

ECISS
EUROPEAN COMMITTEE FOR IRON AND STEEL STANDARDISATION
COMITÉ EUROPÉE DE NORMALISATION DU FER ET DE L'ACIER
EUROPÄISCHES KOMITEE FÜR EISEN-UND STAHLNORMUNG
 EUROPEAN CERTIFIED REFERENCE MATERIAL (EURONORM – CRM)
CERTIFICATE OF CHEMICAL ANALYSIS
EURONORM – CRM No. 085-1 0.3% SULPHUR STEEL

LABORATORY MEANS (4 Values)
 mass content in %

Line No	C	Si	Mn*	P	S*	Co	Cu	Pb	Sb	V	Zn
1	0.0630	-	0.9475	-	0.3162	-	0.2772	0.0009	0.0066	0.0010	0.0018
2	0.0640	-	0.9550	0.0605	0.3268	0.0155	0.2800	0.0009	0.0066	0.0014	0.0020
3	0.0648	0.0068	0.9557	0.0611	0.3288	0.0170	0.2825	0.0009	0.0068	0.0017	0.0020
4	0.0650	0.0070	0.9575	0.0615	0.3295	0.0170	0.2845	0.0010	0.0068	0.0018	0.0021
5	0.0650	0.0070	0.9675	0.0615	0.3300	0.0182	0.2850	0.0010	0.0069	0.0018	0.0022
6	0.0652	0.0071	0.9688	0.0618	0.3311	0.0182	0.2858	0.0010	0.0072	0.0020	0.0022
7	0.0664	0.0072	0.9740	0.0618	0.3338	0.0182	0.2865	0.0010	0.0072	0.0020	0.0023
8	0.0665	0.0074	0.9750	0.0618	0.3345	0.0184	0.2886	0.0010	0.0073	0.0020	0.0024
9	0.0665	0.0080	0.9765	0.0620	0.3362	0.0185	0.2900	0.0010	0.0075	0.0021	0.0024
10	0.0667	0.0082	0.9775	0.0620	0.3372	0.0185	0.2900	0.0010	0.0075	0.0022	0.0024
11	0.0672	0.0083	0.9798	0.0620	0.3375	0.0190	0.2900	0.0011	0.0075	0.0022	0.0026
12	0.0675	0.0085	0.9800	0.0622	0.3375	0.0190	0.2902	0.0011	0.0075	0.0024	0.0027
13	0.0678	0.0086	0.9800	0.0622	0.3388	0.0190	0.2910	0.0012	0.0079	0.0035	0.0030
14	0.0678	0.0088	0.9802	0.0628	0.3398	0.0190	0.2932	0.0012	0.0080	0.0035	0.0032
15	0.0685	0.0088	0.9850	0.0633	0.3400	0.0198	0.2952	0.0013	0.0080	-	0.0042
16	0.0688	0.0090	0.9900	0.0638	0.3408	0.0198	0.2961	-	-	-	-
17	0.0690	0.0090	0.9948	0.0641	0.3418	0.0208	0.2982	-	-	-	-
18	0.0702	0.0095	0.9950	0.0675	0.3420	0.0215	0.3025	-	-	-	-
19	0.0730	-	0.9965	-	0.3562	-	0.3030	-	-	-	-
20	-	-	0.9990	-	-	-	0.3062	-	-	-	-
M_M	0.0670	0.0081	0.9768	0.0625	0.3357	0.0187	0.2908	0.0010	0.0073	0.0021	0.0025
S_M	0.0023	0.0009	0.0147	0.0016	0.0081	0.0014	0.0077	0.0001	0.0005	0.0007	0.0006
S_W	0.0014	0.0007	0.0055	0.0010	0.0073	0.0005	0.0028	0.0001	0.0004	0.0004	0.0004

M_M: Mean of the intralaboratory means, s_M: Standard Deviation of the intralaboratory means.

s_W: Intralaboratory standard deviation, s_b: Interlaboratory standard deviation, $s_b = \sqrt{s_M^2 - s_W^2 / 4}$

The laboratory mean values have been examined statistically to eliminate outstanding values. Where a “-” appears in the table it indicates that an outlying value has been eliminated by either the Cochran or Grubbs Test.

CERTIFIED VALUES
 Mass content in %

	C	Si	Mn*	P	S*	Co	Cu	Pb	Sb	V	Zn
M_M	0.067	0.008	0.977	0.062	0.336	0.019	0.291	0.0010	0.0073	0.0021	0.0025
C(95%)	0.001	0.001	0.007	0.001	0.004	0.001	0.004	0.0001	0.0003	0.0004	0.0004

*Note: Due to the high level of sulphur in this steel the certified values for sulphur and manganese do NOT apply to determination of these elements by optical emission spectrometry

The half-width confidence interval C(95%) = $\frac{t \times s_M}{\sqrt{n}}$ where “t” is the appropriate Student’s t value and “n” is the number of acceptable mean values

For further information regarding the confidence interval for the certified value see ISO Guide 35:1999 section 4

NB An area 6mm in diameter in the centre of the discs, ECRM 085-1(D) should be avoided for optical emission spectrometry.

This reference material was prepared and issued by:



BUREAU OF ANALYSED SAMPLES LIMITED

Newham Hall, Middlesbrough, England

On behalf of:- The Iron and Steel Nomenclature Co-ordinating Committee (COCOR) of the ECISS, after approval by all the participating

laboratories and all the producing organizations. (France –IRSID/CTIF, Germany – Iron and Steel CRM Working Group: VDEh, BAM & MPI für Eisenforschung, Nordic Countries – Nordic CRM Working Group, UK – BAS Ltd.)

JULY 1977

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 with C(95%) and s_W values
 for each certified element

METHODS USED
EURONORM – CRM No. 085-1

Element	Line Number	Methods
C	1	Low Pressure gasometric
	2-5-7-12	Coulometric
	3-17-18-19	Infrared absorption
	4-15	Non aqueous titration
	6-8-9-16	Thermal Conductivity
	10-11-13-14	Conductimetric
Si	4-5-6-7-10-11-12-13-15-16-17-18	Colorimetric as molybdenum blue
	3-9	Atomic absorption spectroscopy
	8-14	Gravimetric after dehydration with perchloric acid
Mn	1-2-6-10-12-15-18	Atomic absorption spectroscopy
	3-5-7-8-9-13-14-16-17-19-20	Colorimetric with periodate
	4-11	Titrimetric after oxidation with persulphate/silver nitrate
P	2-6-7-10-15-16	Colorimetric as phosphovanadomolybdate with extraction
	3-4-5-8-11-13-14-17-18	Colorimetric as molybdenum blue
	9-12	Titrimetric, separation as phosphomolybdate
S	1-13-14	Combustion, oxidation/reduction titration
	2-16-17	Combustion, acidimetric titration
	3-10	Gravimetric as barium sulphate
	4	Combustion, thermal conductivity
	5-6-9-11-12-18-19	Combustion, infrared absorption
	7	Combustion, coulometric
8-15	Combustion, conductimetric	
Co	2-4-7-14	Colorimetric with nitroso-R-salt
	3-5-6-9-10-13-15-16-17-18	Atomic absorption spectroscopy
	8	Colorimetric with 2-nitroso 1-naphthol after extraction of iron
	11-12	Colorimetric with nitroso-R-salt after separation with 1-nitroso 2-naphthol
Cu	1-2-4-5-6-8-9-10-11-14-17-20	Atomic absorption spectroscopy
	3-7-15-18-19	Colorimetric with 2,2'-diquinolyl
	12	Colorimetric with diethyldithiocarbamate
	13-16	Colorimetric with bis-cyclohexanone oxalyldihydrazone
Pb	1-2-4-5-6-7-8-9-10-11-12-13-14-15	Atomic absorption spectroscopy
	3	Colorimetric with dithizone
Sb	1-4-9-10-13-14	Atomic absorption spectroscopy
	2-8	Colorimetric with brilliant green
	3-12-15	Colorimetric as iodide
	5-6-7-11	Colorimetric with rhodamine B
V	1-6-9-10	Atomic absorption spectroscopy
	2-8	Colorimetric with dimethyl naphthidine
	3	Titrimetric with ferrous ammonium sulphate
	4-5-13-14	Colorimetric as phosphovanadotungstate after separation of iron
	7-11-12	Colorimetric with N-benzoyl phenylhydroxylamine
Zn	1-2-3-4-6-7-8-9-10-11-12-13-14-15	Atomic absorption spectroscopy
	5	Colorimetric with dithizone

PARTICIPATING LABORATORIES

Acciaria di Piombino, Piombino, (Italy)	Dillinger Hüttenwerke, Dillingen-Saar (Germany)
Acieries Neuves Maisons, Neuve Maisons (France)	Dunford Hadfields Ltd., Sheffield (U.K.)
Arbed, Division de Differdange, Differdange (Luxembourg)	G.K.N. Group Technological Centre, Wolverhampton (U.K.)
Arbed, Division d'Esch Belval, Esch-sur-Alzette (Luxembourg)	Hainaut Sambre, Couillet (Belgium)
British Steel Corporation, Bilston, Wolverhampton and Birchley Works (UK)	Hoogovens-ESTEL, IJmuiden (Holland)
British Steel Corporation, Rotherham Works (U.K.)	Institut de Recherches de la Sidérugie Francaise (IRSID), St. Germain en Laye (France)
Boudet et Dussaix, Croissy sur Seine (France)	Mannesman A.G. Hüttenwerke, Duisberg (Germany)
Bundesanstalt für Materialprüfung (BAM), Berlin (Germany)	Neunkircher Eisenwerke, Neunkirchen (Germany)
Centro Sperimentale Metallurgico, Rome (Italy)	NV Staalgieterwerk-SMDK, Utrecht (Holland)
Cockerill, Seraing (Belgium)	Ridsdale & Co Ltd., Middlesbrough (U.K.)
Creusot-Loire, Le Creusot (France)	

DESCRIPTION OF THE SAMPLE

The sample is available in the form of chips passing a 1700µm aperture from which the fines passing a 250µm aperture sieve have been removed. It is supplied in bottles containing 100g...ref ECRM 085-1(C). It is also supplied in the form of 38mm dia. discs...ref ECRM 085-1(D).

INTENDED USE & STABILITY

The chip sample, ECRM 085-1(C), is intended for the verification of analytical methods, such as those used by the participating laboratories, for the calibration of analytical instruments in cases where the calibration with primary substances (pure metals or stoichiometric compounds) is not possible and for establishing values for secondary reference materials.

It will remain stable provided that the bottle remains sealed and is stored in a cool, dry atmosphere. When the bottle has been opened the lid should be secured immediately after use. If the contents should become discoloured (eg oxidised) by atmospheric contamination they should be discarded.

The disc sample, ECRM 085-1(D), is intended for establishing and checking the calibration of Optical Emission and X-Ray Spectrometers for the analysis of similar materials. The "as received" working surface of the sample should be finished before use to remove any protective coating. It will remain stable provided that it is not subject to excessive heat (eg, during preparation of the working surface).

TRACEABILITY

The traceability of this ECRM is ensured by the use of either stoichiometric analytical techniques or methods which are calibrated against pure metals or stoichiometric compounds.

FURTHER INFORMATION

For information regarding the preparation, certification and supply of these European Certified Reference Materials (EURONORM-CRMS) and the use of the statistical information given on this certificate, please refer to CEN Report CR 10317 and ECISS Information Circular No. 5, both of which are available from the national standards body in your country. (In the UK this is the BSI, 389 Chiswick High Road, London W4 4AL).

Des informations complémentaires sur la fabrication, la certification et la distribution des Matériaux de Référence Certifiées Européennes (EURONORM-MRC) ainsi que sur l'utilisation des informations statistiques données sur le certificat se trouvant dans le Rapport CEN CR 10317 et dans la circulaire d'information No. 5 (ECISS). On peut se procurer ces deux circulaires auprès des organismes nationaux de normalisation. (Pour la France: AFNOR, 11 Avenue Francis de Pressensé, 93571 – St Denis la Plaine Cedex).

Angaben über Herstellung, Zertifizierung und Bezugsmöglichkeiten dieser Europäischen Zertifizierten Referenzmaterialien (EURONORM-ZRM) sowie über die Anwendungen der in diesem Zertifikat enthaltenen statistischen Daten finden sich im CEN-Report CR 10317 und in der Mitteilung Nr. 5 (ECISS), beide zu beziehen durch die nationalen Normenorganisationen. (In Deutschland bei der Vertriebsstelle des DIN: Beuth-Verlag GmbH, Burggrafenstrasse 4-10, 10787 Berlin).

För information angående tillverkning, certifiering och distribuering av dessa europeiska certifierade referensmaterial (EURONORM CRM) och för användning av statistisk information, som angivits i detta certifikat, refereras till CEN rapport CR 10317 och till informationscirkulär Nr. 5 (ECISS) från den nationella standardiseringsorganisationen. (I Sverige är det SIS, Box 6455, SE-113 82 Stockholm, i Finland är det SFS, PL. 116, FIN-002 41, Helsinki, i Danmark är det DS, Kollegievej 6, DK-Charlottenlund 2920, i Norge är det NSF, Drammensveien, 145 A, Postboks 353 Skøyen, NO-0213 Oslo, på Island är det STRI, Holtagarðer, IS-104 Reykjavík).