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EUROPEAN COAL AND STEEL COMMUNITY
COMMUNAUTÉ EUROPÉENNE DU CHARBON ET DE L'ACIER
EUROPÄISCHE GEMEINSCHAFT FÜR KOHLE UND STAHL

CERTIFIED REFERENCE MATERIAL

CERTIFICATE OF CHEMICAL ANALYSIS

EURO–CRM No. 584-1 FERRO-TITANIUM

LABORATORY MEANS (4 Values)
mass content in %

Line No.	C	Si	Mn	P	S	Al (Total)	Ti (Total)
1	0.0360	–	1.095	0.0285	0.0268	6.768	36.71
2	0.0388	1.675	1.104	0.0295	0.0268	6.838	36.75
3	0.0410	1.699	1.112	0.0297	0.0270	6.922	36.82
4	0.0415	1.708	1.112	0.0300	0.0275	6.935	36.82
5	0.0417	1.728	1.113	0.0306	0.0282	7.028	36.97
6	0.0418	1.761	1.114	0.0310	0.0284	7.052	37.00
7	0.0420	1.775	1.115	0.0310	0.0285	7.075	37.10
8	0.0423	1.786	1.117	0.0310	0.0291	7.080	37.11
9	0.0423	1.787	1.118	0.0310	0.0294	7.150	37.18
10	0.0435	1.791	1.122	0.0320	0.0300	7.175	37.26
11	0.0440	1.805	1.125	0.0323	0.0300	7.218	37.29
12	0.0440	1.806	1.125	0.0325	0.0301	7.291	37.30
13	0.0443	1.807	1.128	0.0332	0.0303	7.358	37.30
14	0.0459	1.809	1.132	0.0342	0.0307	7.390	37.34
15	0.0459	1.815	1.138	0.0342	0.0311	7.400	37.36
16	0.0465	1.820	1.142	0.0400	0.0317	7.435	37.38
17	0.0475	1.850	1.142	–	0.0320	7.445	37.45
18	0.0502	1.875	1.148		0.0325	7.465	37.48
19	0.0512	1.879	1.150		0.0330	7.583	37.56
20	0.0516	1.910	1.156		0.0332		–
21	0.0522	1.955	1.161		0.0332		
M_M	**0.0445**	**1.802**	**1.127**	**0.0319**	**0.0300**	**7.190**	**37.17**
s_M	0.0043	0.070	0.018	0.0027	0.0021	0.234	0.26

M_M: Mean of the intralaboratory means. s_M: Standard deviation of the intralaboratory means.
The laboratory mean values have been examined statistically to eliminate any outlying values. Where "—" appears in the table it indicates that an outlying value has been omitted.

CERTIFIED VALUES
mass content in %

	C	Si	Mn	P	S	Al (Total)	Ti (Total)
M_M	**0.044**	**1.80**	**1.13**	**0.032**	**0.030**	**7.19**	**37.17**
s_M	0.004	0.07	0.02	0.003	0.002	0.23	0.26

NOTE: Approximately 1.2% Al and 0.2% Ti are present in the form of acid insoluble compounds.

DESCRIPTION OF THE SAMPLE

This sample consists of material passing a 150 µm aperture sieve from which the fines passing a 45 µm aperture sieve have been removed. It is supplied only in bottles of 100g.

PARTICIPATING LABORATORIES

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British Steel Corporation, River Don & Associated Works, Sheffield (UK)
Bundesanstalt für Materialprüfung (BAM), Berlin-Dahlem (Germany)
CFAS, Usine des Dunes, Dunkerque (France)
Cockerill-Sambre, Couillet (Belgium)
Cockerill-Sambre, Seraing (Belgium)
Dantest, Copenhagen (Denmark)
Hoesch Hüttenwerke AG, Dortmund (Germany)
Gesellschaft für Electrometallurgie mbH, Nurnberg (Germany)
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Murex Ltd., Rainham (UK)
O.E.T. - Metalconsult, Bergamo, (Italy)
Pattinson & Stead, Middlesbrough (UK)
Ridsdale & Co. Ltd., Middlesbrough (UK)
SNIAS, Suresnes (France)
Société Francaise d'Electrometallurgie (SOFREM), Le Fayet (France)
SOLLAC, Florange (France)
Stahlwerke Röchling-Burbach GmbH, Völklingen-Saar (Germany)
Thyssen Edelstahlwerke AG, Krefeld (Germany)
USINOR, Dunkerque (France)

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On behalf of:- The Commission of Co-ordination of the Nomenclature of Metallurgical Products— Commission of European Communities.

METHODS USED

ECRM 584-1

Element	Line Number	Method
C	1-2-3-4-5-6-7-9-10-12-13-14-15-16-18-19-20	Combustion, infra-red absorption
	8	Combustion, coulometric
	11-17	Combustion, non-aqueous titration
	21	Combustion, gas volumetric
Si	2-4-8-11-12-15-16-18	Gravimetric, dehydration with sulphuric acid
	3-5-7-9-10-13-19	Gravimetric, dehydration with perchloric acid
	6	Gravimetric, dehydration with nitro-sulphuric acid
	14	FAAS
	17	Gravimetric, dehydration with hydrochloric acid
	20-21	XRF
Mn	1-7-8	XRF
	2-15	Photometric, persulphate oxidation
	3-6-10-12-13-14-16-18	Photometric, periodate oxidation
	4-5-20	Titrimetric with arsenite, persulphate oxidation
	9-11-17-19-21	FAAS
P	1-6-7-14-16	Photometric as molybdenum blue after extraction
	2-4-8	Photometric as molybdenum blue without extraction
	3-5-9-10-12-13	Photometric as phosphovanadomolybdate after extraction
	11	Acidimetric titration of phosphomolybdate
	15	Gravimetric as ammonium phosphomolybdate
S	1-3-4-6-7-8-9-10-12-13-14-16-17-18-19-20	Combustion, infra-red absorption
	2-5-21	Combustion, oxidation/reduction titration
	11	Combustion, conductimetric
	15	Combustion, gas volumetric
Al (Total)	1	Photometric with eriochrome cyanine without separation
	2-3-14	Gravimetric as oxide after cupferron separation of titanium
	4	ICP AES
	5-10-11	Gravimetric as hydroxyquinolate
	6	Complexometric titration after separation
	7-13-17	XRF
	8-9-12-15-16-19	FAAS
	18	Photometric with chrome azurol, without separation
Ti (Total)	1-7-9-15	Gravimetric as oxide after cupferron separation
	2	Photometric with diantipyrylmethane
	3-18	XRF
	4	FAAS
	5	ICP AES
	6-8-10-12-13-16-17	Titrimetric with oxidising agent
	11	Photometric with chromotropic acid, without separation
	14	Titrimetric with reducing agent
	19	Gravimetric as oxide

Abbreviations

FAAS : Flame Atomic Absorption Spectrometry
ICP AES : Inductively Coupled Plasma Atomic Emission Spectrometry
XRF : X-ray Fluorescence Spectrometry

FURTHER INFORMATION

For information regarding the preparation and certification of Euro-CRMs (Certified Reference Materials) and sources of supply please refer to ECSC Information Circular No. 1 available from the Institution responsible for standardization in your country. (In the UK this is the BSI, 2 Park Street, London. W1A 2BS).

Pour tous renseignements sur les Euro-MRC (Matériaux de Référence Certifies) se reporter à la Circulaire d'information No. 1 de la CECA, diffusée par les organismes nationaux de normalisátion.

Wegen Erläuterungen über Euro-ZRM (Zertifiziertes Referenzmaterial) siehe Mitteilung Nr. 1 der EGKS, zu beziehen durch die nationalen Normenorganisationen.