

# Rolled threads for bolts — Lead and runout requirements

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# Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Aerospace Standards Policy Committee (ACE/-) to Technical Committee ACE/12, upon which the following bodies were represented:

The Association of Electronics, Telecommunications and Business Equipment Industries

British Industrial Fasteners Federation

Ministry of Defence

Society of British Aerospace Companies Ltd.

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## National foreword

This British Standard has been prepared under the direction of the Aerospace Standards Policy Committee. It is identical with ISO 3353:1992 *Aerospace — Rolled threads for bolts — Lead and runout requirements* published by the International Organization for Standardization (ISO). It supersedes BS A 231:1982 which is withdrawn.

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### Summary of pages

This document comprises a front cover, an inside front cover, pages i and ii, pages 1 to 8 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

## 1 Scope

This International Standard specifies the lead and runout requirements for rolled threads for bolts, and the inspection method to be used in case of dispute.

It is also applicable to other threaded male parts, used in aerospace construction, provided that it is referenced in the definition document of the part.

## 2 Definitions

For the purposes of this International Standard, the following definitions apply.

### 2.1

#### lead threads

an area in which are located threads incompletely formed during rolling, beginning at the entering chamfer of the thread

### 2.2

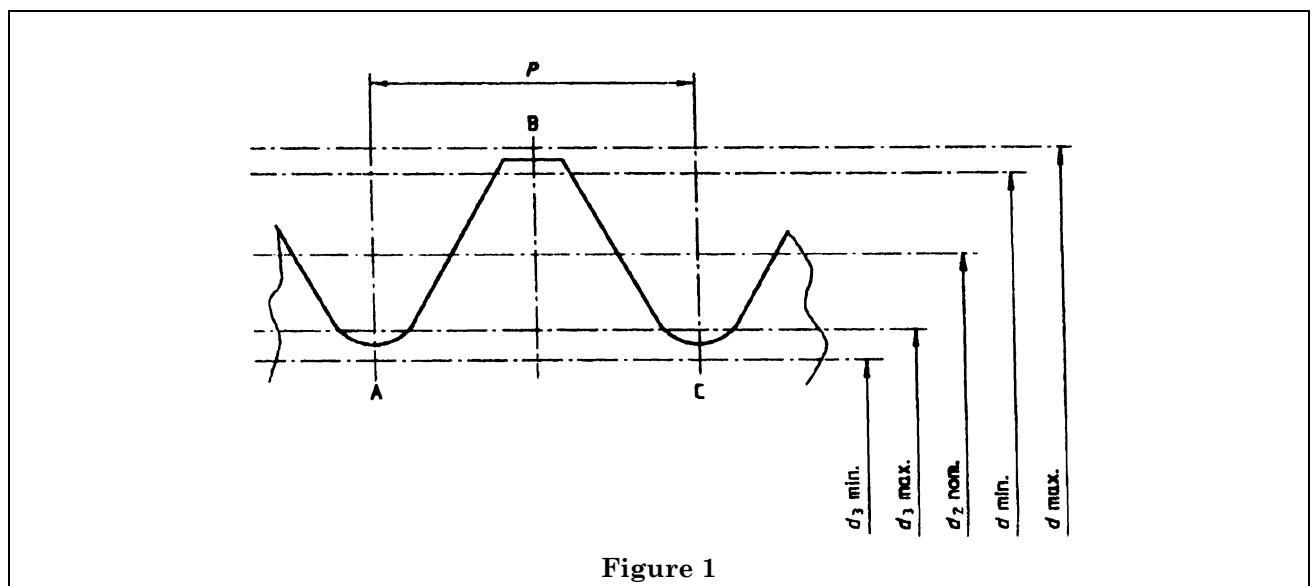
#### runout threads

an area in which are located threads incompletely formed during rolling, between the completely formed threads and the part which has not been rolled

### 2.3

#### completely formed thread

a thread, the profile of which (ABC) is located, over an axial distance of  $1P$ , within the limits specified in the definition document for the thread (See Figure 1.)



## 3 Symbols for threads

- $d$  = major diameter of the thread
- $d_2$  = pitch diameter of the thread
- $d_3$  = minor diameter of the thread
- $P$  = thread pitch

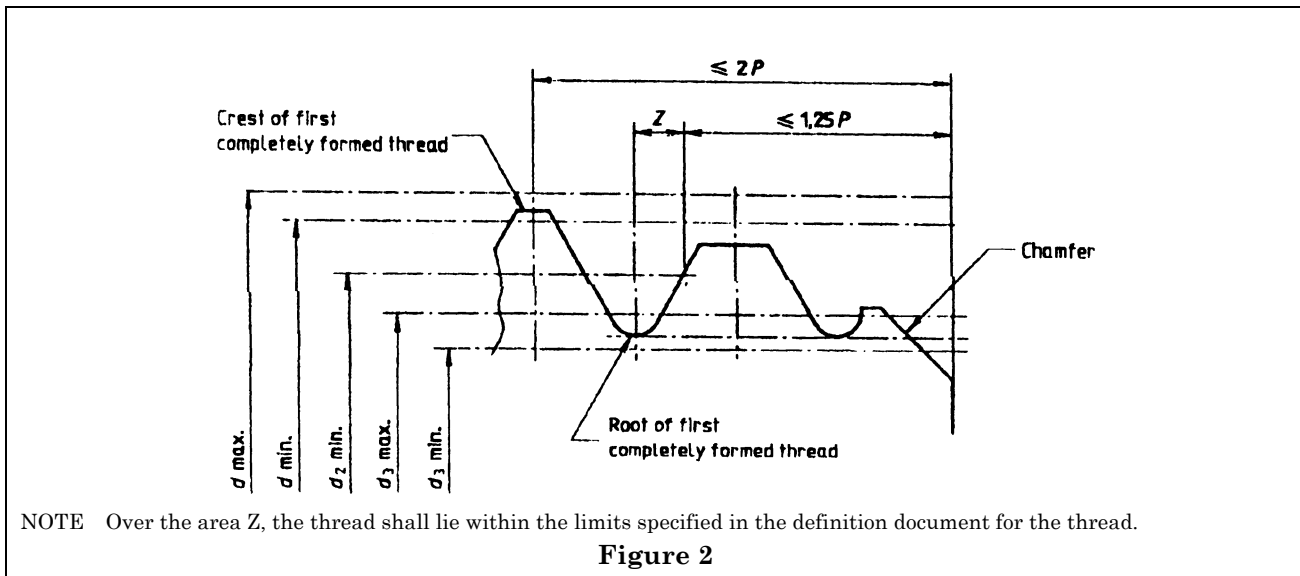
## 4 Lead and runout requirements

### 4.1 General requirements

The flanks at the root of the incompletely formed threads shall be joined by a radius or by two radii and a flat, that are smooth and devoid of abrupt tool marks. This radius, or these radii, and the radius  $r$  (see Figure 3 to Figure 9) shall be not smaller than the minimum root radius specified for the complete threads in the definition document for the thread.

### 4.2 Lead threads

See Figure 2

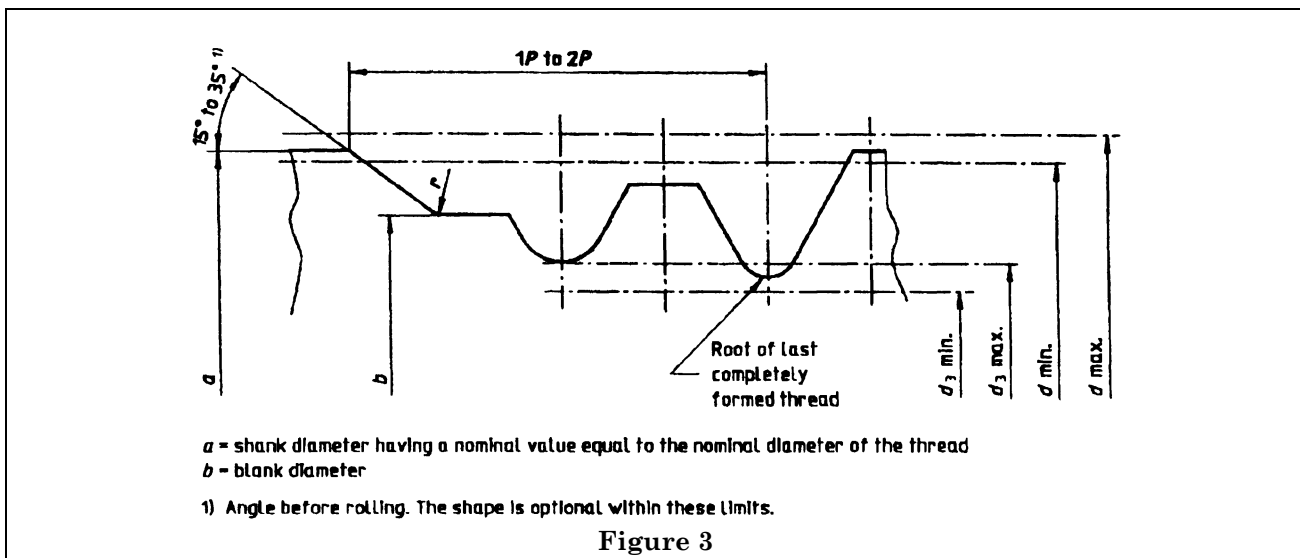


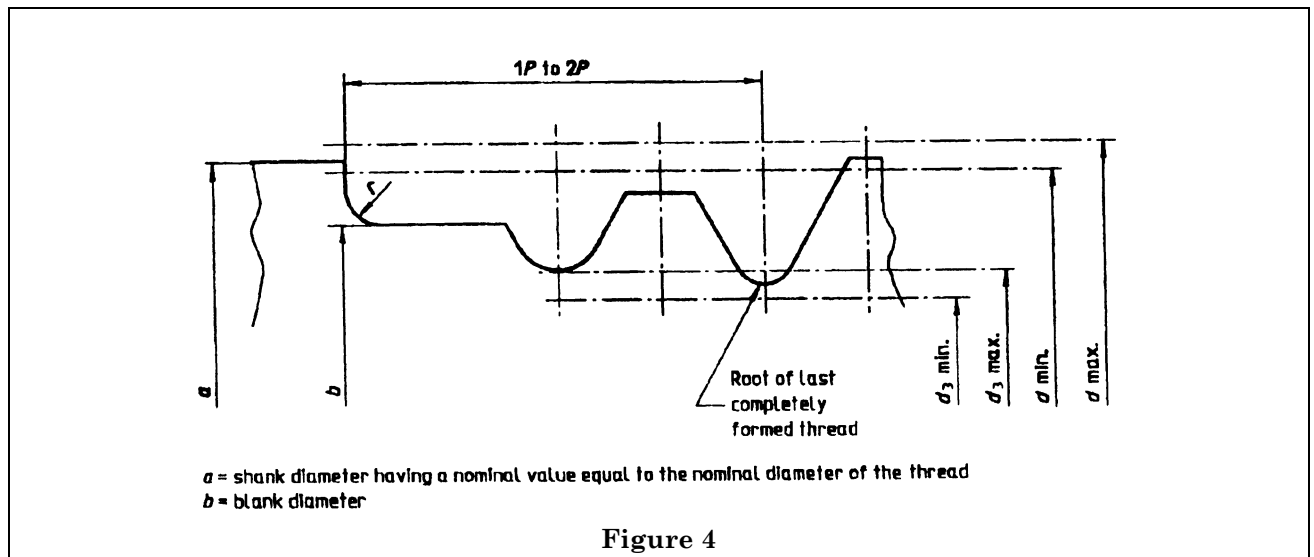
The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 10.

### 4.3 Runout threads

#### 4.3.1 Normal shank

See Figure 3 and Figure 4.

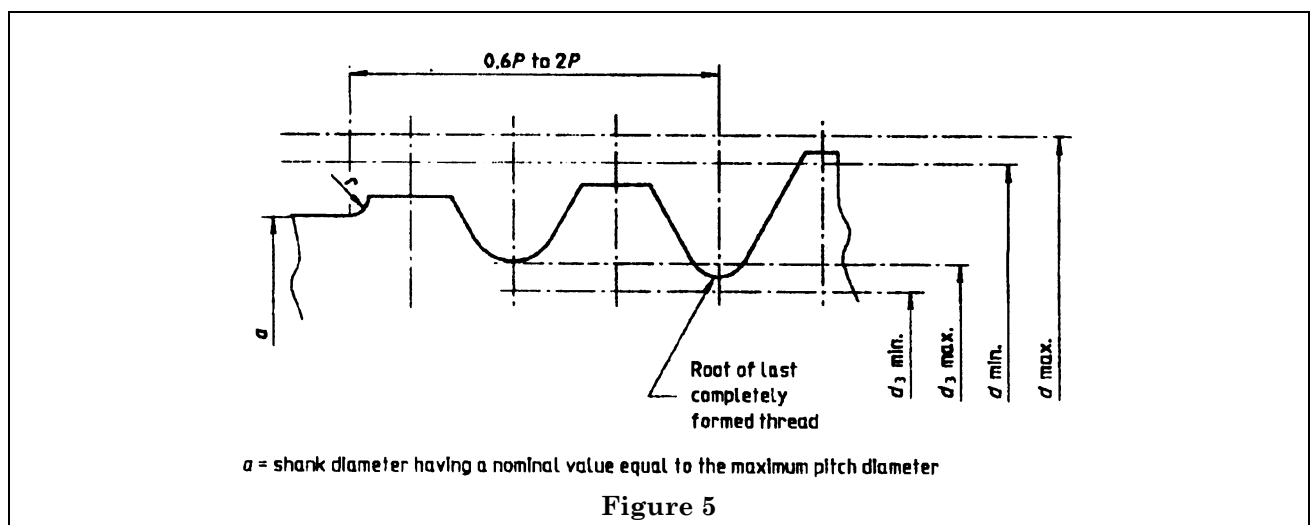




The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 11.

#### 4.3.2 Pitch diameter shank

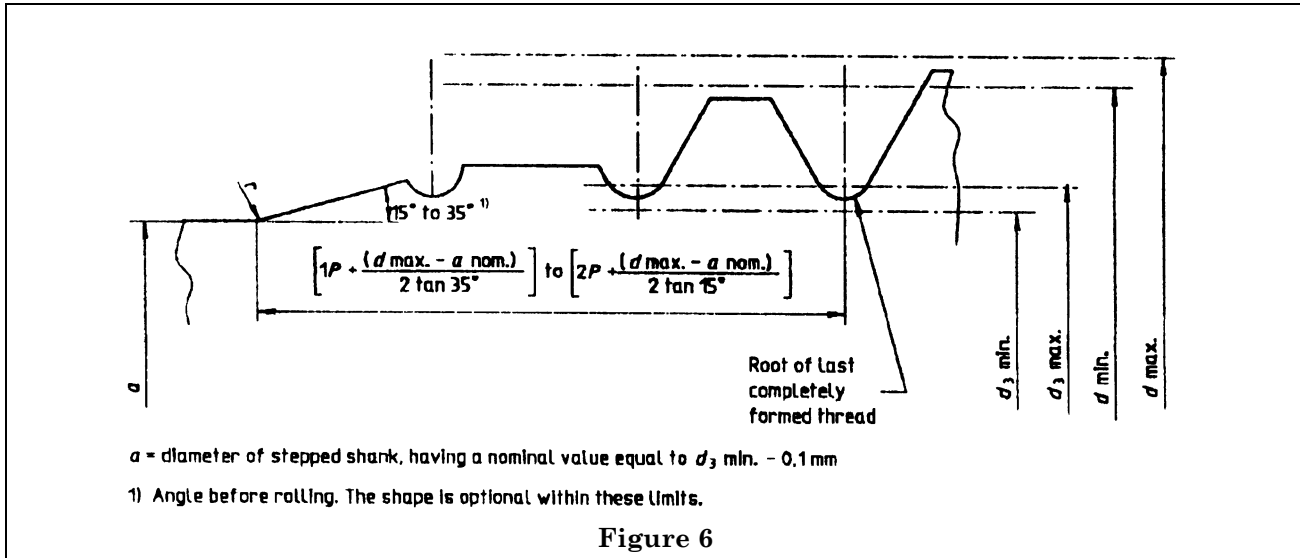
See Figure 5.



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

4.3.3 Stepped shank

See Figure 6.

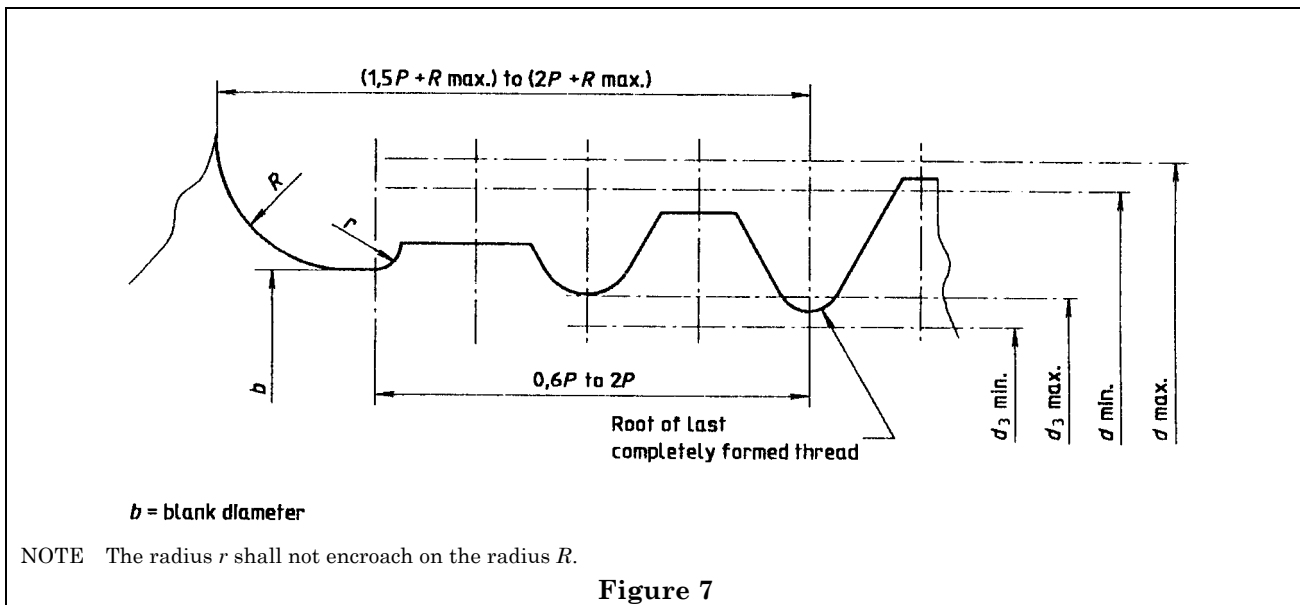


The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 13.

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

4.3.4.1 Protruding head

See Figure 7.

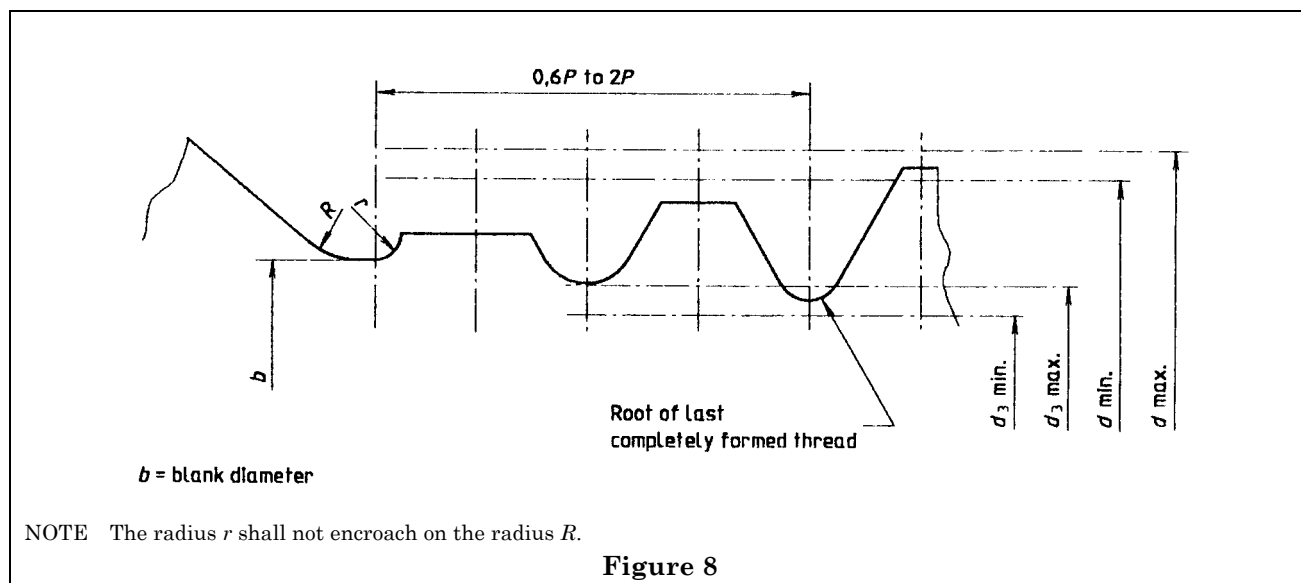


The possible profile projection comparator inspection shall be carried out using a chart drawn in accordance with Figure 12.



## 4.3.4.2 Flush head

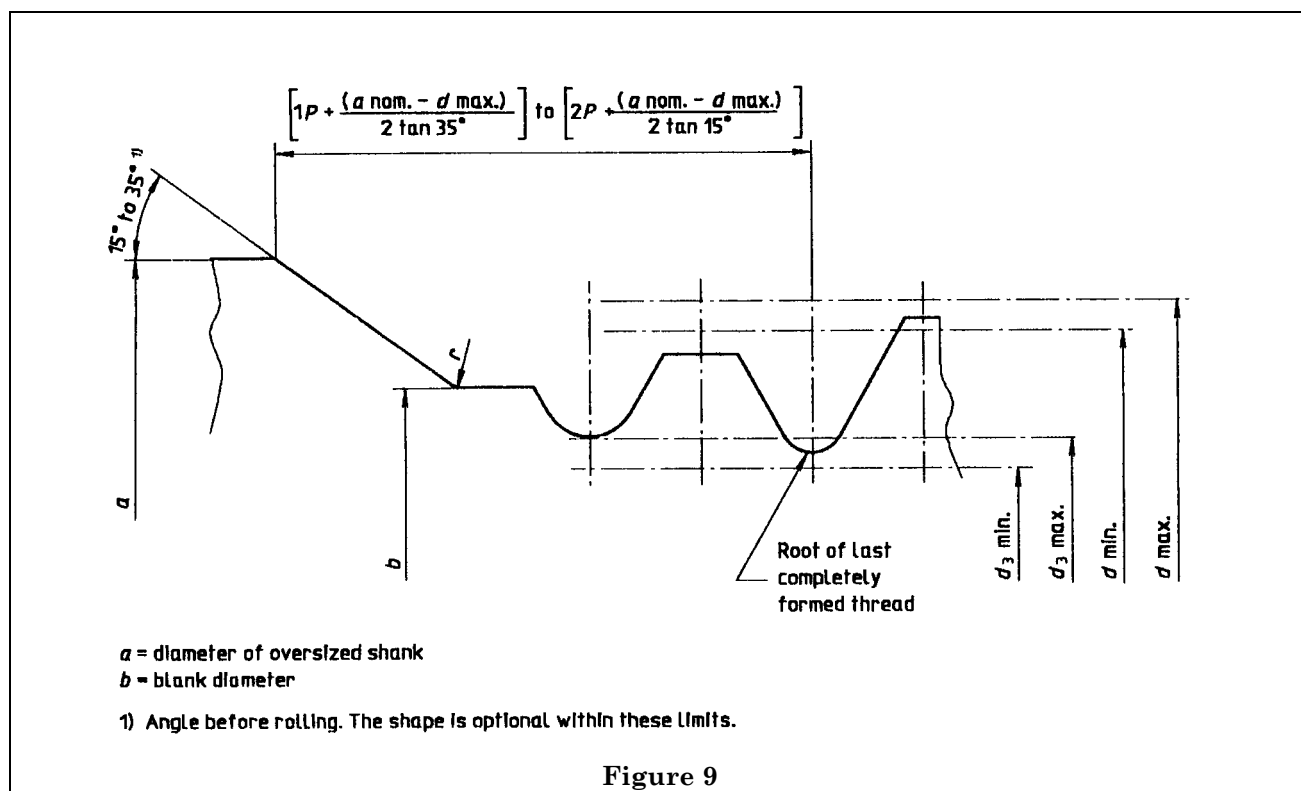
See Figure 8.



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

## 4.3.5 Oversized bolts (for example, bolts for repairs)

See Figure 9.



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

## 5 Inspection method

The method is left to the discretion of the manufacturer, provided that it ensures conformity with the requirements given in clause 4.

In case of dispute, the method by optical projection, defined hereafter, shall be used.

### 5.1 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  $\times 20$ .

### 5.2 Procedure

#### 5.2.1 For lead threads

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

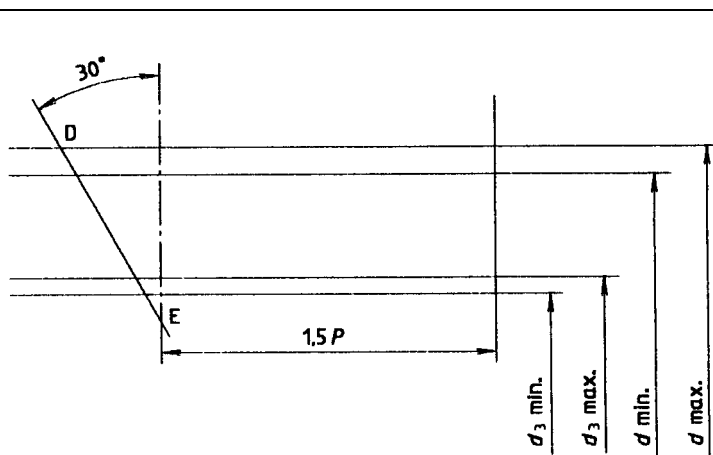


Figure 10

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.

### 5.2.2 For runout threads

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

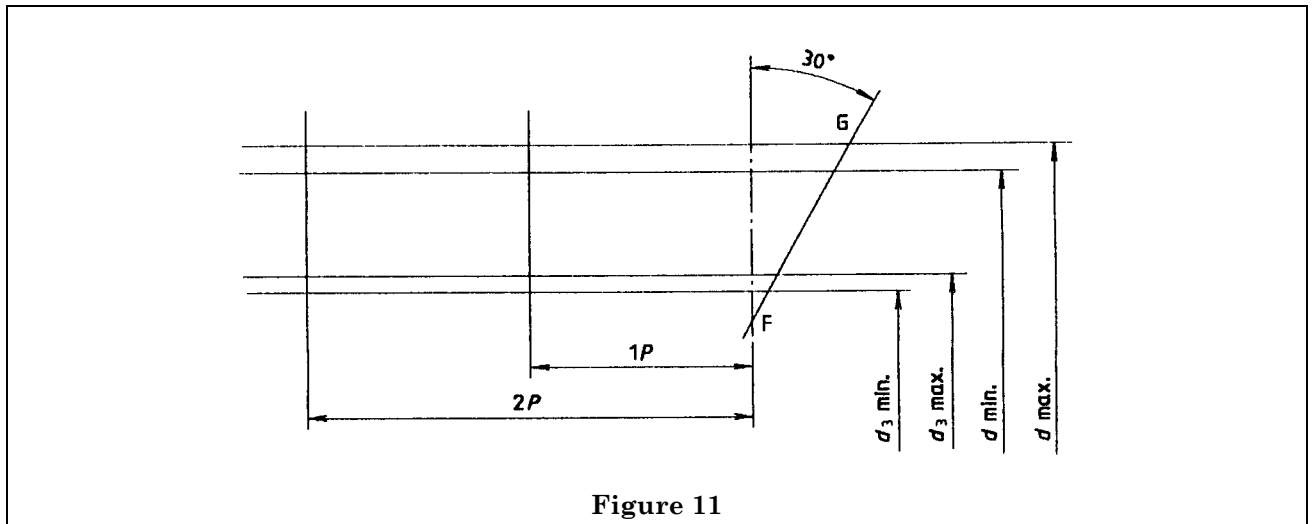


Figure 11

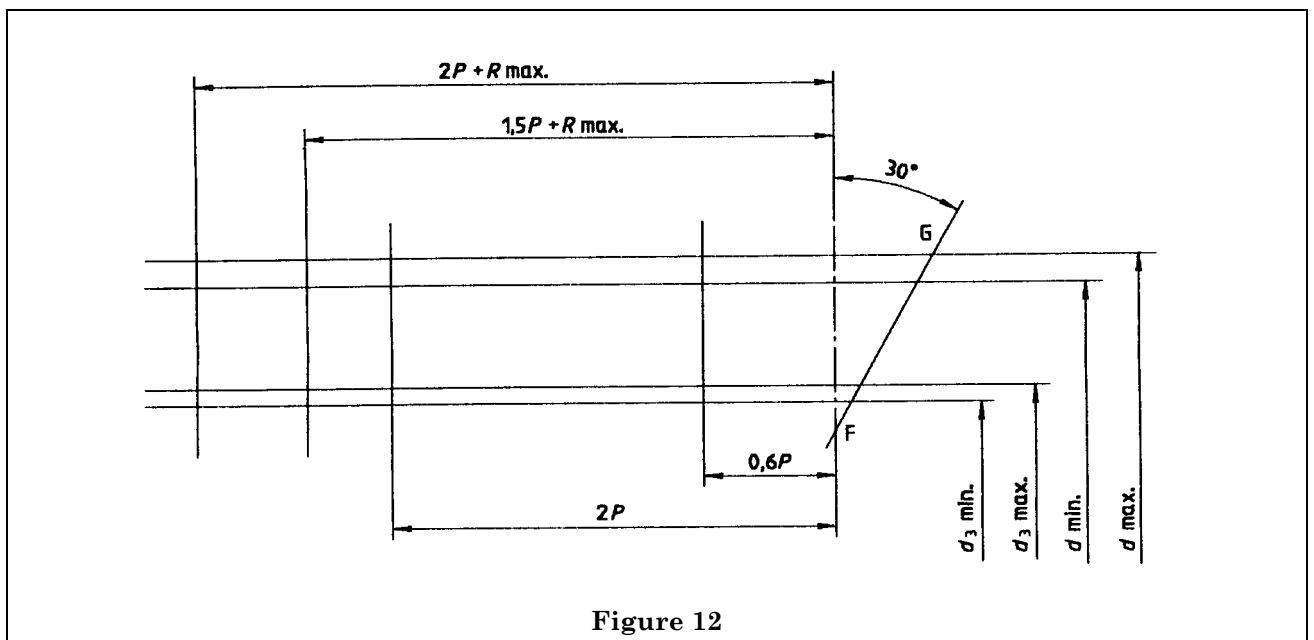
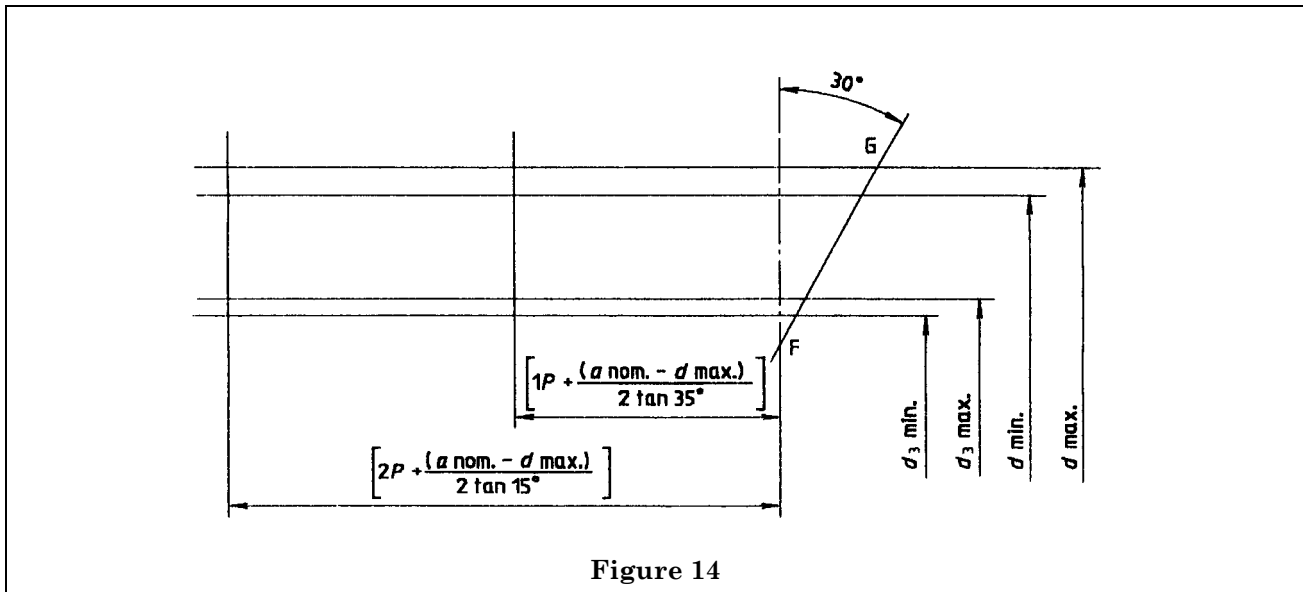
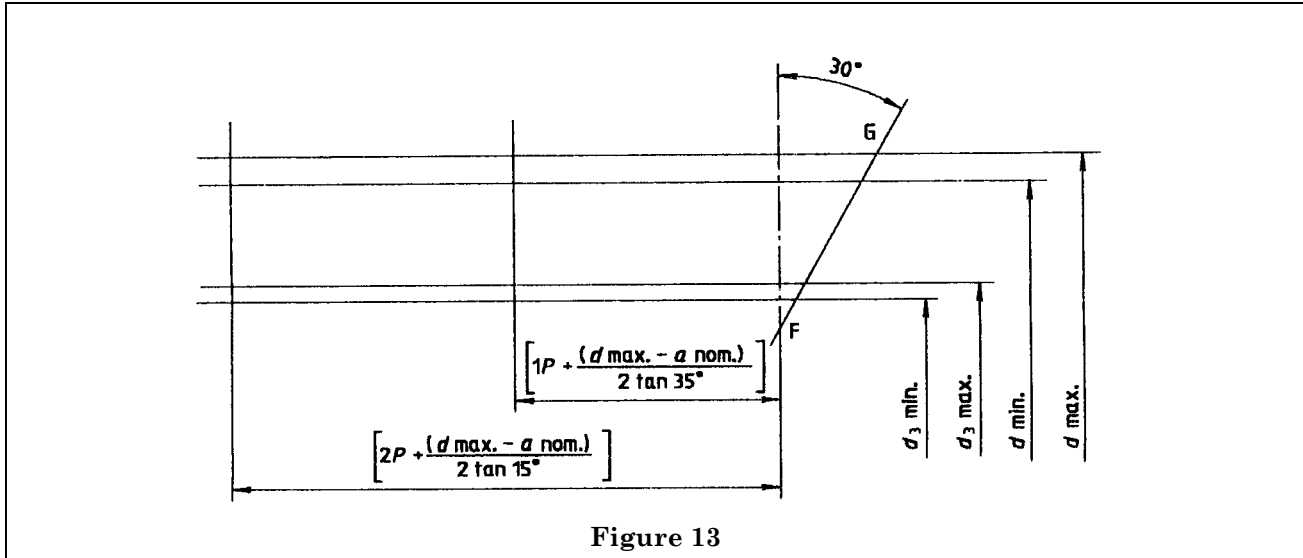


Figure 12



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.



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