Metal and Quality LLC

Certified Reference Material

Certificate of Chemical Analysis

CA012

Stainless Steel

APPLICABILITY

Certified Reference Materials of stainless steel CA012 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	0.00537	0.0304	0.00048
2	0.00537	0.0307	0.00050
3	0.00566	0.0308	0.00051
4	0.00570	0.0310	0.00052
5	0.00570	0.0310	0.00052
6	0.00576	0.0311	0.00054
7	0.00582	0.0316	0.00054
8	0.00582	0.0324	0.00055
9	0.00590	0.0326	0.00057
10	0.00597	0.0332	0.00058
11	0.00599	0.0332	0.00061
12	0.00610	0.0334	-
13	0.00612	0.0338	-
14	0.00617	0.0339	-
15	-	0.0342	-
M(M)	0.00582	0.0322	0.00054
s(M)	0.00025	0.0013	0.00004

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	**0.0058**	**0.0322**	**0.00054**
Uncertainty C(95%)	**0.0002**	**0.0007**	**0.00003**

Indicative content of diffusible hydrogen (non-melted sample) is about 0.00026 %

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 35:2006 (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 CA012 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. **Samples extracted from the bottle using clean metallic tweezers and placed directly into a carefully cleaned weigher and boot devices of analyzer**

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
ŽĎAS 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 CA012 registered in the Register of the Ministry of Industrial Policy of Ukraine under number GSZU 3-237-2014(2)

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