

BS EN 3385:2012



BSI Standards Publication

Aerospace series — Rings retaining, external, axial mounting, steel, vacuum cadmium plated

bsi.

...making excellence a habit.™

National foreword

This British Standard is the UK implementation of EN 3385:2012.

WARNING Retaining rings conforming to BS EN 3385:2012 have cadmium as plating material. Cadmium has been restricted and/or banned in many countries owing to environmental and health concerns and should not be used on new product designs. Users of retaining rings that require parts with a surface treatment that is corrosion resistant should raise their own in-house retaining ring specification directing the retaining ring manufacturer to make the rings to BS EN 3385:2012 in form but with a surface treatment to a specification provided by the user.

Health and safety officials such as surface treatment experts serving aerospace equipment service areas or aerospace product design areas should be consulted about any concerns on using cadmium-plated parts.

The UK participation in its preparation was entrusted to Technical Committee ACE/12, Aerospace fasteners and fastening systems.

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 2012

Published by BSI Standards Limited 2012

ISBN 978 0 580 75991 8

ICS 49.030.50

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 30 April 2012.

Amendments issued since publication

| Amd. No. | Date | Text affected |
|----------|------|---------------|
|----------|------|---------------|

EUROPEAN STANDARD

EN 3385

NORME EUROPÉENNE

EUROPÄISCHE NORM

March 2012

ICS 49.030.50

English Version

**Aerospace series - Rings retaining, external, axial mounting,
steel, vacuum cadmium plated**

Série aérospatiale - Anneaux d'arrêt, à montage axial, type
extérieur, en acier, cadmiés sous vide

Luft- und Raumfahrt - Sicherungsringe, axial auf Wellen
montierbar, aus Stahl, vakuumverkadmet

This European Standard was approved by CEN on 24 September 2011.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and United Kingdom.



EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

Management Centre: Avenue Marnix 17, B-1000 Brussels

Contents

Page

| | |
|---|---|
| Foreword | 3 |
| 1 Scope and field of application | 4 |
| 2 Normative references | 4 |
| 3 Required characteristics | 4 |
| 3.1 Configuration — Dimensions — Masses | 4 |
| 3.2 Materials | 4 |
| 3.3 Surface treatment | 4 |
| 4 Designation | 8 |
| 5 Marking | 8 |
| 6 Technical specification | 8 |
| 7 Mounting | 8 |

Foreword

This document (EN 3385:2012) has been prepared by the Aerospace and Defence Industries Association of Europe - Standardization (ASD-STAN).

After enquiries and votes carried out in accordance with the rules of this Association, this Standard has received the approval of the National Associations and the Official Services of the member countries of ASD, prior to its presentation to CEN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2012, and conflicting national standards shall be withdrawn at the latest by September 2012.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN [and/or CENELEC] shall not be held responsible for identifying any or all such patent rights.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey and the United Kingdom.

1 Scope and field of application

This standard defines the characteristics of axial mounting external retaining rings, in steel, vacuum cadmium plated, for aerospace applications.

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.

EN 2424, *Aerospace series — Marking of aerospace products*

EN 2535, *Aerospace series — Vacuum deposition of cadmium*

EN 3380, *Aerospace series — Rings retaining — Technical specification*

EN 3426, *Aerospace series — Groove dimensions for axial mounting external type retaining rings*

3 Required characteristics

3.1 Configuration — Dimensions — Masses

See figure 1 and table.

3.2 Materials

Spring steel:

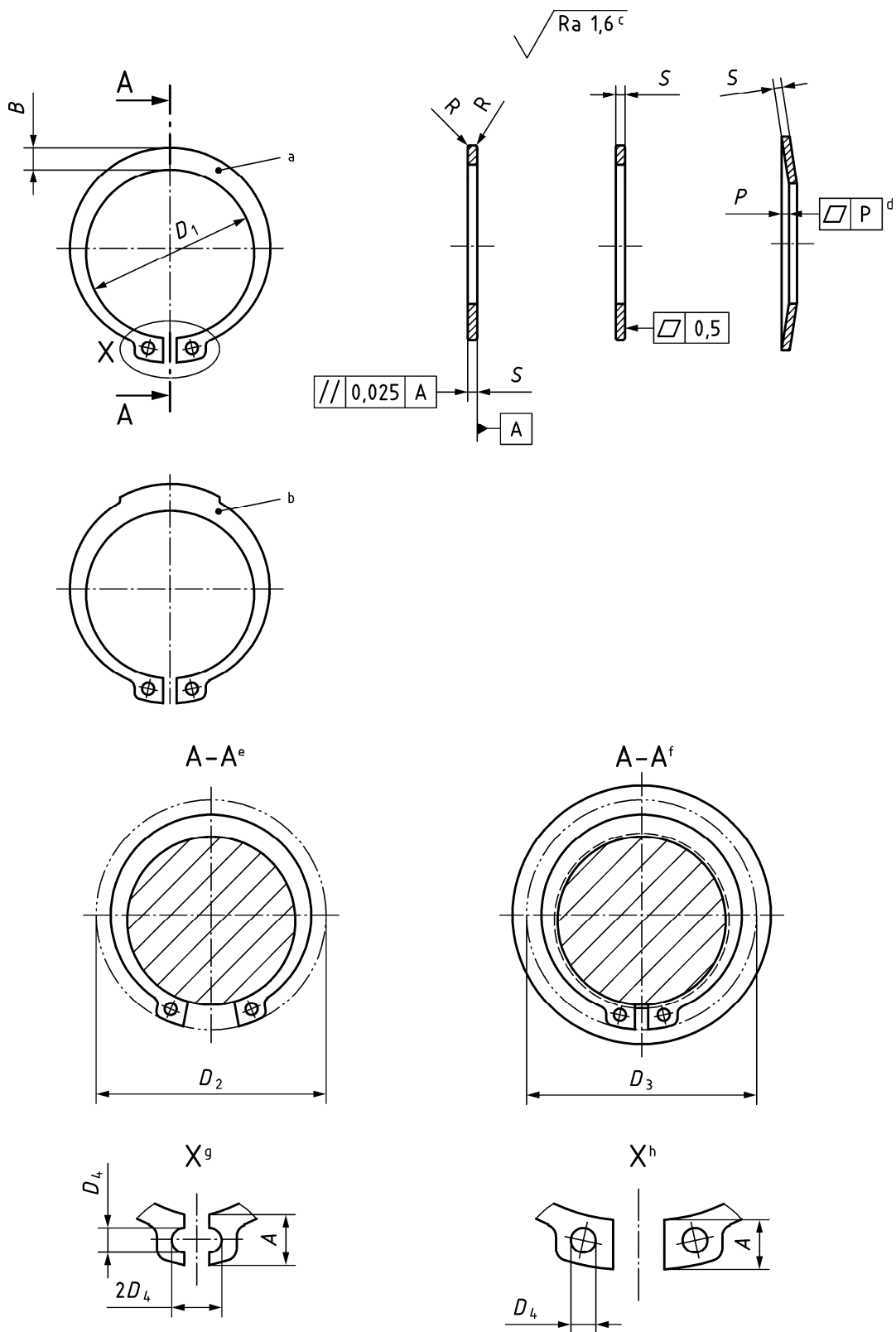
— 480–530 HV (Diameter codes 008 to 038)

— 440–510 HV (Diameter codes 040 to 165)

3.3 Surface treatment

EN 2535, 5 µm to 9 µm, on all surfaces which can be contacted by a 20 mm ball. On all other surfaces a continuous deposit shall be present, but no value is specified.

NOTE Details of form not stated are left to the manufacturer's option.



Key:

- a Free
- b Alternative configuration for size 40 mm to 165 mm
- c Value in Micrometres, apply prior to cadmium plating
- d Table

- e At mounting
- f Installed
- g Diameter codes 003 to 009
- h Diameter codes 010 to 165

Figure 1

Table 1

Dimensions in millimetres

| Diameter code ^b | <i>A</i> | <i>B</i> ^c | <i>D</i> ₁ | | <i>D</i> ₂ | <i>D</i> ₃ | <i>D</i> ₄ | <i>P</i> | <i>S</i> | <i>R</i> | Mass ^d kg/1 000 pieces | | | |
|----------------------------|----------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|----------|----------|----------|--------------------------------------|--------|------|-------|
| | max. | ≈ | nom. | Tol. | max. | max. | min. | | | | | | | |
| 003 | 1,9 | 0,8 | 2,7 | +0,06 -0,12 | 7,2 | 6,6 | 0,8 | 0,1 | 0,4 | 0,04 | 0,017 | | | |
| 004 | 2,2 | 0,9 | 3,7 | +0,07 -0,15 | 8,8 | 8,2 | 1 | | | | 0,022 | | | |
| 005 | 2,5 | 1,1 | 4,7 | | 10,7 | 9,8 | | | 1,15 | 0,066 | | | | |
| 006 | 2,7 | 1,3 | 5,6 | | 12,2 | 11,1 | 0,084 | | | | | | | |
| 007 | 3,1 | 1,4 | 6,5 | +0,09 -0,18 | 13,8 | 12,9 | 1,2 | | 0,8 | 0,08 | 0,121 | | | |
| 008 | 3,2 | 1,5 | 7,4 | | 15,2 | 14 | | | | | 0,158 | | | |
| 009 | 3,3 | 1,7 | 8,4 | | 16,4 | 15,2 | 0,300 | | | | | | | |
| 010 | 3,3 | 1,8 | 9,3 | +0,15 -0,3 | 17,6 | 16,2 | 1,5 | | 1 | 0,1 | 0,340 | | | |
| 011 | 3,3 | 1,8 | 10,2 | +0,18 -0,36 | 18,6 | 17,1 | 1,7 | | | | 0,410 | | | |
| 012 | 3,3 | 1,8 | 11 | | 19,6 | 18,1 | | | | | 0,500 | | | |
| 013 | 3,4 | 2 | 11,9 | | 20,8 | 19,2 | | | | | 0,530 | | | |
| 014 | 3,5 | 2,1 | 12,9 | | 22 | 20,4 | | | | | 0,640 | | | |
| 015 | 3,6 | 2,2 | 13,8 | | 23,2 | 21,5 | | | | | 0,670 | | | |
| 016 | 3,7 | 2,2 | 14,7 | | 24,4 | 22,6 | | | | | 0,700 | | | |
| 017 | 3,8 | 2,3 | 15,7 | | 25,6 | 23,8 | | | | | 0,820 | | | |
| 018 | 3,9 | 2,4 | 16,5 | | 26,8 | 24,8 | | | | | 2 | 1,2 | 0,12 | 1,110 |
| 019 | 3,9 | 2,5 | 17,5 | | 27,8 | 25,8 | | | | | | | | 1,220 |
| 020 | 4 | 2,6 | 18,5 | | 29 | 27 | | | 1,300 | | | | | |
| 021 | 4,1 | 2,7 | 19,5 | 30,2 | 28,2 | 1,420 | | | | | | | | |
| 022 | 4,2 | 2,8 | 20,5 | 31,4 | 29,4 | 1,500 | | | | | | | | |
| 024 | 4,4 | 3 | 22,2 | 33,8 | 31,7 | 1,770 | | | | | | | | |
| 025 | 4,4 | 3 | 23,2 | 34,8 | 32,7 | 1,900 | | | | | | | | |
| 026 | 4,5 | 3,1 | 24,2 | 36 | 33,9 | 1,960 | | | | | | | | |
| 028 | 4,7 | 3,2 | 25,9 | 38,4 | 36 | 0,15 | 1,5 | 0,15 | 2,920 | | | | | |
| 029 | 4,8 | 3,4 | 26,9 | 39,6 | 37,2 | | | | 3,200 | | | | | |
| 030 | 5 | 3,5 | 27,9 | 41 | 38,6 | | | | 3,320 | | | | | |
| 032 | 5,2 | 3,6 | 29,6 | 43,4 | 40,7 | | | | 3,540 | | | | | |
| 034 | 5,4 | 3,8 | 31,5 | 45,8 | 43,1 | | | | 3,800 | | | | | |
| 035 | 5,6 | 3,9 | 32,2 | 47,2 | 44,2 | | | | 4,000 | | | | | |
| 036 | 5,6 | 4 | 33,2 | 48,2 | 45,2 | | | | 0,17 | 1,75 | 0,17 | 5,000 | | |
| 038 | 5,8 | 4,2 | 35,2 | 50,6 | 47,6 | | | | | | | 5,620 | | |
| 040 | 6 | 4,4 | 36,5 | 53 | 49,5 | | | | | | | 6,030 | | |
| 042 | 6,5 | 4,5 | 38,5 | 56 | 52,5 | | | | | | | 6,500 | | |
| 045 | 6,7 | 4,7 | 41,5 | 59,4 | 55,9 | 7,500 | | | | | | | | |
| 048 | 6,9 | 5 | 44,5 | 62,8 | 59,3 | 7,900 | | | | | | | | |
| 050 | 6,9 | 5,1 | 45,8 | 64,8 | 60,8 | 0,2 | 2 | 0,2 | | | | 10,200 | | |
| 052 | 7 | 5,2 | 47,8 | 67 | 63 | | | | | | | 11,100 | | |
| 055 | 7,2 | 5,4 | 50,8 | 70,4 | 66,4 | | | | | | | 11,400 | | |
| 056 | 7,3 | 5,5 | 51,8 | 71,6 | 67,6 | | | | | | | 11,800 | | |
| 058 | 7,3 | 5,6 | 53,8 | 73,6 | 69,6 | | | | 12,600 | | | | | |
| 060 | 7,4 | 5,8 | 55,8 | 75,8 | 71,8 | | | | 12,900 | | | | | |
| 062 | 7,5 | 6 | 57,8 | 78 | 74 | | | | 14,300 | | | | | |
| 063 | 7,6 | 6,2 | 58,8 | 79,2 | 75,2 | | | | 15,900 | | | | | |
| 065 | 7,8 | 6,3 | 60,8 | 81,6 | 77,6 | | | | 0,25 | 2,5 | 0,25 | 18,200 | | |
| 068 | 8 | 6,5 | 63,5 | 85 | 81 | | | | | | | 21,800 | | |
| 070 | 8,1 | 6,6 | 65,5 | 87,2 | 83,2 | 22,000 | | | | | | | | |
| 072 | 8,2 | 6,8 | 67,5 | 89,4 | 85,4 | 22,500 | | | | | | | | |
| 075 | 8,4 | 7 | 70,5 | 92,8 | 88,8 | 24,600 | | | | | | | | |
| 077 | 8,5 | 7,2 | 72,5 | 95 | 91 | 25,700 | | | | | | | | |

^a See page 7.

^b See page 7.

^c See page 7.

^d See page 7.

Table 1 (concluded)

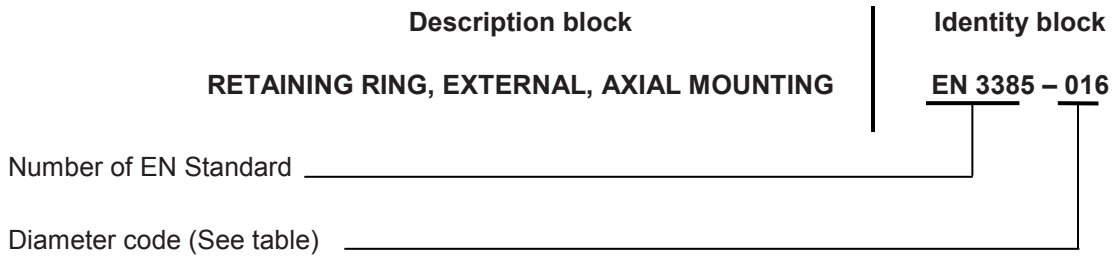
Dimensions in millimetres

| Diameter code ^b | <i>A</i> | <i>B</i> ^c | <i>D</i> ₁ | | <i>D</i> ₂ | <i>D</i> ₃ | <i>D</i> ₄ | <i>P</i> | <i>S</i> | <i>R</i> | Mass ^d kg/1 000 pieces |
|----------------------------|----------|-----------------------|-----------------------|----------------|-----------------------|-----------------------|-----------------------|----------|----------|----------|--------------------------------------|
| | max. | ≈ | nom. | Tol. | max. | max. | min. | | h11 | max. | |
| 078 | 8,6 | 7,3 | 73,5 | +0,46 -0,92 | 96,2 | 92,2 | 3 | 0,2 | 2,5 | 0,25 | 26,200 |
| 080 | 8,6 | 7,4 | 74,5 | | 98,2 | 93,7 | | | | | 27,300 |
| 082 | 8,7 | 7,6 | 76,5 | | 101 | 95,9 | | | | | 31,200 |
| 085 | 8,7 | 7,8 | 79,5 | +0,54 -1,08 | 104 | 98,9 | 3,5 | 0,25 | 3 | 0,3 | 36,400 |
| 087 | 8,8 | 7,9 | 81,5 | | 106 | 101,1 | | | | | 39,800 |
| 088 | 8,8 | 8 | 82,5 | | 107 | 102,1 | | | | | 41,200 |
| 090 | 8,8 | 8,2 | 84,5 | | 109 | 104,1 | | | | | 44,500 |
| 092 | 9 | 8,4 | 86,5 | | 111 | 106,5 | | | | | 46,000 |
| 095 | 9,4 | 8,6 | 89,5 | | 115 | 110,3 | | | | | 49,000 |
| 097 | 9,4 | 8,8 | 91,5 | | 117 | 112,3 | | | | | 50,200 |
| 098 | 9,5 | 9 | 92,5 | | 119 | 113,5 | | | | | 51,800 |
| 100 | 9,6 | 9 | 94,5 | | 121 | 115,7 | | | | | 53,700 |
| 102 | 9,7 | 9,2 | 95 | | 123 | 117,4 | | | | | 78,000 |
| 105 | 9,9 | 9,3 | 98 | | 126 | 120,8 | | | | | 80,000 |
| 107 | 10 | 9,5 | 100 | | 129 | 123 | | | | | 81,000 |
| 108 | 10 | 9,5 | 101 | | 130 | 124 | | | | | 81,500 |
| 110 | 10,1 | 9,6 | 103 | | 132 | 126,2 | | | | | 82,000 |
| 112 | 10,3 | 9,7 | 105 | | 134 | 128,6 | | | | | 83,000 |
| 115 | 10,6 | 9,8 | 108 | | 138 | 132,2 | | | | | 84,000 |
| 117 | 10,8 | 10 | 110 | | 140 | 134,6 | | | | | 85,000 |
| 118 | 10,9 | 10,1 | 111 | 141 | 135,8 | 85,500 | | | | | |
| 120 | 11 | 10,2 | 113 | 143 | 138 | 86,000 | | | | | |
| 122 | 11,2 | 10,3 | 115 | 146 | 140,4 | 88,000 | | | | | |
| 125 | 11,4 | 10,4 | 118 | 149 | 143,8 | 90,000 | | | | | |
| 127 | 11,4 | 10,5 | 120 | +0,63 -1,26 | 151 | 145,8 | 4 | 0,25 | 4 | 0,4 | 95,000 |
| 128 | 11,5 | 10,5 | 121 | | 152 | 147 | | | | | 98,000 |
| 130 | 11,6 | 10,7 | 123 | | 155 | 149,2 | | | | | 100,000 |
| 132 | 11,7 | 10,8 | 125 | | 157 | 151,4 | | | | | 103,000 |
| 135 | 11,8 | 11 | 128 | | 160 | 154,6 | | | | | 104,000 |
| 137 | 11,9 | 11 | 130 | | 162 | 156,8 | | | | | 107,000 |
| 138 | 11,9 | 11,1 | 131 | | 163 | 157,8 | | | | | 108,000 |
| 140 | 12 | 11,2 | 133 | | 165 | 160 | | | | | 110,000 |
| 142 | 12,1 | 11,3 | 135 | | 168 | 162,2 | | | | | 112,000 |
| 145 | 12,2 | 11,5 | 138 | | 171 | 165,4 | | | | | 115,000 |
| 147 | 12,3 | 11,6 | 140 | | 173 | 167,6 | | | | | 116,000 |
| 148 | 12,4 | 11,7 | 141 | | 174 | 168,8 | | | | | 118,000 |
| 150 | 13 | 11,8 | 142 | | 177 | 171 | | | | | 120,000 |
| 152 | 13 | 11,9 | 143 | | 178 | 173 | | | | | 128,000 |
| 155 | 13 | 12 | 146 | | 182 | 176 | | | | | 135,000 |
| 157 | 13,1 | 12 | 148 | | 183,2 | 178,2 | | | | | 140,000 |
| 158 | 13,1 | 12,1 | 149 | | 184,2 | 179,2 | | | | | 145,000 |
| 160 | 13,3 | 12,2 | 151 | 188 | 181,6 | 150,000 | | | | | |
| 162 | 13,3 | 12,3 | 152,5 | 188,6 | 183,6 | 155,000 | | | | | |
| 165 | 13,5 | 12,5 | 155,5 | 193 | 187 | 160,000 | | | | | |

- a Values apply after cadmium plating.
b Corresponds to the nominal diameter (expressed in millimetres) of the shaft on which the ring shall be mounted (see EN 3426).
c Shall not exceed "A" max.
d Approximate values, calculated on the basis of 7,85 kg/dm³, given for information purpose only.

4 Designation

EXAMPLE



NOTE If necessary, the originator code I9005 shall be placed between the description block and the identity block.

5 Marking

EN 2424, style G.

6 Technical specification

EN 3380

7 Mounting

EN 3426

British Standards Institution (BSI)

BSI is the national body responsible for preparing British Standards and other standards-related publications, information and services.

BSI is incorporated by Royal Charter. British Standards and other standardization products are published by BSI Standards Limited.

About us

We bring together business, industry, government, consumers, innovators and others to shape their combined experience and expertise into standards-based solutions.

The knowledge embodied in our standards has been carefully assembled in a dependable format and refined through our open consultation process. Organizations of all sizes and across all sectors choose standards to help them achieve their goals.

Information on standards

We can provide you with the knowledge that your organization needs to succeed. Find out more about British Standards by visiting our website at bsigroup.com/standards or contacting our Customer Services team or Knowledge Centre.

Buying standards

You can buy and download PDF versions of BSI publications, including British and adopted European and international standards, through our website at bsigroup.com/shop, where hard copies can also be purchased.

If you need international and foreign standards from other Standards Development Organizations, hard copies can be ordered from our Customer Services team.

Subscriptions

Our range of subscription services are designed to make using standards easier for you. For further information on our subscription products go to bsigroup.com/subscriptions.

With **British Standards Online (BSOL)** you'll have instant access to over 55,000 British and adopted European and international standards from your desktop. It's available 24/7 and is refreshed daily so you'll always be up to date.

You can keep in touch with standards developments and receive substantial discounts on the purchase price of standards, both in single copy and subscription format, by becoming a **BSI Subscribing Member**.

PLUS is an updating service exclusive to BSI Subscribing Members. You will automatically receive the latest hard copy of your standards when they're revised or replaced.

To find out more about becoming a BSI Subscribing Member and the benefits of membership, please visit bsigroup.com/shop.

With a **Multi-User Network Licence (MUNL)** you are able to host standards publications on your intranet. Licences can cover as few or as many users as you wish. With updates supplied as soon as they're available, you can be sure your documentation is current. For further information, email bsmusales@bsigroup.com.

Revisions

Our British Standards and other publications are updated by amendment or revision.

We continually improve the quality of our products and services to benefit your business. If you find an inaccuracy or ambiguity within a British Standard or other BSI publication please inform the Knowledge Centre.

Copyright

All the data, software and documentation set out in all British Standards and other BSI publications are the property of and copyrighted by BSI, or some person or entity that owns copyright in the information used (such as the international standardization bodies) and has formally licensed such information to BSI for commercial publication and use. Except as permitted under the Copyright, Designs and Patents Act 1988 no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means – electronic, photocopying, recording or otherwise – without prior written permission from BSI. Details and advice can be obtained from the Copyright & Licensing Department.

Useful Contacts:

Customer Services

Tel: +44 845 086 9001

Email (orders): orders@bsigroup.com

Email (enquiries): cservices@bsigroup.com

Subscriptions

Tel: +44 845 086 9001

Email: subscriptions@bsigroup.com

Knowledge Centre

Tel: +44 20 8996 7004

Email: knowledgecentre@bsigroup.com

Copyright & Licensing

Tel: +44 20 8996 7070

Email: copyright@bsigroup.com

BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK



...making excellence a habit.™