

Joint Research Centre

Certified reference materials for testing of mechanical properties



BCR-661

Steel for Charpy V-notch impact toughness testing

Code	Nominal absorbed energy level (KV)	Typical expanded uncertainty
ERM-FA013	20-30 J	1.3 J
ERM-FA015	80 J	2.4 J
ERM-FA016	120 J	4 J
ERM-FA415	150 J	4 J

- sets of 5 steel Charpy V-notch test pieces
- for indirect verification in accordance with EN 10045-2 and ISO 148-2 (required once a year at two or more energy levels) at 20° C, except ERM-FA013 where one batch is available with certified values at 0° C. By default a batch certified by 20° C will be delivered, unless the order explicitly mentions the value at 0° C.

BCR-425: Nickel-based alloy for creep testing

The test piece is delivered in the form of a bar of 14 mm diameter and 150 mm length.
BCR-425 samples are to be tested for creep at 600 ° C and at an applied stress of 160 MPa.

Property	Certified value
Creep rate at 400 hours	$72 \pm 5 \cdot 10^{-6} \text{ h}^{-1}$
Time to 2 % creep strain	$278 \pm 16 \text{ h}$
Time to 4 % creep strain	$557 \pm 30 \text{ h}$

BCR-661: Nickel-based alloy for ambient temperature tensile testing

BCR-661 is supplied as 1 bar of 500 mm long. Values as defined in EN 10002-1.

Property	Certified value
0.2 % proof stress $R_{p0.2}$	$300 \pm 8 \text{ MPa}$
0.5 % proof stress $R_{p0.5}$	$318 \pm 7 \text{ MPa}$
Tensile strength R_m	$750 \pm 4 \text{ MPa}$
Elongation at fracture A	$40.9 \pm 0.9 \%$
Reduction in area at fracture Z	$60 \pm 4 \%$

Confidence in measurements

All certificates and detailed production information can be found at <https://crm.irmm.jrc.ec.europa.eu>

BCR-692: diamond-like-carbon coated steel for scratch testing

Failure event	Critical load [N]
Forward chevron cracks at the borders of the scratch track (LC_1)	13.6 ± 1.8
Forward chevron cracks at the borders of the scratch track, with local interfacial spallation or with gross interfacial spallation (LC_2)	17.0 ± 2.1
Gross interfacial shell-shaped spallation (LC_3)	28.0 ± 2.9

The reference samples are 30 mm x 30 mm x 5 mm steel coupons coated with a diamond-like carbon (DLC) coating.



BCR-116

BCR-116: limestone powder for shear testing (Jenike Cell)

The reference material consists of 3 kg of limestone powder packed in a polyethylene jar. It is accompanied by a certificate giving shear stress as a function of normal applied stress for four different powder compaction stresses.



BCR-692

How to order reference materials

From JRC in Geel

Tel: +32 14 571 705 • Fax: +32 14 590 406
<https://ec.europa.eu/jrc/en/reference-materials>
 E-mail: jrc-irmm-rm-distribution@ec.europa.eu

From authorised distributors

LGC Standards GmbH (DE)
<http://www.lgcstandards.com/>
 E-mail: de@lgcstandards.com

Sigma-Aldrich Chemie GmbH (CH)
<http://www.sigmaaldrich.com/irmm>
 E-mail: flukatec@sial.com

Sigma-Aldrich RTC Inc. (USA)
<http://www.RT-Corp.com>
 E-mail: RTCSalesgroup@sial.com

ARMI (USA)
<http://www.armi.com>
 E-mail: Info@ARMI.com

Industrial Analytical (RSA)
<http://www.industrialanalytical.co.za>
 E-mail: info@industrialanalytical.co.za



Accredited CRM Producer: the JRC-IRMM is accredited to ISO Guide 34:2009 for the production of reference materials under the code BELAC 268-RM