AD 496:
Toughness testing of bolts

Bolts used in environments subject to low temperatures that fall outside the range of temperatures usually encountered, such as in cold stores, may require toughness testing at the service temperature. SCI has recently been contacted regarding testing bolts that are smaller than the limiting diameter for normal Charpy impact tests. The purpose of this note is to advise how impact testing can be carried out.

AD 332: Toughness of bolts advised that non-preloaded and preloaded bolts supplied to BS EN 15048:2007 and BS EN 14399-3:2005 would be tested at -20°C and have a Charpy V-notch impact strength of at least 27 joules.

Bolt materials comply with BS EN ISO 898-1:2013[1] which indicates in clause 1 Scope, Note 1 that "Fasteners conforming to the requirements of this part of ISO 898 are used in applications ranging from -50°C to + 150°C. ...". Notwithstanding this, clause 9.14.1 indicates that impact tests are carried out only if required by a product standard or agreed between manufacturer and purchaser. The standard indicates tests are to be carried out in accordance with ISO 148-1 (Charpy V-notch test) at -20°C and are required to achieve a Charpy V-notch impact strength of at least 27 joules, for bolts of size M16 or greater (see Table 3). No tests are carried out to demonstrate impact strength at temperatures below -20°C unless specified but the standard indicates that other test temperatures and impact strength values can be called for.

The bolt size limitation appears to be indicated so that standard Charpy test pieces can be produced from the bolts. (M16 bolts have a tensile stress area of 157 mm² and a corresponding diameter of 14.1mm. The diagonal dimension of a 10mm square Charpy test piece is 14.1mm). Tests specified in ISO 898-1 are applicable to machined tests pieces made from bolts, screws and studs of diameter at least 16mm. The total length of the test pieces is at least 55mm.

If impact tests are required on bolts of smaller size than M16, these can also be carried out in accordance with ISO 148-1, which allows for 7.5 mm, 5 mm and 2.5 mm square samples of 55 mm length. Such tests are not strictly in accordance with ISO 898-1 but will allow the impact properties of fasteners of smaller size than M16 to be determined at temperatures required by the purchaser. There is however no published basis for correlating test results from the smaller test pieces with results from standard ones so acceptance criteria should be agreed before supply. Test pieces with the standard length, depth and notch size but reduced width can also be used. The impact energy of such test pieces can be adjusted pro rata with the cross-sectional area at the notch for comparison with standard test requirements and would allow the impact properties of M12 bolts to be determined.

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1. BS EN ISO 898-1:2013 *Mechanical properties of fasteners made of carbon steel and alloy steel Part 1: Bolts, screws and studs with specified property classes – coarse thread and fine pitch thread* (ISO 898-1:2013), BSI

New and revised codes and standards

From BSI Updates October 2022

BS EN PUBLICATIONS

BS EN ISO 4014:2022
Fasteners. Hexagon head bolts. Product grades A and B
supersedes BS EN ISO 4014:2011

BS EN ISO 4016:2022
Fasteners. Hexagon head bolts. Product grade C
supersedes BS EN ISO 4016:2011

BS IMPLEMENTATIONS

BS ISO 8504-4:2022
Preparation of steel substrates before application of paints and related products. Surface preparation methods. Acid pickling
no current standard is superseded

CORRIGENDA TO BRITISH STANDARDS

BS EN ISO 2566-1:2021
Steel. Conversion of elongation values. Carbon and low-alloy steels
Corrigendum, September 2022; Corrigendum, March 2022

BRITISH STANDARDS REVIEWED AND CONFIRMED

BS EN ISO 9223:2012
Corrosion of metals and alloys. Corrosivity of atmospheres. Classification, determination and estimation

BS EN ISO 9224:2012
Corrosion of metals and alloys. Corrosivity of atmospheres. Guiding values for the corrosivity categories

BS EN ISO 9225:2012
Corrosion of metals and alloys. Corrosivity of atmospheres. Measurement of environmental parameters affecting corrosivity of atmospheres

BS EN ISO 9226:2012
Corrosion of metals and alloys. Corrosivity of atmospheres. Determination of corrosion rate of standard specimens for the evaluation of corrosivity

NEW WORK STARTED

EN 1994-1-2
Design of composite steel and concrete structures. General rules. Structural fire design
will supersede BS EN 1994-1-2:2005+A1:2014

ISO 8504-5
Preparation of steel substrates before application of paints and related products. Surface preparation methods. Water Jetting (Water Jet Cleaning)
will supersede None

DRAFT BRITISH STANDARDS FOR PUBLIC COMMENT – ADOPTIONS

22/30439955 DC
BS EN 1998-1-1 Eurocode 8. Design of structures for earthquake resistance. General rules and seismic action
Comments for the above document are required by 22 November, 2022