



CERTIFIED REFERENCE MATERIAL BCR[®] – 024

CERTIFICATE OF ANALYSIS

TITANIUM		
	Mass fraction	
	Certified value [mg/kg]	Uncertainty [mg/kg]
Nitrogen	117 ¹⁾	13 ³⁾
Oxygen	608 ²⁾	23 ⁴⁾
<p>1) This value is the mean of 9 sets of results obtained by different laboratories and methods. The certified value is traceable to the SI.</p> <p>2) This value is the unweighted mean of 342 accepted individual measurement results obtained by different laboratories and methods. The certified value is traceable to the International System of Units (SI).</p> <p>3) The uncertainty is a 95 %/ 95 % tolerance interval of the population of results.</p> <p>4) Standard deviation of the mean as defined in 2).</p>		

This certificate is valid for five years after purchase.

Sales date:

The minimum amount of sample to be used for the determination of nitrogen is 100 mg.

The minimum amount of sample to be used for the determination of oxygen is 15 mg.

DESCRIPTION OF THE SAMPLE

The samples are available as:

- BCR-024B: 0.4 g samples (in bottles of 25 samples)
- BCR-024C: 0.2 g samples (in bottles of 25 samples)

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, November 1977 / December 1982

Revised: August 2015

Signed:

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European Commission
Joint Research Centre
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ANALYTICAL METHODS USED FOR CERTIFICATION

- 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
- Triton activation analysis
- 14 MeV neutron activation analysis
- Reducing fusion

PARTICIPANTS

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- Metallgesellschaft A.G., Frankfurt/Main (DE)
- Staatliches Materialprüfungsamt Nordrhein-Westfalen, Dortmund-Aplerbeck (DE)

SAFETY INFORMATION

The usual laboratory safety precautions apply.

INSTRUCTIONS FOR USE

The material is intended to assess method performance. Before use, the samples must be etched during 60 s at 20 °C in a solution containing 4 volumes HNO₃ ($\rho = 1400 \text{ kg/m}^3$) and 1 volume HF (40 %); the remains of the etching solution are removed by successive immersion of the sample in 3 vessels of distilled water and 3 vessels of methanol. The samples are dried in a stream of warm air. From a freshly etched sample the residual surface nitrogen is $< 0.1 \text{ } \mu\text{g/cm}^2$, and the surface oxygen is evaluated at $0.4 - 0.6 \text{ } \mu\text{g/cm}^2$ (cf ITE-90). The analysis should be performed as soon as possible after mechanical etching of the sample.

STORAGE

The material should be stored 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

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NOTE

A technical report on the production of BCR-024 is available on the internet (<http://www.irmm.jrc.be>). A paper copy can be obtained from IRMM on request.