FLX-CRM 123-03

Certified Reference Material
FLX-CRM 123 - Continuous Casting Powder

New certificate issued December 2023

Mass fraction in %	Consensus value[1)]	Uncertainty[2)]
Al_2O_3	**4,63**	0,08
BaO	**0,265**	0,016
CaO	**29,82**	0,40
Cr_2O_3	**0,018**	0,004
F	**6,6**	0,3
Fe_2O_3	**1,69**	0,07
K_2O	**0,41**	0,02
MgO	**2,75**	0,06
MnO_2	**0,041**	0,009
Na_2O	**7,84**	0,15
P_2O_5	**0,095**	0,006
SiO_2	**35,56**	0,38
TiO_2	**0,202**	0,010
ZnO	**0,010**	0,002
ZrO_2	**0,021**	0,009
C_{total} *	***6,30***	*0,12*
CO_2 *	***7,4***	*1,4*

1) The above values are the present best estimates of the true content for each component. Each value is a panel consensus, based on the averaged results of an inter laboratory testing program, detailed in values obtained by individual laboratories or methods. **All values are based on dried sample material (1h 105°C).**

2) Uncertainty calculated for a confidence interval of 95% (k=2).

**Not certified, info only*

Bedburg-Hau, **11.12.2023**

Responsible Reference Materials
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Quality Management
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GM Dr. R. Schramm, reg.in Kleve HRA 2935, personal liability FLUXANA Verwaltungs-GmbH Bedburg-Hau, reg.in Kleve HRB 8211, FLUXANA® registered trademark

Reference Material Information

Type:	5 different continuous casting powders (FLX-CRM 123, 124, 125, 126, 127)
Form and Size:	Granulate, as-produced, 50 ml each bottle
Manufactured by:	Imerys Metal Casting Germany GmbH, Germany
Packaged and tested by:	FLUXANA GmbH & Co.KG, Germany
Certified by:	FLUXANA GmbH & Co.KG, Germany

Description

About 10 kg of each material were delivered to and homogeneously distributed into 50 ml bottles by FLUXANA. The bottles were then vacuum packed for storage.

Description of the CRM

This reference material is an industrial product and was taken directly from the production stream. The complete batch was sealed into 50 ml bottles. This material is normally used as continuous casting powder in steel industry.

Intended use

Calibration and control sample for x-ray fluorescence (xrf) analysis.

Instructions for the correct use of the CRM

This material has to be dried at 105 °C until constant mass prior use. The minimum sample quantity for analysis should be 0.5 g. The material is moisture sensitive and should be stored in a desiccator after breaking the seal.

For XRF use, dried samples should be prepared as a fused bead, using e.g. 1 part sample + 8 parts Lithium tetraborate or a mixture of Lithium tetraborate and Lithium metaborate (66 % : 34 %), prepared on an automated fusion machine. The fusion process must be performed as long that all carbon is burned away to receive clear and transparent glass beads.

Hazardous situation

For this material an actual MSDS is available.

Level of homogeneity and stability

The material was used as delivered. Based on ISO Guide 35:2006 and DIN ISO 13528:2009-01, a homogeneity and stability study of the materials was performed.

Metrological traceability

The analytical methods used by the participants must be in accordance with international measurement standards (XRF fusion, carbon analysis as combustion, ICP or any other wet chemical methods), which are considered as traceable. Other methods, like XRF pressed pellet or XRF standard less methods, are not recognized as being traceable. Values from these methods will not be taken into account for calculation of the assigned values and uncertainty.

Measurement uncertainty

Measurement uncertainty includes components arising from systematic effects, such as components associated with corrections and the assigned quantity values of measurement standards, as well as the definitional uncertainty. The participants did not provide any uncertainty with the concentration values.

Evaluation

Launching the process of accreditation according DIN EN ISO/IEC 17043:2010-05 FLUXANA has adapted the evaluation process to robust statistical methods.
The assigned values were determined as consensus values from the participants who used traceable methods. Additionally all statistical data were calculated using robust statistical methods according DIN ISO 13528:2009-01, ISO/TS 20612:2007 and DIN 38402-45:2014-06.

Advantages of using robust statistics

Statistical methods are robust in the sense that any outliers have only a limited effect on the overall result. Steps were taken to ensure that the results are still meaningful even if the proportion of outliers is 1/3. Robust statistics are also preferable for small populations.

Values obtained by individual laboratories or methods

Please see the detailed report from the proficiency test for this information.

Methods used

X-ray fluorescence analysis with fused bead as sample preparation
Wet chemical methods with digestion and ICP-OES
Combustion technique to detect total carbon and CO_2
Wet chemistry with ion selective electrode to detect fluorine.

Further information

This Reference Material has been produced and certified, wherever possible, in accordance with the requirements of ISO 17043, ISO Guide 34-2009, ISO Guide 31-2000 and ISO Guide 35-2006.

This certification is applicable to the whole of the sample.

As-supplied, this material will not remain stable indefinitely. The matrix will be affected by contact with the atmosphere, and in particular it will absorb moisture. Therefore it must be stored in a desiccator after breaking the seal. Then it continues to be fit for use for an indeterminate period, on the understanding that the sample will be dried prior to weighing, bead preparation and measurement.

All production records will be retained for a period of 10 years from the date of this certificate. This certification will therefore expire **31.12.2033**, although we reserve the right to make changes as issue revisions, in the intervening period.

Participating Laboratories

Voestalpine Stahl Donawitz GmbH, Austria
Voestalpine Stahl GmbH, Austria
Carboox Resende Química Industria e Comercio LTDA, Brasilia
Sumicol - Suministros de Colombia S.A., Colombia
SSAB, Finland
Aperam Isbergues, France
ArcelorMittal, Maizières Process, chemical lab, France
Vallourec, France
AG der Dillinger Hüttenwerke, Germany
Bergisches Wasser- und Umweltlabor der BTV GmbH, Germany
Chemische Fabrik Budenheim KG, Germany
Dorfner Anzaplan, Germany
Eltra GmbH, Germany
FLUXANA GmbH & Co.KG, Germany
GBA Gesellschaft für Bioanalytik mbH, Germany
HuK Umweltlabor GmbH, Germany
Imerys Metal Casting Germany GmbH, Germany
Quarzwerke GmbH, Germany
Saarstahl AG, Germany
Technische Universität Bergakademie Freiberg Institut für Eisen- und Stahltechnologie, Germany
Thyssen Krupp Steel Europe AG, Germany
VGH Severstal, Germany
Voestalpine Böhler Welding Germany GmbH
COGNE ACCIAI SPECIALI, Italy
Instytut Materialów Ceramicznych i Budowlanych, Poland
IK4-AZTERLAN, Spain
ESAB AB, Sweden
SSAB Special Steels, Sweden

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