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Specification for

Materials for water tap and stopvalve seat washers

Amendments issued since publication

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Foreword

BS 3457 was first prepared in 1962 under the authority of the Sanitary Appliances Industry Standards Committee, to provide standard tests and performance requirements for materials for water tap seat washers.

Although this present British Standard contains specifications for rubber and leather and fibre, the majority of the committee responsible for its preparation strongly recommends rubber washers because they are suitable for use with both hot and cold water. The presence in the standard of the specifications for leather and fibre is explained by the suitability of washers of these materials for certain applications, namely, leather for cold water only and fibre for hot water only.

The other principal changes between this and the previous edition of the standard are:

- (1) the introduction of the term 'seat washer' to distinguish such washers from head washers and joint washers.
- (2) the use of more realistic criteria in Clause 3 for determining the effect of washer materials on water.
- (3) more precise reference in Clause 7 to BS 1309 and BS 3144 for testing leather washers.
- (4) the deletion from Clause 7 of the moisture content requirement and stearine base requirements.
- (5) the deletion from Clause 8 of hard vulcanized fibre and the replacement of BS 1737 and F.64 by BS 3964 as the testing criterion.

As part of BSI's programme of metrication, this standard is expressed in metric terms. The metric values are given in SI units: for further information reference should be made to BS 3763, 'The International System of units (SI)' and PD 5686, 'The use of SI units'.

British Standard Specification for

Materials for water tap and stopvalve seat washers

1. Scope

This British Standard specifies requirements for physical and some chemical properties for materials for water tap and stopvalve seat washers of the type defined in Clause 2, and made of rubber or leather or fibre.

NOTE. The titles of the British Standards referred to in this standard are listed on the inside back cover.

2. Definitions

For the purposes of this British Standard the following definitions apply:

- (1) *Seat washer.* The disc of material fitted to the washer plate of a water tap or stopvalve in such a manner that, on closing the tap or valve, it is brought into contact with the seat and closes the orifice against further flow.
- (2) *Cold water.* Water at a temperature not exceeding 35 °C.
- (3) *Hot water.* Water at a temperature exceeding 35 °C and not exceeding 100 °C.

3. Effect on water

3.1 Material used for seat washers shall be immersed for a period of 24 hours in a glass containing 0.25 litre of normal potable water at 20 ± 2 °C having a residual chlorine content of 0.5 ± 0.1 mg/l. This first portion of water shall then be rejected and replaced by a second similar portion. Immersion for 24 hours of the same sample of material in this second portion of water shall neither impart any appreciable or objectionable taste to the water, nor produce any toxic effect, nor foster the growth of bacteria, nor impart colour discernible to the unaided eye.

3.2 To assess the compliance of the material with the requirements stated in 3.1, one tap washer having the following dimensions shall be used:

outside diameter	60 mm min.
inside diameter	10 mm max.
thickness (when new)	6 mm min.

Alternatively, a number of smaller washers of total equivalent surface area may be used.

4. Effect on metals

The material of the washer shall not corrode the metal seat or the washer plate sufficiently to impair the performance and life of a tap or stopvalve.

5. Marking

Sheet materials supplied as complying with the requirements of this British Standard shall bear the following marks.

- (1) The number of this British Standard, i.e. BS 3457.
- (2) An identification mark of the manufacturer.

NOTE. Attention is drawn to the certification facilities offered by BSI; see the inside back cover of this standard.

6. Rubber for washers for hot* and cold* water

Rubber for washers to be used with hot* and cold* water shall be either vulcanized synthetic or vulcanized natural rubber which passes the following tests.

- (1) It shall have a hardness of between 85 ° and 95 ° IRHD when tested in accordance with the requirements of Method H in Part A26 of BS 903.
- (2) When aged for 14 days at 70 °C by Method B specified in Part A19 of BS 903 the hardness shall not have altered by more than 3 ° IRHD and shall remain within the range given in (1) when tested after the ageing period.
- (3) When submitted to the constant strain test by Method A in Part A6 of BS 903, for a period of 24 hours at 100 ± 1 °C, the compression set shall be not greater than 40 %.
- (4) When submitted to the water absorption test in 7.3 in Part A16 of BS 903, for a period of 168 hours at 20 ± 2 °C and using the standard test piece, the absorption of water shall not exceed 2 % by volume.

7. Leather for washers for cold* water only

7.1 General

7.1.1 Leather complying with the requirements of this British Standard shall be used for the manufacture of washers intended for cold* water only.

7.1.2 Leather for washers shall be full chrome hydraulic leather as specified in 7.2 below.

7.2 Full chrome hydraulic leather

7.2.1 The leather shall be made from ox hides, British or wet salted, and shall be fully chrome tanned and shall be as specified in (1) to (4) below when tested in accordance with BS 1309, and as specified in (5) below when tested in accordance with BS 3144.

- (1) Chrome expressed as chromic oxide (Cr_2O_3) shall be not less than 3.5 %.
- (2) Water soluble matter shall not exceed 10 %.
- (3) Acidity: the pH value of a water extract shall be not less than 3.3.
- (4) Oil and fat content shall be not less than 10 % and not more than 15 %.
- (5) Tensile strength: the leather shall have an ultimate strength of not less than 20 MN/m².

7.2.2 All results of analysis shall be calculated and expressed as a percentage of fat-free leather.

8. Flexible vulcanized fibre for washers for hot* water only

8.1 General. Flexible vulcanized fibre complying with the requirements of this British Standard, as given in 8.2, shall be used for the manufacture of washers intended for hot* water only.

8.2 Flexible vulcanized fibre. Flexible vulcanized fibre shall be of a quality which complies with the requirements of BS 3964 and shall meet the tests given in that specification to ensure the following characteristics.

- (1) When tested for flexibility in accordance with Appendix B of BS 3964 round a mandrel of 32 mm diameter the specimen shall show no signs of splitting along the edge or of cracking.
- (2) When tested in accordance with Appendix C of BS 3964, the specimen shall have a compression strain of not less than 20 % and not more than 30 %.
- (3) When tested as described in Appendix D of BS 3964, the material shall contain not more than 0.05 % by weight of chlorides calculated as Cl.
- (4) When tested as described in Appendix D of BS 3964, the material shall contain not more than 0.05 % by weight of sulphates calculated as SO_4 .

* See Clause 2, 'Definitions'.

BSI publications referred to in this standard

This standard makes reference to the following British Standards:

BS 903	Methods of testing vulcanized rubber
Part A6.	Determination of compression set
Part A16.	The resistance of vulcanized rubber to liquids
Part A19.	Accelerated ageing tests
Part A26.	Determination of hardness
BS 1309	Methods of sampling and analysis of vegetable-tanned and chrome-tanned leathers
BS 3144	Methods of sampling and physical testing of leather
BS 3964	Flexible vulcanized fibre sheets

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