

Metal and Quality LLC
Certified Reference Material
Certificate of Chemical Analysis
CA013
Stainless Steel



APPLICABILITY

Certified Reference Materials of stainless steel CA013 is intended for verification of analytical methods, for calibration of analytical instruments based on inert gas fusion methods

MEAN VALUES OF LABORATORIES

Lab. No.	Mass fraction in %		
	O	N	H
1	0.00170	0.0088	0.00055
2	0.00170	0.0095	0.00056
3	0.00172	0.0096	0.00060
4	0.00172	0.0098	0.00061
5	0.00176	0.0099	0.00064
6	0.00177	0.0099	0.00068
7	0.00178	0.0099	0.00069
8	0.00180	0.0100	0.00070
9	0.00180	0.0100	0.00074
10	0.00182	0.0103	0.00077
11	0.00187	0.0103	0.00078
12	0.00189	0.0105	0.00079
13	0.00193	0.0113	0.00080
14	0.00205	0.0113	-
15	-	0.0114	-
M(M)	0.00181	0.0102	0.00068
s(M)	0.00010	0.0007	0.00009

M(M) - Mean of intralaboratory means

s(M) - Standard deviation of the mean values of laboratories

CERTIFIED VALUES (mass fraction in %)

Elements	O	N	H
Certified	0.0018	0.0102	0.00068
Uncertainty C(95%)	0.0001	0.0004	0.00005

Uncertainty C(95%) estimated as the half-width confidence interval of Student's t-distribution, when n is the number of laboratory means

$$C(95\%) = \frac{t \cdot s(M)}{\sqrt{n}}$$

SPECIFICATION	Reference material made of stainless steel as prepared for analysis pins with protective coated diameter of 4.0 mm weighing 1.0 gram
TRACEABILITY	The characterization of material has been achieved by means interlaboratory experiment in accordance to ISO Guide 35:2006. In each laboratory applied the methods of analysis of their choice
HOMOGENEITY	The homogeneity was evaluated according to ISO Guide 35:2017 (7.7.Evaluating a homogeneity study) and DSTU GOST 8.531:2002 "Reference materials of composition of solid and disperse materials. Ways of homogeneity assessment"
DELIVERY	Packing - 50 pins in glass bottle and Certificate
DATE OF ISSUE	October 2014
VALID	October 2027
SAFETY	CRM CA013 and packing does not contain explosives and radioactive substances and substances which might influence health and the environment
NOTE	Reference material should be stored in a tightly closed bottle in a dry and cool place. When the bottle is opened for analysis, it should be stoppered immediately after use. <u>Samples extracted from the bottle using clean metallic tweezers and placed directly into a carefully cleaned weigher and boat devices of analyzer</u>

PARTICIPATING LABORATORIES

Alchevsk Iron & Steel Works, Ukraine
 Asovstal Iron & Steel Works, Ukraine
 Azovelectrostal PJSC, Ukraine
 Dneprospetsstal (DSS) OJSC, Ukraine
 Energomashspetsstal (EMSS) OJSC, Ukraine
 E.O. Paton Electric Welding Institute, Ukraine
 Metpromservis Ltd, Ukraine
 OSCAR Production Group, Ukraine
 Ukrainian Special Steels Institute (USSI) SE, Ukraine
 Element Materials Technology, USA
 Electronic and Beam Technology Ltd, RU
 Institute for Certified Reference Materials (ICRM), RU
 ENVIFORM a.s., Czech Republic
 LECO European Technical Centre Prague, Czech Republic
 ŽDAS a.s., Czech Republic

THE METHODS USED

Inert gas fusion: chromatography with thermal conductivity for oxygen and nitrogen (USSI), vacuum hot extraction of hydrogen with mass spectrometry (Electronic and Beam Technology), thermal conductivity for hydrogen (EMMS), infrared absorption (oxygen, hydrogen) and thermal conductivity (nitrogen) - the rest laboratories. Calibration using potassium nitrate for oxygen and nitrogen (ICRM)

CRM CA013 registered in the Register of the Ministry of Industrial Policy of Ukraine under number GSZU 3-237-2014(3)

CONTACTS

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