BS ISO 4081:2016

BSI Standards Publication

Rubber hoses and tubing for cooling systems for internal-combustion engines — Specification

Documents
Document Sharing Hub

Full document details: BS ISO 4081:2016

National foreword

This British Standard is the UK implementation of ISO 4081:2016. It supersedes BS ISO 4081:2010 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee PRI/66, Rubber and plastics tubing, hoses and hose assemblies.

A list of organizations represented on this committee can be obtained on request to its secretary.

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

© The British Standards Institution 2016.
Published by BSI Standards Limited 2016

ISBN 978 0 580 92844 4

ICS 43.040.01; 83.140.40

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

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 October 2016.

Amendments/corrigenda issued since publication

Date	Text affected

Documents
Document Sharing Hub

Full document details: BS ISO 4081:2016

INTERNATIONAL STANDARD

ISO 4081

Fourth edition
2016-10-15

Rubber hoses and tubing for cooling systems for internal-combustion engines — Specification

Tubes et tuyaux en caoutchouc pour systèmes de refroidissement pour moteurs à combustion interne — Spécifications

Reference number
ISO 4081:2016(E)

Documents
Document Sharing Hub
© ISO 2016

Full document details: BS ISO 4081:2016

COPYRIGHT PROTECTED DOCUMENT

© ISO 2016, Published in Switzerland

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
copyright@iso.org
www.iso.org

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub

Full document details: BS ISO 4081:2016

Contents

Page

Foreword ..... **iv**
1 Scope **1**
2 Normative references **1**
3 Classification **2**
4 Size and tolerances **2**
5 Performance requirements for hose and tubing **2**
6 Frequency of testing **5**
7 Marking **6**
Annex A (normative) **Dilation test** **7**
Annex B (normative) **Resistance to surface contamination by engine oil** **8**
Annex C (normative) **Pressure, vibration and temperature test** **9**
Annex D (informative) **Example of how a non-standard type of hose or tubing could be specified by an original equipment manufacturer (OEM) using a matrix** **11**
Annex E (normative) **Type test** **12**
Annex F (normative) **Routine test** **13**
Annex G (informative) **Production acceptance test** **14**
Bibliography **15**

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 4081:2016

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT) see the following URL: www.iso.org/iso/foreword.html.

The committee responsible for this document is ISO/TC 45, *Rubber and rubber products*, Subcommittee SC 1, *Rubber and plastics hoses and hose assemblies.*

This fourth edition cancels and replaces the third edition (ISO 4081:2010), of which it constitutes a minor revision. The following change has been made:

— Clause 2 has been updated, where ISO 1746 and ISO 4672 have been deleted and replaced by ISO 10619-1 and ISO 10619-2, respectively.

© ISO 2016 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 4081:2016

INTERNATIONAL STANDARD ISO 4081:2016(E)

Rubber hoses and tubing for cooling systems for internal-combustion engines — Specification

WARNING — Persons using this International Standard should be familiar with normal laboratory practice. This International Standard does not purport to address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any national regulatory conditions.

1 Scope

This International Standard specifies the requirements for straight or pre-formed rubber hoses and tubing for use in pressurized or unpressurized cooling circuits containing 1,2-ethanediol-based coolants in internal-combustion engines for vehicles with an unladen mass (as defined in ISO 1176) of 3,5 t or less. In addition, this specification may also be applied as a classification system to enable original equipment manufacturers (OEMs) to detail a "line call-out" of tests for specific applications where these are not covered by the main types specified (see example in Annex D). In this case, the hose or tubing would not carry any marking showing this ISO specification number but may detail the OEM's own identification markings as shown on their part drawings.

2 Normative references

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

ISO 188, *Rubber, vulcanized or thermoplastic — Accelerated ageing and heat resistance tests*

ISO 1307, *Rubber and plastics hoses — Hose sizes, minimum and maximum inside diameters, and tolerances on cut-to-length hoses*

ISO 1402, *Rubber and plastics hoses and hose assemblies — Hydrostatic testing*

ISO 1629, *Rubber and latices — Nomenclature*

ISO 1817, *Rubber, vulcanized or thermoplastic — Determination of the effect of liquids*

ISO 6162-1, *Hydraulic fluid power — Flange connections with split or one-piece flange clamps and metric or inch screws — Part 1: Flange connectors, ports and mounting surfaces for use at pressures of 3,5 MPa (35 bar) to 35 MPa (350 bar), DN 13 to DN 127*

ISO 7233, *Rubber and plastics hoses and hose assemblies — Determination of resistance to vacuum*

ISO 7326:2016, *Rubber and plastics hoses — Assessment of ozone resistance under static conditions*

ISO 8033, *Rubber and plastics hoses — Determination of adhesion between components*

ISO 10619-1:2011, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 1: Bending tests at ambient temperature*

ISO 10619-2:2011, *Rubber and plastics hoses and tubing — Measurement of flexibility and stiffness — Part 2: Bending tests at sub-ambient temperatures*

ISO 23529, *Rubber — General procedures for preparing and conditioning test pieces for physical test methods*

SAE J20:2006, *Coolant system hoses*

© ISO 2016 – All rights reserved

Documents
Document Sharing Hub
Full document details: BS ISO 4081:2016

SAE J1638, *Compression set of hoses or solid discs*

SAE J1684:2005, *Test method for evaluating the electrochemical resistance of coolant system hoses and materials*

3 Classification

The product shall consist of rubber materials with or without an integral reinforcement which may or may not be pre-formed before final vulcanization. The hoses and tubing may be branched, in which case the method of attachment of the branch shall be such that the integrity of the hose is maintained when it is tested to this International Standard. This International Standard does not cover methods of attachment to mounting spigots.

Four types of hose and tubing for specific applications are specified as follows:

— Type 1 = Tubing and hoses for ambient operating temperatures from −40 °C to +100 °C;

— Type 2 = Tubing and hoses for ambient operating temperatures from −40 °C to +125 °C;

— Type 3 = Tubing and hoses for ambient operating temperatures from −40 °C to +150 °C;

— Type 4 = Tubing and hoses for ambient operating temperatures from −40 °C to +175 °C.

Wherever economically and technically possible, hoses and tubing shall use in their construction materials that are capable of being recycled. Also, wherever economically and technically possible, hoses and tubing shall use in their construction materials that contain post-consumer or post-industrial recyclates.

4 Size and tolerances

Bore sizes and tolerances shall be in accordance with ISO 1307. Wall thicknesses shall be sufficient to meet the requirements of this International Standard.

5 Performance requirements for hose and tubing

Tests shall be selected from the following list for each application of hose or tubing, based on the performance requirements of the finished product. Type tests (as defined in Clause 6) for each hose or tubing type are given in Annex E.

a) **Burst pressure**

When determined in accordance with ISO 1402 at standard laboratory temperature as specified in ISO 23529, the minimum burst pressure shall be:

Tubing:	0,2 MPa (2 bar) for all diameters
Hose:	1,2 MPa (12 bar) for diameters up to and including 18 mm
	0,9 MPa (9 bar) for diameters >18 mm up to, and including, 35 mm
	0,5 MPa (5 bar) for diameters >35 mm

b) **Adhesion** (for all constructions with two or more bonded layers only)

When determined by the appropriate procedure of ISO 8033, the adhesion between each pair of bonded layers shall not be less than 1,8 kN/m for unaged hoses and not less than 1,3 kN/m for

© ISO 2016 – All rights reserved
Documents
Document Sharing Hub
Full document details: BS ISO 4081:2016