

BRITISH STANDARD

Rubber bonded fibre jointing for industrial and aerospace purposes – Specification

ICS 23.040.80

Confirmed
December 2011

BSi
British Standards

NO COPYING WITHOUT BSI PERMISSION EXCEPT AS PERMITTED BY COPYRIGHT LAW

Documents
Document Sharing Hub

Publishing and copyright information

The BSI copyright notice displayed in this document indicates when the document was last issued.

© BSI 2006

ISBN 0 580 49231 1

The following BSI references relate to the work on this standard:

Committee reference PSE/2

Draft for comment 06/30144329 DC

Publication history

First published 1992

Amendments issued since publication

Amd. no.	Date	Text affected
16859	31 January 2007	Change to figure A.2
Corrigendum No. 1		

Contents

Foreword *ii*

1	Scope	<i>1</i>
2	Normative references	<i>1</i>
3	Terms and definitions	<i>1</i>
4	Information to be supplied by purchaser	<i>2</i>
5	Grades and materials	<i>2</i>
6	Finish	<i>3</i>
7	Thickness	<i>3</i>
8	Tests	<i>4</i>
9	Retest	<i>5</i>
10	Marking	<i>6</i>
11	Test certificate	<i>6</i>

Annexes

Annex A (normative)	Method of carrying out residual stress test	<i>7</i>
Annex B (normative)	Method of carrying out flexibility test	<i>12</i>
Annex C (normative)	Method of carrying out compressibility test	<i>13</i>
Annex D (normative)	Method of carrying out gas permeability test	<i>14</i>
Annex E (normative)	Method of carrying out resistance to fluids tests	<i>16</i>
Annex F	Method of calibration of residual stress testing apparatus	<i>18</i>
Annex G	Method of test to determine maximum stress value	<i>19</i>

List of figures

Figure A.1	General assembly of residual stress testing apparatus	<i>7</i>
Figure A.2	Details of residual stress testing apparatus	<i>8</i>
Figure A.3	Details of dynamometer for calibration of residual stress testing apparatus	<i>9</i>
Figure A.4	Typical calibration curve for residual stress testing apparatus	<i>10</i>
Figure D.1	Typical layout of test apparatus for gas permeability	<i>15</i>
Figure F.1	Arrangement for calibration of dynamometer at increased temperatures	<i>18</i>
Figure F.2	Dynamometer	<i>19</i>

List of tables

Table 1	Tolerance for thickness of sheet	<i>4</i>
Table 2	Resistance to fluids	<i>5</i>
Table A.1	Residual stress: Test report	<i>12</i>
Table E.1	Resistance to fluids test conditions	<i>17</i>

Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 20, an inside back cover and a back cover.

Foreword

Publishing information

This British Standard was published by BSI and came into effect on 31 October 2006. It was prepared by Technical Committee PSE/2, *Joining materials and compounds*. A list of organizations represented on this committee can be obtained on request to its secretary.

Supersession

This British Standard supersedes both BS 7531:1992 and BS F 130:1987, which are withdrawn.

Information about this document

This new edition represents a full revision of the standard, and introduces the following principal change:

Expansion of the Scope and amendment to the text to include two grades for use in aerospace applications which were previously covered in BS F 130:1987.

Hazard warnings

WARNING. This British Standard calls for the use of substances and/or procedures that can be injurious to health if adequate precautions are not taken. It refers only to technical suitability and does not absolve the user from legal obligations relating to health and safety at any stage.

Presentational conventions

The provisions of this standard are presented in roman (i.e. upright) type. Its requirements are expressed in sentences in which the principal auxiliary verb is “shall”.

Commentary, explanation and general informative material is presented in smaller italic type, and does not constitute a normative element.

Contractual and legal considerations

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

Compliance with a British Standard cannot confer immunity from legal obligations.

The BSI copyright notice displayed in this document indicates when the document was last issued.

1 Scope

This British Standard specifies the requirements for the manufacture, quality and finish, thickness and testing of elastomer bonded compressed fibre jointing materials.

This British Standard provides for four grades as follows:

- a) Grades X and Y for general industrial use.
- b) Grades AX and AY for use in aerospace applications.

In addition to the definitive requirements, this standard also requires the items detailed in Clause 4 to be documented. For compliance with this standard, both the definitive requirements and the documented items have to be met.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

BS 6920-1, *Suitability of non-metallic products for use in contact with water intended for human consumption with regard to their effect on the quality of the water – Part 1: Specification*

BS 870, *External micrometers*

BS 907, *Specification for dial gauges for linear measurement*

BS 3643-1, *Specification for ISO metric screw threads – Part 1: Principles and basic data*

BS EN 10269, *Steels and nickel alloys for fasteners with specified elevated and/or low temperature properties*

BS EN ISO 7500-1, *Metallic materials – Verification of static uniaxial testing machines – Part 1: Tension/compression testing machines – Verification and calibration of the force-measuring system*

DIN 3535-6, *Gaskets for gas supply – Part 6: Gasket materials based on synthetic fibres, graphite or polytetrafluoroethylene (PTFE) for gas valves, gas appliances and gas mains*

BS ISO 1817, *Rubber, vulcanized – Determination of the effect of liquids*

3 Terms and definitions

For the purposes of this British Standard, the following terms and definitions apply.

3.1 jointing

manufactured solid run single-ply material supplied in sheets, from which required shapes can be cut and used for the purpose of sealing mating faces of components from the ingress or egress of fluids

3.2 manufacturing run

amount of jointing all of one grade in units of a maximum of 5 t

3.3 batch of material

single mix of ingredients that is uniquely identified and traceable

4 Information to be supplied by purchaser

The following information to be supplied by the purchaser shall be fully documented. For compliance with the standard both the definitive requirements specified throughout the standard and the following documented items shall be satisfied.

- a) the number of this British Standard, i.e. BS 7531:2006 (see **10.1**);
- b) for Grades AX and AY the fibre type (see **5.2**);
- c) the grade of jointing required (see Scope);
- d) the thickness required (see **7.1**);
- e) the dimensions of sheets required;
- f) the quantity of sheets required;
- g) if wire mesh reinforcement is required and, if so the wire material, diameter and mesh size (see **5.3**);
- h) if the jointing will or is likely to come into contact with potable water (see **5.4**);
- i) if the manufacturer's identification mark is not required to be indelibly marked on the jointing (see **10.3**);
- j) for Grades AX and AY if a test certificate is required (see **11.1**);
- k) if one or both surfaces shall be treated with a suitable release agent, e.g. graphite (see Clause **6**).

5 Grades and materials

5.1 Grades

For grades AX and AY the binder shall be acrylonitrile-butadiene (NBR) elastomer.

5.2 Material

NOTE Examples of fibres that can be used (singly or in combination) are aramid, carbon and glass.

The material shall consist of fibres and inorganic fillers bonded with a suitable elastomer or blend of elastomers, and shall be manufactured in the form of sheets. The fibres shall be uniformly dispersed throughout the jointing.

For Grades AX and AY the purchaser shall state which fibre type is required.

5.3 Reinforcement

All grades shall be available with or without wire mesh reinforcement.

The purchaser shall state if wire mesh reinforcement is required and the wire material, diameter and mesh size should be specified.

5.4 Contact with potable water

When used under the conditions for which they are designated, non-metallic products in contact with or likely to come into contact with potable water shall comply with the requirements of BS 6920-1.

NOTE 1 Non-metallic products for installation and use in the United Kingdom which are verified and listed under the UK Water Fitting Byelaws Scheme are deemed to satisfy the requirements of this clause. Details of the Scheme are obtainable from WRC plc, 660 Ajax Avenue, Slough SL1 4BG.

NOTE 2 Non-metallic products approved by the Department of the Environment Committee on Chemicals and Materials of construction for use in Public Water Supply and Swimming Pools are considered free from adverse health effects for the purposes of compliance with this clause.

A list of approved chemicals and materials and details of the approvals scheme are available from the Secretary of the Committee at the Department of the Environment, Water Division, Romney House, 43 Marsham Street, London SW1P 3PY.

The purchaser shall state whether, when used under the conditions for which they are designated, non-metallic products come or are likely to come into contact with potable water.

6 Finish

The sheets of all grades of jointing shall be solid run (not laminated), of uniform texture, smooth on both sides and free from irregularities such as blisters, tears and lumps.

The purchaser shall state whether, and which, surfaces shall be treated with an acceptable release agent, e.g. graphite.

7 Thickness

7.1 Nominal thickness

The nominal thickness of all grades of jointing shall be one of the following:

- a) 0.4 mm;
- b) 0.5 mm;
- c) 0.75 mm;
- d) 1.0 mm;
- e) 1.5 mm;
- f) 2.0 mm.

NOTE For any grade of material the compressive strength at elevated temperature decreases with increasing thickness.

The purchaser shall state the thickness required.

7.2 Thickness tolerance

The maximum variation of any sheet from the nominal thickness, and the maximum possible variation in thickness between any points not more than 250 mm apart on a sheet, shall be in accordance with Table 1.

Table 1 Tolerance for thickness of sheet

Nominal thickness of sheet mm	Maximum permissible variation from nominal thickness mm	Maximum permissible variation in thickness between points not more than 250 mm apart mm
0.4 and 0.5	± 0.05	0.05
0.75 and 1.0	± 0.10	0.10
1.5 and 2.0	± 0.15	0.10

7.3 Thickness measurement

The thickness shall be measured with either:

- a ratchet micrometer complying with BS 870 and having an anvil of 6 mm to 16 mm in diameter. The reading shall be taken after three clicks of the ratchet; or
- a dial type micrometer complying with BS 907, with a flat pressure foot of not less than 6 mm diameter and a flat anvil of diameter not less than that of the pressure foot.

8 Tests

8.1 Samples

The manufacturer shall select from each manufacturing run for Grades X and Y and each batch for Grades AX and AY, a sample or samples including those treated with release agent, e.g. graphite, where appropriate sufficient to provide the test pieces for one complete series of tests as specified in this clause.

The manufacturer shall carry out tests in accordance with 8.2 to 8.6 for each manufacturing run of each grade of jointing and additionally shall carry out tests in accordance with 8.2, 8.4 and 8.6 (Oil No. 3 only) for each batch of grades AX and AY.

8.2 Residual stress

The residual stress when determined in accordance with Annex A shall be not less than 25 MPa for grades X and AX or 22 MPa for grades Y and AY.

8.3 Flexibility

When tested in accordance with Annex B in the as supplied condition all grades shall not crack or delaminate.