. . .				
	511 AU E235	0.0084	9.96	0.076	0.120	0.060	0.137	0.032	. . .	. . .	0.0085	0.014	0.010	. . .			Set only	
	511 AU E236	0.246	3.93	0.600	0.653	0.879	0.037	0.313	. . .	. . .	0.197	0.296	0.00064	. . .				

5.12 Al/Zn/Si

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Ti	Cr	Sr	Size (mm) Ø H	
	512 ZA 871/01	0.011	0.295	9.67	0.155	0.023	0.022	8.94	0.056	0.019	0.0055	60 x 25	C
	512 ZA 872/01	0.10	0.405	8.76	0.41	0.20	0.011	10.00	0.037	0.011	0.0018	60 x 25	
	512 ZA 873/01	0.049	0.535	7.25	0.26	0.104	0.006	11.0	0.0154	0.032	. . .	60 x 25	

5.14 Al/Mn

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Zr	Size (mm) Ø H	
CRM	**514 X 9091.1C**	0.046	(0.001)	0.035	0.081	6.93	(0.0026)	0.029	0.016	0.013	0.0017	<0.005	0.184	40x15 or 50x20	C
	514 X 9091.2C	0.44	0.03	0.45	0.90	10.8	0.07	0.16	0.10	0.04	0.16	0.06	. . .	40 x 15	
CRM	**514 X 9091.3D**	0.62	0.148	0.74	0.94	11.3	0.141	0.223	0.111	0.019	0.424	0.106	<0.005	40x15 or 50x20	
	514 AU E211	0.220	0.011	0.653	0.694	0.919	0.018	0.023	. . .	. . .	0.020	. . .	. . .	62 x 30	
	514 AU E212	0.109	0.039	0.318	0.534	1.21	0.056	0.112	. . .	. . .	0.046	. . .	. . .	each	
	514 AU E213	0.157	0.063	0.460	0.312	1.50	0.101	0.054	. . .	. . .	0.071	. . .	. . .		
	514 AU E214	0.051	0.078	0.170	0.212	1.79	0.135	0.084	. . .	. . .	0.104	. . .	. . .	Set only	
	514 AU E215	0.255	0.109	0.820	0.886	0.597	0.197	0.157	. . .	. . .	0.130	. . .	. . .		
	514 AU E216	0.0072	0.0034	0.047	0.133	2.19	0.0032	0.0092	. . .	. . .	0.013	. . .	. . .		

5.15 Al/Sr Binaries

	Sr		Sr		Sr	Size (mm) Ø H	
	515 X AlSr1A	1.05	**515 X AlSr4A**	3.84	**515 X AlSr7A**	6.67	50 x 20	C
	515 X AlSr2A	2.2	**515 X AlSr5A**	5.2	**515 X AlSr9A**	9.18	50 x 20	

5.16 Al/Fe

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Sb	V	Zr	Ga	B	Size (mm) Ø H	
	516 ZA 155/02	0.100	0.150	0.50	1.00	0.081	0.053	0.062	0.010	0.011	0.065	0.051	. . .	0.050	0.042	0.007	. . .	60 x 25	C
	516 ZA 156/02	0.052	0.063	0.31	1.28	0.056	0.022	0.035	0.0007	. . .	0.042	0.031	. . .	0.0073	0.0100	. . .	. . .	60 x 25	
	516 ZA 157/02	0.0112	0.0203	0.117	1.62	0.0166	0.0025	0.0101	0.0050	0.0019	0.0024	0.0004	. . .	0.0027	0.0051	. . .	. . .	60 x 25	
	516 ZA 158/03	0.0120	0.020	0.053	1.98	0.021	0.0085	0.0075	0.007	0.0050	0.0130	0.0070	. . .	0.013	0.0055	0.010	0.0010	60 x 25	
CRM	**516 ZA 161/01**	0.023	0.024	0.12	2.66	0.035	0.013	0.012	0.0110	0.010	0.023	0.012	0.0053	0.022	0.010	. . .	. . .	60 x 25	HIP

5.17 Al/Zn Sacrificial Anode

		Cu	Si	Fe	Zn	Pb	Ti	Cd	In	Ga	Hg	Size (mm) Ø H	
	517 GO LF30	0.023	. . .	0.01	4.1	. . .	0.027	0.028	0.034	0.020	. . .	55 x 4	CC
	517 GO LF31	0.013	0.07	0.06	4.3	. . .	0.020	0.019	0.029	0.010	. . .	55 x 4	
	517 GO LF32	. . .	0.09	0.11	4.6	. . .	0.010	0.010	0.021	0.005	. . .	55 x 4	
	517 GO LF33	. . .	0.14	0.20	5.1	. . .	0.005	0.005	0.014	0.002	. . .	55 x 4	
	517 GO LF34	0.008	0.05	0.05	0.32	0.007	. . .	. . .	. . .	. . .	0.030	55 x 4	CC
	517 GO LF35	0.014	0.10	0.19	0.84	0.018	. . .	. . .	. . .	. . .	0.037	55 x 4	
	517 GO LF36	0.002	0.18	0.10	1.32	0.014	. . .	. . .	. . .	. . .	0.029	55 x 4	
	517 GO LF37	0.009	0.05	0.15	2.03	0.008	. . .	. . .	. . .	. . .	0.044	55 x 4	
	517 GO LF39	0.006	0.02	0.05	3.25	. . .	. . .	. . .	. . .	. . .	0.065	55 x 4	
	517 GO LF40	0.004	0.16	0.09	4.47	. . .	. . .	. . .	. . .	. . .	0.036	55 x 4	
	517 GO LF41	0.024	0.02		5.55	0.025	. . .	. . .	. . .	. . .	0.055	55 x 4	

5.18 Pressed Powder Alloys

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Co	V	Zr	Ca	Mo	Size (mm) Ø H	
CRM	**518 X 429**	1.01	1.46	28.36	0.348	0.016	0.022	0.061	0.002	0.001	0.019	0.0069	2.18	0.009	. . .	0.0184	. . .	65 x 25	HIP
CRM	**518 X 905**	2.52	0.639	0.105	2.54	0.984	5.05	0.006	<0.001	0.003	0.596	0.0085	0.003	0.019	0.80	<0.001	0.804	45 x 40	

See page 72 for materials in Chippings form

For Setting-Up Samples see section 16

6.1 Residuals in Pure Magnesium

		Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Ce	La	P	Na	Size (mm) Ø H	
CRM	61 X MgP1A **	0.014	. . .	0.0035	<0.0005	0.0008	0.005	0.027	. . .	<0.001	<0.002	<0.002	<0.0002	<0.0002	<0.0002	<0.001	<0.001	. . .	. . .	45 x 20	C
CRM	61 X MgP2A **	0.065	0.0122	0.0118	(0.0007)	0.0109	0.031	0.0061	0.0029	0.0138	0.0073	0.0061	0.003	<0.0001	0.0063	0.0019	0.0014	. . .	. . .	45 x 20	
CRM	61 X MgP3A **	0.096	0.0196	0.0137	(0.0014)	0.0292	0.044	0.014	0.0048	0.054	0.0155	0.0148	0.0125	<0.0001	0.0154	0.0055	0.0038	. . .	. . .	45 x 20	
CRM	61 X MgP4A **	0.0243	0.0158	0.0102	0.030	0.0109	0.039	(0.0044)	0.0028	0.028	0.0068	0.0069	0.021	<0.0001	0.0071	0.0043	0.0029	. . .	. . .	45 x 20	
	Samples marked ** may be unsuitable for use with glow discharge analysis																				
	61 NH R0-90	0.0020	0.0037	0.0014	. . .	0.0006	0.0015	0.0098	0.0013	0.00005	. . .	0.0004	. . .	. . .	<0.00005	. . .	. . .	<0.0001		64 x 13	
	61 NH R1-88	0.0059	0.0003	0.0542	. . .	0.0013	0.0044	0.0251	0.0006	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH R2-88	0.0118	0.0011	0.0272	. . .	0.0028	0.0091	0.0294	0.0027	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH R3-88	0.0194	0.0153	0.0197	. . .	0.0067	0.0139	0.0298	0.0013	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH R4-88	0.0259	0.0271	0.0111	. . .	0.0098	0.0227	0.0359	0.0016	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH R5-88	0.0473	0.0520	0.0061	. . .	0.0150	0.0362	0.0274	0.0012	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH RMGH-88	0.0535	0.0112	0.0012	. . .	0.0055	0.0209	0.0222	0.0041	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH RMGL-88	0.0055	0.0073	0.0298	. . .	0.0008	0.0004	0.0031	0.0003	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH RMGL-93	<0.001	0.0013	0.0005	. . .	0.0012	0.0002	0.0032	0.0005	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	64 x 13	
	61 NH RTC-90	0.0055	0.0027	0.0702	. . .	0.0011	0.0013	0.0309	0.0012	0.0004	0.0000	0.0020	. . .	. . .	<0.0001	. . .	. . .	0.0027	0.0001	64 x 13	
	61 NH RT400-01	0.0161	0.0012	0.0191	. . .	0.0034	0.0084	0.0329	0.0012	0.0009	0.0018	0.0025	. . .	. . .	0.0007	. . .	. . .	0.0043	0.0028	64 x 13	

6.3 Mg/Mn

		Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Size (mm) Ø H	
CRM	63 X MgE1C **	0.40	0.033	0.76	(0.0013)	0.044	0.006	0.010	(0.002)	0.04	0.013	0.010	0.015	<0.0005	. . .	45 x 20	C
	63 X MgE2A	0.07	0.02	1.47	<0.002	0.02	0.01(5)	0.02	0.005	0.01	0.01	0.007		. . .	. . .	40 x 15	
CRM	63 X MgE3B	0.015	0.022	2.36	<0.001	0.012	0.01	0.004	0.0023	0.13	0.0057	0.005	0.005	. . .	0.001	40x15 or 50x20	
	Samples marked ** may be unsuitable for use with glow discharge analysis																
	63 NH K0-87	1.03	0.050	0.489	. . .	0.0022	0.0076	0.0043	0.0005	. . .	. . .	. . .	. . .	0.0005	. . .	64 x 13	
	63 NH M12-X-91	0.094	0.251	2.18	. . .	0.0271	0.0128	0.0015	0.0050	. . .	0.0457	0.0169	. . .	0.0003	. . .	64 x 13	
	63 CA SMD3A	0.08	0.058	1.69	. . .	0.032	0.034	. . .	0.002	. . .	. . .	. . .	. . .	. . .	. . .	60 X 6	

6.4 Mg/Al

	Al	Zn	Mn	Cu	Si	Fe	Ni	Ca	Sn	Pb	Be	Cd	P	Na	Size (mm) Ø H
64 NH STD1-85	9.54	0.0009	0.0169	0.0130	1.14	0.0278	0.0127	. . .	. . .	. . .	0.0015	. . .	. . .	. . .	64 x 13
64 NH AM2002-91	1.99	0.088	0.440	0.0235	0.0831	0.0036	0.0011	. . .	. . .	. . .	0.0009	. . .	. . .	. . .	64 x 13
64 NH AM5002-91	4.92	0.054	0.189	0.0121	0.0722	0.0068	0.0022	. . .	. . .	. . .	0.0004	. . .	. . .	. . .	64 x 13
64 NH AM60-T-89	5.86	0.017	0.294	0.0013	. . .	0.0041	0.0007	<0.0001	0.0004	0.0010	. . .	<0.00005	0.0012	0.0004	64 x 13
64 NH A60-Y-91	5.45	0.070	0.193	0.0013	0.0167	0.0082	0.0005	. . .	. . .	. . .	0.0011	. . .	. . .	. . .	64 x 13
64 NH A60-T-00	5.98	0.084	0.37	0.0011	0.0148	0.0021	0.0009	. . .	0.0015	0.0016	0.0008	. . .	. . .	. . .	64 x 13

6.5 Mg/Al/Zn

	Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Ce	La	Sr	Others	Size (mm) Ø H
65 NH A8-H-98	9.89	2.04	0.074	. . .	0.0229	0.31	0.0179	0.0115	. . .	0.0100	0.0100	. . .	0.0020	. . .	. . .	. . .	. . .		64 x 13
65 NH A8-H-99	9.95	1.21	0.067	. . .	0.0118	0.091	0.0276	0.0109	. . .	. . .	. . .	. . .	0.0015	. . .	. . .	. . .	. . .		64 x 13
65 NH A8-L-98	2.62	0.10	0.50	. . .	0.0009	0.0070	0.0019	0.0012	. . .	0.0009	0.0016	. . .	0.0005	. . .	. . .	. . .	. . .		64 x 13
65 NH A8-L-02	4.73	0.206	0.43	. . .	0.0010	0.0040	0.0032	0.0003	. . .	0.0002	0.0009	. . .	0.0004	<0.0001	. . .	. . .	. . .		64 x 13
65 NH A91-T-00	9.06	0.76	0.203	. . .	0.0012	0.0095	0.0010	0.0008	. . .	0.0017	0.0013	. . .	0.0006	. . .	. . .	. . .	. . .		64 x 13
65 NH A91-L-00	6.98	0.19	0.53	. . .	0.0004	0.0021	0.0004	0.0002	. . .	0.0009	0.0005	. . .	0.0001	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ61-H-91	7.45	1.466	0.040	. . .	0.0301	0.32	0.0140	0.0413	. . .	. . .	. . .	. . .	0.0048	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ61-L-91	4.92	0.112	0.502	. . .	0.0020	0.027	0.0044	0.0038	. . .	. . .	. . .	. . .	0.0004	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ61-T-91	6.23	0.82	0.243	. . .	0.0184	0.166	0.0088	0.0188	. . .	. . .	. . .	. . .	0.0013	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ61-X-91	6.65	1.223	0.127	. . .	0.0245	0.243	0.0154	0.0331	. . .	. . .	. . .	. . .	0.0021	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ61-Y-91	5.56	0.476	0.355	. . .	0.0116	0.087	0.0053	0.0107	. . .	. . .	. . .	. . .	0.0006	. . .	. . .	. . .	. . .		64 x 13
65 NH AZ63-89	6.05	3.71	0.164	. . .	0.0234	. . .	0.0082	0.0032	0.0002	0.0055	0.0052	. . .	0.0012	0.0054	. . .	. . .	. . .	P 0.0069	64 x 13
65 NH AZ63-X-90	6.33	3.21	0.160	. . .	0.0130	0.0616	0.0103	0.0016	. . .	0.0169	0.0182	. . .	0.0014	0.0192	. . .	. . .	. . .		64 x 13
65 NH A31-L-91	1.91	0.202	0.408	. . .	0.0037	0.020	0.0041	0.0007	. . .	. . .	. . .	. . .	0.0003	. . .	. . .	. . .	. . .		64 x 13
65 NH A31-T-91	3.06	1.098	0.256	. . .	0.0355	0.151	0.0103	0.0052	. . .	. . .	. . .	. . .	0.0017	. . .	. . .	. . .	. . .		64 x 13
65 NH A31-X-91	3.51	1.455	0.116	. . .	0.0475	0.263	0.0138	0.0071	. . .	. . .	. . .	. . .	0.0029	. . .	. . .	. . .	. . .		64 x 13
65 NH A31-Y-91	2.37	0.616	0.327	. . .	0.0124	0.0258	0.0073	0.0040	. . .	. . .	. . .	. . .	0.0007	. . .	. . .	. . .	. . .		64 x 13
65 NH A41-X-91	5.16	0.210	0.410	. . .	0.0173	0.924	0.0061	0.0029	. . .	. . .	. . .	. . .	0.0015	. . .	. . .	. . .	. . .		64 x 13
65 NH K2-87	6.14	0.32	0.165	. . .	0.0040	0.018	0.0129	0.0016	. . .	. . .	. . .	. . .	0.0012	. . .	. . .	. . .	. . .		64 x 13
65 NH K3-87	7.36	0.51	0.280	. . .	0.0084	0.030	0.0097	0.0028	. . .	. . .	. . .	. . .	0.0010	. . .	. . .	. . .	. . .		64 x 13
65 NH K5-87	8.11	1.07	0.351	. . .	0.0462	0.083	0.0009	0.0116	. . .	. . .	. . .	. . .	0.0001	. . .	. . .	. . .	. . .		64 x 13
65 NH K7-87	9.40	0.62	0.027	. . .	0.0047	0.046	0.0104	0.0017	. . .	. . .	. . .	. . .	0.0008	. . .	. . .	. . .	. . .		64 x 13
65 NH K8-87	10.32	0.73	0.190	. . .	0.0041	0.018	0.0127	0.0015	. . .	. . .	. . .	. . .	0.0007	. . .	. . .	. . .	. . .		64 x 13
65 NH APE-89	10.24	1.44	0.058	. . .	0.0298	0.086	0.0149	0.0055	0.0005	0.0062	0.0057	. . .	0.0018	0.0060	. . .	. . .	. . .	P 0.0063	64 x 13
65 NH LT500-01	9.28	0.86	0.32	. . .	0.0052	0.0162	0.0050	0.0019	. . .	0.0025	0.0024	. . .	0.0013	. . .	. . .	. . .	. . .		64 x 13
65 NH LT60-01	5.99	0.15	0.37	. . .	0.0034	0.0161	0.0059	0.0016	. . .	0.0020	0.0027	. . .	0.0014	. . .	. . .	. . .	. . .		64 x 13

See page 72 for materials in Chippings form

For Setting-Up Samples see section 16

6.5 Mg/Al/Zn (continued)

		Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Ce	La	Sr	Ti	Size (mm) Ø H	
CRM	65 X MgA1H **	3.83	1.40	0.20	. . .	0.148	0.17	(0.01)	0.008	0.008	0.090	0.016	. . .	0.00055	. . .	. . .	. . .	0.0007	. . .	45 x 20	C
CRM	65 X MgA1J **	5.45	1.26	0.060	(0.0015)	0.221	0.20	0.021	0.021	0.029	0.072	0.012	0.012	0.006	0.013	0.009	0.007	. . .	. . .	45 x 20	
CRM	65 X MgA2G **	7.31	0.97	0.139	. . .	0.112	0.15	0.011	(0.002)	(0.01)	0.049	0.007	. . .	0.0007	. . .	. . .	. . .	0.0005	. . .	45 x 20	
CRM	65 X MgA3H **	8.99	0.706	0.152	. . .	0.0061	0.047	0.004	(0.001)	<0.001	0.0026	0.004	. . .	0.0007	. . .	. . .	. . .	<0.0002	. . .	45 x 20	
CRM	65 X MgA4H **	11.67	0.0050	0.0062	. . .	0.061	0.025	0.0092	0.0036	0.033	0.0102	0.0040	0.0186	0.0011	. . .	. . .	. . .	. . .	. . .	45 x 20	
CRM	65 X MgA5A	8.01	0.411	0.399	. . .	0.020	0.110	0.006	0.020	0.012	0.013	0.043	0.0050	0.0013	0.0035	. . .	. . .	0.00034	. . .	40x15 or 50x20	
CRM	65 X MgA7A	9.38	0.66	0.285	(0.0008)	0.0010	0.006	0.0103	0.0009	. . .	<0.002	<0.002	<0.0005	. . .	. . .	. . .	. . .	0.015	. . .	40 x 17	

Samples marked ** may be unsuitable for use with glow discharge analysis

CRM	65 X MgB1C **	2.34	1.71	0.61	(0.001)	0.195	0.14	0.006	0.012	0.001	0.012	0.01	0.03	0.0006	0.07	0.010	0.010	. . .	. . .	45 x 20	C
CRM	65 X MgB1D **	2.39	1.71	0.68	(0.003)	0.20	0.17	0.016	0.013	0.41	0.011	0.015	0.029	0.0007	0.070	0.015	0.013	. . .	0.009	45 x 20	
	65 X MgB2B	3.38	0.90	0.34	<0.002	0.10	0.07	0.01(7)	0.006	. . .	0.01	0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 15	
	65 X MgB3B **	3.19	0.608	0.0122	<0.001	0.0214	0.012	(0.004)	0.0020	0.030	0.0050	0.0037	(0.0024)	0.0029	0.012	. . .	. . .	. . .	. . .	45 x 20	
CRM	65 X MgB4C*	4.20	0.32	0.004	<0.01	0.05	0.04	0.01	<0.002	. . .	<0.002	<0.002	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 15	

* Target values Samples marked ** may be unsuitable for use with glow discharge analysis

	65 CA C8209	2.55	0.18	0.15	. . .	0.012	0.058	(0.02)	0.001	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	60 X 6	

6.6 Mg/Zn

		Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Ce	La	Sr	Size (mm) Ø H	
	66 X MgD2A	0.30	1.13	0.74	<0.01	0.08	0.07	0.014	0.008	<0.005	0.011	0.012	. . .	. . .	. . .	. . .	. . .	40 x 15	C
	66 X MgD3B **	0.041	1.97	0.28	0.029	0.058	0.020	0.023	0.002	(0.07)	0.007	0.009	0.005	0.0003	0.004	0.004	. . .	45 x 20	
CRM	66 X MgD4B	0.0012	2.77	0.0053	0.69	0.0041	<0.001	0.0010	. . .	. . .	. . .	. . .	. . .	<0.0002	0.015	0.014	. . .	40 x 15	

Samples marked ** may be unsuitable for use with glow discharge analysis

CRM	66 X MgC1B	<0.002	2.54	0.010	0.74	0.056	<0.005	(0.0014)	. . .	. . .	<0.002	0.010	0.006	<0.0002	. . .	. . .	. . .	40 x 15	C
CRM	66 X MgC2D	0.0008	4.49	0.0078	0.54	0.033	<0.001	0.0011	. . .	. . .	(0.0008)	0.0058	0.0031	<0.0002	. . .	. . .	. . .	40 x 15	
CRM	66 X MgC3B	0.011	4.97	0.020	0.13	0.009	(0.003)	(0.001)	0.006	. . .	<0.002	0.003	0.001	. . .	. . .	. . .	. . .	40 x 15	
CRM	66 X MgC4C	0.039	6.80	0.167	<0.001	0.0023	0.06	0.006	0.01	<0.001	0.021	0.003	0.0074	0.0001	. . .	. . .	0.0001	40x15 or 50x20	

6.7 Mg/Rare Earth

		Al	Zn	Mn	Zr	Ce	La	Nd	Pr	Total R.E.	Cu	Si	Fe	Ni	Sn	Pb	Ag	Size (mm) Ø H	
CRM	67 X MgF1B	0.0176	0.501	0.0039	0.022	1.88	1.12	(0.05)	0.48	. . .	0.0048	<0.005	0.0024	(0.0003)	<0.002	<0.001	<0.001	40 x 15	C
CRM	67 X MgF2B	0.0038	1.71	0.0047	0.30	1.42	0.98	0.29	0.112	. . .	0.0033	<0.002	(0.001)	0.0008	<0.002	0.019	<0.001	40 x 15	
CRM	67 X MgF3B	<0.001	3.34	0.0040	0.53	1.17	0.84	0.212	0.106	. . .	0.0010	(0.001)	<0.002	. . .	<0.002	0.0140	<0.001	40 x 15	
CRM	67 X MgF4B	0.079	5.04	0.0023	0.024	0.81	0.47	0.048	0.195	. . .	0.0302	(0.0014)	<0.002	. . .	<0.001	<0.001	<0.0005	40 x 15	
CRM	67 X MgF5B	0.094	6.29	0.171	<0.001	0.412	0.239	0.011	0.100	. . .	0.0735	0.0026	0.0290	0.0004	<0.001	<0.0005	<0.0005	40 x 15	
	67 NH AEL-93	1.45	0.053	0.161	. . .	0.79	0.37	0.25	0.09	. . .	0.0121	0.0172	0.0058	0.0025	. . .	. . .	. . .	64 x 13	
	67 NH AEH-93	4.96	0.40	0.30	. . .	2.29	0.90	0.61	0.28	. . .	0.0575	0.0376	0.0018	0.0084	. . .	. . .	. . .	64 x 13	
	67 CA C7489	0.001	. . .	0.012	0.46	2.57	. . .	. . .	. . .	(5.0)	0.004	0.002	. . .	0.015	. . .	. . .	. . .	60 x 6	C
	67 CA C7514	0.002	. . .	0.012	0.42	2.47	. . .	. . .	. . .	(4.7)	0.12	0.002	. . .	0.002	. . .	. . .	. . .	60 x 6	
	67 CA C7546	0.003	. . .	0.039	0.34	1.63	. . .	. . .	. . .	(3.0)	0.058	0.001	. . .	0.004	. . .	. . .	. . .	60 x 6	
	67 CA C7548	0.004	. . .	0.035	0.16	2.66	. . .	. . .	. . .	(4.8)	0.022	0.002	. . .	0.001	. . .	. . .	. . .	60 x 6	
	67 CA C7594	0.003	. . .	0.033	0.31	3.22	. . .	. . .	. . .	(6.0)	0.080	0.002	. . .	0.001	. . .	. . .	. . .	60 x 6	
	67 CA E1273	. . .	2.87	0.041	0.54	1.86	. . .	. . .	. . .	(3.6)	0.022	. . .	. . .	0.002	. . .	. . .	. . .	60 x 6	

6.8 Mg/Ag/ Rare Earth

		Al	Zn	Mn	Zr	Total R.E.	Ce	La	Nd	Pr	Th	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Size (mm) Ø H	
CRM	68 X MgH1B	<0.002	0.053	0.0027	0.47	. . .	0.040	0.034	3.05	(0.014)	. . .	0.0046	<0.005	<0.002	(0.0006)	. . .	<0.002	<0.002	3.21	40 x 15	C
CRM	68 X MgH2B	<0.002	0.123	0.0038	0.46	. . .	0.055	0.044	2.70	(0.013)	. . .	0.0050	<0.002	(0.0006)	(0.0006)	. . .	<0.005	(0.0021)	2.94	40 x 15	
	68 X MgH3	<0.002	0.030	0.009	0.36	2.6	. . .	. . .	. . .	. . .	. . .	0.011	<0.005	0.002	0.001	0.007	<0.005	0.007	2.4	40 x 15	C
	68 X MgH6A	0.23	0.21	0.17	<0.01	(1.0)	. . .	. . .	. . .	. . .	. . .	0.11	0.01(5)	0.03	0.01	. . .	<0.002	<0.005	1.13	40 x 15	

The rare-earths in the above series were added as Neodymium rich R.E, but breakdowns of the individual R.E. values are not available.

	68 X MgL2	0.003	<0.002	0.008	0.54	1.02	. . .	. . .	. . .	. . .	0.69	0.012	<0.005	<0.001	<0.002	0.003	<0.005	<0.001	2.32	40 x 15	C
	68 X MgL3	0.003	<0.002	0.008	0.39	1.23	. . .	. . .	. . .	. . .	1.22	0.029	<0.005	0.002	<0.002	0.003	<0.005	<0.001	2.91	40 x 15	
	68 X MgL4	0.023	0.19	0.17	<0.005	1.33	. . .	. . .	. . .	. . .	1.32	0.049	0.01	0.017	0.012	0.006	0.009	<0.001	<0.005	40 x 15	

The rare-earths in the above series were added as Neodymium rich R.E, but breakdowns of the individual R.E. values are not available.

6.9 Mg/Y/ Rare Earth

		Al	Zn	Mn	Zr	Cu	Fe	Ni	Pb	Li	Y	Ce	La	Nd	Pr	
CRM	69 X MgY1A	(0.0019)	0.121	0.0109	0.38	(0.0015)	0.0021	(0.0005)	0.014	0.119	4.64	0.029	0.166	2.26	0.059	
CRM	69 X MgY2A *	0.020	0.33	0.008	0.37	0.002	0.003	0.010	0.009	0.010	1.85	0.048	0.033	2.60	0.018	continued
CRM	69 X MgY3A *	0.030	0.29	0.010	0.44	0.003	0.004	0.020	0.010	0.010	3.35	0.030	0.025	2.40	0.015	

* Target values

Continuation from above	Eu	Sm	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu	Typical Alloy Type	Size (mm) Ø H	
69 X MgY1A	(0.004)	0.09	0.284	0.045	0.313	0.065	0.13	(0.013)	0.078	0.007	WE 43	40 x 17	
69 X MgY2A	(0.001)	0.015	0.080	0.010	0.085	0.005	0.015	(0.004)	0.010	0.003		40 x 17	
69 X MgY3A	(0.002)	0.022	0.21	0.005	0.23	0.01	0.035	(0.003)	0.015	0.001		40 x 17	

See page 72 for materials in Chippings form

For Setting-Up Samples see section 16

7. Tin Base

Blocks/Discs

	7.1 Tin with Impurities	Sb	As	Bi	Pb	Cu	Fe	Ni	Al	Cd	Zn	In	Te	Ag	Au	Co	S	Sn	Size (mm) Ø H	
CRM	71 X SR0A	0.019	<0.001	0.014	0.034	0.0020	(0.001)	0.0025	0.014	0.0013	0.007	0.0095	. . .	0.0025	<0.0005	. . .	0.0008	. . .	40 x 15	C
CRM	71 X SR1D	0.013	0.003	0.010	0.030	0.009	0.0017	. . .	. . .	0.007	0.007	0.014	0.003	0.009	0.003	. . .	. . .	. . .	40 x 15	
CRM	71 X SR2D	0.057	0.041	0.056	0.127	0.054	0.002	0.0096	0.002	0.041	0.015	0.049	0.022	0.025	0.008	. . .	. . .	. . .	40 x 15	
CRM	71 X SR3E	0.145	0.061	0.105	0.29	0.101	0.003	0.0009	. . .	0.022	0.014	0.028	0.008	0.007	0.003	. . .	. . .	. . .	40 x 15	
	71 A 192g	0.0007	. . .	0.00003	0.0007	0.00007	0.0002	<0.0001	. . .	. . .	0.00006	. . .	. . .	. . .	. . .	. . .	. . .	99.997	300g block	C
																			W D H	
CRM	71 B 1727	(0.004)	<0.01	. . .	0.00333	. . .	(0.002)	. . .	. . .	. . .	. . .	(0.002)	. . .	. . .	. . .	. . .	. . .	. . .	30 x 30 x 30	
																			Ø H	
	71 MF NF54-1	0.0065	0.0105	0.0026	0.023	0.0107	0.003	0.0018	(0.0003)	0.0003	. . .	0.0053	. . .	0.006		(0.002)	. . .	. . .	37 x 12	C
	71 MF NF54-2	0.011	0.082	0.0046	0.148	0.047	0.014	0.0033	(0.008)	0.0006	. . .	0.013	. . .	0.010	. . .	0.002	. . .	. . .	37 x 12	
	71 MF NF54-3	0.020	0.13	0.010	0.41	0.15	(0.018)	0.012	(0.018)	0.0009	(0.001)	0.02	. . .	0.032	. . .	0.008	. . .	. . .	37 x 12	
	71 MF NF54-4	0.045	0.27	0.022	0.72	0.29	(0.023)	0.024	. . .	0.005	. . .	0.043	. . .	0.063	. . .	0.02	. . .	. . .	37 x 12	
	71 MF NF54-5	0.095	0.47	0.038	1.0	0.52	. . .	. . .	. . .	0.01	(0.016)	0.098	. . .	0.10	. . .	. . .	. . .	. . .	37 x 12	

	7.2 Tin/Antimony	Sb	As	Bi	Pb	Cu	Fe	Cd	Zn		Size (mm) Ø H	
	72 X SA4RB	4.0	0.03	0.10	0.08	0.02	0.10	0.003	0.007		40 x 15	C
	72 X SA5RB	5.0	0.02	0.005	0.025	0.005	0.003	0.02	0.001	A set of Sn/Sb binaries is also available, with certified levels of Sb	40 x 15	
	72 X SA6RB	6.0	0.05	0.25	0.25	0.10	0.05	0.01	0.02	in the range from 1% to 12%. Please enquire for details.	40 x 15	

	7.3 Tin White Metals (Pewter/Babbitt)	Sb	As	Bi	Pb	Cu	Fe	Ni	Al	Cd	Zn	In	Ag	Co	S	Size (mm) Ø H	
CRM	73 X SC1A	1.48	0.008	0.084	0.067	2.02	0.0025	0.0041	0.0025	0.006	0.003	0.008	0.010	<0.001	<0.002	40 x 15	C
CRM	73 X SC2A	3.07	0.035	0.62	0.029	1.06	0.030	0.0048	(0.002)	0.036	0.003	(0.002)	0.006	0.021	<0.001	40 x 15	
CRM	73 X SC3A	4.60	0.029	0.020	0.040	0.222	0.017	0.0136	0.001	0.024	0.0014	0.031	0.013	0.006	(0.002)	40 x 15	
CRM	73 X SC4A	6.02	0.005	0.218	0.514	3.05	0.011	0.017	0.005	0.052	0.008	0.011	0.042	0.0035	(0.003)	40 x 15	
CRM	73 X SC5A	7.03	0.013	0.43	0.136	0.57	0.004	0.0058	0.003	0.008	0.001	0.036	0.063	0.011	(0.001)	40 x 15	
CRM	73 X SC6A	0.092	0.204	0.115	0.100	5.17	0.007	0.013	(0.003)	0.0125	0.01	0.058	0.08	0.0050	(0.004)	40 x 15	
CRM	73 X SC7A	14.01	0.047	0.009	0.356	6.51	0.046	0.008	0.001	0.0018	(0.003)	0.014	0.006	0.0160	<0.001	40 x 15	
CRM	73 X SC8A	9.65	0.121	0.037	0.037	3.89	0.073	0.014	0.004	0.133	(0.008)	0.017	(0.0015)	0.017	(0.011)	40 x 15	
CRM	73 X SC9A	8.18	0.53	0.066	0.20	8.47	0.037	0.008	<0.001	0.078	(0.003)	0.010	0.004	0.0030	(0.008)	40 x 15	
CRM	73 X SC11A	11.63	0.31	0.537	0.040	10.54	0.072	0.49	<0.002	1.63	0.065	. . .	0.060	. . .	. . .	40 x 15	
CRM	73 X SC12A	8.05	0.024	0.020	0.024	7.72	0.051	0.384	<0.002	0.625	0.020	. . .	0.83	. . .	. . .	40 x 15	
CRM	73 PN LA1	6.79	0.012	0.014	3.18	2.45	0.012	0.011	. . .	1.41	0.0016	. . .	. . .	. . .	. . .	40 x 25	
CRM	73 PN LA2	7.81	0.092	0.033	2.17	3.84	0.018	0.094	. . .	0.88	. . .	. . .	. . .	. . .	. . .	each	
CRM	73 PN LA3	10.22	0.24	0.059	1.19	8.13	0.059	0.28	. . .	0.50	0.0095	. . .	. . .	. . .	. . .		
CRM	73 PN LA4	11.66	0.43	0.085	0.41	6.35	0.080	0.45	. . .	0.096	. . .	. . .	. . .	. . .	. . .	Set Only	
CRM	73 PN LA5	13.58	0.54	0.099	0.070	5.45	0.096	0.53	. . .	0.011	0.020	. . .	. . .	. . .	. . .		

	7.4 Tin-base (Lead-Free) Solders	Cu	Ag	Pb	Sb	Bi	Zn	Ni	Fe	As	Cd	Se	Au	Al	Sn	Size (mm) Ø H	
CRM	74 X E A	3.00	0.744	0.0262	0.028	0.0097	<0.001	0.011	0.052	0.088	0.0022	0.0025	. . .	. . .	rem	40 x 15	C
CRM	74 X HN A	3.98	0.156	0.082	0.0256	0.141	0.0011	0.0083	0.028	0.0009	0.0045	0.0057	. . .	. . .	(95.6)	40 x 15	
CRM	74 X TC A	4.88	0.013	0.183	0.056	0.040	0.011	0.0134	0.062	0.016	0.0112	0.069	. . .	. . .	(94.6)	40 x 15	
CRM	74 X AM A	3.00	0.55	0.174	1.05	0.196	0.0024	0.028	0.054	0.064	0.0065	. . .	. . .	. . .	rem	40 x 15	C
CRM	74 X HA A	0.604	2.69	0.025	1.98	0.057	2.59	0.016	0.052	0.0076	0.0025	. . .	. . .	. . .	rem	40 x 15	
CRM	74 X HB A	4.76	0.069	0.059	4.97	0.0087	0.018	1.10	0.116	0.027	0.0106	. . .	. . .	. . .	rem	40 x 15	
CRM	74 X CA1A	0.696	0.406	0.077	0.016	0.013	. . .	. . .	. . .	. . .	. . .	. . .	0.0069	0.0101	. . .	40 x 15	C
CRM	74 X CA3A	0.055	3.11	0.036	0.027	0.017	. . .	. . .	. . .	. . .	. . .	. . .	0.0100	<0.001	. . .	40 x 15	
	74 MF NF46-3X	0.19	3.1	0.043	0.205	0.05	. . .	. . .	. . .	. . .	. . .	. . .	(0.015)	. . .	. . .	37 x 12	C
	74 MF NF46-4X	0.096	4.1	0.059	0.11	0.095	. . .	. . .	. . .	. . .	. . .	. . .	(0.007)	. . .	. . .	37 x 12	
	74 MF NF46-5X	0.030	5.0	0.21	0.059	0.25	. . .	. . .	. . .	. . .	. . .	. . .	(0.017)	. . .	. . .	37 x 12	

8. Lead Base

Blocks/Discs

	8.1 Binaries. Lead-Antimony, Lead-Arsenic	Sb	As	Size (mm) Ø H	
CRM	81 X PA0.5C	0.481	. . .	40 x 15	C
CRM	81 X PA1.0C	0.989	. . .	40 x 15	
CRM	81 X PA2.0D	1.996	. . .	40 x 15	
CRM	81 X PA3.5D	3.53	. . .	40 x 15	
CRM	81 X PA7.0D	7.02	. . .	40 x 15	
CRM	81 X PA10.0C	9.60	. . .	40 x 15	
CRM	81 X PA12.5D	12.72	. . .	40 x 15	
	81 X PAs1A	. . .	1.25	40 x 15	C

See page 73 for materials in Chippings form

For Setting-Up Samples see section 16

8.2 Lead/Silver

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Fe	Al	In	Size (mm) Ø H	
CRM	82 X PAg 1.5R E	0.036	0.386	0.065	0.27	0.005	1.55	(0.004)	...	...	...	...	40 x 15	C
CRM	82 X PAg 2.5R D	0.082	0.246	0.13	0.26	0.009	2.21	(0.0024)	...	...	...	...	40 x 15	
CRM	82 X PAg 3.5R D	0.25	0.106	0.290	0.073	0.020	3.54	(0.0004)	0.0027	<0.001	0.0015	0.037	40 x 15	
CRM	82 X PAg 6.0R A	0.50	0.48	0.52	0.18	0.021	5.93	0.007	0.010	<0.001	<0.001	0.008	40 x 15	
	82 MF NF32-30X	0.63	0.43	0.045	0.22	(0.005)	1.96	(0.001)	...	...	...	...	37 x 12	C
	82 MF NF32-31X	1.04	0.24	0.10	0.067	0.016	1.57	(0.0025)	...	...	...	...	37 x 12	
	82 MF NF32-32X	1.25	0.11	0.30	0.52	0.023	0.55	(0.005)	...	...	...	...	37 x 12	
	82 MF NF34-4.5X	0.049	0.42	0.051	0.25	(0.005)	4.54	(0.001)	...	...	...	...	37 x 12	C
	82 MF NF34-5.5X	0.081	0.28	0.10	0.14	(0.01)	5.43	(0.0025)	...	...	...	...	37 x 12	
	82 MF NF34-6.5X	0.19	0.11	0.22	0.81	(0.02)	6.65	(0.005)	...	...	...	...	37 x 12	

8.3 Lead with Impurities

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Fe	Te	Al	In	Ca	Na	Se	Au	Size (mm) Ø H	
	83 X PR1G	0.004	0.005	0.080	0.006	0.050	0.088	0.002	0.075	0.001	0.001	0.003	0.001	0.045	0.004	0.01	<0.002	0.008	40 x 15	C
CRM	83 X PR2E	0.095	0.053	0.0177	0.039	0.018	0.053	(0.0004)	0.0021	0.0010	<0.0005	0.0064	...	0.0015	(0.001)	...	0.004	(0.0011)	40 x 15	
CRM	83 X PR3E	0.048	0.09	0.193	0.057	(0.001)	0.003	0.0017	0.050	0.0024	<0.001	0.004	<0.001	0.002	0.001	(0.003)	(0.01)	(0.005)	40 x 15	
	83 X PR4F	0.009	0.012	0.014	0.015	(0.002)	0.014	0.005	0.010	0.013	<0.005	0.025	0.001	0.005	0.0026	0.001	0.003	0.002	40 x 15	
	83 X PR5B	<0.0002	<0.0001	0.0028	0.0007	(0.0001)	0.0005	<0.0001	0.00009	<0.0001	<0.0001	<0.0001	...	...	<0.0001	...	<0.0001	...	52 x 14	
CRM	83 X PR7A	0.21	0.84	0.50	0.22	0.049	0.30	0.002	0.49	0.005	(0.001)	0.002	(0.001)	0.077	(0.001)	0.004	(0.01)	(0.001)	40 x 15	
CRM	83 X PR8A	0.59	0.25	1.13	0.083	0.17	0.55	0.007	0.260	0.003	(0.001)	(0.002)	(0.001)	0.74	<0.002	0.019	(0.012)	(0.011)	40 x 15	
	83 MF NF44-A	<0.003	<0.003	0.00086	0.00088	0.00072	0.0013	0.0005	0.0021	0.00072	<0.005	...	...	<0.001	0.00037	...	...	...	37 x 12	C
	83 MF NF44-B	0.0030	0.0054	0.0051	0.0058	0.0059	0.0050	...	0.00070	0.0036	<0.005	...	...	0.0014	...	...	...	...	37 x 12	
	83 MF NF44-C	0.059	0.018	0.021	0.016	0.015	0.015	...	0.016	0.0013	<0.005	...	...	0.0026	0.0009	...	...	...	37 x 12	
	83 MF NF44-D	0.13	0.059	0.053	0.027	0.055	0.033	...	0.036	...	...	...	...	0.021	...	...	...	...	37 x 12	
	83 MF NF44-E	0.56	0.60	0.49	0.042	0.53	0.19	0.0025	0.12	...	...	...	...	...	...	...	...	...	37 x 12	
	83 MF NF44-F	1.05	0.89	0.77	0.064	...	0.65	0.0015	0.53	...	...	...	...	0.30	...	...	...	...	37 x 12	
	83 X PBTE/2 B	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	...	...	<0.001	0.060	...	...	...	...	...	...	40 x 15	C

		All Elements ppm Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Te	Ti	Se	Size (mm) W D H	
CRM	83 F 286 A	<0.05	0.10	21.5	1.49	<0.002	0.015	<0.1	0.125	0.041	<0.1	2.5	<0.05	60 x 60 x 12	C
CRM	83 F 287 A	<0.05	0.040	67.3	0.98	<0.003	15.2	<0.1	0.36	0.024	<0.2	0.73	<0.05	60 x 60 x 12	
CRM	83 F 288 A	30.6	32.5	215.8	19.3	55.7	30.5	8.2	33.3	4.57	32.8	2.3	<0.2	60 x 60 x 12	

8.4 Lead/Tin/Calcium (Battery Alloys)

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Te	Al	Ca	Ni	Fe	Mn	Mg	Se	S	Size (mm) Ø H	
CRM	84 X BA1E	1.054	0.0018	0.0148	0.0019	(0.0004)	0.0099	0.0031	0.0026	(0.0004)	0.0135	0.099	0.0002	...	...	...	...	...	40 x 15	C
CRM	84 X BA2B	0.51	0.002	0.024	0.003	<0.0005	0.008	0.019	0.0052	<0.002	...	0.062	(0.0002)	...	...	...	...	...	40 x 15	
CRM	84 X BA3B	0.233	0.0049	0.034	0.0042	(0.0007)	0.0044	0.0069	0.0032	(0.0003)	0.0051	0.017	...	...	...	...	...	...	40 x 15	
CRM	84 X BA4B	0.108	0.061	0.074	0.031	(0.0008)	0.003	(0.0003)	0.010	0.030	...	(0.0014)	0.0007	...	...	...	...	...	40 x 15	
	84 X BA5A	1.18	<0.001	0.01	(0.0007)	<0.001	0.002	<0.0005	(0.0002)	<0.001	...	0.093	...	...	...	...	...	...	52 x 14	
	84 X BA6A	0.73	0.001	0.008	0.0010	<0.001	0.002	<0.001	(0.0002)	<0.001	...	0.095	...	...	...	...	...	...	52 x 14	
	84 X BA7A	0.61	0.002	0.009	0.0009	<0.001	0.002	<0.0005	<0.0002	<0.001	...	0.036	...	...	...	...	...	...	52 x 14	
CRM	84 X BA8A	0.293	0.0009	0.019	0.0007	(0.0004)	0.0043	0.0013	0.0010	<0.002	0.021	0.156	...	...	...	...	...	...	40 x 15	
CRM	84 X BA9A	2.97	0.0008	0.0160	0.0009	(0.0008)	0.0018	(0.0002)	<0.0005	<0.0005	0.0189	0.098	...	...	...	...	...	...	40 x 15	
CRM	84 X BACM D	0.645	(0.0003)	0.0022	0.0004	(0.0001)	0.0004	0.0002	<0.0001	(0.0002)	0.0123	0.101	<0.0001	<0.0005	<0.0001	(0.00008)	<0.0001	<0.0001	55 x 12	C
CRM	84 X BAHC E	<0.0005	(0.0001)	0.0130	0.0005	(0.00015)	0.0005	(0.00017)	<0.0001	(0.0001)	0.0304	0.139	<0.0001	<0.0001	<0.0001	(0.0001)	<0.0001	<0.0001	55 x 12	
CRM	84 DB 101	0.293	...	0.0167	0.00173	...	0.00288	...	...	...	0.0257	0.1436	...	...	...	...	...	...	50 x 30	C
CRM	84 DB 102	0.895	...	0.0148	0.00109	...	0.00248	...	...	...	0.0124	0.0705	...	...	...	...	...	...		

8.5 Various Lead Alloys

		Sn	Sb	Bi	Cu	As	Ag	Ni	Cd	Zn	Te	Se	Fe	S	Size (mm) Ø H	
	85 X PSn2A	1.87	0.023	0.0093	0.035	<0.005	0.002	<0.001	<0.001	<0.001	<0.001	0.0058	<0.001	...	52 x 14	C
CRM	85 X PSb3B	0.242	2.67	0.017	0.039	0.150	0.002	0.0011	0.0012	(0.0003)	0.0030	0.022	(0.0005)	(0.003)	40 x 15	
CRM	85 X PSb3C	0.226	3.24	0.0150	0.041	0.125	0.0020	0.0005	(0.0002)	<0.0005	(0.0007)	0.011	<0.0005	(0.0034)	40 x 15	
	85 X PSb5A	0.057	5.14	0.022	0.007	0.12	0.0017	0.0025	<0.001	<0.001	<0.001	0.0008	<0.001	(0.0070)	52 x 14	
	85 X PSb8A	0.085	8.43	0.010	0.032	0.02	0.0016	0.0014	<0.001	(0.0002)	<0.005	0.0007	<0.001	(0.0011)	52 x 14	
	85 X PSb10A	0.080	10.2	0.007	0.14	0.11	0.0015	0.0013	<0.001	0.014	<0.002	<0.001	<0.005	...	52 x 14	
	85 X PSb12A	0.21	11.4	0.007	0.30	0.11	0.0015	0.0016	<0.001	0.087	<0.005	<0.001	<0.001	...	52 x 14	
CRM	85 X ANTH D	1.32	6.32	0.059	0.0234	0.487	0.0058	0.0035	0.0052	0.0004	0.010	0.017	0.0041	(0.0030)	40 x 15	C
CRM	85 X HRH G	0.87	1.14	0.090	0.080	0.73	0.247	0.001	0.0002	...	0.002	0.035	...	(0.0008)	55 x 12	
CRM	85 X CADH A	0.196	2.03	0.0174	0.029	0.191	0.0043	0.0023	2.06	0.0035	0.0021	0.004	0.0003	<0.001	40 x 15	
CRM	85 X 0494Pb1A	0.051	0.95	0.0017	0.012	0.049	...	...	...	...	...	0.004	...	...	40 x 15	C
CRM	85 X 0494Pb2A	0.155	2.07	0.0018	0.054	0.128	...	...	...	...	...	0.023	...	...	40 x 15	
CRM	85 X 0494Pb3A	0.294	3.02	0.038	0.100	0.277	...	...	...	...	...	(0.05)	...	...	40 x 15	
CRM	85 X 0616Pb1A	0.070	1.76	0.026	0.047	0.068	0.0023	0.0010	0.0022	0.0009	(0.0016)	0.017	<0.001	...	40 x 15	C

8.6 Lead Babbitts

		Sn	Sb	Bi	Cu	As	Ag	Ni	Cd	Zn	Fe	Al	In	Pd	Size (mm) Ø H	
CRM	86 X PSS1A	4.42	12.11	0.21	0.028	0.59	0.003	0.0014	0.006	<0.001	(0.0005)	<0.001	0.008	<0.0005	40 x 15	C
CRM	86 X PSS2A	6.33	8.16	0.054	0.118	1.42	0.004	0.0080	0.069	<0.002	<0.001	<0.0005	(0.002)	(0.001)	40 x 15	
CRM	86 X PSS3A	9.01	14.02	0.031	0.608	0.10	0.006	0.0040	0.020	<0.001	(0.0016)	<0.001	0.004	(0.003)	40 x 15	
CRM	86 X PSS4A	10.69	16.97	0.120	0.328	0.278	(0.006)	0.0031	0.047	<0.002	(0.0013)	<0.001	0.013	(0.007)	40 x 15	

See page 73 for materials in Chippings form

For Setting-Up Samples see section 16

9.1 Tin/Lead Solders

		Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Ni	Au	In	Te	Al	Pb	Size (mm) Ø H	
	91 X S10 PR1B	8.81	0.04	0.03	0.015	0.006	0.005	0.003	0.008	0.003	0.009	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S10 PR2C	10.38	0.51	0.15	0.05	0.04	0.050	0.003	0.030	0.007	0.003	. . .	. . .	. . .	. . .	rem	40 x 15	
	91 X S10 PR3B	11.97	0.26	0.23	0.12	0.02	0.030	0.002	0.003	0.011	(0.02)	. . .	. . .	. . .	. . .	rem	40 x 15	
	91 X S10 P C	10.14	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.001	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 MF NF43-9X	9.5	0.015	0.011	0.001	0.0009	0.002	(0.0002)	(0.0002)	0.0007	(0.0002)	0.005	0.005	. . .	(0.0005)	rem	37 x 12	C
	91 MF NF43-10X	10.0	0.11	0.012	0.002	0.003	0.004	(0.0003)	(0.0001)	0.002	(0.0003)	0.009	0.011	. . .	(0.002)	rem	37 x 12	
	91 MF NF43-11X	11.3	0.20	0.040	0.003	0.004	0.010	(0.010)	(0.010)	0.009	(0.0004)	0.012	0.036	. . .	(0.004)	rem	37 x 12	
	91 MF NF31-33X	8.6	0.20	0.0079	0.02	. . .	2.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	rem	37 x 12	C
	91 MF NF31-34X	10.0	0.085	0.010	0.014	. . .	2.15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	rem	37 x 12	
	91 MF NF31-35X	10.7	0.048	0.032	0.0045	. . .	1.10	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	rem	37 x 12	
	91 X S30 PR1B	29.3	0.047	0.057	0.19	0.006	0.007	(0.08)	0.0013	0.0024	0.0023	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S30 PR2B	30.2	0.60	0.15	0.076	0.028	0.044	0.04	0.031	0.0070	0.007	. . .	. . .	. . .	. . .	rem	40 x 15	
CRM	**91 X S30 PR3C**	30.88	0.269	0.294	0.102	0.0126	0.024	0.0016	(0.003)	0.0115	0.0269	0.0063	0.0085	. . .	. . .	rem	40 x 15	
	91 X S30 P C	30.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S40 PR1B	39.1	0.059	0.060	0.20	0.006	0.005	<0.005	0.008	0.001	0.002	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S40 PR2C	40.4	0.60	0.15	0.050	0.026	0.050	(0.003)	0.028	0.0057	0.007	. . .	. . .	. . .	. . .	rem	40 x 15	
	91 X S40 PR3B	41.8	0.25	0.25	0.094	0.018	0.022	0.01	0.002	0.010	0.016	. . .	. . .	. . .	. . .	rem	40 x 15	
	91 X S40 P C	40.3	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S50 PR1B	49.5	0.062	0.060	0.214	0.008	0.006	0.01	0.004	0.006	0.007	. . .	. . .	. . .	. . .	rem	40 x 15	C
	91 X S50 PR2B	50.5	0.56	0.16	0.059	0.026	0.053	0.01	0.023	0.011	0.003	. . .	. . .	. . .	. . .	rem	40 x 15	
	91 X S50 PR3C	51.4	0.26	0.25	0.10	0.015	0.020	0.009	0.008	0.002	0.016	. . .	. . .	. . .	. . .	rem	40 x 15	
CRM	**91 X S50 PR4A**	54.6	0.098	0.097	1.58	0.044	0.045	(0.0034)	0.0105	0.0118	0.0114	0.029	0.052	. . .	. . .	rem	40 x 15	
	91 X S50 P D	50.1	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	. . .	. . .	. . .	. . .	rem	40 x 15	C
CRM	**91 X S63 PR0A**	59.8	0.013	0.007	0.023	0.008	0.010	(0.0026)	<0.001	0.012	<0.005	0.018	0.01	<0.001	. . .	rem	40 x 15	C
CRM	**91 X S63 PR1F**	61.30	0.075	0.062	0.252	(0.001)	0.0065	0.012	0.0032	0.0057	0.0010	0.040	0.028	0.0008	. . .	rem	40 x 15	
CRM	**91 X S63 PR2G**	62.6	0.614	0.162	0.052	0.080	0.057	0.030	0.007	0.0168	0.0073	0.090	0.019	0.009	. . .	rem	40 x 15	
CRM	**91 X S63 PR3F**	64.27	0.253	0.255	0.133	0.0190	0.0222	0.0054	(0.002)	0.0015	0.0196	0.175	0.0087	(0.0002)	. . .	rem	40 x 15	
CRM	**91 X S63 PR4A**	66.8	0.093	0.030	0.021	<0.002	0.030	<0.005	<0.001	0.021	<0.005	0.05	0.014	0.006	. . .	rem	40 x 15	
	91 X S63 P G	62.6	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	. . .	. . .	. . .	rem	40 x 15	C
	91 MF NF1-60X	60.0	0.0034	<0.0005	0.0006	<0.0005	0.0006	0.0031	0.006	0.0006	<0.0005	0.00096	<0.001	. . .	<0.0005	rem	37 x 12	C
	91 MF NF1-62X	62.3	0.021	0.0057	0.0012	0.00084	0.0012	0.012	0.0095	0.0020	0.0006	0.0056	0.0010	. . .	<0.001	rem	37 x 12	
	91 MF NF1-63X	63.4	0.050	0.0095	0.0045	0.0065	0.0050	0.0052	0.015	0.0049	0.0085	0.0090	0.0091	. . .	<0.001	rem	37 x 12	
	91 MF NF1-64X	64.5	0.095	0.019	0.0090	0.010	0.0085	0.010	0.065	0.010	0.0042	0.019	0.040	. . .	<0.001	rem	37 x 12	
	91 MF NF2-A-10	63.1	0.11	0.040	0.047	0.009	0.015	(0.005)	<0.003	0.004	0.001	0.047	0.005	. . .	<0.002	rem	37 x 12	C
	91 MF NF2-A-11	62.6	0.31	0.098	0.091	0.028	0.031	(0.012)	<0.003	0.011	0.006	0.11	0.018	. . .	<0.002	rem	37 x 12	
	91 MF NF2-A-12	63.4	0.45	0.22	0.28	0.032	0.12	(0.021)	(0.015)	0.018	0.015	0.23	0.030	. . .	<0.002	rem	37 x 12	
CRM	**91 PN L1**	56.06	0.52	0.17	0.11	0.051	. . .	. . .	0.00093	0.0020	. . .	. . .	. . .	. . .	. . .	rem	40 x 30	C
CRM	**91 PN L2**	59.09	0.35	0.11	0.075	0.034	. . .	(0.011)	0.0019	0.0043	. . .	. . .	. . .	. . .	. . .	rem	each	
CRM	**91 PN L3**	60.18	0.14	0.22	0.034	0.092	. . .	(0.023)	0.0064	0.0065	. . .	. . .	. . .	. . .	. . .	rem		
CRM	**91 PN L4**	62.81	0.079	0.055	0.013	0.017	. . .	(0.0085)	0.0011	0.0080	. . .	. . .	. . .	. . .	. . .	rem	Set only	
CRM	**91 PN L5**	64.96	0.011	0.014	0.0037	0.0035	. . .	. . .	0.0056	0.0097	. . .	. . .	. . .	. . .	. . .	rem		

9.3 Tin/Lead/Antimony Solders

		Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Ni	In	Te	Pb	Size (mm) Ø H	
CRM	**93 X S30 APR1C**	28.58	2.54	0.059	0.192	0.010	0.0144	(0.012)	(0.0004)	0.0014	0.0010	0.0094	0.0024	rem	40 x 15	C
CRM	**93 X S30 APR2C**	30.68	1.80	0.168	0.062	0.0178	0.049	0.0026	0.028	0.0061	0.042	0.0199	0.0102	rem	40 x 15	
CRM	**93 X S30 APR3C**	33.0	0.96	0.28	0.008	0.018	0.021	0.0026	0.005	0.009	0.010	. . .	. . .	rem	40 x 15	
	93 X S40 APR1A	38.5	2.70	0.06	0.23	0.011	0.007	(0.01)	0.002	0.002	0.003	. . .	. . .	rem	40 x 15	C
	93 X S40 APR2A	39.6	2.10	0.19	0.07	0.030	0.052	(0.02)	0.04	0.006	0.006	. . .	. . .	rem	40 x 15	
	93 X S40 APR3A	41.4	1.70	0.26	0.12	0.024	0.021	(0.03)	0.022	0.011	0.014	. . .	. . .	rem	40 x 15	
	93 X S50 APR1A	48.4	3.2	0.052	0.18	0.007	0.010	(0.01)	0.002	0.002	0.002	. . .	. . .	rem	40 x 15	C
	93 X S50 APR2A	49.6	2.8	0.15	0.049	0.027	0.055	0.01	0.042	0.006	0.014	. . .	. . .	rem	40 x 15	
	93 X S50 APR3A	51.2	2.3	0.25	0.093	0.023	0.025	(0.02)	0.013	0.010	0.010	. . .	. . .	rem	40 x 15	

9.5 Fusible Alloys

		Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Al	In	Pb	Nominal Melting Temperature °C	Size (mm) Ø H	
	95 X 117A	8.02	0.010	45.3	0.010	. . .	0.0043	. . .	0.0056	4.95	. . .	18.72	23.1	47	40 x 15	C
	95 X 136A	12.05	0.022	48.8	0.0028	. . .	0.0056	. . .	0.031	0.0092	. . .	21.49	18.0	58	40 x 15	
	95 X 158A	13.38	0.056	50.1	0.049	. . .	0.0021	. . .	0.043	9.50	. . .	0.0058	26.9	70	40 x 15	
	95 X 174A	16.70	0.086	57.1	0.0030	. . .	0.0075	. . .	0.037	0.0089	. . .	26.08	0.082	79	40 x 15	
	95 X 255A	0.220	0.312	55.7	0.041	. . .	0.0020	. . .	0.035	0.0065	. . .	0.010	43.7	124	40 x 15	
	95 X BIS40P1A	42.9	0.10	56.5	0.106	0.005	0.033	0.002	0.011	0.011	(0.0009)	0.051	0.085	138	40 x 15	
	95 X CDS50P1A	50.1	0.113	0.13	0.26	0.027	0.030	(0.0022)	0.007	18.1	<0.002	0.092	31.0	145	40 x 15	

10.1 Various Ti Alloys

	Al	Mo	Sn	Fe	Mn	Cu	V
101 P 205	. . .	15.0	. . .	0.03	. . .	. . .	. . .
101 P 230	. . .	. . .	. . .	0.05	. . .	2.5	. . .
101 P 260	. . .	. . .	. . .	0.05	. . .	. . .	. . .
101 P 315	1.5	. . .	. . .	0.05	1.5	. . .	. . .
101 P 317	5.0	. . .	2.5	0.2	. . .	. . .	. . .
101 P 318	6.0	. . .	. . .	0.2	. . .	. . .	4.0
101 P 367	6.0	. . .	. . .	0.1	. . .	. . .	. . .

Suitable for use with XRF Spectrometers only.

10.1 Various Ti Alloys (continued)

	Al	Mo	Si	Sn	Zr	Fe	V	Nb	Size (mm) Ø	H
101 P 550	4.0	4.0	0.5	2.0	0.05	0.05	. . .	. . .	All this	
101 P 551	4.0	4.0	0.5	4.0	. . .	0.05	. . .	. . .	10.1 Series	
101 P 679	2.25	1.0	0.2	11.0	5.0	0.05	. . .	. . .	are	
101 P 685	6.0	0.5	0.3	<0.02	5.0	0.03	. . .	. . .	Cast Discs	
101 P 811	8.0	1.0	. . .	. . .	. . .	0.03	10.0		of size	
101 P 829	5.5	0.3	0.3	3.5	3.0	0.03	. . .	1.0	32	x 8
101 P 6242	6.0	2.0	0.1	2.0	4.0	0.07	. . .	. . .		
101 P 6246	6.0	6.0	0.05	2.0	4.0	0.05	. . .	. . .		

Suitable for use with XRF Spectrometers only.

		Al	Mo	Si	Sn	Zr	Mn	Cu	V	Fe	Nb	Cr	W	Ni	C	N	O	H	Size (mm) Ø	H	
CRM	**101 M BS T-2a**	0.005	0.002	0.002	0.006	<0.003	0.003	(0.001)	<0.002	0.156	. . .	0.018	<0.002	0.021	(0.007)	(0.0044)	(0.12)	(0.0020)	32	x 12	W
CRM	**101 M BS T-4a**	0.040	0.0006	0.011	0.005	<0.002	0.003	(0.001)	(0.001)	0.19	. . .	0.026	<0.002	0.014	0.014	0.005	(0.37)	(0.0027)	32	x 12	
CRM	**101 M BS T-5a**	6.33	0.004	0.02	0.009	0.003	<0.002	0.0025	4.10	0.170	. . .	0.013	<0.01	0.012	0.011	0.008	0.190	(0.0025)	32	x 12	
	101 MBS T-13	3.7	1.23	0.03	0.020	(0.001)	0.04	0.021	0.11	2.21	. . .	3.59	0.38	0.018	0.008	(0.012)	. . .	. . .	32	x 12	
	101 MBS T-14	4.94	1.72	0.04	0.03	<0.01	0.02	0.022	0.013	1.9	<0.002	1.98	0.48	0.012	(0.01)	0.006	. . .	. . .	32	x 12	
	101 MBS T-15	6.23	3.1	0.02	0.015	<0.002	0.02	0.03	(0.01)	1.02	. . .	1.02	(0.52)	0.007	0.007	(0.007)	. . .	. . .	32	x 12	
	101 MBS T-22	0.004	1.15	(0.02)	0.019	<0.01	2.02	0.04	0.50	1.19	. . .	1.22	0.51	0.008	0.005	(0.01)	. . .	. . .	32	x 12	
	101 MBS T-23	0.003	0.91	<0.01	0.025	(0.002)	3.70	0.012	0.93	0.93	. . .	0.91	0.87	0.004	0.006	(0.007)	. . .	. . .	32	x 12	
	101 MBS T-24	0.002	0.51	(0.01)	0.019	(0.001)	4.7	0.02	1.22	0.54	. . .	0.54	0.37	(0.007)	0.005	0.006	. . .	. . .	32	x 12	
	101 MBS T-26	0.002	0.028	(0.01)	0.025	0.005	0.006	0.037	0.02	0.055	. . .	0.037	0.57	0.002	0.005	(0.005)	. . .	. . .	32	x 12	
CRM	**101 MI 174A**	0.013	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	. . .	0.15	. . .	<0.01	. . .	. . .	0.009	0.0089	0.30	0.0057	31	x 18	W
CRM	**101 F 089**	5.97	. . .	. . .	. . .	. . .	. . .	. . .	3.976	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	x 20	
CRM	**101 F 090A**	(0.074)	0.0488	. . .	(0.071)	(0.0436)	0.0314	0.0513	(0.057)	0.0563	(0.0492)	0.0533	(0.050)	0.0667	. . .	. . .	. . .	Co 0.0501	40	x 20	

11.1 Cobalt/Cr/W — Alloy Type WI 52

		C	Si	Mn	Ni	Cr	W	Nb	Ta	Fe	Cu	Pb	Sn	Mo	Al	S	N	Others	Size (mm) Ø	H	
	111 X 12667L	. . .	0.63	0.50	0.60	20.8	10.7	1.56	0.14	1.41	0.11	(0.013)	0.14	0.16	0.02	. . .	. . .		40	x 15	C
	111 X 12669J	. . .	0.71	0.57	0.62	22.04	10.65	2.06	. . .	1.41	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 15	
	111 X 12670M	0.01	0.60	0.46	1.13	19.6	10.7	2.36	0.07	1.32	0.06	(0.005)	0.042	0.08	(0.003)	(0.027)	0.008	P (0.012)	40	x 15	
	111 X 12671J	. . .	0.51	0.61	0.88	20.5	11.8	1.95	. . .	1.45	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 15	
	111 X 12672J	0.126	0.78	0.72	0.71	21.8	9.3	1.87	0.09	1.87	0.14	0.01	0.034	0.29	0.27	0.014	. . .		40	x 15	
CRM	**111 X 12673A**	(0.005)	0.82	0.52	1.69	19.0	9.75	2.35	0.06	1.70	0.104	(0.003)	0.074	0.086	<0.005	0.022	0.031	P 0.010	40	x 15	

11.2 Cobalt/Cr/Mo — Alloy Type Stellite 8, BS 3531, etc

		C	Si	Mn	Ni	Cr	W	Mo	Fe	Al	Cu	Nb	Zr	P	S	B	N	Others	Size (mm) Ø	H	
	112 X 14936N	0.45	0.23	0.77	1.67	23.00	1.12	4.65	0.39	0.48	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 15	C
CRM	**112 X 14937Q**	0.238	1.48	0.85	3.47	24.37	3.17	7.1	1.84	1.20	0.164	0.058	(0.015)	0.0095	0.0069	0.0061	0.11	Sn 0.011	43	x 20	
	112 X 14941M	0.38	0.45	0.14	1.17	26.85	0.54	4.16	0.76	0.03	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 15	
	112 X 14942M	0.090	1.02	0.46	0.29	28.47	1.67	6.22	1.09	0.18	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 15	
CRM	**112 X 14943E**	0.233	0.53	1.18	0.12	32.5	(0.09)	7.53	0.85	<0.01	0.116	(0.063)	. . .	0.006	0.0137	(0.0034)	0.115	Pb (0.0067)	43	x 20	
CRM	**112 X 14944A**	0.225	0.71	0.744	0.128	29.24	<0.02	6.29	0.14	<0.01	0.006	<0.01	. . .	0.0017	0.0040	(0.0004)	0.148		38	x 19	W
CRM	**112 MT 074A**	0.089	0.59	0.78	0.150	27.12	<0.01	5.47	(0.93)	. . .	0.005	. . .	. . .	0.002	0.002	(<0.001)	0.17		38	x 14	

11.3 Cobalt/Cr/Ni/W — Alloy Type Stellite 31

		C	Si	Mn	Ni	Cr	W	Fe	B	S	P	Size (mm) Ø	H	
	113 X X401G	0.56	1.22	0.20	11.74	25.24	7.09	0.73	0.008	. . .	. . .	40	x 15	C
	113 X X402H	0.38	0.32	1.26	9.41	24.86	7.96	2.15	. . .	0.036	0.045	40	x 15	
	113 X X403G	0.52	0.85	0.69	10.40	25.03	7.82	1.06	0.006	0.022	0.021	40	x 15	
	113 X X404D	0.51	0.75	0.69	10.76	23.7	7.71	1.28	0.001	0.006	0.002	40	x 15	
	113 X X405E	0.48	0.76	0.68	10.79	26.7	7.65	1.30	0.001	0.005	0.002	40	x 15	

11.9 Various Cobalt alloys

		C	Si	Mn	Ni	Cr	W	Mo	Nb	Cu	Fe	Ti	Mg	S	P	N	Others	Typical Alloy Type	Size (mm) Ø	H	
	119 MBS 171B	0.087	0.29	1.90	10.68	20.5	15.1	0.65	0.046	0.035	1.82	. . .	. . .	<0.001	0.008	. . .			35	x 12	W
	119 MBS 172A	0.098	0.37	0.77	23.7	21.85	14.0	0.3	0.09	0.027	1.76	. . .	. . .	<0.0005	(0.011)		La 0.045		35	x 12	
	119 MBS 173	0.046	0.61	0.76	0.14	27.5	. . .	5.62	(0.002)	(0.008)	0.19	. . .	. . .	0.001	(0.003)	0.190			35	x 12	
CRM	**119 TI E378-1(D)**	1.181	1.172	0.0579	0.617	28.22	4.43	0.0503	. . .	. . .	0.606	. . .	. . .	0.0055	(0.0023)	. . .	Co 63.52		40	x 20	W
CRM	**119 MI 64B**	0.062	0.27	0.78	9.06	25.26	2.12	4.77	. . .	0.020	3.02	0.011	0.005	(0.0004)	0.005	0.12		Ultimet 1233	31	x 18	W
CRM	**119 MI 95B**	0.946	0.46	0.99	2.25	28.8	3.42	0.83	(0.002)	0.008	1.10	0.004	(0.0004)	0.0006	0.010	0.0027		Stellite 6B	31	x 18	
CRM	**119 MI 95C**	1.10	0.54	1.55	2.88	29.0	3.96	1.37	(0.008)	0.014	2.47	0.004	(0.0004)	0.001	0.009	0.033		Stellite 6B	31	x 18	
CRM	**119 MI 96B**	0.132	0.16	1.39	10.04	20.54	14.52	1.17	0.046	0.047	2.29	0.007	(0.0005)	0.0005	0.0063	0.007		Stellite 25	31	x 18	
CRM	**119 MI 96C**	0.132	0.31	1.91	10.36	19.95	15.4	1.88	0.047	0.08	2.93	0.007	(0.0002)	0.001	0.008	0.031		Stellite 25	31	x 18	
CRM	**119 MI 96D**	0.079	0.23	1.40	10.66	19.97	14.71	0.35	0.08	0.038	2.17	0.046	(0.004)	0.0005	0.006	0.0084		Stellite 25	31	x 18	
CRM	**119 MI 97C**	0.130	0.47	0.82	22.8	22.2	14.6	0.36	0.023	0.027	2.37	0.011	0.0010	0.0004	0.011	0.075		Stellite 188	31	x 18	
CRM	**119 MI 208C**	0.052	0.62	0.53	0.63	27.55	0.02	6.12	0.011	0.01	0.29	0.012	0.0002	0.0004	0.010	0.169		Stellite 21 - F75	31	x 18	
	119 X COB 1E	0.009	0.41	0.52	22.8	24.3	11.1	. . .	. . .	<0.005	16.4	. . .	. . .	0.0015	(0.001)	0.188	Al 0.39		44	x 20	C
	119 X COB 2A	. . .	. . .	0.50	22.3	24.7	11.5	. . .	. . .	. . .	9.6	. . .	. . .	. . .	. . .	. . .			40	x 15	
	119 X 81601A	0.29	1.17	1.55	19.6	14.2	3.75	3.85	3.9	. . .	12.6	. . .	0.042	0.03	. . .	. . .			40	x 15	
CRM	**119 X ST3H**	2.19	0.82	0.51	2.5	30.4	11.6	0.345	0.02	0.065	2.58	. . .	. . .	0.013	0.005	0.094	B 0.012		43	x 20	

12.1 Various Zr Alloys

		Sn	Ni	Cr	Cu	Fe	Mo		Size (mm) Ø	H	
	121P Zr 20	1.50	0.05	0.10	. . .	0.15	. . .	Suitable for use with	32	x 8	C
	121P Zr 30	. . .	. . .	. . .	0.50	0.05	0.50	XRF spectrometers	32	x 8	
	121P Zr 40	1.50	. . .	0.10	. . .	0.15	. . .	only.	32	x 8	

See page 74 for materials in Chippings form

For Setting-Up Samples see section 16

13.1.1 High Purity Gold

	%	All Elements ppm														
	Au	Ag	Cu	Zn	Pb	Sb	Bi	Se	Pt	Pd	Rh	Fe	Mn	Co	Cr	As
131 SI RAuHP1	99.99(5)	6	3	3	2	1	<1	<2	<2	<2	<1	2	2	<1	<2	< 2
131 SI RAuHP2	99.99	20	10	10	6	3	2	6	6	6	2	6	6	2	5	6
131 SI RAuHP3	99.9(7)	60	30	30	20	10	5	20	20	20	5	20	20	5	15	20

Certified values will be supplied for Ag and all impurities present - the above values are only examples of typical impurity levels. Other impurities may be present and , where possibe, will be reporte

13.1.2 Refined Gold

	All Elements ppm														
	Ag	Cu	Zn	Pb	Sb	Bi	Se	Pt	Pd	Rh	Fe	Mn	Co	Cr	Ti
131 SI RAuP1	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
131 Si RAuP2	10	10	10	10	10	10	10	10	10	10	10	10	10	10	10
131 SI RAuP3	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
131 SI RAuP4	50	50	50	50	50	50	50	50	50	50	50	50	50	50	50
131 SI RAuP5	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
131 SI RAuP6	150	150	150	`159	150	150	150	150	150	150	150	150	150	150	150
131 SI RAuP7	200	200	200	200	200	200	200	200	200	200	200	200	200	200	200

The impurity concentrations will be certified and will fall within 20% of the specified values. Products can be prepared to custpmers' own specifications

13.1.3 Au/Ag/Cu Jewellery alloys

	%	%	%	
	Au	Ag	Cu	
131 SI RAuA1	98.0	2.0	. . .	
131 SI RAuA2	96.0	2.0	2.0	
131 SI RAuA3	91.5	. . .	8.5	
131 SI RAuA4	88.0	8.0	4.0	The concentrations of major elements Au, Ag and Cu in each alloy will fall within 1% of the values specified.
131 SI RAuA5	75.0	18.0	7.0	Minor elements are present within the range 1 - 150 ppm. Please specify if values for these are required
131 SI RAuA6	50.0	20.0	30.0	Products can be prepared to customers' own specifications.
131 SI RAuA7	37.0	10.0	53.0	

13.2.1 High purity Silver

	%	All Elements ppm														
	Ag	Au	Cu	Zn	Pb	Sb	Bi	Cd	Pt	Pd	Rh	Fe	Mn	Co	Cr	Ti
133 SI RAgHP1	99.99(5)+	10	10	5	5	5	1	1	2	1	1	5	2	2	1	1
133 SI RAgHP2	99.99	30	30	15	15	15	3	3	6	3	3	15	6	6	3	3

Certified values will be supplied for Ag and all impurities present - the above values are only examples of typical impurity levels. Other impurities may be present and , where possibe, will be reporte

13.2.2 Refined Silver

	All Elements ppm												
	Au	Rh	Pd	Pt	Te	Sn	Pb	Sb	Bi	Zn	Cu	Fe	Ni
133 SI RAgP1	5	5	5	5	5	5	5	5	5	5	5	5	5
133 SI RAgP2	10	10	10	10	10	10	10	10	10	10	10	10	10
133 SI RAgP3	25	25	25	25	25	25	25	25	25	25	25	25	25
133 SI RAgP4	50	50	50	50	50	50	50	50	50	50	50	50	50
133 SI RAgP5	100	100	100	100	100	100	100	100	100	100	100	100	100
133 SI RAgP6	150	150	150	`159	150	150	150	150	150	150	150	150	150
133 SI RAgP7	200	200	200	200	200	200	200	200	200	200	200	200	200

The impurity concentrations will be certified and will fall within 20% of the specified values Products can be prepared tp costomers' own specifications

13.2.3 Ag/Cu Alloys

	%	%	
	Ag	Cu	
133 SI RAgA1	97.0	3.0	
133 SI RAgA2	94.0	6.0	
133 SI RAgA3	91.5	8.5	The concentrations of major elements Ag and Cu in each alloy will fall within 1% of the values specified.
133 SI RAgA4	80.0	20.0	Minor elements are present within the range 1 - 150 ppm - please specify if values for these are required
133 SI RAgA5	60.0	40.0	Products can be prepared to customers' own specifications.

13.3.1 Ternary / Jewellery Alloys

	%	%	%	All Elements ppm									
	Au	Ag	Cu	Bi	Fe	Mn	Ni	Pb	Pd	Pt	Sb	Sn	Zn
135 SI RTA1	98.0	1.5	0.5										
135 SI RTA2	96.0	3.0	1.0										
135 SI RTA3	95.0	2.5	2.5										
135 SI RTA4	93.0	4.5	2.5										
135 SI RTA5	90.0	4.0	6.0										
135 SI RTA6	83.3	4.0	12.7	The concentrations of major elements Au, Ag and Cu in each alloy will fall within 1% of the values specified.									
135 SI RTA7	81.7	7.2	11.1	Minor elements are all present within the range 1 - 150 ppm, and all will be certified									
135 SI RTA8	80.0	12.5	7.5	Products can be prepared to customers' own specifications.									
135 SI RTA9	58.3	8.0	33.7										
135 SI RTA10	58.3	20.0	21.7										
135 SI RTA11	58.3	30.0	11.7										
135 SI RTA12	50.0	20.0	30.0										
135 SI RTA13	37.5	2.0	60.5										
135 SI RTA14	37.5	10.0	52.5										
135 SI RTA15	37.5	16.0	46.5										

13.4.1 High Purity Precious metals

	%	%		%	%	
	Pt	Pd		Pt	Pd	
Platinum:	99.99+	traces	**Palladium:**	traces	99.99+	Trace impurities present in the range 1 to 50 ug/g will be given.
Rhodium	Powder standards. Please enquire for details.		**Ruthenium**	Powder standards. Please enquire for details.		

13.4.2 Precious Metal Calibration Standards

A range of standards for calibration purposes can be prepared. Please enquire

Note: Sizes & Shapes for all the above precious metals.

The sizes and shapes depend on the analytical method to be used. Generally the following are available

XRF Spectrometry: 24 mm Dia. x 4mm discs mounted in 31 mm Dia. Bakalite TSP.

ICP, AAS, others solution methods:Globules 200mg+/-5mg each, quantity will determine unit size

OES spark (time resolved): 25mm dia. discs with minimum thickness 4mm

OES DC Arc: globules as above.

Other forms: wire, rods, plate (+1mm)

15.1.1 Fe Binary

			C	Si	S	P	Mn	Ni	Cr	Mo	Al	Size (mm) Ø H
	151 X FC1A	Cr	0.013	0.02	0.008	0.020	0.06	0.018	**0.45**	<0.005	0.067	40 x 15
	151 X FC2A		0.017	0.02	0.007	0.020	0.069	0.020	**1.00**	<0.005	0.045	40 x 15
	151 X FM1A	Mn	0.019	0.01	0.008	0.011	**0.53**	0.015	0.015	<0.005	<0.005	40 x 15
	151 X FM2A		0.019	0.02	0.008	0.012	**1.11**	0.015	0.015	<0.005	<0.005	40 x 15
	151 X FM3A		0.025	0.04	0.009	0.012	**4.60**	0.01	0.01	<0.005	<0.005	40 x 15
	151 X FN1A	Ni	0.018	0.01	0.009	0.003	0.06	**0.515**	0.015	<0.005	0.12	40 x 15
	151 X FS1B	S	0.07	0.10	**0.058**	0.013	0.26	0.015	0.03	0.01	0.02	40 x 15

15.1.2 Fe Binary

			Element	%	Size (mm) Ø H	
	151 X 14930D	Al	Aluminium	14.30	40 x 15	C
	151 X 14931D	Al	Aluminium	19.7	40 x 15	
CRM	151 US 57	Ce	Cerium	0.011	40 x 27	C
CRM	151 US 58	Ce	Cerium	0.020	40 x 27	
CRM	151 US 59	Ce	Cerium	0.050	40 x 27	
	151 US 601	Ce	Cerium	0.002	40 x 27	C
	151 US 602	Ce	Cerium	0.005	40 x 27	
	151 US 603	Ce	Cerium	0.198	40 x 27	
	151 US 604	Ce	Cerium	0.496	40 x 27	
	151 X 13765G	Cr	Chromium	19.9	40 x 15	
	151 X 13593G	Cr	Chromium	39.6	40 x 15	
	151 X 13584D	Co	Cobalt	1.00	40 x 15	C
	151 X 13603E	Co	Cobalt	3.51	40 x 15	
	151 X 13601D	Co	Cobalt	5.59	40 x 15	
	151 X 13602D	Co	Cobalt	7.71	40 x 15	
	151 X 13764C	Co	Cobalt	11.5	40 x 15	
	151 X 13600D	Co	Cobalt	20.95	40 x 15	
	151 X 13668E	Cu	Copper	1.08	40 x 15	C
	151 X 14045E	Mn	Manganese	0.49	40 x 15	C
	151 X 14046D	Mn	Manganese	0.89	40 x 15	
	151 X 13937G	Mn	Manganese	1.14	40 x 15	
	151 X 13599G	Mn	Manganese	4.16	40 x 15	
	151 X 13595E	Mn	Manganese	7.61	40 x 15	
	151 X 13757G	Mo	Molybdenum	4.96	40 x 15	C
	151 X 13754G	Mo	Molybdenum	11.10	40 x 15	

Fe Binary (continued)

		Element	%	Size (mm) Ø H	
151 X 13672E	Ni	Nickel	5.00	40 x 15	C
151 X 13763F	Ni	Nickel	10.01	40 x 15	
151 X 13673F	Ni	Nickel	19.72	40 x 15	
151 X 13589J	Ni	Nickel	49.6	40 x 15	
151 X 13767E	Nb	Niobium	0.65	40 x 15	C
151 X 13664E	Nb	Niobium	1.11	40 x 15	
151 X 13604E	Si	Silicon	0.57	40 x 15	C
151 X 13607E	Si	Silicon	1.01	40 x 15	
151 X 13605E	Si	Silicon	2.04	40 x 15	
151 X 13606F	Si	Silicon	3.12	40 x 15	
151 X 13759E	Ti	Titanium	0.23	40 x 15	C
151 X 13762E	Ti	Titanium	0.41	40 x 15	
151 X 13674D	W	Tungsten	1.81	40 x 15	C
151 X 13669D	W	Tungsten	5.04	40 x 15	
151 X 13670D	W	Tungsten	14.66	40 x 15	
151 X 13699D	W	Tungsten	24.6	40 x 15	
151 A 421	W	Tungsten	0.52	38 x 19	C
151 A 422	W	Tungsten	1.28	each	
151 A 423	W	Tungsten	2.06		
151 A 424	W	Tungsten	3.02	Set Only	
151 X 13700D	V	Vanadium	0.59	40 x 15	C
151 X 13703D	V	Vanadium	5.45	40 x 15	

These binary materials are available until stocks are exhausted.

These binary materials are certified only for the element detailed but will also include elements which have not been analysed

16. Setting Up Samples

All of these samples have been prepared to meet the daily setting up requirements of laboratories using Direct Reading Spectrometers.
The Analytical Data are supplied with each sample but are not certified as accurate as these are not intended to be used as Primary Reference Materials.

16.1 Cast Iron

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Sn	Al	Ti	V	Size (mm) W D H	
161 A 1/17	3.0	2.6	0.06	0.06	0.38	0.20	0.51	0.30	0.48	0.05	0.02	0.01	0.04	60 x 35 x 18	CC
161 A 2/37	3.4	1.8	0.11	0.21	0.72	0.46	0.05	0.10	0.17	0.10	<0.005	0.04	0.57	60 x 35 x 18	
161 A 3/19	3.2	2.1	0.09	1.0	0.89	0.02	0.25	<0.005	0.01	<0.005	<0.005	0.07	0.31	60 x 35 x 18	
161 A 4/20	3.2	2.7	0.01	...	0.12	0.10	0.08	...	0.75	<0.005	0.01	0.05	0.49	60 x 35 x 18	
161 A 5/37	3.8	2.0	0.01	...	0.58	1.1	0.01	...	0.02	0.07	0.03	0.005	0.50	60 x 35 x 18	
161 A 6/6	2.5	1.8	0.12	0.05	0.65	...	0.10	...	0.02	0.05	<0.005	0.02	0.02	60 x 35 x 18	
161 A 7/8	2.8	0.94	0.18	0.09	0.29	...	0.07	...	0.21	<0.01	0.02	...	0.06	60 x 35 x 18	
														Ø H	
161 U RG13	3	2	0.04	0.3	1.0	0.6	1.0	0.3	0.5	0.2	0.06	0.05	0.3	40 x 40	
161 U RG14	3	2	0.01	0.04	0.2	0.01	0.9	...	0.07	0.2	0.09	0.02	0.1	40 x 40	
161 U RG15	2	4	0.07	0.1	0.8	0.5	0.5	0.9	0.5	0.1	0.07	...	...	40 x 40	
161 U RN15	3.3	0.4	0.01	0.006	1.4	3	...	...	...	0.05	0.06	0.009	...	40 x 40	
161 MI 215A	3.6	2.0	0.13	0.3	1.0	0.8	0.5	0.5	0.5	0.2	0.02	0.04	0.5	36 x 38	HIP
161 MI 216A	3.0	3.0	0.005	0.02	0.2	...	1.5	...	0.05	0.2	0.1	...	0.03	36 x 38	
161 M BS SU CCA	3.53	1.99	0.012	0.020	0.64	0.048	0.045	0.005	0.13	0.003	0.011	0.003	0.010	34 x 17	
161 M BS SU CCB	3.45	2.05	0.011	0.021	0.60	0.059	0.069	0.006	0.098	0.003	0.013	0.003	0.010	34 x 17	

16.2 Steels

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb	W	
162 A A/10	0.03	0.01	<0.005	<0.005	0.17	0.04	0.03	<0.005	<0.005	0.01	<0.005	0.03	<0.005	<0.005	
162 A B/6	0.39	0.29	<0.005	0.005	0.44	1.5	1.2	0.20	0.15	0.02	0.01	0.01	0.005	0.005	
162 A C/17	0.15	0.17	0.06	0.07	1.2	3.4	0.19	0.11	0.47	0.06	0.05	0.05	0.02	0.25	
162 A D/11	0.80	0.80	0.03	0.01	0.40	0.10	3.0	1.3	0.11	0.29	0.01	0.19	0.05	0.16	continued
162 A E/5	0.07	0.29	<0.001	0.005	0.53	31.0	19.7	0.005	0.005	0.04	...	0.55	<0.005	0.02	
162 A F/4	0.02	0.19	<0.005	0.02	0.46	7.4	25.5	3.5	0.58	...	0.01	<0.005	<0.005	0.63	
162 A F/5	0.02	0.26	<0.005	0.02	0.50	7.0	24.7	3.5	0.59	0.01	<0.001	<0.005	<0.005	0.62	
162 A G/5	0.03	0.33	0.03	0.03	1.6	11.4	16.5	2.2	0.43	0.12	<0.01	<0.005	<0.005	0.04	
162 A G/6	0.02	0.22	0.03	0.03	1.5	11.0	16.9	2.1	0.35	0.11	0.008	0.003	<0.001	0.06	
162 A H/6	0.52	1.0	0.03	0.04	1.6	1.1	1.3	0.42	0.39	...	0.03	0.20	0.11	...	
162 M BS SU CP1A	0.008	0.015	0.0036	0.005	0.060	0.020	0.020	0.0015	0.010	0.0030	0.0059	<0.002	<0.001	(0.001)	continued
162 U RE12	30ppm	30ppm	<20ppm	<50ppm	<100ppm	<100ppm	<100ppm	<50ppm	<100ppm	20ppm	10ppm	<50ppm	20ppm	<100ppm	
162 U RE13	<0.005	<0.01	<0.005	<0.005	0.03	0.02	0.01	<0.01	0.01	<0.005	<0.001	<0.003	0.001	<0.001	
162 U RH12	0.5	0.4	<0.01	0.01	17	0.3	3.4	0.1	0.05	0.03	<0.01	0.02	<0.01	0.02	continued
162 U RH13	1	0.3	<0.01	<0.01	0.4	0.3	3.5	4.5	0.14	4	0.01	0.01	0.03	7	
162 U RH18	1	0.3	<0.01	0.02	0.3	0.3	4	3	0.2	9.5	0.02	0.02	0.02	9	
162 U RH31	0.03	0.3	<0.01	0.02	1	20	17	2	1.8	0.1	<0.01	0.01	0.3	0.08	
162 U RH32	0.1	0.5	<0.002	<0.005	1	20	22	3	...	18	...	0.3	...	2.4	
162 U RN13	1	1	<0.01	<0.01	2	2.5	0.01	0.01	<0.01	0.01	0.05	0.2	0.005	<0.001	continued
162 U RN14	0.05	1.3	0.07	0.08	0.07	0.02	3	0.5	0.4	0.4	0.002	0.01	0.4	0.4	
162 U RN16	0.9	0.01	<0.01	<0.01	1.8	2.9	0.005	<0.01	0.01	0.01	0.05	0.5	0.006	<0.01	
162 U RN17	0.05	1.5	0.08	0.08	0.1	0.07	3	0.5	0.4	0.4	0.002	<0.01	0.4	0.4	continued
162 U RN18	1	...	0.3	...	1	9	...	...	8	...	0.6	0.05	...	...	
162 U RN19	0.9	1.3	0.08	0.1	1.6	3.1	2.7	0.9	0.5	0.8	0.1	0.3	0.5	0.7	

Continuation from above	As	Ti	V	Zr	B	Ca	Pb	N	Ta	Bi	Sb	Te	Others	Size (mm) Ø H	
162 A A/10	...	<0.001	<0.005	...	...	...	...	...	...	...	...	...		44 x 25/75/150	W
162 A B/6	0.005	0.01	0.01	...	0.001	<0.001	<0.001	...	...	...	...	...		44 x 25/75/150	
162 A C/17	...	0.04	0.4	0.05	0.008	<0.001	...	0.004	...	...	...	...		44 x 25/75/150	
162 A D/11	...	0.1	0.12	...	<0.001	...	...	0.01	...	...	...	...		44 x 25/75/150	
162 A E/5	...	0.48	0.08	...	<0.001	...	...	0.01	...	...	...	...	Ce 0.02	44 x 25/75/150	
162 A F/4	...	0.01	0.05	...	<0.001	...	...	0.2	...	...	...	...		44 x 25/75/150	
162 A F/5	0.005	<0.005	0.03	...	0.002	...	...	0.23	...	...	...	...		44 x 25/75/150	
162 A G/5	...	<0.005	0.06	<0.005	...	<0.005	...	0.03	<0.005	...	...	...		44 x 25/75/150	
162 A G/6	...	0.003	0.05	<0.001	...	0.002	...	0.04	<0.002	...	...	...		44 x 25/75/150	
162 A H/6	0.01	0.34	0.33	0.03	0.01	<0.005	...	...	...	...	...	...		44 x 25/75/150	
														W D H	
162 M BS SU CP1A	0.002	<0.0005	<0.0005	<0.002	<0.0002	(0.0002)	<0.001	...	(0.002)	...	<0.001	...	Fe 99.98	51 x 51 x 30	
														Ø H	
162 U RE12	<10ppm	3ppm	<10ppm	<10ppm	<1ppm	<1ppm	<20ppm	...	...	...	...	...		40 x 40	
162 U RE13	<0.003	<0.001	<0.001	<0.001	<0.0002	<0.0002	<0.001	...	0.001	...	...	...		40 x 40	
162 U RH12	<0.005	<0.01	0.1	<0.005	...	...	...	...	...	...	...	...		40 x 40	
162 U RH13	...	0.002	1.5	...	...	...	...	...	...	...	...	...		40 x 40	
162 U RH18	...	0.005	3	...	...	...	...	...	...	...	...	...		40 x 40	
162 U RH31	<0.01	0.01	0.05	<0.01	...	...	...	...	...	...	...	...		40 x 40	
162 U RH32	...	...	...	0.01	<0.002	...	...	0.15	...	...	...	...	La 0.01	40 x 40	
162 U RN13	0.002	0.05	0.07	0.03	0.001	<0.0005	0.001	0.01	...	...	0.08	0.004		40 x 40	
162 U RN14	0.05	0.09	0.5	0.006	0.004	0.003	0.05	0.04	0.2	...	<0.005	0.01		40 x 40	
162 U RN16	0.002	0.003	0.01	0.2	0.0005	<0.0005	<0.001	0.002	...	...	0.06	...		40 x 40	
162 U RN17	0.05	0.09	0.5	0.003	0.006	0.003	0.03	0.04	...	...	0.005	...		40 x 40	
162 U RN18	...	...	...	...	...	...	0.4	...	...	0.07	...	0.04		40 x 30	
162 U RN19	0.06	0.1	0.5	0.06	0.008	0.005	0.04	0.03	0.5	(0.03)	0.08	(0.03)		40 x 40	

16.2 Steels (continued)

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb	W	
162 MI 217A	0.01	0.01	0.001	0.002	0.003	0.01	0.01	0.01	0.001	0.004	0.0005	0.0002	0.001	0.005	
162 MI 218A	0.05	0.1	0.07	0.1	2	5	0.1	0.1	0.6	0.01	0.1	0.003	<0.0001	0.7	continued
162 MI 219A	0.9	2	0.002	0.003	0.02	2.8	5	1.5	0.6	1	0.06	0.2	0.4	0.01	
162 MI 194A *	0.51	0.49	0.025	0.039	1.03	0.78	0.70	0.40	0.26	0.054	0.017	0.10	0.058	0.13	continued
162 MI 195A *	0.25	1.16	0.008	0.018	1.85	1.01	0.21	0.052	0.52	0.10	0.085	0.014	0.008	0.38	
162 MI 196A *	1.08	0.35	0.015	0.040	2.42	0.61	2.35	0.13	0.25	0.014	0.034	0.016	0.088	0.19	

* most of these values are certified

Continuation from above	As	Ti	V	Zr	B	Ca	Pb	N	Ta	Sb			Size (mm) Ø H	
162 MI 217A	0.003	0.0001	0.002	0.005	<0.0001	0.0001	0.004	0.0005	0.01	0.006		QA A	36 x 38	
162 MI 218A	0.1	0.01	1	<0.001	0.0004	<0.0001	<0.001	0.007	0.02	0.02		QA C	38 x 38	
162 MI 219A	0.01	1.7	0.3	0.002	0.01	<0.0001	0.003	0.002	0.01	0.1		QA D	38 x 38	
162 MI 194A	0.033	0.078	0.34	0.027	0.006	. . .	(0.003)	0.0053	. . .	0.016			45 x 25	w
162 MI 195A	0.023	0.0023	0.085	0.003	0.004	. . .	(0.002)	0.0076	. . .	0.007			45 x 25	
162 MI 196A	0.030	0.013	0.16	0.006	0.002	. . .	(0.002)	0.0099	. . .	0.002			45 x 25	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Al	Nb	As	Ti	Pb	Ta	Size (mm) Ø H	
162 JH STD	0.13	0.19	0.028	0.009	0.48	4.17	26.05	0.049	0.012	0.012	0.079	0.10	0.10	0.070	0.023	0.010	34 x 20	
162 JH STE	0.44	1.42	0.009	0.008	1.60	14.53	15.21	2.47	0.054	0.20	0.040	0.46	0.049	0.19	0.017	0.37	each	
162 JH STF	0.024	0.58	0.003	0.032	0.21	29.21	1.0	0.94	0.017	0.053	0.007	1.56	0.005	0.50	0.046	0.13	Set Only	
162 JH STG	0.034	1.25	0.006	0.025	1.41	3.96	11.29	1.21	0.20	0.20	0.085	1.03	0.088	0.32	. . .	. . .	35 x 18	
162 JH STH	0.086	0.50	0.001	0.007	0.51	0.47	17.90	0.53	0.052	0.054	0.045	0.10	0.010	0.11	. . .	. . .	each	
162 JH STI	0.26	0.19	0.028	0.004	0.20	0.019	27.06	0.056	0.012	0.003	0.013	0.016	0.001	0.015	. . .	. . .	Set Only	

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	N	O	Others	Size (mm) Ø H	
162M BS 01C	0.19	0.042	0.018	0.004	0.46	0.010	0.012	0.005	0.017	. . .	<0.002	0.006	. . .	0.003	0.014		38-44 x 150	w
162 M BS 02E	0.454	0.278	0.019	0.008	0.73	0.076	0.090	0.022	0.17	0.006	0.007	0.004	<0.002	(0.007)	(0.004)		38-44 x 150	
162 M BS 03D	0.18	0.28	0.10	0.025	1.15	0.11	0.18	0.04	0.27	0.02	0.017	<0.001	. . .	0.011	0.005		38-44 x 150	
162 M BS 04D	0.39	0.17	0.072	0.016	1.02	0.12	0.20	0.09	0.09	. . .	0.006	0.028	. . .	0.003	0.002		38-44 x 150	
162 M BS 05E	1.06	0.23	0.025	0.010	0.33	0.11	1.55	0.024	0.18	0.01	0.010	0.009	0.008	0.006	0.003		38-44 x 150	
162 M BS 06J	0.192	0.22	0.030	0.009	0.801	0.42	0.502	0.157	0.14	0.010	0.008	0.029	0.005	(0.008)	(0.002)		38-44 x 150	
162 M BS 10B	0.02	0.43	0.026	0.024	1.75	8.3	18.5	0.4	0.27	0.090	0.009	0.003	0.06	0.07	. . .	W 0.04	38-44 x 150	
																	Ø H	
162M BSSULF-2	0.17	0.24	0.008	0.007	1.13	0.115	0.12	0.035	0.19	0.014	. . .	0.040	. . .	0.0074	0.002		38 x 40	w
162M BSSULF-3	0.17	0.22	0.011	0.008	0.83	3.25	0.11	0.017	0.07	0.010	0.005	0.021	0.0024	0.0067	0.002		38 x 40	
162M BSSU4130	0.29	0.25	0.020	0.015	0.55	0.090	0.97	0.16	0.104	0.006	. . .	0.030	. . .	0.0057	0.002		38 x 40	
162M BSSU4620	0.21	0.23	0.023	0.010	0.58	1.69	0.15	0.26	0.14	0.009	0.008	0.022	0.002	0.0090	0.002		38 x 40	
162M BSSU8620	0.21	0.29	0.0216	0.011	0.836	0.485	0.547	0.185	0.084	0.005	0.006	0.033	. . .	0.0072	0.0017	Ca 0.0008	38 x 40	
162M BSSU9310	0.125	0.23	0.016	0.010	0.57	3.25	1.29	0.127	0.19	0.016	0.014	0.026	0.005	0.0102	0.002		38 x 40	
162M BSSUP-20	0.38	0.64	0.005	0.011	0.84	0.116	1.76	0.46	0.21	0.011	0.011	0.018	0.010	0.0093	0.002	Ca 0.0016	38 x 40	
162M BSSU8740	0.41	0.24	0.014	0.014	0.92	0.44	0.51	0.225	0.14	0.012	0.007	0.019	. . .	0.0085	0.0016		38 x 40	
162 U RFe C	0.1	0.2	0.07	0.09	1.4	3	0.8	0.1	0.6	0.07	0.05	0.003	0.6	0.01	. . .	continued		
162 U RFe D	0.8	1.2	0.02	0.01	0.2	0.1	3	1.3	0.05	0.3	0.009	0.1	0.1	0.03	. . .			
162 M BS SS-1	0.122	0.215	0.027	0.009	1.08	3.97	27.87	0.05	0.094	0.02	0.044	0.042	0.017	0.0046	. . .			
162 M BS SS-2	0.329	1.36	0.01	0.018	1.7	15.32	15.12	2.01	0.199	0.2	0.012	0.034	0.1	0.0027	. . .	continued		
162 M BS SS-3	0.073	0.64	0.002	0.031	0.21	31.45	4.37	0.8	0.026	0.1	0.0008	0.034	0.06	0.0017	. . .			
162 M BS SU 309	0.077	0.50	0.0009	0.027	1.68	13.68	22.50	0.30	0.26	0.13	0.007	0.006	0.065	0.095	0.005			
162 M BS SU 316L	0.021	0.39	0.025	0.035	1.70	12.27	17.58	2.09	0.405	0.21	. . .	0.005	0.044	0.091	0.005			
162 M BS SU 321	0.055	0.63	0.023	0.016	1.67	10.15	17.18	0.22	0.21	0.16	0.004	0.19	0.13	0.012	0.002	continued		
162 M BS SU 347	0.056	0.51	0.027	0.030	1.61	9.43	17.26	0.39	0.16	0.05	0.007	0.005	. . .	0.060	0.004			
162 X FESUS1	1.1	1.8	0.35	0.15	0.8	0.5	25.0	0.45	0.3	1.1	0.05	0.6	0.4	. . .	. . .	continued		

Continuation from above	As	B	Nb	Pb	Ti	W	Zr	Ca	Sb	Ta	Bi	Te	Zn		Size (mm) Ø H	
162 U RFe C	0.06	0.0025	0.1	0.016	0.005	0.6	0.002	0.0001	0.015	0.1	0.01	0.02	. . .		40 x 40	
162 U RFe D	0.01	0.01	0.3	0.007	0.17	0.1	0.02	0.003	0.09	(0.01)	(0.02)	(0.005)	. . .		40 x 40	
															W D H	
162 M BS SS-1	0.024	0.0032	0.1	0.004	0.044	(0.014)	0.028	0.0016	0.02	(0.002)	. . .	. . .	. . .		44 x 44 x 13	w
162 M BS SS-2	0.048	0.0022	0.52	0.011	0.15	0.1	0.012	0.0055	0.011	0.24	. . .	. . .	. . .		each	
162 M BS SS-3	0.0012	0.001	1.31*	0.003	0.5*	0.052	<0.002	(0.0004)	(0.0003)	0.12	. . .	. . .	. . .		Set Only	
	* Segregation of these elements is evident in this sample														**Ø H**	
162 M BS SU 309	. . .	0.0030	0.027	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		44 x 40	
162 M BS SU 316L	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		38 x 40	
162 M BS SU 321	. . .	. . .	. . .	. . .	0.45	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		39 x 40	
162 M BS SU 347	. . .	0.0040	0.79	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		38 x 40	
162 X FESUS1	0.005	. . .	0.05	0.005	0.4	0.2	0.04	. . .	0.015	. . .	0.005	. . .	0.002		43 x 20	c

All of these samples have been prepared to meet the daily setting up requirements of laboratories using Direct Reading Spectrometers.
The Analytical Data are supplied with each sample but are not certified as accurate as these are not intended to be used as Primary Reference Materials.

16.4 Pure Aluminium

All Elements ppm

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	B	Be	Na	Li	Ca	Ni	
164 X ALSUS 1	<2	<2	<2	<0.3	<2	<0.4	<0.7	<0.5	<0.2	<0.1	<0.5	<0.1	<1	<0.5	continued
164 U RA10	~30	~5	~2	<1	<1	<1	<3	<1	<2	<1	<0.01	<0.02	<0.1	<2	continued
164 MI 220B	<1	0.6	0.4	0.3	1	<1	3	0.4	<1	<1	<1	<1	<1	<1	continued
164 HY AL4N	13	18	25	2	15	0.6	3	0.6	0.6	0.1	1	0.2	0.2	0.4	
164 V E0	<0.8	<0.5	<0.4	<0.2	<0.6	<0.3	<0.5	<0.5	<0.4	<0.1	<0.2	<0.1	<0.4	<0.1	
164 V E1	5	<3	<4	<0.5	<3	<0.5	<2	<1	<2	<2	<1	<0.1	<1	<0.3	continued
164 V E10	<10	<5	<4	<1	<3	<1	<3	<1	<2	<0.2	<1	<0.2	<1	<1	

Continuation from above	All Elements ppm													Others	Size (mm) Ø H	
	Pb	Sn	Zr	Bi	Ag	Ba	In	Co	V	Ga	Sb	Sr	Cd			
164 X ALSUS 1	<0.5	<0.5	<0.3	<1	<0.5	<0.2	<1	<0.1	<1	<0.2	<1	. . .	. . .	20 other each at <1 ppm	60 x 75	HIP
164 U RA10	<3	<3	<1	<3	<1	. . .	. . .	<1	<2	<1	<3	<0.3	<1		50 x 50	HIP
164 MI 220B	<1	<2	<1	<5	<1	<2	. . .	<2	<1	<1	<5	. . .	. . .	QA 10	57 x 40	CC
164 HY AL4N	1	0.5	0.5	0.1	. . .	. . .	. . .	. . .	1	0.5	2	1	. . .		50 x 35	
164V E0	<0.1	<0.2	<0.3	<0.2	<0.1	<0.1	<0.1	<0.1	<0.3	<0.1	<0.2	<0.2	<0.2		60 x 40	
164 V E1	<0.5	<0.2	<0.5	<0.5	<0.1	<0.1	<0.1	<0.1	<0.2	<0.2	<1	. . .	<0.2		60 x 40/75	
164 V E10	<2	<3	<1	<3	<2	. . .	. . .	<1	<0.5	<1	. . .	. . .	<1		60 x 40/75	

16.4 Aluminium

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	B	Be	Na	Li	Ca	Ni		
164 V E2	0.9	0.9	0.20	0.15	0.20	0.05	0.10	0.20	. . .	0.004	0.007	. . .	0.007	0.2		
164 V E3	10.0	0.35	4.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.01	1.0		
164 V E4	. . .	. . .	. . .	0.7	1.1	0.2	5.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	continued	
164 V E5	. . .	. . .	. . .	1.4	4.9	. . .	. . .	. . .	0.007	. . .	. . .	0.008	. . .	. . .		
164 V E8	0.01	0.012	0.02	0.005	0.005	0.005	0.005	0.003	. . .	0.001	. . .	. . .	0.005	0.003		
164 V E13	. . .	4.8	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	60 x 25/40/75	
164 V P2	2.2	1.8	0.5	1.5	2.8	0.34	0.54	0.24	0.002	0.002	0.002	0.007	0.018	0.03	continued	
164 V P3	0.07	5.8	0.02	0.04	0.003	0.001	0.008	0.004	0.0002	. . .	. . .	. . .	0.0002	0.003		
164 U RA13	14.5	0.3	4	0.02	0.2	0.006	0.4	0.001	0.007	<0.001	0.004	0.0001	0.01	2.8		
164 U RA14	1	1.2	0.5	0.6	5	0.5	4	0.2	0.001	0.002	0.0002	0.003	0.005	0.5		
164 U RA16	15	. . .	4	. . .	0.2	. . .	0.3	. . .	. . .	. . .	. . .	. . .	. . .	3	continued	
164 U RA17	1	1.2	0.5	0.6	5	0.2	4	0.2	0.001	0.002	0.0002	0.003	0.005	0.5		
164 U RA18	15	0.2	8.3	0.34	0.2	0.005	0.3	<0.001	0.0078	<0.0001	0.0045	<0.0001	0.012	3		
164 U RA19	1.4	1	0.58	1.4	8.2	0.23	6.9	0.22	0.002	0.006	0.0003	0.0045	0.003	0.6		
164 MI 221A	0.2	0.2	0.6	0.4	4.8	0.22	6.8	0.1	. . .	0.005	. . .	. . .	0.03	. . .	continued	
164 MI 222A	1.1	0.9	4.9	1.1	0.2	. . .	0.3	0.2	. . .	0.003	. . .	. . .	. . .	0.3		
164 MI 223A	12.0	0.5	1.0	0.2	1.5	0.1	0.013	0.1	. . .	. . .	. . .	. . .	0.001	2.4		
164 HY AMS-1	1.2	0.8	0.6	0.5	1.3	0.2	0.4	0.2	0.004	0.002	0.005	0.01	0.01	0.02	continued	
164 HY ASC-1	14.0	1.6	6.0	0.4	1.2	0.2	0.5	0.5	. . .	0.003	. . .	. . .	0.02	0.6		
164 X ALSUS 5	0.05	0.05	1.1	0.002	2.6	0.005	12.0	0.025	<0.005	<0.005	. . .	. . .	0.0005	0.005		
164 X ALSUS 6	0.5	0.2	12.0	0.1	0.03	0.02	0.05	0.05	. . .	0.005	. . .	. . .	. . .	0.1	continued	
164 X ALSUS 7A	0.9	0.55	4.0	0.06	0.15	0.01	0.12	0.3	. . .	0.1	<0.001	<0.001	<0.001	1.1		
164 X ALSUS 8A	9.5	0.25	0.75	0.45	0.9	0.06	0.25	0.02	. . .	0.015	<0.001	<0.001	<0.001	0.12		
164 X ALSUS 25	**27.15 ***	0.26	0.035	0.1	0.03	0.005	0.05	0.025	. . .	. . .	. . .	. . .	0.007	0.005		

* This value is certified

Continuation from above	Pb	Sn	Zr	Bi	Sr	Cd	Sb	Co	Ga	V	Ag	Ba	In	P		Size (mm) Ø H	
164 V E2	0.1	0.18	. . .	. . .	0.12	. . .	. . .	0.04	0.06	0.1	0.22	. . .	. . .	. . .		60 x 25/40/75	C
164 V E3	0.4	. . .	. . .	. . .	. . .	. . .	0.3	. . .	. . .	. . .	. . .	. . .	. . .	. . .		60 x 25/40/75	
164 V E4	. . .	. . .	0.2	. . .	. . .	0.06	. . .	0.3	. . .	. . .	0.2	. . .	. . .	. . .		60 x 25/40/75	
164 V E5	. . .	. . .	. . .	0.1	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .			60 x 25/40/75	
164 V E8	0.003	0.003	0.003	0.005	0.002	0.003	0.01	0.002	0.005	0.003	0.005	0.004	0.005	. . .		60 x 25/40/75	
164 V P2	0.06	0.03	0.09	0.022	<0.0002	0.004	. . .	0.007	0.037	0.017	0.0006	. . .	. . .	. . .		52 x 40	HIP
164 V P3	0.03	0.007	0.001	. . .	. . .	0.001	0.0002	0.0005	0.02	. . .	. . .	. . .	. . .	. . .		52 x 40	
164 U RA13	0.27	0.1	0.001	0.02	0.02	0.01	0.13	0.009	0.01	<0.0005	0.003	. . .	. . .	~0.01		50 x 50	
164 U RA14	0.002	0.004	0.09	0.2	<0.002	~0.012	0.001	0.1	0.01	0.1	0.05	. . .	(0.01)	0.001		50 x 50	
164 U RA16	0.3	0.1	. . .	. . .	0.03	. . .	. . .	. . .	. . .	. . .	(0.06)	. . .	(0.01)	. . .		50 x 40	
164 U RA17	0.002	0.004	0.09	0.2	<0.002	~0.012	0.001	0.1	0.01	0.1	0.05	. . .	(0.01)	0.001		50 x 40	
164 U RA18	0.26	0.32	<0.001	<0.0005	0.04	~0.012	0.36	0.002	0.01	0.0005	0.001	. . .	(0.01)	>0.012		50 x 40	
164 U RA19	0.008	0.005	0.16	0.24	<0.001	0.044	0.004	0.27	0.06	0.15	0.06	. . .	0.01	<0.001		50 x 40	
164 MI 221A	. . .	. . .	. . .	. . .	. . .	. . .	0.01	0.2	0.03	. . .	. . .	. . .	. . .	. . .	QA 11	62 x 40	
164 MI 222A	0.1	0.1	0.2	. . .	. . .	0.2	. . .	0.02	0.06	0.1	0.2	. . .	. . .	0.0025	QA 12	62 x 40	
164 MI 223A	. . .	. . .	. . .	. . .	0.035	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	QA 15	62 x 40	
164 HY AMS-1	0.05	0.03	. . .	0.01	. . .	0.03	0.02	. . .	0.01	0.03	. . .	. . .	. . .	. . .		45 x 35	
164 HY ASC-1	0.1	0.1	0.01	0.1	0.03	0.05	0.02	. . .	0.04	0.02	. . .	. . .	. . .	. . .		45 x 35	
164 X ALSUS 5	0.005	0.005	0.3	<0.005	<0.005	. . .	<0.005	. . .	0.005	0.003	. . .	. . .	. . .	. . .		50 x 25	W
164 X ALSUS 6	0.05	0.1	0.05	. . .	. . .	0.03	0.05	0.05	0.02	0.03	. . .	. . .	. . .	. . .		50 x 20	C
164 X ALSUS 7A	0.11	0.01	0.18	. . .	0.003	. . .	0.12	0.2	. . .	. . .	0.09	. . .	. . .	<0.01		50 x 20	
164 X ALSUS 8A	0.001	0.13	0.025	. . .	0.07	. . .	0.03	0.025	. . .	. . .	1.0	. . .	. . .	<0.01		50 x 20	
164 X ALSUS 25	0.01	<0.001	. . .	. . .	0.04	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		65 x 30	SC

All of these samples have been prepared to meet the daily setting up requirements of laboratories using Direct Reading Spectrometers.
The Analytical Data are supplied with each sample but are not certified as accurate as these are not intended to be used as Primary Reference Materials.

16.5.1 Pure Copper

All Elements ppm

	Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	Mg	P	S	
165 X CUSUS1	0.7	11	0.4	8	1	0.05	0.05	0.05	0.01	0.05	0.1	0.01	1	11	continued
165 U RC11	1	2	2	2	1	1	1	1	2	1	1	1	2	8	continued
165 U RC20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	

Continuation from above	All Elements ppm Cr	Ag	Be	Cd	Co	Se	Te	Au	Zr	% C	O	N	Cu	Size (mm) Ø	H	
165 X CUSUS1	0.01	0.05	<0.01	<0.01	0.1	0.05	<0.05	<0.05	<0.01	(0.5)	(370)	(6)	99.96	50	x 45	w
165 U RC11	1	10	...	1	1	1	1	...	...	...	~10	...	99.99	40	x 40	
165 U RC20	...	...	...	...	...	...	...	...	...	...	300	...	99.96	40	x 40	

16.5.2 Copper

	Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	Mg	P	S	Cu	Others		Size (mm) Ø	H	
165 U RC110	0.006	0.005	0.005	0.005	0.003	0.003	0.003	0.003	0.004	0.003	0.006	0.004	0.003	0.004	rem					
165 U RC12	0.2	0.09	0.2	0.1	0.06	0.1	0.06	0.09	0.04	0.009	0.05	0.003	0.1	0.1	rem					
165 U RC14	0.03	<0.01	0.03	0.02	<0.02	<0.01	<0.02	<0.01	<0.02	<0.01	<0.01	...	...	<0.01	rem					
165 U RC32	0.2	0.7	37	0.5	0.1	1.1	0.6	0.005	1.7	0.001	...	...	0.004	0.002	57		continued			
165 U RC33	<0.01	0.01	<0.01	4	4.5	10	0.03	0.05	0.1	0.01	...	<0.001	<0.02	...	rem					
165 U RC36	8	12	0.8	0.03	1.5	<0.005	<0.005	0.02	<0.002	0.01	0.5	<0.001	0.02	0.03	rem					
165 U RC38	<0.01	0.02	0.01	0.5	30	...	0.01	...	0.9	...	...	<0.01	0.01	<0.001	rem					
165 U RC40	<0.01	<0.01	0.01	1.5	2	8	0.02	<0.01	4	...	...	<0.01	<0.01	...	rem					
165 X CC102	<0.005	<0.005	<0.01	0.01	<0.01	0.01	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	98		continued			
165 X CA104	0.01	0.01	...	4.3	4.7	9.5	0.05	<0.005	0.4	<0.005	0.01	<0.005	<0.005	...	80					
165 X MNB5SUS	1.8	0.2	37.0	0.6	1.3	3.1	0.5	<0.001	0.25	...	<0.001	<0.001	<0.001	...	55			45	x 20	cc
165 X PB10SUS	12.7	0.015	0.015	0.001	0.01	<0.001	0.001	0.001	<0.001	...	0.005	<0.001	0.02	0.002	87			45	x 20	cc
165 X ALB1SUS	0.02	0.20	0.005	3.0	5.8	9.3	0.10	0.002	0.08	...	...	<0.002	0.01	...	81.5	Cr 0.01		45	x 20	c
165 X WSB4SUS	0.9	0.25	5.3	0.9	0.3	0.6	4.4	0.04	1.9	...	0.08	0.001	0.05	0.005	...	Cr 0.05		45	x 20	c
165 X GM4SUS	2.5	5.3	7.4	0.06	2.0	0.001	0.001	0.02	0.005	0.02	0.04	...	0.01	0.35	82.0	Ag 0.005		40	x 15	cc
165 T EA1	0.20	2.95	38.5	0.14	0.065	...	<0.01	0.090	...	...	...	...	...	...	57.8			40	x 18	c

Continuation from above	Cr	Ag	Be	C	Cd	Co	Se	Te	Ti	Zr	O	Au	Size (mm) Ø	H	
165 U RC12	0.05	0.05	0.001	...	0.04	0.04	0.01	0.05	0.001	0.002	...	...	40	x 40	
165 U RC14	0.9	...	...	...	...	...	...	...	...	0.06	...	...	40	x 40	
165 U RC32	<0.01	...	...	...	...	...	<0.001	<0.01	...	...	...	...	40	x 40	
165 U RC33	<0.005	...	<0.001	...	...	<0.005	...	...	<0.001	<0.001	...	...	40	x 40	
165 U RC36	<0.005	<0.01	<0.001	...	<0.001	<0.002	...	...	<0.001	<0.005	...	...	40	x 40	
165 U RC38	<0.01	...	...	0.05	...	...	...	...	...	0.01	...	...	40	x 40	
165 U RC40	<0.01	...	...	...	...	...	...	...	...	...	...	...	40	x 40	
165 U RC110	0.004	0.006	0.0003	...	0.004	0.003	0.004	0.007	0.001	<0.002	...	0.003	40	x 40	
165 X CC102	0.9	<0.01	...	...	<0.01	...	...	...	...	0.1	...	...	50	x 45	w
165 X CA104	<0.005	...	...	...	...	...	...	...	...	...	...	...	45	x 45	

16.6 Magnesium

	Mn	Cu	Si	Fe	Ni	Al	Zn	Pb	Sn	Zr	Cd	Na	Be	Ag	Sr	Ca	Size (mm) Ø	H	
166 X MGSUS1	0.17	0.002	0.06	0.005	0.001	0.04	6.8	0.003	0.02	<0.001	...	...	0.0001	0.007	0.0001	<0.001	45	x 50	c
166 X MGSUS2	0.4	0.02	0.12	0.005	0.02	8.0	0.4	0.04	0.01	...	0.004	...	0.0015	0.005	0.0003	0.015	45	x 50	
166 U RMg11	<0.01	0.001	0.041	0.005	0.002	0.011	0.015	...	...	...	...	...	...	...	...	...	40	x 40	
166 U RMg13	0.2	0.006	0.01	0.001	0.001	5.7	0.8	0.001	0.001	0.004	0.0001	0.001	...	...	...	...	40	x 40	
166 U RMg14	0.4	0.3	0.08	0.003	0.04	7.9	1	0.08	0.08	<0.01	...	...	0.002	...	...	<0.01	40	x 40	

16.7 Nickel

	C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	W	
167 U RNi10	<8ppm	<10ppm	<2ppm	...	...	<1ppm	<5ppm	...	...	3ppm	...	<4ppm	...	
167 U RNi11	0.02	0.05	<0.01	<0.01	0.1	<0.02	<0.06	<0.02	0.03	<0.01	0.001	<0.02	<0.03	
167 U RNi12	0.1	0.15	<0.01	<0.01	0.6	31	0.7	<0.01	0.08	0.01	0.6	2.8	0.02	continued
167 U RNi13	<0.01	<0.02	<0.01	<0.01	1	0.6	6	14	16	0.2	<0.01	0.4	3	
167 U RNi14	0.05	0.1	<0.01	<0.01	0.1	<0.1	0.1	20	6	20	...	0.5	<.0.1	
167 U RNi15	0.02	0.08	<0.01	<0.01	0.1	0.05	17.5	19.5	2.8	0.3	1	0.5	0.04	

Continuation from above	Nb	V	B	Zn	Pb	Ag	As	Mg	Ta	Zr	Size (mm) Ø	H
167 U RNi10	...	...	...	2ppm	0.8ppm	0.3ppm	<0.5ppm	...	...	...	40	x 40
167 U RNi11	<0.01	<0.03	<0.005	...	...	...	...	0.02	...	<0.003	40	x 40
167 U RNi12	<0.01	<0.03	0.005	...	<0.01	...	...	...	0.04	0.01	40	x 40
167 U RNi13	0.1	0.4	<0.005	...	<0.01	...	...	...	0.01	<0.01	40	x 40
167 U RNi14	0.03	0.04	...	...	<0.01	...	...	...	0.3	...	40	x 40
167 U RNi15	5	0.03	0.003	...	<0.01	...	...	...	0.03	0.02	40	x 40

16. Setting Up Samples

All of these samples have been prepared to meet the daily setting up requirements of laboratories using Direct Reading Spectrometers.
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16.8 Lead

	Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Te	Fe	Tl	Se	S	In	Ca	Au	Size (mm) Ø H	
168 X PBSUS1	1.4	6.2	0.04	0.02	0.4	0.01	0.002	0.005	0.005	0.01	0.005	. . .	0.005	0.002	0.005	. . .	0.001	44 x 40	C
168 X PBSUS5	0.85	0.5	0.35	0.1	0.25	0.2	0.003	0.12	0.001	0.006	0.0001	0.005	0.0002	0.0005	0.3	0.001	0.002	40 x 40	
168 X PBSUS6	0.15	0.1	0.2	0.1	0.025	0.04	0.005	0.025	0.001	0.005	0.0005	0.03	0.003	0.001	0.015	0.01	0.001	43 x 45	
168 X PBSUS7	0.05	10	0.02	0.04	0.7	0.005	0.001	0.002	0.01	0.025	. . .	0.005	0.015	0.005	0.001	0.001	0.005	43 x 45	
168 U RPb11	<3ppm	<3ppm	53ppm	<1ppm	<2ppm	7ppm	<5ppm	<3ppm	<2ppm	. . .	<10ppm	<3ppm	. . .	. . .	. . .	. . .	. . .	40 x 40	
168 U RPb13	0.2	0.1	0.2	0.1	0.03	0.04	0.02	0.04	0.001	(0.01)	0.0002	0.03	(0.005)	. . .	<0.0001	. . .	. . .	40 x 40	
168 U RPb14	0.005	10	0.01	0.05	1	0.01	<0.01	0.01	<0.001	(0.01)	<0.001	0.01	(0.005)	0.01	<0.0001	. . .	. . .	40 x 40	
168 U RPb15	30.0	2.0	0.1	2.0	0.02	3.0	0.2	0.01	0.003	. . .	. . .	0.01	. . .	. . .	. . .			40 x 40	
168 U RPb16	0.18	0.001	0.006	0.0015	0.0001	0.0025	0.001	0.0001	0.00006	0.0001	0.00008	0.0008	0.0001	0.0001	0.0002	0.34	0.0001	continued	
168 U RPb17	3.6	9.9	0.1	1.5	0.3	0.3	0.001	. . .	0.001	0.003	0.007	0.002	. . .	. . .	. . .	0.01	0.0001	continued	
168 U RPb18	0.03	1.2	0.3	0.06	7.6	0.09	. . .	0.03	. . .	0.03	. . .	0.02	0.02	. . .	0.01	. . .	. . .	continued	

Continuation from above	Cr	Co	K	Ge	Ba	Rh	Mn	Al	Pt	Na	Mg	Pd	Ru	Size (mm) Ø H
168 U RPb16	0.00005	0.00006	0.0002	0.01	0.018	0.0001	0.00001	0.017	0.0003	0.01	0.0015	0.0001	0.00006	40 x 40
168 U RPb17	0.00009	0.001	0.0007	0.001	. . .	. . .	0.0002	. . .	0.001	. . .	. . .	0.0003	. . .	40 x 40
168 U RPb18	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40

16.8.1 Lead with precious metals — All Elements ppm

	Au	Pt	Pd	Rh	Ru	Ir	Ag	Fe	Bi	Te	As	Sb	Tl	S	Size (mm) Ø H	
168 X PBSUSPM1	25	30	10	6	1	3	25	5	120	3	2	2	7	<1	44 x 40	C
168 U RPbPM	100	50	. . .	50	5	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	

16.9 Zinc

	Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Ti	Cr	Ag	In	Tl	Sb	Si	Bi	Size (mm) Ø H	
169 X ZnSUS1	0.6	0.002	0.35	0.3	0.05	0.3	0.35	0.06	0.001	0.001	0.001	0.04	0.25	0.06	0.2	0.003	0.005	50 x 20	C
169 U RZn11	~8ppm	<1ppm	<1ppm	<1ppm	~5ppm	<1ppm	~3ppm	1ppm	<1ppm	<1ppm	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
169 U RZn12	70ppm	40ppm	40ppm	80ppm	70ppm	70ppm	70ppm	40ppm	10ppm	60ppm	. . .	70ppm	80ppm	80ppm	20ppm	. . .	. . .	40 x 40	
169 U RZn13	0.6	<0.001	0.4	0.3	0.005	0.3	0.2	0.04	<0.01	<0.001	. . .	0.04	0.3	0.02	0.1	. . .	. . .	40 x 40	
169 U RZn14	0.04	0.1	11	0.04	0.08	0.03	4	<0.01	0.01	0.06	. . .	<0.001	<0.01	<0.01	<0.01	. . .	. . .	40 x 40	
169 U RZn15	0.2	. . .	0.2	0.4	0.4	0.06	0.3	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.02	. . .	. . .	40 x 40	
169 U RZn16	0.1	. . .	0.2	0.01	0.09	0.004	0.005	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	

16.10 Titanium

	Al	V	Fe	Pd	C	Mo	Zr	Sn	B	Co	Cr	Cu	Mg	Mn	Size (mm) Ø H	
1610 U RTi11	. . .	. . .	~0.05	. . .	~0.06	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
1610 U RTi12	. . .	. . .	~0.02	0.2	~0.06	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
1610 U RTi13	6	4	0.3	. . .	0.08	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
1610 U RTi14	(6)	. . .	0.01	. . .	0.02	2	4	2	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
1610 M BS TSU-1	6.11	4.12	0.22	0.15	0.062	0.067	0.068	0.076	0.01	0.061	0.07	0.073	<0.005	0.065		
1610 M BS TSU-2	5.15	0.08	0.18	. . .	0.095	3.93	1.94	2.05	0.013	. . .	4.03	0.16	. . .	0.089	continued	
1610 M BS TSU-3	0.13	0.069	0.1	0.14	0.066	0.28	0.065	0.069	0.012	0.065	0.063	0.077	<0.003	0.064		

Continuation from above	N	Nb	Ni	O	P	Ru	S	Si	Ta	W	Y		Size (mm) Ø H	
1610 M BS TSU-1	0.02	0.068	0.073	0.191	0.009	0.07	0.008	0.057	0.079	0.075	0.009		44 x 7	HIP
1610 M BS TSU-1	0.017	. . .	0.059	0.164	0.012	. . .	0.011	0.11	. . .	0.082	0.011	For X-ray use only	each	
1610 M BS TSU-1	0.018	0.066	0.77	0.25	0.01	0.066	0.005	0.067	0.083	0.065	0.008		set only	

16.11 Tin

	Ag	Sb	As	Bi	Pb	Cu	Zn	Cd	Fe	In	Tl	Al	Ni	Co	Au	Pt	Pd	Size (mm) Ø H	
1611 X SnSUS6	0.1	0.14	0.45	0.08	0.9	0.45	0.001	0.01	0.01	0.005	0.005	0.002	0.1	0.015	0.003	0.003	0.003	40 x 40	C
1611 X SnSUS7	0.12	10.5	2.5	2.4	0.3	11.2	0.01	0.015	0.3	0.05	0.05	0.002	0.1	0.03	0.001	. . .	0.001	45 x 25	
1611 U RSn10	<1ppm	<10ppm	<10ppm	<5ppm	<10ppm	<5ppm	<1ppm	<1ppm	<5ppm	<5ppm	<5ppm	<5ppm	<5ppm	. . .	. . .	. . .	. . .	40 x 40	
1611 U RSn11	. . .	<0.003	<0.002	<0.001	<0.002	<0.003	<0.001	. . .	<0.001	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40 x 40	
1611 U RSn12	0.2	2	0.5	0.08	35	1	0.01	0.1	<0.001	0.1	0.2	<0.001	<0.001	<0.001	. . .	. . .	. . .	40 x 40	
1611 U RSn13	<0.001	15	<0.01	0.06	1	0.4	0.01	0.02	0.2	<0.01	<0.001	0.2	0.1	0.1	. . .	. . .	. . .	40 x 40	

16.12 Cobalt

	C	Si	Mn	Ni	Cr	W	Mo	Nb	Fe	Al	B	S	P		Size (mm) Ø H	
1612 X CoSUS1	0.9	1.3	0.9	12.0	27.0	5.0	5.0	1.1	4.0	2.0	0.01	0.1	0.05	continued		
1612 U RCo11	. . .	0.01	<0.005	0.003	<0.005	0.01	<0.005	<0.0005	<0.02	. . .	. . .	. . .	<0.003	continued		
1612 U RCo14	0.8	1	0.5	10	25	7.5	1	<0.03	1	0.2	0.007	<0.005	<0.005			

Continuation from above	Ti	Ta	Zr	Cu	V	Sn	Pb	Size (mm) Ø H	
1612 X COSUS1	0.05	0.1	0.05	0.1	0.1	0.1	0.02	45 x 20	C
1612 U RCo11	<0.03	. . .	<0.003	<0.01	0.001	. . .	. . .	35 x 20	
1612 U RCo14	<0.03	. . .	. . .	. . .	. . .	. . .	. . .	35 x 40	

All of these samples have been prepared to meet the daily setting up requirements of laboratories using Direct Reading Spectrometers.
The Analytical Data are supplied with each sample but are not certified as accurate as these are not intended to be used as Primary Reference Materials.

16.20 Steel/Iron

	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	Nb	W	As	
1620 U CFe1	0.004	0.0065	0.0025	0.003	0.0385	0.022	0.013	<0.001	0.01	0.003	5ppm	0.0025	0.001	<2ppm	0.0015	
1620 U CFe2	0.26	0.25	0.022	0.035	0.9	0.25	0.25	0.09	0.12	0.025	0.015	0.065	0.045	0.01	0.05	
1620 U CFe3	0.04	0.36	0.002	0.026	1.7	11.03	16.7	2.01	0.09	0.21	...	0.007	0.77	0.03	...	
1620 U CFe4	1.7	0.4	0.010	0.010	0.40	0.30	11.0	0.80	0.06	0.03	0.005	0.008	0.04	0.03	0.008	
1620 U CFe5	3.7	0.8	0.03	0.10	0.80	0.10	0.10	0.10	0.10	...	0.04	...	...	...	...	continued
1620 U CFe6	3.3	2.9	0.075	0.07	0.56	0.08	0.12	0.03	0.52	...	0.014	<0.002	...	...	...	
1620 U CFe7	3.7	3.1	0.005	0.02	0.07	0.05	0.03	<0.01	0.14	...	0.003	0.015	...	...	...	
1620 U CFe8	3.3	2.4	0.1	0.15	0.50	0.10	0.12	0.04	0.18	...	0.02	0.05	...	...	...	
1620 U CFe9	0.09	0.001	0.3	0.06	1.2	0.01	0.01	0.005	0.006	0.003	...	0.0005	...	...	0.003	

Continuation from above	Ti	V	Zr	B	Ca	Pb	N	Te	Sb	Ta	Size (mm) Ø H
1620 U CFe1	0.0005	0.0003	<2ppm	0.001	<0.0001	<0.001	...	<0.0002	...	...	40 x 30/50
1620 U CFe2	0.042	0.07	0.008	0.0045	0.0028	...	0.0088	...	0.0036	...	40 x 30/50
1620 U CFe3	0.005	0.07	...	0.0045	...	...	...	...	...	...	40 x 30/50
1620 U CFe4	0.003	1.0	0.004	0.002	...	...	0.045	...	...	...	40 x 30/50
1620 U CFe5	...	1.0	...	...	...	0.005	...	...	...	...	40 x 30/50
1620 U CFe6	0.019	0.015	...	...	...	<0.002	...	...	...	...	40 x 30/50
1620 U CFe7	0.01	0.018	...	...	...	<0.001	...	...	...	...	40 x 30/50
1620 U CFe8	0.019	...	...	...	...	<0.002	0.007	...	...	...	40 x 30/50
1620 U CFe9	...	...	...	0.0001	...	0.3	0.007	...	0.0005	...	40 x 30/50

	FOR ARGON SYSTEM/ARGON PURITY CHECK IN O.E.S.	Size (mm) Ø H
1620 U CFe0	The following minimum intensities should be achieved for control sample 1620 U CFe0 (FeSi) using HEPS/ spark like discharge (with or without hydrogen in argon) compared to the pure sample 162 U RE 12 or 162 U RE 13	
	Fe 1877 > 60%, Fe 2730 > 70%, Fe 2813 or 3608 > 80%	40 x 30/50

16.40 Aluminium

	Si	Fe	Cu	Mn	Mg	Cr	Zn	Ti	B	Na	Ca	Ni	
1640 U CAl2	0.88	0.28	0.058	0.63	0.75	0.052	0.05	0.048	<0.001	...	...	0.005	
1640 U CAl3	0.08	0.17	0.004	0.21	2.8	0.001	0.007	0.009	...	...	0.02	0.002	
1640 U CAl4	19.6	5.0	0.010	0.03	0.010	...	<0.01	...	0.0008	0.0008	...	1.82	continued
1640 U CAl5	8.8	0.7	1.4	0.08	1.9	0.08	0.24	0.09	0.0010	...	...	1.3	

Continuation from above	Pb	Sn	Sb	Ga	P	Size (mm) Ø H
1640 U CAl2	<0.005	<0.003	<0.005	0.011	...	50 x 30/50
1640 U CAl3	0.002	0.002	...	0.011	...	50 x 30/50
1640 U CAl4	<0.01	...	...	...	...	50 x 30/50
1640 U CAl5	0.07	0.07	...	...	0.0050	50 x 30/50

	FOR ARGON SYSTEM/ARGON PURITY CHECK IN O.E.S.	Size (mm) Ø H
1640 U CAl0	The following minimum intensities should be achieved for control sample 1640 U CAl0 (AlSi) using HEPS / spark like discharge (with or without hydrogen in argon) compared to the pure sample 164 U RA 10	
	Al 3059 > 70%	50 x 30/50

16.50 Copper

	All elements ppm																	Size (mm)
	Ag	Au	As	Bi	Cd	Cr	Co	Fe	Mn	Ni	Pb	S	Sb	Se	Sn	Te	Zn	Ø H
1650 U CCu2	4930	47	...	90	...	110	...	227	113	4220	3710	...	2830	...	2180	...	1150	40 x 30/50
1650 U CCu3	...	...	875	...	96	...	496	...	...	...	...	229	...	475	...	194	...	40 x 30/50

16.60 Magnesium

	Mg	Al	Si	Fe	Cu	Mn	Zn	Ni	Pb	Sn	Zr	Cd	Na	Size (mm) Ø H
1660 U CMg2	93	5.7	0.01	0.001	0.006	0.2	0.8	0.001	0.001	0.001	0.004	0.0001	0.001	50 x 30/50

16.90 Zinc

	Pb	Mg	Al	Cd	Fe	Sn	Cu	Size (mm) Ø H
1690 X ZnChk1	0.005	0.02	4.0	0.005	0.025	0.003	1.2	50 x 20
1690 X ZnChk2	2.0	<0.001	0.01	0.12	0.75	1.0	0.42	50 x 20
1690 U CZn3	0.0046	0.046	4.06	0.0058	0.0106	0.0011	1.19	40 x 30/50
1690 U CZn4	1.97	...	...	0.107	0.67	0.96	0.39	40 x 30/50
								40 x 30/50

	1.1 Cast Iron	Total C	Graphitic C	Si	S	P	Mn	Ni	Cr	Cu	Ti	Mg	Mo	V	Others	Typical Alloy Type	Size
CRM	C11 E 37B	3.37	2.85	1.66	0.069	0.148	0.737	0.074	0.088	0.052	0.034	. . .	. . .	. . .			80g
CRM	C11 E 66	3.56	2.23	1.49	0.027	0.048	0.635	0.163	0.621	0.154	. . .	. . .	0.022	. . .			80g
CRM	C11 E 69	3.34	2.5	2.07	0.018	0.267	0.715	0.272	0.353	0.47	0.019	. . .	(0.004)	. . .			80g
CRM	C11 E 75A	3.4	2.7	1.98	0.033	0.250	0.722	0.425	0.487	0.433	0.022	. . .	0.439	0.030		White	100g
	C11 T FB11-2	3.148	. . .	(1.44)	0.084	(0.02)	(0.42)	. . .	. . .	. . .	. . .	. . .	. . .	. . .			100g
	C11 T FB12-2	3.8	. . .	. . .	0.17	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		White	100g
	C11 T FB13	2.9	. . .	. . .	0.10	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		White	100g
	C11 T FB20	2.114	. . .	1.012	0.128	0.039	0.464	. . .	0.035	. . .	. . .	. . .	. . .	. . .		White	100g
	C11 T FB20-1	3.552	. . .	(0.935)	0.059	(0.068)	(0.39)	. . .	(0.10)	. . .	. . .	. . .	. . .	. . .			100g
	C11 T FG10	2.322	. . .	2.467	0.016	0.111	1.10	. . .	. . .	. . .	. . .	. . .	. . .	. . .		Grey	100g
	C11 T FG20	2.487	. . .	1.726	0.109	1.440	0.571	. . .	. . .	. . .	. . .	. . .	. . .	. . .		Grey	100g
	C11 T FA10	1.976	. . .	1.480	. . .	0.045	1.063	20.05	1.99	0.492	. . .	. . .	. . .	. . .			100g
	C11 T FA20	0.643	. . .	1.519	. . .	0.045	0.368	. . .	28.30	. . .	. . .	. . .	. . .	. . .			100g
CRM	C11 DB E428-2	2.747	. . .	1.752	0.1105	0.0691	0.750	0.0358	0.0366	0.0996	0.0311	. . .	(0.0014)	0.0120	As 0.0156		100g
CRM	C11 DB E476-3	3.390	. . .	1.813	0.0493	0.0908	0.987	0.0549	0.0648	0.2445	0.0222	. . .	. . .	0.0115	As 0.0145, N 0.0038		100g
CRM	C11 DB E478-2	4.003	. . .	2.411	0.0460	0.202	0.321	0.151	0.251	0.1276	0.0328	. . .	. . .	(0.0113)			100g
CRM	C11 DB E479-1	2.86	. . .	2.02	0.089	0.076	0.136	1.012	1.00	. . .	. . .	. . .	0.196	. . .	Al 0.014		100g
CRM	C11 DB E480-1	3.03	. . .	2.41	0.0086	0.0021	0.151	0.483	. . .	. . .	. . .	0.017	. . .	. . .	Al 0.016		100g
CRM	C11 A 206/3	(2.44)	(2.37)	3.17	0.049	1.63	0.72	0.068	0.053	0.1	(0.04)	. . .	. . .	0.05	As	High Si & P	100g
CRM	C11 A 236/3	(2.53)	(1.96)	2.0	0.068	0.046	1.16	(0.21)	. . .	(0.07)	0.052	. . .	. . .	. . .	As	Hamatite	100g
CRM	C11 A E481-1	3.91	. . .	2.29	0.004	0.019	0.448	1.19	0.063	0.15	. . .	0.051	0.011	. . .	As,Al	Nodular	100g
CRM	C11 A E482-2	2.599	. . .	1.815	0.728	0.0974	0.728	2.284	0.675	1.231	. . .	. . .	0.454	. . .			100g
CRM	C11 A E483-1	2.46	1.65	1.75	0.103	0.615	0.596	. . .	0.039	. . .	. . .	. . .	. . .	. . .	Sn	High Duty	100g
CRM	C11 A E484-1	3.2	. . .	0.717	0.23	0.121	0.395	. . .	0.155	. . .	. . .	. . .	. . .	. . .		Whiteheart	100g
CRM	C11 A E486-1	2.21	. . .	2.43	0.023	1.0	0.841	0.057	0.104	0.548	. . .	. . .	. . .	0.02	Sn	Foundry	100g
CRM	C11 A E489-1	2.86	. . .	1.524	0.155	0.815	(0.51)	. . .	. . .	0.274	. . .	. . .	. . .	. . .	N	White	100g
CRM	C11 TI E485-2	3.308	. . .	0.508	0.165	0.61	0.19	0.0742	0.0845	0.0303	. . .	. . .	. . .	. . .	N	White	100g
CRM	C11 TI E487-1	3.27	. . .	0.006	0.0007	0.002	0.094	0.04	0.063	. . .	. . .	. . .	. . .	. . .	Co,As		100g
CRM	C11 TI E488-2	3.956	. . .	0.374	0.1173	0.0111	0.201	0.1247	0.303	0.0256	0.0636	. . .	. . .	0.0545	N,Sn	White	100g
	C11 M BS CE209	2.46	. . .	2.13	0.027	0.167	0.39	0.045	0.01	0.211	0.062	0.0013	(0.001)	0.03	Ce,Al,As	Rare Earth	150g
	C11 M BS CE208	2.41	. . .	1.63	0.041	0.118	0.35	0.047	0.007	0.212	0.048	0.0008	(0.001)	0.024	Ce,Al,As	Rare Earth	150g
	C11 M BS CE207	3.05	. . .	2.07	0.017	0.089	1.2	0.048	0.039	0.222	0.079	0.0027	(0.0005)	0.034	Ce,Al,As	Rare Earth	150g
CRM	C11 S 120-1	2.85	. . .	1.32	0.0095	0.053	0.70	0.12	0.28	0.29	0.006	. . .	. . .	0.007	N 0.0058		150g

	1.1.5 Pig Iron	C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Ti	V	Sn	As	Pb	Sb	N	Size
	C11 CG 01123	2.00	1.54	0.022	0.096	1.13	0.0125	0.122	0.017	0.122	0.053	0.018	0.0043	0.0067	0.00019	0.0010	. . .	100g
	C11 CG 01124	2.68	0.627	0.067	0.174	0.783	0.095	0.110	0.021	0.063	0.015	0.019	0.0021	0.0048	0.00025	0.00084	. . .	100g
	C11 AU 41008	4.03	0.88	0.040	0.049	0.40	. . .	0.0068	0.00065	0.0032	0.027	0.0040	0.00015	0.0016	<0.0002	0.00014	. . .	150g
	C11 AU 41009	3.89	1.58	0.028	0.058	0.650	0.0058	0.0081	0.00066	0.0029	0.042	0.0049	0.00015	0.0010	<0.0002	0.00016	. . .	150g
CRM	C11 S 102-7	4.66	0.71	0.0181	0.103	0.375	. . .	. . .	. . .	. . .	0.0503	. . .	. . .	. . .	. . .	. . .	0.0051	150g

	1.1.6 Pure Iron	All Elements ppm C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	N	V	Sn	As	B	Others	Size
CRM	C11 E 68	71	(20)	30	90	42	160	12	50	110	60	34	. . .	. . .	. . .	. . .		50g
CRM	C11 E 73	34	28	49	34	44	330	300	49	760	40	76	. . .	. . .	. . .	. . .		120g
CRM	C11 A E088-2(C)	6	52	70	48	809	275	244	(25)	163	61	(10)	2.9	. . .	. . .	. . .	Ca,	100g
CRM	C11 A E097-1(C)	<20	<100	22	16	64	25	16	<10	20	37	7	<10	<25	51	3	B, Zn	100g

		All Elements ppm C	S	P	Mn	Cr	Ni	Cu	Al	Si	Mo	Ca	Mg	Ti	N	Size
	C11 CG 01401a	15	15	14	170	56	120	30	100	490	28	. . .	. . .	25	25	15g
	C11 CG 01402d	12	8	(1)	2.2	3.7	11	4	3.4	42	1.4	17	2.4	(1)	. . .	15g

	1.1.11 With Cr	C	Si	S	P	Mn	Ni	Cr	Cu	Mo	V	W	Co	Sn	Pb	Size
CRM	C11 X 152940S	2.15	0.49	0.072	0.081	0.52	4.20	31.02	0.174	0.278	0.024	0.301	1.05	0.072	0.023	100g

	1.1.14 Ductile Iron	C	Si	Mn	P	S	Cu	Cr	Ni	Mo	Co	RE	Mg	V	Ti		Size
	C11 CG 01119a	3.67	2.673	0.497	0.084	0.0053	0.033	0.0115	0.011	0.0013	0.0065	0.0187	0.023	0.0205	0.068		85g
	C11 M BS CE206	2.64	2.76	0.99	0.15	0.018	0.45	0.068	0.048	0.007	0.029	0.021	0.0006	0.038	0.78	continued	

	Continuation from above	Ce	Al	As	La	Te	Size
	C11 M BS CE206	0.011	0.004	0.004	0.004	<0.002	150g

1.2.1 Plain Carbon

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	Nb	As	N	Others	Typical Alloy Type	Size
CRM	**C12 E 11A**	0.205	0.030	0.011	0.009	0.439	0.079	0.121	0.010	0.013	0.153	...	...	...		AISI 1020	120g
CRM	**C12 E 13A**	0.573	0.260	0.014	0.011	0.723	0.065	0.098	0.018	0.076	0.027	...	...	...		AISI 1060	100g
CRM	**C12 E 14A**	0.415	0.292	0.036	0.029	0.699	0.104	0.100	0.029	0.278	(0.009)	...	...	...		AISI 1040	100g
CRM	**C12 E 39**	0.048	0.061	0.034	0.021	0.340	0.048	0.084	0.012	0.019	0.169	...	...	...		AISI 1006	100g
CRM	**C12 E 41B**	0.072	0.022	0.322	0.057	1.08	0.012	0.037	...	0.005	...	...	...	...	Pb 0.220	AISI 12L14	100g
CRM	**C12 E 43**	0.310	0.207	0.112	0.029	1.42	0.056	0.098	0.013	0.056	...	...	...	...		AISI 1132	120g
CRM	**C12 E 55**	0.837	0.240	0.027	0.023	0.923	0.174	0.215	0.099	0.187	0.093	0.061	...	...		AISI 1080	100g
CRM	**C12 E 71**	0.406	0.541	0.025	0.017	1.04	0.085	0.174	0.018	0.125	0.038	...	...	...	B 0.0084	AISI 10B40	100g
CRM	**C12 E 93**	0.140	0.261	0.028	0.036	1.02	0.053	0.104	0.013	0.129	0.045	...	...	...	B 0.0022, Ti 0.034	AISI 15B13	100g
CRM	**C12 E 100**	0.462	0.188	0.019	0.016	0.755	0.524	1.08	0.94	0.053	0.029	...	...	0.0075	V 0.117	Cr/Ni/Mo/V	100g
CRM	**C12 E 108**	0.598	1.96	0.020	0.028	0.861	0.052	0.133	0.017	0.121	0.019	...	...	...	Co 0.006, Ti 0.004	AISI9260	100g
CRM	**C12 DB E030-4**	0.456	0.318	0.021	0.018	0.603	0.042	0.117	...	0.061	0.042	...	0.012	0.0051			100g
CRM	**C12 DB E031-3**	0.055	0.037	0.021	0.014	0.329	...	...	...	0.020	0.054	...	0.013	0.0050			100g
CRM	**C12 DB E032-2**	0.271	0.282	0.0254	0.0129	0.556	(0.040)	(0.088)	...	0.085	...	...	0.020	0.0044			100g
CRM	**C12DB E035-2(C)**	1.277	0.216	0.111	0.0038	0.305	0.0190	0.0104	0.0056	0.0085	0.0177	...	0.0017	0.0230			100g
CRM	**C12 DB E036-1**	0.858	0.194	0.0095	0.0074	0.327	(0.058)	(0.091)	...	0.065	(0.015)	...	0.0233	0.0100	V (0.019)		100g
CRM	**C12 DB E042-1**	0.108	0.037	0.024	0.0057	0.666	0.029	0.016	...	0.041	0.010	0.054	...	0.0078			100g
CRM	**C12 DB E077-2**	0.151	0.293	0.014	0.022	1.28	(0.021)	(0.016)	(0.003)	(0.029)	...	...	0.007	0.0054			100g
CRM	**C12 DB E079-2**	0.596	0.247	0.192	0.0234	0.743	0.022	0.0382	...	0.046	...	...	0.004	0.0074			100g
CRM	**C12 DB E082-1**	0.415	0.235	0.030	0.013	0.769	0.027	0.018	...	0.025	...	...	...	...	Pb 0.149, Te 0.030		100g
CRM	**C12 DB E083-1**	0.028	...	0.0100	0.0077	0.289	0.014	(0.013)	...	0.016	...	...	...	0.0022			100g
CRM	**C12 A 159/3**	0.51	0.24	0.036	0.016	0.77	(0.12)	(0.16)	(0.02)	(0.15)	...	...	...	...			100g
CRM	**C12 A 161/3**	0.79	0.3	0.03	0.043	1.02	(0.13)	(0.11)	(0.026)	(0.12)	(0.01)	...	...	...			100g
CRM	**C12 A 163/2**	1.26	0.24	0.022	0.019	0.3	(0.1)	(0.16)	(0.012)	(0.09)	...	...	...	...			100g
CRM	**C12 A 232/2**	0.181	(0.11)	0.126	(0.025)	1.18	(0.14)	(0.05)	...	(0.15)	...	...	...	...			100g
CRM	**C12 A 237/2**	0.122	(0.17)	(0.031)	(0.024)	0.45	(0.039)	(0.028)	<0.005	(0.06)	...	...	...	...			100g
CRM	**C12 A 238/2**	0.21	0.12	(0.034)	(0.019)	(0.61)	(0.21)	...	...	(0.1)	...	...	...	...			100g
CRM	**C12 A 270**	0.22	(0.05)	(0.1)	0.092	(0.88)	(0.14)	(0.17)	(0.02)	(0.21)	...	...	...	...			100g
CRM	**C12 A E057-2(C)**	0.0507	(0.003)	0.0172	0.012	0.246	0.0095	0.0114	...	0.0146	...	...	...	0.0023	Al 0.059		100g
CRM	**C12 A E064-1(C)**	0.0026	0.0065	0.0104	0.0091	0.1641	0.0115	0.0184	0.00077	0.0077	0.0302	0.0146	0.0036	0.0026	Ti 0.0189		100g
CRM	**C12 A E084-1(C)**	0.391	0.265	0.029	0.018	0.86	0.154	...	0.033	0.267	...	...	...	...	Sn		100g
CRM	**C12 A E085-1(C)**	0.067	0.008	0.336	0.062	0.977	...	...	...	0.291	...	...	...	...	Co, Pb, V, Sb, Zn		100g
CRM	**C12 A E086-1(C)**	0.297	0.206	0.037	0.024	0.879	0.168	0.15	...	0.32	...	...	0.023	...	Sn,		100g
CRM	**C12 A E087-1**	0.174	0.263	0.046	0.01	0.671	0.118	0.078	0.021	0.171	...	...	0.024	...	Co,Sn,Sb		100g
CRM	**C12 A E090-1(C)**	1.05	0.281	0.0095	0.013	0.226	0.053	0.121	0.0089	...	...	...	...	0.0146	V		100g
CRM	**C12 A E091-1**	0.518	...	...	...	...	0.31	0.312	0.098	...	...	...		0.0111			100g
CRM	**C12 A 431/2**	0.0249	0.015	0.0065	0.121	0.902	0.04	0.049	(0.004)	...	...	0.0040	...	0.0052			100g
CRM	**C12 A 432/2**	0.0065	0.0822	0.036	0.0171	0.712	0.0196	0.0166	(0.002)	...	...	0.0174	...	0.0066			100g
CRM	**C12 A 433/2**	0.096	0.0071	0.0083	0.011	1.188	0.037	0.0262	(0.004)	...	...	0.0590	...	...			100g
CRM	**C12 A 434/2**	0.275	0.51	0.0141	0.0611	1.546	0.037	0.238	(0.014)	...	...	0.038	...	0.0104			100g
CRM	**C12 A 435/2**	0.489	0.328	0.0424	0.0373	0.39	0.133	0.184	(0.018)	...	...	0.134	...	...	Co		100g
CRM	**C12 TI E080-1**	0.452	0.317	0.024	0.028	1.116	...	0.025	...	...	...	...	...	0.0073			100g
CRM	**C12 TI E081-1**	0.099	0.105	0.014	0.0129	0.605	0.042	...	...	0.026	...	...	...	...	Al,Co		100g
	C12 M BS CE24	0.63	0.27	0.01	0.016	0.84	0.045	0.016	0.006	0.066	0.044	...	0.0029	...	Co		150g
CRM	**C12 S 023-8**	0.112	0.22	0.0067	0.020	0.48	...	...	...	0.010	(0.015)	...	...	(0.0037)			150g
CRM	**C12 S 030-7**	0.196	0.24	0.0076	0.024	0.75	...	...	...	0.024	0.023	...	...	0.0033			150g
CRM	**C12 S 050-6**	0.38	0.19	0.0057	0.013	0.50	...	...	...	0.008	0.023	...	...	0.0029			150g
CRM	**C12 S 057-6**	0.52	0.19	0.0057	0.017	0.55	...	...	...	0.006	0.030	...	...	0.0030			150g
CRM	**C12 S 061-7**	0.626	0.206	0.0106	0.0240	0.513	...	...	...	0.0086	(0.002)	...	...	0.0036			150g
CRM	**C12 S 065-5**	0.80	0.20	0.0060	0.0095	0.73	...	...	...	0.008	0.022	...	...	(0.0037)			150g

1.2.2 Mild Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	W	Ti	V	As	Size
	C12 X 3490A	0.24	0.26	0.024	0.021	0.69	0.23	0.10	0.06	0.20	0.006	0.16	0.32	0.08	0.085	0.002	0.005	100g
	C12 X 3500A	0.18	0.45	0.032	0.029	0.70	0.18	0.31	0.10	0.15	0.005	0.03	0.35	0.29	0.054	0.002	0.070	100g
CRM	**C12 X 3520B**	0.275	0.414	0.126	0.07	0.200	0.376	0.313	0.261	0.140	0.020	0.110	0.257	0.202	0.29	0.029	0.036	100g
CRM	**C12 A 451/1**	0.051	0.1116	0.014	0.009	0.62	0.016	0.10	0.04	0.47	...	0.002	...	0.099	0.105	...	0.041	100g.
CRM	**C12 A 452/1**	0.323	0.055	0.017	0.035	1.30	0.19	0.07	0.05	0.22	...	0.094	...	0.054	0.031	...	0.015	100g.
CRM	**C12 A 453/1**	0.16	0.34	0.026	0.044	1.38	0.11	0.26	0.08	0.099	...	0.022	...	0.3	0.073	...	0.052	100g.
CRM	**C12 A 454/1**	0.376	0.31	0.047	0.061	0.80	0.069	0.06	0.20	0.05	...	0.054	...	0.15	0.01	...	0.070	100g.
CRM	**C12 A 455/1**	0.598	0.25	0.055	0.052	0.40	0.35	0.21	0.14	0.04	...	0.085	...	0.2	0.022	...	0.026	100g.
CRM	**C12 A 456/2**	0.112	0.297	0.0221	0.0212	0.22	...	...	...	...	0.0504	...	0.0017	...	...	0.0221	...	100g
CRM	**C12 A 457/2**	0.307	0.105	0.0448	0.0098	0.327	...	...	...	...	0.0217	...	0.088	...	...	0.153	...	100g
CRM	**C12 A 458/2**	0.198	0.504	0.0314	0.0281	0.479	...	...	...	...	0.198	...	0.055	...	...	0.105	...	100g
CRM	**C12 A 459/2**	0.467	0.64	0.0481	0.0482	0.909	...	...	...	...	0.089	...	0.015	...	...	0.0585	...	100g
CRM	**C12 A 460/2**	0.383	0.126	0.0099	0.0374	0.616	...	...	...	...	0.0106	...	0.024	...	...	0.0322	...	100g

		C	Si	S	P	Mn	Co	Al	Nb	V	B	Sb	Zr	Size
	C12 X 3530A	0.075	0.10	0.007	0.004	1.01	0.025	0.015	0.12	0.02	(0.0004)	0.11	0.09	100g
	C12 X 3540A	0.27	0.19	0.015	0.066	0.86	0.03	0.01	0.07	0.02	0.0002	0.05	0.03	100g
	C12 X 3550A	0.20	0.48	0.024	0.028	0.62	0.05	<0.01	0.02	0.11	0.001	0.08	<0.01	100g
	C12 X 3560A	0.36	0.37	0.031	0.049	0.44	0.12	0.05	0.02	0.09	0.007	0.02	0.01	100g
	C12 X 3570A	0.45	0.23	0.062	0.016	0.24	0.21	0.06	<0.001	0.19	0.014	<0.005	<0.005	100g

1.2.3 Low Alloy

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Nb	Soluble Al	V	N	Others	Typical Alloy Type	Size
CRM	C12 E 12A	0.435	0.348	0.009	0.012	0.908	0.508	0.528	0.172	0.082	. . .	. . .	. . .	. . .	. . .		AISI 8640	100g
CRM	C12 E 16A	0.212	0.287	0.018	0.019	0.820	0.559	0.493	0.201	0.053	. . .	. . .	0.016	. . .	. . .		AISI 8620	100g
CRM	C12 E 17A	0.415	0.260	0.021	0.014	0.724	1.76	0.820	0.259	0.074	0.039	. . .	. . .	. . .	. . .		AISI 4340	100g
CRM	C12 E 25	0.400	0.222	0.007	0.012	0.902	0.072	1.01	0.280	0.040	. . .	. . .	. . .	. . .	. . .		AISI 4140	100g
CRM	C12 E 29A	0.614	0.372	0.0076	0.012	0.565	0.794	0.845	0.276	0.012	. . .	. . .	0.028	0.080	0.0039		Ni/Cr/Mo	100g
CRM	C12 E 31	0.497	0.146	0.009	0.021	0.794	0.106	1.15	. . .	0.251	. . .	. . .	0.087	0.250	. . .		AISI 6150	100g
CRM	C12 E 33	0.603	0.133	0.007	0.011	0.772	0.059	0.793	. . .	0.036	. . .	. . .	0.099	. . .	. . .		AISI 5160	100g
CRM	C12 E 36	0.315	0.291	0.004	0.016	0.430	0.217	1.25	0.201	0.129	. . .	. . .	0.86	. . .	. . .		Cr/Mo/Al	100g
CRM	C12 E 47	0.122	0.273	0.020	0.013	0.959	0.221	0.573	. . .	0.245	. . .	0.032	. . .	. . .	. . .			100g
CRM	C12 E 96	0.109	0.286	0.0049	0.017	0.845	0.018	0.614	. . .	0.272	(0.0048)	0.0072	0.041	. . .	0.0092			120g
CRM	C12 E 97	0.165	0.231	0.026	0.015	1.11	0.227	1.22	0.064	0.129	0.012	0.023	0.028	0.024	0.0119	Ti, B		100g
CRM	C12 E 117	0.515	0.349	0.011	0.019	0.557	3.01	1.02	0.292	0.07	0.014	. . .	0.026	0.015	. . .	W		100g
CRM	C12 A 219/4	0.315	0.079	0.027	0.011	0.81	2.55	0.66	0.58	0.088	. . .	. . .	. . .	. . .	. . .	Sn		100g
CRM	C12 A 222/1	(0.31)	(0.22)	(0.009)	(0.020)	(0.62)	3.54	(0.05)	(0.029)	(0.14)	(0.038)	. . .	. . .	. . .	. . .			100g
CRM	C12 A 225/2	0.40	0.23	0.012	0.019	0.56	1.43	1.08	0.34	(0.17)	(0.02)	. . .	. . .	(<0.01)	(0.012)			100g

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Sn	Al	V	N	Nb	Zr	Size
	C12 X LA10A	0.06	0.75	0.045	0.013	1.32	0.21	0.85	<0.01	0.034	. . .	. . .	<0.01	0.41	. . .	. . .	. . .	50g
	C12 X LA20A	0.24	0.98	0.042	0.026	0.55	0.73	0.81	0.10	0.44	. . .	. . .	0.03	0.09	. . .	. . .	. . .	50g
	C12 X LA20B	0.188	0.97	0.043	0.033	0.55	0.74	0.81	0.101	0.436	<0.01	. . .	1.45	0.09	0.006	. . .	. . .	50g
	C12 X LA30A	0.48	0.13	0.04	0.032	1.50	0.31	0.37	0.30	0.20	. . .	. . .	0.06	0.19	. . .	. . .	. . .	50g
	C12 X LA40A	0.67	0.28	0.021	0.044	0.24	0.46	0.64	0.46	0.29	. . .	. . .	0.19	0.36	. . .	. . .	. . .	50g
	C12 X LA50A	0.81	0.67	0.015	0.057	0.98	0.13	0.12	0.19	0.09	. . .	. . .	0.19	0.58	. . .	. . .	. . .	50g
	C12 X LA60A	0.01	0.06	0.006	0.005	0.10	0.03	0.03	<0.01	0.01	. . .	. . .	<0.01	<0.01	. . .	. . .	. . .	50g
	C12 X LA70A	0.295	0.39	0.039	0.051	0.62	0.31	1.04	0.26	0.23	0.15	0.05	1.14	0.24	. . .	. . .	. . .	50g
	C12 X LA80A	0.205	0.26	0.024	0.028	1.05	3.98	1.98	0.39	0.30	0.06	0.1	0.12	0.05	. . .	. . .	. . .	50g
	C12 X LA90A	0.47	1.07	0.065	0.074	0.58	2.04	3.10	1.10	0.51	0.30	0.007	0.05	0.39	. . .	. . .	. . .	50g
CRM	C12 HY CH20	0.008	0.005	0.013	0.012	0.09	0.038	0.03	<0.01	0.03	. . .	(0.003)	(0.01)	<0.005	. . .	. . .	. . .	100g
CRM	C12 HY CH21	0.98	1.79	0.020	0.019	0.08	4.08	1.83	. . .	0.50	. . .	. . .	. . .	. . .	. . .	. . .	0.074	100g
CRM	C12 HY CH22	0.20	0.53	0.025	0.012	0.14	. . .	5.94	. . .	0.25	. . .	. . .	. . .	1.16	. . .	. . .	. . .	100g
CRM	C12 HY CH23	0.55	1.72	0.043	0.047	1.07	. . .	. . .	. . .	0.49	. . .	. . .	. . .	. . .	. . .	. . .	0.09	100g
CRM	C12 HY CH24	0.43	0.34	0.048	0.028	0.76	1.62	1.32	0.21	0.41	. . .	. . .	0.007	0.026	. . .	0.022	. . .	100g
CRM	C12 HY CH25	1.16	1.21	0.005	0.028	0.65	0.16	3.17	1.25	0.107	0.30	. . .	. . .	1.14	. . .	0.41	. . .	100g
CRM	C12 HY CH27	0.096	0.59	0.018	(0.01)	1.53	0.97	0.64	0.56	0.73	. . .	. . .	(0.01)	0.27	. . .	. . .	. . .	100g
CRM	C12 JN 100LA	1.002	0.283	0.018	0.012	0.33	0.0266	1.52	0.01	0.0194	0.01	. . .	0.0046	0.0036	. . .	. . .	. . .	150g
CRM	C12 TI E176-2	1.91	(0.65)	0.012	(0.016)	(0.60)	1.08	0.99	. . .	(0.01)	. . .	. . .	. . .	(0.07)	. . .	. . .	. . .	100g
CRM	C12 TI E185-1	1.172	(0.25)	0.0209	(0.02)	(0.41)	(0.17)	0.99	. . .	(0.17)	. . .	0.0212	. . .	. . .	. . .	. . .	. . .	100g
CRM	C12 TI E188-1	1.094	. . .	0.0113	. . .	. . .	(0.28)	1.54	(0.17)	. . .	(0.06)	. . .	. . .	(0.02)	. . .	. . .	. . .	100g
CRM	C12 TI E190-1(C)	0.395	0.278	0.0044	0.0112	1.28	0.934	2.18	0.41	. . .	0.03	. . .	. . .	. . .	0.0096	. . .	. . .	100g
CRM	C12 DB E179-2(C)	0.598	0.579	(0.0006)	0.0267	0.539	0.078	1.08	0.07	0.111	(0.0153)	. . .	. . .	0.188	0.0068	. . .	. . .	100g
CRM	C12 DB E180-1	0.197	0.362	0.0249	0.0174	1.286	0.096	1.25	. . .	0.115	. . .	. . .	. . .	. . .	0.0068	. . .	. . .	100g
CRM	C12 DB E181-1	0.59	1.054	0.035	0.018	1.047	0.07	0.13	. . .	0.174	. . .	(0.015)	. . .	. . .	0.0068	. . .	. . .	100g
CRM	C12 DB E182-1	0.79	0.368	0.011	0.0076	0.389	0.152	0.59	. . .	0.141	. . .	. . .	. . .	0.177	0.00102	. . .	. . .	100g
CRM	C12 DB E183-1	0.083	0.421	0.031	0.089	0.354	0.073	0.67	. . .	0.445	. . .	. . .	. . .	. . .	0.0064	. . .	. . .	100g
CRM	C12 DB E184-1	0.333	0.218	0.0032	0.0047	0.528	3.318	1.29	0.46	0.06	0.056	0.0044	. . .	0.108	0.0051	. . .	. . .	100g
CRM	C12 DB E187-1(C)	0.195	0.026	0.025	0.014	1.354	0.096	1.19	0.04	0.161	0.014	0.011	. . .	. . .	0.014	. . .	. . .	100g
CRM	C12 DB E192-1(C)	0.188	0.219	0.001	0.0029	1.377	0.755	0.07	0.48	0.045	0.0055	(0.003)	. . .	(0.003)	0.0118	. . .	. . .	100g
CRM	C12 DB E193-1(C)	0.139	0.404	0.0086	0.0063	0.972	1.178	0.18	0.35	0.598	0.0073	. . .	. . .	(0.0019)	0.0108	. . .	. . .	100g
CRM	C12 DB E194-1(C)	0.153	0.431	0.008	0.0097	1.188	0.342	0.73	0.29	0.075	. . .	. . .	. . .	0.0243	0.0115	. . .	. . .	100g

		C	Si	Mn	Ni	Cr	Mo	Ti	As	Sn	Ca	Al	V	Co	B	Zr	Nb	Sb	Size
CRM	C12 S 168-7	0.053	0.20	0.43	0.017	0.020	0.095	0.077	0.012	0.0065	0.0006	0.041	. . .	. . .	. . .	. . .	. . .	. . .	150g
CRM	C12 S 169-7	0.047	0.21	0.42	0.046	0.108	0.068	0.012	0.04	0.013	0.0008	0.04	. . .	. . .	. . .	. . .	. . .	. . .	150g
CRM	C12 S 170-7	0.052	0.18	0.43	0.081	0.049	0.011	0.105	0.032	0.056	0.0019	0.045	. . .	. . .	. . .	. . .	. . .	. . .	150g
CRM	C12 S 171-7	0.042	0.21	0.40	0.099	0.074	0.036	0.039	0.04	0.040	0.0027	0.037	. . .	. . .	. . .	. . .	. . .	. . .	150g
CRM	C12 S 172-7	0.051	0.20	0.43	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.012	0.010	0.052	0.0010	0.009	0.050	0.0022	150g
CRM	C12 S 173-7	0.038	0.21	0.40	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.019	0.028	0.031	0.0041	0.005	0.031	0.0051	150g
CRM	C12 S 174-7	0.042	0.20	0.40	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.034	0.065	0.011	0.0076	0.014	0.020	0.0102	150g
CRM	C12 S 175-7	0.025	0.22	0.32	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.063	0.091	0.025	0.0102	0.044	0.0101	0.020	150g

		C	Si	S	P	Mn	Ni	Cr	Cu	V	Al	Size
CRM	C12 A 401/2	0.935	0.602	0.0078	0.0265	1.20	0.019	0.138	0.101	0.496	0.074	100g
CRM	C12 A 402/2	1.311	0.111	0.0138	0.0161	0.23	0.808	0.652	0.302	0.194	0.161	100g
CRM	C12 A 403/2	0.75	0.209	0.0381	0.055	1.68	0.223	0.463	0.221	0.341	0.049	100g
CRM	C12 A 404/2	0.696	1.121	0.0228	0.0479	0.53	0.393	0.774	0.427	0.107	0.017	100g
CRM	C12 A 405/2	0.044	0.947	0.058	0.0095	0.90	0.102	0.206	0.022	0.411	0.330	100g
CRM	C12 A 406/2	0.173	0.342	0.043	0.0102	0.45	1.620	2.001	0.289	0.010	0.013	100g
CRM	C12 A 407/2	0.49	0.66	0.0105	0.038	0.20	0.527	3.300	0.397	0.190	0.040	100g
CRM	C12 A 408/2	0.289	0.237	0.03	0.056	0.56	4.130	0.111	0.694	0.067	0.154	100g
CRM	C12 A 409/2	0.086	1.18	0.0179	0.0141	0.56	3.020	1.318	0.205	0.008	0.094	100g
CRM	C12 A 410/2	0.428	1.1	0.041	0.074	0.419	2.07	1.684	0.436	0.44	0.046	100g

1.2.3 Low Alloy (continued)

		C	Si	S	P	Mn	Ni	Cr	Cu	V	Ti	Soluble Al	Total Al	Soluble B	Total B			Size
	C12 CG 01322	0.0332	1.50	0.022	0.013	0.230	0.078	0.473	0.320	0.050	0.247	0.066	0.069	0.0061	0.0067			100g
	C12 CG 01323	0.188	0.305	0.046	0.013	1.44	0.166	0.389	0.277	0.158	0.285	0.106	0.112	0.0018	0.0023			100g
	C12 CG 01324	0.283	1.09	0.023	0.022	0.438	0.224	0.300	0.247	0.144	0.171	0.128	0.132	0.0041	0.0045			100g
	C12 CG 01325	0.392	0.626	0.019	0.028	1.08	0.241	0.174	0.030	0.023	0.116	0.082	0.086	0.0037	0.0042			100g
	C12 CG 01326	0.506	1.96	0.012	0.034	0.755	0.314	0.102	0.126	0.241	0.76	0.197	0.201	0.0016	0.0019			100g
	C12 CG 01327	0.569	0.204	0.0038	0.038	1.90	0.413	0.018	0.116	0.283	0.064	0.276	0.279	0.0007	0.0010			100g

1.2.4 Calcium Treated Steel

		C	Si	S	P	Mn	Ni	Cr	Cu	Al	V	Ti	N	Mo	Co	Sn	Ca	Size
	C12 M BSCSN-2C	0.469	0.17	0.0305	0.012	0.60	0.071	0.072	0.073	0.046	0.004	0.002	0.0173	(0.006)	(0.006)	(0.006)	0.0033	100g
CRM	C12 A E096-2(C)	0.105	0.262	0.0016	0.0128	1.32	0.0253	0.0243	...	0.046	...	...	...	0.002	0.017	...	0.002	100g

1.2.5 Low-Alloy Structural Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	V	Sn	As	Pb	Sb	Bi	Cu	N	Size
	C12 CG 01359	0.285	0.236	0.012	0.030	0.315	0.102	2.37	1.27	0.351	0.0085	0.024	0.00029	0.0058	0.00005	...	...	100g
	C12 CG 01360	0.282	0.265	0.016	0.024	0.466	0.248	1.62	1.09	0.252	0.030	0.019	0.0015	0.0058	0.0002	...	...	100g
	C12 CG 01361	0.318	0.033	0.025	0.034	0.348	0.204	1.93	1.19	0.301	0.014	0.037	0.0037	0.0086	0.0022	...	...	100g
	C12 CG 01362	0.244	0.400	0.050	0.017	0.505	0.292	1.50	0.987	0.193	0.033	0.042	0.036	0.0084	0.0027	...	...	100g
	C12 CG 01363	0.325	0.179	0.0080	0.040	0.264	0.059	2.51	1.47	0.164	0.016	0.019	0.0056	0.0047	0.0052	...	...	100g
CRM	C12 A E195-1(C)	0.756	0.466	0.0121	0.0160	0.571	0.327	1.566	0.768	0.312	(0.002)	...	...	...	...	0.0355	0.0100	100g
CRM	C12 A E276-2(C)	0.399	1.034	0.0189	0.0093	0.365	0.203	4.975	1.134	0.296	0.0133	...	...	...	...	0.183	0.0116	100g

1.3.2 Austenitic Stainless Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Al	Nb	Ti	B	N	Others	Size
	C13 X 125340A	0.10	0.78	0.017	0.033	0.71	8.12	17.90	2.02	0.10	0.04	0.02	...	0.35	...	...		100g
	C13 X 125370A	0.05	0.99	0.030	0.097	0.91	9.98	19.8	2.99	0.05	0.11	0.06	...	0.54	...	...		100g
	C13 X 170020A	0.11	0.48	0.024	0.038	1.09	8.12	17.7	0.21	0.06	0.08	...	0.46	...	0.016	...		100g
	C13 X 170050A	0.030	1.64	0.052	0.015	0.40	20.0	24.72	0.48	0.11	0.03	...	0.12	...	0.002			100g
CRM	C13 A 332	0.063	0.44	0.02	0.015	0.8	12.45	12.8	...	(0.1)	(0.037)	...	...	...	...	...		100g
CRM	C13 A 461/1	0.0103	0.37	0.0051	0.0053	0.686	6.124	14.727	0.01	0.0091	(0.004)	...	...	...	...	...		100g
CRM	C13 A 462/1	0.0345	0.46	0.0041	0.0053	0.722	12.85	11.888	0.03	0.0112	...	...	...	...	...	...		100g
CRM	C13 A 463/1	0.019	0.27	0.019	0.025	1.4	10.2	18.46	0.27	0.276	0.116	...	...	<0.005	0.0022	0.063		100g
CRM	C13 A 464/1	0.086	0.57	0.028	0.02	0.791	20.05	25.39	...	...	0.054	...	...	...	...	...	Pb 0.0004	100g
CRM	C13 A 465/1	0.066	0.41	0.012	0.021	1.38	9.24	17.31	0.09	0.098	0.053	0.026	...	0.4	0.0006	0.01	V 0.102	100g
CRM	C13 A 467/1	0.082	0.52	0.019	0.018	0.788	9.21	18.09	...	...	...	...	0.99	...	...	...		100g
CRM	C13 A 468/1	0.143	1.41	0.02	0.014	1.7	8.9	17.96	...	...	0.018	...	...	...	...	...		100g
CRM	C13 A 474	0.022	0.17	0.02	0.008	1.7	14.74	19.06	3.550	0.35	(0.02)	...	...	...	...	...	V 0.30	100g
CRM	C13 A 475	0.05	0.21	0.008	0.037	0.89	5.66	14.14	1.590	1.94	0.22	...	0.22	...	...	...	Sn 0.015	100g
CRM	C13 E 24A	0.048	0.510	0.020	0.035	1.53	11.12	17.37	2.47	0.32	(0.16)	...	...	...	...	(0.036)		100g
CRM	C13 E 98	0.050	0.26	0.016	0.042	1.88	11.01	16.75	1.92	0.292	0.125	0.070 (sol)	...	0.41	...	0.0112	Sn 0.019, V 0.053	100g
	C13 X 180030A	0.12	0.79	0.030	0.050	1.10	10.0	19.8	0.40	0.07	0.11	...	1.00	...	...	...		100g
	C13 X 180040A	0.09	1.30	0.017	0.077	1.53	11.98	21.84	0.60	0.02	0.16	...	0.78	...	...	...		100g
	C13 X 190020A	0.07	0.76	0.053	0.031	1.05	9.18	17.1	1.99	0.105	...	...	0.07	...	...	...		100g
	C13 X 190030A	0.09	0.59	0.029	0.063	1.60	13.1	18.9	2.50	0.08	...	...	0.11	...	...	...		100g
CRM	C13 S 651-14	0.046	0.67	0.0058	0.027	1.19	9.03	18.26	0.11	0.12	0.17	(0.002)	...	...	...	(0.0426)		150g
CRM	C13 S 652-14	0.044	0.61	0.0020	0.032	1.34	10.62	16.86	2.07	0.086	0.20	(0.003)	...	...	...	0.0239		150g
CRM	C13 S 654-10	0.042	0.82	0.0007	0.015	0.97	19.12	24.87	0.039	0.038	0.16	0.017	...	...	...	0.0393		150g
CRM	C13 S 655-10	0.045	0.63	(0.0005)	0.024	0.96	9.75	17.53	0.033	0.045	(0.073)	(0.003)	0.49	...	...	0.0072		150g
CRM	C13 DB E237-1	0.068	0.482	0.012	0.032	1.443	10.32	17.24	0.306	0.123	0.221	...	0.660	...	...	0.035	V 0.057	100g
CRM	C13 DB E284-2(C)	0.0201	0.537	0.0237	0.0258	1.745	10.72	16.811	2.111	0.1831	0.0525	0.0027	(0.0028)	0.191	0.0026	0.0151	V 0.0425	100g

1.3.3 Maraging Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	Co	Al	Ti	Sn	Cu	Zr	B	N	Size
	C13 X 149330A	0.017	0.05	0.016	0.02	0.15	16.9	0.04	3.97	10.9	0.002	0.04	...	...	...	...	...	50g
	C13 X 149350A	0.02	0.31	0.049	0.036	0.42	18.9	0.01	5.55	7.07	0.22	0.89	...	...	...	...	...	50g
CRM	C13 A E285-2(C)	0.002	0.012	0.0025	0.0053	0.017	18.7	0.024	4.987	7.76	0.1067	0.520	0.001	0.009	0.005	0.0008	0.0007	100g

1.3.4 Martensitic Stainless Steels

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Nb	Nb+Ta	Al	V	N	B		Size
	C13 X 147750A	0.13	0.59	0.074	0.060	1.47	1.79	17.84	0.51	0.22	0.16	0.72	. . .	. . .	. . .	. . .	. . .		100g
	C13 X 150230A	0.15	0.23	0.020	0.020	1.56	1.49	10.59	1.08	0.08	0.21	. . .	1.15	. . .	. . .	. . .	. . .		100g
	C13 X 150240A	0.20	0.77	0.035	0.042	0.66	3.00	14.9	0.26	0.36	0.10	0.17	. . .	. . .	. . .	. . .	. . .		100g
	C13 CG 01602	0.089	0.46	0.015	0.023	0.92	0.538	10.49	0.79	0.084	6.20	0.35	. . .	. . .	0.216	0.018	0.009		150g
	C13 CG 01603	0.099	0.29	0.024	0.027	0.71	2.53	11.81	1.76	0.084	. . .	. . .	. . .	. . .	0.36	0.021	. . .		150g
CRM	**C13 E 22**	0.628	0.449	0.009	0.029	0.804	0.143	16.21	. . .	0.050	. . .	. . .	. . .	. . .	. . .	0.008	. . .		100g
CRM	**C13 E 26**	0.201	0.306	0.012	0.022	0.713	0.413	13.69	0.070	0.029	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 HY CH26**	0.061	1.38	0.017	0.026	1.10	. . .	23.5	. . .	(0.18)	. . .	(0.04)	. . .	1.53	. . .	. . .	. . .		100g
CRM	**C13 A E296-1C**	0.1166	0.242	0.0026	0.0178	0.676	2.790	11.82	1.700	0.1498	0.0218	. . .	. . .	. . .	0.363	0.0214	(0.0003)	As, Sn	100g
CRM	**C13 A 339**	0.29	0.36	0.022	0.022	0.41	0.37	12.4	. . .	(0.08)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 340**	0.18	0.35	0.02	0.024	0.38	0.4	16.35	. . .	(0.06)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 341**	0.1	0.31	0.024	0.016	0.43	0.56	24.0	. . .	(0.1)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 342**	0.18	0.92	0.026	0.03	0.91	2.16	16.15	0.690	(0.08)	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 469**	0.279	0.421	0.02	0.015	0.598	0.246	11.93	. . .	(0.02)	(0.01)	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 470**	0.153	0.335	0.035	0.024	0.235	0.369	17.68	. . .	(0.02)	(0.02)	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 471**	0.095	0.326	0.023	0.018	0.417	0.96	23.85	. . .	(0.02)	(0.02)	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 472**	0.227	1.05	0.029	0.032	1.02	1.95	15.82	0.661	(0.02)	(0.02)	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 A 473**	0.172	0.604	0.03	0.019	0.494	(0.06)	9.06	0.950	(0.03)	(0.01)	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C13 S 670-3**	0.008	0.55	(0.0005)	0.020	0.53	0.21	11.23	0.020	0.044	. . .	. . .	. . .	(0.055)	. . .	0.0064	. . .	Ti 0.26	150g
CRM	**C13 DB E226-1**	0.416	0.514	0.0094	0.0207	0.434	0.139	13.67	0.024	. . .	. . .	. . .	. . .	. . .	0.022	0.0362	. . .		100g

1.3.5 Special Stainless

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	Al	As	Sn	V	N	Others	Size
	C13 X 125380A	0.05	0.52	0.039	0.042	0.61	6.03	25.6	2.02	2.97	. . .	. . .	. . .	. . .	. . .	. . .		50g
	C13 X 142110A	0.08	1.72	0.016	0.006	0.70	12.4	26.05	0.30	0.31	0.08	. . .	. . .	. . .	. . .	. . .	Nb 0.18, W 3.29	50g
CRM	**C13 A E295-1C**	0.0166	0.418	0.0003	0.0167	1.758	24.40	19.51	3.996	1.481	0.0450	0.0203	0.0041	0.0025	0.0456	0.0615	B 0.0018	100g
CRM	**C13 A E281-1**	0.048	0.929	0.016	0.012	0.786	9.37	18.17	. . .	0.076	0.023	0.015	(0.015)	0.009	. . .	0.023	B,Pb, Ti	100g
CRM	**C13 A E287-1(C)**	0.016	0.569	0.0014	0.027	1.48	10.35	18.61	0.247	0.203	0.148	. . .	. . .	. . .	. . .	0.019	B	100g
CRM	**C13 A E292-1(C)**	0.0367	0.402	0.0055	0.0175	1.744	10.09	18.00	0.0464	0.0391	0.0255	(0.002)	(0.008)	. . .	. . .	0.0640	Nb 0.571	100g
CRM	**C13 TI E276-1**	0.364	0.985	0.011	0.012	0.368	0.178	5.29	1.47	0.083	. . .	. . .	. . .	. . .	0.541	0.0207		100g
CRM	**C13 TI E279-2**	0.088	0.516	. . .	. . .	0.258	1.603	15.64	. . .	0.107	. . .	. . .	. . .	. . .	. . .	(0.043)		100g
CRM	**C13 TI E282-1**	0.086	0.734	0.0042	0.019	1.64	10.86	16.72	2.19	0.109	. . .	. . .	. . .	. . .	(0.031)	. . .	Ti 0.488	100g
CRM	**C13 DB E278-1**	0.903	0.336	0.0052	0.0154	0.405	0.236	18.11	1.040	0.077	. . .	. . .	. . .	. . .	0.077	. . .		100g
CRM	**C13 DB E283-1**	1.219	0.345	0.029	0.022	0.217	. . .	4.15	3.41	. . .	10.27	0.010	. . .	. . .	3.28	0.033	B 0.003, W 9.66	100g
CRM	**C13 DB E286-1**	0.100	. . .	0.280	0.026	1.92	8.54	18.13	0.329	. . .	0.150	(0.0023)	. . .	0.0084	. . .	0.043	Sb 0.0014	100g
CRM	**C13 DB E288-1**	2.08	0.260	(0.0012)	0.024	0.292	0.298	12.00	0.103	0.060	0.018	0.012	(0.006)	(0.0043)	0.055	0.151	Ti 0.020	100g
CRM	**C13 DB E289-1**	0.0489	0.531	0.0027	0.0114	1.016	24.68	14.63	1.102	. . .	0.065	0.199	(0.006)	0.111	0.260	. . .	B 0.0044,Ti 2.01	100g
CRM	**C13 DB E290-1**	0.911	0.072	0.0160	0.0160	0.244	0.329	4.18	4.83	0.081	5.12	. . .	. . .	. . .	1.91	0.0325	W 6.27	100g
CRM	**C13 DB E291-1**	0.903	0.907	0.0087	0.0168	0.808	0.563	17.10	2.10	0.0711	0.0233	0.0030	. . .	. . .	0.388	0.1142		100g
CRM	**C13 DB E327-2**	0.152	2.052	0.0046	0.0228	1.289	19.72	24.35	0.174	0.060	0.159	0.070	. . .	. . .	0.044	0.059		100g

1.3.6 Precipitation Hardening

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Nb	Nb+Ta	Co	As	N	Typical Alloy Type	Size
CRM	**C13 X PH 10M**	0.107	0.236	0.031	0.053	1.49	5.21	16.17	0.172	3.11	0.071	. . .	0.004	0.003	0.238		100g
	C13 X PH 20A	0.08	0.47	0.045	0.058	1.24	3.6	16.88	1.00	3.97	0.17	. . .	. . .	. . .	0.035	17/4 PH	100g
	C13 X PH 40A	0.047	0.75	0.051	0.033	0.87	4.07	15.00	0.26	5.55	. . .	0.39	. . .	. . .	0.092		100g
	C13 X PH 70A	0.16	1.28	0.029	0.017	1.44	5.65	14.1	2.56	0.82	. . .	0.28	. . .	. . .	0.094	FV520	100g

1.3.7 High Nitrogen

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	V	W	Nb	Nb+Ta	Al	N	Size
CRM	**C13 X NSA 20B**	0.094	0.506	0.010	. . .	0.51	9.97	16.89	1.74	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.126	40g
CRM	**C13 X NSB 30B**	0.178	0.63	0.009	. . .	0.50	9.92	16.8	0.51	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.264	40g
	C13 X NSC 30A	0.71	1.19	. . .	. . .	9.5	3.34	24.8	. . .	. . .	. . .	. . .	. . .			2.4	0.62	40g
CRM	**C13 X NSC 40B**	0.565	1.95	0.0115	. . .	8.78	7.05	32.20	0.98	0.17	0.195	0.19	0.17	1.95	. . .	. . .	0.86	40g
CRM	**C13 X NSC 50A**	0.493	1.153	0.0095	. . .	2.49	4.16	22.46	0.0018	0.745	. . .	0.026	. . .	2.31	. . .	0.315	0.257	40g
CRM	**C13 X NSD 10A**	0.077	0.559	0.0067	. . .	22.59	0.100	24.97	1.10	0.023	. . .	. . .	. . .	. . .	. . .	. . .	1.09	40g
CRM	**C13 X NSD 20A**	0.253	1.50	0.0027	. . .	17.01	0.104	23.94	1.06	0.054	. . .	. . .	. . .	. . .	. . .	. . .	0.801	40g
CRM	**C13 JN 500 HA**	0.0413	0.720	0.012	0.0244	1.541	10.996	16.927	2.732	0.182	0.139	0.074	. . .	0.0227	. . .	. . .	0.1154	150g
CRM	**C13 JN 501 HA**	0.0138	0.676	0.0028	0.0196	0.858	17.69	19.79	6.139	0.761	0.159	0.0437	. . .	0.0073	. . .	. . .	0.2243	150g

1.4.1 Tool Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	V	Soluble Al	N	Typical Alloy Type	Size
CRM	**C14 E 67**	1.27	0.26	0.007	0.036	0.256	0.32	4.33	4.39	0.092	9.79	8.03	2.58	. . .	. . .	Co/Mo/W	100g
CRM	**C14 E 50**	0.916	0.326	0.015	0.031	0.28	0.33	4.49	5.54	0.091	0.26	6.4	2.0	. . .	. . .	AISI M2	120g
CRM	**C14 E 114**	0.388	1.02	0.0023	0.021	0.361	0.165	5.20	1.29	0.064	0.018	0.174	0.89	0.028	. . .		100g
CRM	**C14 S 603-8**	0.30	0.32	0.012	0.012	0.31	0.084	2.23	0.13	0.055	. . .	5.47	0.46	. . .	0.0250		150g

1.4.2 High Speed Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Co	W	V	Sn	N	Others	Size
	C14 X HS 10A	0.79	0.195	0.022	0.02	0.29	0.1	3.93	1.11	0.05	0.51	16.8	0.9	. . .	. . .		100g
	C14 X HS 20A	0.9	0.41	0.04	0.037	0.38	0.07	3.79	0.86	0.04	5.02	18.11	1.01	. . .	. . .		100g
	C14 X HS 30A	0.84	0.58	0.02	0.019	0.59	0.33	4.65	1.06	0.04	10.1	19.1	1.17	. . .	. . .		100g
	C14 X HS 40A	0.99	0.11	0.012	0.01	0.13	0.05	3.71	0.42	0.03	2.04	9.83	0.47	. . .	. . .		100g
	C14 X HS 50A	0.59	0.3	0.022	0.017	0.29	0.14	3.4	3.54	0.13	8.02	6.0	1.37	. . .	. . .		100g
	C14 X HS 60A	0.7	0.16	0.032	0.029	0.17	0.06	3.94	5.47	0.08	0.28	6.63	1.95	. . .	. . .		100g
	C14 X HS 80A	0.97	0.13	0.022	0.02	0.29	0.17	3.58	9.47	0.09	9.04	1.81	1.2	. . .	. . .		100g
CRM	**C14 S 606-8**	0.76	0.28	0.0008	0.016	0.31	0.065	4.00	0.58	0.027	0.12	17.16	0.83	. . .	0.0290		150g
CRM	**C14 S 607-8**	0.78	0.30	0.0031	0.026	0.35	0.052	3.97	0.54	0.025	4.59	17.48	0.84	. . .	0.0270		150g
CRM	**C14 S 608-8**	0.80	0.36	0.0028	0.025	0.33	0.044	3.99	0.41	0.017	9.09	17.03	0.99	. . .	0.0320		150g
CRM	**C14 S 609-9**	0.92	0.32	(0.0007)	0.026	0.30	0.16	4.01	4.84	0.048	4.66	6.11	1.85	. . .	0.0248		150g
CRM	**C14 S 610-9**	1.24	0.30	0.0029	0.018	0.32	0.100	4.04	3.06	0.040	9.61	9.07	3.26	. . .	0.0354		150g
CRM	**C14 DB E227-1**	0.95	0.272	0.022	0.016	0.236	0.114	4.25	2.64	0.124	. . .	3.03	2.44	. . .	0.040		100g
CRM	**C14 A 481/1**	3.91	2.29	0.004	0.019	0.448	1.19	0.063	0.011	0.15	. . .	. . .	. . .	. . .	. . .	Al 0.023, As 0.010	100g
CRM	**C14 A 482/1**	2.599	1.815	0.0491	0.0974	0.728	2.284	0.675	0.454	1.231	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C14 A 483/1**	2.46	1.75	0.103	0.615	0.596	. . .	0.039	. . .	. . .	. . .	. . .	. . .	0.130	. . .		100g
CRM	**C14 A 484/1**	3.2	0.717	0.23	0.121	0.395	. . .	0.155	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C14 A 220/2**	0.88	0.19	0.029	0.023	0.3	0.12	5.12	4.92	0.09	0.32	6.97	1.94	0.019	. . .		100g
CRM	**C14 A 241/2**	0.84	0.21	0.025	0.024	0.27	0.15	5.35	0.53	0.08	5.7	19.9	1.59	0.025	. . .		100g

1.4.3 High Manganese Steel

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	Al	V	Sn	Co	N		Size
	C14 X MN10A	0.53	0.65	0.004	0.022	18.4	0.04	1.31	0.45	0.03	0.004	0.03	0.03	. . .	. . .		50g
	C14 X MN30A	1.06	1.4	0.013	0.061	10.7	0.35	0.59	0.27	0.24	0.002	0.04	0.02	. . .	. . .		50g
CRM	**C14 A 214/2**	0.39	0.18	0.043	0.032	1.61	0.15	0.09	0.26	0.21	. . .	<0.01	. . .	. . .	. . .		100g
CRM	**C14 A 290/2**	1.15	0.34	0.019	0.042	12.5	0.29	0.16	(0.031)	(0.17)	. . .	(0.02)	. . .	(0.35)	(0.013)		100g
CRM	**C14 A 491**	0.92	0.9	0.012	0.026	16.1	0.05	1.45	0.6	(0.04)	0.042	(0.06)	. . .	. . .	. . .		100g
CRM	**C14 A 494**	1.24	0.26	0.005	0.04	13.55	0.69	0.56	0.078	(0.19)	0.004	(0.02)	. . .	(0.43)	. . .		100g
CRM	**C14 A 495/1**	0.81	0.58	0.026	0.054	13.1	1.13	1.93	0.11	. . .	0.17	(0.02)	. . .	. . .	. . .		100g
CRM	**C14 DB E235-1**	0.912	0.094	0.0072	0.045	12.73	(0.08)	0.354	0.032	0.073	. . .	(0.012)	. . .	. . .	0.020		100g

1.4.4 Resulphurised and Leaded Steels

		C	Si	S	P	Mn	Mo	Ni	Cr	Cu	Pb	As	Sn	N		Size
	C14 X FM10A	0.5	0.07	0.65	0.029	0.54	0.34	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
	C14 X FM20A	0.1	0.14	0.134	0.053	1.37	0.06	. . .	. . .	. . .	. . .	. . .	. . .	. . .		100g
CRM	**C14 S 519-1**	0.39	0.25	0.022	0.012	0.7	. . .	0.056	0.12	0.105	0.097	. . .	. . .	. . .		150g
CRM	**C14 DB E039-2**	0.107	0.011	0.310	0.083	1.274	. . .	0.051	0.048	0.117	0.207	0.018	0.016	0.0113		100g

1.4.9 Silicon Steels

		C	S	P	Mn	Si	Ni	Cr	Cu	Mo	Soluble Al	Insoluble Al	Total Al	Ca	As	Co	N	Size
	C14 CG 01371	0.079	0.025	0.026	0.313	2.39	0.222	0.392	0.408	0.004	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C14 CG 01372	0.057	0.02	0.012	0.225	3.36	0.316	0.259	0.314	0.0036	0.166	0.0019	. . .	. . .	. . .	. . .	. . .	100g
	C14 CG 01373	0.034	0.019	0.007	0.127	4.38	0.415	0.164	0.118	0.0037	0.073	0.0018	. . .	. . .	. . .	. . .	. . .	100g
	C14 CG 01374	0.162	0.03	0.036	0.346	0.998	0.103	0.471	0.213	0.0048	0.208	0.001	. . .	. . .	. . .	. . .	. . .	100g
CRM	**C14 A 317**	0.028	0.023	0.015	0.085	3.49	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
CRM	**C14 A E186-1(C)**	0.61	0.035	0.022	0.87	1.72	0.19	0.218	0.281	0.048	0.014	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C14 J E196-1(C)	0.0039	0.0005	0.0076	0.365	1.908	. . .	. . .	. . .	. . .	. . .	. . .	0.201	0.0005	. . .	. . .	0.0020	100g
CRM	**C14 HY CH28**	0.026	0.017	0.009	0.184	3.24	0.11	0.03	0.09	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C14 M BS CE31	0.074	0.0088	0.0074	0.19	3.67	0.27	0.17	0.26	0.003	0.19	. . .	. . .	. . .	0.0052	0.005	. . .	100g

1.4.10 Speciality Fe-base Alloys

		C	S	P	Si	Mn	Cr	Ni	Cu	Nb	R.E.	Al	N	Co	Ti	Ta	Typical Alloy Type	Size
	C14 CG 01651	0.073	0.0053	0.0253	0.438	0.675	0.09	0.096	0.089	0.044	0.048	0.093	0.013	. . .	. . .	. . .	Rare Earth Steel	150g
	C14 CG 01652	0.069	0.0076	0.0135	0.715	0.991	0.228	0.071	0.075	0.076	0.018	0.123	0.014	. . .	. . .	. . .	Rare Earth Steel	150g
	C14 CG 01653	0.124	0.0045	0.0125	0.674	0.821	0.127	0.055	0.094	0.122	0.098	0.177	. . .	. . .	. . .	. . .	Rare Earth Steel	150g
CRM	**C14 A E376-1**	0.0256	0.0040	. . .	0.313	0.046	. . .	13.37	2.94	0.305	. . .	8.12	. . .	23.70	0.158	(0.016)	Alnico	100g
CRM	**C14 A 383**	0.025	0.2	. . .	. . .	(0.07)	. . .	(13.2)	(2.63)	(0.51)	. . .	(7.7)	. . .	(24.4)	. . .	. . .	Alcomax III	100g
CRM	**C14 A 398**	0.025	0.19	. . .	0.11	0.065	. . .	16.59	6.09	0.13	. . .	9.98	. . .	14.92	0.765	. . .	Alnico HC	100g

2.2 Ni/Cr

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Mg	B	Ni		Typical Alloy Type	Size
	C22 X 7530A	0.06	0.96	. . .	. . .	0.23	0.05	5.00	19.9	0.06	0.52	0.26	0.07	0.05	. . .	. . .		Nimonic 75'	50g
	C22 X 7550A	0.12	0.22	. . .	. . .	0.99	0.23	1.11	18.09	0.52	0.10	0.84	0.58	<0.005	. . .	. . .			50g
	C22 X 8010A	0.12	0.22	. . .	. . .	0.50	0.22	0.66	21.88	0.20	0.52	2.81	1.03	0.008	(0.0001)	. . .	Ag, Sn, Zr	Nimonic 80A'	50g
	C22 X 8030A	0.03	1.09	. . .	. . .	0.21	0.08	1.88	17.7(2)	0.50	1.99	1.81	1.84	0.001	<0.001	. . .	Ag, Sn, Zr		50g
	C22 X 9030A	0.05	1.00	. . .	. . .	0.20	0.01	0.33	20.96	0.06	18.04	1.85	1.66	<0.005	0.023	. . .		Nimonic 90'	50g
	C22 X 9050A	0.20	0.21	. . .	. . .	0.97	0.22	1.09	18.10	0.51	20.99	2.75	1.01	<0.005	<0.001	. . .			50g
	C22 X 10530A	0.12	0.98	. . .	. . .	0.51	0.21	0.40	13.91	6.05	17.74	1.37	5.24	0.0007	. . .	. . .		Nimonic 105'	50g
	C22 X 10550A	0.30	0.26	. . .	. . .	<0.01	<0.01	1.22	15.52	3.96	21.7	0.44	4.74	0.014	. . .	. . .			50g
	C22 X 90120A	0.10	0.25	0.022	0.015	0.52	0.14	. . .	13.76	4.49	0.38	2.01	0.13	. . .	0.008	41.1		Nimonic 901'	50g
	C22 X 90130A	0.11	0.29	0.034	0.036	0.68	0.25	. . .	11.02	6.38	1.02	3.88	0.34	. . .	0.036	43.6			50g
CRM	**C22 A 310/1**	0.068	0.46	. . .	. . .	0.35	. . .	. . .	19.45	. . .	17.0	2.43	1.06	. . .	. . .	58.6		Nimonic 90'	100g
CRM	**C22 A 387/1**	0.033	0.06	0.0028	0.0033	0.025	0.0076	. . .	11.35	5.83	0.02	3.00	0.24	. . .	0.017	41.2		Nimonic 901'	100g

2.3 Fe/Ni/Cr

		C	Si	S	P	Mn	Cu	Cr	Mo	Co	Ti	Al	Ni	Fe	Typical Alloy Type	Size
	C23 X 80010A	0.11	0.22	. . .	. . .	1.05	0.07	22.9	0.52	0.98	0.44	0.38	30.1	. . .	Incoloy 800'	50g
	C23 X 80030A	0.05	0.87	. . .	. . .	0.42	0.53	18.92	0.14	0.11	0.10	0.06	34.7	. . .		50g
	C23 X DS 10A	0.13	2.38	. . .	. . .	1.65	0.04	17.7	0.04	0.99	0.04	0.04	34.6	. . .	Incoloy 800DS'	50g
	C23 X DS 30A	0.04	1.43	. . .	. . .	0.67	0.62	19.87	0.62	0.11	0.34	0.01	39.66	. . .		50g
CRM	**C23 S 680-3**	0.051	0.44	0.0018	(0.0009)	0.95	0.20	20.96	. . .	0.40	0.42	0.51	32.80	(43.2)		150g

2.4 Ni/Cr/Co/Mo

		C	S	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Nb	B	V	W	Zr	P	Others	Size
	C24 X 26310A	0.06	0.002	0.12	0.71	0.07	0.74	18.96	5.66	20.9	2.56	0.30	. . .	0.006	. . .	. . .	. . .	. . .		50g
	C24 X 26350A	0.11	0.005	0.55	0.11	0.23	0.17	20.9	6.62	18.9	1.96	0.605	. . .	<0.001	. . .	. . .	. . .	. . .		50g
	C24 X WASP 10A	0.02	0.002	0.56	0.11	0.07	0.58	17.82	6.20	14.9	3.68	1.65	<0.01	<0.001	<0.01	0.02	0.03	0.009		50g
CRM	**C24 X WASP 30D**	0.118	0.026	0.208	0.542	0.735	0.96	20.84	1.96	13.77	5.52	2.99	0.163	0.0087	0.123	0.064	0.059	0.014	Ni, Ta	50g
	C24 X WASP 40A	0.14	0.008	0.02	0.42	0.23	2.33	20.7(3)	3.06	11.76	2.53	0.91	0.12	0.011	0.15	0.22	0.10	<0.001		50g
CRM	**C24 X WASP 40C**	0.052	(0.01)	0.21	0.53	(0.004)	1.48	19.7	7.51	11.01	2.25	2.16	0.25	0.014	0.145	0.25	0.08	<0.005	Pb, Ni	50g

2.7 Ni/Cr/Mo/Co

		C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Typical Alloy Type	Size
	C27 X 141840A	0.29(5)	0.39	0.41	0.09	0.57	21.0	10.2	10.3	0.07	0.05	C242/ANC11	50g

2.8 Ni/Cr/Fe

		C	Si	S	P	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Nb	Ni	B	N	Others	Size
	C28 X 60010A	0.06	0.85	. . .	. . .	0.14	1.08	5.98	16.75	. . .	0.98	0.60	0.02	. . .	. . .	. . .	. . .		50g
	C28 X 60020A	0.16	0.20	. . .	. . .	0.64	0.03	10.07	13.95	. . .	0.21	0.12	0.26	. . .	. . .	. . .	. . .		50g
	C28 X 62510A	0.02	0.27	0.004	0.003	0.08	0.03	2.19	19.9	10.36	0.02	0.01	0.003	2.93	. . .	. . .	. . .		50g
CRM	**C28 X 62510K**	0.039	0.47	0.001	(0.0014)	0.17	0.051	3.12	20.5	9.88	0.022	(0.01)	0.16	2.70	(62.3)	0.0047	0.211		50g
CRM	**C28 X 62520L**	0.077	0.61	0.0039	0.010	0.28	0.145	4.14	21.5	8.77	0.20	0.027	0.21	3.39	59.9	0.014	0.32	Sn, Bi, Ag	50g
	C28 X 62530A	0.15	0.74	0.013	0.01	0.60	0.32	5.5	22.9	7.69	0.45	0.53	0.53	4.96	. . .	. . .	. . .		50g
CRM	**C28 X 62530M**	0.124	1.26	0.013	0.02	0.54	0.30	5.41	21.90	7.86	0.39	0.044	0.32	4.25	56.67	0.023	0.35	Sn, Bi	
CRM	**C28 X 62540K**	0.037	0.53	0.0046	0.004	0.093	0.027	6.46	21.1	5.89	0.22	0.30	0.05	3.53	(61.3)	0.0014	0.065		
	C28 X 71810A	0.05	0.24	0.011	0.005	0.10	0.02	. . .	21.16	2.23	0.01	0.21	0.17	4.34	49.7	. . .	. . .		50g
CRM	**C28 X 71810H**	0.008	0.71	0.005	(0.003)	0.108	0.013	(19.5)	18.71	2.94	0.01	0.025	(0.007)	4.97	52.6	0.0010	0.233	Sn, V	50g
CRM	**C28 X 71820L**	0.035	0.47	0.0066	0.004	0.184	0.117	17.0	21.30	0.88	0.64	1.13	0.34	4.76	52.7	(0.0010)	0.033	Ta, V, W	50g
	C28 X 71830A	0.19	0.38	0.05	0.026	0.47	0.35	. . .	17.78	3.31	1.00	1.40	1.77	5.44	54.8	. . .	. . .		50g
CRM	**C28 X 71830S**	0.296	0.52	0.0023	0.003	0.36	0.26	(19.6)	18.85	1.31	0.94	1.21	1.21	6.25	49.0	0.0016	0.037	Ta, V, W	50g
CRM	**C28 X 71860H**	0.007	0.65	0.014	0.016	0.253	0.091	(16.5)	17.85	2.88	0.404	0.20	0.32	5.15	54.84	0.0047	0.077	V	50g
	C28 X 75010A	0.10	0.60	. . .	. . .	1.52	0.52	5.08	16.82	0.51	. . .	2.31	0.98	1.46	. . .	. . .	. . .		50g
	C28 X 75030A	0.06	0.25	. . .	. . .	0.54	0.07	8.04	13.72	0.12	. . .	2.93	0.41	0.55	. . .	. . .	. . .		50g
CRM	**C28 A 351**	0.025	0.14	0.0006	(0.006)	0.037	0.016	. . .	18.12	3.06	0.136	1.06	0.55	5.2	53.1	0.0051	. . .		100g
CRM	**C28 S 683-2**	0.049	0.39	0.0013	(0.0008)	0.32	0.051	9.66	15.82	. . .	(0.011)	0.013	0.12	. . .	73.43	. . .	. . .		150g

2.1	Ni/Co/Cr/Al/Ti	C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	V	Ni	W	B	N	Typical Alloy Type	Size
CRM	**C210 X 117750G**	0.024	0.36	0.127	(0.008)	1.02	10.42	3.19	14.83	5.76	7.0	0.47	(56.6)	. . .	. . .	(0.003)	IN100	50g
CRM	**C210 RU N15/3**	0.052	0.219	0.047	0.017	0.51	10.02	5.55	15.06	2.55	4.02	0.319	. . .	5.50	0.022	. . .		250g

2.11	Ni/Cr/Al	C	Si	Mn	Cu	Fe	Cr	Mo	Co	Ti	Al	Nb	Zr	B	Ni	Typical Alloy Type	Size
	C211 X 71310A	0.04	0.11	0.06	0.008	0.57	10.92	3.53	0.14	0.45	5.5	2.78	0.06	<0.001	. . .		50g
	C211 X 71320A	0.16	0.51	0.27	0.13	0.39	12.9	5.50	1.04	1.13	6.59	1.64	0.18	0.016	. . .	N 713	50g
CRM	**C211 A 350**	0.138	0.11	0.019	. . .	. . .	13.43	4.29	0.338	0.87	5.97	2.17	. . .	0.013	70.8	Inconel 713'	100g

2.12	Ni/Cu	C	Si	S	Mn	Fe	Cr	Pb	Co	Ti	Al	Mg	Ni	Cu	Typical Alloy Type	Size
	C212 X 40010A	0.10	1.48	0.022	3.04	0.57	0.05	0.08	0.12	0.11	0.09	0.13	67.6	rem	'Monel'	50g
	C212 X 40020A	0.04	0.10	0.075	2.00	1.17	0.02	0.04	0.08	0.06	0.05	0.02	65.2	rem	400/500	50g
	C212 X 40060A	0.03	3.94	0.035	0.83	1.95	0.12	0.02	0.05	1.34	3.85	0.016	63.3	rem	505/506	50g
CRM	**C212 A 363/1**	0.14	0.028	(0.002)	1.26	. . .	(0.05)	. . .	0.032	0.03	0.027	. . .	64.7	31.9	Monel 400'	100g

2.15	Ni/Co/Cr/Fe/Mo	C	Si	S	P	Mn	Fe	Cr	Mo	Co	V	W	Cu	Al	N	Typical Alloy Type	Size
	C215 X HB10A	0.04	0.14	0.051	<0.006	1.15	6.95	1.15	35.8	0.05	0.57	. . .	. . .	. . .	. . .		50g
CRM	**C215 X HB10L**	0.056	0.48	0.026	0.006	1.21	7.71	0.84	33.6	0.10	0.87	. . .	0.05	0.31	0.042	'Hastelloy 'B''	50g
	C215 X HB50A	0.16	0.59	0.005	0.058	0.38	3.48	0.06	27.2	2.67	0.11	. . .	. . .	. . .	. . .		50g
CRM	**C215 X HB50J**	0.147	1.30	0.002	0.053	0.44	3.05	0.03	26.0	2.47	0.14		0.05	0.20	0.008		50g
	C215 X HC10A	0.04	0.38	0.007	0.006	1.28	4.50	16.0	19.6	2.28	0.13	3.58	. . .	. . .	. . .		50g
CRM	**C215 X HC20H**	0.066	1.02	0.003	0.012	0.97	3.62	15.7	18.9	1.70	0.38	3.91	0.023	0.18	0.18		50g
	C215 X HC50A	0.67	1.04	0.078	0.085	0.27	10.96	19.9	15.5	0.13	0.60	5.5	. . .	. . .	. . .	'Hastelloy 'C''	50g
CRM	**C215 X HC50Q**	0.190	1.56	0.044	0.049	0.30	7.65	19.9	16.0	0.08	0.72	5.4	0.05	0.22	0.32		50g

2.16	Pure Nickel	All Elements ppm											Size
		C	S	P	Si	Mn	Cr	Mo	Pb	Cu	Fe	Al	
	C216 M BSHPN-1	268	4	5	6	2	22	3	0	2	202	70	100g

2.19	Various Nickel Alloys	C	Si	S	P	Mn	Cr	Mo	Ni	Al	B	Co	Cu	W	Ti	V	Others	Size
CRM	**C219 X 205000A**	0.025	1.48	0.004	0.002	0.22	51.2	0.002	45.7	. . .	. . .	0.002	0.002	. . .	. . .	. . .	Fe 1.26	50g
CRM	**C219 DB E326-1**	0.092	1.46	0.0028	0.0093	0.406	16.37	(0.025)	61.16	(0.79)	. . .	0.223	(0.027)	. . .	. . .	(0.024)	Zr 0.129	100g
CRM	**C219 RU N8/3**	0.0103	0.421	0.0016	0.0023	0.010	14.06	4.30	. . .	. . .	0.020	. . .	0.011	6.05	2.18	0.58	Mg 0.0015	250g
CRM	**C219 RU N13/4**	0.0097	0.404	0.0019	0.0017	0.203	17.89	4.40	. . .	2.84	0.0097	5.52	. . .	6.53	1.11	. . .	Ce 0.0046	250g
CRM	**C219 RU N14/3**	0.0120	0.67	0.0029	0.0020	0.385	24.35	1.32	57.0	0.164	. . .	. . .	0.0082	13.47	0.40	. . .	Fe 2.16	250g
CRM	**C219 A 345**	0.153	. . .	. . .	. . .	. . .	9.95	3.01	rem	5.58	0.019	14.71	. . .	. . .	4.74	1.0		
CRM	**C219 A 346**	(0.15)	. . .	. . .	. . .	. . .	(10.0)	(3.0)	rem	(5.5)	. . .	(15.0)	. . .	. . .	(5.0)	(1.0)		
CRM	**C219 A 371**	0.3	0.34	0.013	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.39	. . .	. . .	. . .	. . .		

continued

Continuation from above	All Elements ppm												Typical Alloy Type	Size
	Pb	Bi	Ag	Se	Te	Sb	As	Cd	Ga	Sn	Zn	Mg	Tl	Ca		
C219 A 345	0.2	<0.2	<0.2	<0.5	<0.2	<2	(2)	<0.1	8	6	<0.5	5	<0.2	<5		100g
C219 A 346	21	10	35	9	12	47	50	0.4	(52)	91	29	147	(2)	(36)	Inconel' 100	100g
C219 A 371	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	600	. . .	. . .	Comm Nickel	100g

3.1.1 Brass

		Sn	Pb	Fe	Ni	Al	Si	Mn	As	Bi	Sb	S	P	Cu	Zn	Cd	Se	B	Size
	C31 X B20B	0.18	0.31	0.10	0.22	0.19	0.01	0.31	0.14	0.04	0.10	. . .	. . .	60.3	. . .	. . .	. . .	. . .	100g
	C31 X B40A	0.025	0.007	0.014	0.008	<0.005	<0.005	<0.005	<0.01	<0.005	<0.005	. . .	. . .	70.7	. . .	. . .	. . .	. . .	100g
CRM	C31 X B40K	0.0075	0.0071	0.016	0.0119	<0.002	<0.005	(0.0003)	(0.0015)	(0.0009)	(0.0009)	. . .	. . .	69.46	30.40	. . .	. . .	0.0015	100g
CRM	C31 X B70J	0.101	0.010	0.018	0.020	<0.005	<0.005	(0.0002)	0.0016	0.066	0.0019	. . .	. . .	84.80	15.01	. . .	. . .	0.0030	100g
CRM	C31 X B80H	0.036	0.071	0.027	0.0089	(0.001)	0.0052	0.0013	0.0095	0.030	0.0110			90.22	9.53			0.0022	100g
	C31 X B950	0.5	<0.001	(0.01)	(<0.001)	(0.001)	(0.01)	<0.001	(0.01)	(0.01)	<0.001	<0.001	<0.001	95.0	. . .	. . .	. . .	. . .	100g
CRM	C31 X TB20G	0.105	0.110	0.073	0.090	0.083	0.042	0.088	0.099	0.032	0.050	. . .	. . .	61.90	37.20	. . .	. . .	<0.0005	100g
CRM	C31 A 344	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	68.98	30.98	. . .	. . .	. . .	100g
CRM	C31 A 179/2	0.7	0.35	1.02	0.56	2.22	0.044	0.86	(0.008)	. . .	. . .	. . .	. . .	58.5	35.8	(0.003)	. . .	. . .	100g
CRM	C31 DB 229	0.00485	0.0192	0.01061	0.01114	. . .	. . .	. . .	0.00217	. . .	0.00072	. . .	(0.00106)	63.334	36.63	. . .	0.0034	. . .	100g
	C31 CG 02101	0.54	0.19	0.89	. . .	0.26	. . .	0.73	. . .	0.0024	0.0091	. . .	0.0076	58.0	rem	. . .	. . .	. . .	100g

3.1.3 Naval Brass

		Sn	Pb	Fe	Ni	Al	Si	Mn	As	Bi	Sb	S	P	Cu	Size
	C31 X NB10A	0.54	0.50	0.04	0.07	<0.01	0.02	0.18	0.20	0.03	0.02	0.002	0.06	61.6	100g
	C31 X NB40A	2.07	0.09	0.11	0.16	0.29	0.22	0.02	0.025	0.09	0.39	0.002	0.20	63.8	100g

3.1.4 Aluminium Brass

		Sn	Pb	Fe	Ni	Al	As	Bi	Sb	P	Cu	Size
	C31 CG 02110	0.020	0.052	0.060	0.252	2.00	0.049	0.0018	0.0051	0.020	77.53	100g

3.1.7 Leaded Brass

		Sn	Pb	Fe	Ni	Mn	P	Al	Zn	Sb	Bi	As	S	Ag	Cd	Co	Cu	Others	Size
CRM	C31 E 40	0.18	2.45	0.007	0.001	. . .	. . .	0.010	39.1	0.023	. . .	. . .	. . .	0.0015	0.049	. . .	58.1		100g
CRM	C31 DB 223	0.089	2.13	0.091	0.0214	<0.001	0.0003	. . .	38.82	0.0040	0.0018	0.0084	0.0011	. . .	. . .	. . .	58.74		100g
CRM	C31 DB 224	0.066	1.13	0.136	0.038	1.70	0.0112	. . .	39.40	0.0026	0.0006	0.0025	0.0004	. . .	. . .	. . .	57.40		100g
CRM	C31 X 7835.10N	0.395	2.88	0.135	0.14	. . .	0.0195	0.0156	35.18	0.0048	0.0138	0.0012	0.0007	. . .	. . .	0.025	61.05		100g
CRM	C31 X 7835.20H	0.202	2.08	0.077	0.0088	. . .	0.0149	0.199	32.88	0.053	. . .	0.047	. . .	. . .	. . .	. . .	64.34		100g
CRM	C31 X 7835.30E	0.113	1.35	0.381	0.253	. . .	0.0378	0.386	36.50	0.096	0.025	0.097	. . .	. . .	. . .	0.0070	60.67	Se 0.003	100g
CRM	C31 X 7835.40H	0.046	1.03	0.020	0.492	. . .	0.125	0.561	30.09	0.188	. . .	0.206	. . .	. . .	. . .	. . .	67.11		100g
CRM	C31 X 7835.50A	0.116	1.64	0.126	0.249	. . .	0.018	0.077	6.23	0.114	. . .	0.104	. . .	. . .	. . .	. . .	91.25		100g
CRM	C31 A 385	0.27	2.24	0.15	0.13	. . .	. . .	<0.005	38.5	<0.01	. . .	. . .	. . .	. . .	. . .	. . .	58.7		100g
CRM	C31 A 390	0.34	1.04	0.83	0.033	. . .	. . .	0.83	38.6	. . .	. . .	. . .	. . .	. . .	(0.011)	. . .	57.1		100g
	C31 CG 02116	0.113	2.66	0.194	0.47	. . .	0.012	0.47	. . .	0.0047	0.0018	. . .	. . .	. . .	. . .	. . .	63.44		100g

3.1.8 Manganese Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Sb	P	Cu	Size
CRM	C31 X MNB10C	0.105	1.44	29.37	0.268	0.053	0.596	. . .	0.188	. . .	. . .	67.77	100g
CRM	C31 X MNB20C	0.319	1.02	32.19	0.66	0.118	0.268	0.233	2.23	. . .	. . .	63.02	100g
CRM	C31 X MNB50L	1.75	0.127	37.91	0.56	1.31	3.35	0.49	0.243	. . .	. . .	54.14	100g
	C31 CG 02103	0.186	0.44	. . .	1.13	. . .	0.10	. . .	3.41	0.045	0.020	55.64	100g

3.1.9 Silicon Brass

		Sn	Pb	Fe	Ni	Al	Si	Mn	As	Sb	S	P	Zn	Mg	Co	Cr	Cu	Size
	C31 X WSB 10 A	0.22	0.23	0.20	0.14	1.16	5.27	0.03	0.10	0.03	<0.002	0.011	18.9	0.004	0.19	. . .	. . .	100g
CRM	C31 X WSB 10 B	0.23	0.55	0.100	0.076	1.90	5.95	0.10	0.13	0.03	<0.002	0.040	7.55	0.003	0.34	0.017	(82.7)	100g
CRM	C31 X WSB 30C	0.60	0.40	0.50	0.36	0.70	3.48	1.43	0.054	0.067	<0.002	0.044	9.63	0.004	0.052	0.05	(82.3)	100g
CRM	C31 X WSB 40J	0.80	0.168	0.77	0.25	0.48	4.58	1.85	0.040	0.067	<0.005	0.060	5.05	(0.0007)	0.109	0.045	85.7	100g
CRM	C31 X WSB 50B	1.00	0.068	0.99	0.49	0.085	7.08	0.45	0.03	0.13	0.004	0.072	0.13	0.002	0.053	0.022	(89.5)	100g
	C31 X WSB 60A	0.39	0.96	0.05	0.37	0.10	2.61	0.29	0.01	0.10	0.01	0.06	1.12	0.004	0.05	. . .	. . .	100g
CRM	C31 X WSB 60C	0.053	0.61	0.048	0.115	0.31	2.42	0.32	0.009	0.003	(0.0034)	(0.008)	1.00	(0.0015)	0.25	(0.04)	94.7	100g

3.2.1 Phosphor-Bronze

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Sb	Bi	P	Cu	S	Se	Mg	Size
	C32 X PB10A	11.0	0.37	0.02	<0.01	0.12	<0.01	0.01	0.05	<0.01	0.07	. . .	0.84	. . .	. . .	. . .	. . .	100g
	C32 X PB20A	4.13	0.06	0.20	0.06	0.50	<0.01	0.07	0.09	0.075	0.11	. . .	0.42	. . .	. . .	. . .	. . .	100g
CRM	C32 X PB100K	11.93	0.055	0.037	0.008	0.057	(0.0008)	0.0015	0.011	0.0010	0.0051	0.024	0.0236	87.70	0.018	0.0055	0.004	100g
CRM	C32 X PB110B	3.00	1.02	1.93	0.49	1.01	0.067	0.52	0.175	0.80	0.54	. . .	0.72	(89.5)	0.016	. . .	<0.001	100g
CRM	C32 X PB120C	4.64	0.47	0.49	0.31	0.51	<0.001	0.01	0.098	0.39	0.24	. . .	0.42	(92.0)	(0.010)	. . .	<0.001	100g
CRM	C32 X PB130B	6.96	0.25	0.27	0.14	0.26	<0.001	<0.005	0.052	0.096	0.12	. . .	0.22	(91.5)	(0.03)	. . .	<0.001	100g
CRM	C32 X PB140B	8.95	0.086	0.23	0.041	0.099	<0.005	0.050	0.026	0.035	0.039	0.15	0.050	(90.1)	0.069	. . .	<0.0005	100g
CRM	C32 X PB 230A	7.57	0.0038	0.0022	<0.001	0.004	(0.0003)	0.0017	0.0011	(0.0006)	0.0025	. . .	0.315	91.97	0.0016	. . .	. . .	100g
CRM	C32 A 374	9.8	0.064	0.01	<0.005	0.014	<0.005	<0.005	. . .	. . .	(0.01)	. . .	0.59	89.5	0.012	. . .	. . .	100g

3.2.2 Leaded Bronze

		Sn	Pb	Zn	Fe	Ni	Al	As	Mn	Bi	Sb	P	S	Cu	Cd	Si	Size
	C32 X LB20A	12.38	9.42	0.27	0.40	0.22	0.04	0.017	0.22	0.009	0.023	0.04	(0.001)	(76.8)	. . .	. . .	100g
	C32 X LB30A	10.3	9.4	<0.01	<0.01	1.52	<0.01	0.02	<0.01	0.025	0.04	0.006	0.020	. . .	. . .	. . .	100g
CRM	C32 X LB130B	6.03	8.17	0.58	0.025	1.29	0.0126	0.116	<0.001	0.035	0.028	0.063	0.100	83.58	. . .	0.022	100g
CRM	C32 E 10	4.58	4.72	4.71	0.211	0.33	. . .	0.020	. . .	. . .	0.113	0.003	0.068	85.13	. . .	. . .	80g
CRM	C32 E 74	2.84	6.24	9.88	0.315	0.15	. . .	0.002	. . .	. . .	0.016	0.002	0.056	80.41	0.013	. . .	60g
CRM	C32 A 364	9.35	9.25	0.13	<0.005	0.28	<0.002	(0.07)	. . .	(<0.01)	0.18	0.056	(0.060)	80.6	. . .	. . .	100g
	C32 CG 02137	5.69	3.25	5.25	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	85.16	. . .	. . .	100g
	C32 CG 02138	5.31	6.33	6.50	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	81.29	. . .	. . .	100g
	C32 CG 02139	4.08	6.16	6.96	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	81.45	. . .	. . .	100g
	C32 CG 02140	4.24	17.62	5.37	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	72.25	. . .	. . .	100g

3.2.3 Aluminium Bronze

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Mg	As	P	Cr	Cu	Size
CRM	C32 X ALB10K	0.025	0.218	0.035	3.00	5.90	10.3	0.132	0.094	0.0013	(0.002)	0.016	0.011	(80.4)	50g
CRM	C32 X ALB20H	0.08	0.09	0.229	4.60	4.64	9.52	0.302	0.393	0.0104	0.0114	0.027	0.0261	80.0	50g
	C32 X ALB30A	0.19	0.09	1.73	5.08	3.84	11.46	0.34	0.29	0.03	. . .	. . .	. . .	. . .	50g
CRM	C32 X ALB30Q	0.10	0.11	0.325	4.15	3.72	11.56	0.135	0.374	0.088	0.0060	0.025	0.0089	79.4	50g
CRM	C32 X ALB40G	0.093	0.149	0.305	4.68	7.02	7.96	0.335	1.20	0.297	0.010	0.028	0.0275	(77.91)	50g
	C32 X ALB50A	0.03	0.04	0.16	1.95	5.11	7.6	0.03	1.39	0.018	. . .	. . .	. . .	. . .	50g
CRM	C32 X ALB60H	0.126	0.060	0.19	3.06	5.62	8.42	0.30	1.41	0.0026	(0.021)	0.036	(0.004)	80.7	50g
CRM	C32 X ALB80C	0.57	0.009	1.01	6.70	6.79	8.08	0.69	0.307	(0.002)	0.172	0.141	0.045	75.3	50g
CRM	C32 A 304/1	0.03	0.01	0.31	4.64	4.82	9.71	0.08	0.12	. . .	. . .	. . .	. . .	80.23	100g
	C32 CG 02102	0.090	0.011	1.00	2.82	0.45	9.21	0.11	0.25	. . .	0.011	0.012	. . .	rem	100g
	C32 CG 02117	0.091	0.022	0.99	0.55	0.48	9.03	0.115	2.04	. . .	. . .	0.016	. . .	rem	100g
	C32 CG 02118	0.054	0.031	0.51	2.89	0.48	9.44	0.161	1.69	. . .	0.0108	0.0155	. . .	rem	100g
	C32 CG 02119	0.052	0.021	0.299	4.32	4.47	10.08	0.106	0.332	. . .	0.0108	0.0105	. . .	rem	100g

3.2.4 Bismuth Bronze

		Sn	Pb	Zn	Fe	Ni	As	P	Sb	Co	Se	Bi	Cd	B	Cu	Size
CRM	C32 X SEB10B	3.83	0.564	11.57	0.059	0.118	0.051	0.025	0.354	0.0108	0.895	5.77	. . .	. . .	(76.7)	100g
CRM	C32 X SEB20C	9.34	0.424	3.73	0.078	0.028	0.0094	0.013	0.0120	0.0121	0.026	4.36	. . .	. . .	81.8	100g
CRM	C32 X SEB40C	9.29	0.010	8.55	0.365	0.0092	0.0011	0.006	0.0055	0.476	0.115	2.69	0.0004	0.0021	78.58	100g
CRM	C32 X SEB50B	5.28	0.0149	6.64	0.360	0.308	0.0121	0.183	0.0344	0.0048	0.512	1.17	0.0067	0.0028	85.5	100g

3.2.9 Various Bronzes

		Sn	Pb	Zn	Fe	Ni	As	Mn	Si	Sb	Bi	P	S	Se	Al	Ag	Cu	Size
CRM	C32 DB 211	10.60	0.74	0.56	0.110	0.122	0.0213	0.0019	. . .	0.033	0.0020	0.0267	0.0211	0.00114	. . .	0.059	87.71	100g
CRM	C32 X SN10D	11.75	5.17	0.804	0.0034	2.17	. . .	0.0018	<0.001	0.006	. . .	0.0025	0.0064	. . .	<0.002	. . .	79.93	100g
CRM	C32 X SN20H	13.54	1.97	1.28	0.0332	0.104	. . .	0.0043	(0.0028)	0.100	. . .	0.082	0.0326	. . .	0.0004	. . .	82.80	100g
CRM	C32 X SN30E	16.51	0.270	0.43	0.0782	0.513	. . .	0.0026	(0.002)	0.260	. . .	0.297	0.096	. . .	0.0004	. . .	81.32	100g

3.3 Gun Metal and Leaded Red Brass

		Sn	Pb	Zn	Fe	Ni	Al	Si	As	Mn	Bi	Sb	P	Cr	Ag	S	Cu	Others	Size
CRM	C33 X GM40W	2.50	5.20	7.17	0.051	2.05	<0.002	<0.005	0.021	(0.0019)	0.041	0.042	<0.005	. . .	0.0062	0.33	82.6		100g
CRM	C33 X GM50B	4.83	3.72	6.15	0.22	1.58	0.016	0.035	0.046	0.026	0.07(5)	0.073	0.031	. . .	0.016	0.117	(83.0)		100g
CRM	C33 X GM60H	7.31	3.11	2.99	0.131	1.069	0.136	0.124	0.175	0.0912	0.037	0.258	0.0566	0.0019	0.0114	0.07	84.46		100g
	C33 X GM70A	9.23	0.78	2.06	0.05	0.36	0.03	0.09	0.12	0.18	0.08	0.06	0.067	. . .	. . .	0.001	. . .		100g
CRM	C33 X GM80E	4.03	6.78	6.21	0.298	0.115	0.0067	(0.0010)	(0.0051)	0.0010	0.0138	<0.002	0.0213	<0.001	0.105	0.0055	82.3		100g
CRM	C33 X GM240A	3.85	3.39	3.67	0.008	0.010	0.0001	0.003	0.0008	(0.0002)	0.0008	0.0015	0.190	0.0014	0.004	0.003	88.82		100g
CRM	C33 X GM290A	6.12	0.052	4.27	0.011	0.029	(0.0004)	0.0030	0.0017	0.0005	0.0020	0.0015	0.136	0.0004	0.0025	0.002	89.30		100g
CRM	C33 X RB10A	2.137	5.02	7.95	0.928	0.0539	0.0048	0.063	0.0030	0.0167	0.0029	0.432	0.020	0.0013	0.0174	0.0044	83.25	Co, Mg	100g
CRM	C33 X RB20A	3.19	3.85	9.14	0.493	0.255	0.0362	0.0116	0.0211	0.0028	0.101	0.019	0.0208	0.0017	0.0029	0.078	82.67	Co, Mg	100g
CRM	C33 A 183/4	7.27	3.15	3.47	0.056	1.3	<0.002	(0.01)	0.13	(0.01)	0.005	0.23	0.09	. . .	. . .	0.11	84.08		100g
CRM	C33 A 207/2	9.74	0.7	1.6	0.029	0.28	0.013	0.016	0.066	. . .	0.04	0.1	(0.018)	. . .	. . .	. . .	87.35		100g
CRM	C33 DB 227	6.01	4.12	3.46	0.129	0.284	. . .	. . .	0.081	. . .	0.0088	0.160	(0.0002)	. . .	. . .	0.122	85.57		100g
CRM	C33 DB 228	9.76	1.24	3.32	0.036	0.109	. . .	. . .	0.024	<0.0001	0.0086	0.078	0.019	. . .	. . .	0.036	85.34		100g

3.4 Nickel Silver

		Sn	Pb	Zn	Fe	Ni	Si	Mn	P	As	S	Co	Al	Ag	Mg	C	Cu	Size
	C34 X NS 10A	. . .	0.05	29.0	0.05	7.67	0.03	0.02	0.010	. . .	<0.002	. . .	. . .	. . .	. . .	. . .	. . .	100g
CRM	C34 X NS 30E	0.031	0.155	17.94	0.201	14.86	0.018	0.129	0.013	. . .	0.063	0.102	0.038	0.108	0.0011	0.014	66.30	100g
	C34 X NS 50A	. . .	0.85	21.4	0.76	19.7	0.18	0.03	0.046	. . .	0.042	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C34 CG 02104	. . .	0.019	20.81	0.47	14.87	0.146	0.32	0.0048	0.0098	. . .	. . .	. . .	. . .	0.033	. . .	. . .	100g

3.6.1 Cupro-Nickel

		Pb	Fe	Ni	Co	Si	Mn	Mg	S	P	Bi	B	C	Cr	Ti	Nb	Zr	Cu	Size
	C36 X CN10A	0.05	1.94	9.5	0.10	0.19	1.91	0.015	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C36 X CN40A	0.015	0.50	30.2	0.04	0.54	0.33	0.003	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	C36 X CN60A	0.008	0.65	32.6	0.03	0.30	0.51	. . .	0.037	0.030	0.03	0.007	0.02	1.21	<0.01	. . .	<0.01	. . .	100g
	C36 X CN90A	0.05	0.93	28.1	<0.01	0.56	1.20	. . .	0.002	0.016	<0.01	0.005	0.02	2.19	0.12	. . .	0.13	. . .	100g
CRM	C36 X CN100A	0.004	4.28	29.3	0.081	1.02	0.262	0.0026	0.055	(0.020)	0.014	0.0029	0.064	1.59	0.03	0.89	(0.055)	61.01	100g
CRM	C36 A 180/2	(0.003)	0.68	30.35	. . .	(0.018)	0.75	. . .	0.006	. . .	. . .	. . .	0.04	. . .	. . .	. . .	. . .	68.12	100g

3.6.4 Cu/Be/Co

		Sn	Pb	Zn	Fe	Ni	Al	Si	Mn	Cr	Be	Co	Ag	Cu	Typical Alloy Type	Size
	C36 X CBC10A	0.002	0.002	<0.01	0.03	1.88	0.02	0.04	<0.01	0.005	0.42	0.13	. . .	. . .	C17510	50g
	C36 X CBC20A	0.004	0.004	0.03	0.02	0.07	0.03	0.05	<0.01	0.005	0.56	2.44	. . .	. . .	C17500	50g
CRM	C36 X CBC20E	0.011	0.0099	0.0103	0.0207	0.0472	0.023	0.0208	0.0015	0.0045	0.450	2.47	0.0020	96.96	C17500	50g
	C36 X CBC30A	<0.002	0.003	0.02	0.04	0.02	0.02	0.06	<0.01	0.005	1.81	0.23	. . .	. . .	C17200	50g
	C36 X CBC40A	0.01	0.30	0.02	0.09	0.04	0.06	0.09	0.003	0.01	1.82	0.21	. . .	. . .	C17300	50g

3.6.5 Chromium Copper

		Sn	Fe	Ni	Si	Mn	Cr	Zr	P	Pb	Zn	Al	S	Co	Cd	C	Cu	Size
CRM	C36X CCZ A	0.0047	0.029	0.0084	0.0032	0.0008	0.674	0.048	0.0015	0.0024	0.0075	0.0003	0.0008	0.0012	0.0027	0.0018	99.21	100g
CRM	C36 X 2740A	0.0142	0.078	2.55	0.595	0.0146	0.536	(0.002)	0.0012	0.0022	0.039	0.0012	0.0036	0.0030	. . .	0.003	96.15	100g

3.7 Various Cu Alloys

		Si	Fe	Mn	P	S	Al	Ni	Cr	Sn	Pb	Zn	As	Sb	Bi	C	Cu	Size
CRM	C37 X 2180A	0.56	0.075	0.084	0.0015	0.006	0.0025	2.51	0.033	0.018	0.0025	0.029	. . .	. . .	. . .	(0.002)	96.60	100g
CRM	C37 X 2260A	3.54	1.52	0.582	0.0025	0.0005	0.0020	0.0024	0.003	0.0032	(0.001)	2.82	. . .	. . .	. . .	0.006	91.58	100g
	C37 DH L0201	. . .	0.677	0.035	0.046	. . .	0.022	0.795	. . .	8.84	1.17	6.3	0.076	0.104	0.006	. . .	81.84	50g
	C37 DH L0202	. . .	0.911	0.007	. . .	0.037	. . .	0.034	0.003	0.381	0.139	0.229	. . .	0.008	. . .	. . .	98.15	50g
	C37 DH L0203	0.23	5.76	0.057	. . .	. . .	12.5	. . .	. . .	2.17	0.59	1.36	. . .	0.329	. . .	. . .	76.88	50g
	C37 DH L0204	0.22	5.7	0.057	0.007	. . .	12.51	. . .	2.14	21.6	0.58	1.36	. . .	0.336	. . .	. . .	77.0	50g
	C37 DH L0205	0.22	5.66	0.056	0.008	. . .	12.53	. . .	2.78	2.14	0.76	1.36	. . .	0.35	. . .	. . .	76.82	50g
	C37 DH L0206	0.043	1.79	0.044	0.017	0.059	0.059	0/221	. . .	2.78	0.891	10.89	0.025	0.06	. . .	. . .	83.05	50g
	C37 DH L0207	. . .	0.936	0.027	. . .	. . .	. . .	0.174	. . .	0.74	2.16	30.2	. . .	0.014	. . .	. . .	65.66	50g
	C37 DH L0208	0.052	2.54	0.711	0.027	. . .	4.15	2.82	0.009	4.78	1.31	1.85	. . .	0.083	. . .	. . .	81.87	50g
	C37 DH L0209	. . .	. . .	. . .	. . .	. . .	. . .	0.265	. . .	11.92	0.542	. . .	. . .	. . .	. . .	. . .	87.01	50g
	C37 DH L0210	0.071	0.257	3.65	0.018	. . .	5.16	0.769	0.006	0.295	0.352	21.56	. . .	0.012	. . .	. . .	65.39	50g

3.8 Pure Copper

All Elements ppm

		Sn	Pb	Zn	Fe	Ni	As	Sb	Ag	Se	P	S	Cd	Co	Mn	Te	Bi	Size
CRM	C38 E 64	<5	0.6	(10)	4.5	1.8	(2)	(2)	10	<2	. . .	. . .	. . .	. . .	. . .	<1	<1	50g
CRM	C38 F 17B	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	6.9	10.4	. . .	. . .	. . .	. . .	. . .	50g
CRM	C38 F 74C	<0.07	0.97	0.46	1.14	1.04	0.78	0.58	12.8	0.37	. . .	. . .	<0.02	<0.05	1.27	(0.21)	(0.1)	50g

3.9 Residuals in Pure Copper

		Pb	Zn	Fe	Ni	As	Bi	Sb	Co	Ag	Cd	Te	Si	
	C39 X 178660A	<0.001	0.005	<0.001	0.034	0.037	0.001	<0.001	0.003	<0.001	<0.001	<0.001	<0.005	
CRM	C39 X 178660AC	0.021	0.079	0.021	0.068	0.061	0.0142	0.0057	0.108	0.0069	0.083	0.0098	0.16	
CRM	C39 X 178670AA	0.029	0.044	0.027	0.044	0.043	0.029	0.0046	0.072	0.0062	0.055	0.021	0.115	
CRM	C39 X 178680AD	0.039	0.039	0.046	0.033	0.030	0.044	0.033	0.047	0.026	0.033	0.034	0.10	
	C39 X 178700A	0.049	0.013	0.16	0.005	0.005	0.042	0.047	0.002	0.045	0.026	0.050	0.020	
CRM	C39 X 178700AD	0.059	0.008	0.054	0.0053	0.003	0.081	0.054	0.0024	0.049	0.0014	0.01	(0.002)	
CRM	C39 X 178710A	0.0092	(0.0008)	(0.0020)	0.027	0.029	0.069	0.017	0.0008	0.025	0.0031	0.011	<0.0005	
CRM	C39 A 399	(0.002)	(0.003)	(0.006)	(0.002)	<0.001	. . .	<0.001	. . .	. . .	(0.003)	. . .	. . .	continued
CRM	C39 DB 365	0.00288	. . .	0.00223	0.01753	0.00298	0.00294	0.00088	. . .	0.01027	. . .	. . .	. . .	continued

Continuation from above		Mn	Al	Sn	Mg	S	P	Cr	In	Au	Se	B	Zr	Be	Cu	Size
	C39 X 178660A	<0.001	<0.002	0.013	<0.001	0.003	<0.002	0.002	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C39 X 178660AC	0.0167	0.0067	0.065	0.0041	0.106	0.019	0.23	. . .	0.0050	0.0045	(0.003)	(0.0006)	0.00015	. . .	50g
	C39 X 178670AA	0.0221	0.039	0.045	0.0049	0.058	0.017	0.256	. . .	0.0085	0.0115	(0.001)	(0.001)	0.0003	. . .	50g
	C39 X 178680AD	0.059	0.139	0.035	0.047	0.018	0.041	0.21	. . .	0.020	0.0040	(0.0024)	(0.005)	0.0013	. . .	50g
	C39 X 178700A	0.036	0.006	0.009	0.003	0.005	0.0043	0.006	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C39 X 178700AD	0.024	0.0024	0.016	(0.0007)	(0.004)	0.075	0.0016	(0.007)	0.031	0.007	0.0014	. . .	. . .	. . .	50g
	C39 X 178710A	0.0010	<0.0005	. . .	(0.0002)	0.0080	<0.0005	(0.0003)	. . .	0.0048	0.028	. . .	<0.0005	(0.0004)	. . .	50g
	C39 A 399	<0.001	. . .	(0.003)	. . .	. . .	0.045	. . .	. . .	. . .	. . .	. . .	. . .	. . .	(99.935)	100g
	C39 DB 365	<0.0001	. . .	<0.0005	. . .	(0.00077)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	99.937	100g

4.1 Zinc with Impurities

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Sb	As	Bi	In	Tl	Ti	Cr	Ag	Size
CRM	C41 X Z10M	0.0018	(0.0003)	(0.00015)	0.00005	0.0005	<0.0002	0.0005	0.00010	0.00018	(0.0004)	. . .	. . .	<0.00005	(0.0003)	. . .	. . .	. . .	50g
CRM	C41 X Z30K	0.0052	0.0009	0.0083	0.0044	0.002	0.0039	0.0019	0.0031	0.0007	0.0037	. . .	. . .	0.0007	0.002	0.0012	. . .	. . .	50g
CRM	C41 X Z40K	0.0092	0.0019	0.0096	0.0066	0.003	0.0070	0.0047	0.0069	0.0012	0.005	. . .	. . .	0.0015	0.003	<0.0005	. . .	. . .	50g
CRM	C41 X Z50L	0.0235	0.012	0.142	0.024	(0.015)	0.0213	0.0228	0.0116	0.0033	0.006	. . .	. . .	0.004	0.0032	. . .	. . .	. . .	50g
CRM	C41 X 0336 Z10K	0.95	0.0049	0.014	0.0056	0.0124	0.005	0.007	(0.0006)	0.0035	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X 0336 Z30J	0.019	0.134	0.43	0.341	0.270	0.111	0.361	. . .	0.0058	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X 0336 Z40B	2.87	0.179	1.39	0.638	(0.018)	2.38	0.874	0.0074	0.038	0.048	0.0005	0.027	0.0035	(0.004)	. . .	. . .	0.0023	50g
CRM	C41 X 0336 Z50A	0.91	<0.0005	0.035	0.056	0.016	0.21	0.023	(0.0005)	(0.0001)	0.008	. . .	(0.001)	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X 0336 Z60A	1.82	0.0008	0.105	0.014	0.08	0.0023	0.0203	0.0018	0.0010	0.234	0.0020	0.123	0.0123	0.0132	. . .	. . .	0.0055	50g
CRM	C41 X 4380 Z10C	0.068	0.0012	0.055	0.376	0.01	0.049	0.175	0.0029	0.0015	0.002	. . .	0.0017	. . .	. . .	(0.001)	0.002	. . .	50g
CRM	C41 X 4380 Z40C	0.325	0.126	0.144	0.094	0.056	0.038	0.0022	0.0040	0.0007	0.017	. . .	0.011	. . .	. . .	0.005	(0.0003)	. . .	
CRM	C41 X 4380 Z70C	1.25	0.0028	0.137	0.015	(0.0044)	0.0047	0.012	0.012	. . .	0.090	. . .	. . .	. . .	. . .	0.009	0.0045	. . .	50g
CRM	C41 X 4380 Z80C	0.73	0.007	0.225	0.0079	0.003	0.011	0.020	0.024	0.0015	0.016	. . .	0.011	. . .	. . .	0.012	0.0019	. . .	50g
CRM	C41 X 2951 Z10	0.0042	0.0029	0.029	0.0005	0.011	(0.0007)	0.79	0.0038	0.0013	. . .	. . .	. . .	. . .	. . .	0.278	0.083	. . .	50g
CRM	C41 X 2951 Z30	0.0065	0.0164	0.078	0.0062	0.029	(0.006)	1.89	0.0010	0.0018	. . .	. . .	. . .	. . .	. . .	0.133	0.184	. . .	50g
																		Co	
CRM	C41 X GLV10A	0.056	. . .	0.115	0.0093	0.059	0.010	0.0028	0.0141	. . .	<0.001	<0.001	0.0025	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X GLV20A	0.214	. . .	0.068	0.0025	0.048	0.003	0.0052	0.0070	. . .	0.006	<0.001	0.017	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X GLV30A	0.0080	. . .	0.31	0.021	0.012	0.006	0.0188	0.0301	. . .	0.048	(0.0008)	0.0011	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X GLV40A	0.0038	. . .	0.201	(0.0001)	0.017	<0.005	0.0009	0.049	. . .	0.025	<0.002	0.0051	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X GLV50A	0.0187	. . .	0.014	0.0138	0.076	0.020	0.0116	0.0030	. . .	0.162	0.0041	0.0109	. . .	. . .	. . .	. . .	. . .	50g
CRM	C41 X GLV60A	0.120	. . .	0.475	0.0055	0.0048	0.015	0.041	0.0008	0.0014	0.011	0.0015	0.024	. . .	. . .	. . .	0.0030	0.0050	50g
CRM	C41 X GLV70A	0.082		0.399	0.00056	0.0031	(0.0006)	0.023	0.0060	0.0025	0.0031	0.0016	0.0108	. . .	. . .	. . .	0.0010	(0.0001)	50g
	C41 CG 02701	0.0030	. . .	. . .	0.0010	0.0010	. . .	0.00010	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 CG 02702	0.0142	. . .	. . .	0.0103	0.0097	. . .	0.00099	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 CG 02703	0.309	. . .	. . .	0.0733	0.0301	0.0025	0.0021	. . .	. . .	0.0106	0.0052	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 M BS SP-A	0.003	. . .	0.051	. . .	0.011	<0.001	<0.0005	. . .	. . .	0.099	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 M BS SP-B	0.021	. . .	0.141	. . .	0.025	<0.001	<0.002	. . .	. . .	0.061	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 M BS SP-C	0.005	. . .	0.185	. . .	0.041	<0.001	<0.0005	. . .	. . .	0.031	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
	C41 M BS SP-D	0.038	. . .	0.25	. . .	0.060	<0.001	<0.0005	. . .	. . .	0.006	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g

4.2 Zn/Al

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Cr	In	Tl	Sb	Si	Ce	La	Size
	C42 X Z10A	0.002	<0.001	4.3	<0.001	0.002	0.002	0.003	0.001	<0.001	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C42 X Z30H	0.006	0.0287	3.74	0.0048	(0.047)	0.0030	0.159	0.0102	0.0256	0.0020	. . .	. . .	0.003	0.015	(0.0003)	(0.0003)	50g
	C42 X Z40A	0.01	0.05	3.25	0.003	0.005	0.003	0.057	0.017	0.014	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C42 X Z40B	0.011	0.058	3.51	0.008	0.014	0.006	0.063	0.017	0.008	. . .	(0.0014)	(0.0026)	0.002	. . .	0.021	0.019	50g
CRM	C42 X Z50A	0.0047	0.073	4.22	0.0021	0.029	(0.0023)	0.100	0.019	0.0070	0.0018	0.0050	0.0056	0.005	. . .	0.011	0.009	50g
CRM	C42 X Z70A	0.0097	0.0095	4.39	0.030	0.027	0.012	0.0249	0.0067	0.0045	(0.0001)	. . .	. . .	. . .	0.006	0.053	0.047	50g
CRM	C42 X Z80A	0.0025	0.0033	7.03	0.0003	0.013	(0.0023)	0.0215	0.0019	0.0014	(0.0002)	. . .	. . .	. . .	0.013	0.0081	0.0079	50g

4.3 Zn/Al/Cu

		Pb	Mg	Al	Cd	Fe	Sn	Cu	Ni	Mn	Cr	Ti	Bi	Sb	Si	In	Tl	Size
	C43 X Z20A	0.008	0.042	3.2	0.01	0.02	0.01	0.89	0.003	0.008	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C43 X Z20K	0.0065	0.073	3.79	0.0068	0.021	0.003	1.04	0.012	0.0059	0.0021	. . .	(0.0022)	0.008	0.009	0.003	0.004	50g
CRM	C43 X Z30L	0.0132	0.0143	3.64	0.0132	0.061	0.0125	1.59	0.0061	0.0125	0.004	. . .	0.018	0.003	0.005	(0.0019)	(0.0035)	50g
CRM	C43 X Z40B	(0.0024)	0.043	4.76	0.0025	(0.064)	(0.0023)	3.21	0.0286	0.088	0.0063	0.0017	0.012	0.0043	(0.0065)	. . .	. . .	50g
CRM	C43 X Z50A	0.0045	0.041	3.05	0.0111	0.023	0.0032	6.05	0.0021	0.0030	0.0010	0.0009	. . .	. . .	0.003	. . .	. . .	50g
CRM	C43 X Z60A	0.0016	0.0256	4.02	0.0016	0.019	0.0053	2.72	0.029	0.0006	0.0006	0.0013	0.0049	0.0045	0.012	. . .	. . .	50g
	C43 X Z110A	0.015	0.05	11.2	0.014	0.008	0.02	0.47	0.006	0.01	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C43 X Z120D	0.0133	0.027	10.05	0.0114	0.047	0.0089	0.796	0.0035	0.0059	0.0023	0.0054	(0.002)	0.0039	(0.008)	. . .	. . .	50g
CRM	C43 X Z130D	0.0125	0.0204	9.55	0.0100	0.05	0.0111	0.981	0.0109	0.0070	. . .	. . .	. . .	0.009	(0.0048)	. . .	. . .	50g
CRM	C43 X Z140D	0.0082	0.0026	8.24	0.0067	0.015	0.0053	1.23	0.0052	0.0033	0.0046	0.0012	0.010	0.011	0.010	. . .	. . .	50g
	C43 X Z150 A	0.003	0.01	8.1	0.002	0.004	0.004	1.37	0.006	0.002	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C43 X Z150 C	0.0054	0.0024	7.36	0.0030	0.009	0.004	1.53	0.0019	0.0020	0.0025	0.0020	0.005	0.005	(0.011)	. . .	. . .	50g
	C43 X Z210A	0.007	0.06	24.9	0.01	0.05	0.01	2.05	0.002	0.009	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C43 X Z210C	0.012	0.047	23.5	0.027	0.12	0.0140	1.81	0.043	0.0104	0.0087	0.013	. . .	. . .	0.022	. . .	. . .	50g
	C43 X Z230A	0.002	0.01	29.8	0.002	0.008	0.003	2.73	0.003	0.002	. . .	. . .	. . .	. . .	. . .	. . .	. . .	50g
CRM	C43 X Z230C	0.0028	0.0133	31.4	0.0024	(0.24)	(0.002)	2.74	0.0115	0.0124	0.036	0.0026	. . .	. . .	0.061	. . .	. . .	50g

5.2 Residuals in Al

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Co	Bi	Sb	Be	Size
CRM	C51 X G00H10A	0.034	0.039	0.12	0.051	0.041	0.038	0.042	0.018	0.028	0.031	0.027	0.016	0.011	0.011	<0.005	0.0004	50g
CRM	C51 X G00H10D	0.0132	0.054	0.143	0.835	0.0074	0.230	0.249	0.0021	0.097	0.0135	0.0062	0.0080	. . .	0.024	(0.003)	. . .	50g
CRM	C51 X G00H20B	0.173	0.088	0.61	0.49	0.303	0.206	0.219	0.116	0.122	0.136	0.100	0.070	0.079	0.062	0.057	0.0024	50g

5.4 Al/Si

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Co	Bi	Be	Others	Size
CRM	C54 X G25D10L	0.010	0.67	3.37	0.721	0.815	0.262	0.359	(0.0033)	<0.005	0.099	0.140	0.016	. . .	0.112	0.0011		50g
CRM	C54 X G25D20K	0.130	0.59	3.93	0.576	0.479	0.139	0.169	0.073	0.042	0.152	0.150	(0.006)	0.105	0.22	0.049	Cd 0.011	50g
	C54 X G25D30A	0.13	0.31	6.3	0.61	0.34	0.11	0.14	0.09	0.09	0.1	0.08	. . .	. . .	. . .	. . .		50g
CRM	C54 X G25D30R	0.117	0.208	5.97	0.454	0.289	0.111	0.092	0.074	0.054	0.078	0.061	0.011	. . .	. . .	0.0032	Ga 0.016	50g
CRM	C54 X G25D40M	0.162	0.075	7.34	0.125	0.093	0.098	0.111	0.160	0.092	0.09	0.020	(0.0022)	0.045	0.092	0.019	Cd 0.018	50g
CRM	C54 X G25D50L	0.273	(0.0011)	8.14	0.191	(0.0046)	0.0082	0.020	0.273	0.130	0.0068	0.0097	(0.0025)	0.0024	. . .	0.022		50g
CRM	C54 X G06H20S	0.54	0.40	10.19	0.640	0.234	0.55	0.47	0.213	0.116	0.179	0.130	0.018	0.0086	0.027	. . .		50g
	C54 X G06H30A	0.29	0.47	11.1	0.73	0.40	0.33	0.01(4)	0.10	0.08	0.09	0.08	. . .	. . .	. . .	. . .		50g
CRM	C54 X G06H30N	0.327	0.179	11.27	0.500	0.445	0.295	0.072	0.065	0.050	0.084	0.069	0.010	0.021	. . .	. . .	Cd 0.0052, Ga 0.010	50g
CRM	C54 X G06H40Q	0.237	0.134	132.21	0.138	0.691	0.139	0.131	0.040	(0.007)	0.124	0.120	0.011	0.207	. . .	. . .		50g
CRM	C54 X G06H50L	0.0229	(0.0022)	13.76	0.210	0.85	0.0067	0.225	(0.0020)	0.022	0.0106	0.026	0.008	<0.0005	. . .	. . .		50g
CRM	C54 X G13H10N	1.87	2.89	8.91	0.801	0.0137	1.83	0.37	0.240	0.260	0.112	0.062	. . .	0.0051	<0.001	0.0078		50g
CRM	C54 X G13H20M	1.29	1.37	10.42	0.767	0.248	1.15	0.530	0.083	0.145	0.166	0.103	. . .	0.004	. . .	. . .		50g
	C54 X G13H30A	0.82	1.05	10.8	0.72	0.38	0.94	0.31	0.08	0.09	0.17	0.06	. . .			. . .		50g
CRM	C54 X G13H40N	0.643	0.78	12.55	0.405	0.617	0.84	0.251	0.055	0.068	0.083	0.0264	. . .	(0.001)	<0.001	0.0048	Zr 0.021, Sr 0.026	50g
CRM	C54 X G231H10C	1.19	0.45	9.82	0.80	0.029	0.31	0.60	0.145	0.082	0.022	0.089	. . .	. . .	. . .	(0.0002)		50g
CRM	C54 A 182/3	0.037	0.067	11.03	0.51	0.26	0.046	0.128	0.056	0.027	0.107	. . .	. . .	. . .	. . .	. . .		100g
CRM	C54 A 268/1	1.35	0.49	5.49	0.47	0.24	0.16	0.028	0.028	0.031	(0.008)	. . .	. . .	. . .	. . .	. . .		100g
CRM	C54 A 380/1	0.91	0.24	1.93	1.24	0.094	0.94	0.025	. . .	. . .	0.024	. . .	. . .	. . .	. . .	. . .		100g

5.5 Al/Si/Cu — 5.6 Al/Cu — 5.7 Al/Cu/Si

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	Co	V	Zr	Bi	Others	Size
	C55 X G02D40A	3.16	0.10	8.98	0.64	0.18	0.67	2.46	0.19	0.26	0.09	0.11	. . .	. . .	. . .	. . .		50g
CRM	C55 X G02D60J	0.487	0.336	12.3	1.27	0.648	0.027	0.083	0.457	<0.005	0.34	0.035	0.018	. . .	. . .	. . .	Li 0.0055, Ca 0.006	50g
CRM	C55 X G02D70K	1.59	0.52	10.74	0.90	0.45	0.249	0.614	0.219	0.047	0.160	0.094	0.093	0.007	. . .	0.078	Be 0.00055	50g
CRM	C55 X G02D80H	2.26	0.205	9.91	0.94	0.453	0.366	1.29	0.335	0.186	0.240	0.052	0.058	0.024	. . .	. . .	Be 0.0008	50g
CRM	C55 X G02D90H	3.40	0.207	8.62	0.82	0.113	0.62	2.46	0.106	0.194	0.090	0.109	0.052	0.007	. . .	. . .	Be 0.0010, Ga 0.01	50g
CRM	C55 X G02D100K	4.65	<0.01	6.56	0.186	0.015	0.97	4.76	(0.004)	0.87	<0.005	0.160	0.059	. . .	. . .	0.09		50g
	C55 X G04H30A	3.60	0.17	5.55	0.86	0.40	0.33	1.30	0.10	0.10	0.20	0.06	. . .	. . .	. . .	. . .		50g
CRM	C55 X G04H90D	2.64	0.079	5.99	0.304	0.304	0.231	1.89	0.062	0.031	0.31	0.005	0.010	0.009	. . .	. . .	Cd 0.0015	50g
CRM	C55 X G04H100D	1.360	0.004	7.21	0.512	0.532	0.0232	2.26	(0.0074)	<0.01	0.0097	0.090	0.043	0.0077	. . .	0.029	Ga 0.011	50g
	C55 X G26H10F	4.34	0.29	7.69	1.78	0.015	0.012	1.14	0.24	(0.008)	0.21	0.20	0.022	0.012	. . .	0.07		40g
CRM	C55 X G26H20F	4.14	1.49	9.36	0.71	0.52	0.41	0.64	0.111	0.110	0.120	0.083	0.052	0.011	. . .	0.035		40g
CRM	C55 X G26H30F	2.19	1.01	9.6	1.07	0.45	0.51	0.79	0.228	0.16	0.147	0.130	0.076	0.020	. . .	. . .	Ga 0.011, Li 0.006	40g
CRM	C55 X G28J10Z	1.82	1.26	14.33	0.678	0.024	2.47	0.258	0.0038	0.182	0.104	0.319	0.119	0.0095	. . .	. . .		40g
	C55 X G28J30A	1.60	1.04	17.4	0.64	0.44	1.57	0.12	0.09	0.08	0.12	0.20	. . .	. . .	. . .	. . .		40g
CRM	C55 X G28J30B	1.58	0.99	17.5	0.50	0.378	1.81	0.32	0.081	0.059	0.073	0.256	0.345	0.011	. . .	. . .	Cd 0.004, Be 0.0042	40g
	C55 X A30J30A	4.09	0.48	17.5	0.71	0.32	0.10	0.07	0.06	0.08	0.12	0.05	. . .	. . .	. . .	. . .		25g
CRM	C55 X A30J30J	4.02	0.31	16.5	0.286	0.259	0.072	0.048	0.018	0.083	0.144	0.037	0.194	0.006	. . .	0.020		25g
CRM	C55 X G900J20F	0.86	0.62	0.44	0.38	0.145	0.133	0.309	0.52	0.34	0.054	0.118	. . .	. . .	. . .	0.55		50g
CRM	C55 X G900J40F	0.249	0.459	1.39	0.306	0.75	0.351	0.149	0.088	0.153	0.171	0.343	. . .	. . .	. . .	0.285		50g
	C56 CG 02204	4.89	0.034	0.050	0.077	0.41	. . .	. . .	. . .	. . .	0.24	. . .	. . .	0.18	0.093	. . .	B 0.013, Cd 0.19	100g
CRM	C56 X G250J10C	3.82	0.075	0.26	0.41	0.040	1.33	0.28	0.101	0.125	0.008	0.0067	0.008	0.102	(0.003)	. . .		50g
CRM	C56 X G250J20D	4.81	0.060	0.211	0.346	0.225	1.10	0.155	(0.0016)	(0.004)	0.210	0.063	0.195	0.018	0.247	. . .	Sb 0.324	50g
CRM	C56 X G250J30C	4.90	(0.0011)	0.11	0.079	0.278	0.92	0.103	0.024	0.031	0.162	0.024	0.264	0.036	0.275	. . .	Sb 0.35, Be 0.0014	50g
CRM	C56 X G250J50D	4.36	0.022	0.205	0.535	0.150	1.77	0.086	0.076	0.097	0.051	0.047	0.34	0.021	0.22	. . .	Sb 0.076, Be 0.0022	50g
CRM	C56 X G2000J10B	3.47	2.75	(0.046)	0.132	1.42	0.010	1.01	(0.008)	0.104	(0.004)	0.005	. . .	(0.003)	0.26	0.16		50g
CRM	C57 X G12H10C	5.54	0.40	2.52	0.88	0.032	0.31	1.03	0.016	0.095	0.114	0.069	0.113	0.15	0.07	. . .	Cd 0.012, Li 0.008	50g
CRM	C57 X G12H50G	12.2	0.028	0.55	0.192	0.073	0.108	0.072	0.068	0.067	0.036	0.016	0.054	0.033	0.045	. . .	Be 0.003, Cd 0.023	50g

5.8 Al/Zn — 5.9 Al/Zn/Mg/Cu

		Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Co	Zr	Cd	Others	Size
	C58 CG 02222	0.00089	. . .	. . .	. . .	0.028	0.00093	5.76	. . .	. . .	. . .	. . .	. . .	. . .	0.57	. . .	R.E. 0.85	100g
CRM	C58 A 300/1	1.27	2.74	0.14	0.24	0.33	. . .	5.87	. . .	. . .	0.09	0.13	. . .	. . .	0.18	. . .		100g
CRM	C58 X G40H60B	0.111	(0.003)	0.09	0.08	0.004	0.008	7.55	<0.002	<0.005	0.064	0.005	<0.005	0.006	(0.004)	0.032		50g
CRM	C59 X G77J10F	2.41	4.83	0.15	0.205	0.46	0.167	1.91	0.125	0.126	0.178	0.242	0.005	0.018	(0.010)	(0.0035)	Mo 0.004	50g
CRM	C59 X G77J30E	2.42	2.27	0.366	0.712	0.594	0.43	4.57	0.075	0.137	0.107	0.023	0.006	<0.005	0.026	0.0115	Bi 0.046	50g
CRM	C59 X G77J50D	0.122	0.72	0.30	1.32	0.030	1.38	7.57	(0.003)	<0.01	0.058	0.050	0.007	. . .	. . .	0.012	Ga 0.020	50g
CRM	C59 X G77J60A	1.13	2.63	0.04	0.054	0.0024	0.003	11.62	(0.005)	0.006	0.023	0.0046	0.003	. . .	0.29	. . .		50g

C5. Aluminium Base

Chippings

	5.10 Al/Cu/Mg; 5.11 Al/Mg; 5.14 Al/Mn	Cu	Mg	Si	Fe	Mn	Ni	Zn	Pb	Sn	Ti	Cr	V	Be	Others	Typical Alloy Type	Size
	C510 CG 02220	2.17	1.56	0.88	1.18	0.14	1.15	0.30	. . .	. . .	0.041	. . .	. . .	. . .			50g
	C510 CG 02221	4.46	1.51	0.34	0.38	0.36	0.045	0.28	. . .	. . .	0.055	. . .	. . .	. . .			50g
	C511 CG 02201	0.043	6.02	0.14	0.18	0.60	0.038	0.20	. . .	. . .	0.076	. . .	. . .	0.0022			50g
CRM	C511 X G05H10H	0.32	2.02	0.42	0.79	0.012	0.123	0.47	0.023	0.179	0.205	0.240	0.053	(0.0002)	Cd 0.013		25g
CRM	C511 X G05H20G	0.37	3.12	0.35	0.60	0.186	0.22	0.26	0.068	0.154	0.079	0.30	(0.001)	0.004	Cd 0.002, Ga 0.012		25g
	C511 X G05H30A	0.10	5.35	0.24	0.54	0.38	0.09	0.09	0.10	0.10	0.07	0.06	. . .	. . .		LM 5	25g
CRM	C511 X G05H30H	0.093	3.97	0.21	0.405	0.396	0.090	0.092	0.107	0.098	0.249	0.095	. . .	0.0074			25g
CRM	C511 X G05H40F	0.056	5.16	0.11	0.14	0.547	0.040	0.062	0.152	0.144	0.048	0.029	. . .	0.015			25g
CRM	C511 X G10H40B	0.052	10.4	0.33	0.19	0.12	0.085	0.21	0.10	0.051	0.097	0.15	. . .	0.023	B 0.004		40g
CRM	C511 X G3000B20B	0.20	0.68	0.23	0.335	0.81	0.063	0.098	0.137	0.105	0.111	0.200	<0.005	0.0017	Co 0.007		40g
CRM	C511 X G3000B30B	0.120	0.80	0.35	0.376	1.06	0.116	0.140	0.062	0.028	0.22	0.056	<0.005	0.005	Co 0.008		40g
CRM	C511 A 262/1	0.039	10.75	0.16	0.2	0.084	0.071	0.085	(0.05)	(0.04)	0.005	(0.002)	. . .	<0.01			100g
CRM	C511 A 263/2	0.019	4.67	0.14	0.26	0.36	. . .	0.056	. . .	. . .	0.022	0.074	. . .	<0.001			100g
CRM	C514 X 909110C	0.046	(0.001)	0.035	0.081	6.93	(0.0026)	0.029	0.016	0.013	0.0017	<0.005	. . .	. . .	Zr 0.184		40g
CRM	C514 X 909130D	0.623	0.149	0.74	0.94	11.3	0.143	0.225	0.114	0.019	0.425	0.106	. . .	. . .	Zr <0.005		40g

C6. Magnesium Base

Chippings

	6.1 Magnesium with Impurities	Al	Zn	Mn	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Ce	La	Size
CRM	C61 X MgP10A	0.0144	(0.0017)	0.0035	0.0008	0.005	0.027	. . .	<0.001	<0.002	<0.002	<0.0002	<0.0002	<0.0002	<0.0005	<0.0005	30g
CRM	C61 X MgP20A	0.065	0.0122	0.0118	0.0109	0.029	0.0061	0.0029	0.0139	0.0073	0.0061	0.003	<0.0001	0.0063	0.0019	0.0014	30g
CRM	C61 X MgP30A	0.096	0.0196	0.0135	0.0296	0.046	0.014	0.0049	0.053	0.0154	0.0148	0.0125	<0.0001	0.0154	0.0055	0.0038	30g

	6.3 Mg/Mn	Al	Zn	Mn	Cu	Si	Fe	Ni	Ca	Sn	Pb	Zr	Ag	Cd	Ti	Size
	C63 X MgE20A	0.056	0.04	1.58	0.058	0.035	0.009	0.012	(0.003)	0.011	0.013	. . .	. . .	. . .	. . .	30g
CRM	C63 X MgE30B	0.015	0.022	2.36	0.012	0.01	0.004	0.0023	0.13	0.0057	0.005	<0.001	0.005	0.001	(0.0026)	30g

	6.5 Mg/Al/Zn	Al	Zn	Mn	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Cd	Ce	La	Sr	Size
CRM	C65 X MgA10H	3.83	1.40	0.20	0.148	0.17	(0.01)	0.008	0.008	0.090	0.016	. . .	0.00055	. . .	. . .	. . .	0.0007	30g
CRM	C65 X MgA10J	5.45	1.26	0.060	0.221	0.20	0.021	0.021	0.029	0.072	0.012	0.012	0.006	0.013	0.009	0.007	. . .	30g
CRM	C65 X MgA20G	7.19	0.95	0.14	0.112	0.13	0.011	0.003	(0.005)	0.050	0.006	. . .	0.0007	. . .	. . .	. . .	. . .	30g
	C65 X MgA30A	8.4	0.60	0.27	0.06	0.12	0.03	0.009	0.004	0.01	0.01	. . .	. . .	. . .	. . .	. . .	. . .	30g
CRM	C65 X MgA30H	8.97	0.70	0.152	0.006	0.044	0.004	(0.0015)	(0.0005)	0.003	(0.0036)	. . .	0.0007	. . .	. . .	. . .	<0.0001	30g
CRM	C65 X MgA40H	11.70	0.0047	0.0061	0.062	0.024	0.008	(0.0036)	0.033	0.0101	0.0040	0.0186	0.0011	. . .	. . .	. . .	. . .	30g
CRM	C65 X MgA50A	8.01	0.411	0.399	0.020	0.110	0.006	0.020	0.013	0.013	0.043	0.0050	0.0013	0.0035	. . .	. . .	0.00034	30g
CRM	C65 X MgB10D	2.39	1.711	0.68	0.20	0.17	0.016	0.013	0.41	0.011	0.017	0.029	0.0008	0.070	(0.014)	(0.013)	. . .	30g
	C65 X MgB20A	2.32	0.95	0.44	0.096	0.06	0.015	0.005	0.008	0.012	0.012	. . .	. . .	. . .	. . .	. . .	. . .	30g
CRM	C65 X MgB30B	3.12	0.60	0.012	0.021	0.013	0.008	0.0018	0.029	0.005	0.004	(0.0023)	0.0030	0.011	. . .	. . .	. . .	30g

	6.6 Mg/Zn	Al	Zn	Mn	Zr	Cu	Si	Fe	Ni	Ca	Sn	Pb	Ag	Be	Total R.E.	Others	Size
CRM	C66 X MgD30B	0.039	1.97	0.282	(0.029)	0.058	0.017	0.023	(0.002)	(0.05)	0.008	0.006	(0.004)	(0.0003)	. . .		30g
	C66 X MgD40A	0.006	2.80	0.02	0.44	0.01	0.01	0.003	0.002	0.004	0.003	0.017	. . .	. . .	. . .		30g
	C66 X MgC20A	0.007	5.93	0.016	0.45	0.15	0.007	0.013	0.016	0.006	0.010	0.018	. . .	. . .	. . .		30g
CRM	C66 X MgC40C	0.039	6.80	0.167	<0.001	0.0023	0.06	0.006	0.001	<0.001	0.021	0.003	0.0074	0.0001	. . .	Sr 0.00014	30g
CRM	C66 A 307	(0.008)	2.08	0.006	0.56	0.005	<0.001	0.002	<0.001	. . .	<0.001	. . .	. . .	. . .	2.84		100g
CRM	C66 A 316	8.01	0.68	0.28	. . .	0.04	0.055	0.009	0.004	. . .	0.005	0.024	. . .	. . .	. . .		100g

	6.7 Mg/Rare Earth	Al	Zn	Mn	Zr	Th	Cu	Si	Fe	Ni	Sn	Pb	Ca	Total R.E.	Size
	C67 X MgF30A	0.01	3.18	0.015	0.48	. . .	0.03	0.005	0.009	0.002	0.006	0.017	0.006	2.4	30g
	C67 X MgG40A	0.001	5.47	0.015	0.72	1.85	0.06	0.003	0.003	0.007	0.005	0.009	0.001	. . .	30g

	6.8 Mg/Ag/Rare Earth	Al	Zn	Mn	Zr	R.E.	Th	Cu	Si	Fe	Ni	Ag	Size
	C68 X MgH40A	0.004	0.17	0.015	0.46	2.4	. . .	0.03	0.002	0.001	0.004	2.05	30g
	C68 X MgL10A	0.002	0.009	0.016	0.54	2.09	0.24	0.013	0.001	0.009	0.005	1.41	30g

C7. Tin Base

Chippings

7.1 Tin with Impurities

		Sb	As	Bi	Pb	Cu	Fe	Ni	Al	Cd	Zn	In	Te	Ag	Au	Sn	Size
CRM	C71 X SR10D	0.013	0.004	0.010	0.030	0.0088	0.0017	0.001	0.0007	0.0070	0.0071	0.014	0.0032	0.009	0.003	. . .	50g
CRM	C71 X SR20D	0.057	0.041	0.056	0.127	0.054	0.0027	0.0096	0.003	0.041	0.015	0.049	0.022	0.025	0.0083	. . .	50g
CRM	C71 X SR30E	0.15	0.061	0.105	0.30	0.099	0.003	0.0009	(0.0009)	0.021	0.014	0.028	0.008	0.0069	0.003	. . .	50g
	C71 A 192h	(0.0007)	. . .	. . .	(0.0007)	(0.00007)	(0.0002)	<0.00005	. . .	. . .	(0.00006)	. . .	. . .	. . .	. . .	(99.997)	100g

7.2 Tin-Antimony

		Sb	As	Bi	Pb	Cu	Zn	Cd	Fe	Sn	Size
CRM	C72 X SA50R	4.93	0.015	0.006	0.08	0.018	0.035	0.05	(0.004)	. . .	50g
CRM	C72 CG 02301	7.87	0.018	0.014	1.32	4.06	. . .	. . .	. . .	86.61	100g
CRM	C72 CG 02302	11.81	0.020	0.012	1.2	6.72	. . .	. . .	. . .	80.27	100g

7.3 Tin White Metal

		Sb	As	Bi	Pb	Cu	Fe	Ni	Al	Cd	Zn	In	Ag	Co	S	Sn	Size
CRM	C73 X SC40A	6.02	0.005	0.218	0.514	3.05	0.011	0.017	0.005	0.052	0.008	0.011	0.042	0.0035	(0.003)	. . .	50g
CRM	C73 X SC70A	14.01	0.047	0.009	0.356	6.51	0.046	0.008	0.001	0.0018	(0.003)	0.014	0.006	0.0160	<0.001	. . .	50g
CRM	C73 X SC90A	8.18	0.53	0.066	0.20	8.47	0.037	0.008	<0.001	0.078	(0.003)	0.010	0.004	0.0030	(0.008)	. . .	50g
CRM	C73 X SC110A	11.63	0.31	0.537	0.040	10.54	0.072	0.49	<0.002	1.63	0.065	. . .	0.060	. . .	. . .	. . .	50g
CRM	C73 A 178/2	9.45	0.15	0.11	3.18	4.58	0.024	0.17	0.005	0.14	0.040	. . .	(0.02)	. . .	. . .	82.2	100g

7.4 Tin-base (Lead-Free) Solders

		Cu	Ag	Pb	Sb	Bi	Zn	Ni	Fe	As	Cd	Se	Sn	Size
CRM	C74 X E A	3.01	0.742	0.0262	0.027	0.0097	<0.001	0.011	0.052	0.088	0.0021	0.0025	rem	50g
CRM	C74 X HA A	0.604	2.69	0.025	1.98	0.057	2.59	0.016	0.052	0.0076	0.0027	. . .	rem	50g
CRM	C74 X HB A	4.75	0.070	0.058	5.00	0.008	0.018	1.12	0.12	0.026	0.011	. . .	rem	50g

C8. Lead Base

Chippings

8.2 Pb/Ag

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Fe	Al	In	Size
CRM	C82 X Ag 1.5E	0.04	0.39	0.06	0.27	0.006	1.55	0.004	. . .	. . .	. . .	. . .	100g
CRM	C82 X Ag 3.5D	0.24	0.11	0.27	0.075	0.022	3.48	0.001	0.004	0.001	<0.001	0.045	100g
CRM	C82 X Ag 6.0A	0.50	0.48	0.52	0.18	0.021	5.93	0.007	0.010	<0.001	<0.001	0.008	100g

8.3 Pure Lead

		ppm Sn	ppm Sb	ppm Bi	ppm Cu	ppm As	ppm Ag	ppm Zn	ppm Cd	ppm Ni	ppm Te	ppm Se	ppm Tl	ppm Fe	ppm Al	% Pb		Size
CRM	C83 F 286B	<0.05	0.10	21.5	1.49	<0.002	0.015	<0.1	0.125	0.041	<0.1	<0.05	2.5	. . .	. . .	. . .		160g
CRM	C83 F 287B	<0.05	0.04	67.3	0.98	<0.003	15.2	<0.1	0.36	0.024	<0.2	<0.05	0.73	. . .	. . .	. . .		160g
CRM	C83 F 288B	30.6	32.5	215.8	19.3	55.7	30.5	8.2	33.3	4.57	32.8	<0.2	2.3	. . .	. . .	. . .		160g
CRM	C83 A 210e	<20	<20	. . .	(6)	. . .	. . .	<50	. . .	<10	. . .	. . .	. . .	<5	10	(99.996)	Bar	500g

8.3.1 Lead with Impurities

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Te	In	Ca	Na	Se	Au	Size
CRM	C83 X PR10G	0.004	0.005	0.080	0.006	0.050	0.088	0.002	0.075	0.001	0.003	0.045	0.004	0.01	<0.002	0.008	100g
CRM	C83 X PR40F	0.009	0.012	0.014	0.015	(0.002)	0.014	0.005	0.010	0.013	0.025	0.005	0.0026	0.001	0.003	0.002	100g
CRM	C83 X PR70A	0.21	0.84	0.50	0.22	0.049	0.30	0.002	0.49	0.005	0.002	0.077	(0.001)	0.004	(0.01)	(0.001)	100g
CRM	C83 X PR80A	0.59	0.25	1.13	0.083	0.17	0.55	0.007	0.260	0.003	(0.002)	0.74	<0.002	0.019	(0.012)	(0.011)	100g

8.4 Pb/Sn/Ca (Battery Alloys)

		Sn	Sb	Bi	Cu	As	Ag	Zn	Cd	Ni	Te	Al	Ca	Size
CRM	C84 X BA10E	1.05	0.0018	0.0148	0.0019	(0.0004)	0.0099	0.0031	0.0026	0.0002	(0.0004)	0.0135	0.099	100g
CRM	C84 X BA20B	0.51	0.002	0.024	0.003	<0.0005	0.008	0.019	0.0052	(0.0002)	<0.002	. . .	0.062	100g
CRM	C84 X BA40B	0.108	0.061	0.074	0.031	(0.0008)	0.003	(0.0003)	0.010	0.0007	0.030	. . .	(0.0014)	100g
CRM	C84 X BA80A	0.293	0.0009	0.019	0.0007	(0.0004)	0.0043	0.0013	0.0010	. . .	<0.002	0.021	0.157	100g

8.5 Various Lead Alloys; 8.6 Lead Babbit

		Sn	Sb	Bi	Cu	As	Ag	Ni	Cd	Zn	In	Te	Se	Fe	S	Pb	Size
CRM	C85 X ANTH D	1.32	6.32	0.059	0.0234	0.487	0.0058	0.0035	0.0052	0.0004	. . .	0.010	0.017	0.0041	(0.0030)	. . .	100g
CRM	C85 X HRH A	0.87	1.14	0.090	0.080	0.73	0.247	0.0009	0.0002	. . .	. . .	0.002	0.035	. . .	(0.0008)	. . .	100g
CRM	C85 X 0616Pb10A	0.070	1.76	0.026	0.047	0.068	0.0023	0.0010	0.0022	0.0009	. . .	(0.0016)	0.017	<0.001	. . .	. . .	100g
	C86 CG 02401	15.97	16.09	0.024	1.96	0.014	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	65.72	100g
	C86 CG 02402	5.69	15.02	0.0075	2.88	0.012	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	76.22	100g
	C86 A 177/2	5.07	10.1	0.028	0.12	0.05	(0.008)	0.007	. . .	. . .	. . .	. . .	. . .	. . .	. . .	84.5	100g
CRM	C86 X PSS20A	6.33	8.16	0.054	0.118	1.42	0.004	0.0080	0.069	<0.002	(0.002)	. . .	. . .	<0.001	. . .	. . .	100g
CRM	C86 X PSS40A	10.69	16.97	0.120	0.328	0.278	(0.006)	0.0031	0.047	<0.002	0.013	. . .	. . .	(0.0013)	. . .	. . .	100g

C9. Solders

Chippings

9.1 Sn/Pb Solders		Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Ni	Au	In	Te	Pb	Size
CRM	C91 X S30 PR30C	30.88	0.269	0.294	0.102	0.0126	0.024	0.0016	(0.003)	0.0115	0.0269	0.0063	0.0085	. . .	. . .	100g
CRM	C91 X S63 PR00A	59.8	0.013	0.007	0.023	0.008	0.010	(0.0026)	<0.001	0.012	<0.005	0.018	0.01	<0.001	rem	100g
	C91 X S63 PR10F	61.30	0.075	0.062	0.252	(0.001)	0.0065	0.012	0.0032	0.0057	0.0010	0.040	0.028	0.0008	rem	100g
CRM	C91 X S63 PR20G	62.6	0.614	0.162	0.052	0.080	0.057	0.030	0.007	0.0168	0.0073	0.090	0.019	0.009	rem	100g
CRM	C91 X S63 PR40A	66.8	0.093	0.030	0.021	<0.002	0.030	<0.005	<0.001	0.021	<0.005	0.05	0.014	0.006	rem	100g

9.3 Sn/Pb/Sb Solders		Sn	Sb	Bi	Cu	As	Ag	Fe	Zn	Cd	Ni	In	Te	Pb	Size
CRM	C93 X S30 APR10C	28.58	2.54	0.059	0.192	0.010	0.0144	(0.012)	(0.0004)	0.0014	0.0010	0.0094	0.0024	. . .	100g
CRM	C93 X S30 APR20C	30.68	1.80	0.168	0.062	0.0178	0.049	0.0026	0.028	0.0061	0.042	0.0199	0.0102	. . .	100g
CRM	C93 X S30 APR30C	33.0	0.96	0.28	0.008	0.018	0.021	0.003	0.0053	0.009	0.010	. . .	. . .	rem	100g

C10. Titanium Base

Chippings

10.1 Various Titanium Alloys		Al	Mo	Si	Sn	Zr	V	Fe	Nb	B	Cr	Cu	W	Ni	N	C	Typical Alloy Type	Size
	C101 P 3180A	6.5	. . .	. . .	. . .	. . .	4.08	0.19	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	318	50g
	C101 P 5510A	4.04	3.8	0.48	3.89	. . .	. . .	0.05	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	551	50g
	C101 P 6790A	2.35	1.0	0.2	10.88	4.88	. . .	0.02	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	679	50g
	C101 P 6850A	6.11	0.48	0.21	. . .	5.05	. . .	0.02	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	685	50g
	C101 P 8290A	5.62	0.25	0.28	3.49	2.98	. . .	0.02	0.97	. . .	. . .	. . .	. . .	. . .	. . .	. . .	829	50g
	C101 P 8110A	7.97	0.97	. . .	. . .	. . .	1.02	0.08	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	811	50g
CRM	C101 A 356	6.25	0.0020	(0.0200)	(0.0155)	<0.0005	4.05	0.124	. . .	<0.0005	0.01123	0.0055	(0.0010)	0.0070	0.0103	. . .		50g
CRM	C101 A 357	5.46	0.053	(0.0500)	(0.0620)	(0.0455)	3.53	0.202	. . .	(0.0013)	0.0521	0.0537	(<0.001)	0.0511	0.0148	. . .		50g
CRM	C101 CG 02501	6.42	2.53	0.28	. . .	0.276	. . .	0.473	. . .	. . .	1.55	. . .	. . .	. . .	0.010	0.013		50g
CRM	C101 CG 02502	6.33	3.40	0.275	. . .	1.71	. . .	0.057	. . .	. . .	. . .	. . .	. . .	. . .	0.021	0.0123		50g

C11. Cobalt Base

Chippings

11.1 - 11.9 Various Cobalt Alloys		C	Si	S	Mn	Ni	Cr	W	Nb	Fe	Cu	Pb	Sn	Mo	Al	B	Co	N	Size
	C111 X 126670A	0.38	0.064	. . .	0.97	1.12	19.7	10.2	1.53	2.20	0.11	0.03	0.10	. . .	. . .	. . .	. . .	. . .	30g
	C111 X 126690A	0.51	0.62	. . .	0.54	0.57	22.7	12.3	2.59	1.2	0.006	0.001	0.01	. . .	. . .	. . .	. . .	. . .	30g
	C112 X 149360A	0.50	0.12	. . .	0.74	1.57	23.0	0.95	. . .	0.44	. . .	. . .	. . .	4.97	0.50	. . .	. . .	. . .	30g
	C112 X 149430A	0.23	0.72	. . .	1.21	0.09	30.7(1)	0.07	. . .	0.18	. . .	. . .	. . .	8.0(3)	<0.01	. . .	. . .	. . .	30g
	C113 X X4010A	0.53	1.25	. . .	0.20	11.5(1)	26.9	7.14	. . .	0.65	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30g
	C113 X X4020A	0.42	0.28	. . .	1.13	9.64	24.75	7.95	. . .	2.17	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	30g
	C119 X COB10E	0.009	0.41	0.0015	0.52	22.8	24.3	11.1	. . .	16.4	<0.005				0.39	. . .	. . .	0.188	50g
CRM	C119 X ST30G	2.04	0.95	0.020	0.62	2.44	30.4	10.1	<0.05	1.48	0.026	(0.002)	(0.03)	0.45	. . .	0.0022	. . .	0.104	50g
CRM	C119 TI E378-1(C)	1.181	1.172	0.0055	0.0579	0.617	28.22	4.43	. . .	0.606	. . .	. . .	. . .	. . .	. . .	. . .	63.52	. . .	100g
CRM	C119 DB E328-1	0.390	0.629	0.003	1.395	20.38	20.54	4.16	3.61	2.40	0.013	. . .	. . .	4.41	0.070	. . .	41.65	0.027	100g

C13. Carbides

Chippings

13.1 Various Carbides		Total C	Free C	Ni	Co	Fe	Nb	Al	Ca	Cr	V	Ta	Ti	Type	Size
	C131 M BS107	6.14	(0.04)	0.0008	0.0013	0.008	(0.014)	0.0004	0.001	0.0014	0.15	. . .	. . .	Tungsten Carbide	100g
CRM	C131 A 352/1	6.154	0.036	. . .	. . .	0.0029	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Tungsten Carbide	100g
	C13 MA 307	6.16	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Tungsten carbide	150g
CRM	C131 B 276b	6.10	(0.04)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Tungsten Carbide	75g
CRM	C131 B 887	(5.5)	. . .	<0.01	10.35	<0.05	<0.05	. . .	. . .	. . .	. . .	. . .	<0.05	Cemented Carbide W83-Co10	100g
CRM	C131 B 888	(4.6)	. . .	<0.05	24.7	<0.05	<0.05	. . .	. . .	. . .	. . .	4.77	(0.04)	Cemented Carbide W64-Co25-Ta5	100g
CRM	C131 B 889	(6.0)	. . .	<0.05	9.50	<0.05	<0.05	. . .	. . .	. . .	. . .	4.03	4.03	Cemented Carbide W/Co/Ta/Ti	100g

17.1.1 Steel	ppm O	ppm N		Sample Form	Typical Alloy Type	Quantity
17 MA 644	3	171		1g Pins	Steel	100 pins
17 MA 645	60	58		1g Pins	Steel	100 pins
17 MA 646	31	677		1g Pins	Steel	100 pins
17 MA 1647	41	1797	**These values may**	1g Pins	Steel	100 pins
17 MA 1648	180	73	**change as the**	1g Pins	Steel	100 pins
17 MA 1649	n/.a	23	**batches are remade.**	1g Pins	Steel	101 pins
17 MA 1650	76	97		1g Pins	Steel	100 pins
17 MA 1651	64	213		1g Pins	Steel	100 pins
17 MA 1652	54	532		1g Pins	Steel	100 pins
17 MA 1653	14	34		1g Pins	Steel	100 pins
	These are nominal values. Exact chemistry is given with the product.				**Each grade is also available as 0.5g pins.**	
	Each pin is plated to ensure stable and accurate oxygen values					
17 DB E099-1	8	78		1g Balls	Ball-Bearing Steel	100 balls
17 DB E026-1	31	53		8mm Ø x 80mm Rod	Unalloyed	1 rod
17 DB E026-2	25	42		8mm Ø x 80mm Rod	Unalloyed	1 rod
17 DB E027-1	84	157		8mm Ø x 80mm Rod	Unalloyed	1 rod
17 DB E028-1	113	29		8mm Ø x 80mm Rod	Unalloyed	1 rod
17 DB E029-1	312	83		8mm Ø x 80mm Rod	Unalloyed	1 rod
17 DB E284-2	99	151		Chippings	Stainless Steel	100g

17.1.2 Steel	ppm H	ppm N	ppm O	Others	Sample Form	Typical Alloy Type	Quantity
17 MA 546	0.61	. . .	. . .		1g Pins	Steel	100 pins
17 MA 555	2.5	. . .	. . .		1g Pins	Steel	100 pins
17 MA 556	5.75	. . .	. . .		1g Pins	Steel	100 pins
17 MA 557	3.7	425	18		1.07g Pins	Steel	50 pins
		These pins are Ni plated. These are nominal values - exact chemistry is given with the product.					
17 M BSH0N	2.02	362.7	56.4	C 490ppm, S 25ppm	1g pins	AISI 302	250 pins
17 JS GS1D	1.7 ± 0.2	254	46.0 ± 3.8		5mm Ø x 230mm Rods		8 rods
17 JS GS2C	. . .	145	17.5		5mm Ø x 230mm Rods		8 rods
17 JS GS5C	. . .	29	125		5mm Ø x 230mm Rods		8 rods
17 JS GS6B	. . .	. . .	3.4		1.04g Pins		150 pins
17 CG 02606	6.5	. . .	. . .		2g Balls		100 pcs
17 CG 02607-2B	4.7	. . .	. . .		2g Balls		20 pcs
17 CG 02608	2.4	. . .	. . .		2g Balls		100 pcs
17 CG 02609		51	12		1g Balls		50 pcs
17 CM 3001	5.9	184	68				20 pcs
17 CM 3012-3	6.5	. . .	. . .		2g Balls		20 pcs
17 CM 3012-4	6.5	. . .	. . .		1g Balls		20 pcs
17 CM 3013	4.5	. . .	. . .		1g Balls		20 pcs
17 CM 3014-1	4.4	. . .	. . .		2g Balls		20 pcs
17 CM 3014-2	4.4	. . .	. . .		1g Balls		20 pcs
17 CM 3015-1	2.4	. . .	. . .		1g Balls		20 pcs
17 CM 3016-1	2.4	. . .	. . .		2g Balls		20 pcs
17 CM 3031	. . .	. . .	214		0.64g		20 pcs
17 CM 3032	. . .	360	187		1g Balls		20 pcs
17 CM 3033	. . .	184	64		1g Balls		20 pcs
17 CM 3034	. . .	231	39		1g Balls		20 pcs
17 CM 3036	. . .	256	62.4		0.5g Balls		20 pcs
17 CM 3037	. . .	100	137		0.45g Balls		20 pcs
17 CM 3038	. . .	297	244		0.5g Balls		20 pcs
17 CM 3039	. . .	204	353		0.5g Balls		20 pcs

		ppm O	% N	% Sol Al	% C	% Mn	% Si	% Cr	% Ni	Sample Form	Quantity
CRM	17 J 31	15	. . .	0.020	1.03	0.36	0.32	. . .	. . .	10mm Ø x 500mm Rod	1 rod
CRM	17 J 32	28	. . .	0.008	1.02	0.30	0.32	1.38	. . .	10mm Ø x 500mm Rod	1 rod
CRM	17 J 34	68	. . .	0.047	0.13	1.40	0.31	. . .	. . .	10mm Ø x 500mm Rod	1 rod
CRM	17 J 35	198	. . .	0.001	0.04	1.51	0.31	17.3	9.9	10mm Ø x 500mm Rod	1 rod

	ppm N	ppm O	ppm H		Sample Form	Quantity
17 S SS-1	5-10	410-450	. . .		0.5g Pins	100
17 S SS-2	10-20	100-120	. . .	**Nominal ranges.**	1.0g Pins	100
17 S SS-3	55-70	165-185	. . .	**Exact values will be**	1.0g Pins	100
17 S SS-4	135-145	10-15	. . .	**supplied with product**	1.0g Pins	100
17 S SS-6	10-20	580-640	. . .		1.0g Pins	100
17 S SS-5	. . .	. . .	6.5-8	**Nominal range.**	10g Rods	10
17 S SMN-11	4-6	. . .	. . .	**Nominal range.**	Chippings	150g
17 S SMO-10	. . .	1691	. . .		0.5g pin	100
CRM 17 S GS-3C	32	34.6	. . .		5mm Ø x 230mm Rod	1
CRM 17 J 47	76	1.1%	. . .		Powder	35g

17.2 Nickel		ppm O	ppm S	ppm N	ppm C	Sample Form	Typical Alloy Type	Quantity
CRM	172 F 099	8.4	. . .	1.1	. . .	2g Cubes	Pure Nickel	25 cubes
CRM	172 PN Ni/1	. . .	31	. . .	1260	Chippings	Nickel Alloy	100g
CRM	172 PN Ni/2	. . .	149	. . .	128	Chippings	Nickel Alloy	100g

17.3 Copper		ppm O	ppm S			Sample Form	Typical Alloy Type	Quantity
CRM	173 F 022A	138	. . .			26mm Ø x 9mm Disc	Electrolytic tough pitch	1 disc
CRM	173 F 022B	138	. . .			26mm Ø x 9mm Disc	Electrolytic tough pitch	1 rod
CRM	173 F 054R	0.47	. . .			26mm Ø x 9mm Disc	Low Oxygen	1 rod
CRM	173 F 058	390	. . .			26mm Ø x 9mm Disc	Continuous cast	1 rod
	173 MA 147	13	26	These values may		1g Pins		100 pins
	173 MA 148	498	12	change as the		1g Pins		100 pins
	173 MA 149	305	6	batches are remade.		1g Pins		100 pins

		ppm O	ppm S	ppm P	Sample Form	Quantity
	173 DB 379/1	38	. . .	. . .	40mm Ø x 30mm Disc	1 disc
	173 DB 379/2	212	. . .	. . .	40mm Ø x 30mm Disc	1 disc
	173 DB 379/3	378	. . .	. . .	40mm Ø x 30mm Disc	1 disc
CRM	173 PN Cu10/I	3.8	. . .	. . .	6mm Ø Rod	1 rod
CRM	173 PN Cu600/I	581	. . .	. . .	6mm Ø Rod	1 rod
CRM	173 PN CuS-10	. . .	7.5	. . .	Chippings	150g
CRM	173 PN CuS-20	. . .	23.1	. . .	Chippings	150g
CRM	173 F 017A	. . .	. . .	6.9	42mm Ø x 30mm Disc	1 disc
CRM	173 F 017B	. . .	10.4	. . .	Chippings	50g
	173 DB 373/1	. . .	. . .	33.8	50mm Ø x 30mm Disc	
	173 DB 373/2	. . .	. . .	226.5	50mm Ø x 30mm Disc	set only
	173 DB 373/3	. . .	. . .	455.7	50mm Ø x 30mm Disc	

17.5 Aluminium		ppm O	ppm C	ppm B	ppm H	Sample Form	Typical Alloy Type	Quantity
	175 US US1001	. . .	. . .	. . .	0.18	12mm Ø x 250mm Rod	Al-6Cu	1 rod
	175 US US1002	. . .	. . .	. . .	0.16	12mm Ø x 250mm Rod	Al-6Cu	1 rod
	175 US US1003	. . .	. . .	. . .	0.23	12mm Ø x 250mm Rod	Al-1Mg	1 rod
	175 US US1004	. . .	. . .	. . .	0.23	12mm Ø x 250mm Rod	Al-6Mg	1 rod

17.10 Titanium		ppm O	ppm N	ppm H		Sample Form	Typical Alloy Type	Quantity
CRM	1710 F 024B	608	117	. . .		0.4g cube	Pure Titanium	25 pcs
CRM	1710 F 024C	608	117	. . .		0.2g cube	Pure Titanium	25 pcs
CRM	1710 F 059A	1750	. . .	. . .		Ø 26mm x 9mm Disc	Ti 6Al 4V alloy	1 disc
CRM	1710 F 059B	1750	. . .	. . .		0.2g cube	Ti 6Al 4V alloy	25 pcs
CRM	1710 F 318	. . .	. . .	12.2		Ø 7mm x 1mm Disc	Pure Titanium	25 pcs
	1710 MA 637	597	101	16		0.1g Pins		100 pins
	1710 MA 642	1500	120	49	These values may	0.25g Pins		100 pins
	1710 MA 648	1238	49	142	change as the	0.1g Pins		100 pins
	1710 MA 649	810	119	200	batches are remade.	0.25g Pins		100 pins
	1710 MA 650	1913	330	62		0.25g Pins		100 pins
	1710 MA 651	1275	51	29		0.1g Pins		100 pins
	1710 CG 02601	. . .	170	. . .		Chippings	Pure Titanium	35g
	1710 CG 02602	. . .	200	. . .		Chippings	Ti 5Al 4V alloy	35g
	1710 CG 02604	2730	230	. . .		2x3x100mm Strip	Pure Titanium	3 strips
	1710 CG 02618	. . .	130	. . .		Chippings	Ti 15Al 3V alloy	20g

17.12 Zirconium		ppm O	ppm N	ppm C	ppm H	Sample Form	Typical Alloy Type	Quantity
CRM	1712 F 276	1541	41	107.6	. . .	4.5mm Ø x 2mm Pins	Zircaloy 4	100 pcs
	1712 MA 640	1480	51	. . .	11	0.10g Pins		100 pcs

18. Carbon,Sulphur & Nitrogen in Steels Chippings/Pins

18.1 Cast Iron	% C	% S		Sample Form	Typical Alloy Type	Weight
18 MA 301	2.12	0.01		Chippings	Cast	150g
18 MA 302	3.31	0.03		Chippings	Grey	150g
18 MA 303	3.95	0.01	**These pins are Ni plated.**	Chippings	Nodular	150g
18 MA 304	4.20	0.02	**These are nominal values.**	Chippings	Ductile	150g
18 MA 305	2.75	0.02	**Eact chemistry is given**	Chippings	Malleable	150g
18 MA 306	3.50	0.01	**with the product.**	Chippings	Nodular	150g
18 MA 309	3.70	0.01		Chippings	Nodular	150g
18 MA 310	3.38	0.10		Chippings	Cast	150g
18 MA 673	0.0004	0.001		Chippings	Pure Iron	454g

18.3 Steel	% C	% S	% N	Sample Form	Typical Alloy Type	Quantity
18 M BS CSN 2-1	0.476	0.034	0.064	1.00g Pins	AISI 440A	500 pins
18 M BS CSN 2-2	0.548	0.028	0.076	1.00g Pins	AISI 440A	500 pins
18 M BS CSN 3	0.892	0.0035	0.0047	1.00g Pins	Low Alloy	500 pins
18 M BS CSN 4	0.011	0.0008	0.026	1.00g Pins	AISI 302 mod	500 pins
18 M BS CS5	0.050	0.0040	. . .	1.00g Pins	AISI 304	500 pins
18 M BS CSN A	0.068	0.305	0.0081	Chippings	AISI 1213 mod	100g
18 M BS ST-626	0.068	0.020	0.0064	Pins	Carbon Steel	100pins
CRM **18 E 58**	0.294	0.019	. . .	Chippings	Carbon Steel	120g
CRM **18 E 59A**	0.497	0.027	. . .	Chippings	Carbon Steel	120g
CRM **18 E 60A**	0.715	0.012	. . .	Chippings	Carbon Steel	100g
18 J 36	0.0125	0.0126	0.0337	Chippings		150g
18 J 40	0.793	0.200	0.0344	Chippings		100g
CRM **18 S 243-5**	. . .	0.346	. . .	Chippings	Binary Alloy	150g
18 S CS-01	0.93	0.006	. . .	8mm Ø x 0.5g Ring,		200 pcs
18 S CS-11	0.93	0.006	. . .	8mm Ø Double Ring,		100 pcs
18 MA 947	0.389	0.094	0.0121	Chippings		150g
18 MA 948	0.534	0.089	0.0082	Chippings		150g
18 MA 949	0.018	0.028	0.0628	Chippings		150g
18 MA 950	0.071	0.013	0.0016	Chippings		150g
18 MA 951	0.179	0.023	0.0090	Chippings		150g
18 MA 952	0.449	0.024	0.0089	Chippings		150g
18 MA 953	0.968	0.013	0.0078	Chippings		150g
18 MA 954	0.405	0.022	0.0076	Chippings		150g
18 MA 955	0.203	0.021	0.0085	Chippings		150g
18 MA 956	0.450	0.297	0.0060	Chippings		150g
18 MA 957	0.183	0.106	0.0083	Chippings		150g
18 MA 958	0.057	0.027	0.0517	Chippings		150g
18 MA 959	0.019	0.023	0.0742	Chippings		150g
18 MA 960	0.105	0.0006	0.0403	Chippings		150g
18 MA 961	0.0194	0.0161	0.0499	Chippings		150g
18 MT 088A	0.0151	0.00045	. . .	2g Pins	T-302 HQ	200 pins

19.2 Rocks

		SiO_2	Al_2O_3	Fe_2O_3	FeO	Fe	MgO	CaO	Na_2O	K_2O	CO_2	TiO_2	P_2O_5	MnO	S	Pb	
	192 BG COD 89	56.28	16.58	6.51	3.28	...	2.84	5.56	3.39	4.76	0.20	0.60	0.223	0.125	...	...	
	192 BG COD 36a	47.67	18.51	6.74	3.98	...	8.42	14.92	1.43	0.25	...	0.50	0.054	0.137	...	...	continued
	192 BG COD 161a	55.40	13.23	6.09	...	...	1.69	3.70	1.48	4.10	3.16	0.42	0.27	1.11	2.29	1.73	
CRM	192 B 2780	...	16.75	...	...	2.784	0.888	0.273	0.298	4.07	...	(1.20)	(0.096)	(0.060)	1.263	0.577	continued

Continuation from above	All Elements ppm Ba	Ce	Cr	Co	Cu	Ga	La	Li	Ni	Rb	Sr	V	
192 BG COD 89	443	...	27	14	97	...	...	20	...	167	461	130	
192 BG COD 36a	...	...	101	30	97	...	...	...	63	...	...	190	continued
192 BG COD 161a	2180	75	610	14	1940	15	38	38	13	221	277	61	
192 B 2780	(993)	(64)	(44)	(2.2)	(215.5)	(26)	(38)	(18)	(12)	(175)	(217)	(268)	continued

Continuation from above	All Elements ppm Zn	Zr	Mo	Ag	As	Cd	Sc	Yb	Cs	Cl	Hg	% L.O.I.	Type	Size
192 BG COD 89a	58	122	2.5	...	...	...	17	...	...	...	...	3.29	Monzonite	50g
192 BG COD 36b	58	...	...	...	...	...	...	...	...	...	...	...	Gabbro	50g
192 BG COD 161b	2.44%	181	20	12.8	61	190	...	2.1	12.1	...	...	...	Pb-Zn Sulphide Ore	50g
192 B 2780	2570	(176)	(11)	(27)	48.8	12.10	(23)	...	(13)	...	0.710	...	Hard Rock Mine Waste	50g

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	TiO_2	P_2O_5	MnO	Na_2O	K_2O	S	H_2O	CO_2	Type	Size
CRM	192 A FER-1	16.95	0.52	(49.88)	(23.34)	0.30	3.29	0.03	2.39	0.22	0.03	0.02	0.26	0.41	1.39	Iron Formation	100g
CRM	192 A FER-2	49.21	5.16	22.5	15.24	2.10	2.17	0.18	0.27	0.12	0.57	1.33	0.17	0.98	0.07	Iron Formation	100g
CRM	192 A FER-3	53.61	0.09	(29.4)	(13.63)	1.02	0.84	0.01	0.07	0.08	0.03	0.03	(0.03)	(0.20)	1.20	Iron Formation	100g
CRM	192 A FER-4	50.07	1.70	22.7	15.54	1.41	2.23	0.07	0.13	0.19	0.05	0.29	0.11	0.72	4.86	Iron Formation	100g

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	TiO_2	P_2O_5	MnO	Na_2O	K_2O	Cr_2O_3	H_2O	CO_2	
	192 CG 07101	34.34	0.67	(4.21)	(2.42)	41.03	0.10	0.008	0.004	0.068	0.008	0.010	1.57	14.17	0.58	continued
	192 CG 07102	37.75	0.21	(4.85)	(1.97)	38.34	1.80	0.004	0.003	0.097	0.028	0.009	0.42	12.69	1.66	
CRM	192 A UM-2	(39.2)	(7.23)	...	...	(25.45)	(4.68)	(0.24)	(0.02)	(0.08)	(0.32)	(0.11)	(1.51)	(6.27)	(0.10)	continued
CRM	192 A UM-4	39.35	8.89	...	...	22.5	6.79	0.35	0.02	0.15	0.45	0.18	2.59	(4.86)	0.26	

Continuation from above	S	NiO	CoO	V_2O_5	Cl	ZnO	CuO		Type	Size
192 CG 07101	0.051	0.32	0.012	0.007	0.57	...	...		Ultrabasic	150g
192 CG 07102	0.008	0.30	0.013	0.003	0.022	...	...	Plus another 39 elements	Ultrabasic	150g
192 A UM-2	(0.94)	0.29	0.012	...	...	(0.004)	0.095		Sulfide-ultramafic	100g
192 A UM-4	0.44	0.19	0.007	...	...	0.008	0.054		Sulfide-ultramafic	100g

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	TiO_2	P_2O_5	MnO	Na_2O	K_2O	H_2O	CO_2	Total L.O.I.		Type	Size
	192 CG 03104	69.63	14.82	5.67	(0.40)	0.67	0.22	0.68	0.043	0.024	0.20	3.76	(3.71)	0.13	4.17		Shale	50g
	192 CG 03116	66.26	18.63	0.19	...	0.054	0.76	0.048	...	...	3.69	9.6	...	...	...		Feldspar	50g
	192 CG 03124	60.64	20.05	1.37	0.28	0.13	0.52	0.12	0.020	0.050	8.97	5.06	...	...	2.37		Nepheline Syenite	50g
	192 CG 03125	39.42	29.67	0.33	1.24	0.92	5.98	0.14	0.072	0.031	12.59	4.72	...	2.97	...		Nepheline Syenite	50g
	192 CG 03126	66.84	23.58	1.94	...	0.087	0.17	0.70	0.20	0.004	0.34	0.38	4.15	...	5.48		Pyrophyllite	50g
	192 CG 03127	70.34	22.20	0.220	...	0.041	0.066	0.18	0.11	0.0040	0.043	0.028	5.57	...	6.34		Pyrophyllite	50g
	192 CG 07103	72.83	13.40	2.14	1.02	0.42	1.55	0.287	0.091	0.060	3.13	5.01	0.60	0.15	...		Granite	70g
	192 CG 07104	60.62	16.17	4.90	2.39	1.72	5.20	0.52	0.23	0.08	3.86	1.89	1.50	3.47	...	Each	Andesite	70g
	192 CG 07105	44.64	13.83	13.4	7.60	7.77	8.81	2.37	0.93	0.17	3.38	2.32	2.86	...	...	with	Basalt	70g
	192 CG 07106	90.36	3.52	3.22	0.61	0.082	0.30	0.263	0.218	0.020	0.061	0.65	1.01	0.19	...	50+	Sandstone	70g
	192 CG 07107	59.23	18.82	7.60	1.39	2.01	0.60	...	0.155	0.022	0.35	4.16	5.60	0.077	...	other	Shale	70g
	192 CG 07109	54.48	17.72	6.04	1.23	0.65	1.39	0.48	0.018	0.12	7.16	7.48	2.38	0.26	...	elements	Syenite	100g
	192 CG 07110	63.06	16.1	4.51	0.19	0.84	2.47	0.80	0.36	0.089	3.06	5.17	1.79	1.03	...	certified	Andesite	100g
	192 CG 07111	59.68	16.56	2.64	3.08	2.81	4.72	0.77	0.34	0.094	4.05	3.50	0.88	0.15	...	at the	Granodiorite	100g
	192 CG 07112	35.69	14.14	9.90	13.36	5.25	9.86	7.69	0.028	0.193	2.11	0.15	1.09	0.12	...	ppm	Gabbro	100g
	192 CG 07113	72.78	12.96	1.14	1.86	0.16	0.59	0.30	0.045	0.14	2.57	5.43	1.18	0.52	...	Level	Rhyolite	100g
CRM	192 A 375/1	69.24	17.88	0.291	...	0.180	0.78	0.312	0.226	...	8.89	1.47	...	...	0.72		Soda-Feldspar	100g
	192 S JA-1b	63.97	15.22	2.59	3.98	1.57	5.70	0.85	0.165	0.157	3.84	0.77	0.72	...	...		Andesite	20g
	192 S JA-2	56.42	15.41	2.16	3.69	7.60	6.29	0.66	0.146	0.108	3.11	1.81	1.12	...	...		Andesite	20g
	192 S JA-3	62.27	15.56	1.15	4.83	3.72	6.24	0.70	0.116	0.104	3.19	1.41	0.20	...	...		Andesite	20g
	192 S JB-1b	51.11	14.38	3.29	5.16	8.14	9.6	1.26	0.256	0.147	2.63	1.32	1.53	...	...	with	Basalt	100g
	192 S JB-2	53.25	14.64	3.33	9.98	4.62	9.82	1.19	0.101	0.218	2.04	0.42	0.25	...	...	50+	Basalt	20g
	192 S JB-3	50.96	17.20	3.20	7.85	5.19	9.79	1.44	0.294	0.177	2.73	0.78	0.18	...	...	other	Basalt	20g
	192 S JF-1	66.69	18.08	0.06	<0.04	0.006	0.93	0.005	0.01	0.001	3.37	9.99	0.23	...	...	elements	Feldspar	100g
	192 S JF-2	65.30	18.52	0.06	<0.03	0.004	0.09	0.005	0.003	0.001	2.39	12.94	0.24	...	...	certified	Feldspar	100g
	192 S JG-1	72.30	14.24	0.38	1.61	0.74	2.20	0.26	0.099	0.063	3.38	3.98	0.54	...	...	at the	Granodiorite	20g
	192 S JG-1a	72.30	14.30	0.51	1.36	0.69	2.13	0.25	0.083	0.057	3.39	3.96	0.59	...	...	ppm	Granodiorite	20g
	192 S JG-2	76.83	12.47	0.33	0.57	0.037	0.70	0.044	0.002	0.016	3.54	4.71	0.33	...	...	Level	Granite	20g
	192 S JG-3	67.29	15.48	1.62	1.83	1.79	3.69	0.48	0.122	0.071	3.96	2.64	0.67	...	...		Granodiorite	100g
	192 S JGb-1	43.66	17.49	4.79	9.43	7.85	11.90	1.60	0.056	0.189	1.20	0.24	1.28	...	...		Gabbro	20g
	192 S JGb-2	46.47	23.48	0.62	5.41	6.18	14.10	0.56	0.017	0.13	0.92	0.059	1.46	...	...		Gabbro	100g
	192 S JP-1	42.38	0.66	1.98	5.99	44.60	0.55	0.006	0.002	0.121	0.021	0.003	2.39	...	...		Peridotite	20g

19.2 Rocks (continued)

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	TiO_2	P_2O_5	MnO	F	Others	Type	Size
	192 S JH-1	48.18	5.66	1.39	8.09	16.73	15.02	0.71	0.53	1.82	. . .	0.67	0.099	0.19	. . .	Each with	Hornblendite	100g
	192 S JSI-1	59.47	17.60	1.875	4.523	2.413	1.479	2.184	2.845	3.92	0.769	0.725	0.202	0.0599	0.0598	~50 other	Slate	100g
	192 S JSI-2	59.45	18.17	0.959	5.048	2.385	1.885	1.344	3.008	4.158	1.236	0.754	0.164	0.0818	0.0678	elements	Slate	100g
	192 S JCh-1	97.81	0.734	0.272	0.0867	0.0754	0.0449	0.0305	0.221	0.356	0.055	0.0316	0.0167	0.0173	0.0134	certified	Chert	20g
	192 S JR-1	75.45	12.83	0.35	0.49	0.12	0.67	4.02	4.41	1.16	. . .	0.11	0.021	0.099	0.0991	at the	Rhyolite	20g
	192 S JR-2	75.69	12.72	0.27	0.44	0.04	0.50	3.99	4.45	1.19	. . .	0.07	0.012	0.112	0.1109	ppm or ppb	Rhyolite	20g
	192 S JR-3	72.76	11.90	2.61	1.86	0.050	0.093	4.69	4.29	0.72	. . .	0.21	0.017	0.083	. . .	level	Rhyolite	100g
	192 S JSy-1	60.02	23.17	. . .	. . .	0.016	0.25	10.74	4.82	. . .	. . .	0.0015	0.014	0.0024	. . .		Syenite	100g
	192 S JCRM R651	21.74	71.7	1.48	. . .	0.10	0.19	0.03	0.65	. . .	. . .	3.15	0.19	. . .	. . .	+ Zr, LOI	Aluminous Shale	100g
	192 S JCRM R802	60.7	32.3	0.23	. . .	<0.01	0.04	0.09	0.07	. . .	. . .	0.19	0.05	. . .	. . .	LOI 6.0	Pyrophillite	50g
	192 S JCRM R901	59.77	0.924	1.224	. . .	31.22	0.438	0.054	0.004	. . .	. . .	0.019	0.195	0.004	. . .	LOI 6.14	Talc	50g
	192 S JCRM R902	60.77	0.115	0.091	. . .	31.97	0.342	0.006	0.003	. . .	. . .	0.004	0.046	(0.002)	. . .	LOI 6.64	set only	50g
	192 S JCRM R903	55.76	2.447	0.564	. . .	31.84	0.998	0.029	0.007	. . .	. . .	0.075	0.051	(0.003)	. . .	LOI 8.23		50g
CRM	**192 A SY4**	49.9	20.69	6.21	2.86	0.54	8.05	7.10	1.66	(1.0)	3.5	0.287	0.131	0.108	(0.06)	Many others	Diorite	100g
CRM	**192 LI Zeo 1**	67.11	12.21	1.75	. . .	1.41	4.51	0.612	2.19	. . .	. . .	0.190	0.055	0.045	. . .		Natural Zeolite	50g
CRM	**192 E 18B**	1.15	0.35	0.21	. . .	1.65	52.6	0.14	0.23	. . .	. . .	. . .	35.7	. . .	. . .		Phosphate	100g
CRM	**192 A SA 32**	(0.4)	(0.05)	0.14	. . .	0.50	54.44	. . .	. . .	. . .	1.61	. . .	39.96	. . .	2.49		Phosphate	100g
CRM	**192 A SA 34**	39.04	59.15	0.75	. . .	0.13	(0.13)	0.093	0.24	. . .	. . .	0.17	. . .	. . .	. . .		Andalusite	100g
CRM	**192 B 120c**	5.5	1.30	1.08	. . .	0.32	48.02	0.52	0.147	. . .	3.27	0.103	33.34	0.027	3.82	+ U, V	Florida Phosphate	90g
CRM	**192 B 694**	11.2	1.8	0.79	. . .	0.33	43.6	0.86	0.51	. . .	. . .	(0.11)	30.2	0.0116	3.2	+ U, V	Western Phosphate	90g
CRM	**192 A SA 1**	75.70	12.08	(0.6)	1.30	(0.06)	0.78	3.36	4.99	0.49	(0.10)	. . .	. . .	0.02	0.42			
CRM	**192 A SA 2**	63.63	17.34	1.11	0.30	0.46	0.68	0.43	15.35	0.22	0.09	. . .	0.12	0.01	. . .			
CRM	**192 A SA 3**	52.40	13.64	8.78	1.13	0.28	3.22	8.37	5.51	2.31	0.17	0.48	0.06	0.77	0.44	continued		
CRM	**192 A SA 4**	52.64	16.50	(0.8)	7.47	7.50	11.50	2.46	0.25	0.33	(0.10)	0.20	(0.03)	0.18	. . .			
CRM	**192 A SA 5**	51.10	4.18	0.87	10.59	25.33	2.66	0.37	0.09	0.26	(0.08)	0.20	0.02	0.22	. . .			
CRM	**192 A SA 6**	38.96	(0.3)	0.71	14.63	43.51	0.28	(0.04)	(0.01)	0.30	0.40	. . .	. . .	0.22	. . .			
CRM	**192 A SA 39**	33.44	4.29	9.29	(4.0)	26.24	9.69	(0.5)	1.04	. . .	. . .	1.58	1.46	0.17	. . .			
CRM	**192 A SA 40**	3.08	0.41	2.75	(0.4)	1.97	49.77	(0.05)	(0.03)	. . .	. . .	0.05	2.05	0.18	. . .			
CRM	**192 A SA 41**	56.67	13.50	4.23	(0.3)	8.10	1.50	0.93	1.39	. . .	. . .	0.55	0.05	0.06	. . .			
CRM	**192 A SA 44**	34.84	58.80	2.06	(1.0)	(0.1)	0.14	(0.05)	0.18	. . .	. . .	1.83	0.10	0.03	. . .	continued		
CRM	**192 A SA 45**	49.62	26.22	12.6	(10.0)	3.39	0.78	0.84	3.18	. . .	. . .	1.82	0.08	0.10	. . .			
CRM	**192 A SA 47**	36.30	1.09	4.14	(0.4)	42.09	(0.1)	(0.05)	(0.02)	. . .	. . .	(0.01)	(0.02)	0.06	. . .			
CRM	**192 A SA 48**	67.11	11.24	0.58	(0.2)	0.18	8.90	3.22	4.26	. . .	. . .	0.10	(0.09)	0.02	. . .			
CRM	**192 A SA 50**	51.56	15.28	11.0	8.49	7.57	10.80	2.30	0.61	. . .	. . .	0.86	0.15	0.17	. . .			
CRM	**192 PI AC1**	1.22	(0.77)	(0.71)	. . .	(0.072)	45.8	0.52	(0.25)	. . .	. . .	0.49	. . .	0.41	. . .	continued		

Continuation	All Elements ppm												
from above	Ba	Ce	Cr	Co	Cu	Ga	La	Li	Nb	Ni	P	Pb	
192 A SA 1	(120)	195	12	. . .	12	27	109	(12)	53	(8)	. . .	40	
192 A SA 2	2400	12	12	(3)	19	11	(5)	. . .	. . .	(7)	520	(5)	
192 A SA 3	450	(240)	(10)	. . .	13	(54)	(250)	(48)	960	. . .	260	43	continued
192 A SA 4	102	(6)	(30)	58	14	16	(3)	. . .	. . .	120	(130)	. . .	
192 A SA 5	46	. . .	24000	110	18	(8)	(2)	. . .	. . .	555	90	. . .	
192 A SA 6	(10)	. . .	2900	208	10	. . .	(0.2)	. . .	. . .	2040	(40)	(40)	
192 A SA 39	1700	(85)	. . .	77	58	(10)	. . .	. . .	110	994	. . .	(25)	
192 A SA 40	(310)	(160)	(35)	(20)	(10)	(10)	. . .	. . .	(10)	(250)	. . .	(20)	
192 A SA 41	820	(60)	123	(15)	53	(20)	. . .	. . .	8	122	. . .	(30)	
192 A SA 44	(50)	(220)	384	(8)	(10)	(55)	. . .	. . .	96	(15)	. . .	(30)	continued
192 A SA 45	(900)	(100)	256	41	11	(35)	. . .	. . .	27	80	. . .	(20)	
192 A SA 47	(75)	(20)	. . .	79	(5)	(5)	. . .	. . .	. . .	2221	. . .	(60)	
192 A SA 48	(290)	(850)	23	. . .	(10)	. . .	. . .	. . .	202	. . .	. . .	135	
192 A SA 50	220	(30)	357	40	84	. . .	. . .	. . .	(10)	(85)	. . .	(25)	
192 PI AC1	767	3326	(13)	2.72	54.0	. . .	2176	. . .	. . .	(9)	. . .	. . .	continued

Continuation	All Elements ppm												
from above	Rb	S	Sr	Th	Ti	V	Zn	Zr	Cl	Y	Others	Type	Size
192 A SA 1	325	. . .	10	51	540	(2)	50	300	. . .	143	Eu, Nd, Yb	Granite	100g
192 A SA 2	530	. . .	62	1	265	10	(10)	(33)	. . .	. . .	Eu	Syenite	100g
192 A SA 3	190	(650)	4600	66	2900	81	395	11000	1200	22	Eu, Nd, U,	Lujavrite	100g
192 A SA 4	. . .	. . .	260	. . .	1200	220	68	(23)	(23)	(7)	Eu	Norite	100g
192 A SA 5	. . .	. . .	32	. . .	1200	230	100	. . .	. . .	(5)	Eu	Pyroxenite	100g
192 A SA 6	. . .	. . .	(3)	. . .	120	40	90	. . .	. . .	. . .		Dunite	100g
192 A SA 39	52	(1500)	1400	(10)	. . .	109	70	239	. . .	17		Kimberlite	100g
192 A SA 40	(10)	(500)	1600	(12)	. . .	27	25	87	. . .	33		Carbonatite	100g
192 A SA 41	59	(1500)	54	(12)	. . .	139	76	146	. . .	17		Carbonaceous Shale	100g
192 A SA 44	13	(300)	5	50	. . .	395	271	406	. . .	84		Sillimanite Schist	100g
192 A SA 45	142	(500)	92	(21)	. . .	266	74	322	. . .	63		Kinzingite	100g
192 A SA 47	. . .	(200)	(3)	. . .	. . .	(16)	45	. . .	. . .	(5)		Serpentinite	100g
192 A SA 48	291	. . .	29	113	. . .	(8)	53	300	. . .	436		Fluorspar Granite	100g
192 A SA 50	14	(300)	195	(6)	. . .	216	81	86	. . .	23		Dolerite	100g
192 PI AC1	. . .	. . .	(2.0)	21.8	. . .	104	38.0	(51)	. . .	272	Many	Apatite	50g

19.3 Soils

		Si	Al	Ca	Fe	K	Mg	Mn	Na	P	Ti	ppm As	ppm Ba	ppm Cd	ppm Ce	ppm Co	ppm Cr	
CRM	**193 A SO-2**	24.99	8.07	1.96	5.56	2.45	0.54	0.072	1.9	0.3	0.86	. . .	966	. . .	. . .	9	16	
CRM	**193 A SO-3**	15.86	3.05	14.63	1.51	1.61	4.98	0.052	0.74	0.048	0.2	. . .	296	. . .	. . .	8	26	continued
	193 A TILL-1	28.4	7.3	1.94	4.77	1.84	1.29	0.14	2.01	0.10	0.59	18	702	. . .	71	18	65	
	193 A TILL-2	28.4	8.5	0.91	3.77	2.55	1.10	0.08	1.62	0.07	0.53	26	540	. . .	98	15	74	continued
	193 A TILL-3	32.2	6.5	1.88	2.74	2.01	1.03	0.05	1.96	0.05	0.29	87	489	. . .	42	15	123	
	193 A TILL-4	30.3	7.6	0.89	3.94	2.70	0.76	0.05	1.83	0.09	0.49	111	395	. . .	78	8	53	
	193 S JSO-1	17.91	9.56	1.82	7.97	0.28	1.27	0.153	0.50	0.21	0.90	8.1	267	. . .	. . .	32	71	continued
	193 S JSO-2	19.71	11.30	0.78	7.31	1.29	1.00	0.136	0.76	0.07	0.84	1076	352	. . .	. . .	1071	1118	
	193 S JSAC 0401	(35.0)	(6.5)	. . .	(3.0)	(1.7)	. . .	0.0266	. . .	. . .	(0.38)	10.62	(410)	4.25	(62)	(6.2)	50.4	continued
	193 S JSAC 0411	. . .	(7.6)	. . .	(3.3)	(0.64)	. . .	0.0943	. . .	. . .	(0.32)	11.3	(250)	0.274	(43)	(6.5)	23.5	
	193 CG 08302	30.57	7.11	2.59	3.34	2.12	1.53	0.068	1.52	0.086	0.40	3.8	509	0.081	83.6	13.1	60.8	continued
	193 CG 08303	25.9	6.86	4.79	2.79	1.57	1.30	0.0051	1.10	0.16	0.36	10.6	724	1.20	. . .	13.0	112	
CRM	**193 B 2586**	29.15	6.652	2.218	5.161	0.9760	1.707	0.1000	0.4680	0.1001	0.6050	8.7	413	2.71	58.0	. . .	301	
CRM	**193 B 2587**	33.13	5.860	0.927	2.813	1.583	0.669	0.0651	1.127	0.0970	0.3920	13.7	568	1.92	. . .	. . .	92	
CRM	**193 B 2709**	29.66	7.50	1.89	3.50	2.03	1.51	0.0538	1.16	0.062	0.342	17.7	968	0.38	(42.0)	13.4	130	continued
CRM	**193 B 2710**	28.97	6.44	1.25	3.38	2.11	0.853	1.01	1.14	0.106	0.283	626	707	21.8	(57)	(10)	(39)	
CRM	**193 B 2711**	30.44	6.53	2.88	2.89	2.45	1.05	0.0638	1.14	0.086	0.306	105	726	41.70	(69)	(10)	(47)	
CRM	**193 LI 12.1.07**	(25.0)	(9.0)	(0.69)	3.73	3.08	(0.59)	0.09	(0.3)	(0.13)	(0.55)	. . .	582.0	0.214	. . .	15.4	79.8	
CRM	**193 LI 12.1.08**	(31.0)	(5.77)	(0.49)	2.7	1.85	(0.63)	0.091	(0.8)	(0.1)	(0.5)	. . .	365.0	0.198	. . .	11.9	87.4	continued
CRM	**193 LI 12.1.09**	(20.0)	(7.48)	(6.34)	3.73	2.63	(1.19)	0.073	(0.45)	(0.14)	(0.38)	. . .	315.0	0.285	. . .	15.6	75.3	
CRM	**193 SA 42**	34.61	5.31	0.64	3.27	0.37	1.16	0.08	(0.11)	(0.02)	0.22	. . .	(250.0)	. . .	. . .	35.0	430.0	continued

Continuation from above	All Elements ppm Cu	Hg	Ni	Pb	Rb	Sr	V	Zn	Zr	Y	Others	Type	Size
193 A SO-2	7	0.082	8	21	78	340	64	124	. . .	. . .		Podzolic B Horizon	200g
193 A SO-3	17	0.017	16	14	39	217	38	52	. . .	. . .		Calcereous C Horizon	200g
193 A TILL-1	47	. . .	24	22	44	291	99	98	502	. . .		Soil	100g
193 A TILL-2	150	. . .	32	31	143	144	77	130	390	. . .		Till	100g
193 A TILL-3	22	. . .	39	26	55	300	62	56	230	. . .		Soil	100g
193 A TILL-4	237	. . .	17	50	161	109	67	70	385	. . .		Till	100g
193 S JSO-1	169	. . .	39	13	14.5	196	300	105	96	24.9			100g
193 S JSO-2	1276	. . .	1070	1087	62.5	87	1345	1174	1161	1090			100g
193 S JSAC 0401	15.3	. . .	18.9	26	(88)	. . .	65.0	66.8	. . .	. . .	Se, Be	Brown Soil	50g
193 S JSAC 0411	26.7	. . .	11	18.9	(49)	(60)	68.6	64.6	. . .	. . .	Se, Be	Volcanic Ash Soil	50g
193 CG 08302	24.6	0.018	31.1	14.2	135	163	77.5	58.0	. . .	. . .	many	Tibetan	15g
193 CG 08303	120	2.15	40	73	60	405	. . .	260	. . .	. . .	La, Th, U	Polluted farmland	40g
193 B 2586	. . .	0.367	. . .	432	. . .	84.1	. . .	352	. . .	. . .	Nd, Yb	Urban	55g
193 B 2587	. . .	0.290	. . .	3242	. . .	126	. . .	335.8	. . .	. . .		Urban (contaminated)	55g
193 B 2709	34.6	1.40	88	18.9	(96)	231	112	106	(160)	(18)	many	San Joaquin	50g
193 B 2710	2950	32.6	14.3	5532	(120)	(330)	76.6	6952	. . .	(23)	many	Montana - elevated traces	50g
193 B 2711	114	6.25	20.6	1162	(110)	245.3	81.6	350.4	(230)	(25)	many	Montana - elevated traces	50g
193 LI 12.1.07	30.0	0.171	30.8	19.6	(200)	(82.0)	98.3	88.8	(350)	. . .	many	Eutric Cambisol	50g
193 LI 12.1.08	21.2	0.078	40.0	18.9	(100)	107.0	(87.5)	63.7	(500)	. . .	many	Orthic Luvisol	50g
193 LI 12.1.09	30.9	0.087	37.4	41.3	(100)	274.0	89.7	119.0	(200)	. . .	many	Rendzina	50g
193 A SA 42	17.0	. . .	125.0	(10.0)	22.0	37.0	94.0	44.0	192.0	11.0	many		100g

	SiO_2	Al_2O_3	CaO	Fe_2O_3	K_2O	MgO	MnO	Na_2O	P_2O_5	TiO_2	L.O.I.	
193 BG COD 310	46.08	11.36	14.83	3.92	2.26	3.15	0.1	1.24	0.2	0.43	. . .	
193 BG COD 311	66.7	13.72	2.9	4.09	2.72	1.68	0.097	2.19	0.15	0.5	4.98	continued
193 BG COD 312	56.52	13.78	7.39	4.56	2.34	2.3	0.099	1.92	0.2	0.52	9.64	

Continuation from above	All Elements ppm Be	Cu	Cr	Cd	As	Co	Li	Pb	Mo	Ni	V	Zn	Type	Size
193 BG COD 310A	2.39	49.82	103.5	4.59	9.24	11.34	21.95	120.27	5.74	63.11	85.75	269.75	Meadow Soil	50g
193 BG COD 311A	2.4	72.0	68.0	. . .	7.02	10.7	21.25	51.0	1.48	39.0	87.2	74.0	Meadow Soil	50g
193 BG COD 312A	2.52	88.15	52.5	0.67	6.54	12.5	24.1	88.0	. . .	52.0	85.35	126.3	Meadow Soil	50g

19.3 Soils (continued)

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	H_2O	CO_2	Organic C	L.O.I.		Size
	193 CG 07401	62.6	14.18	5.19	(1.27)	1.81	1.72	1.66	2.59	(4.99)	(1.13)	(1.8)	(8.59)		70g
	193 CG 07402	73.35	10.31	3.52	(0.56)	1.04	2.36	1.62	2.54	(2.86)	(0.97)	(0.49)	(4.41)		70g
	193 CG 07403	74.72	12.24	2.0	(0.48)	0.58	1.27	2.71	3.04	(1.91)	(0.13)	0.5	(2.65)		70g
	193 CG 07404	50.95	23.45	10.3	(0.41)	0.49	0.26	0.11	1.03	(10.13)	(0.12)	(0.62)	(10.88)	Plus another 61 elements	70g
	193 CG 07405	52.57	21.58	12.62	(0.22)	0.61	(0.095)	0.122	1.5	(8.81)	(0.096)	(0.32)	(9.14)	all certified at ppm levels	70g
	193 CG 07406	56.93	21.23	8.09	(0.57)	0.34	0.22	0.19	1.7	(8.9)	(0.084)	(0.806)	(10.0)		70g
	193 CG 07407	32.69	29.26	18.76	(1.05)	0.26	0.16	0.074	0.2	(13.73)	(0.11)	(0.64)	(14.3)		70g
	193 CG 07408	58.61	11.92	4.48	(1.2)	2.38	8.27	1.72	2.42	(3.28)	(5.97)	0.31	(9.15)		70g
	193 CG 07409	73.28	12.91	2.08	. . .	0.49	1.35	3.31	3.37	. . .	. . .	. . .	. . .	Plus another ~50 elements	50g
	193 CG 07410	65.64	14.55	4.6	. . .	1.25	1.42	1.9	2.59	. . .	. . .	. . .	. . .	all certified at ppm levels	50g
	193 CG 07411	47.96	12.04	7.97	. . .	3.71	4.33	1.1	2.03	. . .	. . .	. . .	. . .		50g

		All Elements ppm														
		Al	Sb	As	Ba	Be	Cd	Ca	Cr	Co	Cu	Fe	Pb	Mg	Mn	
	193 GL 021	2725	4955	25	586	. . .	1	5426	11	. . .	4792	6481	. . .	. . .	174	continued
	193 GL 027	9149	. . .	12.4	166	2.73	12.0	5970	26.9	4.7	9.87	11173	51.9	2755	259	
	193 GL 6135	22700	. . .	70	305	1.4	. . .	23400	455	20	107	47500	411	9400	390	continued

	Continuation	All Elements ppm													
	from above	Hg	Mo	Ni	K	Se	Ag	Na	Sr	Tl	Sn	V	Zn	Type	Size
	193 GL 021	4.7	. . .	12.8	1006	. . .	7	380	. . .	. . .	. . .	. . .	546	Metals in Natural Soil	100g
	193 GL 027	3.80	(1.05)	10.5	2115	14.0	5.88	241	43.0	(4.81)	. . .	21.4	61.3	Metals in Natural Soil	50g
	193 GL 6135	2.9	. . .	291	16300	0.9	. . .	1700	. . .	. . .	. . .	139	345	Brick Works Soil	50g

19.4 Clays

		SiO_2	Al_2O_3	Fe_2O_3	FeO	TiO_2	P_2O_5	CaO	MgO	Na_2O	K_2O	S	CO_2	L.O.I.	Others	Type	Size
CRM	**194 E 28**	45.4	37.6	0.84	. . .	2.01	0.15	0.1	0.04	0.01	0.02	. . .	. . .	13.7		Para	50g
CRM	**194 E 32**	51.8	28.5	3.46	. . .	1.49	0.13	0.7	0.39	0.16	0.8	. . .	. . .	12.6		Saracuruna	50g
CRM	**194 E 42**	51.9	32.2	1.09	. . .	0.96	0.07	0.05	0.19	0.02	0.47	. . .	. . .	12.9		Sao-Simao	50g
CRM	**194 B 679**	52.1	20.8	12.94	. . .	0.96	(0.17)	0.23	1.25	0.18	2.93	. . .	. . .	. . .	Trace Elements	Brick Clay	75g
	194 CG 03101a	49.98	26.27	10.55	(0.08)	0.70	0.14	0.13	0.46	0.06	0.79	0.049	(0.041)	10.62	Cl 0.0041		50g
	194 CG 03102a	53.67	31.32	0.33	(0.052	0.03	0.053	1.80	0.083	2.55	1.15	0.023	(0.051)	8.81	Cl 0.0029		50g
	194 CG 03103	66.64	13.28	4.64	(0.8)	0.66	0.106	3.23	1.84	1.81	2.50	0.027	1.66	5.1	Cl 0.011		60g
	194 CG 03121	54.55	31.41	0.50	. . .	0.69	0.099	0.052	0.12	0.015	0.34	0.53	(0.026)	11.94		Kaolin	50g
	194 CG 03122	44.53	38.62	0.72	. . .	0.39	0.21	0.16	0.068	0.069	0.049	0.12	(0.06)	15.00		Kaolin	50g
	194 D KK	47.05	36.75	0.975	. . .	0.166	0.092	0.26	0.196	0.03	1.07	. . .	. . .	13.12	Trace Elements	Kaolin	100g
CRM	**194 A 348**	51.13	31.59	1.04	. . .	1.08	0.071	0.173	0.305	0.344	2.23	. . .	. . .	11.75	Cr_2O_3 0.016	Ball Clay	100g
	194 GC 2CAS1	52.5	32.0	1.03	. . .	1.16	. . .	0.2	0.28	0.34	2.25	. . .	. . .	9.8	Li_2O 0.03	Ball Clay	100g
	194 GC AN41	54.8	41.5	0.71	. . .	0.05	. . .	0.16	0.41	<0.05	1.81	. . .	. . .	. . .		China Clay	100g
	194 BG COD 12B	. . .	35.1	0.52	. . .	0.18	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		Kaolin C1	70g
	194 BG COD 13B	. . .	31.9	0.95	. . .	0.23	. . .	. . .	. . .	. . .	. . .	. . .	. . .	11.3		Kaolin B2	70g
	194 BG COD 14B	. . .	32.5	1.17	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	11.9		Kaolin K2	70g
	194 BG COD 52	51.28	29.69	2.45	0.89	1.16	0.044	0.71	0.63	0.19	1.83	0.19	0.27	11.66	Many at ppm levels	Fire Clay	50g

19.5.1 Sediments

		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	S	C	H_2O	L.O.I. 1000°C	
	195 CG 07302	69.91	15.72	1.90	0.56	0.21	0.25	3.03	5.20	0.23	0.045	0.031	0.0089	0.39	2.58	...	
	195 CG 07303	71.29	12.04	6.54	0.72	0.68	0.22	0.32	2.46	1.06	0.142	0.052	0.0192	0.58	4.1	...	
	195 CG 07304	52.59	15.69	5.91	0.91	1.02	7.54	0.30	2.23	0.89	0.106	0.107	0.0354	1.05	6.6	...	
	195 CG 07305	56.44	15.37	5.84	0.94	0.98	5.34	0.39	2.11	0.90	0.142	0.150	0.0410	1.30	6.7	...	
	195 CG 07306	61.24	14.16	5.88	1.58	3.00	3.90	2.30	2.43	0.77	0.230	0.125	0.0784	0.36	3.49	...	
	195 CG 07307	64.70	13.41	6.51	1.50	3.08	1.67	1.21	3.54	0.75	0.185	0.089	0.019	0.63	3.6	...	
	195 CG 07308	82.89	7.70	2.20	0.53	0.25	0.24	0.47	2.84	0.61	0.032	0.043	0.008	0.33	2.22	...	continued
	195 CG 07309	64.89	10.58	4.86	1.53	2.39	5.35	1.44	1.99	0.92	0.151	0.080	0.015	0.46	2.93	7.21	
	195 CG 07310	88.89	2.84	3.86	0.26	0.12	0.70	0.039	0.125	0.21	0.061	0.130	0.009	0.40	2.1	2.88	
	195 CG 07311	76.25	10.37	4.39	0.35	0.62	0.47	0.46	3.28	0.35	0.057	0.321	0.017	0.24	2.67	3.02	
	195 CG 07312	77.29	9.30	4.88	1.19	0.47	1.16	0.44	2.91	0.25	0.053	0.181	0.094	0.40	2.15	2.62	
	195 CG 07313	53.88	13.75	6.58	0.29	3.38	1.71	4.81	2.95	0.67	0.45	0.43	...	0.25	5.39	9.93	
	195 CG 07315	51.10	11.41	5.93	0.30	3.02	5.74	4.43	2.32	0.61	0.48	0.59	0.25	0.30	5.80	13.0	
	195 CG 07316	31.60	7.70	3.81	0.23	2.04	22.6	3.76	1.61	0.39	0.33	0.40	0.20	0.26	4.00	25.8	
	195 CG 08301	...	...	...	...	...	...	...	...	...	...	0.126	...	...	...	...	continued
	195 S JLk-1	57.16	16.73	4.251	2.191	1.736	0.686	1.051	2.805	0.668	0.208	0.266	0.1052	1.503	6.372	...	
	195 S JSd-1	66.55	14.65	3.526	1.363	1.813	3.034	2.727	2.183	0.643	0.122	0.0924	0.0068	0.111	2.301	...	
	195 S JSd-2	60.78	12.31	4.552	5.955	2.731	3.658	2.438	1.145	0.614	0.105	0.120	1.310	0.316	2.554	...	continued
	195 S JMS-1	53.74	15.82	4.54	2.12	2.87	2.13	4.07	2.24	0.70	0.18	0.102	1.32	1.69	6.79	...	
	195 S JMS-2	41.78	14.18	10.96	<0.04	3.24	4.68	5.79	2.70	1.40	1.26	2.26	0.29	0.39	7.13	...	
CRM	195 B 1646a	85.71	4.339	2.870	...	0.647	0.727	0.999	1.041	0.773	0.063	0.030	0.3520	...	...	...	
CRM	195 B 1944	(66)	10.07	5.04	...	...	...	...	...	...	...	0.065	...	...	...	...	continued
CRM	195 B 8704	...	11.52	5.67	...	2.000	3.697	0.745	2.411	0.723	...	0.070	...	...	...	...	

Continuation	All Elements ppm															
from above	Ag	As	Ba	Cd	Ce	Co	Cr	Cs	Cu	Ga	Hg	Ni	Pb	Rb	Sb	
195 CG 07302	0.066	6.2	185	0.065	192	2.6	12	16.6	4.9	27.4	0.04	5.5	32	470	0.46	
195 CG 07303	0.59	18	615	0.10	64	11.7	87	7.8	177	15.9	0.05	26	40	79	5.4	
195 CG 07304	0.084	19.7	470	0.19	78	18	81	10	37	20.5	0.044	40	30	130	1.84	
195 CG 07305	0.36	75	440	0.82	89	18.9	70	9.4	137	20.3	0.100	34	112	118	3.9	
195 CG 07306	0.36	13.6	330	0.43	68	24.4	190	9.1	383	16.7	0.045	78	27	107	1.25	
195 CG 07307	1.05	84	720	1.05	78	21	122	5.9	38	17.7	0.053	53	350	147	2.6	
195 CG 07308	0.062	2.4	480	0.081	54	3.6	7.6	3.6	4.1	10.8	0.042	2.7	21	132	0.24	continued
195 CG 07309	0.089	8.4	430	0.26	78	14.4	85	5.1	32	14.0	0.083	32	23	80	0.81	
195 CG 07310	0.27	25	42	1.12	38	15.3	136	2.3	22.6	6.4	0.230	30	27	9.2	6.3	
195 CG 07311	3.2	188	260	2.3	58	8.5	40	17.4	79	18.5	0.072	14.3	636	408	14.9	
195 CG 07312	1.15	115	206	4.0	61	8.8	35	7.9	1230	14.1	0.056	12.8	285	270	24	
195 CG 07313	...	5.8	0.44	...	92	76.7	58.4	9.4	424	23.7	...	150	29.3	97.3	1.85	
195 CG 07315	...	7.1	0.31	0.25	82	81	59	6.8	357	18	0.95	167	37	73	2.0	
195 CG 07316	...	4.6	0.25	0.30	55	53	38	4.5	231	12	0.13	108	22	50	1.3	
195 CG 08301	...	56	375	2.45	...	16.5	90	...	53	...	0.22	32	79	...	...	continued
195 S JLk-1	0.198	26.8	574	0.572	87.9	18.0	69.0	10.9	62.9	21.4	0.142	35.0	43.7	147	1.68	
195 S JSd-1	0.036	2.42	520	0.146	34.4	11.2	21.5	1.89	22.0	17.2	0.0155	7.04	12.9	67.4	...	
195 S JSd-2	1.04	38.6	1199	3.06	23.4	48.4	108	1.07	1117	15.3	0.106	92.8	146	26.9	12.5	continued
195 S JMS-1	...	18	307	...	...	18.1	133	5.9	88	...	...	53	49	88	1.4	
195 S JMS-2	...	35	1856	...	...	226	78	3.0	447	...	...	311	88	65	4.5	
195 B 1646a	<0.3	6.23	(210)	0.148	(34)	(5)	40.9	...	10.01	(5)	(0.04)	(23)	11.7	(38)	(0.3)	
195 B 1944	(6.4)	18.9	...	8.8	...	...	266	...	(380)	...	...	76.1	330	...	...	continued
195 B 8704	...	(17)	413	2.94	66.5	13.57	121.9	5.83	...	...	...	42.9	150	...	3.07	

Continuation	All Elements ppm													
from above	Sc	Se	Sn	Sr	Th	Tl	U	V	Y	Zn	Zr	Others	Type	Size
195 CG 07302	4.4	0.2	29	28	70	1.9	17	16.5	67	44	460	many	Stream	70g
195 CG 07303	14.3	1.0	3.4	90	9.2	0.58	1.9	120	22	52	220	many	Stream	70g
195 CG 07304	15.4	0.29	4.0	142	14.6	1.2	2.6	118	26	101	188	many	Stream	70g
195 CG 07305	14.5	0.40	4.6	204	15.2	1.16	2.6	109	26	243	220	many	Stream	70g
195 CG 07306	17	0.30	2.8	266	9.0	1.08	2.4	142	20	144	170	many	Stream	70g
195 CG 07307	14.6	0.30	5.4	220	12.6	0.93	3.5	96	24	238	162	many	Stream	70g
195 CG 07308	5.7	0.11	9.4	52	13.4	0.78	3.0	26	18	43	490	many	Stream	70g
195 CG 07309	11.1	0.16	2.6	166	12.4	0.49	2.6	97	27	78	370	many	Stream	70g
195 CG 07310	4.1	0.28	1.4	25	5.0	0.21	2.1	107	14	46	70	many	Stream	70g
195 CG 07311	7.4	0.20	370	29	23.3	2.9	9.1	47	4.3	373	153	many	Stream	70g
195 CG 07312	5.1	0.25	54	24	21.4	1.76	7.8	47	29	498	234	many	Stream	70g
195 CG 07313	25.6	...	...	267	13.9	...	1.98	112	104	160	177	many	Marine	50g
195 CG 07315	23	...	...	298	11	...	1.9	101	98	137	140	many	Marine	50g
195 CG 07316	15	...	...	667	7.0	...	1.1	69	69	142	94	many	Marine	50g
195 CG 08301	...	0.39	...	...	...	...	...	96	...	251	...		River	50g
195 S JLk-1	15.9	0.641	5.7	67.5	1.23	1.17	3.83	117	40.0	152	137	many	Lake	100g
195 S JSd-1	10.9	0.25	2.77	340	4.44	0.407	1.00	76.0	14.8	96.5	132	many	Stream	20g
195 S JSd-2	17.5	18.8	32.5	202	2.33	...	1.10	125	17.4	2056	111	many	Stream	20g
195 S JMS-1	...	...	...	154	...	...	...	127	24.3	264	132		Marine	100g
195 S JMS-2	...	...	...	454	...	...	...	183	254	166	220		Marine	100g
195 B 1646a	(5)	0.193	(1)	(68)	(5.8)	<0.5	(2.0)	44.84	...	48.9	...		Estuarine	70g
195 B 1944	...	(1.4)	(42)	...	...	(0.59)	...	...	...	...	...	plus PAHs, PCBs	New York	50g
195 B 8704	11.26	...	...	...	9.07	...	3.09	94.6	...	408	...		Buffalo River	50g

19.5.1 Sediments (continued)		SiO_2	Al_2O_3	Fe_2O_3	FeO	MgO	CaO	Na_2O	K_2O	TiO_2	P_2O_5	MnO	S	C	H_2O	L.O.I. 1000°C	
CRM	195 A SA 46	35.9	6.71	28.16	(18.0)	3.16	1.32	0.28	0.35	0.6	0.11	1.14	(0.17)	. . .	. . .	. . .	
CRM	195 A SA 51	33.81	11.87	18.36	(3.0)	0.92	0.86	0.07	0.33	0.82	0.21	0.21	(0.24)	. . .	. . .	. . .	continued
CRM	195 A SA 52	57.81	9.38	19.71	(4.0)	0.6	0.37	(0.1)	0.25	1.3	0.09	0.27	(0.02)	. . .	. . .	. . .	
	195 A LKSD-1	40.1	7.8	4.1	. . .	1.7	10.8	2.0	1.1	0.5	0.2	0.1	1.57	12.3	2.92	29.9	
	195 A LKSD-2	58.9	12.3	6.2	. . .	1.7	2.2	1.9	2.6	0.6	0.3	0.3	0.14	4.5	2.23	13.6	
	195 A LKSD-3	58.5	12.5	5.7	. . .	2.0	2.3	2.3	2.2	0.5	0.2	0.2	0.14	4.5	2.07	13.4	
	195 A LKSD-4	41.6	5.9	4.1	. . .	0.9	1.8	0.7	0.8	0.4	0.3	0.1	0.99	17.7	6.55	43.6	continued
	195 A STSD-1	42.5	9.0	6.5	. . .	2.2	3.6	1.8	1.2	0.8	0.4	0.5	0.18	12.3	4.46	31.6	
	195 A STSD-2	53.7	16.1	7.5	. . .	3.1	4.0	1.7	2.1	0.8	0.3	0.1	0.06	1.6	2.43	10.3	
	195 A STSD-3	48.6	10.9	6.2	. . .	2.2	3.3	1.5	1.8	0.7	0.4	0.3	0.14	8.4	3.47	23.6	
	195 A STSD-4	58.9	12.1	5.7	. . .	2.1	4.0	2.7	1.6	0.8	0.2	0.2	0.09	4.1	1.73	11.6	

Continuation from above	All Elements ppm Ag	As	Ba	Ce	Co	Cr	Cs	Cu	Ga	Ni	Pb	Rb	Sb	
195 SA 46	. . .	. . .	(180)	(110)	56	559	. . .	566	. . .	(125)	(1.3)	(20)	. . .	
195 SA 51	. . .	. . .	(335)	(120)	60	509	. . .	268	(20)	178	5200	37	. . .	continued
195 SA 52	. . .	. . .	(410)	(210)	81	1300	. . .	219	(15)	182	1200	20	. . .	
195 A LKSD-1	0.6	40	430	27	11	31	1.5	44	. . .	16	82	24	1.2	
195 A LKSD-2	0.8	11	780	108	17	57	3.0	37	. . .	26	44	85	1.1	
195 A LKSD-3	2.7	27	680	90	30	87	2.3	35	. . .	47	29	78	1.3	
195 A LKSD-4	<0.5	16	330	48	11	33	17	31	. . .	31	91	28	1.7	continued
195 A STSD-1	<0.5	23	630	51	17	67	1.8	36	. . .	24	35	30	3.3	
195 A STSD-2	0.5	42	540	93	19	116	12	47	. . .	53	66	104	4.8	
195 A STSD-3	<0.5	28	1490	63	16	80	5.2	39	. . .	30	40	68	4.0	
195 A STSD-4	<0.5	15	2000	44	13	93	1.9	65	. . .	30	16	39	7.3	

Continuation from above	All Elements ppm Sc	Se	Sn	Sr	Th	U	V	Y	Zn	Zr	Others	Type	Size
195 SA 46	. . .	. . .	. . .	25	. . .	. . .	225	(20)	5900	101		Stream	100g
195 SA 51	. . .	. . .	. . .	44	(10)	. . .	1.81	21	2200	121		Stream	100g
195 SA 52	. . .	. . .	. . .	25	(11)	. . .	346	20	264	250		Stream	100g
195 A LKSD-1	9	. . .	16	250	2.2	9.7	50	19	331	134	many	Lake	100g
195 A LKSD-2	13	. . .	5	220	13.4	7.6	77	44	209	254	many	Lake	100g
195 A LKSD-3	13	. . .	3	240	11.4	4.6	82	30	152	178	many	Lake	100g
195 A LKSD-4	7	. . .	5	110	5.1	31.0	49	23	194	105	many	Lake	100g
195 A STSD-1	14	. . .	4	170	3.7	8.0	98	42	198	218	many	Stream	100g
195 A STSD-2	16	. . .	5	400	17.2	18.6	101	37	246	185	many	Stream	100g
195 A STSD-3	13	. . .	4	230	5.5	10.5	134	36	204	196	many	Stream	100g
195 A STSD-4	14	. . .	2	350	4.3	3.0	106	24	107	190	many	Stream	100g

19.5.2 Sludges		% Ca	% Fe	% P	% Si	ppm As	ppm Cd	ppm Cu	ppm Pb	ppm Hg	ppm Mo	ppm Ni	ppm Se	ppm Zn	ppm Cr	ppm Ag	Type	Size
CRM	195 B 2781	(3.9)	(2.8)	(2.42)	(5.1)	7.82	12.78	627.4	202.1	3.64	46.7	80.2	16.0	1273	(202)	(98)	Domestic	40g
CRM	195 B 2782	0.67	26.9	0.50	(20.3)	166	4.17	2594	574	1.10	10.07	154.1	0.44	1254	109	30.6	Industrial	70g

19.6 Gypsum

		SiO_2	Al_2O_3	Fe_2O_3	CaO	MgO	K_2O	Na_2O	TiO_2	SO_3	CO_2	Cl	H_2O+	SrO	L.O.I.	P_2O_5	V_2O_5	Size
	196 CG 03109a	1.68	0.34	0.16	39.24	1.74	0.094	0.065	0.016	51.91	(4.02)	0.033	0.39	(0.27)	4.55	. . .	. . .	50g
	196 CG 03110	7.21	1.92	0.63	28.5	4.92	0.38	0.021	. . .	32.55	(8.63)	0.019	14.27	(0.071)	(23.55)	. . .	. . .	50g
	196 CG 03111a	0.63	0.14	0.11	32.3	2.47	0.026	0.14	0.01	40.72	(5.44)	0.0032	17.45	(0.096)	23.6	. . .	. . .	50g
	196 CD FGD-1	0.13	0.023	0.014	32.7	0.007	0.007	0.005	. . .	46.4	0.02	. . .	20.70	0.012	21.04	0.03	0.0003	100g
	196 CD FGD-2	0.21	0.033	0.043	32.8	0.019	0.01	0.02	. . .	45.6	0.62	. . .	20.38	0.024	21.33	0.05	0.0009	100g
	196 CD GYP-A	0.45	0.10	0.05	32.9	0.18	0.021	0.009	. . .	46.2	0.47	. . .	19.4	0.11	20.06	0.011	. . .	100g
	196 CD GYP-B	1.05	0.17	0.07	32.8	1.80	0.05	0.021	. . .	41.0	5.0	. . .	17.80	0.14	22.85	0.010	. . .	100g
	196 CD GYP-C	3.5	0.79	0.40	30.4	5.35	0.36	0.022	. . .	33.0	11.2	. . .	14.37	0.35	25.93	0.018	. . .	100g
	196 CD GYP-D	8.7	2.03	1.08	28.2	1.73	0.54	0.07	. . .	36.7	3.6	. . .	16.39	0.18	20.82	0.025	. . .	100g
	196 CD TIG-1	0.11	0.57	0.26	32.3	0.12	0.008	0.036	0.82	43.4	1.41	. . .	20.3	0.42	22.03	0.04	0.10	100g

19.7 Limestone and Dolomite

		CaO	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	MnO	P_2O_5	SrO	MgO	Na_2O	K_2O	Cr_2O_3	L.O.I.	Other	Type	Size
CRM	**197 E 35**	53.8	1.98	0.24	0.14	0.013	0.012	0.008	0.04	0.7	0.004	0.1	. . .	43.0		Calcitic	80g
CRM	**197 E 44**	50.5	2.69	0.33	0.3	0.019	0.015	0.013	0.04	2.93	0.002	0.12	. . .	42.9			80g
CRM	**197 E 122**	32.0	4.3	1.24	0.65	0.06	0.042	0.048	0.018	17.5	0.019	0.43	. . .	43.3		Dolomitic	80g
CRM	**197 A E752-1**	55.4	0.70	0.12	0.045	0.009	0.010	(<0.01)	0.019	0.15	(<0.03)	0.02	. . .	43.4	BaO 0.006	Limestone	100g
CRM	**197 A E782-1**	30.34	0.266	0.104	0.450	0.0042	0.081	0.0128	. . .	21.29	. . .	0.0260	0.0009	47.25		Dolomite	100G
CRM	**197 TI E701-1**	52.7	1.99	0.55	1.04	0.03	0.028	0.05	. . .	0.6	. . .	. . .	. . .	. . .	S 0.040	Calcitic	100g
	197 GC AN34	57.2	1.02	0.38	1.05	0.02	. . .	. . .	. . .	40.0	0.11	0.08	0.01	. . .	Mn_3O_4 0.14	Dolomite	100g
	197 GC 2CAS6	30.8	1.71	0.67	0.49	0.03	. . .	. . .	. . .	19.7	0.04	0.14	<0.01	45.9	Mn_3O_4 0.07	Dolomitic	100g
	Results calculated to the Ignited Basis																
	197 DH X0907	28.67	3.91	0.846	0.84	0.065	0.046	0.067	. . .	20.06	0.045	0.349	. . .	44.68	SO_3 0.105	Dolomite	100g
	197 DH X0908	26.57	8.55	1.93	1.19	0.140	0.045	0.086	. . .	18.59	0.056	0.734	. . .	41.39	SO_3 0.242	Dolomite	100g
	197 DH X0909	34.94	6.71	1.55	0.92	0.110	0.037	0.065	. . .	12.99	0.043	0.589	. . .	41.59	SO_3 0.180	Dolomite	100g
	197 DH X0912	32.78	7.14	5.59	11.36	0.292	1.34	0.495	. . .	27.99	0.051	0.076	. . .	12.43	SO_3 0.502	Recycled Dolomite	100g
	197 DH X0913	25.23	5.23	3.44	18.76	0.164	0.78	0.226	. . .	30.31	0.041	0.058	. . .	14.89	SO_3 0.389	Recycled Dolomite	100g
	197 S JLs-1	55.09	0.120	0.0207	0.0178	0.0020	0.00209	0.0295	0.035	0.606	0.00194	0.00297	0.0005	. . .	~50 elements at ppm levels		100g
	197 S JDo-1	33.96	0.216	0.0174	0.0232	0.00133	0.00657	0.0343	0.014	18.47	0.0129	0.00232	0.0012	. . .	~50 elements at ppm levels		100g
	197 CG 03105	53.27	1.98	0.29	0.14	0.016	0.0045	0.0088	. . .	1.40	0.026	0.059	. . .	42.82	SO_3, Cl		50g
	197 CG 03105a	54.03	1.09	0.24	0.11	0.010	0.0067	0.0081	. . .	0.81	0.017	0.084	. . .	43.12	SO_3, Cl		50g
	197 CG 03106	50.38	4.38	0.64	0.29	0.034	0.0071	0.013	. . .	2.28	0.07	0.14	. . .	41.58	SO_3, Cl		50g
	197 CG 03106a	51.61	2.09	0.33	0.17	0.015	0.0089	0.0061	. . .	2.25	0.017	0.17	. . .	42.84	SO_3, Cl		50g
	197 CG 03107	49.94	3.76	1.25	0.78	0.059	0.019	0.04	. . .	2.18	0.026	0.5	. . .	41.35	SO_3, Cl		50g
	197 CG 03108	47.49	3.84	0.88	1.97	0.014	0.19	0.04	. . .	3.63	0.024	0.23	. . .	41.52	SO_3, Cl		50g
	197 CG 07108	35.67	15.60	5.03	2.52	0.327	0.056	0.051	0.108	5.19	0.081	0.78	0.004	34.5	~50 elements at ppm levels		70g
	197 CG 07114	30.02	0.62	0.1	0.04	0.015	0.01	0.006	0.006	21.8	0.03	0.038	0.0005	47.1	~50 elements at ppm levels		100g
	197 CG 07214	54.95	0.38	0.017	0.071	. . .	0.009	. . .	. . .	0.67	. . .	. . .	. . .	43.57	P, S		50g
	197 CG 07215	51.56	1.17	0.5	0.292	. . .	0.018	. . .	. . .	2.67	. . .	. . .	. . .	43.22	P, S		50g
	197 CG 07216	36.55	0.092	0.027	0.226	. . .	0.029	. . .	. . .	16.59	. . .	. . .	. . .	46.23	P, S	Dolomite	50g
	197 CG 07217	30.6	0.96	0.295	0.376	. . .	0.062	. . .	. . .	20.73	. . .	. . .	. . .	46.3	P, S	Dolomite	50g
	197 CG 07210	51.32	3.26	0.58	1.04	0.037	0.024	36.89	0.077	0.43	0.33	0.17	. . .	. . .	F 3.54	Phosphate	100g
	197 CG 07211	40.71	3.61	2.58	1.08	0.14	0.015	2.086	0.16	8.19	0.059	0.28	. . .	. . .	F 2.05	Phosphate	100g
	197 CG 07212	19.42	38.8	4.06	3.08	0.48	0.026	6.06	0.055	7.12	0.14	2.63	. . .	. . .	F 0.51	Phosphate	100g
	197 BG COD 35B	32.44	0.100	0.037	0.017	. . .	. . .	. . .	. . .	20.03	. . .	. . .	. . .	47.24	CO_2 47.29	Dolomite	50g
	197 B 88b	29.95	1.13	0.336	0.277	. . .	0.0160	0.0044	0.0076	21.03	0.0290	0.1030	. . .	. . .	CO_2 46.37	Dolomitic limestone	75g

19.7a Trace elements in Synthetic Limestone

All Elements ppm

	Ag	As	B	Ba	Be	Bi	Cd	Ce	Co	Cr	Cu	Ga	La	Li	Mn	
197 CG 07712	0.030	2.2	2.2	24	0.22	0.23	0.023	2.8	2.3	2.3	2.2	2.8	2.6	3.2	37	
197 CG 07713	0.060	5.2	5	54	0.52	0.53	0.053	5.8	5.3	5.3	5.2	5.8	5.6	6.2	67	
197 CG 07714	0.11	10.2	10	104	1.0	1.0	0.10	11	10.3	10.3	10.2	10.8	10.6	11.2	117	
197 CG 07715	0.21	20	20	204	2.0	2.0	0.20	21	20.3	20.3	20	20.8	20.6	21	217	
197 CG 07716	0.51	50	50	504	5.0	5.0	0.50	51	50	50	50	51	50.6	51	517	continued
197 CG 07717	1.0	100	100	1000	10	10	1.00	101	100	100	100	101	101	101	1020	
197 CG 07718	2.0	200	200	2000	20	20	2.00	200	200	200	200	200	200	200	2020	
197 CG 07719	5.0	500	500	5000	50	50	5.00	500	. . .	. . .	500	. . .	. . .	500	5000	
197 CG 07720	10	. . .	. . .	. . .	100	100	10	. . .	. . .	. . .	1000	. . .	. . .	. . .	10000	

In each case, the matrix for this set is the same: 85% $CaCO_3$, 8% $MgCO_3$, 5.2% SiO_2, 1.1% Al_2O_3, trace Fe_2O_3, Na_2SO_4.

All Elements ppm

Continuation from above	Mo	Nb	Ni	Pb	Sb	Sn	Sr	Ti	V	W	Y	Yb	Zn	Zr	Size
197 CG 07712	0.21	2.5	2.1	2.4	0.21	0.28	110	31	3.2	0.22	2.1	0.22	3.0	4.0	70g
197 CG 07713	0.51	5.5	5.1	5.4	0.51	0.58	200	61	6.2	0.52	5.1	0.52	6.0	7.0	70g
197 CG 07714	1.0	10.5	10	10.4	1.0	1.1	250	111	11.2	1.0	10	1.0	11	12	70g
197 CG 07715	2.0	20.5	20	20.4	2.0	2.1	350	210	21	2.0	20	2.0	21	22	70g
197 CG 07716	5.0	50.5	50	50	5.0	5.1	650	510	51	5.0	50	5.0	51	52	70g
197 CG 07717	10	100	100	100	10	10	1150	1010	101	10	100	10	101	102	70g
197 CG 07718	20	200	200	200	20	20	2200	2000	200	20	200	20	200	202	70g
197 CG 07719	50	. . .	500	500	50	50	5200	5000	500	50	. . .	50	500	500	70g
197 CG 07720	100	. . .	. . .	1000	100	100	. . .	. . .	. . .	100	. . .	100	1000	. . .	70g

20.1 Slags

		SiO_2	Al_2O_3	Total Fe	TiO_2	Cr_2O_3	MnO	CaO	MgO	S	P_2O_5	Na_2O	K_2O	C	Others	Type	Size
	201 DH X3220	36.31	9.21	0.333	0.494	. . .	0.614	42.78	6.10	1.00	0.004	0.322	0.607	0.413	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3203	36.95	9.46	0.422	0.489	. . .	0.936	41.41	6.56	0.814	0.017	0.481	0.672	0.226	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3204	36.14	11.51	1.54	0.871	. . .	0.772	39.95	4.47	1.01	0.033	0.414	0.744	0.156	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3205	29.00	15.39	0.458	0.575	. . .	1.72	43.81	4.04	0.801	0.297	0.184	0.353	0.163	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3208	40.72	9.07	0.212	0.482	. . .	0.550	38.59	8.18	0.942	0.003	0.234	0.779	0.091	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3209	39.03	9.23	0.512	0.489	. . .	0.636	40.62	8.08	1.09	. . .	0.135	0.34	0.048	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3210	38.44	9.99	0.414	0.547	. . .	0.975	37.87	8.13	1.22	. . .	0.566	2.05	0.036	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3215	36.98	11.03	0.186	1.92	. . .	0.325	39.93	7.99	1.25	<0.01	0.269	0.570	0.041	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3216	36.74	11.31	0.207	0.875	. . .	0.253	40.95	8.11	1.44	<0.01	0.207	0.448	0.046	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3217	46.68	10.74	0.796	0.558	. . .	1.78	35.44	2.72	0.600	. . .	0.233	0.258	. . .	ZrO_2, SrO, CO_2	Blast furnace	100g
	201 DH X3911	8.58	0.93	18.51	0.35	0.225	5.71	50.50	1.54	0.160	2.65	. . .	0.013	. . .	V_2O_5 0.59	Converter	100g
	201 DH X3912	9.97	0.372	19.45	0.433	0.155	5.63	49.52	1.41	0.063	2.16	. . .	0.016	. . .	V_2O_5 0.527	Converter	100g
	201 DH X3913	9.87	0.76	14.61	0.42	0.246	5.68	56.31	1.07	0.152	2.29	. . .	. . .	. . .	V_2O_5 0.55	Converter	100g
	201 DH X3921	10.56	4.79	16.92	0.780	0.287	2.98	50.05	2.99	0.196	1.36	0.020	0.013	. . .	F 0.500	Converter	100g
	201 DH X3922	8.30	4.07	12.34	0.601	0.226	2.26	61.79	2.67	0.154	1.02	0.016	0.030	. . .	F 0.411	Converter	100g
	201 DH X3923	11.52	1.27	20.33	1.21	0.216	3.54	46.50	3.23	0.288	1.73	0.014	0.011	. . .	F 0.030	Converter	100g
	201 DH X3924	8.90	0.598	29.99	0.559	0.231	2.89	39.62	1.66	0.089	1.23	0.022	0.014	. . .	F 0.359	Converter	100g
	201 DH Q0198	5.39	34.68	8.50	1.99	0.17	4.80	30.35	9.86	<0.01	0.22	0.125	0.030	. . .	V_2O_5 0.61	Ladle	100g
	201 DH Q0298	4.29	21.03	13.16	0.27	0.36	5.02	42.97	5.59	<0.01	0.61	0.01	0.01	. . .	V_2O_5 0.18	Ladle	100g
	201 DH Q0398	16.20	1.25	16.40	0.96	0.22	3.75	48.06	1.50	0.04	1.80	0.07	0.02	. . .	V_2O_5 0.94	Ladle	100g
	201 DH X5101	0.234	39.64	0.536	3.79	0.012	0.114	49.92	4.48	1.54	(0.003)	0.006	0.002	. . .		Vacuum Ladle	100g
	201 DH X5201	1.95	36.11	0.323	0.137	0.004	0.190	50.55	5.45	1.38	0.002	. . .	. . .	0.006	F 2.62	Vacuum Ladle	100g
	201 M BS 101/1	23.7	0.61	6.25	0.8	. . .	3.45	52.4	9.15	0.18	0.78	0.009	0.003	. . .		Steel making	100g
	201 M BS 101/2	16.8	0.92	15.16	0.77	. . .	4.76	47.0	8.12	0.23	0.7	0.031	0.006	. . .		Steel making	100g
	201 M BS 101/3	18.8	1.47	10.96	0.92	. . .	5.2	53.7	3.1	0.19	0.77	0.028	0.006	. . .		Steel making	100g
	201 M BS 101/4	16.5	0.87	13.37	1.21	. . .	4.7	51.9	4.6	0.15	0.8	0.023	0.007	. . .		Steel making	100g
	201 M BS 101/5	14.9	0.57	19.2	1.1	. . .	5.7	46.0	5.5	0.12	0.71	0.043	0.005	. . .		Steel making	100g
	201 M BS 100A	35.2	10.13	0.3	0.5	. . .	0.35	37.6	12.9	1.82	. . .	0.18	0.49	0.07		Iron making	100g
	201 M BS Slag1	36.7	18.5	0.28	0.42	. . .	1.11	30.2	11.01	1.8	. . .	0.2	0.36	0.07		Iron Making	50g
	201 M BS Slag2	37.0	10.3	0.23	0.2	. . .	0.19	44.6	5.87	1.14	. . .	0.16	0.17	0.2		Iron Making	50g
	201 M BS Slag3	37.44	12.9	0.25	0.63	. . .	1.72	37.3	8.3	0.81	. . .	0.26	0.81	0.03		Iron Making	50g
CRM	**201 A 381**	8.78	0.67	13.3	0.35	0.33	3.16	49	1.03	0.19	15.7	. . .	. . .	. . .	V_2O_5 0.94	Basic	100g
CRM	**201 A E879-1**	8.82	0.803	18.97	0.535	0.477	4.45	43.7	2.19	0.102	8.46	. . .	. . .	. . .	F 0.368	Basic	100g
CRM	**201 S 904-1**	33.8	13.4	0.38	0.84	(0.016)	0.91	(41.0)	7.5	0.73	0.02	0.31	0.28	. . .		Blast Furnace	70g
CRM	**201 J S9**	1.4	31.5	0.03	0.05	. . .	0.04	29.1	2.2	. . .	. . .	. . .	. . .	0.042	CaF_2 35.5	ESR high-Al	100g
CRM	**201 J S10**	7.8	0.54	0.08	0.05	. . .	0.03	20.3	0.3	. . .	. . .	. . .	. . .	0.022	CaF_2 70.7	ESR low-Al	100g
CRM	**201 J S11**	26.8	2.85	. . .	0.95	0.17	0.12	60.0	4.7	0.30	(<0.005)	. . .	. . .	. . .	F (7.9)	AOD	100g
CRM	**201 TI E802-1**	32.45	16.12	0.576	0.61	0.008	0.59	42.84	4.76	0.714	0.25	0.32	0.59	. . .		Blast Furnace	100g
CRM	**201 TI E803-1**	32.13	13.19	0.613	0.5	. . .	0.71	43.28	4.05	0.767	0.27	. . .	. . .	. . .		Blast Furnace	100g
CRM	**201 TI E804-1**	5.54	(0.79)	11.92	0.25	. . .	1.91	51.6	1.46	0.127	17.56	. . .	. . .	. . .		Basic	100g
CRM	**201 TI E805-1**	6.63	0.62	14.87	0.34	. . .	2.05	48.92	1.86	0.092	16.19	. . .	. . .	. . .		Basic	100g
CRM	**201 TI E806-1**	11.73	0.9	17.89	0.5	. . .	5.94	46.13	3.02	0.11	2.25	. . .	. . .	. . .		Basic	100g
CRM	**201 TI E878-1**	33.75	15.97	0.6	0.62	0.248	1.28	35.62	9.62	0.83	0.03	0.47	1.29	. . .	F 0.15	Blast Furnace	100g
	201 CG 01701	28.24	14.63	0.44	0.34	. . .	0.085	49.44	4.15	1.01	. . .	0.057	0.058	. . .		Blast Furnace	50g
	201 CG 01702	38.67	9.03	0.21	0.28	. . .	0.272	44.57	4.07	1.19	. . .	0.18	0.61	. . .		Blast Furnace	50g
	201 CG 01703	36.09	12.28	0.30	0.44	. . .	0.142	40.98	7.17	0.92	. . .	0.38	0.91	. . .		Blast Furnace	50g
	201 CM 1734	36.27	11.35	0.33	0.45	. . .	1.73	44.87	2.59	0.55	. . .	. . .	. . .	. . .		Blast Furnace	100g
	201 CM 1735	36.61	7.46	. . .	0.66	. . .	0.425	46.61	5.95	1.559	2.04	. . .	. . .	. . .		Blast Furnace	100g
	201 CM 1738	36.62	7.84	0.33	0.39	. . .	0.22	42.45	8.18	0.53	0.074	. . .	. . .	. . .		Blast Furnace	100g
	201 CM 1739	39.95	7.64	0.62	0.41	. . .	0.31	41.55	8.07	0.43	0.018	. . .	. . .	. . .		Blast Furnace	100g
	201 CM 1740	40.66	8.28	0.42	0.45	. . .	0.23	40.46	7.61	0.58	0.010	. . .	. . .	. . .		Blast Furnace	100g
	201 CM 1741	13.72	7.60	12.13	0.47	. . .	1.24	35.68	24.36	0.070	0.67	. . .	. . .	. . .		Steel making	100g
	201 CM 1744	8.91	3.92	34.33	0.32	. . .	2.01	26.73	12.15	0.107	0.87	. . .	. . .	. . .		Steel making	100g

	SiO_2	Al_2O_3	Total Fe	TiO_2	MnO	Total Ca	MgO	S	P_2O_5	Na_2O	K_2O	F	Type	Size
201 CG 01704	10.24	0.62	13.6	0.565	1.88	40.62	6.89	0.105	1.03	. . .	. . .	0.105	Converter	50g
201 CG 01705	13.73	1.43	12.56	0.52	3.03	37.39	8.33	0.126	1.08	. . .	. . .	0.126	Converter	50g
201 CG 01706	19.13	4.73	11.21	0.445	3.63	35.27	5.18	0.192	1.15	0.064	0.038	0.192	Converter	50g
201 CG 01707	26.4	7.75	5.55	0.531	1.93	31.73	9.24	0.459	0.58	0.12	0.36	0.459	Converter	50g
201 CG 01708	12.2	3.08	18.82	0.781	1.64	25.90	11.67	0.089	0.95	0.03	0.052	0.089	Converter	50g
201 CM 1745	14.91	1.78	13.38	0.42	1.86	37.64	9.28	0.097	1.02	. . .	. . .	0.97	Steel making	100g
201 CM 1756	21.35	4.00	13.12	0.18	13.16	16.19	21.18	0.036	. . .	. . .	. . .	0.17	Arc Furnace	100g
201 CM 1757	24.77	8.73	2.25	0.25	2.39	28.87	15.67	0.25	. . .	. . .	. . .	0.82	Arc Furnace	100g

20.1 Slags (continued)

		SiO_2	Al_2O_3	Total Fe	TiO_2	Cr_2O_3	MnO	CaO	MgO	S	P_2O_5	V	B_2O_3	Type	Size
CRM	201 LI 7-1-005	35.3	10.0	0.21	0.32	...	0.47	38.8	12.0	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-006	38.5	7.05	0.59	0.34	...	1.24	...	16.8	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-007	39.0	6.2	0.55	0.39	...	0.78	31.2	18.9	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-008	39.1	8.4	0.30	0.30	...	0.73	42.1	6.1	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-009	32.8	9.2	...	0.38	...	0.60	49.6	1.1	1.17	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-010	44.0	7.94	5.5	0.91	...	3.40	31.2	0.73	0.14	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-011	21.9	24.0	...	...	...	...	29.4	17.5	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-012	51.4	45.2	...	...	...	0.06	0.57	...	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-013	20.3	38.6	1.12	0.78	...	0.26	28.7	8.0	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-014	33.57	24.0	...	...	...	...	30.1	9.3	...	...	...	...	Blast furnace	75g
CRM	201 LI 7-1-015	...	14.5	1.68	...	...	0.58	28.0	9.2	...	...	...	...	Blast furnace	75g
CRM	201 DB E826-1	8.96	1.31	...	...	0.26	...	46.48	...	...	14.65	0.503	...	phosphate	100g
CRM	201 DB E827-1	6.21	...	...	...	...	...	47.38	...	...	20.70	...	...	phosphate	100g
	201 SI XS-FCS	24.34	23.72	8.42	...	22.45	...	3.91	15.39	...	...	...	...	Ferro-Chrome	100g
	201 SI SAM-FMS1	30.21	4.95	0.046	...	...	22.53	30.26	7.38	...	...	...	0.59	Ferro-Manganese	100g
	201 SI SAM-SMS1	43.28	8.96	0.125	...	...	16.81	19.47	5.16	...	...	...	0.26	Silico-Manganese	100g

20.1.1 Titanium Slag

	TiO_2	Fe_2O_3	SiO_2	Al_2O_3	MgO	CaO	MnO	Cr_2O_3	V_2O_5	Size
201A SA 57	85.4	11.8	1.72	1.23	0.98	0.16	1.76	0.16	0.39	100g
201 A SA 58	84.1	9.6	2.95	2.17	0.69	0.22	1.44	...	0.4	100g

20.3 Sinters

		Si	Al	Total Fe	FeO	Ti	Mn	Ca	Mg	S	P	Na	K	F	V	Size
	203 M BS 104	3.72	0.55	54.6	...	0.06	0.81	7.4	0.78	0.014	0.044	0.02	0.12	...	...	100g
CRM	203 TI E611-1	2.07	0.69	62.22	(13.8)	0.033	1.97	2.85	0.32	(0.008)	0.03	...	...	...	...	100g
CRM	203 TI E612-1	5.94	3.0	42.4	(9.2)	0.151	0.363	12.06	1.2	0.053	0.885	...	...	...	...	100g
CRM	203 A E676-1	6.40	3.4	39.76	...	0.19	0.83	12.78	1.16	0.12	0.59	0.095	0.43	0.1	0.07	100g

	SiO_2	Al_2O_3	Total Fe	Ti	Mn	CaO	MgO	S	P	Cu	K_2O	Na_2O	Fe	Size
203 CG 07219	6.38	2.45	54.24	0.087	0.066	11.03	3.21	0.014	0.06	0.005	0.084	0.054	(9.06)	100g

20.4.1 Fluorspar

		CaF_2	$CaCO_3$	$MgCO_3$	SiO_2	Fe_2O_3	K_2O	P	S	Al_2O_3	Ba	Pb	Na_2O	F	Others	Type	Size
	204 DH X2703	85.94	0.587	0.052	12.35	0.151	0.133	...	...	0.392	0.046	0.003	0.009	41.83	CO_2, H_2O		100g
	204 DH X2704	74.31	0.591	0.052	24.33	0.103	0.067	...	...	0.332	0.005	...	0.007	36.17	CO_2, H_2O		100g
	204 DH X2707	86.03	6.44	0.146	6.16	0.257	0.042	...	...	0.371	0.005	0.003	0.061	41.87	CO_2, H_2O		100g
	204 DH X2709	77.84	0.019	0.033	0.77	15.77	0.028	...	...	0.310	0.007	0.005	0.030	37.91	CO_2, H_2O		100g
	204 DH X2712	82.85	2.96	1.55	0.373	0.373	0.125	...	...	1.01	0.009	0.095	...	40.32	CO_2, H_2O		100g
CRM	204 A SA 14	97.32	(0.3)	(0.03)	(0.57)	0.06	...	(0.079)	...	...	...	...	...	...		Buffalo	100g
CRM	204 A SA 15	97.84	0.95	0.55	(0.26)	(0.23)	...	0.007	...	...	...	...	...	...	Mn 0.0213	Marico	100g
CRM	204 J C	76.91	...	...	8.2	0.7	...	0.026	1.75	0.66	8.2	0.07	...	37.43			100g
CRM	204 J D	97.07	...	...	(1.5)	0.2	...	0.035	0.004	0.04	...	<0.001	...	47.24			100g
	204 GB 39	...	...	...	...	...	...	...	...	...	(0.44)	...	...	46.85	Sr (0.014)		50g
CRM	204 S 883-1	75.24	0.29	...	20.16	...	...	0.008	0.39	...	...	...	...	...	As 0.0012	China	70g
CRM	204 A 392	97.2	1.0	...	0.67	...	...	...	0.12	...	0.33	0.18	...	...			100g
CRM	204 E 95	85.4	...	...	8.3	0.36	...	...	...	...	...	...	...	...			100g
CRM	204 CG 07250	94.91	(0.02)	...	4.72	0.096	0.019	0.0025	0.029	...	...	...	0.005	...			65g
CRM	204 CG 07251	90.87	(0.02)	...	8.35	0.124	0.026	0.0031	0.090	...	...	...	0.005	...			65g
CRM	204 CG 07252	92.57	(0.02)	...	6.84	0.124	0.029	0.0024	0.043	...	...	...	0.006	...			65g
CRM	204 CG 07253	85.21	(0.02)	...	14.15	0.209	0.044	0.0013	0.045	...	...	...	0.005	...			65g
CRM	204 CG 07254	98.59	0.27	...	0.87	0.087	...	0.007	0.011	...	...	...	...	...			65g

20.4.2 Aluminium Fluoride

	F	Na	Si	Fe	Ca	P	S	L.O.I.	Size
204 CA ALF-01	62.0	0.32	0.070	0.009	0.017	0.0100	0.28	...	100g
204 CA ALF-02	63.0	0.26	0.130	0.010	0.014	0.0100	0.26	...	100g
204 CA ALF-03	64.3	0.27	0.120	0.009	0.014	0.0090	0.25	...	100g
204 CA ALF-04	63.0	0.29	0.100	0.007	0.016	0.0090	0.31	...	100g
204 CA ALF-05	63.3	0.29	0.090	0.006	0.015	0.0060	0.10	...	100g
204 ML SRP-8	62.4	0.21	0.16	0.010	...	0.030	0.14	0.69	50g

20.4.3 Cryolite

	F	Na	Al	Si	Fe	S	Ca	Cl	P	CO_2	L.O.I.	Type	Size
204 CA CAA	40.5	30.6	13.5	0.26	0.053	1.71	...	...	...	...	...		100g
204 CA CAB	44.3	30.1	11.9	0.16	0.067	2.59	...	...	...	...	...		100g
204 CA CAC	44.7	32.9	11.9	0.24	0.039	2.16	...	...	...	...	...		100g
204 CA CAG	47.7	31.9	12.2	0.035	0.013	1.28	...	...	...	...	...		100g
204 ML SRP-2	50.8	31.2	14.0	0.61	0.035	0.36	0.05	0.02	...	...	0.40	Synthetic	50g
204 ML SRP-9	49.0	31.7	12.4	0.12	0.014	0.67	0.02	...	0.002	1.52	2.84	Synthetic	50g
204 ML SRM-3	54.3	32.8	12.9	0.07	0.008	...	0.018	...	...	...	0.08	Natural (greenland)	200g

20.2 Iron Ore

		Total Fe	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Na_2O	K_2O	Mn	P	S	Pb	Cu	Zn	Type	Size
CRM	202 E 27	61.89	7.94	0.1	0.018	0.042	1.74	...	...	0.24	0.054	0.004	...	...	...		100g
CRM	202 E 30	65.01	2.7	0.047	2.59	0.29	0.82	...	...	0.03	0.026	0.012	...	...	...		100g
	202 AU 3001	53.95	8.56	...	0.46	0.17	4.06	0.010	0.055	0.045	0.322	0.229	0.014	0.169	0.018		100g
	202 AU 3002	62.78	5.35	...	1.11	0.34	1.01	0.024	0.017	0.053	0.052	0.035	0.0009	0.008	0.0033		100g
	202 AU 3003	54.05	8.42	...	0.54	0.18	4.07	0.011	0.051	0.047	0.336	0.192	0.012	0.144	0.017		100g
	202 AU 3004	52.02	11.28	...	1.68	0.71	4.11	0.040	0.141	0.31	0.278	0.103	0.0051	0.074	0.016		100g
	202 AU 3005	56.09	10.24	...	3.60	1.12	1.06	0.058	0.031	0.091	0.04	0.095	0.0019	0.018	0.0074		100g
	202 AU 3006	61.63	6.32	...	1.68	1.47	0.78	0.051	0.04	0.129	0.015	0.296	0.0015	0.014	0.0093		100g
CRM	202 A MW1	66.08	4.6	(0.13)	0.054	0.032	0.3	(0.015)	0.013	(0.016)	0.011	(0.011)	...	...	...	Mt Wright, Quebec	200g
CRM	202 A SCH1	60.73	8.09	0.05	0.041	0.03	0.96	0.025	0.031	0.777	0.054	0.007	...	...	...	Scheffoville, Quebec	100g
CRM	202 A E651-1	23.85	7.40	0.16	22.6	1.73	4.26	0.07	0.32	...	0.35	0.40	...	...	...	Lincolnshire	100g
	202 M BS 103	59.41	8.12	0.04	1.27	0.34	0.96	(0.05)	(0.07)	0.47	0.058	0.065	...	...	...		100g

		Total Fe	FeO	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Na_2O	K_2O	Mn	P	S	
CRM	202 A SA 11	66.16	...	3.1	0.064	0.045	0.021	1.38	0.015	0.14	0.0113	0.042	0.012	continued
CRM	202 A SA 12	66.63	...	0.34	0.72	1.09	2.8	0.77	0.012	0.13	0.17	0.048	0.069	
CRM	202 S 803-6	65.50	(0.27)	2.88	0.059	(0.018)	0.020	1.22	(0.006)	(0.005)	0.020	0.048	(0.011)	
CRM	202 S 805-1	68.04	...	0.49	0.029	0.028	0.033	1.02	(0.004)	(0.006)	0.25	0.044	(0.003)	
CRM	202 S 812-3	59.95	24.23	14.47	0.061	0.64	0.46	0.42.	...	...	0.032	0.043	0.021	
CRM	202 S 814-1	65.7	...	3.88	0.06	0.78	1.43	0.47	0.117	0.103	0.025	0.036	0.845	continued
CRM	202 S 820-2	57.0	...	5.75	0.25	0.12	0.084	2.78	0.019	(0.009)	0.077	0.036	0.033	
CRM	202 S 831-1	57.03	28.35	3.73	7.77	1.33	3.28	3.69	0.114	0.078	0.5	0.168	0.006	
CRM	202 S 850-4	65.67	(0.3)	4.12	0.056	0.41	0.79	0.4	0.129	0.075	0.019	0.013	0.006	
CRM	202 S 851-4	56.16	5.95	5.41	0.31	9.91	1.62	2.01	...	...	0.26	0.060	0.012	
CRM	202 S 852-2	66.83	...	1.7	0.48	0.13	1.15	0.38	0.03	0.007	0.077	0.014	(0.002)	
CRM	202 S 853-1	65.41	(0.74)	2.29	0.14	2.49	0.49	0.54	0.030	0.098	0.042	0.043	(0.003)	
CRM	202 J 28	65.86	2.4	4.2	0.2	0.3	0.3	0.6	0.106	0.12	...	0.045	0.004	
CRM	202 J 29	71.09	28.35	0.47	0.25	0.09	0.25	0.27	0.034	0.012	...	0.008	0.016	continued
CRM	202 J 30	34.67	11.9	38.6	0.11	3.39	3.72	...	0.24	0.78	...	0.019	0.028	
CRM	202 J 42	70.83	...	0.60	0.207	0.177	0.46	0.214	0.029	0.016	0.062	0.025	0.007	

Continuation from above	Cu	Ni	Cr	V	Zn	Fe_2O_3	MnO	P_2O_5	V_2O_5	ppm As	ppm Pb	ppm Co	ppm Cd	Type	Size
202 SA 11	0.0011	0.003	0.0041	0.004	0.0023	...	...	...	...	19.0	18.0	...	3.0	Sishen Hematite	100g
202 SA 12	0.0502	0.0281	0.0021	0.052	0.0142	...	...	...	...	(2.0)	25.0	223.0	(5.0)	Phalaborwa Magnetite	100g
202 S 803-6	(0.001)	(0.001)	0.010	(0.002)	(0.002)	...	...	...	...	...	...	...	...	Iscor Hematite	100g
202 S 805-1	(0.001)	...	...	(0.005)	(0.002)	...	...	...	...	...	...	...	...	MBR Hematite	100g
202 S 812-3	0.001	(0.002)	(0.004)	0.003	...	...	...	...	...	...	...	...	...	Musan Ore	100g
202 S 814-1	0.036	0.007	...	0.045	0.032	...	...	...	...	...	...	...	...	Peru Magnetite	100g
202 S 820-2	(0.001)	(0.003)	(0.002)	(0.005)	0.009	...	...	...	...	...	(10.0)	...	...	Robe River Limonite	70g
202 S 831-1	0.007	0.007	0.024	0.3	0.076	...	...	...	...	...	...	...	...	Taharoa Iron Sand	100g
202 S 850-4	0.008	(0.006)	(0.003)	0.025	(0.007)	...	...	...	...	...	...	...	...	Marcona Pellet	100g
202 S 851-4	...	0.008	0.028	0.031	0.013	...	...	...	...	...	...	...	...		100g
202 S 852-2	0.006	0.045	(0.004)	0.46	(0.005)	...	...	...	...	...	...	...	...	Savage River Pellet	100g
202 S 853-1	...	0.009	0.018	0.19	(0.002)	...	...	...	...	...	...	...	...		100g
202 J 28	0.002	...	...	...	...	91.5	0.059	0.102	0.21	...	...	...	...		150g
202 J 29	0.002	...	...	...	...	70.1	0.05	0.018	0.2	...	...	...	...		150g
202 J 30	0.014	...	...	...	...	36.3	0.15	0.042	<0.005	...	...	...	...		150g
202 J 42	0.0008	0.0144	0.0044	...	0.0019	...	0.062	...	0.190	(2.0)	(1.0)	102	<0.5		150g

	Total Fe	FeO	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Na_2O	K_2O	Mn	S	NiO	Cr_2O_3	
202 DH X1101	63.6	0.348	2.05	0.144	0.018	0.018	1.51	0.002	0.009	0.02	0.023	...	0.006	
202 DH X1102	63.96	8.75	7.82	...	0.195	0.283	0.376	0.034	0.06	0.028	0.061	0.001	...	
202 DH X1104	63.61	0.168	5.46	0.095	0.028	0.03	1.49	0.01	0.022	0.101	0.004	...	0.007	
202 DH X1106	58.41	0.576	6.22	0.167	0.964	0.142	3.31	0.024	0.063	0.216	0.029	...	0.02	
202 DH X1107	62.22	0.144	6.4	0.099	0.056	0.074	2.36	0.006	0.019	0.07	0.009	...	0.003	continued
202 DH X1108	64.05	2.73	4.6	0.043	0.007	0.017	1.21	0.003	0.005	0.077	0.008	...	...	
202 DH X1109	70.47	38.65	0.735	0.313	0.188	0.454	0.297	0.037	0.016	0.046	...	0.019	0.002	
202 DH X1111	65.44	19.87	7.17	0.039	0.209	0.309	0.155	0.057	0.037	0.023	0.003	...	...	
202 DH X1112	67.83	0.408	0.597	0.046	0.007	0.018	0.704	0.002	...	0.101	...	...	...	
202 DH X1122	69.61	29.28	1.23	0.485	0.585	0.448	0.196	0.026	0.066	0.066	0.015	...	...	

Continuation from above	V_2O_5	PbO	ZnO	Co_3O_4	CO_2	P_2O_5	C	L.O.I 900°C	Type	Size
202 DH X1101	0.005	0.005	0.002	...	0.006	0.218	0.181	4.54	Cerro Boliv	100g
202 DH X1102	...	...	0.001	...	0.024	0.054	0.053	0.505	Bong-Range	100g
202 DH X1104	...	...	0.002	...	0.029	0.144	0.066	1.44	Morro Agudo fines	100g
202 DH X1106	...	0.003	0.005	...	0.537	0.129	1.96	...	Bellary	100g
202 DH X1107	0.01	0.004	0.004	...	0.016	0.161	0.033	1.61	Mount Newman	100g
202 DH X1108	...	...	...	...	0.003	0.138	0.046	2.43	Nimba Washed	100g
202 DH X1109	0.224	...	0.003	0.015	0.013	0.062	0.018	0.081	Malmberget	100g
202 DH X1111	...	...	...	...	0.073	0.024	0.029	0.366	Guelbs	100g
202 DH X1112	..	...	...	...	0.022	0.106	0.038	1.27	Carajas Sinter	100g
202 DH X1122	0.226	...	...	...	0.213	0.11	0.066	0.137	Kiruna B	100g

20.2 Iron Ore

		Total Fe	FeO	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Mn	S	Cr_2O_3	P_2O_5	V_2O_5	C	CO_2	L.O.I. 900°C	Type	Size
	202 DH X1123	64.99	0.133	2.65	0.045	0.031	0.034	1.62	0.047	0.011	. . .	0.122	0.005	0.058	0.007	2.35	Hamerslay	100g
	202 DH X1124	65.47	0.109	2.54	0.045	2.05	0.135	1.26	0.034	0.004	0.003	0.081	. . .	0.068	0.098	0.079	Samarco pellets	100g
	202 DH X1125	64.05	0.193	2.52	0.045	2.53	0.421	1.20	0.068	0.010	0.002	0.087	0.008	0.671	0.929	. . .	Samarco pellets	100g
	202 DH X1126	65.88	8.07	4.64	0.046	0.424	0.306	0.151	0.095	0.004	0.002	0.011	0.009	0.28	0.97	0.097	Carol conc.	100g
	202 DH X1127	62.86	0.611	4.11	0.097	0.139	0.086	2.38	0.050	0.018	. . .	0.163	0.007	0.14	0.051	2.86	Hamerslay	100g
	202 DH X1128	65.52	0.144	2.55	0.043	2.08	0.110	1.23	0.044	0.004	. . .	0.094	0.005	0.030	0.075	0.059	Samarco pellets	100g
	202 DH X1129	66.185	0.306	0.858	0.083	0.006	0.016	0.645	0.028	0.016	. . .	0.159	. . .	0.123	0.003	3.29	San Isidro	100g
	202 DH X1131	67.22	0.084	0.426	0.044	0.008	0.028	1.26	0.380	0.005	0.006	0.129	0.011	0.059	0.007	1.31	Carajas NPO	100g
	202 DH X1132	65.21	0.588	5.00	0.053	0.023	0.025	0.811	0.072	0.003	0.017	0.052	0.008	0.033	0.005	0.628	M-Agudo Sinter	100g
	202 DH X1133	61.04	5.86	9.51	0.032	1.02	0.551	0.185	0.153	. . .	0.015	0.017	0.007	0.485	1.741	0.101	Carol-Lake	100g
	202 DH X1134	57.77	0.57	12.79	0.066	0.073	0.095	1.61	0.209	0.011	. . .	0.131	0.006	0.080	0.036	2.09	Morro Agudo	100g
	202 DH X5602	58.03	4.64	5.28	0.103	8.54	1.30	1.25	0.362	0.004	0.008	0.093	0.029	0.097	0.196	0.128	Sinter	100g
	202 DH X5605	58.10	7.97	5.82	0.131	8.04	0.76	1.88	0.421	0.004	0.025	0.110	0.029	0.115	0.198	0.122	Sinter	100g
	202 DH X5611	51.78	7.33	6.90	0.156	14.07	1.78	1.30	0.878	0.034	0.030	0.285	0.055	0.152	0.513	0.295	Sinter	100g
	202 DH X5612	53.21	7.48	6.78	0.141	12.74	1.60	1.22	0.759	0.028	0.025	0.255	0.046	0.166	0.464	0.267	Sinter	100g
	202 DH X5614	57.82	5.21	5.56	0.113	8.80	1.08	1.31	0.308	0.012	0.010	0.096	0.032	0.064	0.173	0.122	Sinter	100g
	202 DH X5619	57.33	7.04	6.05	0.102	8.78	1.72	1.38	0.287	0.009	0.031	0.129	0.019	0.037	0.043	0.090	Sinter	100g
	202 DH X5620	58.04	7.64	5.84	0.093	8.19	1.54	1.41	0.241	. . .	0.026	0.126	0.016	0.033	0.041	0.098	Sinter	100g
	202 DH X5621	55.97	5.98	7.90	0.087	8.32	2.04	1.28	0.331	0.006	0.034	0.128	0.110	0.051	0.062	0.129	Sinter	100g

		Total Fe	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Na_2O	K_2O	Mn	P	S	Cu	Ni	Co	V_2O_5	Type	Size
	202 CG 07213	67.01	3.16	0.032	0.22	0.71	1.23	. . .	. . .	0.147	(0.0037)	0.118	. . .	. . .	. . .	. . .		100g
	202 CG 07218a	64.90	3.48	. . .	0.081	0.045	1.58	0.012	0.084	0.056	0.055	0.015	. . .	. . .	. . .	. . .		100g
	202 CG 07219a	54.24	6.38	0.146	11.03	3.21	2.45	0.054	. . .	0.066	0.060	0.014	0.005	. . .	. . .	. . .	Sinter	100g
	202 CG 07219b	52.20	7.46	0.210	11.87	2.94	2.24	0.083	0.26	0.133	0.052	0.045	0.038	0.0042	. . .	. . .	Sinter	100g
	202 CG 07220	61.97	4.92	0.07	3.54	1.64	0.74	0.031	0.053	0.113	0.014	0.039	0.011	0.015	0.008	. . .	Pellets	100g
	202 CG 07220a	65.54	3.06	. . .	0.80	0.039	0.71	. . .	. . .	0.102	0.038	0.0044	0.005	0.0024	. . .	. . .	Pellets	100g
	202 CG 07221a	64.27	3.48	0.108	0.80	1.41	0.91	0.061	0.18	0.117	0.012	0.398	0.056	0.0082	0.0068	. . .		100g
	202 CG 07222	39.47	8.80	0.073	5.20	4.20	1.00	0.032	0.22	0.193	0.045	1.18	0.086	0.024	0.013	. . .	Siderite	100g
	202 CG 07222a	43.66	3.99	0.021	3.37	3.85	0.60	0.024	0.2	0.235	0.034	1.46	0.087	0.0058	0.016	. . .	Siderite	100g
	202 CG 07223	62.76	5.51	0.08	0.10	0.30	0.99	0.014	0.062	0.096	0.043	0.126	0.289	0.0083	0.012	. . .	Hematite	100g
	202 CG 07223a	61.68	9.82	0.067	0.11	0.054	0.48	0.006	0.055	0.026	0.024	0.036	0.061	0.0023	0.0048	. . .	Hematite	100g
	202 CG 07224	32.97	20.33	10.63	6.38	6.16	8.26	. . .	. . .	0.223	0.01	0.687	0.02	0.0094	0.018	0.313	Crude Ore	100g
	202 CG 07225	27.55	25.47	9.72	7.5	6.17	10.29	. . .	. . .	0.205	0.0119	0.566	0.015	0.0083	0.016	0.258	Crude Ore	100g
	202 CG 07226	50.81	5.55	12.34	1.48	3.49	5.11	. . .	. . .	0.26	0.0026	0.570	0.021	0.014	0.020	0.558	Concentrate	100g
	202 CG 07226a	52.66	4.11	12.66	1.04	3.21	4.46	. . .	. . .	0.27	0.0022	0.556	0.019	0.012	0.02	0.572	Concentrate	100g
	202 CG 07227	13.23	36.33	10.74	11.62	8.32	11.47	. . .	. . .	0.187	0.0115	0.446	0.0065	0.0048	0.0098	0.059	Tailings	100g

		Fe	Si	Al	Ca	Mg	Mn	Ti	P	S	Na	K	V	As	Cr	L.O.I	Type	Size
CRM	**202 A AS 004**	62.5	2.34	1.38	0.272	0.069	0.401	0.081	0.042	0.01	0.038	9.021	0.011	0.0012	. . .	1.51	Whyalla Pellets	100g
CRM	**202 A AS 006**	58.42	3.49	2.33	0.025	0.024	0.032	0.113	0.054	0.024	0.015	0.016	0.0034	0.0009	. . .	4.03	Hamersley Low Grade	100g
CRM	**202 A AS 007**	66.19	2.25	0.173	0.014	0.015	0.005	0.031	0.0045	0.0054	0.0085	0.065	0.0013	0.0005	. . .	0.165	Dampier Lump	100g
CRM	**202 TI E677-1**	51.54	11.78	0.32	0.038	0.012	0.16	0.013	0.017	(0.005)	0.007	0.008	. . .	. . .	. . .	. . .		100g
CRM	**202 TI E679-1**	24.2	3.43	1.99	18.07	0.7	0.295	0.106	0.557	0.099	0.054	0.157	0.035	. . .	. . .	. . .		100g
CRM	**202 TI E685-1**	91.1	0.795	0.32	0.14	0.239	0.042	0.22	0.017	0.0031	0.077	0.042	0.144	. . .	. . .	. . .		100g
	202 M BS105	65.95	2.14	0.1	0.5	0.19	0.09	0.008	0.008	(0.001)	0.017	0.014	0.003	0.0013	0.013	. . .	Iron Ore Pellets	100g
CRM	**202 A E681-1**	33.21	8.32	5.62	2.80	0.89	0.22	0.29	0.88	0.103	0.068	0.49	0.077	(0.01)	0.041	C 1.80, F 0.19	Iron Ore	100g
CRM	**202 A E682-1**	68.74	0.226	0.203	0.014	0.018	0.212	0.032	0.036	0.004	(0.0035)	(0.0054)	. . .	. . .	. . .	. . .	Iron Ore	100g
CRM	**202 A E683-1**	56.06	3.38	1.30	5.70	1.04	0.462	0.097	0.148	(0.013)	0.045	0.148	0.026	. . .	0.018	Zn 0.010	Iron Ore Sinter	100g
CRM	**202 A E877-1**	62.07	1.08	0.044	3.23	0.28	1.37	0.032	0.18	0.18	0.23	0.058	0.029	0.014	0.017	Zn 1.16, Pb 1.00	Furnace Dust	100g

		Total Fe	SiO_2	TiO_2	CaO	MgO	Al_2O_3	Na_2O	K_2O	Mn	P	S	Cr	As	Others	Type	Size
CRM	**202 DB E627-2**	31.77	9.24	0.225	15.67	1.57	4.49	. . .	. . .	0.250	0.661	0.114	0.018	0.020		Minette	100g
CRM	**202 DB E629-1**	36.21	19.25	0.216	5.63	1.64	4.07	. . .	. . .	0.390	0.096	0.063	0.016	0.023		Minette	100g
CRM	**202 DB E630-1**	65.63	5.88	0.066	0.10	0.47	0.88	. . .	. . .	0.060	0.043	0.032	. . .	. . .		Bomi-Hill	100g
CRM	**202 DB E631-1**	61.09	3.20	0.109	0.75	0.54	1.06	(0.04)	(0.04)	0.044	0.114	0.033	. . .	. . .		Venezuela	100g
CRM	**202 DB E678-1**	60.76	3.70	0.22	5.50	0.94	0.53	0.15	0.13	0.075	1.61	0.021	. . .	. . .	F, V	Kiruna D	100g
CRM	**202 DB E680-1**	59.98	8.98	0.08	0.63	0.23	1.23	0.172	0.094	0.025	0.018	0.544	0.005	0.057	Zn, Pb, Co	Purple	100g
CRM	**202 DB E686-1**	69.44	0.018	0.0022	0.014	0.0045	0.077	0.0078	0.0029	0.231	0.0078	. . .	0.0182	. . .	Cl, Co, Cu, Mo, Ni, Sn	Iron Oxide	100g
CRM	**202 B 690**	66.85	3.71	0.022	0.20	0.18	0.18	0.003	0.0030	0.18	0.011	0.003	. . .	. . .		Canada	100g
CRM	**202 B 691**	90.8	3.7	0.27	0.63	0.52	1.22	0.186	. . .	0.033	0.006	0.008	. . .	. . .	C, Co, Cu	Reduced oxide	100g
CRM	**202 B 692**	59.58	10.14	0.045	0.023	0.035	1.41	0.008	0.039	0.36	0.039	0.005	. . .	. . .		Labrador	100g
CRM	**202 E 21A**	68.48	0.96	0.038	0.013	0.022	0.75	(0.003)	(0.003)	0.017	0.015	(0.003)	0.012	. . .	Zn		90g
CRM	**202 E 123**	65.1	2.76	0.056	3.31	0.043	0.46	. . .	0.013	0.073	0.026	0.003	0.0056	. . .	Zn, Cu, Cr, Pb, Ni, V		100g

		Fe	Si	Al	Ca	Mg	Ni	Zn	Pb	Cu	Co	ppm As	S sulfide	S free	S sulfate	S total	Type	Size
CRM	**202 A RTS-1**	19.64	19.89	4.26	2.67	2.67	0.0022	0.0553	0.0105	0.0595	0.00166	8.2	(0.0)	(0.50)	1.26	1.66	Sulfide tailings	100g
CRM	**202 A RTS-2**	37.4	2.92	0.83	0.53	0.35	0.2430	0.0117	0.0045	0.0670	0.0072	6.3	(0.61)	(14.47)	3.87	18.95	Sulfide tailings	100g
CRM	**202 A RTS-3**	21.04	15.99	4.79	2.20	2.45	0.0071	0.1850	0.0146	0.2820	0.0260	9.1	(5.63)	(2.81)	1.54	9.98	Sulfide tailings	100g
CRM	**202 A RTS-4**	56.7	0.998	0.339	0.327	0.179	0.7940	0.0158	0.0060	0.0280	0.0186	207	(35.2)	(0.43)	0.27	35.9	Sulfide tailings	25g
	202 CG 07267	46.08	. . .	. . .	. . .	. . .	0.0034	0.0219	0.00234	0.0431	0.00039	14.4	. . .	. . .	. . .	52.72	Sulfide	10g

20.6 Ores

		Al_2O_3	Fe_2O_3	SiO_2	TiO_2	ZrO_2	P_2O_5	V_2O_5	Cr_2O_3	CaO	MgO	MnO	ZnO	K_2O	Na_2O	SO_3	L.O.I.	Size
	(Al) Aluminium																	
CRM	**206 B 600**	40.0	17.0	20.3	1.31	0.06	0.039	0.06	0.024	0.22	0.05	0.013	0.0030	0.23	0.022	0.16	20.5	90g
CRM	**206 B 69B**	48.8	7.14	13.43	1.9	0.29	0.118	0.028	0.011	0.13	0.085	0.11	0.0035	0.068	(0.025)	0.55	27.2	60g
CRM	**206 B 696**	54.5	8.7	3.79	2.64	0.14	0.05	0.072	0.047	0.018	0.012	0.004	0.0014	0.009	(0.007)	0.15	29.9	60g
CRM	**206 B 697**	45.8	20.0	6.81	2.52	0.065	0.97	0.063	0.1	0.71	0.18	0.41	0.0037	0.062	(0.036)	0.077	22.1	60g
CRM	**206 B 698**	48.2	19.6	0.69	2.38	0.061	0.37	0.064	0.08	0.62	0.058	0.38	0.0029	0.01	(0.015)	0.143	27.3	60g
CRM	**206 A 394**	88.8	1.9	4.98	3.11	(0.15)	0.22	...	(0.08)	0.08	0.12	...	...	0.02	0.02	...	(0.4)	100g
CRM	**206 A 395**	52.4	16.3	1.24	1.93	...	...	...	(0.066)	0.05	0.02	0.0054	(0.0035)	(0.02)	(0.02)	...	27.8	100g
	206 CA BXT-01	58.3	5.1	0.95	3.46	0.09	0.13	0.07	0.065	0.57	0.02	0.02	0.002	0.01	0.04	0.05	31.08	100g
	206 CA BXT-02	50.9	17.8	1.56	1.87	0.05	0.15	0.06	0.068	0.04	0.09	0..01	0.009	0.01	0.04	0.08	27.0	100g
	206 CA BXT-03	54.1	11.7	3.79	1.05	0.06	0.02	0.04	0.016	<0.01	0.01	0.01	0.002	<0.01	0.02	0.09	28.9	100g
	206 CA BXT-04	48.5	17.0	2.68	5.32	0.06	0.13	0.19	0.090	0.02	0.05	0.04	0.003	0.03	0.02	0.13	25.7	100g
	206 CA BXT-05	46.8	19.2	1.98	2.25	0.06	0.38	0.11	0.108	1.13	0.08	0.32	0.026	0.01	0.03	0.21	27.2	100g
	206 CA BXT-06	48.7	18.9	0.80	2.67	0.07	0.61	0.13	0.134	0.13	0.06	0.27	0.023	0.01	0.03	0.15	27.2	100g
	206 CA BXT-07	44.6	25.2	2.41	2.41	0.07	0.14	0.07	0.047	0.01	0.04	0.08	0.006	0.01	0.02	0.16	24.7	100g
	206 CA BXT-08	51.5	9.6	3.17	9.41	0.10	0.26	0.19	0.048	0.02	0.04	0.02	0.006	0.02	0.02	...	25.6	100g
	206 CA BXT-09	53.4	14.5	7.57	2.98	0.12	0.07	0.06	0.037	0.01	0.002	0.03	0.040	0.01	0.01	0.06	20.8	100g
	206 CM 1778	90.58	1.82	4.20	2.13	...	...	...	...	0.16	0.038	...	...	0.12	0.19	...	...	90g
	206 CM 1770	79.26	1.12	1.49	3.05	...	0.148	...	...	0.060	0.077	...	...	...	...	...	14.38	50g
	206 CM 1769	57.16	1.45	6.19	4.00	...	0.17	...	...	0.089	0.28	...	...	0.15	0.042	...	0.21	100g
	206 ML SRC-28	55.1	9.46	2.64	2.58	0.13	0.07	...	...	...	...	...	...	...	...	...	29.7	75g
	206 ML SRC-38	60.5	1.44	2.54	3.16	...	...	...	...	...	...	...	...	...	...	...	31.5	75g
	206 ML SRC-39	58.4	0.98	6.46	2.78	...	...	...	...	...	...	...	...	...	...	...	30.3	75g
	206 ML SRC-40	52.8	1.30	15.6	3.01	...	...	...	...	...	...	...	...	...	...	...	26.1	75g
	206 ML SRC-41	52.6	14.1	2.02	2.04	...	...	...	...	...	...	...	...	...	...	...	28.5	75g
	206 ML SRC-45	48.6	20.3	2.82	2.52	...	...	...	...	...	...	...	...	...	...	...	24.6	50g
	206 ML SRC-78	58.4	5.60	0.88	3.59	0.07	0.12	...	0.10	0.02	...	0.02	...	...	...	0.05	30.7	50g

		Sb	Al	Si	Ca	Mg	Na	K	Fe	As	C	Cu	Pb	S	Size
	(Sb) Antimony														
CRM	**206 A CD 1**	3.57	(5.5)	(32.9)	(1.4)	(0.6)	(0.1)	(1.8)	(2.8)	0.66	(0.2)	<0.01	(0.02)	(3.1)	200g

		Ba	SO_3	F	Sr	Type	Size
	(Ba) Barium						
	206 GB 38	51.52	30.77	2.89	(0.85)	Barytes UK	80g

		SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	Fe_2O_3	P_2O_5	Be	F	MnO	TiO_2	L.O.I.	Others	Size
	(Be) Beryllium															
	206 CG 07150	73.97	14.86	0.582	0.071	4.79	0.82	0.513	0.012	0.060	0.019	0.030	0.015	0.68	Plus a further 17 elements,	100g
	206 CG 07151	73.99	14.86	0.584	0.069	4.67	0.87	0.593	0.013	0.365	0.041	0.036	0.016	0.73	mostly rare-earths	100g

		Al_2O_3	Fe_2O_3	SiO_2	TiO_2	B_2O_3	F	BaO	SrO	CaO	MgO	K_2O	Na_2O	SO_3	L.O.I.	Type	Size
	(B) Boron																
	206 B 1835	3.474	1.141	18.408	0.1332	18.739	0.348	0.0497	0.9418	21.622	3.411	1.261	3.484	1.477	25.724	Borate	60g

		Cr_2O_3	Al_2O_3	SiO_2	CaO	MgO	Total Fe	FeO	MnO	P	S	TiO_2	V_2O_5	L.O.I.	Type	Size
	(Cr) Chromium															
CRM	**206 S 870-2**	48.14	11.62	3.96	...	15.54	14.04	...	...	(0.002)	0.018	...	...	...		100g
	206 GB 30	35.0	(29.12)	(2.76)	...	(16.63)	11.2	...	...	...	...	0.23	...	...	Philippines	50g
CRM	**206 A 308**	41.5	19.4	4.25	0.34	16.4	...	15.3	(0.14)	...	...	(0.16)	...	...	Greece	100g
	206 GC 2CAS5	35.8	23.2	5.55	0.57	16.8	11.5	...	0.13		...	0.29	...	0.76	Chrome Ore	100g
	206 GC AN22	34.0	29.3	3.45	0.39	16.5	...	...	0.14		...	0.26	...	...		100g
CRM	**206 A SA 8**	48.97	10.57	4.3	0.26	14.69	14.13	(13.9)	0.25	0.0039	0.0341	0.24	0.14	...	Chromite	100g
CRM	**206 A SA 9**	46.45	15.17	0.61	(0.16)	10.85	19.41	(17.5)	0.21	0.0024	0.0028	0.56	0.32	...	Chromite	100g
	206 CG 07201	49.44	12.1	4.08	0.36	15.66		(13.06)	0.28	0.001		0.12		1.55		200g
	206 CG 07202	48.97	13.37	4.2	0.66	16.95		(9.13)	0.12	0.001		0.077		1.63	Plus further 14 elements	200g

		% Cu	% Fe	% Mn	% Pb	% S	% Zn	% SiO_2	% Sb	% Se	ppm Au	ppm Ag	% Cd	% As	ppm Co	ppm Ni	Type	Size
	(Cu) Copper																	
	206 GB 44	40.33	1.01	0.122	34.86	14.34	1.51	...	0.346	...	...	691	0.103	1.14	198	615	Matte - Australia	80g
CRM	**206 PN MR1**	1.23	1.41	...	0.15	...	0.040	(60)	...	...	...	58	...	0.0280	...	...		200g
CRM	**206 PN MR2**	1.61	0.88	...	0.085	...	0.025	(22)	...	...	...	29	...	0.0130	...	...		200g
CRM	**206 PN MR3**	1.87	1.10	...	0.16	...	0.047	(49)	...	...	...	44	...	0.0057	...	...		200g
CRM	**206 PN RM2**	2.28	1.34	...	...	1.10	...	...	...	...	...	260	...	...	170	120		150g
CRM	**206 PN ZM6**	2.12	46.72	...	...	1.04	...	...	...	...	...	31	...	...	3900	800	Converter slag	250g
	206 A CCU-1C	25.62	29.34	0.012	(0.34)	33.3	3.99	2.52	(0.004)	0.0107	4.94	129	0.0136	0.0034	...	...	Flotation concentrate	200g
	206 CG 07268	33.30	30.30	0.0048	0.0128	34.69	0.30	...	0.0003	0.0048	...	846	0.00202	0.00031	75.1	41.3	sulphide	10g

20.6 Ores (continued)

	Cu	S	Zn	Al_2O_3	SiO_2	CaO	TiO_2	Fe_2O_3	MnO	MgO	Na_2O	K_2O	F		Size
(Cu) Copper (continued)															
206 CG 07233	1.15	0.72	0.059	1.73	9.27	9.61	0.079	55.58	0.60	3.91	0.044	0.071	0.079	Plus a further 37 elements	100g
206 CG 07234	0.19	0.14	0.013	15.18	53.26	4.95	0.50	12.25	0.12	1.30	3.21	2.71	0.080	analysed all at ppm	100g

	SiO_2	TiO_2	Al_2O_3	Fe_2O_3	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	S	Cu	Zn	Pb	Ba	FeO	
206 BG COD 260A	48.46	0.49	10.84	15.79	0.022	0.19	0.38	0.08	0.62	0.19	13.96	2.75	0.2	0.16	2.19	...	
206 BG COD 53B	67.21	0.48	14.85	4.34	0.044	2.33	1.1	3.76	1.88	0.144	0.85	0.361	0.415	0.0288	0.0247	1.89	continued

Continuation from above	All Elements ppm															
	As	Au	Ag	Co	Cd	Cr	La	Li	Ni	Rb	Sc	F	V	Zr	L.O.I	
206 BG COD 260	7000	3.3	33.7	20	14	...	...	130	...	...	...	...	...	...	...	50g
206 BG COD 53A	...	0.27	...	7	...	21	17	16	12	59	9	...	123	120	3.29	50g

	ppm Au	ppm Ag	% S	Type	Size
(Au) Gold					
CRM **206 A SA 54**	0.215	...	...		500g
CRM **206 A SA 56**	2.69	(1.7)	...	Tails	500g
CRM **206 A GTS-2**	0.346	...	(1.1)	Tails	400g
CRM **206 A MA1B**	17.0	(4.0)	(1.17)	Au Ore	200g
CRM **206 A MA2C**	3.02	(0.051)	(0.23)	Au Ore	400g
CRM **206 A MA3A**	7.49	(1.5)	(0.56)	Au Ore	200g
CRM **206 B 886**	8.25	...	1.466	Calcined	200g
206 CG 07203	3.59	5.41	...		1kg
206 CG 07204	7.16	3.34	...		1kg
206 CG 07205	14.0	19.4	...		1kg
206 CG 07206	19.4	24.6	...		1kg
206 CG 07207	0.008	0.33	...		1kg
206 CG 07208	0.051	2.06	...		1kg
206 CG 07209	0.421	9.08	...		1kg

	ppm Au	ppm Ag	Al_2O_3	SiO_2	Fe_2O_3	MnO	CaO	K_2O	MgO	TiO_2	Cu	Pb	Zn	S	
206 BG 325	11.2	6	12.03	52.76	10.42	0.26	3.31	5.17	3.56	0.51	0.204	2.03	0.50	4.7	
206 BG 326	4.3	17.2	7.09	42.32	8.36	0.50	10.27	...	2.54	0.23	0.510	5.47	4.06	6.06	continued
206 BG 327	0.46	20.0	6.53	28.81	34.43	0.14	0.63	0.94	3.09	0.30	6.65	0.053	0.028	21.14	
206 BG 328	93	1700	3.64	40.52	17.96	0.128	2.81	...	0.79	0.16	2.11	13.62	0.18	12.52	

Continuation from above	All Elements ppm							Type	Size
	Cd	Co	Ni	Bi	As	Pd	Pt		
206 BG 325	32.6	21.5	17.0	...	...	...	...	gold -pyrite Zidarovo	50g
206 BG 326	212	13.5	12	90	...	...	...	polymetallic gold ore Zidarovo	50g
206 BG 327	2	229	38	879	100	...	...	copper-pyrite Zidarovo	50g
206 BG 328	38.8	71	174	...	578	0.028	0.048	polymetallic gravity concentrate	50g

	Pb	Cu	Zn	S	F	SiO_2	Al_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	Fe_2O_3	MnO		Size
(Pb) Lead																
206 CG 07235	4.17	0.2	0.062	0.86	0.27	43.63	12.88	0.53	19.51	1.62	1.61	1.42	4.37	1.40	Plus a further ~40 elements	100g
206 CG 07236	0.61	0.035	0.092	0.38	0.23	30.51	8.95	0.44	34.56	2.06	0.066	0.82	3.79	1.53	analysed all at ppm levels	100g
206 CG 07269	84.26	0.0127	0.0533	13.30	...	...	...	...	...	...	...	...	...	...	Plus 12 other associated elements	10g
CRM **206 PN KO12**	61.43	...	2.48	17.95	...	0.58	0.12	...	1.91	0.89	...	...	12.04	...	Plus 6 other associated elements	400g

	Pb	Cu	Zn	S	Fe	SiO_2	Al_2O_3	CaO	MgO	C	Mn	As	Cd	ppm Ni	ppm Ag	Type	Size
206 SI RPZ-PF	3.85	0.29	12.85	12.57	5.16	14.32	1.66	14.12	8.48	5.77	1.35	0.023	0.026	7.1	70	Feed stock	120g
206 SI RPZ-PC	52.13	0.66	7.05	16.76	5.03	1.26	0.22	4.06	2.30	3.45	0.39	0.059	0.015	5.2	660	Concentrate	120g

	SiO_2	Al_2O_3	CaO	MgO	Na_2O	K_2O	Fe_2O_3	P_2O_5	Be	F	Li_2O	Cs_2O	Rb_2O	L.O.I.	Others	Size
(Li) Lithium																
206 CG 07152	74.37	14.76	0.335	0.054	4.19	3.17	0.394	0.173	0.018	0.667	0.460	0.037	0.145	1.48	Plus a further ~20 elements,	100g
206 CG 07153	64.64	19.12	0.076	0.036	2.33	4.80	0.301	0.237	0.026	3.12	2.29	0.177	0.735	4.06	mostly rare-earths at ppm levels	100g

	Mn	Al	SiO_2	CaO	MgO	Na_2O	K_2O	Fe	As_2O_3	BaO	P	S	TiO_2	Others	Type	Size
(Mn) Manganese																
206 GB 29	58.96	...	(2.21)	...	...	...	...	...	...	0.66	...	...	...	Cu (0.185)	Pyrolusite (Morocco)	40g
CRM **206 E 52**	46.1	5.62	3.06	0.15	0.25	0.1	1.6	2.4	0.0026	0.32	0.035	0.018	0.28	Ni, Co, Cu, Pb		120g
CRM **206 S 861-1**	49.22	2.04	5.46	(0.1)	...	...	...	3.15	...	1.44	0.087	(0.006)	...	O 13.45		100g
CRM **206 A SA 16**	49.17	(0.16)	5.04	4.7	0.76	(0.03)	0.02	11.48	...	0.6	0.033	0.17	...	Zn 0.0364	Wessels	100g
CRM **206 A SA 17**	38.81	0.13	4.69	(14.4)	3.03	0.09	0.09	4.27	...	(0.08)	0.018	(0.01)	...	CO_2 15.4	Mamataran	100g
CRM **206 A 176/2**	47.5	2.75	2.53	0.09	0.04	0.11	1.30	6.86	0.22	0.19	0.087	0.018	0.30			100g
CRM **206 DB E633-1**	47.85	0.92	10.39	2.02	0.58	...	...	1.64	...	1.13	0.170	0.227	0.079			100g
CRM **206 B 25d**	51.78	2.82	2.52	...	...	...	0.93	2.74	...	...	0.06	...	0.13	O 14.28		60g

20.6 Ores (continued)

	Mn	Fe	SiO_2	Al_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	S	P	Cu	Zn	Ni	BaO	Type	Size
(Mn) Manganese (continued)																	
206 DH X4301	36.01	21.48	7.49	0.69	0.039	2.13	0.402	0.353	0.70	...	0.035	...	0.014	...	0.447		100g
206 DH X4302	36.80	20.26	9.57	0.538	0.035	3.93	0.619	0.083	0.107	...	0.019	...	0.035	...	0.823		100g
206 DH X4303	29.05	30.01	3.63	2.17	0.070	0.060	0.032	0.017	0.244	...	0.052	...	0.002	...	0.133		100g
206 DH X4304	30.65	28.25	2.41	2.96	0.104	0.078	0.064	0.012	0.261	...	0.066	...	0.002	...	0.228		100g
206 DH X4305	36.37	9.32	11.72	1.28	0.070	8.57	1.81	0.109	0.198	...	0.025	...	0.022	0.017	0.428		100g
206 CG 07261	45.39	1.22	16.16	2.20	0.063	1.06	0.64	0.044	1.00	0.007	0.054	0.013	0.027	0.019	0.68		100g
206 CG 07262	36.99	2.24	22.24	3.00	0.10	3.60	1.44	0.048	0.46	0.013	0.081	0.014	0.029	0.019	0.47		100g
206 CG 07263	32.54	11.24	14.50	8.55	0.43	0.083	0.11	0.039	0.93	0.019	0.207	0.036	0.064	0.099	0.18		100g
206 CG 07264	25.00	20.99	10.46	8.97	0.54	0.051	0.10	0.030	0.72	0.032	0.275	0.028	0.048	0.073	0.23		100g
206 CG 07265	22.54	1.40	14.07	1.68	0.10	14.73	3.50	0.024	0.46	0.21	0.043	0.009	0.009	0.041	0.13		100g
206 CG 07266	15.74	2.07	15.82	2.49	0.15	19.78	3.82	0.04	0.70	0.27	0.061	0.014	0.020	0.050	0.15		100g
206 CG 07265 and 66 are certified for Mn(CO) at 22.46% and 15.69% respectively.																	
206 CG 07295	24.7	5.2	15.45	5.2	1.37	2.67	3.03	2.56	1.08	0.14	0.26	0.69	0.092	1.02	many	polymetallic nodule	70g
206 CG 07296	32.2	4.7	12.30	4.7	0.54	2.25	3.56	3.03	1.14	0.11	0.16	1.36	0.160	1.55	others	polymetallic nodule	70g
206 S JMn-1	25.63	10.08	14.11	4.30	1.06	2.91	3.12	2.80	0.94	0.094	0.24	1.1132	0.1068	1.2632	many others	nodule	100g

	Mo	Al	Si	Ca	S	Na	K	Fe	Bi	O	C	F	Mn	H_2O	W	Type	Size
(Mo) Molybdenum																	
206 GB 27	0.276	...	...	...	...	...	...	1.76	...	...	...	...	...	...	0.036	Mo-W ore	60g

	Mo	W	SiO_2	Al_2O_3	CaO	Fe_2O_3	MgO	Na_2O	K_2O	MnO	F	S				Type	Size
206 CG 07238	1.51	0.36	34.10	3.46	31.44	21.34	0.86	0.075	0.046	1.40	4.08	1.64	Plus a further ~40 elements			Tailings	100g
206 CG 07239	0.11	0.10	46.67	7.27	23.03	14.66	1.83	0.77	0.82	1.49	1.33	0.48	analysed all at ppm levels			Tailings	100g

	Mo	Fe	SiO_2	Al_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	S	P_2O_5	CuO	ZnO	PbO	C	Type	Size
206 DH X4701	58.02	1.60	7.05	0.902	0.078	1.11	0.984	0.103	0.242	0.111	0.032	0.38	0.046	0.053	0.322	concentrate	100g
206 DH X4702	63.29	1.21	2.88	0.495	0.034	0.143	0.129	0.110	0.106	0.033	0.067	0.582	0.011	0.004	0.008	concentrate	100g
206 DH X4703	60.12	1.76	6.01	0.925	0.106	0.355	0.14	0.015	0.26	0.092	0.076	0.070	0.138	0.399	0.004	concentrate	100g
206 DH X4704	57.46	2.62	6.89	0.995	0.041	0.415	0.577	0.316	0.178	0.132	0.020	1.27	0.022	0.021	0.013	concentrate	100g
206 DH X4705	55.50	3.61	9.71	1.08	0.048	0.423	0.182	0.415	0.357	0.063	0.022	0.539	0.118	...	0.008	concentrate	100g

	% Ni	% Al	% Si	% Ca	% Mg	% Fe	% Au	ppm Ag	ppm Co	% Cu	% Pb	% Pd	ppm Pt	ppm S	Type	Size
(Ni) Nickel																
CRM **206 A SU1A**	1.233	(5.0)	(17.8)	(3.5)	(3.0)	(20.0)	(0.2)	4.3	0.041	0.967	(0.01)	0.37	0.41	(10.0)	Ni-Cu-Co Ore	200g
206 SI BCL-NCT1	0.13	...	21.57	...	...	13.06	...	...	61	0.041	...	...	...	3.36	Ni-Cu-Co Tailings	100g
206 GB 21	1.97	...	...	...	...	23.59	...	...	0.069	0.798	...	...	...	...	Norite (Canada)	50g
206 GB 22	1.255	...	...	...	...	22.88	...	...	0.051	0.106	...	...	...	...	Serpentinite (Canada)	40g

	Nb_2O_5	Fe	SiO_2	Al_2O_3	TiO_2	CaO	MgO	K_2O	ZrO_2	CeO_2	La_2O_3	Nd_2O_4	Ta_2O_5	U_3O_8	BaO	SrO	Size
(Nb) Niobium																	
206 DH X1801	0.696	5.68	8.75	2.61	0.266	26.86	13.53	1.38	0.094	0.096	0.042	0.051	0.005	0.002	0.154	0.123	100g
206 DH X1802	0.200	5.72	8.91	2.67	0.237	26.96	13.51	1.41	0.074	0.098	0.041	0.049	0.002	0.002	0.162	0.116	100g
206 DH X1803	60.62	3.50	1.91	0.291	4.26	13.02	0.136	0.233	0.847	0.556	0.153	0.207	0.273	0.202	0.201	1.20	100g
206 DH X1807Q	61.95	2.29	2.28	0.382	3.86	13.18	0.150	0.320	0.868	0.567	0.150	0.209	0.276	0.190	0.192	1.18	100g
206 DH X1808Q	56.71	5.41	3.52	0.614	3.92	11.67	0.177	0.463	0.837	0.588	0.185	0.214	0.265	0.153	0.277	1.31	100g

	Nb	Al	Si	Ca	Mg	Na	K	Fe	Mn	P	S	Ta	Ti	L.O.I		Size
CRM **206 A OKA-1**	0.37	(0.9)	(2.4)	(31.3)	(1.3)	(0.2)	(0.3)	(2.8)	(1.1)	(1.1)	(0.6)	...	...	31.9		200g

	% Ca	% Fe	% S	% Cu	% Ni	% Co	ppm Pt	ppm Pd	ppm Au	ppm Ag	ppm Rh	ppm Ru	ppm Os	ppm Ir	Type	Size
Noble Metals																
CRM **206 A SA 7**	...	...	...	...	...	...	3.74	1.53	0.31	0.42	0.24	0.43	0.063	0.074	Pt Ore	500g
206 SI MIM-C1	...	...	...	3.57	4.37	0.12	51.9	35.3	6.83	...	3.55	3.40	...	1.75	Pyroxenite concentrate	120g
206 SI MIM-C2	...	...	...	3.31	4.28	0.123	44.5	33.4	4.90	(5.5)	4.01	3.76	...	2.18	Pyroxenite concentrate	120g
206 SI MIM-O1	...	...	...	0.1134	0.2104	0.0117	1.97	1.55	0.31	...	0.16	0.18	...	0.11	Pyroxenite ore	120g
206 SI MIM-T1	...	...	...	0.0176	0.0743	0.0083	0.51	0.43	0.14	...	0.054	0.065	...	0.08	Pyroxenite tailings	120g
206 SI MIM-T2	...	...	...	0.018	0.084	0.007	0.358	0.384	0.13	...	0.048	0.055	...	<0.5	Pyroxenite tailings	120g
206 SI TATNC-T1	2.45	33.21	25.46	3.96	6.41	0.18	1.61	10.3	0.49	10.5	0.21	0.05	...	...	Ni-Cu Concentrate	100g
CRM **206 A TDB-1**	(6.9)	10.4	(0.03)	0.0323	0.0092	...	0.0058	0.0224	0.0063	...	(0.0007)	(0.0003)	...	(0.00015)	diabase rock	400g
206 A WGB-1	(11.27)	4.7	(0.02)	...	...	...	0.0061	0.0139	0.0029	...	(0.00032)	(0.0003)	...	(0.00033)	gabbro rock	400g
206 A WMG-1	(10.7)	(11.9)	(3.5)	...	...	...	0.731	0.382	0.110	...	0.026	0.035	(0.024)	0.046	mineralised gabbro	400g
206 A WMS-1	(1.1)	...	(32)	...	...	...	1.741	1.185	0.279	...	0.225	0.099	(0.119)	0.235	massiuve sulfide	200g
206 A WPR-1	(1.4)	(9.9)	0.9	...	...	...	0.285	0.235	0.042	...	0.0134	0.022	(0.013)	0.0135	altered peridotite	400g
CRM **206 A PTC1A-1A**	...	(34.6)	(31.8)	13.51	10.03	(0.30)	2.72	4.48	1.31	56.0	0.33	(0.21)	...	(0.11)	Concentrate	200g
CRM **206 A PTM1A-1A**	...	(1.48)	(22.4)	24.96	47.44	(1.97)	7.31	10.01	3.3	(135)	(0.92)	(0.7)	...	(0.35)	Ni-Cu Matte	400g
CRM **206 A PTA1-1**	(1.2)	(63.0)	...	...	...	...	3.05	...	...	...	...	...	...	...	Pt Blacksand	400g
CRM **206 A UMT-1**	...	...	...	(0.0743)	(0.1396)	(0.0077)	0.0129	0.0106	0.0048	...	0.001	...	...	...	Ultramafic Tailings	400g

20.6 Ores (continued)

	REO	ThO_2	La_2O_3	CeO_2	Pr_6O_{11}	Nd_2O_3	Sm_2O_3	Eu_2O_3	Gd_2O_3	Tb_4O_7	Dy_2O_3	Ho_2O_3	Er_2O_3	Tm_2O_3	Lu_2O_3	
(R.E.) Rare Earths																
206 GB 40	7.78	(0.023)	2.43	(3.96)	0.33	0.97	(0.06)	(0.010)	(0.019)	(0.0067)	(0.0028)	(0.0050)	(0.00097)	(0.0003)	(0.0129)	continued
206 GB 41	64.21	(0.121)	20.9	(32.24)	2.74	(7.61)	(0.52)	(0.075)	(0.151)	(0.068)	(0.0157)	(0.0034	(0.0049)	(0.00105)	(0.050)	
206 CG 07158	0.092	0.0028	0.000003	0.0092	0.0049	0.02	0.0034	0.0008	0.0032	0.0005	0.0027	. . .	0.0016	0.0002	0.0002	
206 CG 07159	0.085	0.0047	0.0020	0.0022	0.0006	0.0028	0.0016	0.00004	0.0032	0.0008	0.0056	. . .	0.0036	0.0006	0.0006	
206 CG 07160	0.486	0.0045	0.00001	0.0035	0.0045	0.02	0.02	0.0002	0.03	0.0058	0.04	. . .	0.02	0.0032	0.0030	
206 CG 07161	0.784	0.0027	0.00003	0.02	0.05	0.19	0.03	0.0075	0.03	0.0041	0.02	. . .	0.01	0.0015	0.0014	

Continuation from above	Y_2O_3	Yb_2O_4	SiO_2	Al_2O_3	Fe_2O_3	MgO	CaO	Na_2O	K_2O	Rb_2O	Sc_2O_3	Others	Type	Size
206 GB 40	(0.00047)	(0.014)	(16.59)	2.1	3.28	(4.02)	(16.99)	(0.12)	(1.28)	. . .	. . .	several	Bastnazite	90g
206 GB 41	(0.080)	(0.066)	(0.82)	(0.073)	(0.42)	(0.26)	(4.52)	(0.13)	(0.01)	. . .	. . .	several	Bastnazite conc.	90g
206 CG 07158	0.0014	0.02	67.28	19.04	3.49	0.229	0.033	0.062	2.13	0.012	0.0011			100g
206 CG 07159	0.0037	0.057	74.55	14.70	1.15	0.077	90.026	0.158	4.98	0.069	0.0010			100g
206 CG 07160	0.02	0.30	74.34	14.65	1.13	0.08	0.031	0.155	4.92	0.067	0.0009			100g
206 CG 07161	0.0100	0.12	66.72	19.00	3.46	0.231	0.029	0.064	2.11	0.011	0.0012			100g

	ppm Ag	Size
(Ag) Silver		
206 CG 07255	46.9	500g
206 CG 07256	112	500g
206 CG 07257	298	500g
206 CG 07258	446	500g
206 CG 07259	559	500g
206 CG 07260	732	500g

	Ta	Al	SiO_2	Ca	Mg	Na	K	Fe	Mn	Nb	Sn	Ti	Type	Size
(Ta) Tantalum														
206 A TAN1-1	0.236	(8.2)	(71.5)	(0.5)	(0.02)	(4.6)	(1.5)	(0.2)	(0.02)	(0.02)	(0.01)	. . .	Ta ore	200g

	Sn	Al	Si	Ca	Mg	Fe	As	Bi	Cu	F	S	Ti	W	Zn	Type	Size
(Sn) Tin																
CRM **206 F 010**	76.59	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		225g
206 GB 26	33.36	. . .	. . .	. . .	. . .	12.03	. . .	. . .	2.11	. . .	. . .	. . .	13.52	. . .	Sn-W ore	40g
CRM **206 A 355**	31.42	4.12	7.14	2.63	0.35	17.08	0.14	0.015	0.085	2.07	0.5	0.37	0.35	0.059		100g
206 CG 07231	45.8	. . .	. . .	. . .	. . .	21.33	0.574	0.034	. . .	. . .	0.183	. . .	. . .	. . .	continued	
206 CG 07232	62.49	. . .	. . .	. . .	. . .	9.53	0.306	0.016	0.043	. . .	0.09	. . .	. . .	. . .		

Continuation from above	Pb	Sb	Zn	Ag	SiO_2	WO_2	Type	Size
206 CG 07231	2.89	0.024	0.264	0.00255	. . .	. . .	Concentrate	100g
206 CG 07232	1.62	0.016	0.12	. . .	0.93	0.182	Concentrate	100g

	TiO_2	Fe_2O_3	SiO_2	Al_2O_3	MgO	CaO	MnO	Cr_2O_3	V_2O_5	Ti	Total Fe	Others	Type	Size
(Ti) Titanium														
CRM **206 A SA 59**	48.8	50.3	0.75	0.61	0.56	0.05	1.05	0.1	0.25	. . .	. . .	. . .	Ilmenite	100g
CRM **206 A SA 61**	93.3	0.68	2.03	0.93	. . .	. . .	. . .	0.11	0.42	. . .	. . .	. . .	Rutile	100g
206 GB 32	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	57.19	. . .	Nb (0.26)	Rutile	40g
CRM **206 B 670**	96.16	0.86	0.51	. . .	. . .	. . .	. . .	0.23	0.66	. . .	. . .	ZrO_2 0.84	Rutile	90g
206 DH X6703	28.74	. . .	5.67	3.40	2.47	0.99	. . .	0.108	0.25	. . .	40.92	many	Ilmenite	100g
206 DH X6704	31.92	. . .	7.93	4.64	2.81	1.30	. . .	0.109	0.286	. . .	36.23	many	Ilmenite	100g
206 DH X5802	93.76	0.629	2.04	0.449	. . .	0.048	0.007	0.113	0.454	. . .	. . .	many	Rutile	100g
206 DH X5803	91.47	1.22	3.07	0.668	. . .	0.131	0.056	0.213	0.455	. . .	. . .	many	Rutile	100g

	W	Mo	Bi	Ag	Sn	Al	SiO_2	Ca	Mg	Fe	S	Cu	Zn	As	Type	Size
(W) Tungsten																
CRM **206 A CT-1**	1.04	(0.03)	. . .	. . .	. . .	(2.9)	(36.82)	(12.2)	(2.0)	(17.5)	. . .	. . .	. . .	. . .	Scheelite Ore	200g
CRM **206 A BH-1**	0.422	(0.02)	. . .	. . .	. . .	(3.5)	(81.34)	(0.5)	(0.4)	(3.2)	. . .	. . .	. . .	. . .	Wolframite Ore	200g
CRM **206 A TLG-1**	0.083	(<0.01)	. . .	. . .	. . .	(3.0)	(46.02)	(166.0)	(2.7)	(8.6)	. . .	. . .	. . .	. . .	Scheelite Ore	200g
CRM **206 A MP=2**	0.65	0.281	0.245	0.00049	0.043	(5.4)	(76.1)	(2.7)	(0.04)	(3.7)	(0.7)	(0.9)	(0.4)	(0.2)	W-Mo-Bi Ore	200g

	W	Cu	Pb	Zn	Bi	Sn	S	F	Al_2O_3	SiO_2	Fe_2O_3	CaO	MgO	K_2O	Type	Size
206 CG 07240	0.015	0.079	0.26	0.29	0.011	0.14	3.12	9.91	8.24	32.27	7.79	37.73	1.45	1.94	Tailings	100g
206 CG 07241	0.22	0.096	0.00812	0.010	0.068	0.17	1.90	4.48	11.15	71.27	5.60	4.17	0.14	1.58	Tailings	100g

Each sample is also certified for ~30 other elements, all at ppm levels

	% WO_2	ppm As	ppm Bi	ppm Mo	ppm P	ppm S	ppm Ca	ppm Fe	ppm Pb	ppm Mn	ppm Nb	ppm Si	ppm Sn	ppm Ti	Ore Type	Size
CRM **206 B 277**	67.4	(0.015)	(0.07)	(0.06)	(0.03)	(0.25)	(0.37)	(7.4)	(0.07)	(10.0)	(1.00)	(0.85)	(0.54)	(2.2)	Concentrate	100g
CRM **206 B 2430**	70.26	0.002	0.078	0.22	0.017	0.26	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Scheelite Ore	100g

20.6 Ores (continued)

		U	Th	Al	Si	Ca	Mg	Na	K	Fe	S	Ti	Pb	L.O.I	H_2O	Others	Type	Size
	(U) Uranium																	
CRM	**206 A DL-1A**	0.0116	0.0076	(5.3)	(39.95)	(0.3)	(0.2)	(0.09)	(0.2)	(0.93)	(0.41)	(0.09)	. . .	(1.4)	(0.2)		U-Th Ore	200g
CRM	**206 A DH-1A**	0.2629	0.091	(3.44)	(37.3)	(0.04)	(0.07)	(0.04)	(1.43)	(5.17)	(4.82)	. . .	. . .	. . .	(0.07)		U-Th Ore	200g
CRM	**206 A BL-1**	0.022	0.0015	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		U-Th-Ore	100g
CRM	**206 A BL-2A**	0.426	. . .	(6.62)	(27.6)	(4.06)	(1.5)	(3.42)	(0.33)	(4.75)	(0.36)	. . .	(0.09)	(5.16)	(0.19)		U. Ore	200g
CRM	**206 A BL-3**	1.02	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		U. Ore	100g
CRM	**206 A BL-4A**	0.125	. . .	(6.75)	(28.6)	(3.27)	(1.38)	(3.24)	(0.36)	(5.26)	(0.28)	. . .	(0.031)	(4.44)	(0.16)		U. Ore	200g
CRM	**206 A BL-5**	7.09	(0.004)	(6.0)	(22.0)	(4.0)	(1.5)	(3.6)	(0.4)	(5.9)	(0.3)	(0.4)	(1.5)	. . .	. . .		Concentrate	100g
CRM	**206 A OKA-2**	0.02186	2.893	. . .	. . .	. . .	. . .	. . .	(0.34)	. . .	. . .	. . .	. . .	. . .	. . .		R.E.-Th Ore	100g
CRM	**206 A RL-1**	0.201	. . .	(6.5)	(25.3)	(1.8)	(9.2)	(0.06)	(0.22)	(2.3)	(0.13)	(0.25)	. . .	(10.2)	(0.9)	As, Ni	U Ore	100g
CRM	**206 A UTS-1**	0.0049	0.0138	6.24	. . .	5.24	. . .	. . .	. . .	4.87	1.00	0.54	. . .	. . .	. . .	Ba, SO_3	U Ore Tailings	200g
CRM	**206 A UTS-2**	0.0056	0.0174	2.71	. . .	0.42	. . .	. . .	. . .	3.20	3.23	0.18	. . .	. . .	. . .	Ba, SO_3	U Ore Tailings	200g
CRM	**206 A UTS-3**	0.0513	0.0010	5.80	. . .	4.03	. . .	. . .	. . .	3.25	0.23	0.23	. . .	. . .	. . .	Ba, SO_3	U Ore Tailings	200g
CRM	**206 A UTS-4**	0.1010	0.0015	6.29	. . .	1.75	. . .	. . .	. . .	2.61	1.00	0.24	. . .	. . .	. . .	Ba, SO_3	U Ore Tailings	100g
CRM	**206 GB 37**	0.148	0.0345	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		Canada	40g

		Zn	Cu	Pb	S	Cd	SiO_2	Fe_2O_3	Al_2O_3	MgO	CaO	Na_2O	K_2O	F	Others	Type	Size
	(Zn) Zinc																
	206 CG 07237	2.75	0.71	0.25	2.87	. . .	82.95	3.50	2.80	0.082	1.91	0.56	0.99	1.20	~30 at ppm levels	Tailings	100g
CRM	**206 A 362**	2.08	(0.004)	2.44	1.48	0.020	9.03	0.483	0.667	0.068	44.21	0.084	0.14	. . .	Mn_3O_4 0.829	Tailings	100g

		Zn	Al	Si	Ca	Mg	Fe	Ag	Pb	Cd	Cu	S	ppm Hg	As	Sn	H_2O	Type	Size
CRM	**206 B 113b**	56.49	. . .	. . .	0.8196	0.4460	2.077	0.04607	2.731	0.7804	0.2953	30.032	(0.55)	. . .	. . .	. . .	Concentrate	100g
	206 SI RPZ-ZC	55.26	0.074	0.25	1.29	0.53	4.02	0.031	3.53	0.11	0.65	31.75	. . .	0.023	0.012	. . .	Concentrate	120g
CRM	**206 A CZN-3**	50.92	. . .	(0.44)	. . .	. . .	9.97	0.0045	0.113	0.248	0.685	31.6	(0.0005)	0.039	. . .	. . .	Concentrate	200g
CRM	**206 A KC-1A**	34.65	(0.1)	(10.4)	0.3	0.05	(10.9)	0.167	2.24	. . .	0.629	(27.5)	. . .	. . .	0.61	(0.09)	Zn-Pb-Sn-Ag	200g
CRM	**206 A PD-1**	(35.9)	. . .	(3.05	. . .	. . .	(12.2)	. . .	2.75	(0.28)	(7.03)	(8.23)	389	0.77	. . .	(0.4)	Non-ferrous Dust	200g

		Zn	S	Cd	Cu	Fe	Pb	ppm Ag	ppm As	ppm Bi	ppm Co	ppm Ga	ppm Ge	ppm In	ppm Mn	ppm Ni	ppm Sb	Size
	206 CG 07270	62.51	32.33	0.15	2.14	2.14	0.10	5.0	3.3	6.1	491	251	6.0	21.0	169	43.2	249	10g

		Zn	Cu	Pb	Fe	Cd	Mg	Al_2O_3	SiO_2	CaO	MgO	S	F	Cl	ppm Hg	Type	Size
CRM	**206 PN RB7**	3.07	. . .	(0.26)	8.28	0.033	. . .	. . .	(0.8)	24.35	15.26	(10.3)	. . .	. . .	. . .	Blende	170g
CRM	**206 PN RG8**	5.40	. . .	0.84	6.34	0.047	. . .	0.90	2.64	26.45	12.16	0.57	. . .	. . .	. . .	Galmei Ore	130g
CRM	**206 PN TC9**	53.4	. . .	3.77	5.64	0.0049	. . .	. . .	5.47	6.96	3.50	0.52	0.055	0.033	. . .	Roasted oxide	220g
CRM	**206 PN TC/P10**	60.6	. . .	2.31	6.7	. . .	. . .	0.14	0.56	2.54	1.38	3.07	. . .	. . .	. . .	Roasted oxide	240g
CRM	**206 PN Kc11**	54.51	. . .	1.21	6.53	. . .	. . .	0.069	0.26	0.72	0.30	32.36	. . .	. . .	. . .	Concentrate	280g
CRM	**206 F 109**	. . .	0.946	0.738	14.51	0.46	0.020	. . .	. . .	. . .	. . .	. . .	0.0081	. . .	0.96	Blende	200g
CRM	**206 F 110**	. . .	1.628	9.78	0.55	1.051	0.136	. . .	. . .	. . .	. . .	. . .	0.0055	. . .	148.4	Blende	200g

		ZrO_2	Al_2O_3	SiO_2	CaO	MgO	Fe_2O_3	Na_2O	K_2O	P_2O_5	TiO_2	HfO_2	MnO	F	L.O.I.		Size
	206 CG 07156	0.187	14.74	66.02	2.70	2.10	4.80	3.83	3.37	0.163	0.420	0.0042	0.085	0.080	1.55	Plus a further 16 elements,	100g
	206 CG 07157	1.25	14.70	65.66	2.64	2.01	4.69	3.74	3.31	0.167	0.410	0.03	0.083	0.082	1.51	mostly rare-earths	

21.1 Ferro Alloys

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	V	Ti	Fe	Al	Others	Type	Size
	(B) Ferro Boron																
CRM	**211 A E587-1**	0.738	(0.129)	(0.001)	(0.020)	0.272	...	(0.10)	(0.005)	...	0.004	(0.04)	...	0.047	B 18.7		100g
	211 DH L1701	0.009	0.66	...	0.014	0.275	0.039	0.092	...	...	0.177	0.05	75.48	1.54	B 21.22		50g
	211 DH L1702	0.56	0.535	...	0.036	0.762	0.082	0.154	...	0.088	0.013	0.047	77.41	0.211	B 19.12		50g
	211 DH L1703	0.318	0.326	...	0.018	0.246	0.359	0.08	...	0.064	0.004	0.017	79.36	0.141	B 81.78		50g
	211 AU 42025	0.031	1.09	...	0.018	...	...	...	...	...	...	1.72	...	...	B 22.51		80g
	211 AU 42026	0.078	0.57	...	0.013	...	...	...	...	...	...	0.66	...	...	B 15.28		80g
CRM	**211 RU F22/2**	0.145	8.71	0.015	0.023	...	...	...	...	3.76	...	...	...	8.63	B 8.40		200g
	(Cr) Ferro Chromium																
	211 M BS 130/1	7.06	4.46	0.034	0.016	1.2	...	51.6	...	(0.011)	(0.39)	(0.16)	...	...			100g
	211 M BS 130/2	7.76	2.12	0.045	0.013	0.45	...	52.6	...	(0.007)	(0.38)	(0.1)	...	...			100g
	211 M BS 130/3	6.54	6.25	0.029	0.014	0.77	...	49.0	...	(0.011)	(0.36)	(0.18)	...	...			100g
CRM	**211 S 732**	7.76	3.86	0.013	0.021	...	...	56.15	...	...	...	...	...	...			150g
CRM	**211 J 14B**	0.023	0.65	0.002	0.015	0.29	0.32	72.87	...	0.009	0.095	...	...	...	Co 0.45, N 0.043		100g
CRM	**211 J 15A**	7.54	3.03	0.022	0.02	0.275	0.33	55.08	...	(0.008)	0.19	0.3	...	...	Co 0.049, Mg 0.017		100g
CRM	**211 A SA 10**	6.99	1.95	0.0611	0.0173	0.16	0.19	53.7	...	...	0.32	0.2	36.04	...	Co 0.0512		100g
CRM	**211 A E580-1**	0.019	0.306	...	0.011	...	...	72.18	...	...	0.083	...	...	...	Co 0.047, N 0.035		100g
CRM	**211 A E585-1**	6.87	2.76	0.039	0.018	0.86	0.197	57.6	...	...	0.33	0.36	(31.1)	...	Co 0.044 , N 0.023		100g
CRM	**211 E 65**	0.051	0.71	0.016	0.006	0.128	0.077	71.2	...	...	...	...	17.9	9.2	Co 0.016		100g
CRM	**211 TI E507-1**	5.4	1.2	...	0.017	0.27	...	70.3	...	...	...	...	...	...	N 0.049		100g
CRM	**211 TI E509-1**	0.012	0.23	...	(0.019)	...	...	72.85	...	...	...	...	...	...	N 0.032		100g
	211 CG 01424	6.55	1.29	0.043	0.025	0.14	...	68.75	...	...	...	...	...	...		Hi Carbon	50g
	211 CG 01425	0.201	0.90	0.0066	0.047	0.24	...	66.74	...	...	...	...	...	...		Lo Carbon	70g
	211 CG 01425a	0.178	1.02	0.0044	0.026	0.356	...	66.96	...	...	...	...	...	...			50g
	211 DH L1801	0.142	0.859	...	0.03	0.216	0.314	72.48	...	...	...	...	25.38	...	O 0.1336		50g
	211 DH L1805	0.722	0.806	...	0.024	0.215	0.444	62.58	...	...	...	...	33.91	...	O 0.525		50g
	211 DH L1806	0.388	0.645	...	0.015	0.084	0.369	60.53	...	...	...	...	37.03	...	O 0.375		50g
	211 DH L1808	0.031	0.605	...	0.015	0.861	0.302	67.13	...	...	...	...	30.53	...	O 0.165		50g
	211 DH L1811	1.48	0.545	...	0.025	0.134	0.45	61.78	...	...	...	...	34.96	...	O 0.244		50g
	211 DH L1812	1.32	0.566	...	0.025	0.13	0.453	61.42	...	...	...	...	35.6	...	O 0.220		50g
	211 DH L1813	1.74	0.815	...	0.044	0.369	0.284	68.79	...	...	...	...	26.01	...	O 0.521		50g
	211 DH L1814	0.46	0.941	...	0.046	0.30	0.293	67.52	...	...	...	...	29.94	...	O 0.151		50g
CRM	**211 RU F8/2**	0.029	0.25	0.013	0.0035	...	...	99.2	...	0.0014	...	...	0.26	0.17	N 0.025		250g
CRM	**211 RU F15/1**	0.078	2.10	0.0023	0.036	...	...	68.1	...	...	...	...	...	0.30	N 1.78		250g
	211 SI XS-FCMA	6.26	4.64	0.036	0.010	0.19	0.17	50.65	...	...	0.36	0.38	36.59	0.037	Co 0.054		100g
	211 SI XS-FCME	6.05	4.06	0.054	0.011	0.16	0.16	49.30	...	...	0.34	0.31	37.11	0.36	Co 0.048		100g
	(Mn) Ferro Manganese																
	211 M BS 121	1.62	0.62	0.004	0.38	81.4	...	(0.08)	(0.017)	(0.15)	...	(<0.001)	14.9	...	Zr (0.0002)		100g
CRM	**211 S 701-5**	6.81	0.04	0.002	0.144	74.14	...	...	...	...	...	...	...	...			150g
CRM	**211 E 54**	1.2	1.74	0.003	0.22	80.4	0.14	0.043	...	0.059	...	...	15.9	...			120g
CRM	**211 A E583-1**	0.333	0.396	0.007	0.146	86.42	...	...	...	...	...	...	(12.3)	...	N (0.041)		100g
CRM	**211 TI E503**	0.7	0.865	(0.009)	0.069	80.8	...	...	...	...	...	...	...	...			100g
	211 DH L1901	6.81	0.713	...	0.181	76.83	0.066	0.009	...	0.056	0.024	0.081	14.63	0.022	Co 0.128		50g
	211 DH L1202	1.353	0.791	...	0.261	81.59	0.053	0.371	...	0.007	0.011	0.001	15.34	...	Co 0.014		50g
	211 DH L1203	1.293	0.863	...	0.114	88.15	0.067	0.076	...	0.051	0.015	0.001	8.87	...	Co 0.141		50g
	211 DH L1204	0.057	0.738	...	0.075	87.19	0.02	0.029	...	0.023	0.016	...	11.5	...	Co 0.041		50g
	211 DH L1205	1.38	1.04	...	0.248	80.48	0.039	0.114	...	0.008	0.01	0.001	16.51	...	Co 0.015		50g
	211 DH L1906	6.895	0.04	...	0.167	77.09	0.057	0.01	...	0.04	0.035	0.003	15.4	...	Co 0.069		50g
	211 DH L1206	1.482	0.35	...	0.229	80.24	0.14	0.105	0.028	0.088	0.071	0.004	15.91	...	Co 0.166		50g
	211 DH L1207	1.63	1.11	...	0.081	88.0	0.022	0.06	...	0.016	0.026	...	8.78	...	Co 0.039		50g
	211 CG 01421	1.34	0.92	0.0024	0.277	79.95	...	...	...	...	...	...	...	...			150g
	211 CG 01426	6.27	1.43	0.0116	0.162	72.98	...	...	...	...	...	...	...	...			150g
CRM	**211 RU F5/2**	0.081	1.26	0.0096	0.065	95.9	...	...	...	0.0054	...	...	2.71	...			250g
CRM	**211 RU F6/2**	1.90	2.00	0.0031	0.330	90.3	...	...	...	0.050	...	...	5.40	...			300g
	(Mo) Ferro Molybdenum																
CRM	**211 S 745-3**	0.03	0.55	0.025	0.05	...	...	...	62.06	0.45	...	...	...	(0.037)			150g
CRM	**211 A E578-1**	0.016	0.208	0.065	0.024	...	...	...	72.23	0.136	...	...	...	...			100g
CRM	**211 T E508-1**	0.052	0.56	0.085	0.035	...	...	...	59.65	...	...	...	...	...			100g
	211 DH L2003	0.027	0.239	...	0.038	0.08	0.032	0.039	72.84	0.467	...	...	25.65	...	W 0.030		50g
	211 DH L2006	0.031	0.252	...	0.086	0.07	0.905	0.018	73.83	0.134	0.007	...	24.03	...	W 0.050		50g
	211 DH L2007	0.047	1.05	...	0.098	0.07	0.611	0.027	64.07	0.356	0.004	...	31.92	0.048	W 0.046		50g
	211 DH L2008	0.018	0.71	0.059	0.017	0.088	0.02	0.039	72.82	0.378	0.022	...	25.51	...	W 0.022		50g
	211 DH L2009	0.021	0.93	0.074	0.019	0.057	...	0.034	68.687	0.452	0.015	...	29.0	...	W 0.029		50g
	211 DH L2011	0.042	1.36	0.107	0.03	0.071	0.026	0.044	65.33	0.525	0.014	...	31.19	...	W 0.095		50g
	211 DH L2012	0.011	0.79	0.084	0.028	0.042	...	...	69.99	0.39	...	...	27.82	...			50g
	211 DH L2013	0.029	0.28	0.081	0.039	0.012	0.017	0.05	60.03	0.4	...	...	38.42	...	W 0.188		50g
	211 DH L2020	0.028	0.21	0.079	0.034	0.013	0.019	0.057	62.2	0.376	...	...	36.71	...	W 0.155		50g
	211 CM 1631	0.097	0.67	0.072	0.024	...	...	...	59.16	0.178	...	...	...	...			150g
	211 CM 1632	0.066	0.23	0.080	0.025	...	...	...	62.76	0.177	...	...	...	...			50g
	211 CM 1633	0.049	0.45	0.065	0.023	...	...	...	60.08	0.191	...	...	...	...			150g

21.1 Ferro Alloys

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	V	Ti	Fe	Al	Nb	Ta	Sn	Size
	(Nb) Ferro Niobium																	
CRM	**211 S 755-2**	0.19	2.12	0.15	0.049	...	...	...	...	...	...	...	...	3.23	68.49	(0.18)	(0.05)	150g
CRM	**211 A E576-1**	0.201	1.79	...	...	...	...	...	...	...	...	1.32	...	2.53	43.90	0.306	0.195	100g
CRM	**211 A E579-1**	0.037	1.03	0.021	0.064	...	...	...	...	...	...	0.567	...	1.86	62.87	3.85	0.344	100g
	211 DH L2801	0.432	1.9	...	0.105	0.102	0.003	0.007	...	0.011	0.028	0.439	29.77	0.8	64.69	0.099	...	50g
	211 DH L2802	0.379	4.14	...	0.246	1.09	0.021	0.14	...	0.065	0.289	1.34	32.51	2.37	52.57	0.564	...	50g
	211 DH L2803	0.076	1.88	...	0.101	0.276	...	...	...	0.062	0.084	0.141	28.38	1.25	66.99	0.059	...	50g
	211 DH L2804	0.06	2.28	...	0.125	0.077	...	...	...	0.111	0.01	0.077	28.44	0.078	67.61	0.097	...	50g
	211 DH L2805	0.047	1.53	...	0.149	2.52	...	0.023	...	0.033	0.025	0.919	26.5	1.53	65.4	0.35	...	50g
	211 DH L2806	0.081	2.11	...	0.109	0.129	0.017	0.028	...	0.341	0.015	0.044	30.69	0.061	65.05	0.071	...	50g
	211 DH L2807	0.099	1.94	...	0.114	0.136	0.015	0.028	...	0.279	0.014	0.045	31.93	0.064	64.09	0.066	...	50g
	211 DH L2808	0.181	3.17	...	0.071	0.415	0.012	0.038	...	0.048	1.16	1.82	24.02	3.2	64.49	0.171	...	50g
	211 DH L2809	0.495	3.47	...	0.097	0.53	0.017	0.035	...	0.037	0.878	1.35	27.46	2.22	60.12	0.217	...	50g
	211 DH L2812	0.135	2.09	...	0.089	0.441	0.006	0.012	...	0.095	0.052	0.683	29.84	1.132	64.37	0.317	...	50g

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	V	Ti	Fe	Al	Others	Size
	(P) Ferro Phosphorus															
CRM	**211 CG 01429**	0.224	1.87	0.0681	17.9	0.47	...	...	...	...	...	...	...	...		50g
	(Si) Ferro Silicon															
CRM	**211 E 56**	0.032	75.0	0.001	0.022	0.029	0.003	0.011	...	0.001	...	0.02	24.1	0.31	Ca 0.34, Mg 0.023	60g
CRM	**211 E 70**	0.087	44.7	(0.006)	0.018	0.283	0.022	0.046	...	0.066	...	0.018	54.1	0.21	Ca 0.16, Mg 0.016	60g
	211 M BS140/1	(0.03)	45.2	(0.004)	(0.02)	0.46	0.15	(0.25)	...	0.13	...	0.09	52.8	0.68	Ca 0.04	100g
	211 M BS140/2	(0.03)	51.85	(0.004)	(0.02)	0.53	0.15	(0.25)	...	0.14	...	0.1	46.12	0.62	Ca 0.03	100g
	211 M BS140/3	(0.05)	47.2	(0.004)	(0.02)	0.6	0.09	(0.18)	...	0.09	...	0.07	50.85	0.59	Ca 0.09	100g
	211 M BS140/4	(0.05)	49.8	(0.004)	(0.02)	1.0	0.11	(0.19)	...	0.09	...	0.09	47.5	0.9	Ca 0.09	100g
CRM	**211 S 720**	(0.045)	76.35	(0.003)	0.032	0.21	...	...	...	...	...	...	...	1.52		100g
CRM	**211 A SA 33**	1.01	15.6	(0.008)	0.043	0.75	0.28	0.43	...	0.29	...	...	80.2	0.62		100g
CRM	**211 J 39**	0.105	75.9	...	0.018	0.165	(0.008)	(0.013)	...	0.013	(0.007)	0.116	21.6	1.45	Ca 0.24	50g
CRM	**211 TI E582-1**	0.15	75.2	...	0.0184	0.23	...	0.074	...	...	...	0.225	21.42	1.154	Ca 0.405	100g
CRM	**211 DB E529-1**	0.10	91.11	...	0.013	0.04	...	...	...	...	...	0.09	6.15	0.86	Ca 0.46, Mg 0.04	100g
	211 DH L2302	0.064	76.83	0.001	0.014	0.267	0.015	0.05	...	0.036	0.006	0.086	20.55	1.21	Mg 0.013	50g
	211 DH L2303	0.179	80.54	0.002	0.016	0.132	0.025	0.054	...	0.034	0.006	0.08	16.1	1.392	Mg 0.031	50g
	211 DH L2304	0.165	83.65	0.003	0.009	0.141	0.029	0.038	...	0.032	0.017	0.102	13.31	0.827	Mg 0.010	50g
	211 DH L2311	8.31	50.0	0.048	0.011	0.08	0.007	0.027	...	0.016	...	0.07	9.06	4.36	Mg 1.15	50g
	211 DH L2312	4.96	48.3	0.056	0.011	0.114	0.013	0.083	...	0.02	...	0.062	12.38	3.4	Mg 0.193	50g
	211 CG 01422a	0.081	76.74	0.004	0.023	0.172	...	0.14	...	...	...	...	...	1.8	Ca 0.30	50g
	211 CG 01432	0.024	78.96	0.0037	0.0093	0.058	0.035	0.0053	0.0013	0.049	0.0024	0.032	20.24	0.24	Ca 0.064, Mg 0.0051	70g
	211 CG 01433	0.190	55.73	0.048	0.038	0.220	0.0063	0.014	0.011	0.060	0.011	0.119	41.89	0.78	Ca 0.14, Mg 0.0068	70g
CRM	**211 RU F1/3**	0.499	24.5	0.0027	0.042	0.510	...	0.361	...	...	...	0.072	...	0.74	Ca (0.01)	250g
CRM	**211 RU F2/2**	0.027	44.6	0.0024	0.036	0.305	...	0.320	...	...	...	...	(52)	1.09	Ca 0.06	200g
CRM	**211 RU F3/3**	0.049	77.6	0.0025	0.026	0.128	...	0.096	...	...	...	0.127	...	1.97	Ca 0.40	100g
	(Si/Ca) Silicon-Calcium															
	211 M BS 119	0.3	62.3	0.01	0.033	...	...	...	...	...	...	...	3.0	0.46	Ca 32.3	100g
	211 DH L0401	0.53	60.75	...	0.018	0.086	0.006	0.016	0.008	0.013	...	0.077	4.26	2.163	Ca 29.53	50g
	211 DH L0402	0.194	58.68	...	0.013	0.051	0.006	0.009	<0.015	0.014	...	0.055	6.74	1.13	Ca 28.48	50g
	211 DH L0403	0.4	60.12	...	0.014	0.611	0.008	0.018	0.003	0.016	...	0.169	5.56	1.59	Ca 28.60	50g
	211 DH L0404	0.533	62.53	...	0.011	0.094	0.007	0.016	0.026	0.02	...	0.238	5.03	1.74	Ca 26.79	50g
	211 DH L0405	0.755	57.48	...	0.014	0.039	0.012	0.006	0.0	0.005	...	0.055	3.47	1.19	Ca 32.84	50g
	211 CG 01431	0.61	57.02	0.048	0.025	0.426	...	...	...	...	...	...	8.49	1.95	Ca 30.03	100g
	211 CG 01434	0.21	59.24	0.051	0.024	0.067	0.012	0.035	...	...	...	...	9.71	1.55	Ca 9.89, Ba 16.54	70g
	211 CM 1657	0.30	59.02	0.028	0.026	...	...	...	...	...	...	...	10.17	1.30	Ca 27.12	100g
CRM	**211 RU F25/2**	...	51.5	0.0055	0.011	...	...	...	...	...	...	...	...	0.66	Ca 20.5	125g
	(Si/Cr) Silico-Chromium															
	211 DH L5403	0.034	40.46	...	0.022	0.41	0.19	36.93	...	0.02	0.074	0.124	20.93	0.579		50g
CRM	**211 RU F24/2**	0.02	49.9	0.0015	0.027	...	...	29.2	...	...	...	...	...	0.86		250g

21.1 Ferro Alloys

		C	Si	S	P	Mn	Ni	Cr	Mo	Cu	V	Ti	Fe	Al	Others	Size
	(Si/Mn) Silico-Manganese															
	211 S 705-4	2.11	14.76	0.014	0.081	61.56	0.014	0.016	. . .	0.02	0.015	0.236	. . .	0.05	Ca 0.028, Mg 0.015	100g
CRM	**211 TI E586-1**	0.025	34.0	. . .	0.041	62.5	. . .	0.044	. . .	. . .	0.041	. . .	2.89	0.022	Ca 0.039, Co 0.007	100g
	211 DH L0101	1.764	17.42	. . .	0.11	69.46	0.053	0.032	. . .	0.034	. . .	0.183	10.06	. . .	Co 0.065	50g
	211 DH L0102	1.407	18.19	. . .	0.166	73.02	0.102	0.046	. . .	0.042	. . .	0.184	6.11	. . .	Co 0.108	50g
	211 DH L0103	1.716	17.79	. . .	0.1	68.25	0.032	0.009	. .	0.032	. . .	0.191	11.11	. . .	Co 0.066	50g
	211 DH L0104	1.165	19.47	. . .	0.148	68.2	0.093	0.045	. . .	0.042	. . .	0.208	9.88	. . .	Co 0.109	50g
	211 DH L0105	1.693	17.22	. . .	0.147	67.02	0.068	0.032	. . .	0.069	. . .	0.201	12.64	. . .	Co 0.143	50g
	211 DH L0106	0.015	30.16	. . .	0.05	59.06	0.033	0.035	. . .	0.019	. . .	0.471	9.91	0.016	Co 0.028	50g
	211 CG 01427	0.922	19.34	0.0125	0.217	66.66	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50g
	211 CM 1642	1.08	18.56	0.013	0.178	64.95	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50g
	211 CM 1643	2.19	14.42	0.012	0.305	64.29	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		50g
	211 RU F23/2	1.43	18.08	0.022	0.488	73.0	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		250g
	(Si/Zr) Silico-Zirconium															
CRM	**211 RU F27/2**	0.111	26.1	(0.001)	0.044	. . .	. . .	. . .	. . .	1.47	. . .	0.215	(12)	7.48	Zr 51.5	200g
	(Ti) Ferro Titanium															
CRM	**211 A E584-1**	0.044	1.80	0.030	0.032	1.13	. . .	. . .	. . .	. . .	. . .	37.17	. . .	7.19	Soluble Al (6.0)	100g
CRM	**211 TI E510-1**	0.058	4.65	. . .	(0.035)	. . .	. . .	. . .	. . .	. . .	. . .	26.95	. . .	(4.9)	N (0.014)	100g
CRM	**211 DB E589-1**	0.132	(0.412)	0.0152	(0.011)	0.151	0.663	0.506	0.934	0.146	2.32	68.4	16.93	5.34	Co 0.115, Sn 0.55, Zr 0.866, N 0.64	100g
	211M BS FeTi-1	0.57	2.9	0.009	0.05	7.7	0.17	0.33	0.06	0.6	0.69	19.9	. . .	12.5	Zr 3.6	100g
	211M BS FeTi-2	0.46	3.2	. . .	0.053	7.91	0.16	0.3	0.15	0.43	0.81	19.4	. . .	12.7	N 0.16, Sn 0.16	100g
	211 DH L2403	. . .	0.325	. . .	0.01	0.102	0.412	0.439	0.238	0.185	3.167	69.39	17.12	5.47	Sn 0.418	50g
	211 DH L2404	. . .	0.265	. . .	0.007	0.116	1.82	1.007	0.4	0.115	2.24	66.74	19.19	4.92	Sn 0.530	50g
	211 DH L2405	. . .	0.087	. . .	0.011	0.049	0.13	0.087	0.086	0.047	0.838	66.8	27.87	1.497	Sn 0.016	50g
	211 DH L2407	. . .	0.359	. . .	0.0	0.075	0.645	0.397	0.295	0.682	3.158	70.61	13.26	6.51	Sn 0.434	50g
	211 CG 01430	0.023	4.68	0.012	0.040	2.54	. . .	. . .	. . .	0.012	. . .	28.76	. . .	5.08		50g
CRM	**211 RU F16/3**	0.051	6.44	0.024	0.053	0.68	. . .	0.127	0.112	1.46	0.208	33.11	. . .	8.45	Zr 0.022, Zn 0.122, Sn 0.023	250g
CRM	**211 RU F30/2**	0.132	0.191	0.0061	0.0036	0.156	0.046	0.107	0.96	0.040	0.86	71.2	21.28	3.76	Sn 0.023, N 0.48,	250g
	(W) Ferro Tungsten															
CRM	**211 A E555-1**	0.025	1.75	(0.018)	(0.02)	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.14	W 79.9, Sn 0.034	100g
CRM	**211 A E590-1**	0.0250	1.05	(0.07)	. . .	0.136	. . .	. . .	0.101	0.0484	. . .	. . .	(17.9)	(0.37)	W 79.55, Sn 0.045	100g
	211 J 17	0.74	0.2	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	W 80.8, Sn 0.045	100g
	211 CG 01428	0.055	0.34	0.048	0.028	0.12	. . .	. . .	. . .	0.043	. . .	. . .	. . .	. . .	W 76.66	150g
CRM	**211 RU F18/2**	0.075	0.35	0.071	0.042	0.095	. . .	. . .	0.56	0.105	. . .	. . .	. . .	. . .	W 74.7, Sn 0.038, As 0.028	300g
	(V) Ferro Vanadium															
CRM	**211 J 18A**	0.080	0.48	0.008	0.025	0.32	(0.008)	0.58	(0.1)	(0.005)	80.8	. . .	15.3	1.58	N 0.149	100g
CRM	**211 S 750-2**	0.14	0.52	0.1	0.018	. . .	. . .	. . .	. . .	. . .	53.4	. . .	. . .	3.2		150g
CRM	**211 A E577-1**	0.089	1.79	0.034	0.035	0.158	0.053	. . .	. . .	0.054	50.16	. . .	. . .	0.414	Soluble Al (0.21)	100g
CRM	**211 TI E511-1**	0.049	0.341	0.018	(0.016)	. . .	. . .	. . .	. . .	. . .	80.7	. . .	. . .	. . .		100g
CRM	**211 DB E591-1**	0.141	0.847	0.0153	0.0299	0.307	0.0141	. . .	. . .	0.0596	79.72	. . .	14.59	3.19		100g
	211 DH L2501	502.0	0.53	0.011	0.033	0.165	0.011	0.141	0.014	0.007	79.56	0.034	17.12	1.318		50g
	211 DH L2502	0.062	1.38	0.041	0.037	0.247	0.021	0.313	0.022	0.034	81.59	0.032	14.0	1.15		50g
	211 DH L2503	0.092	1.418	0.0-19	0.011	0.08	0.018	0.099	0.051	0.018	83.73	0.024	12.0	0.794		50g
	211 DH L2504	0.093	0.797	0.019	0.034	0.422	0.076	0.753	0.004	0.07	79.96	0.017	15.25	1.87		50g
	211 DH L2505	0.216	0.805	0.021	0.036	0.326	0.022	0.119	0.201	0.219	76.12	0.034	19.99	0.845		50g
	211 DH L2506	0.118	1.42	0.019	0.041	0.172	0.03	0.191	0.171	0.084	82.13	0.121	10.89	3.72		50g
	211 DH L2507	0.289	0.959	0.108	0.03	0.106	0.033	0.986	0.017	0.055	76.65	0.045	15.97	4.06		50g
	211 DH L2508	0.294	1.34	. . .	0.072	3.16	0.049	0.596	0.004	0.189	51.54	0.011	41.26	0.026		50g
	211 DH L2509	0.216	3.73	. . .	0.034	2.41	0.327	2.16	0.136	0.315	37.63	0.345	52.05	0.48		50g
	211 M BS FeV42	0.30	3.81	0.31	0.12	3.37	3.85	5.21	0.024	0.31	42.35	0.033	39.45	(0.06)	N 0.20	100g
	211 M BS FeV45	0.24	4.86	0.33	0.12	4.14	4.28	5.82	0.01	0.41	45.27	0.022	33.8	(0.013)	N 0.26	100g

22.4 Ceramics

		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	ZrO_2+ HfO_2	L.O.I.	Others	Type	Size
	224 GC AN28	32.8	2.4	0.03	<0.01	0.04	<0.01	0.04	0.04	. . .	. . .	0.13	PbO 64.5	Pb bisilicate	100g
	224 GC AN30	51.8	7.41	0.18	0.03	13.0	0.22	8.67	1.13	. . .	. . .	. . .	B_2O_3 17.4	Borax frit	100g
	224 A 201a	57.3	23.54	0.12	0.05	1.07	0.025	7.53	8.9	0.025	. . .	0.76		Nepheline	100g
	224 A 202a	1.38	0.33	0.1	0.03	37.4	0.39	<0.03	0.1	<0.01	. . .	6.78		Plaster	100g
	224 A 203a	59.7	0.3	0.22	<0.01	0.25	32.08	0.02	0.005	0.13	. . .	6.78		Talc	100g
	224 A 204a	37.6	0.74	0.18	2.22	0.15	0.012	0.014	0.017	0.77	53.8	0.5		Zircon	100g

		Si	Ca	Mg	Al	Ti	Mn	P	Fe	Na	K	B	Cr	Type	Size
CRM	**224 DB E777-1**	44.44	2.02	0.043	0.42	0.27	. . .	. . .	0.23	(0.02)	0.13	. . .	. . .	Silica Brick	100g
CRM	**224 DB E779-1**	0.182	1.691	(54.6)	0.105	0.0081	0.503	0.0267	3.73	(0.006)	(0.002)	0.0116	0.003	Magnesite	100g

22.5.1 Refractories - Aluminosilicate

		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	ZrO_2	Li_2O	SrO	MnO	L.O.I.	Type	Size
CRM	**225 E 51**	55.0	40.3	1.19	2.19	0.06	0.2	0.09	0.69	0.09	0.07	0.018	. . .	. . .	0.16	Burnt Refractory	80g
CRM	**225 E 53**	65.8	18.3	0.13	0.013	0.27	0.05	2.5	12.1	0.072	. . .	. . .	. . .	. . .	0.51	Feldspar (K)	80g
CRM	**225 E 57**	24.3	71.5	1.25	1.19	0.05	0.13	0.35	0.83	0.054	0.2	0.008	0.009	. . .	0.2	Burnt Refractory	80g
CRM	**225 E 63**	96.28	0.48	0.52	0.03	2.21	0.18	0.013	0.043	0.013	(0.002)	(0.0005)	. . .	0.008	0.17	Silica Refractory	80g
CRM	**225 E 72**	66.2	20.26	0.09	0.005	0.18	(0.022)	10.0	1.47	1.03	. . .	. . .	. . .	. . .	0.66	Feldspar (Na)	80g
	225 S JCRM R303	89.49	5.55	1.51	2.93	0.012	0.006	. . .	. . .	0.064	0.110	. . .	. . .				100g
	225 S JCRM R304	35.90	55.94	0.585	1.33	0.427	0.451	0.273	0.329	. . .	0.105	. . .	. . .	. . .	4.26	Set only	100g
	225 S JCRM R401	28.11	70.18	0.598	0.185	0.059	0.190	0.197	0.174	0.136	0.058	. . .	. . .	. . .	. . .		100g
	225 S JCRM R404	>99.99	0.0011	0.00006	0.0006	0.00002	<0.00001	0.0001	0.00004	. . .	. . .	. . .	. . .	. . .	0.00		100g
	225 S JCRM R405	97.78	1.07	0.053	0.022	0.029	0.023	0.060	0.71	. . .	. . .	. . .	. . .	. . .	0.13	Set only	100g
	225 S JCRM R406	96.71	1.31	0.102	0.564	0.016	0.005	0.030	0.13	. . .	. . .	. . .	. . .	. . .	0.97		100g
	225 DH X2607	10.57	79.12	0.305	0.077	0.093	0.073	0.271	0.121	0.015	6.88	. . .	. . .	0.081	0.431	79 Alumina	100g
	225 DH X2608	45.33	41.87	2.33	1.57	1.18	4.82	0.173	1.14	0.129	0.081	. . .	. . .	0.061	0.447	42 Alumina	100g
	225 GC 2CAS12	34.0	63.6	0.3	1.34	0.31	0.06	0.13	0.12	. . .	. . .	<0.01	. . .	. . .	0.12	Sillimanite	100g
	225 GC AN40	58.9	38.2	0.9	0.02	0.15	0.27	0.1	1.48	. . .	. . .	. . .	. . .	. . .	. . .	Molochite	100g
	225 GC 2CAS14	62.5	0.15	0.35	0.01	0.28	31.7	0.02	<0.01	. . .	. . .	<0.01	. . .	. . .	5.15	Steatite (talc)	100g
	225 GC CAS8	67.15	18.63	0.11	0.03	0.22	0.02	3.53	10.6	. . .	. . .	. . .	. . .	. . .	(0.3)	Feldspar (K)	100g
CRM	**225 A 309**	34.1	61.1	1.51	1.92	0.22	0.17	0.34	0.46	. . .	. . .	(0.01)	(0.003)	(0.03)	(0.1)	Sillimanite	100g
CRM	**225 A E776-1**	62.76	29.28	1.43	1.62	0.310	0.476	0.488	2.92	0.062	(0.04)	0.019	. . .	. . .	(0.3)	Firebrick	100g
CRM	**225 A 313/1**	99.78	0.036	0.012	0.017	0.006	0.0013	0.003	0.005	. . .	. . .	(0.0005)	. . .	0.00013	(0.1)	Hi-purity Silica	100g
CRM	**225 B 76a**	54.9	38.7	1.60	2.03	0.22	0.52	0.07	1.33	0.120	. . .	0.042	0.037	. . .	(0.34)	Burnt Refractory	75g
CRM	**225 B 77a**	35.0	60.2	1.00	2.66	0.05	0.38	0.037	0.090	0.092	. . .	0.025	0.009	. . .	(0.22)	Burnt Refractory	75g
CRM	**225 B 78a**	19.4	71.7	1.2	3.22	0.11	0.70	0.078	1.22	1.3	. . .	0.12	0.25	. . .	(0.42)	Burnt Refractory	75g
CRM	**225 B 198**	. . .	0.16	0.66	0.02	2.71	0.07	0.012	0.017	0.022	. . .	0.001	. . .	0.008	0.21	Silica Brick	45g
CRM	**225 B 199**	. . .	0.48	0.74	0.06	2.41	0.13	0.015	0.094	0.015	. . .	0.002	. . .	0.007	0.17	Silica Brick	45g
CRM	**225 RU K1/1**	96.1	0.57	1.23	(0.5)	1.37	0.046	. . .	. . .	0.030	. . .	. . .	. . .	0.030	. . .	Silica Refractory	75g
CRM	**225 RU K2/3**	58.9	34.8	2.57	1.88	0.39	0.47	0.19	0.68	. . .	. . .	. . .	. . .	0.083	. . .	Fire Clay	75g
CRM	**225 RU K3/2**	32.3	63.6	1.15	1.34	0.44	0.27	0.17	0.15	. . .	. . .	. . .	. . .	. . .	. . .	Mullite	100g

		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	ZrO_2	Cr_2O_3	MnO	L.O.I.	Type	Size
	225 S JRRM 121	86.3	6.07	0.40	0.05	1.96	0.12	3.20	0.23	0.32	1.11	0.018	0.023	0.057	Fireclay	20g
	225 S JRRM 122	78.2	10.2	0.24	1.03	0.43	0.65	1.04	2.05	4.89	0.20	0.81	0.20	0.12		20g
	225 S JRRM 123	79.1	13.3	4.13	0.45	0.13	1.32	0.29	0.10	0.80	0.008	0.014	0.012	0.037		20g
	225 S JRRM 124	73.9	16.5	2.60	2.74	1.09	0.10	0.31	1.79	0.19	0.11	0.11	0.24	0.10		20g
	225 S JRRM 125	79.2	18.7	0.50	0.30	0.13	0.08	0.07	0.69	0.04	0.023	0.010	0.008	0.077		20g
	225 S JRRM 126	66.9	21.3	3.34	2.84	0.45	0.12	0.28	3.13	0.49	0.049	0.65	0.038	0.17		20g
	225 S JRRM 127	68.5	23.0	0.92	2.19	0.18	0.15	1.75	0.54	1.78	0.046	0.27	0.17	0.072		20g
	225 S JRRM 128	54.3	26.0	4.45	1.37	2.80	3.10	0.37	1.84	3.36	1.01	0.85	0.24	0.023	Set only	20g
	225 S JRRM 129	62.2	30.1	1.46	0.96	0.15	2.23	0.23	1.92	0.20	0.11	0.10	0.018	0.11		20g
	225 S JRRM 130	53.4	32.7	0.53	3.35	1.95	0.61	2.32	1.42	0.91	0.83	1.05	0.37	0.11		20g
	225 S JRRM 131	52.7	36.6	2.20	1.16	0.78	1.02	0.76	2.61	1.61	0.26	0.076	0.032	0.17		20g
	225 S JRRM 132	50.6	39.1	1.64	0.29	1.29	0.34	2.16	0.79	2.38	0.75	0.11	0.11	0.15		20g
	225 S JRRM 133	50.1	39.0	3.69	1.93	0.10	2.03	0.33	0.91	0.34	0.57	1.27	0.017	0.089		20g
	225 S JRRM 134	47.2	44.3	1.07	1.74	0.20	0.20	0.13	0.37	3.83	0.35	0.24	0.24	0.14		20g
	225 S JRRM 135	37.2	48.9	3.05	0.07	2.36	1.24	2.87	2.77	0.48	0.20	0.42	0.049	0.18		20g
	225 S JRRM 201	84.36	9.71	1.46	0.038	2.77	0.73	0.31	0.14	. . .	. . .	. . .	0.14	. . .	Silica	20g
	225 S JRRM 202	85.72	7.59	3.97	0.56	0.81	0.020	1.01	0.025	. . .	. . .	. . .	0.004	. . .		20g
	225 S JRRM 203	87.33	5.09	1.78	0.18	3.97	0.47	0.61	0.24	. . .	. . .	. . .	0.11	. . .		20g
	225 S JRRM 204	89.64	4.49	2.08	0.15	1.79	0.31	0.31	0.90	. . .	. . .	. . .	0.10	. . .		20g
	225 S JRRM 205	90.40	3.08	1.24	0.32	3.11	0.092	0.93	0.50	. . .	. . .	. . .	0.064	. . .	Set only	20g
	225 S JRRM 206	92.88	1.77	3.20	0.018	1.20	0.072	0.18	0.50	. . .	. . .	. . .	0.018	. . .		20g
	225 S JRRM 207	94.05	1.70	0.96	0.078	2.51	0.16	0.047	0.21	. . .	. . .	. . .	0.042	. . .		20g
	225 S JRRM 208	94.43	0.46	0.064	0.005	4.19	0.056	0.63	0.022	. . .	. . .	. . .	0.001	. . .		20g
	225 S JRRM 209	96.22	0.87	0.37	0.050	1.89	0.10	0.033	0.17	. . .	. . .	. . .	0.068	. . .		20g
	225 S JRRM 210	97.69	0.16	0.83	0.005	0.30	0.78	0.021	0.007	. . .	. . .	. . .	0.002	. . .		20g

22.5.1 Refractories - Aluminosilicate (continued)

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	B_2O_3	Type	Size
225 S JRRM 301	43.91	46.80	3.52	1.03	0.79	0.69	0.17	2.00	0.87	Medium-high Alumina	20g
225 S JRRM 302	37.70	53.93	4.49	0.59	0.87	0.69	0.56	0.66	. . .		20g
225 S JRRM 303	36.16	59.25	1.47	0.16	1.03	0.85	0.69	0.20	. . .		20g
225 S JRRM 304	27.55	63.06	3.46	4.34	0.18	0.37	0.27	0.38	. . .		20g
225 S JRRM 305	20.03	68.69	2.81	3.30	0.65	0.30	0.80	3.11	. . .	Set only	20g
225 S JRRM 306	17.35	74.19	1.95	2.68	0.62	0.100	0.99	1.75	. . .		20g
225 S JRRM 307	10.87	80.14	2.97	1.22	0.15	0.61	1.08	2.36	. . .		20g
225 S JRRM 308	10.25	86.59	0.41	1.79	0.090	0.053	0.26	0.10	. . .		20g
225 S JRRM 309	2.12	89.83	1.27	3.85	1.02	0.28	0.42	0.92	. . .		20g
225 S JRRM 310	0.41	94.71	0.024	2.06	0.038	0.97	0.081	1.32	. . .		20g

22.5.2 Refractories - Zircon, Zirconia

		ZrO_2	HfO_2+ ZrO_2	Al_2O_3	SiO_2	CaO	MgO	Fe_2O_3	Cr	HfO_2	P_2O_5	Ti	ThO_2	U_3O_8	Y_2O_3	Type	Size
CRM	**225 A SA 13**	64.01	. . .	0.61	32.45	(0.14)	(0.044)	0.187	(0.0023)	1.29	0.23	0.177	. . .	. . .	. . .	Zircon Conc	100g
CRM	**225 A SA 62**	64.2	. . .	0.88	32.8	. . .	. . .	0.07	. . .	1.31	0.12	. . .	0.0158	0.0354	. . .	Zircon Conc	100g
	225 GB 35	66.14	. . .	. . .	. . .	. . .	. . .	. . .	. . .	1.42	. . .	0.16	. . .	. . .	. . .	Zircon	50g
CRM	**225 A 358**	92.70	. . .	0.08	0.20	1.50	3.42	0.064	. . .	1.63	. . .	0.12	. . .	. . .	. . .	Zirconia	100g
CRM	**225 A 388**	64.9	. . .	0.291	32.7	(0.04)	(<0.05)	0.049	. . .	1.3	0.12	0.14	0.018	0.034	0.136	Zircon	100g
	225 GC 2CAS15	. . .	64.6	0.36	34.1	0.52	0.11	0.08	. . .	. . .	. . .	0.108	. . .	. . .	. . .		100g
	225 S JCRM R501	. . .	66.5	0.39	32.6	. . .	. . .	0.06	. . .	. . .	. . .	0.096	. . .	. . .	. . .	Zircon sand	100g
	225 S JCRM R502	. . .	60.3	5.87	32.8	. . .	. . .	0.10	. . .	. . .	. . .	0.14	. . .	. . .	. . .	Zircon sand	100g

	ZrO_2	HfO_2	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	MnO	L.O.I.	Type	Size
225 S JRRM 601	92.01	1.59	0.26	0.11	0.10	0.16	5.58	0.061	0.001	0.002	0.007	0.003		0.070		20g
225 S JRRM 602	88.25	1.52	0.33	0.078	1.61	0.16	0.22	5.29	0.76	0.001	1.33	0.015		0.25	Zircon and Zirconia	20g
225 S JRRM 603	84.7	1.45	0.96	5.29	2.85	0.93	0.95	0.956	0.18	0.65	0.83	0.029		0.11		20g
225 S JRRM 604	79.18	1.35	3.04	6.91	0.42	0.13	0.091	0.017	1.08	1.93	1.99	3.06		0.23		20g
225 S JRRM 605	75.27	1.31	10.78	4.83	0.17	0.12	1.93	1.99	0.45	0.54	0.35	1.54		0.31		20g
225 S JRRM 606	72.35	1.26	22.03	0.53	0.93	0.11	0.021	0.32	2.02	0.011	0.019	0.008		0.32		20g
225 S JRRM 607	61.31	1.21	32.75	3.51	0.12	0.13	0.043	0.031	0.026	0.043	0.085	0.002		0.56	Set only	20g
225 S JRRM 608	58.84	1.21	34.62	0.70	0.092	0.10	0.52	3.12	0.031	0.019	0.11	0.49		0.069		20g
225 S JRRM 609	55.56	1.12	40.50	0.88	0.15	0.15	0.30	0.15	0.94	0.020	0.081	0.012		0.12		20g
225 S JRRM 610	48.70	0.98	45.66	0.45	0.30	0.093	3.07	0.54	0.043	0.010	0.11	0.009		0.073		20g
225 S JRRM 701	48.0	0.85	28.4	10.0	2.00	4.96	2.07	0.47	1.84	0.024	(0.027)	1.01	(0.007)	(0.098)		20g
225 S JRRM 702	42.5	2.08	9.99	38.1	0.37	0.21	1.55	1.97	2.02	0.57	(0.028)	0.11	(0.004)	(0.18)	Zircon aluminosilicates	20g
225 S JRRM 703	37.3	0.72	14.6	46.3	0.059	0.072	0.037	0.011	0.53	0.002	(0.035)	0.006	(0.000)	(0.096)		20g
225 S JRRM 704	33.4	0.68	42.6	19.5	0.55	1.02	0.15	0.51	0.22	0.40	(0.13)	0.51	(0.89)	(0.079)		20g
225 S JRRM 705	27.9	0.48	1.99	64.1	0.14	2.02	0.19	0.46	0.30	0.018	(0.017)	2.01	(0.004)	(0.16)		20g
225 S JRRM 706	22.7	1.19	39.3	25.9	0.13	3.77	1.58	0.15	3.49	0.95	(0.016)	0.010	(0.004)	(0.72		20g
225 S JRRM 707	18.1	0.36	21.1	55.7	1.81	0.28	1.08	0.84	0.19	0.15	(0.055)	0.18	(0.003)	(0.012)	Set only	20g
225 S JRRM 708	12.8	1.03	0.54	79.5	0.80	1.02	1.17	1.64	0.089	0.74	(0.002)	0.29	(0.001)	(0.13)		20g
225 S JRRM 709	8.32	0.18	34.3	50.3	0.47	0.091	0.52	1.20	1.03	0.21	(0.009)	2.91	(0.002)	(0.20)		20g
225 S JRRM 710	2.96	1.51	5.62	82.2	1.15	3.00	0.22	0.040	1.41	0.63	(0.042)	1.02	(0.002)	(0.094)		20g
225 GC AN46	15.7	. . .	45.5	30.5	0.85	0.50	0.21	5.36	0.15	1.01				0.08	Zircon Batt	100g

22.5.3 Refractories - Silicon Carbide

		Total C	Total Si	Total Al	Free C	Free Si	Total Fe	Mn	P	Cr	Mo	O	N	Ti	Ca	Others	Type	Size
CRM	**225 A E781-1**	48.25	35.56	4.39	(37.22)	(4.646)	(8.061)	(0.0274)	(0.011)	(0.024)	(0.0264)	. . .	(0.0282)	(0.032)	(0.0433)			100g
CRM	**225 A 359**	23.46	67.6	0.118	(0.061)	(0.325)	0.175	. . .	. . .	. . .	. . .	(0.532)	(7.84)	0.022	0.108		Nitrogen-bearing	100g
CRM	**225 A 360**	23.53	60.8	6.52	(0.085)	(0.538)	(0.19)	. . .	. . .	. . .	. . .	(4.03)	(4.77)	0.025	0.115		Sialon bonded	100g
CRM	**225 TI E780-1**	26.38	63.5	. . .	. . .	. . .	1.30	0.029	. . .	. . .	. . .	. . .	0.32	. . .	0.84			100g
	225 S JRRM 1001	29.81	. . .	(0.008)	0.04	(0.06)	(0.044)	. . .	. . .	. . .	. . .	(0.048)	(0.03)	(0.0035)	(<0.001)	SiC 99.58		50g

22.5.4 Refractories - Alumina

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	Mn_3O_4	ZrO_2	L.O.I.	Note	Size
225 GC AN 25	99.4	<0.01	0.03	<0.01	0.05	0.01	0.53	<0.01	0.05	. . .	. . .	. . .	Calcined data	100g
225 GC AN 26	99.8	0.09	0.04	<0.01	0.06	<0.01	0.03	<0.01	. . .	. . .	. . .	. . .	Calcined data	100g
225 GC AN 27	99.84	0.05	0.03	<0.01	0.06	<0.01	0.02	<0.01	. . .	. . .	. . .	. . .	Calcined data	100g
225 GC CAS10	97.7	1.26	0.06	<0.01	0.1	0.04	0.6	0.08	. . .	0.19	. . .	(0.52)	Calcined data	100g
225 S JCRM R301	87.5	7.24	1.40	2.90	0.03	0.02	0.03	0.04	0.07		0.13	0.35	Burned Bauxite	100g
225 S JCRM R302	90.6	3.45	1.76	3.17	0.02	0.03	0.02	0.02	0.05		0.30	0.22	Burned Bauxite	100g

22.5.5 Slide Gate Sands

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Cr_2O_3	Na_2O	K_2O	P_2O_5	V_2O_5	C	Mn_3O_4	L.O.I.	Size
225 DH X4501	72.21	4.92	. . .	0.195	0.025	2.40	11.53	0.059	0.633	0.008	0.102	0.607	0.065	0.204	100g
225 DH X4502	65.97	5.69	. . .	0.203	0.038	3.24	14.75	0.062	0.693	0.007	0.110	0.471	0.074	0.177	100g
225 DH X4503	58.28	6.61	11.29	0.242	0.031	3.98	18.41	0.059	0.502	0.008	0.138	0.659	0.096	0.172	100g
225 DH X4504	82.53	3.08	4.23	0.124	1.18	1.40	6.52	0.056	0.449	0.010	0.058	0.287	0.042	0.167	100g

22.5.6 Continuous Casting Powder

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	Ca	MgO	P_2O_5	Na_2O	K_2O	MnO	F	S	C	CO_2	H_2O	Size
225 DH X3006	34.48	18.99	5.75	0.725	2.32	1.51	0.403	6.17	2.55	0.073	0.153	0.392	18.90	4.82	1.47	100g
225 DH X3007	16.55	16.83	1.13	0.399	28.74	14.14	0.340	0.349	0.428	0.019	0.040	0.109	6.53	1.10	2.15	100g
225 DH X3008	31.95	4.98	0.361	0.055	25.64	1.63	0.039	5.20	0.239	0.036	4.99	0.064	7.75	10.60	0.99	100g
225 DH X3009	34.49	19.34	5.07	0.707	3.85	1.44	0.531	6.33	2.51	0.072	0.268	0.508	19.89	4.41	0.754	100g

22.6.1 Refractories - Magnesite, Graphitised Magnesia

		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	B_2O_3	L.O.I.	MnO	Mn_3O_4	C	Type	Size
CRM	**226 A 319/1**	1.093	0.109	0.291	0.0070	3.00	95.38	. . .	. . .	(0.007)	0.0035	(0.002)	. . .	0.108	. . .	. . .	Magnesia	100g
CRM	**226 A 389/1**	0.274	0.104	0.607	0.0051	0.880	97.89	. . .	. . .	0.0295	(0.004)	(0.015)	. . .	0.100	. . .	. . .	Hi-purity Magnesia	100g
CRM	**226 TI E778-1**	1.05	0.63	0.96	(0.015)	1.24	81.45	. . .	. . .	(0.01)	0.15	. . .	15.38	0.016	. . .	14.00	Graphitised Mag	100g
CRM	**226 DB E779-1**	0.390	0.198	5.33	0.013	2.367	91.0	(0.008)	(0.002)	0.060	(0.004)	0.034	. . .	. . .	0.692	. . .	Magnesite	100g
	226 GC AN 31	2.49	0.85	1.77	0.04	2.32	92.2	0.03	0.02	. . .	0.07	. . .	. . .	. . .	0.10	. . .	Magnesite	100g
	226 GC AN 36	0.49	0.49	4.71	0.01	0.97	93.2	. . .	. . .	. . .	0.06	. . .	. . .	. . .	0.11	. . .	Magnesite	100g
	226 GC AN 37	1.41	1.08	1.87	0.04	1.54	93.9	. . .	. . .	. . .	0.005	. . .	. . .	. . .	0.11	. . .	Magnesite	100g
	226 GC AN 43	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	0.005	. . .	. . .	. . .	. . .	Magnesite	100g
CRM	**226 RU K6/2**	2.03	0.54	2.23	. . .	2.93	92.4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	Magnesite	125g
	226 DH X4203	15.94	1.27	2.75	0.054	1.29	76.81	0.375	0.019	0.059	0.119	. . .	1.01	. . .	0.090	0.396	Magnesite	100g
	226 DH X4204	4.05	1.40	1.20	0.056	1.92	90.66	0.055	0.008	0.115	0.135	. . .	0.158	. . .	0.100	0.030	Magnesite	100g
	226 DH X4205	11.39	1.52	2.38	0.092	2.18	79.79	0.269	0.040	0.132	0.222	. . .	0.63	. . .	0.077	0.373	Magnesite	100g
	226 DH X4206	17.03	2.37	3.59	0.197	2.37	71.27	0.319	0.048	0.132	0.209	. . .	0.84	. . .	0.065	0.458	Magnesite	100g
CRM	**226 A SA 43**	5.99	(0.06)	0.26	(0.01)	0.75	44.11	(0.05)	(0.04)	(0.02)	. . .	. . .	. . .	(0.01)	. . .	. . .	continued	

Continuation from above	All Elements ppm Ba	Ce	Cr	Cu	Co	Ni	S	Sr	Zn	Size
226 A SA 43	(25.0)	(20.0)	(195.0)	(15.0)	4.0	252.0	(400.0)	8.0	(10.0)	100g

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	P_2O_5	Cr_2O_3	B_2O_3	MnO	ZrO_2	L.O.I.	Type	Size
226 S JRRM 401	6.42	8.10	3.89	(0.017)	0.20	81.24	(0.008)	(0.003)	(0.035)	(0.004)	(0.016)	(0.011)	. . .	. . .	Magnesite	20g
226 S JRRM 402	5.46	1.99	5.05	(0.026)	3.57	83.77	(0.010)	(0.001)	(0.077)	(0.006)	(0.12)	(0.011)	. . .	. . .		20g
226 S JRRM 403	8.14	4.06	1.55	(0.003)	0.61	85.48	(0.008)	(0.001)	(0.044)	(0.010)	(0.031)	(0.013)	. . .	. . .		20g
226 S JRRM 404	1.22	6.01	2.00	(0.007)	1.78	88.02	(0.008)	(0.001)	(0.053)	(0.006)	(0.011)	(0.030)	. . .	. . .		20g
226 S JRRM 405	3.47	1.37	1.34	(0.056)	1.60	91.95	(0.009)	(0.015)	(0.12)	(0.014)	(0.011)	(0.074)	. . .	. . .	Set only	20g
226 S JRRM 406	1.19	1.13	0.87	(0.008)	4.80	91.85	(0.002)	(0.006)	(0.041)	(0.006)	(0.013)	(0.011)	. . .	. . .		20g
226 S JRRM 407	2.43	0.100	2.14	(0.003)	0.67	94.55	(0.004)	(0.001)	(0.044)	(0.080)	(0.023)	(0.014)	. . .	. . .		20g
226 S JRRM 408	0.46	2.55	0.13	(0.006)	0.67	96.19	(0.001)	(0.000)	(0.015)	(0.009)	(0.090)	(0.010)	. . .	. . .		20g
226 S JRRM 409	0.53	0.20	0.49	(0.003)	0.74	98.03	(0.002)	(0.001)	(0.023)	(0.019)	(0.036)	(0.015)	. . .	. . .		20g
226 S JRRM 410	0.18	0.058	0.050	(0.003)	0.59	99.08	(0.001)	(0.000)	(0.045)	(0.003)	(0.020)	(0.010)	. . .	. . .		20g
226 S JRRM 801	0.35	93.4	2.00	0.21	0.14	3.26	0.19	0.014	0.003	(0.003)	. . .	(0.002)	(0.008)	(0.14)	Magnesite-alumina	20g
226 S JRRM 802	3.32	84.2	1.03	1.48	2.00	6.13	0.15	0.46	0.95	(0.002)	. . .	(0.003)	(0.002)	(0.063)		20g
226 S JRRM 803	0.58	74.2	4.90	2.51	0.57	16.2	0.86	0.007	0.017	(0.002)	. . .	(0.005)	(0.004)	(0.36)		20g
226 S JRRM 804	5.17	64.6	4.02	0.13	4.76	20.8	0.088	0.044	0.11	(0.010)	. . .	(0.020)	(0.002)	(0.012)		20g
226 S JRRM 805	2.49	58.0	0.73	1.05	0.28	36.0	0.54	0.015	0.68	(0.001)	. . .	(0.006)	(0.006)	(0.17)		20g
226 S JRRM 806	0.51	48.8	0.16	0.004	0.97	49.4	0.049	0.001	0.048	(0.006)	. . .	(0.028)	(0.001)	(0.21)	Set only	20g
226 S JRRM 807	0.58	39.9	0.32	0.19	2.75	55.0	0.32	0.15	0.53	(0.002)	. . .	(0.005)	(0.001)	(0.57)		20g
226 S JRRM 808	0.79	28.6	0.56	0.71	0.99	67.0	0.40	0.69	0.22	(0.001)	. . .	(0.017)	(0.001)	(0.84)		20g
226 S JRRM 809	0.36	19.8	0.11	2.88	4.47	70.1	0.049	0.98	1.06	(0.001)	. . .	(0.008)	(0.001)	(0.48)		20g
226 S JRRM 810	4.21	10.0	3.11	1.91	0.18	78.9	0.75	0.16	0.51	(0.004)	. . .	(0.016)	(0.004)	(0.22)		20g

22.6.2 Refractories - Chrome Magnesite

		SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	Cr_2O_3	B_2O_3	MnO	Mn_3O_4	NiO	V_2O_5	Type	Size
CRM	**226 A 369**	2.59	14.7	10.3	0.14	1.17	53.5	. . .	. . .	17.2	. . .	0.11	. . .	. . .	. . .	Magnesite(Cr)	100g
CRM	**226 A 370**	3.01	12.3	7.23	0.13	1.54	61.8	. . .	. . .	13.4	. . .	0.11	. . .	. . .	. . .	Magnesite(Cr)	100g
CRM	**226 A 396**	1.37	5.73	10.9	0.26	1.12	64.6	(0.06)	(0.03)	15.6	0.09	0.17	. . .	. . .	. . .	Magnesite(Cr)	100g
	226 DH X0501	3.88	11.59	11.02	0.070	1.30	50.74	0.011	0.06	20.73	. . .	. . .	0.27	0.119	0.1	Cr Magnesite	100g
CRM	**226 RU K5/2**	8.64	4.28	8.47	. . .	1.15	54.8	. . .	. . .	22.6	. . .	. . .	. . .	. . .	. . .	Cr Magnesite	125g

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Cr_2O_3	MnO	P_2O_5	NiO	V_2O_5	ZnO	L.O.I.	Type	Size
226 S JRRM 501	0.026	2.92	4.80	0.006	0.023	87.60	2.82	0.020	(0.036)	(0.016)	(0.010)	(0.006)	(0.13)	Cr Magnesite	20g
226 S JRRM 502	3.11	11.98	1.02	0.013	0.20	76.28	7.49	0.018	(0.026)	(0.026)	(0.024)	(0.004)	(0.064)		20g
226 S JRRM 503	9.09	7.14	3.00	0.047	3.81	63.11	13.60	0.038	(0.032)	(0.036)	(0.037)	(0.013)	(0.11)		20g
226 S JRRM 504	2.18	17.56	4.11	0.013	2.60	54.85	18.35	0.011	(0.034)	(0.019)	(0.016)	(0.011)	(0.12)		20g
226 S JRRM 505	1.82	7.76	17.76	0.11	0.49	50.14	21.74	0.100	(0.023)	(0.078)	(0.075)	(0.021)	(0.085)		20g
226 S JRRM 506	2.16	14.69	7.49	0.13	0.46	46.65	28.19	0.072	(0.018)	(0.098)	(0.086)	(0.010)	(0.070)	Set only	20g
226 S JRRM 507	5.69	25.02	12.98	0.16	1.61	22.36	32.03	0.11	(0.010)	(0.20)	(0.13)	(0.037)	(0.11)		20g
226 S JRRM 508	3.08	3.98	22.70	0.014	1.03	30.86	38.18	0.006	(0.016)	(0.010)	(0.008)	(0.005)	(0.053)		20g
226 S JRRM 509	1.96	20.28	10.15	1.20	2.86	20.45	42.57	0.082	(0.013)	(0.048)	(0.11)	(0.037)	(0.13)		20g
226 S JRRM 510	4.91	12.21	14.99	0.13	0.29	16.86	50.38	0.17	(0.016)	(0.19)	(0.11)	(0.041)	(0.25)		20g
226 S JRRM 511	2.90	6.68	27.22	0.10	0.071	10.62	52.51	0.12	(0.004)	(0.10)	(0.054)_	(0.052)	(0.48)		20g
226 S JRRM 512	10.57	29.25	26.01	0.047	4.06	24.81	4.98	0.025	(0.019)	(0.018)	(0.012)	(0.013)	(0.028)		20g

22.7.1 Cements

		CaO	SiO_2	Al_2O_3	Fe_2O_3	MgO	SO_3	Na_2O	K_2O	TiO_2	SrO	Mn_2O_3	P_2O_5	F	ZnO	Cr_2O_3	L.O.I.	Size
CRM	227 B 1880a	63.83	20.31	5.18	2.81	1.72	3.25	0.19	0.92	0.25	0.083	0.127	0.22	. . .	(0.005)	0.007	(1.32)	4 x 5g
CRM	227 B 1881a	57.58	22.26	7.060	3.09	2.981	3.366	0.199	1.228	0.3663	0.036	0.1042	0.1459	(0.09)	0.0489	0.0588	1.59	4 x 5g
CRM	227 B 1882a	39.29	4.01	39.14	14.67	0.51	. . .	0.021	0.051	1.786	0.024	0.06	0.07	. . .	0.004	0.113	(0.20)	4 x 5g
CRM	227 B 1883a	29.52	0.24	70.04	0.078	0.19	. . .	0.30	0.014	0.02	0.019	(0.003)	(0.003)	. . .	. . .	0.006	(0.35)	4 x 5g
CRM	227 B 1884a	62.26	20.57	4.264	2.695	4.475	2.921	0.2161	0.997	0.186	0.2984	0.0853	0.1278	(0.11)	0.0101	0.0166	(1.06)	4 x 5g
CRM	227 B 1885a	62.39	20.909	4.026	1.929	4.033	2.83	1.068	0.206	0.195	0.638	0.0478	0.122	(0.13)	0.0029	0.0195	(1.68)	4 x 5g
CRM	227 B 1886a	67.87	22.38	3.875	0.152	1.932	2.086	0.021	0.093	0.084	0.018	0.0073	0.022	(0.02)	(0.001)	0.0024	(1.56)	4 x 5g
CRM	227 B 1887a	60.90	18.637	6.202	2.861	2.835	4.622	0.4778	1.100	0.2658	0.322	0.1186	0.306	(0.09)	0.0667	0.009	(1.43)	4 x 5g
CRM	227 B 1888a	63.23	21.22	4.265	3.076	2.982	2.131	0.1066	0.526	0.263	0.082	0.1256	0.080	(0.11)	0.107	0.0186	(1.75)	4 x 5g
CRM	227 B 1889a	65.34	20.66	3.89	1.937	0.814	2.69	0.195	0.605	0.227	0.042	0.2588	0.110	(0.05)	0.0048	0.0072	(3.28)	4 x 5g
	227 CG 03201a	62.34	20.56	5.02	3.16	1.40	2.29	0.18	1.15	0.21	. . .	. . .	. . .	. . .	. . .	. . .	3.39	25g
CRM	227 A 353	64.8	20.5	3.77	4.82	2.42	2.25	0.10	0.49	0.16	0.23	0.23	0.077	. . .	. . .	(0.02)	. . .	100g
CRM	227 A 354	70.0	21.8	4.85	0.30	0.42	2.25	0.10	0.11	(0.04)	0.11	0.058	0.12	. . .	. . .	(0.003)	. . .	100g
CRM	227 A 372/1	65.3	20.3	5.37	3.42	1.31	2.95	0.10	0.75	0.27	(0.05)	0.074	(0.07)	. . .	. . .	(0.01)	. . .	100g

The Na_2O and K_2O values for 227A 372 are acid soluble concentrations.

												Mn_3O_4			ZrO_2			
	227 DH X0201	60.56	22.56	6.55	2.09	2.19	4.28	0.145	0.907	0.314	0.118	0.125	0.118	0.059	0.032	0.008	. . .	100g
	227 DH X0202	38.1	4.08	39.31	15.83	0.487	0.105	0.033	0.111	1.81	. . .	0.039	0.043	0.009	0.056	. . .	. . .	100g
	227 DH X0203	64.97	20.59	5.21	3.5	1.37	2.68	0.28	0.577	0.369	0.124	0.053	0.226	0.035	0.046	0.014	. . .	100g
	227 DH X0204	51.58	28.3	9.79	4.01	1.01	2.94	0.29	0.698	0.575	0.132	0.055	0.315	0.035	(0.03)	0.017	. . .	100g
	227 DH X0205	69.25	22.28	3.94	0.387	0.377	2.82	0.076	0.158	0.338	0.122	0.025	0.139	0.054	0.019	0.007	. . .	100g
	227 DH X0206	55.67	24.28	6.52	3.21	2.88	4.6	0.258	1.54	0.383	0.112	0.064	0.159	0.185	0.011	0.028	. . .	100g
	227 DH X0207	61.38	19.34	4.97	3.8	5.83	2.71	0.138	0.331	0.721	0.088	0.138	0.108	0.364	0.016	0.046	. . .	100g
	227 DH X0208	56.04	20.13	5.38	3.16	10.95	2.56	0.226	0.547	0.358	0.105	0.059	0.164	0.1	0.019	0.023	. . .	100g

22.7.2 Cement Clinkers (XRD)

		Alite	Belite	Ferrite	Aluminate	Periclase	Arcanite	CaO	SiO_2	Al_2O_3	Fe_2O_3	MgO	SO_3	K_2O	TiO_2	P_2O_5	L.O.I.	Size
CRM	227 B 2686	58.6	23.3	14.1	2.3	3.3	. . .	(63.36)	(22.48)	(4.70)	(3.60)	(4.73)	(0.27)	(0.42)	(0.25)	(0.06)	(0.16)	3 x 10g
CRM	227 B 2687	73.6	9.1	2.2	12.1	. . .	1.0	(67.20)	(21.43)	(5.53)	(1.98)	(1.48)	(0.83)	(0.72)	(0.27)	(0.29)	(0.17)	3 x 10g
CRM	227 B 2688	66.1	17.9	11.1	5.0	. . .	1.0	(66.50)	(22.68)	(4.90)	(4.07)	(0.98)	(0.31)	(0.35)	(0.24)	(0.08)	(0.21)	3 x 10g

22.8 Red Mud

		Al_2O_3	CaO	Fe_2O_3	Na_2O	SiO_2	TiO_2	Organic C	L.O.I.	T.E.A.	MgO	MnO	Cr_2O_3	P_2O_5	ZrO_2	ZnO	SO_3	Size
	228 CA RM-01	16.8	3.5	53.8	1.4	5.4	5.9	0.36	12.0	4.6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 CA RM-02	13.9	11.2	30.7	3.0	6.2	22.6	0.16	8.4	5.7	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 CA RM-03	13.3	8.3	49.2	1.4	4.6	6.5	0.28	12.1	6.4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 CA RM-04	20.6	7.7	29.0	6.8	13.9	6.0	0.43	12.7	6.6	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 CA RM-05	21.9	0.9	35.6	8.3	15.7	7.1	0.22	8.9	6.9	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 CA CAN	27.9	13.5	4.7	8.5	16.5	8.5	0.23	17.3	13.8	. . .	. . .	. . .	. . .	. . .	. . .	. . .	100g
	228 ML SRC-16	14.5	18.2	30.0	3.99	8.02	3.66	. . .	16.4	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	175g
	228 ML SRC-27	17.5	5.63	46.9	4.42	6.89	5.99	. . .	8.98	. . .	. . .	0.78	0.26	1.14	0.15	0.037	0.38	100g
	228 ML SRC-79	27.3	11.4	4.86	11.4	23.2	3.07	. . .	14.1	. . .	0.12	0.11	0.01	0.28	0.40	0.01	2.79	50g

22.9 Alumina

		CaO	Fe_2O_3	Ga_2O_3	Na_2O	SiO_2	TiO_2	V_2O_5	ZnO	P_2O_5	SO_3	Li_2O	MnO	Cr_2O_3	B_2O_3	L.O.I. 1000^oC	L.O.I. 1200^oC	Size
	229 B 699	0.036	0.013	0.010	0.59	0.014	. . .	0.0005	0.013	0.0002	. . .	0.002	0.0005	0.0002	. . .	0.69	0.89	60g
	229 CA ALU-01	0.017	0.016	0.011	0.27	0.013	0.004	0.002	0.001	0.0005	0.12	. . .	. . .	. . .	. . .	1.2	. . .	100g
	229 CA ALU-02	0.009	0.017	0.011	0.25	0.007	0.002	0.002	0.002	0.0005	0.12	. . .	. . .	. . .	. . .	0.78	. . .	100g
	229 CA ALU-03	0.010	0.011	0.009	0.44	0.010	0.006	0.001	0.001	. . .	0.05	. . .	. . .	. . .	. . .	0.77	. . .	100g
	229 CA ALU-04	0.020	0.017	0.009	0.46	0.021	0.009	0.003	0.001	. . .	0.07	. . .	. . .	. . .	. . .	0.49	. . .	100g
	229 CA ALU-05	0.033	0.008	0.007	0.37	0.014	0.002	0.001	0.010	. . .	0.13	. . .	. . .	. . .	. . .	0.83	. . .	100g
	229 CA ALU-06	0.043	0.008	0.005	0.36	0.017	0.001	0.001	0.009	. . .	0.11	. . .	. . .	. . .	. . .	1.31	. . .	100g
	229 CA ALU-07	0.049	0.023	0.006	0.46	0.025	0.004	0.004	0.001	. . .	0.17	. . .	. . .	. . .	. . .	0.89	. . .	100g
	229 CA ALU-08	0.008	0.022	0.014	0.42	0.007	0.002	0.003	0.001	. . .	0.09	. . .	. . .	. . .	. . .	0.57	. . .	100g
	229 CA ALU-09	0.026	0.008	0.009	0.42	0.018	0.001	0.001	0.001	0.0002	0.08	. . .	. . .	. . .	. . .	0.60	. . .	100g
	229 CA ALU-10	0.004	0.015	0.013	0.37	0.005	0.002	0.002	. . .	0.002	0.08	. . .	. . .	. . .	. . .	0.60	. . .	100g
	229 ML SRP-A-16	0.084	(0.026)	(0.016)	(0.54)	(0.076)	(0.005)	. . .	(0.002)	. . .	. . .	. . .	. . .	(0.0003)	0.22	1.36	. . .	100g
	229 ML SRP-A-29	(0.003)	0.0012	0.005	0.19	(0.007)	(0.001)	. . .	(0.001)	. . .	. . .	. . .	. . .	(0.0001)	. . .	34.7	. . .	250g
	229 ML SRP-A-61	0.036	0.009	(0.008)	2.38	0.028	(0.0005)	0.0040	(0.011)	. . .	. . .	. . .	0.0044	. . .	. . .	0.70	. . .	75g
	229 ML SRP-A-62	(0.028)	0.009	(0.008)	1.21	0.019	(0.0005)	0.0017	(0.011)	. . .	. . .	. . .	(0.004)	. . .	. . .	1.30	. . .	75g

23.1 Glass for XRF Monitoring

	SiO_2	Al_2O_3	B_2O_3	Na_2O	K_2O	MgO	CaO	TiO_2	Fe_2O_3	MnO	ZnO	Cr_2O_3	CoO	F	SO_3	P_2O_5	Size (mm) Ø	H
231 AC 111	53*	30*	. . .	10*	11*	44*	15.2*	2.7*	15.9*	1.6*	. . .	. . .	. . .	. . .	3.9*	3.1*	40	x 5

* These are apparent concentrations, by comparison with discs prepared using 10:1 lithium borate

This monitor also contains 38 other elements, at apparent concentrations of ~ 2000 ppm each

	SiO_2	Na_2O	K_2O	Al_2O_3	CaO	MgO	FeO	SnO	P_2O_5	SrO	ZnO	SO_3	B_2O_3	TiO_2	MnO	CoO	CdO	F	Type	Size (mm) Ø	H
231 X FESN 01	65	15	. . .	. . .	20	. . .	0.007	0.006	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X FESN 02	65	15	. . .	. . .	20	. . .	0.021	0.019	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X FESN 03	65	15	. . .	. . .	20	. . .	0.036	0.032	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X WM0	64	20	. . .	1	. . .	. . .	. . .	. . .	. . .	15	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X WM1	64	19.7	. . .	1	0.042	0.050	. . .	. . .	0.069	15	0.037	0.075	. . .	. . .	. . .	. . .	. . .	. . .	"wear	40	x 6
231 X WM2	64	19.1	. . .	1	0.14	0.17	. . .	. . .	0.23	15	0.12	0.25	. . .	. . .	. . .	. . .	. . .	. . .	metals"	40	x 6
231 X WM3	62.5	18	. . .	1	0.70	0.83	. . .	. . .	1.15	14	0.62	1.25	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X WM4	57.50	0.90	. . .	13.48	1.12	1.26	. . .	. . .	1.80	19.93	1.49	. . .	. . .	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X EAF-1	18	. . .	. . .	1	40	1	1	. . .	0.2	. . .	. . .	4	20.8	4.5	9	. . .	. . .	0.5	EAF	40	x 6
231 X EAF-2B	10	. . .	. . .	5	2	18	30	. . .	1	. . .	. . .	1.5	26	2	0.5	. . .	. . .	4	Slags	40	x 6
231 X EAF-3	1	. . .	. . .	9	18.5	9	20	. . .	1.8	. . .	. . .	0.2	27	0.5	4	. . .	. . .	9		40	x 6
231 X M01	61.27	19.15	0.41	0.96	. . .	. . .	. . .	. . .	1.31	14.36	. . .	0.003	. . .	. . .	. . .	2.54	. . .	. . .		40	x 6
231 X M02	59.96	18.74	0.74	0.94	. . .	. . .	. . .	. . .	1.75	14.05	. . .	0.005	. . .	. . .	. . .	3.81	. . .	. . .		40	x 6
231 X M03	58.71	18.35	0.99	0.92	. . .	. . .	. . .	. . .	2.18	13.76	. . .	0.009	. . .	. . .	. . .	5.09	. . .	. . .		40	x 6
231 X M04	57.45	17.95	1.24	0.90	. . .	. . .	. . .	. . .	2.62	13.47	. . .	0.015	. . .	. . .	. . .	6.36	. . .	. . .		40	x 6
231 X FLX-1	65	13	1	2	1.6	. . .	0.1	. . .	. . .	. . .	13	2	. . .	. . .	. . .	. . .	0.3	2		40	x 6
231 X FLX -D1	10	13	0.5	0.5	31	22	. . .	. . .	0.5	. . .	. . .	. . .	34.5	. . .	0.5	. . .	. . .	. . .	Dolomite	40	x 6

	SiO_2	K_2O	Al_2O_3	CaO	MgO	SnO	PbO	P_2O_5	B_2O_3	TiO_2	Cr_2O_3	NiO	WO_3	Size (mm) Ø	H
231 X PR2	20	9	. . .	. . .	20	1	3	. . .	43	. . .	. . .	. . .	4	40	x 6
231 X PR3	38	. . .	20	4	10	. . .	. . .	10	13.5	3	1	0.5	. . .	40	x 6

	SiO_2	Na_2O	K_2O	Al_2O_3	CaO	MgO	FeO	P_2O_5	SrO	ZnO	B_2O_3	TiO_2	MnO	BaO	Cr_2O_3	CuO	CoO		Size (mm) Ø	H
231 X S1	50	20	5.0	8.0	5.0	8.0	2.0	. . .	. . .	. . .	. . .	2.0	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X S2	50	18	5.0	8.0	5.0	8.0	. . .	. . .	2.0	2.0	. . .	. . .	. . .	2.0	. . .	. . .	. . .		40	x 6
231 X S3	50	16	5.0	4.0	5.0	7.0	1.5	0.5	1.0	1.0	5.0	2.0	0.5	1.0	0.5	. . .	. . .		40	x 6
231 X S4	50	18	5.0	5.0	5.0	10.0	1.0	. . .	1.0	. . .	. . .	1.0	. . .	1.0	0.5	0.5	0.5	continued		
231 X S5	50	10	5.0	4.0	5.0	2.0	0.5	0.5	1.0	1.0	5.0	0.5	0.5	1.0	0.5	0.5	0.5	continued		
231 X S7	50	2.75	2.75	15	10.0	5.0	12	0.25	. . .	. . .	. . .	2.0	0.25	. . .	. . .	. . .	. . .		40	x 6
231 X S9	71.6	12.5	1.5	2.5	9.0	1.0	0.5	0.2	. . .	. . .	1.0	0.2	. . .	. . .	. . .	. . .	. . .		40	x 6
231 X S10	64.8	8.5	0.2	4.0	14.0	3.0	0.3	0.1	. . .	. . .	5.0	0.1	. . .	. . .	. . .	. . .	. . .		40	x 6

Continuation from above	V_2O_5	NiO	ZrO_2	Nb_2O_5	Mo_2O_3	CdO	SnO	Ta_2O_3	WO_3	F	PbO	Bi_2O_5	La_2O_3	CeO_2	Size (mm) Ø	H
231 X S4	1.0	0.5	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	. . .	40	x 6
231 X S5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0	3.0	3.0	0.5	0.5	40	x 6

	Ag_2O	Al_2O_3	As_2O_3	B_2O_3	BaO	Bi_2O_3	Br	CaO	CdO	CeO_2	Cl	CoO	Cr_2O_3	CuO	Dy_2O_3	Er_2O_3	F	FeO	
231 X S6M	. . .	5.9	. . .	5.0	1.3	. . .	. . .	4.7	0.3	0.5	0.2	0.6	0.4	0.5	0.3	0.3	. . .	0.5	
231 X FLX -O1	. . .	3	. . .	5	4	. . .	. . .	5	. . .	. . .	0.5	. . .	1	1	. . .	. . .	. . .	1	continued
231 X FLX-S13	0.3	4	0.2	5	1.3	2	0.5	5	0.5	0.5	0.5	0.5	0.5	0.5	0.3	0.3	1	0.5	

Continuation from above	Gd_2O_5	GeO_2	HfO_2	In_2O_3	K_2O	La_2O_3	MgO	MnO	Mo_2O_3	Na_2O	Nb_2O_5	Nd_2O_3	NiO	P_2O_5	PbO	Pr_6O_{11}	Rb_2O	
231 X S6M	0.3	. . .	0.4	. . .	4.4	0.4	1.7	0.3	0.5	8.8	0.6	0.3	0.5	0.6	2.1	0.3	. . .	
231 X FLX -O1	. . .	. . .	. . .	. . .	. . .	. . .	5	. . .	2	10	. . .	. . .	1	1	3	. . .	. . .	continued
231 X FLX-S13	0.3	0.1	0.3	0.3	5	0.5	2	0.5	0.3	8	0.3	0.3	0.5	0.5	2	0.3	0.1	

Continuation from above	Sb_2O_3	Sc_2O_3	SeO_2	SiO_2	Sm_2O_5	SnO	SO_3	SrO	Ta_2O_5	TeO_2	TiO_2	V_2O_5	WO_3	Y_2O_3	Yb_2O_5	ZnO	ZrO_2	Size (mm) Ø	H
231 X S6M	0.2	. . .	0.02	47.55	0.2	0.5	0.13	1.0	0.6	. . .	4.8	0.5	. . .	0.3	0.3	1.4	0.6	40	x 6
231 X FLX -O1	. . .	. . .	. . .	50	. . .	1	0.5	. . .	. . .	. . .	1	1	. . .	. . .	. . .	4	. . .	40	x 6
231 X FLX-S13	0.2	0.1	0.3	48	0.3	0.5	0.5	1	0.5	0.5	0.5	0.5	0.5	0.2	0.2	1	0.5	40	x 6

23.1 Glass

		SiO_2	TiO_2	Al_2O_3	Fe_2O_3	B_2O_3	CaO	MgO	Na_2O	K_2O	Li_2O	SO_3	ZnO	ZrO_2	P_2O_5	MnO	
CRM	**231 B 89**	65.35	0.01	0.18	0.049	...	0.21	0.03	5.70	8.40	...	0.03	...	0.005	0.23	0.088	
CRM	**231 B 92**	(75.0)	...	...	...	0.70	(8.3)	(0.1)	(13.1)	(0.6)	...	...	(0.2)	...	...	...	
CRM	**231 B 93a**	80.8	0.014	2.28	0.028	12.56	0.01	0.005	3.98	0.014	...	...	...	0.042	...	...	
CRM	**231 B 620**	72.08	0.018	1.80	0.043	...	7.11	3.69	14.39	0.41	...	0.28	...	...	...	...	
CRM	**231 B 621**	71.13	0.014	2.76	0.040	...	10.71	0.27	12.74	2.01	...	0.13	...	0.007	...	...	continued
CRM	**231 B 1411**	58.04	0.02	5.68	0.050	10.94	2.18	0.33	10.14	2.97	...	...	3.85	...	...	...	
CRM	**231 B 1412**	42.38	...	7.52	(0.031)	4.53	4.53	(4.69)	4.69	4.14	(4.50)	...	4.48	...	...	...	
CRM	**231 B 1830**	73.07	0.011	0.12	0.121	...	8.56	3.90	13.75	0.04	...	0.26	...	...	...	...	
CRM	**231 B 1831**	73.08	0.019	1.21	0.087	...	8.20	3.51	13.32	0.33	...	0.25	...	...	...	...	
	231 GR EC1.1	71.97	0.04	1.08	0.103	...	8.63	3.78	13.41	0.59	...	0.23	...	...	...	...	continued
	231 GS 4	69.49	0.041	3.02	0.099	0.19	4.24	<0.05	15.45	0.57	...	<0.05	3.28	...	...	...	
	231 GS 5	72.74	0.034	1.12	0.043	...	6.55	2.75	15.65	0.42	...	0.21	...	...	...	...	
	231 GS 6	73.06	0.02	1.7	0.034	...	9.97	<0.1	14.65	<0.1	...	0.2	...	...	...	...	
	231 GS 7	72.64	0.042	1.5	0.044	...	11.03	0.14	13.9	0.43	...	0.19	...	...	...	...	continued
	231 GS 8	56.34	0.02	0.05	0.01	0.36	<0.02	<0.02	0.23	11.85	...	...	...	...	...	...	
	231 GS 9	56.7	0.03	1.4	0.045	...	0.1	...	4.0	8.4	...	...	...	...	...	...	
	231 GS 10	72.7	0.097	1.62	0.325	...	10.7	1.81	12.2	0.35	...	0.05	...	...	...	...	
	231 GS 11	70.7	0.068	1.83	0.342	...	10.3	2.14	13.6	0.69	...	0.06	...	...	...	...	
CRM	**231 F 126A**	57.80	...	0.128	0.0055	...	1.033	0.512	3.58	10	0.495	...	1.02	...	...	...	continued

Continuation from above	Sb_2O_3	F	Cl	PbO	BaO	As_2O_3	CdO	SrO	L.O.I. 550°C	R.I.	Density	Form	Type	Size
231 B 89	...	...	0.05	17.50	1.40	0.03	...	...	0.32	...	...	powder	lead-barium	45g
231 B 92	...	...	...	...	...	...	...	...	...	...	...	powder	low boron	45 g
231 B 93a	...	...	0.060	...	...	...	...	...	...	...	...	3 x disc	borosilicate	32 x 6
231 B 620	...	...	...	...	...	0.056	...	...	...	...	...	3 x disc	soda-lime	32 x 6
231 B 621	...	...	...	...	0.12	0.030	...	...	...	...	...	3 x disc	soda-lime	32 x 6
231 B 1411	...	...	...	...	5.00	...	...	...	...	...	...	10 x platelet	soft borosilicate	32x32x3
231 B 1412	...	...	...	4.40	4.67	...	4.38	4.55	...	...	...	8 x platelet	multicomponent	32x32x3
231 B 1830	...	...	...	...	...	...	...	...	...	...	...	3 x square plate	soda lime	38 x 38
231 B 1831	...	...	...	...	...	...	...	...	...	...	...	3 x square plate	soda lime	38 x 38
231 GR EC1.1	...	...	...	...	...	...	...	...	...	...	...		Float	25g
231 GS 4	...	4.96	...	...	...	...	...	...	0.22	...	...	Powder	Fluoride opal	25g
231 GS 5	...	...	...	...	...	...	...	...	...	...	...		Na-Ca-Mg-Si	25g
231 GS 6	...	...	...	...	...	...	...	...	...	...	...		Na-Ca-Si	25g
231 GS 7	...	...	...	...	...	...	...	...	0.07	...	...		Na-Ca-Si	25g
231 GS 8	...	...	...	30.59	...	0.32	...	...	0.21	...	...		Pb-K-Si	25g
231 GS 9	...	...	...	28.4	...	0.4	...	...	0.4	...	...			25g
231 GS 10	...	...	...	...	0.02	...	...	...	...	...	...	Powder		25g
231 GS 11	...	...	...	...	0.03	...	...	...	...	...	...			25g
231 F 126A	0.29	...	...	23.98	1.036	...	...	...	...	1.5597	2.99		Lead Crystal	300g

Note: 231 GS4 231, GS10 and 231 GS11 are also available in disc form, 40mmØ x 6mm

23.2 Glass Sand

		SiO_2	TiO_2	Al_2O_3	Fe_2O_3	ppm Cr_2O_3	CaO	MgO	Na_2O	K_2O	ZrO_2	L.O.I.	MnO	Others	Type	Size
CRM	**232 B 81a**		0.12	0.66	0.082	46	...	...	...	...	0.034	...	...			75g
CRM	**232 B 165a**	...	0.011	0.059	0.012	(1.0)	...	...	...	...	0.006	...	...		Low Iron	75g
CRM	**232 B 1413**	82.77	0.11	9.90	0.24	...	0.74	0.06	1.75	3.94	...	...	...	BaO 0.12	High-Alumina	75g
CRM	**232 E 61**	99.79	0.026	0.054	0.014	...	(0.004)	(0.003)	(0.002)	(0.007)	0.01	0.06	...			100g
CRM	**232 E 62**	99.62	0.036	0.11	0.072	...	(0.004)	(0.004)	(0.002)	(0.007)	0.01	0.1	...			100g
CRM	**232 D SPS**	99.32	0.035	0.248	0.037	...	0.029	0.0071	0.045	0.058	...	0.167	...	Trace elements		100g
CRM	**232 A SA 49**	99.6	(0.01)	(0.05)	(0.05)	...	(0.01)	(0.05)	(0.05)	(0.01)	...	...	(0.01)	Sr (5ppm)	Quartz	100g
	232 GS SS1	99.74	0.026	0.061	0.014	3.0	<0.02	<0.02	<0.02	<0.02	...	0.12	...			200g
	232 GS SS6	98.66	0.024	0.6	0.032	(2.5)	<0.02	<0.02	<0.02	0.4	...	0.14	...			200g
	232 GS SS8	95.63	0.073	2.07	0.26	(11.0)	0.06	0.12	0.2	1.06	...	0.48	...			200g
	232 GS SS9	97.24	0.044	1.35	0.103	(3.0)	0.02	0.06	0.1	0.82	...	0.24	...			200g

24.1 Trace Metals in Coal and Coke

		C	H	N	Ash	Volatiles %	GCV MJ/kg	% S	ppm Al	ppm Ca	ppm Fe	ppm Ni	ppm V	ppm Co	ppm Na	Type	Size
CRM	24 B 2718	(89.0)	(3.47)	(1.23)	(0.18)	(10.6)	(35.76)	4.7032	16.5	174	290	139.1	302	(5.79)	(88.6)	Green Pet Coke	50g
CRM	24 B 2719	(97.1)	(0.17)	(1.17)	(0.12)	(0.54)	(32.90)	0.8877	58.9	57.7	201.6	204	58.6	(18.6)	(15.1)	Calcined Pet Coke	50g

	Fe	Mn	Ni	Si	Zn	Ca	V	S	Ash	Density g/cc	Type	Size
24 CA DF	0.028	0.0003	0.050	0.022	0.006	0.028	0.040	1.58	. . .	. . .	Green Pet Coke	100g
24 CA DG	0.023	0.0002	0.038	0.014	0.0011	0.0130	0.035	1.59	. . .	. . .	Green Pet Coke	100g
24 CA DH	0.019	0.0001	0.021	0.006	0.0008	0.004	0.034	2.40	. . .	. . .	Green Pet Coke	100g
24 CA DI	0.017	0.0001	0.004	0.013	0.0008	0.007	0.004	1.02	. . .	. . .	Green Pet Coke	100g
24 CA DJ	0.027	0.0005	0.003	0.12	0.0004	0.015	0.0030	0.64	. . .	. . .	Green Pet Coke	100g
24 CA CAB	0.025	. . .	0.011	0.019	. . .	0.11	0.021	2.49	. . .	. . .	Calcined Pet Coke	100g
24 CA BS	0.038	. . .	0.018	0.033	. . .	0.014	0.024	2.10	. . .	. . .	Calcined Pet Coke	100g
24 CA AU	0.32	. . .	(0.004)	1.8	. . .	0.083	(0.004)	0.57	7.8	1.76	Anthracite	100g
24 CA DM	0.32	. . .	(0.003)	1.9	. . .	0.17	(0.004)	0.40	8.6	1.85	Anthracite	100g

	C	H	N	Cl	Ash	GCV MJ/kg	% Al	ppm As	ppm B	ppm Ba	ppm Br	ppm Cd	ppm Ce	ppm Co	ppm Cr	ppm Cu	ppm F	
CRM 24 F 180	76.01	5.04	1.44	0.059	9.9	31.89	(1.24)	4.23	(55.0)	(157.0)	(7.3)	0.212	(14.1)	(3.3)	(13.5)	(9.1)	. . .	
CRM 24 F 181	84.89	5.4	1.78	0.138	1.85	35.43	(0.28)	27.7	(8.3)	. . .	(34.9)	0.051	(4.8)	(1.6)	(5.0)	(12.3)	. . .	continued
CRM 24 F 182	73.29	(4.22)	1.63	0.37	12.27	29.68	(1.56)	(1.47)	(31.2)	. . .	(36.5)	0.057	(17.0)	(8.7)	(20.0)	(12.3)	. . .	
CRM 24 B 1632c	77.45	5.11	1.54	0.1139	7.16	(32.10)	0.915	6.18	62	41.1	18.7	0.072	11.9	3.48	13.73	6.01	(70)	continued
CRM 24 B 1635	. . .	. . .	. . .	. . .	. . .	. . .	(0.32)	0.42	. . .	. . .	. . .	0.03	(3.6)	(0.65)	2.5	3.6	25.9	

Continuation from above	% Fe	ppm Hg	% K	ppm La	ppm Mn	ppm Na	ppm Ni	ppm Pb	ppm Sc	ppm Se	ppm Th	ppm Ti	ppm V	ppm Zn	Type	Size
24 F 180	1.17	0.123	(0.12)	(6.5)	34.3	(448.0)	(16.0)	17.5	(2.7)	1.32	(2.2)	(0.7)	19.3	27.4	Gas Coal	20g
24 F 181	0.36	0.138	(0.015)	(2.0)	(2.8)	(87.6)	(8.6)	2.59	(0.9)	1.15	(0.5)	. . .	12.0	8.4	Coking Coal	20g
24 F 182	0.73	0.04	(0.43)	(8.0)	195.0	. . .	(39.0)	(15.3)	(3.8)	0.68	(2.3)	(0.6)	24.3	33.3	Steam Coal	20g
24 B 1632c	0.735	0.0938	0.1100	. . .	13.04	298.8	9.32	3.79	2.905	1.326	1.40	517	23.72	12.1	Bituminous	50g
24 B 1635	0.239	0.0109	. . .	. . .	21.4	(0.24)	1.74	1.9	(0.63)	0.9	0.62	(200)	5.2	4.7	Sub-bituminous	75g

	SiO_2	Al_2O_3	Fe_2O_3	TiO_2	CaO	MgO	Na_2O	K_2O	S	P_2O_5	L.O.I.	ppm As	ppm Ba	ppm Be	
CRM 24 A SA 18	6.2	2.57	0.29	0.114	0.18	0.11	. . .	0.145	0.56	. . .	90.11	. . .	78	4.1	
CRM 24 A SA 19	15.0	8.01	1.75	0.341	1.39	0.2	0.29	0.24	1.49	. . .	71.28	7	304	2.8	continued
CRM 24 A SA 20	17.66	11.27	1.17	0.63	1.87	0.43	0.27	0.14	0.51	0.14	64.66	5	372	2.5	

Continuation from above	All Elements ppm Ce	Co	Cr	Cs	Cu	Ga	Ge	Hf	Hg	La	Mn	Ni	P	
24 A SA 18	22	6.7	16	(1)	5.9	(8)	(8)	1.7	(0.04)	10	22	11	30	
24 A SA 19	56	5.6	50	1.4	13	14	13	5.4	(0.2)	27	157	16	130	continued
24 A SA 20	87	8.3	(67)	(2)	18	16	. . .	4.8	0.25	43	80	25	. . .	

Continuation from above	All Elements ppm Pb	Rb	Sc	Se	Sm	Sr	Th	U	V	Y	Zn	Zr	Type	Size
24 A SA 18	(5)	8.1	4.3	(1.0)	2	44	3.4	1.5	23	10	5.5	67	Witbank	120g
24 A SA 19	20	9	7.6	1.4	4.9	126	12	5	35	27	12	351	OFS	120g
24 A SA 20	26	10	10	0.8	6.3	330	18	4	47	29	17	(180)	Sasolberg	120g

24.3 Sulfur and Mercury

	ppm Hg	ppm Cl	% S	% C	% Ash	GCV MJ/kg	Type	Size
CRM 24 B 2682b	0.1088	(76)	0.4917	(66.6)	(6.32)	(25.66)	Coal	50g
CRM 24 B 2683b	0.0900	(1125)	1.955	(73.92)	(9.93)	(30.62)	Coal	50g
CRM 24 B 2684b	0.0974	(1037)	3.076	(69.3)	(10.85)	(28.56)	Coal	50g
CRM 24 B 2685b	0.1462	(530)	4.730	(64.6)	(15.94)	(26.94)	Coal	50g
CRM 24 B 2692b	0.1333	(1593)	1.170	(79.34)	(7.90)	32.81	Coal	50g

24.5 Pitch

	% S	% C	ppm Al	ppm As	ppm Br	ppm Ca	ppm Cd	ppm Cr	ppm Fe	ppm I	ppm K	ppm Mg	ppm Mn	ppm Na	
245 CD Pitch A	0.49	94.0	245	. . .	1.7	91	. . .	0.87	200	0.33	43	17	2.7	257	
245 CD Pitch B	0.52	93.4	228	9	4.8	41	2.5	1.1	280	0.6	34	<30	3.3	150	
245 CD Pitch C	4.46	83.4	9	0.18	0.25	3	<0.05	0.4	14	1.4	2.2	<16	0.21	10	continued
245 CD Pitch D	0.58	92.7	1.2	2.2	0.08	1.4	<0.05	2.2	4	0.84	0.6	<2	0.03	9	

Continuation from above	All Elements ppm Ni	P	Pb	Sb	Si	Sn	Ti	V	Zn	Soft Point °C	Ash % (950°C)	Type	Size
245 CD Pitch A	2.5	10	91	. . .	358	. . .	18	1.2	88	115	0.27	Coal Tar	60g
245 CD Pitch B	. . .	3	80	57	408	3.7	16	0.89	90	118	0.22	Coal Tar	60g
245 CD Pitch C	76	236	1	0.03	20	<0.7	19	170	1	129	0.19	Coal Tar	60g
245 CD Pitch D	. . .	1	0.6	0.014	10	<0.2	0.32	0.06	1	86.5	0.04	Coal Tar	60g

	Fe	Mn	Ni	Si	Zn	Ca	V	Na	Pb	Ti	S	P	Size
245 CA Pitch-02	0.032	0.0004	0.0004	0.041	0.0085	0.0150	0.0002	0.042	0.0097	0.0018	0.53	. . .	100g
245 CA Pitch-03	0.042	0.0005	0.0004	0.066	0.010	0.017	0.00010	0.021	0.012	0.0015	0.76	0.0027	100g
245 CA Pitch-04	0.015	0.0009	0.0003	0.075	0.047	0.0076	0.0001	0.011	0.036	0.0003	1.05	0.0066	100g
245 CA Pitch-05	0.059	0.0004	0.0004	0.154	0.016	0.0066	0.00020	0.0020	0.027	0.0025	0.54	0.0030	100g
245 CA Pitch-06	0.027	0.0003	0.0003	0.082	0.0074	0.0042	0.00010	0.013	0.0081	0.0015	0.50	0.0003	100g
245 CA Pitch-07	0.032	0.0010	0.0004	0.0080	0.074	0.0082	0.00003	0.011	0.051	0.00030	0.57	0.0018	100g

24.2 C,H,S,N

	Coal & Coke	C	H	S	N	Ash	GCV MJ/Kg	GCV BTU/lb	% Volatile Matter	Moisture	Type	Size
CRM	**24 F 331**	...	...	0.499	...	...	...	...	...	...	Steam	20g
CRM	**24 F 332**	...	...	0.961	...	...	...	...	...	...	High vol. Ind.	20g
CRM	**24 F 333**	...	...	1.344	...	...	...	...	...	...	Coking Steam	20g
CRM	**24 F 334**	...	...	1.609	...	...	...	...	...	...	Anthracite	20g
CRM	**24 F 335**	...	...	5.08	...	...	...	...	...	...	Flame	20g
CRM	**24 F 336**	...	...	3.29	...	...	...	...	...	...	High Vol. Steam	20g
CRM	**24 B 2775**	...	...	0.5816	...	(5.77)	...	...	(1.31)	...	Foundry Coke	50g
CRM	**24 B 2776**	...	...	0.825	...	(8.06)	...	...	(0.98)	...	Furnace Coke	50g
CRM	**24 MI 20025A**	51.35	...	0.249	...	5.57	...	12,224	43.45	22.06	Coal	50g
CRM	**24 MI 20075A**	59.41	...	0.760	...	6.28	...	14.004	34.27	2.62	Coal	50g
CRM	**24 MI 20100A**	57.79	...	1.03	...	6.88	...	13,882	35.46	1.78	Coal	50g
CRM	**24 MI 20150A**	58.38	...	1.56	...	4.44	...	14,314	37.08	1.62	Coal	50g
CRM	**24 MI 20300A**	54.66	...	2.92	...	7.70	...	12,488	37.62	8.35	Coal	50g
CRM	**24 MI 20500A**	50.78	...	4.811	...	12.38	...	11,482	37.09	7.81	Coal	50g
	24 MA 1905	71.24	5.1	...	1.56	...	...	...	...	...	Coal	25g
	24 MA 1906	72.6	4.83	...	1.49	...	...	...	...	...	Coal	25g
	24 MA 1907	67.95	5.06	...	1.49	...	...	...	...	...	Coal	25g
	24 MA 1908	70.8	5.16	...	1.06	...	...	...	...	...	Coal	25g
	24 MA 2713	...	...	0.4	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2714	...	...	0.9	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2715	...	...	1.63	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2716	...	...	2.01	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2717	...	...	2.35	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2719	...	...	1.85	...	...	...	...	...	...	Calcined Petroleum Coke	50g
	24 MA 2720	...	...	5.25	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2721	...	...	6.25	...	...	...	...	...	...	Green Petroleum Coke	50g
	24 MA 2722	...	...	2.85	...	...	...	...	...	...	Calcined Petroleum Coke	50g
	24 MA 719	...	...	0.70 Range	...	...	...	...	...	...	Coke	50g
	24 MA 720	...	...	0.90 Range	...	...	...	...	...	...	Coke	50g
	24 MA 723	...	...	0.50 Range	...	...	...	...	...	...	Coke	50g
	24 MA 1700	...	...	0.25 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1701	...	...	0.48 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1702	...	...	0.71 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1703	...	...	0.80 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1704	...	...	0.97 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1705	...	...	1.51 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1706	...	...	2.06 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1707	...	...	2.47 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1708	...	...	3.10 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1709	...	...	3.30 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1710	...	...	4.75 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1711	...	...	5.53 Range	...	...	...	...	...	...	Coal	50g
	24 MA 1712	...	...	6.50 Range	...	...	...	...	...	...	Coal	50g

Values for "MA" coded products listed above are nominal. Exact chemistry is given on each bottle

	C	H	S	N	P	Ash	GCV MJ/Kg	% Volatile Matter	Specific Gravity		Size
24 CG 11101d	75.42	4.72	0.50	1.38	...	9.75	30.65	32.98	1.39	Coal	50g
24 CG 11102d	52.73	3.35	1.45	0.92	...	34.76	21.22	23.67	1.67	Coal	50g
24 CG 11103c	77.34	0.99	0.31	0.22	...	16.91	26.24	6.56	1.94	Coal	50g
24 CG 11104b	68.61	0.67	1.00	0.21	...	26.33	23.06	5.99	2.10	Coal	50g
24 CG 11105a	76.48	3.30	1.73	1.18	...	13.89	29.94	11.76	1.49	Coal	50g
24 CG 11107c	76.83	4.63	0.92	1.40	...	8.49	31.23	34.05	1.39	Coal	50g
24 CG 11108b	72.27	4.59	1.91	1.33	...	11.07	29.66	33.53	1.42	Coal	50g
24 CG 11109b	68.59	4.48	3.03	1.17	...	13.88	28.33	34.17	1.45	Coal	50g
24 CG 11110c	55.73	2.44	4.70	0.72	...	32.8	21.55	12.79	1.80	Coal	50g
24 CG 11111a	78.69	4.54	1.38	1.38	...	10.02	32.18	25.26	1.38	Coal	50g
24 CG 11112a	69.03	3.01	2.20	1.03	...	21.23	26.95	11.82	1.58	Coal	50g
24 CG 11113a	50.03	2.18	3.40	0.65	...	40.62	19.25	10.55	1.85	Coal	50g
24 CG 11106a	...	...	0.580	...	0.034	13.05	28.47	1.00	...	Coke	90g

	Ash	% Volatile Matter	Total C	Total S	H	N	P	C as CO_3	Cl	Hardgrove Grindability Index	Gross Calorific Value	Type	Size
24 A AS 011-7	...	...	...	...	...	...	...	...	...	31 to 91	...	Coal	4 x 2kg
24 A AS 012D-2	...	...	...	5.21	...	...	...	...	...	...	...	Coal	125g
24 A AS 013-9	9.97	20.29	80.01	0.578	4.41	1.73	0.03	0.039	0.038	...	32.524/MJ/kg	Coal	250g

24.2 C,H,S,N

	Coal & Coke	C	H	S	N	P	Ash	% Volatile Matter	Size
CRM	24 SI CMT-001	...	...	0.50	...	...	14.50	24.50	150g
CRM	24 SI CMT-002	...	...	0.64	...	...	7.05	32.26	150g
CRM	24 SI CMT-003	67.35	3.83	0.93	1.64	0.120	17.51	28.02	150g
CRM	24 SI CMT-004	68.59	2.48	1.32	1.71	0.080	23.98	8.13	150g
CRM	24 SI CMT-005	72.72	4.46	0.81	1.87	0.070	10.94	32.02	150g
CRM	24 SI CMT-006	71.63	3.82	0.89	1.90	0.031	13.50	26.67	150g
CRM	24 SI CMT-007	73.13	4.04	0.54	1.77	0.100	13.24	26.75	150g
CRM	24 SI CMT-008	84.46	2.62	0.85	1.75	0.025	8.90	5.11	150g
CRM	24 SI CMT-009	73.60	3.91	0.70	1.76	0.114	13.48	25.21	150g
CRM	24 SI CMT-010	72.74	4.32	0.84	1.91	0.070	11.50	32.41	150g
CRM	24 SI CMT-011	77.20	3.45	1.60	2.17	0.029	13.72	11.73	150g
CRM	24 SI CMT-012	64.75	3.30	0.80	1.49	0.051	20.05	24.04	150g
CRM	24 SI CMT-013	73.83	4.64	0.70	1.93	0.005	10.90	32.48	150g
CRM	24 SI CMT-014	74.11	3.83	0.93	1.68	0.017	12.35	22.00	150g
CRM	24 SI CMT-015	72.02	3.56	0.33	1.62	0.051	14.41	23.34	150g

24.9 Ultimate Series for Coal & Coke

	Proximate Analysis				Ultimate Analysis					Sulphur Forms			
	% Volatile	% Fixed			%	%	%	%	%	%	%	%	%
	% Ash	Matter	Carbon	BTU	S	C	H	N	Cl	Ash	Pyritic	Sulphate	Organic	Total
24 MA 2771	11.36	2.02	86.62	12236	0.71	88.16	0.06	1.17	0.03	11.36	0.1	0.01	0.6	0.71
24 MA 2772	9.33	1.76	88.91	12211	0.85	88.1	0.25	1.38	0.0	9.33	0.01	0.0	0.84	0.85
24 MA 2773	7.14	45.15	47.71	11738	0.5	68.71	4.75	0.92	0.03	7.14	0.08	0.0	0.42	0.51
24 MA 2775	6.47	37.14	56.39	13513	0.66	77.16	4.87	1.45	0.03	6.47	0.05	0.0	0.61	0.66
24 MA 2776	7.57	35.62	56.81	13413	0.94	76.17	4.83	1.46	0.34	7.57	0.37	0.0	0.57	0.94
24 MA 2778	10.76	6.31	82.93	13191	0.63	83.44	2.11	0.92	0.03	10.76	0.06	0.0	0.57	0.63
24 MA 2780	8.23	39.05	52.72	12748	3.58	70.87	5.05	1.58	0.0	8.23	0.83	0.04	2.71	3.58
24 MA 2782	13.06	39.06	47.44	12226	5.82	67.61	4.82	1.39	0.0	13.12	3.42	0.91	1.49	5.82

continued

Continuation from above

	All values %														
	P_2O_5	SiO_2	Fe_2O_3	Al_2O_3	TiO_2	CaO	MgO	SO_3	K_2O	Na_2O	SrO	BaO	MnO	Undetirmined	Type	Size
24 MA 2771	0.38	45.94	21.98	21.98	1.1	2.59	1.0	1.61	2.12	0.95	0.75	0.92	0.0	...	Coke	50g
24 MA 2772	0.36	46.12	18.98	25.8	1.22	2.74	0.8	1.49	1.49	0.52	0.12	0.92	0.0	...	Coke	50g
24 MA 2773	0.98	32.51	4.9	16.93	1.32	21.92	4.53	13.99	0.33	1.02	0.3	0.53	0.06	0.68	Coal	50g
24 MA 2775	0.9	62.7	2.27	28.21	1.48	0.96	0.38	0.46	1.41	0.28	0.3	0.06	0.0	0.59	Coal	50g
24 MA 2776	0.16	50.35	9.85	29.73	1.71	2.13	0.73	2.52	1.88	0.67	0.16	0.11	0.0	...	Coal	50g
24 MA 2778	0.68	51.24	4.78	32.06	2.09	2.17	1.04	1.77	2.0	0.84	0.19	0.25	0.0	0.94	Coal	50g
24 MA 2780	0.11	33.71	46.35	14.4	0.73	0.54	0.53	0.53	1.43	0.17	0.01	0.0	0.29	1.2	Coal	50g
24 MA 2782	0.26	29.12	45.87	14.67	0.51	4.5	0.54	2.82	1.05	0.54	0.01	0.09	0.02	...	Coal	50g

Ash Fusion Temperature, Softeneing Temperature & Fluid Temeperature values are also certified

The following ASTM procedures were employed in the analysis of these samples: All analysis reported on a dried basis.

Preparation ASTM D2013 | Ash ASTM D3174 | Volatile Matter ASTM D3175 | Carbon, Hydrogen ASTM D3178 | Sulphur ASTM D3177
Chlorine ASTM D2361 | BTU ASTM D2015 | Ash Analysis ASTM D 3682 | Sulphur Forms ASTM D2492 | Nitrogen ASTM D3179

Petroleum Coke

	% Moisture	% Ash Dry	Total % S Dry	Calorific Value BTU/lb	Calorific Value MJ/kg	Size
24 A PC-1	<2	6.63	6.96	12940	30.08	75g
24 A PC-2	<2	2.57	6.04	14737	34.23	75g

Coal Ash

	Al_2O_3	BaO	CaO	Fe_2O_3	K_2O	MgO	Mn_3O_4	P_2O_5	SiO_2	Na_2O	SrO	SO_3	TiO_2	Size
24 A AS 010	29.8	0.19	3.27	12.8	0.9	2.11	0.22	0.91	47.3	0.36	0.1	0.62	1.69	100g
24 SI SIBS101	22.80	...	9.31	12.11	1.03	2.52	0.06	0.90	41.00	1.18	...	5.80	1.32	30g
24 SI SIBS102	17.41	...	1.28	5.11	1.10	0.60	0.06	0.12	69.92	0.16	...	0.89	1.60	30g
24 SI SIBS103	34.35	...	9.30	2.34	0.82	2.05	0.06	2.69	39.88	0.22	...	4.32	1.94	30g
24 SI SIBS104	28.34	...	10.80	2.77	0.55	2.93	0.07	1.91	44.80	0.14	...	4.67	1.60	30g
24 SI SIBS105	25.48	...	1.05	1.60	1.38	0.77	0.01	0.11	66.85	0.13	...	0.32	1.25	30g

Electrode Carbon

	Moisture	Ash	% Volatie Matter	Density	Relative Size Fraction	Type	Size
24 A AS 003	<1.0	<5.0	<1.5	2.2-2.3	<5.0	Electrode Carbon	1.5kg

Information

Definitions

The Reference Materials in this Catalogue have been categorised as Certified Reference Materials, Reference Materials or Setting-Up Samples. For these first two categories the definitions used in the ISO Guide 30 : 1992 issued by the International Standards Organisation have been used.

Certified Reference Material (CRM)	A Reference Material, accompanied by a certificate, one or more of whose property values are certified by a procedure which establishes its traceability to an accurate realization of the unit in which the property values are expressed and for which each certified value is accompanied by an uncertainty at a stated level of confidence
Reference Material	A material or substance one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials.
Setting up Samples	Samples which have been prepared to meet the daily setting up requirements of laboratories using direct reading spectrometers. Whilst analytical data are supplied with each sample they are not certified as accurate and are not intended to be used as Reference Materials

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We recommend that customers verify the availability of any material where it is imperative that the material to be supplied has the elemental concentration values listed.

All concentrations in this catalogue are given in % by weight, unless stated otherwise.

Abreviations

CRM	This material is classified as a CRM.
( )	Concentration values stated within brackets are not certified and are listed for information only.
R.E. / R.E.O.	Rare Earth / Rare Earth Oxide
L.O.I.	Loss on Ignition
rem	Remainder
ppm	Parts per Million
MJ/kg	Mega Joules per Kilogram
BTU/lb	British Thermal Units per pound
C	Cast
CC	Chill Cast
HIP	Hot Isostatic Pressed
Sc	Spun cast
W	Wrought

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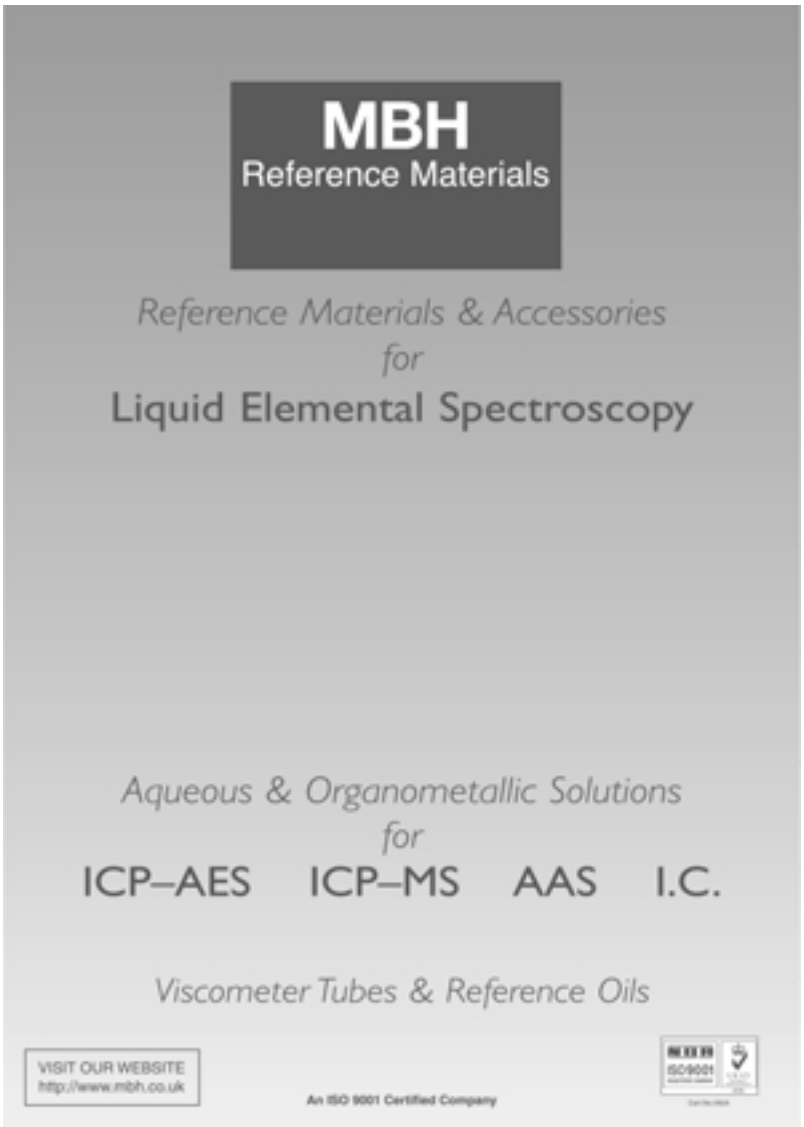

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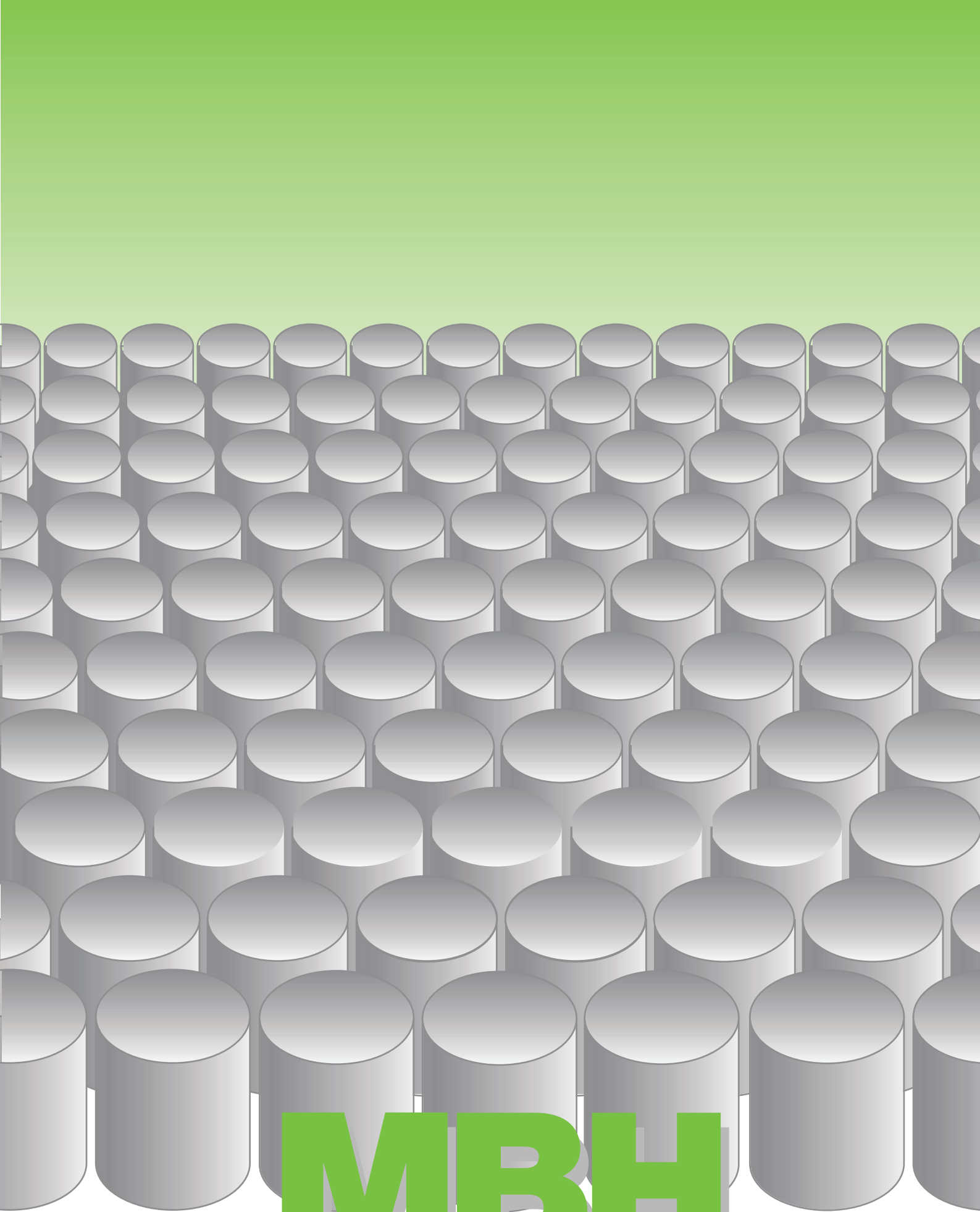

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