CERTIFIED REFERENCE MATERIAL
CERTIFICATE OF CHEMICAL ANALYSIS

REFERENCE – CRM N° **TL-3101**
Titanium

LABORATORY MEANS (4 values) – Mass content in %

Line n°	O	N	H
1	0,1578	0,0024	0,00108
2	0,1652	0,0036	0,00115
3	0,1663	0,0038	0,00118
4	0,1737	0,0040	0,00119
5	0,1737	0,0040	0,00120
6	0,1751	0,0045	0,00126
7	0,1752	0,0052	0,00140
8	0,1773		0,00143
9	0,1850		0,00145
M_M	0,1721	0,0039	0,00126
s_M	0,0079	0,0008	0,00013
s_W	0,0025	0,0003	0,00010

M_M : Mean of intralaboratory means
s_M : Standard deviation of intralaboratory means
s_W : Intralaboratory standard deviation

The laboratory mean values have been examined statistically with the Cochran and Grubbs Test to eliminate outlying values.

CERTIFIED VALUES – Mass content in %

Element	O	N	H
M_M	0,1721	0,0039	0,00126
C (95%)	0,0061	0,0008	0,00010

C(95%) : half-width confidence interval $= \frac{t \times s_M}{\sqrt{n}}$ 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 : 2006 sections 6.1 et 10.5.2.

METHODS USED

Element	Line n°	Methods
O	1,2,3,5,6,7,8,9 4	Reduction fusion + Infrared (Fusion/IR) Reduction fusion + Thermal conductivity (Fusion/Cond th)
N	2,3,4,6,7 1,5	Reduction fusion + Thermal conductivity (Fusion/Cond th) Reduction fusion + Infrared (Fusion/IR)
H	1,2,3,4,8 5,6,7,9	Reduction fusion + Thermal conductivity (Fusion/Cond th) Reduction fusion + Infrared (Fusion/IR)

DESCRIPTION OF THE SAMPLE

The sample TL-3101 is a titanium disc of 5 mm diameter and an average sample mass of 0,17g per disc.
This material is packaged in a bottle of 50 discs.

INTENDED USE

The intended use of this material is for the calibration and validation of inert gas fusion (Oxygen, Nitrogen and Hydrogen).

PREPARATION

The sample TL-3101 was prepared and packaged for immediate use by respecting the handling conditions of the discs before analysis.

STORAGE

This 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.

TRACEABILITY

The traceability of CRM TL-3101 has been established in accordance with the ISO Guides 30-35 and the International vocabulary of basic and general terms in metrology.

The assigned values for each material are achieved by inter-laboratory characterization, each laboratory using the method of their choice, details of which are given above.

PARTICIPATING LABORATORIES

BRAMMER STANDARD	US- 77069 HOUSTON
BUREAU VERITAS LABORATOIRES	FR- 95310 SAINT OUEN L'AUMONE
CEA SACLAY	FR- 91191 GIF SUR YVETTE
EAG LABORATORIES	FR- 31100 TOULOUSE
EDF LES RENARDIERES	FR- 77818 MORET-SUR-LOING Cedex
FILAB	FR- 21000 DIJON
FRAMATOME RUGLES	FR- 27250 RUGLES
FRAMATOME UGINE	FR- 73400 UGINE
LUKASIEWICZ RESEARCH NETWORK – UPPER SILESIAN INSTITUTE OF TECHNOLOGY	PL- 44100 GLIWICE
METAFENSCH	FR- 57270 UCKANGE
TECHLAB	FR- 57070 SAINT JULIEN LES METZ

REFERENCES

- ISO 17034:2016 : General requirements for the competence of reference material producers
- ISO/GUIDE 35:2017 : Reference materials – Guidance for characterization and assessment of homogeneity and stability
- ISO 5725-2 : 2019 : (trueness and precision) of measurement methods and results – Part 2 : Basic method for the determination of repeatability and reproducibility of a standard measurement method
- ASTM E1447-09: Standard Test Method for Determination of Hydrogen in Titanium and Titanium Alloys by Inert Gas Fusion Thermal Conductivity/Infrared Detection Method

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