ECISS

EUROPEAN COMMITTEE FOR IRON AND STEEL STANDARDISATION
COMITÉ EUROPÉEN 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. 091-1 0.5% CARBON STEEL

LABORATORY MEANS (4 Values)
mass content in %

Line No	C	Cr	Mo	Ni	N
1	0.5122	0.2980	0.0920	0.2950	0.0102
2	0.5125	0.2985	0.0925	0.3001	0.0103
3	0.5132	0.2998	0.0941	0.3005	0.0105
4	0.5132	0.3002	0.0950	0.3030	0.0105
5	0.5144	0.3040	0.0950	0.3065	0.0107
6	0.5165	0.3068	0.0955	0.3072	0.0107
7	0.5178	0.3095	0.0957	0.3084	0.0111
8	0.5180	0.3100	0.0958	0.3099	0.0111
9	0.5185	0.3115	0.0972	0.3108	0.0111
10	0.5185	0.3150	0.0973	0.3117	0.0111
11	0.5194	0.3150	0.0976	0.3118	0.0112
12	0.5195	0.3166	0.0978	0.3119	0.0112
13	0.5215	0.3185	0.0980	0.3134	0.0112
14	0.5218	0.3202	0.1005	0.3135	0.0113
15	0.5222	0.3212	0.1005	0.3138	0.0114
16	0.5228	0.3215	0.1005	0.3159	0.0114
17	0.5242	0.3232	0.1012	0.3162	0.0115
18	0.5260	0.3236	0.1032	0.3188	0.0116
19	—	0.3252	0.1038	0.3210	0.0119
M_M	**0.5185**	**0.3125**	**0.0975**	**0.3100**	**0.0111**
s_M	0.0042	0.0092	0.0034	0.0067	0.0005
s_W	0.0032	0.0026	0.0017	0.0022	0.0003

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, $s_b = \sqrt{s_M^2 - (s_W^2 \div 4)}$

The laboratory mean values have been examined statistically to eliminate outlying 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	Cr	Mo	Ni	N
M_M	**0.5185**	**0.312**	**0.0975**	**0.310**	**0.0111**
C(95%)	0.0021	0.005	0.0017	0.003	0.0003

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 35:1989 section 4

This reference material was prepared and issued by:

BUREAU OF ANALYSED SAMPLES LIMITED

Newham Hall, Middlesbrough, England TS8 9EA

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.)

METHODS USED
EURONORM – CRM No. 091-1

Element	Line Number	Methods
C	1	Combustion, gravimetric
	2-5-8-12-13-14-15-16-17	Combustion, infrared absorption
	3-4	Combustion, coulometric titration
	6-9-18	Combustion, non-aqueous titration after absorption in organic solvent
	7-10-11	Combustion, thermal conductivity
Cr	1-3-5-15-16	Photometric, with diphenylcarbazide
	2-4-17-18	Titrimetric with Fe (II), persulphate/silver nitrate oxidation
	6-7-8-9-10-11-12-13-14-19	Flame atomic absorption spectrometry
Mo	1-3-5-9-11-13-14-19	Photometric, as thiocyanate, with extraction
	2-4-7-8-15-16-17	Flame atomic absorption spectrometry
	6-10-12-18	Photometric, as thiocyanate, without extraction
Ni	1-2-5-11-17-19	Photometric, with dimethylglyoxime
	3-15	Photometric with dimethylglyoxime with extraction
	4-6-8-9-10-12-13-14-16-18	Flame atomic absorption spectrometry
	7	Inductively coupled plasma-optical emission spectrometry
N	1-4-5-6-8-9-11-12-13-14-15-16-17-19	Thermal conductivity, decomposition in graphite crucible
	2-3-10	Photometric as indophenol blue after distillation
	7	Acidimetric titration after distillation
	18	Manometric, decomposition in graphite crucible

PARTICIPATING LABORATORIES

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Thyssen AG, Duisberg, Germany
Usinor C, Thionville, France

DESCRIPTION OF SAMPLE

This sample consists of chips all passing a 1700µm aperture sieve from which the dust passing a 250µm sieve has been removed. It is supplied only in bottles containing 100g.

INTENDED USE & STABILITY

This sample 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 (e.g. oxidised) by atmospheric contamination they should be discarded.

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 or from CEN in Brussels. (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 Certifiés Européens (EURONORM-MRC) ainsi que sur l'utilisation des informations statistiques données sur le certificat se trouvent dans le Rapport CEN CR 10317 et dans la circulaire d'information No. 5 (ECISS). On peut se procurer ces deux documents auprès des organismes nationaux de normalisation ou auprès du CEN, Bruxelles. (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 oder direkt von CEN, Brüssel. (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 eller från CEN, Bruxelles. (I Sverige är det SIS, S:t Paulsgatan 6, SE-118 80 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, Holtagardar, IS-104 Reykjavik).

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