BS ISO 3353-1:2020

BSI Standards Publication

Aerospace — Lead and runout threads

Part 1: Rolled external threads

bsi.

National foreword

This British Standard is the UK implementation of ISO 3353-1:2020. Together with BS ISO 3353-2:2020, it supersedes BS 2A 231:1993, which is withdrawn.

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 committee manager.

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Published by BSI Standards Limited 2020

ISBN 978 0 539 06941 9

ICS 49.030.10

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This British Standard was published under the authority of the Standards Policy and Strategy Committee on 31 December 2020.

Amendments/corrigenda issued since publication

Date	Text affected

BS ISO 3353-1:2020

INTERNATIONAL STANDARD

ISO 3353-1

Second edition
2020-12-16

Aerospace — Lead and runout threads —

Part 1: Rolled external threads

Aéronautique et espace — Filets incomplets, débuts et fins de filets —

Partie 1: Filetages extérieurs roulés

Reference number
ISO 3353-1:2020(E)

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Ch. de Blandonnet 8 • CP 401
CH-1214 Vernier, Geneva, Switzerland
Tel. +41 22 749 01 11
Fax +41 22 749 09 47
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Foreword

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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).

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For an explanation of the voluntary nature of standards, 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 www.iso.org/iso/foreword.html.

This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles* Subcommittee SC 4, *Aerospace fastener systems*.

This second edition cancels and replaces the first edition (ISO 3353-1:2002), of which it constitutes a minor revision.

The main changes compared to the previous edition are as follows:

— update of the term “lead threads”;

— editorially revised.

A list of all parts in the ISO 3353 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user’s national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

INTERNATIONAL STANDARD ISO 3353-1:2020

Aerospace — Lead and runout threads —

Part 1: Rolled external threads

1 Scope

This document specifies the lead and runout requirements for rolled external threads for aerospace construction, and the inspection method to be used in case of dispute.

It is applicable whenever it is referenced in a definition document.

2 Normative references

There are no normative references in this document.

3 Terms and definitions

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

ISO and IEC maintain terminological databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

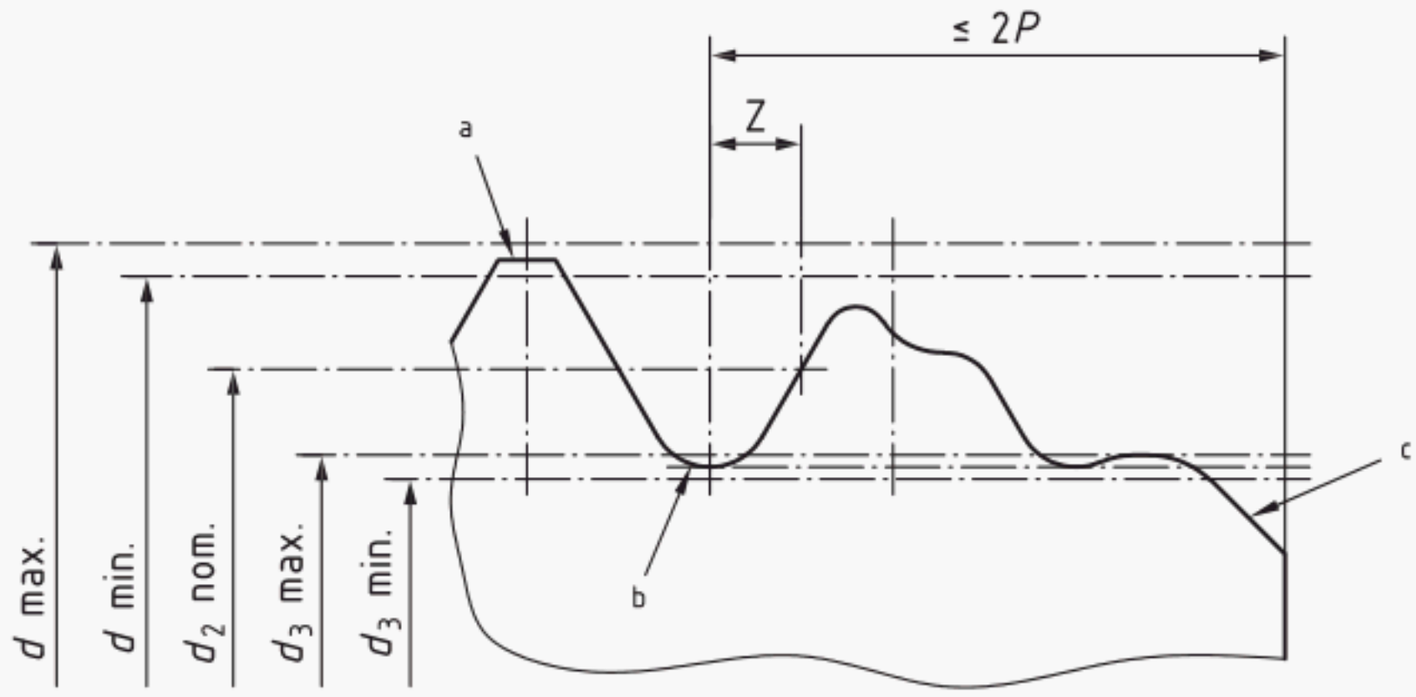
— IEC Electropedia: available at http://www.electropedia.org/

3.1
lead thread
portion of the incomplete thread that is fully formed at the root but not at the crest which occurs at the beginning end of either external or internal threads

3.2
runout thread
part of the screw thread in which is located the thread incompletely formed during rolling, between the completely formed threads and the part which has not been rolled

3.3
completely formed thread
thread, the profile of which (ABC) is located, over an axial distance of 1*P*, within the limits specified in the definition document for the thread

Note 1 to entry: See Figure 1.



Over the area Z, the thread shall lie within the limits specified in the definition document for the thread.

a Crest of first completely formed thread.

b Root of first completely formed thread.

c Chamfer.

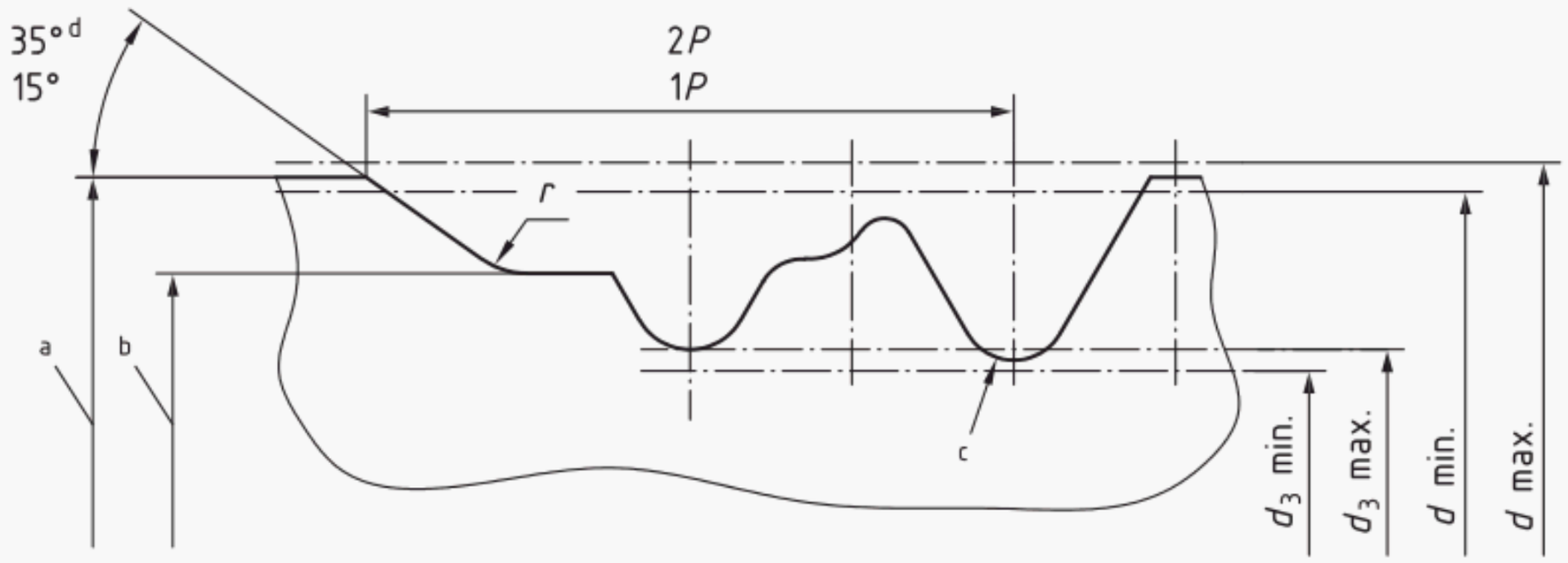
Figure 2 — Lead threads

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 10.

5.3 Runout threads

5.3.1 Normal shank

See Figure 3 and Figure 4.



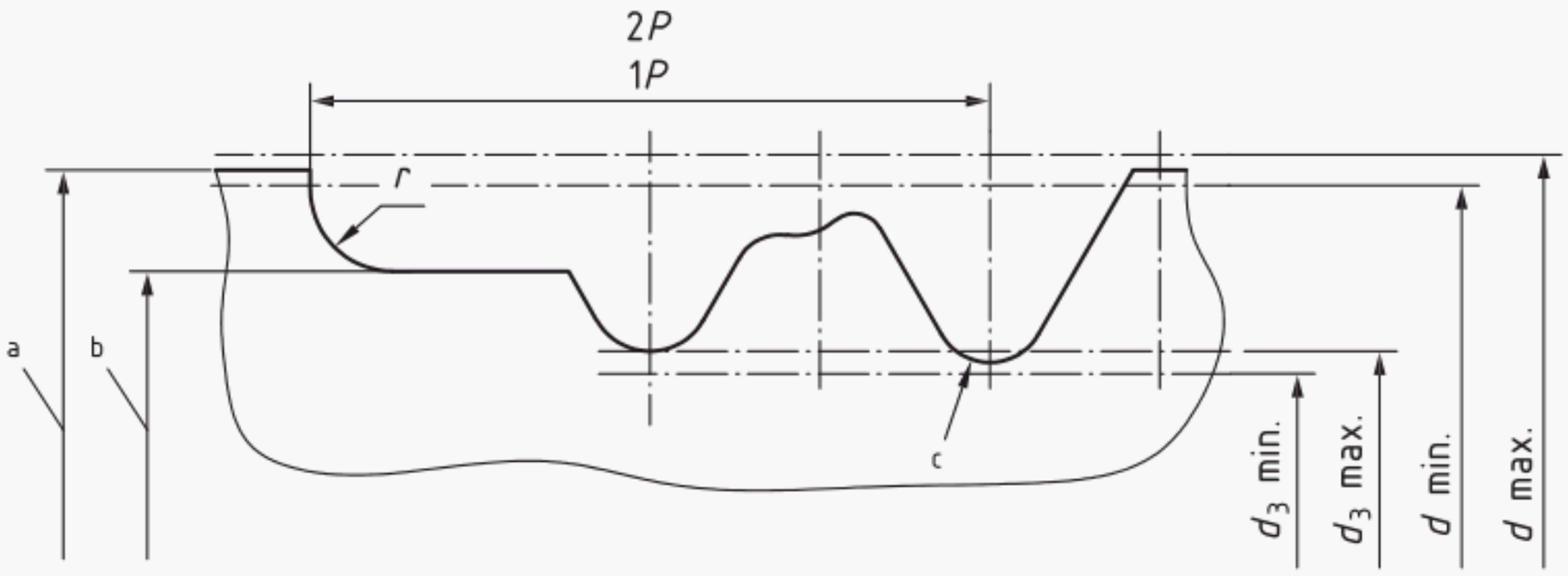
a Shank diameter having a nominal value equal to the nominal diameter of the thread = δ.

b Blank diameter.

c Root of last completely formed thread.

d Angle before rolling. The shape is optional within these limits.

Figure 3 — Normal shank



a Shank diameter having a nominal value equal to the nominal diameter of the thread = δ.

b Blank diameter.

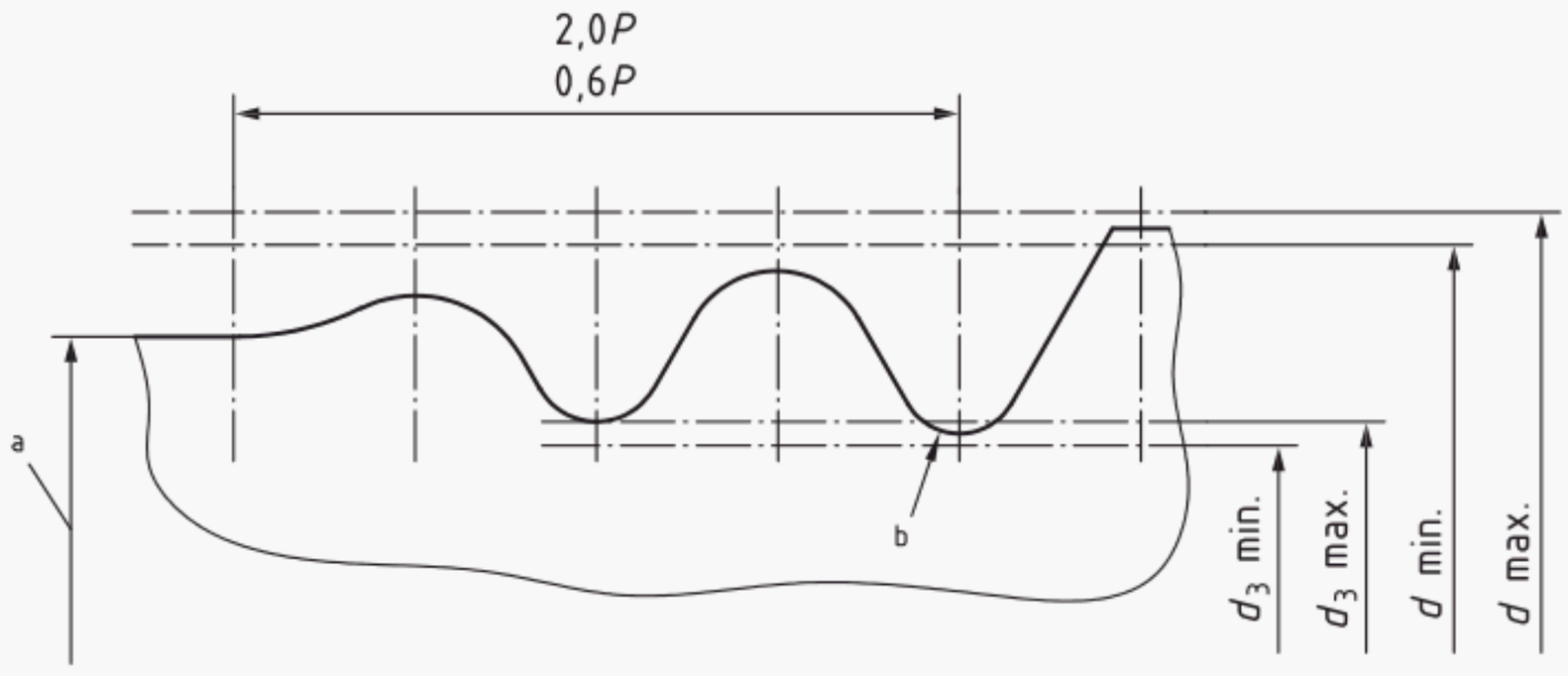
c Root of last completely formed thread.

Figure 4 — Normal shank

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 11.

5.3.2 Pitch diameter shank

See Figure 5.



a Shank diameter having a nominal value equal to the maximum pitch diameter = δ.

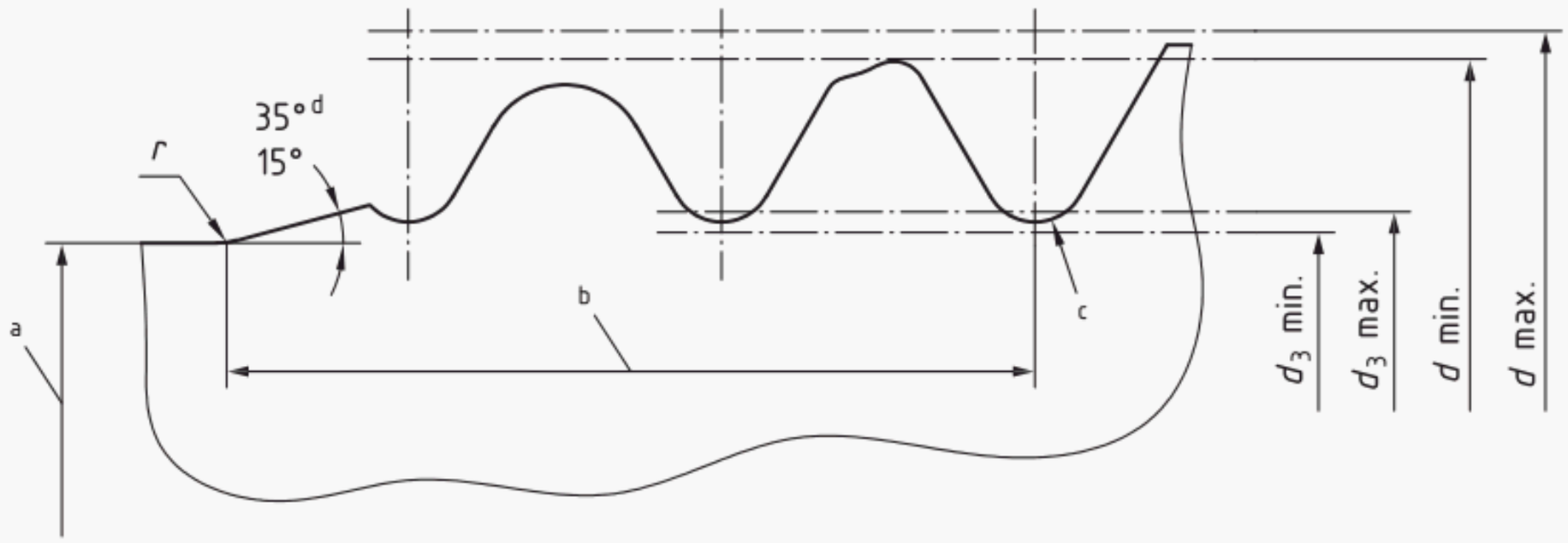
b Root of last completely formed thread.

Figure 5 — Pitch diameter shank

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

5.3.3 Stepped shank

See Figure 6.



a Diameter of stepped shank, having a nominal value equal to d_3 min. − 0,1 mm = δ.

b $\left[1P+\frac{(d\,\text{max.}-\delta\,\text{nom.})}{2\tan 35°}\right]$ to $\left[2P+\frac{(d\,\text{max.}-\delta\,\text{nom.})}{2\tan 15°}\right]$.

c Root of last completely formed thread.

d Angle before rolling. The shape is optional within these limits.

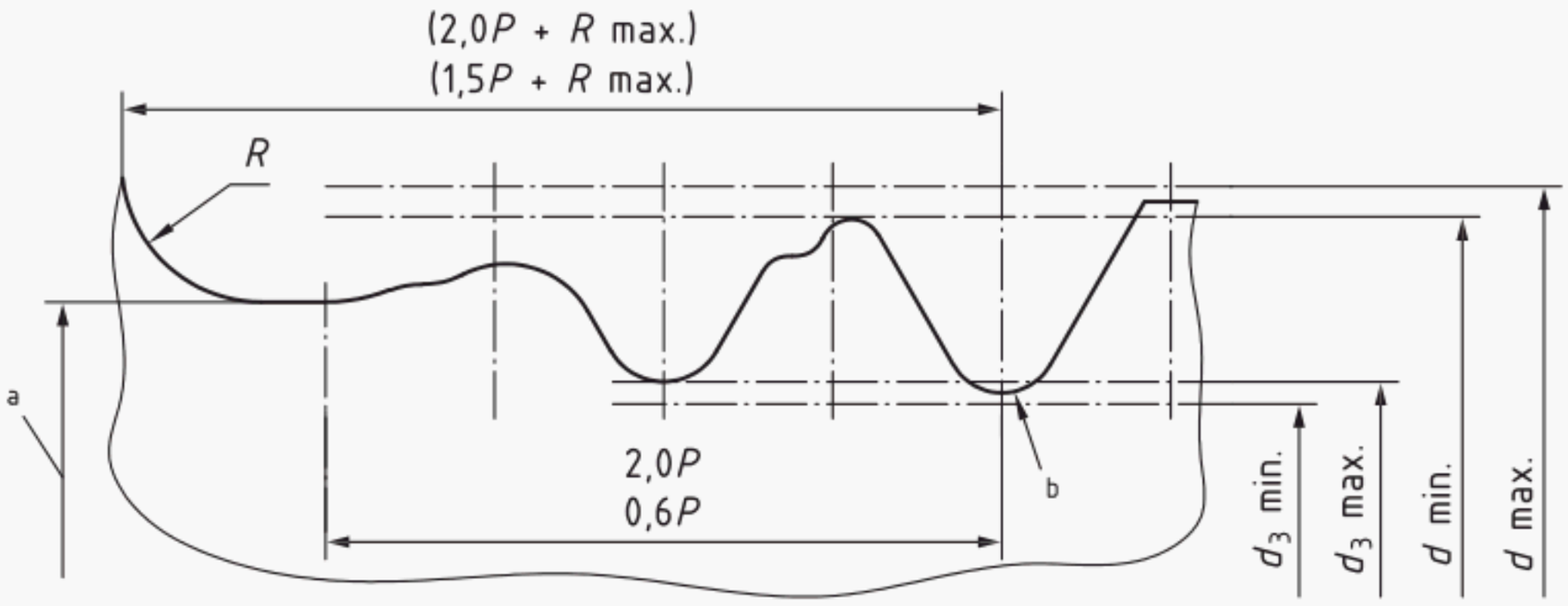
Figure 6 — Stepped shank

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 13.

5.3.4 Screws threaded to the head and bolts threaded to a shoulder

5.3.4.1 Protruding head

See Figure 7.



The beginning of the first thread shall not encroach on the radius R.

a Blank diameter.

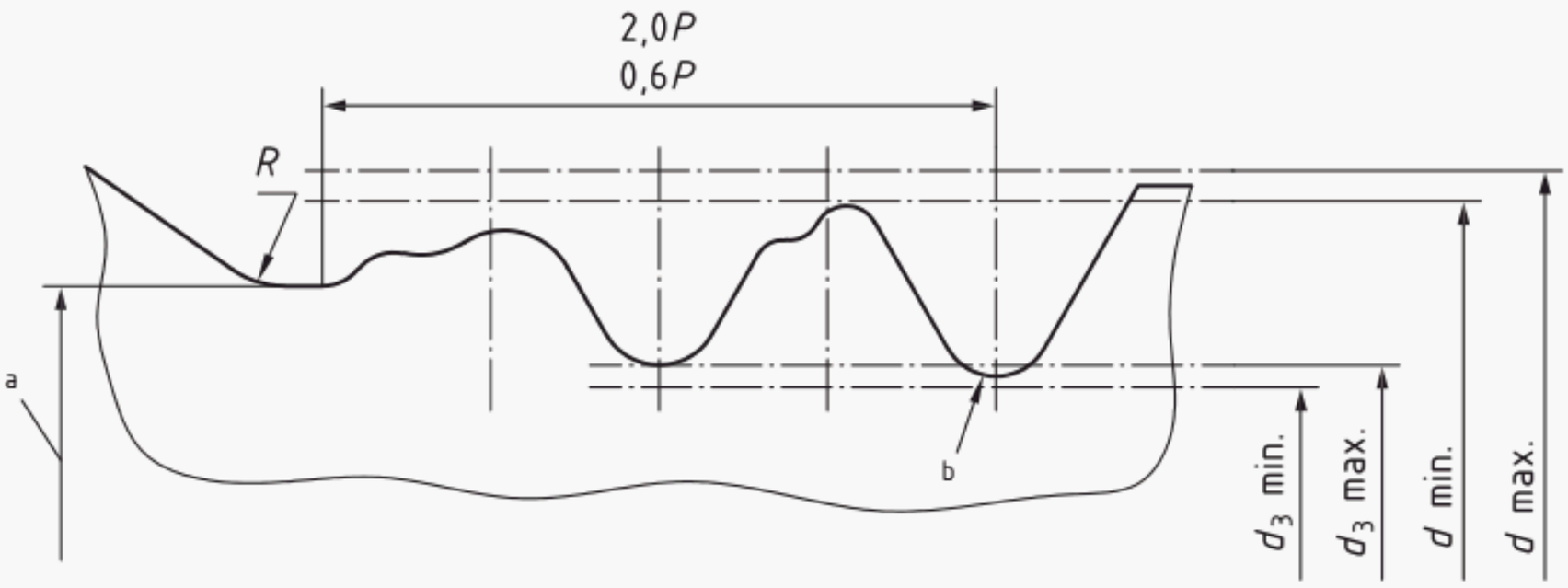
b Root of last completely formed thread.

Figure 7 — Protruding head

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

5.3.4.2 Flush head

See Figure 8.



The beginning of the first thread shall not encroach on the radius *R*.

a Blank diameter.

b Root of last completely formed thread.

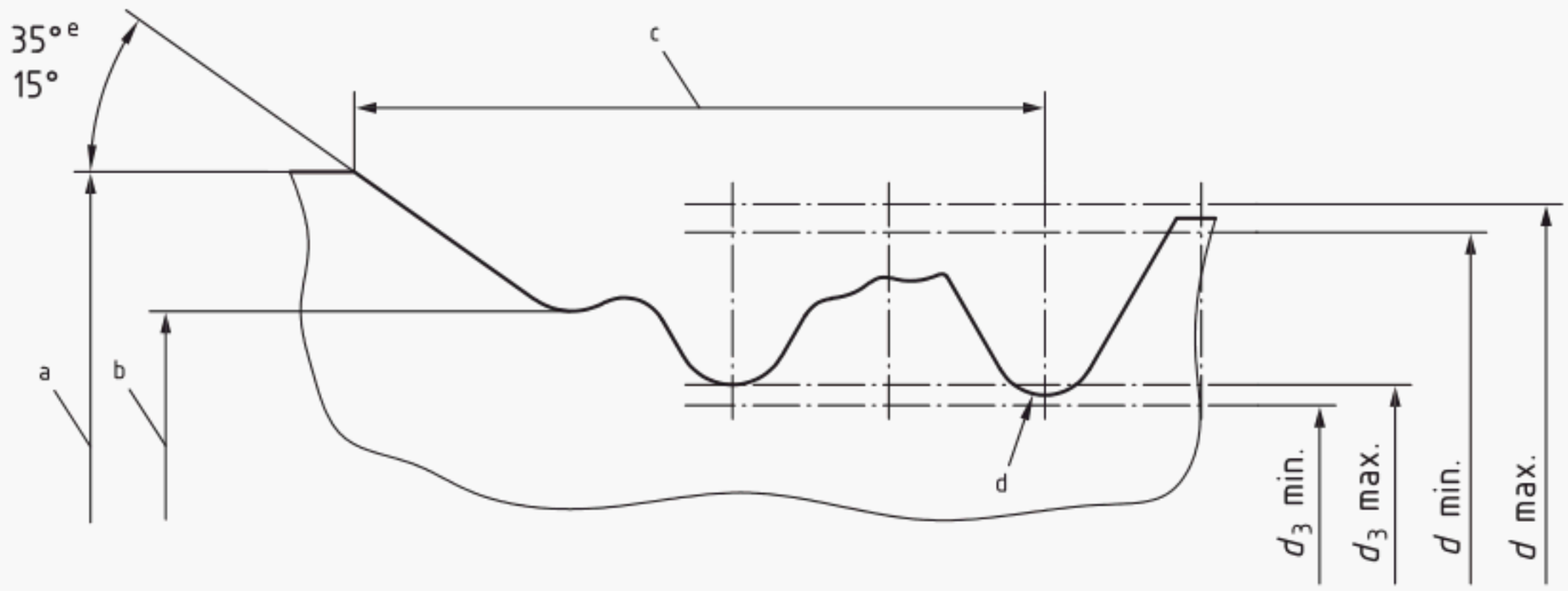
Figure 8 — Flush head

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.

5.3.5 Oversized bolts

EXAMPLE Bolts for repairs.

See Figure 9.



a Diameter of oversized shank = δ.

b Blank diameter.

c $\left[1P+\frac{(\delta \text{ nom.}-\text{d max.})}{2\tan 35°}\right]$ to $\left[2P+\frac{(\delta \text{ nom.}-\text{d max.})}{2\tan 15°}\right]$.

d Root of last completely formed thread.

e Angle before rolling. The shape is optional within these limits.

Figure 9 — Oversized bolts

The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 14.

6 Inspection method

6.1 General

The method is left to the discretion of the manufacturer, provided that it ensures conformity with the requirements given in Clause 5.

In case of dispute, the method by optical projection, defined hereafter, shall be used. See comments in Annex A.

6.2 Use of the charts

The charts shall be used in conjunction with a profile projection comparator having a magnifying power equal to or greater than ×20.

6.3 Procedure

6.3.1 For lead threads

The inspection shall be carried out using a chart drawn in accordance with Figure 10.

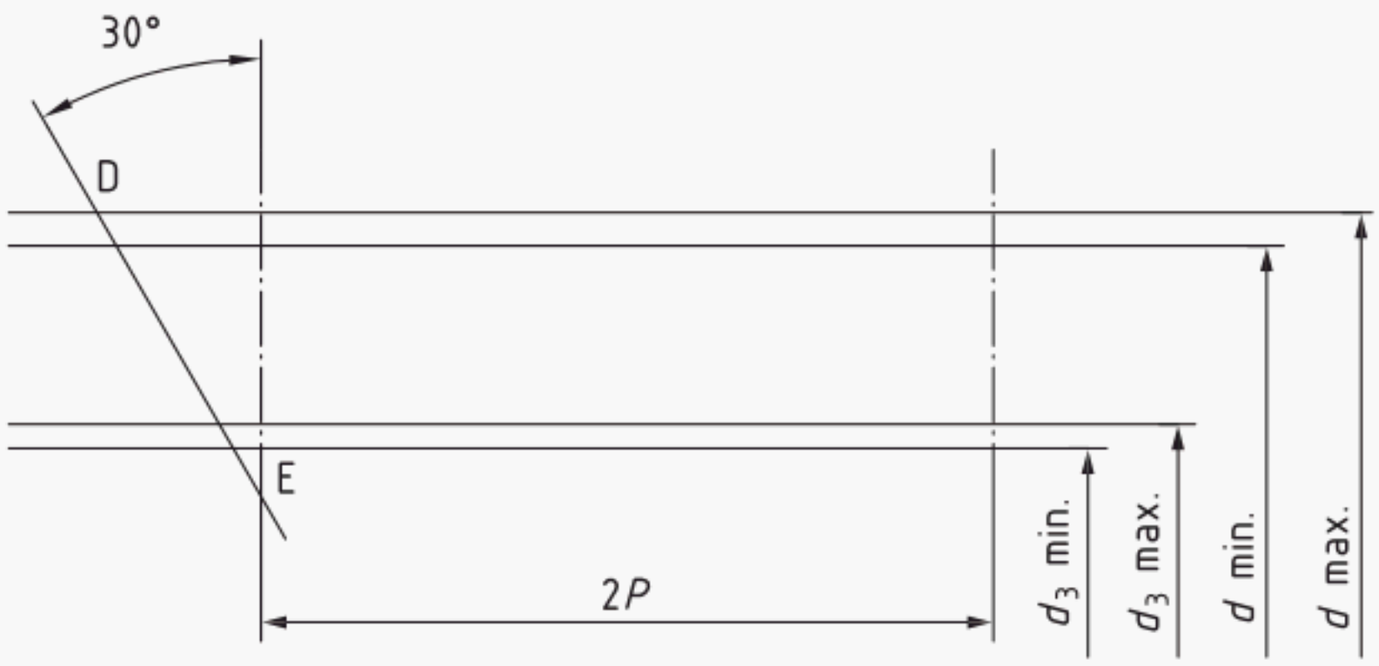


Figure 10 — Lead threads

Rotate the bolt to find the first complete thread (see Figure 1) nearest to the end of the shank which has the thread crest and root not extending beyond the limits defined by the horizontal lines.

Then move the bolt horizontally until the right flank of the above thread coincides with line DE.

6.3.2 For runout threads

The inspection shall be carried out using a chart drawn in accordance with Figure 11 to Figure 14.

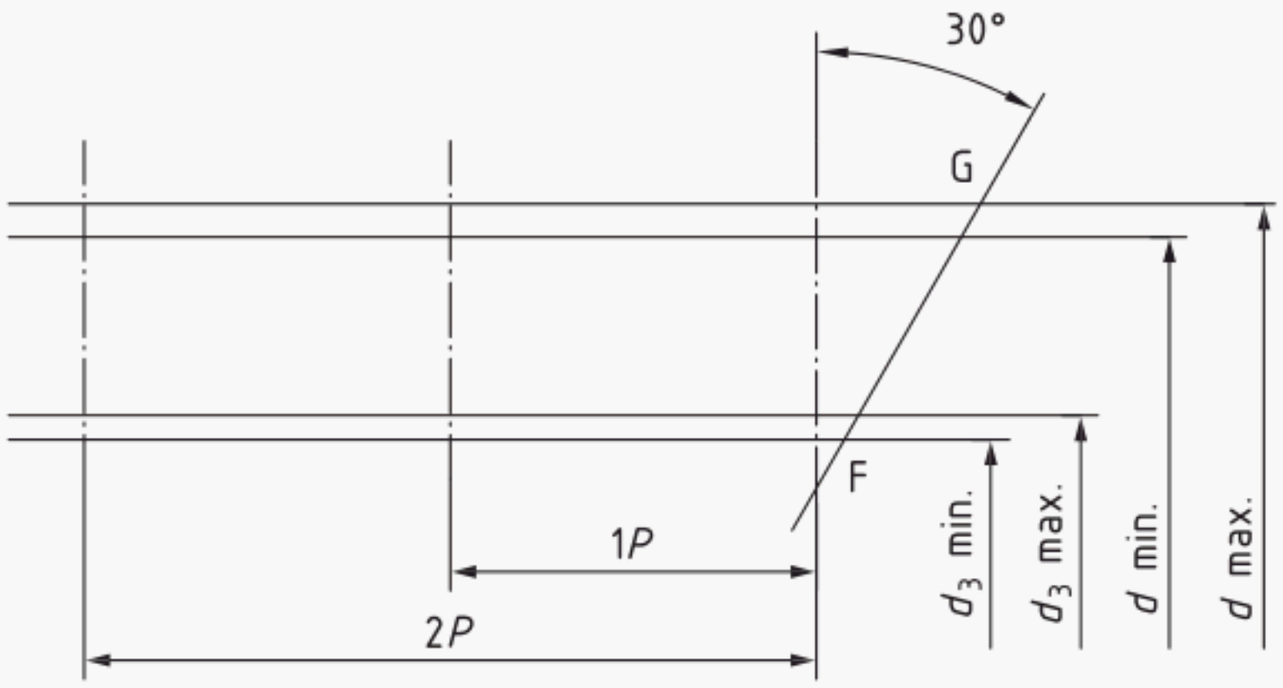


Figure 11 — Runout threads

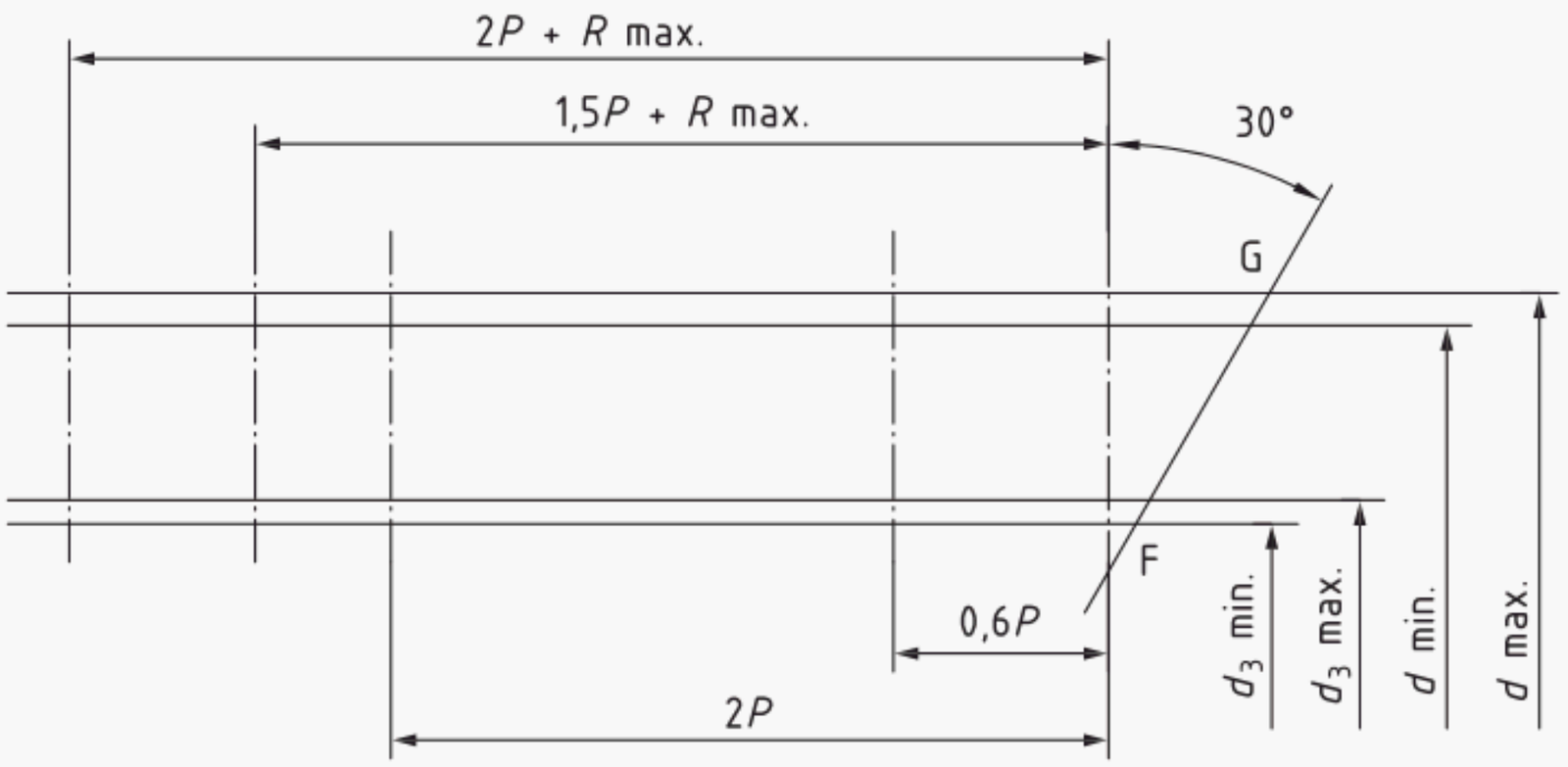
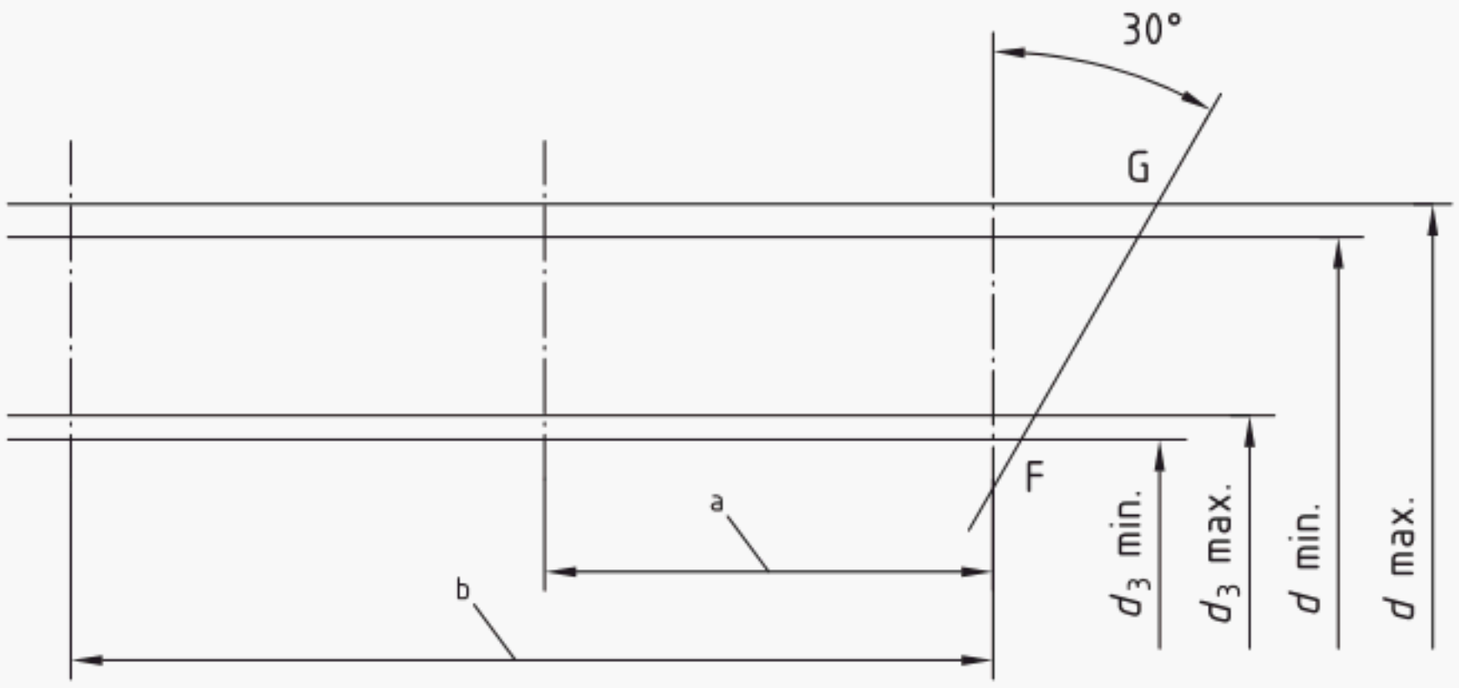


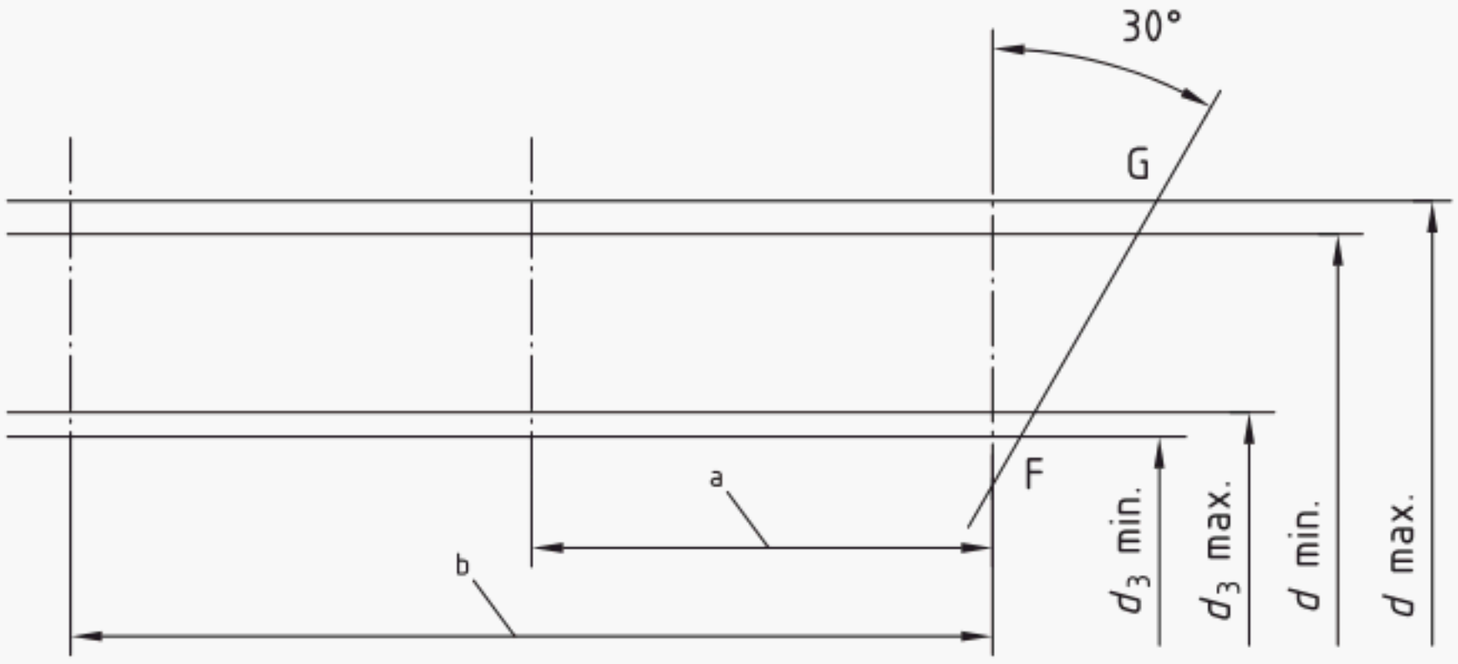
Figure 12 — Runout threads



a $\left[1P+\frac{(d\,\text{max.}-\delta\,\text{nom.})}{2\tan 35°}\right]$.

b $\left[2P+\frac{(d\,\text{max.}-\delta\,\text{nom.})}{2\tan 15°}\right]$.

Figure 13 — Runout threads



a $\left[1P+\frac{(\delta\ \text{nom.}-d\ \text{max.})}{2\tan 35°}\right]$.

b $\left[2P+\frac{(\delta\ \text{nom.}-d\ \text{max.})}{2\tan 15°}\right]$.

Figure 14 — Runout threads

Rotate the bolt to find the last complete thread (see Figure 1) nearest to the plain shank of the bolt which has the thread crest and root not extending beyond the limits defined by the horizontal lines.

Then move the bolt horizontally until the left flank of the above thread coincides with line FG.

Annex A
(informative)

Comments on inspection method

Assembling the bolt to be checked with a GO screw ring gauge, without entering chamfer, is the preferred method for checking lead and runout threads and produces consistent results.

Alternatively, the profile projection comparator method, while theoretically more accurate, takes considerably longer and depends on the skill of the operator.

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BSI Group Headquarters

389 Chiswick High Road London W4 4AL UK