



EUROPEAN COMMISSION
JOINT RESEARCH CENTRE

Institute for Reference Materials and Measurements (Geel)

CERTIFIED REFERENCE MATERIAL BCR[®] – 059

CERTIFICATE OF ANALYSIS

Titanium-aluminum-vanadium alloy Ti 6Al 4V			
	Mass fraction		Number of individual measurement results
	Certified value ¹⁾ [mg/kg]	Uncertainty ²⁾ [mg/kg]	
Oxygen	1750	70	240
Nitrogen	172	27	106
<p>1) This value is the unweighted mean of the individual measurement results independently obtained in different laboratories and/or with different methods of determination. The certified values are traceable to the International System of Units (SI).</p> <p>2) For oxygen, the certified uncertainty is taken as standard deviation of the individual measurement results described in 1). For nitrogen, the certified uncertainty is the expanded uncertainty with a coverage factor 2, corresponding to a level of confidence of about 95 %.</p>			

This certificate is valid for five years after purchase.

Sales date:

The minimum amount of sample to be used is 1 mg for oxygen and 100 mg for nitrogen.

NOTE

This material has been certified by BCR (Community Bureau of Reference, the former reference materials programme of the European Commission). The certificate has been revised under the responsibility of IRMM.

Brussels, May 1997

Latest revision: August 2015

INFORMATION ONLY

Prof. Dr. Hendrik Emons
European Commission
Joint Research Centre
Institute for Reference Materials and Measurements
Retieseweg 111
B-2440 Geel, Belgium

DESCRIPTION OF THE SAMPLE

The samples are available in two forms, a and b:

- a) discs: 26 mm in diameter and 9 mm thickness
- b) 0.2 g samples (in bottles of 25).

ANALYTICAL METHOD USED FOR CERTIFICATION

- 14 MeV neutron activation analysis
- Reducing fusion
- Triton activation analysis
- Surface analysis by prompt (d,p) reaction
- Kjeldahl method
- Heat extraction
- Charged particle activation analysis
- Fast neutron activation analysis
- Photon activation analysis
- Surface analysis by measurement of charged particles from nuclear reactions

PARTICIPANTS

- Bundesanstalt für Materialforschung und –prüfung (BAM), Berlin (DE)
- C.E.A., Centre d'Etudes Nucléaires de Fontenay-aux-Roses, Fontenay-aux-Roses (FR)
- C.E.A., Centre d'Etudes Nucléaires de Grenoble, Grenoble (FR)
- C.E.A., Centre d'Etude de Valduc, Is-sur-Tille (FR)
- CNRS, Service du Cyclotron, Orléans (FR)
- Centre de Recherches Péchiney, Voreppe (FR)
- Centre de Recherches Vallourec, Aulnoye (FR)
- Groupe de Physique des Solides de l'Ecole Normale Supérieure, Paris (FR)
- European Commission, Joint Research Centre, Central Bureau for Nuclear Measurements (CBNM), Geel (BE)
- European Commission, Joint Research Centre, Chemistry Division and CETIS, Ispra (IT)
- Kernforschungszentrum Karlsruhe GmbH, Laboratorium für Isotopentechnik, Karlsruhe (DE)
- Krupp Forschungsinstitut, Essen (DE)
- Max-Planck Institut für Metallforschung, Laboratorium für Reinststoffe, Schwäbisch Gmünd (DE)
- Metallurgie Hoboken-Overpelt, Hoboken (BE)
- Rijksuniversiteit Gent, Instituut voor Nucleaire Wetenschappen, Gent (BE)
- Staatliches Materialprüfungsamt Nordrhein-Westfalen, Dortmund-Aplerbeck (DE)
- Technische Universität München, Institut für Radiochemie, Garching bei München (DE)
- Ugine Aciers, Ugine (FR)
- Universität Frankfurt, Frankfurt/Main (DE)
- Université de Liège, Institut de Physique Nucléaire, Liège (BE)
- CEZUS, Usine de Venthon, Albertville (FR)
- Metallwerk Plansee GmbH, Reutte, Tirol (AT)

SAFETY INFORMATION

The usual laboratory safety precautions apply.

INSTRUCTIONS FOR USE

The form a of the samples is particularly intended for 14 MeV neutron activation analysis, while the form b is particularly intended for reducing fusion.

Before use, samples must be etched for 60 s at 20 °C in a solution containing 4 volumes of HNO₃ (density = 1.4 g/cm³) and 1 volume of HF (40 %), preferably under ultrasonic vibration; the remains of the etching solution are removed by successive immersion of the sample in 3 vessels containing distilled water (the first one preferably under ultrasonic vibration) and 3 vessels containing methanol (same remark). The samples are dried in a warm air stream. Residual surface oxygen is estimated 0.3-0.6 µg/cm² while residual surface nitrogen is estimated 0.1-0.3 µg/cm².

The analysis should be performed as soon as possible after chemical etching of the sample.

STORAGE

Store the samples at room temperature.

However, the European Commission cannot be held responsible for changes that happen during storage of the material at the customer's premises, especially of opened samples.

LEGAL NOTICE

Neither IRMM, its subsidiaries, its contractors nor any person acting on their behalf,

(a) make any warranty or representation, express or implied that the use of any information, material, apparatus, method or process disclosed in this document does not infringe any privately owned intellectual property rights;

or

(b) assume any liability with respect to, or for damages resulting from, the use of any information, material, apparatus, method or process disclosed in this document save for loss or damage arising solely and directly from the negligence of IRMM or any of its subsidiaries.

NOTE

A technical report on the production of BCR-059 is available on the internet (<http://www.irmm.jrc.be>).
A paper copy can be obtained from IRMM on request.

European Commission – Joint Research Centre
Institute for Reference Materials and Measurements (IRMM)
Retieseweg 111, 2440 Geel (Belgium)
Telephone: +32-(0)14-571.722 - Telefax: +32-(0)14-590.406