

Analytical Technology Division, HORIBA TECHNO SERVICE Co., Ltd.

Certificate



Certified Reference Material HORIBA CRM 1603-1A

(Iron and steel certified reference material, for analysis of Carbon and Sulfur)

This iron and steel certified reference material is produced and provided in bottles containing 100 grams of 1 g pin type material in accordance with a management system that conforms to ISO 17034 (JIS Q 17034). It is mainly intended for use in creating calibration curves or validating analytical values when employing the infrared absorption method after combustion*1.

*1: While this is referred to as combustion in an induction furnace in JIS G 1215-4, simply "combustion" is used in this document.

Certified Values

The certified values for this reference material are shown below. The uncertainty of each certified value is the expanded uncertainty determined from the combined standard uncertainty and a coverage factor of $k = 2$, and represents half the width of the interval estimated to have a level of confidence of approximately 95 %.

Name of reference material	Component	Certified value (Mass fraction %)	Uncertainty (Mass fraction %)
HORIBA CRM 1603-1A	Carbon	0.072	0.002
	Sulfur	0.198	0.008

Determination of Certified Values

The certified values for this reference material were determined as follows based on a sample of 11 bottles extracted at random from the total number produced in the same lot.

The carbon values were determined using infrared absorption after combustion with sodium carbonate as a standard (JIS G 1211-3), while the sulfur values were determined using infrared absorption after combustion with potassium sulfate as a standard (JIS G 1215-4). All two of the reagents mentioned here are substances with a high degree of guaranteed purity.

Evaluation of Uncertainties

Regarding the uncertainties of the certified values for this reference material, in order to calculate the certified values, the principal uncertainties involved in their measurement were determined after taking into account the expanded uncertainties calculated from the combined standard uncertainties and a coverage factor of $k = 2$. The value of $k = 2$ was adopted for the coverage factor after also considering the effective degrees of freedom.

Metrological Traceability

The certified values for this reference material are based on an analysis of the values obtained from calibration curves created using the mass fractions of the target elements included in materials of guaranteed high purity. They have been determined in conjunction with their respective uncertainties. All values are traceable to the International System of Units (SI) via the stoichiometric masses of the high purity materials.

Precautions for Use

1. After opening, store the material in humidity-controlled equipment such as a desiccator, or in a cool, dark place*2 and consume as soon as possible.
2. When removing the reference material from the container, use a clean spatula or forceps to prevent contamination.
3. Do not cut or process the reference material.
4. If any reference material remains in the container, immediately place the cap back on the container. Do not leave it in an open state.
5. Once the reference material is removed from the container should be performed operations such as measuring and chemical processing immediately.
6. Do not return any reference material to the container after it has been removed.
7. Use a pin (approx.1 g) of reference material to perform analysis.

*2: Care is required regarding humidity.

Precautions for Storage, Period of Certificate Validity

This certificate is valid until December 1st, 2032. If the material is stored with unopened in humidity-controlled equipment such as a desiccator, or in a cool, dark place, no changes in the certified values are expected. However, HORIBA TECHNO SERVICE will continue to perform periodic monitoring stability of unopened product and report the results on our Website.

Production Method and Homogeneity

The reference material was made by grinding the outer circumference of a wire steel and cutting it into 1 g pins of approx. $\phi 5$ mm \times L 6.5 mm. Each was plated with Ni and then divided into 100 g bottles and stored at room temperature. To test the homogeneity, 11 bottles were extracted at random from the total number produced in a single lot and 2 samples were taken from each of these bottles. This total of 22 samples were then quantitatively analyzed for carbon and sulfur levels. The samples were found to be sufficiently homogeneous, either 1.5% or less of relative standard deviation (RSD) or 0.0002% or less of standard deviation was satisfied respectively.

Date of Analysis

December 1st, 2022

Supervisor Responsible for Approval

Shintaro Komatani

General Manager of Analytical Technology Division, HORIBA TECHNO SERVICE Co., Ltd.

Contact

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Additional Information

Further technical information related to this reference material can be obtained by using the contact details provided above. If there are any changes to the certified values or other major revisions, a notification will also be sent to purchasers who have performed user registration*3.

*3: Please send the following details via the e-mail address above: 1) CRM type and number recorded on the bottle(s), 2) company name, 3) supervisor name, and 4) date of receipt.

Reference Information

Manufacturing partner: SEISHIN TRADING Co., Ltd.

Sales partner: SEISHIN TRADING Co., Ltd.

Other Details

HORIBA TECHNO SERVICE has been certified by the Japan Accreditation Board as a reference material producer under ISO 17034 (cert. no. RMP00040) and as an accredited laboratory under ISO/IEC 17025 (cert. no. RTL00880).

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