

# INTERNATIONAL STANDARD

**ISO**  
**3552-1**

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## **Rotary core diamond drilling equipment — System B —**

### **Part 1: Metric units**

*Matériel de forage rotatif au diamant avec carottage — Système B —*

*Partie 1: Unités métriques*



Reference number  
ISO 3552-1 : 1992 (E)

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## 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.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 3552-1 was prepared by Technical Committee ISO/TC 82, *Mining*, Sub-Committee SC 6, *Diamond core drilling equipment*.

ISO 3552 consists of the following parts, under the general title: *Rotary core diamond drilling equipment — System B*:

- Part 1: *Metric units*
- Part 2: *Inch units*

## Introduction

This part of ISO 3552 is published in parallel with ISO 3551-1 : 1992, *Rotary core diamond drilling equipment — System A — Part 1: Metric units*. The two International Standards cover rotary core diamond drilling equipment.

The two systems are referred to as System A and System B but this is not of any significance since the two systems are not intended as replacements for each other. The system to be adopted by the user will depend on his drilling requirements. The two sets of equipment are not interchangeable. System A is characterized by a series of hole sizes oriented to standard pipe sizes, with relatively wide "nesting", relatively greater reduction in hole diameters as the depth of hole increases, and employing relatively heavy casings between hole sizes. System B is characterized by a series of hole sizes specifically designed to "nest" closely, permitting relatively small reductions in hole diameters as the depth of the hole increases, and employing relatively thin casings between hole sizes. It should not be assumed that, for comparable hole sizes, the physical properties of similar elements of the two systems are equal.

When sizes of casing tubes and drill rods are required larger than specified in this part of ISO 3552, it is recommended that such sizes may, for example, be selected from ISO 3551-1.

NOTE — Another system (System C) is described in ISO 8866 : 1991, *Rotary core diamond drilling equipment — System C*. It is characterized by a series of nesting holes providing small clearances between the hole wall and the equipment, making it possible to use thin-walled casing tubes. System C is considered to be a separate system to be applied in parallel with systems A and B; it is not interchangeable with these systems.

System B was originally drawn up and standardized in metric units, and the conversion was subsequently made into inches; therefore, in the event of a dispute, the values expressed in this part of ISO 3552 shall be taken as the authentic values.

# Rotary core diamond drilling equipment — System B —

## Part 1: Metric units

### 1 Scope

This part of ISO 3552 establishes the nomenclature and lays down the leading dimensions to ensure interchangeability within the limits of System B of the following equipment :

- a) drill rods and couplings, fishing rods and couplings;
- b) casing tubes, casing drive shoes, casing shoe bits, casing bits and sediment tubes;
- c) core barrels, core bits, core lifters and reaming shells.

It specifies the characteristics of a range of equipment for drilling holes having diameters from 36 mm to 146 mm and yielding cores from 22 mm to 120 mm in diameter. The relation between

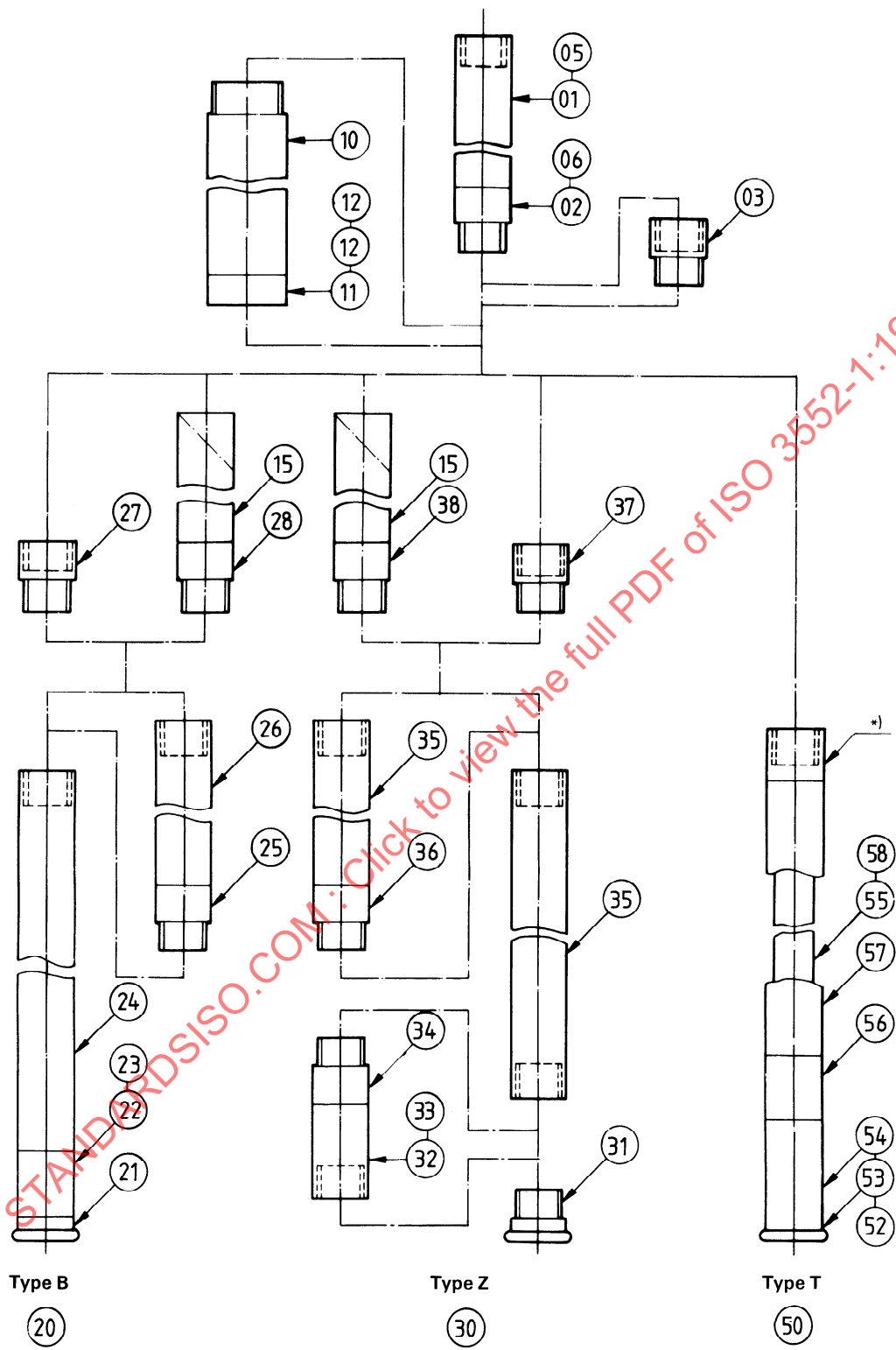
drilled hole diameter (size designation), core diameter (set inside diameter of the bit) and outside diameter and inside diameter ( $D_1 \times D_2$ ) for core barrels, coring tubes and sediment tubes is shown in table 1.

NOTE — The title of this part of ISO 3552 specifies diamond core drilling, but it is also possible to use other cutting materials.

### 2 Designation

Items manufactured in accordance with this part of ISO 3552 shall be designated by its number followed by the two numbers as listed in table 2.

The relationship of the various components is given in figure 1.



\*) Core barrel head: only thread for connection to drill rod is standardized.

Figure 1 — Details of connections (see table 2)

Table 1 — Relationship of components

| Size designation<br>(hole diameter) | Core diameter |    |     | Outside diameter $\times$ inside diameter ( $D_1 \times D_2$ ) |                      |                          |                    |                     |
|-------------------------------------|---------------|----|-----|----------------------------------------------------------------|----------------------|--------------------------|--------------------|---------------------|
|                                     | Type          |    |     | Casing tube                                                    | Sediment tube        | Core barrel (outer tube) |                    |                     |
|                                     | B             | T  | Z   |                                                                |                      | B                        | T                  | Z                   |
| 36                                  | 22            | 22 | —   | —                                                              | —                    | 33,5 $\times$ 23,3       | 35,2 $\times$ 29   | —                   |
| 46                                  | 32            | 32 | 28  | 44,15 $\times$ 37,15                                           | —                    | 44,15 $\times$ 37,15     | 45,2 $\times$ 39,8 | 44,15 $\times$ 32,9 |
| 56                                  | 42            | 42 | 34  | 54,15 $\times$ 47,15                                           | 54,15 $\times$ 47,15 | 54,15 $\times$ 47,15     | 55,2 $\times$ 49   | 54,15 $\times$ 42,9 |
| 66                                  | 52            | 52 | 44  | 64,25 $\times$ 57,25                                           | 64,25 $\times$ 57,25 | 64,25 $\times$ 57,25     | 65,2 $\times$ 59   | 64,25 $\times$ 52,9 |
| 76                                  | 62            | 62 | 54  | 74,25 $\times$ 67,25                                           | 74,25 $\times$ 67,25 | 74,25 $\times$ 67,25     | 75,2 $\times$ 69   | 74,25 $\times$ 62,9 |
| 86                                  | 72            | 72 | 62  | 84,25 $\times$ 77,25                                           | 84,25 $\times$ 77,25 | 84,25 $\times$ 77,25     | 85,2 $\times$ 79   | 84,25 $\times$ 72,9 |
| 101                                 | 87            | —  | 75  | 98 $\times$ 88,3                                               | 98 $\times$ 88,3     | 98 $\times$ 88,3         | —                  | 98 $\times$ 88,3    |
| 116                                 | 102           | —  | 90  | 113 $\times$ 103,3                                             | 113 $\times$ 103,3   | 113 $\times$ 103,3       | —                  | 113 $\times$ 103,3  |
| 131                                 | 117           | —  | 105 | 128 $\times$ 118,3                                             | 128 $\times$ 118,3   | 128 $\times$ 118,3       | —                  | 128 $\times$ 118,3  |
| 146                                 | 132           | —  | 120 | 143 $\times$ 133,3                                             | 143 $\times$ 133,3   | 143 $\times$ 133,3       | —                  | 143 $\times$ 133,3  |

Table 2 — Designation reference numbers

| Drill and fishing rods              |                                  |
|-------------------------------------|----------------------------------|
| 01                                  | Drill rods                       |
| 02                                  | Drill-rod couplings              |
| 03                                  | Drill-rod substitutes            |
| 05                                  | Fishing rods                     |
| 06                                  | Fishing-rod couplings            |
| Casing tubes                        |                                  |
| 10                                  | Casing tubes                     |
| 11                                  | Casing drive shoes               |
| 12                                  | Casing shoe bits                 |
| 13                                  | Casing bits                      |
| Sediment tubes                      |                                  |
| 15                                  | Sediment tubes                   |
| 20 Core barrels, Type B             |                                  |
| 21                                  | Bits                             |
| 22                                  | Core-lifter cases                |
| 23                                  | Core lifter                      |
| 24                                  | Core tubes                       |
| 25                                  | Extension couplings              |
| 26                                  | Extension tubes                  |
| 27                                  | Heads                            |
| 28                                  | Heads with sediment-tube threads |
| 30 Core barrels, Type Z             |                                  |
| 31                                  | Bits                             |
| 32                                  | Core-lifter cases                |
| 33                                  | Core lifter                      |
| 34                                  | Core-lifter couplings            |
| 35                                  | Core and extension tubes         |
| 36                                  | Extension couplings              |
| 37                                  | Heads                            |
| 38                                  | Heads with sediment-tube threads |
| 50 Double-tube core barrels, Type T |                                  |
| 52                                  | Bits                             |
| 53                                  | Core-lifter cases                |
| 54                                  | Core lifters                     |
| 55                                  | Inner tubes                      |
| 56                                  | Reaming shells                   |
| 57                                  | Outer tubes                      |
| 58                                  | Extension tubes                  |
| Threads                             |                                  |
| 61                                  | Threads                          |

### 3 Materials

Materials used in the manufacture of the equipment specified in this part of ISO 3552 shall have the mechanical properties specified in table 3.

The method by which the mechanical properties of tubes are obtained is left to the manufacturer.

**Table 3 — Mechanical properties**

| Component                       | Tensile strength<br>$R_m$ , min.<br>N/mm <sup>2</sup><br>(MPa) | Yield stress<br>$R_e$ , min.<br>N/mm <sup>2</sup><br>(MPa) | Percent elongation after fracture<br>$A$ , min.<br>% |
|---------------------------------|----------------------------------------------------------------|------------------------------------------------------------|------------------------------------------------------|
| Parallel wall rods              | 690                                                            | 550                                                        | 13                                                   |
| Upset or forged ends of rods    | 655                                                            | 380                                                        | 14                                                   |
| Rod couplings and adaptors      | 790                                                            | 690                                                        | 15                                                   |
| Casing outside diameter < 90 mm | 690                                                            | 550                                                        | 13                                                   |
| Casing outside diameter > 90 mm | 655                                                            | 380                                                        | 14                                                   |

## 4 Dimensions and tolerances

### 4.1 General

All dimensions and tolerances shall be in accordance with tables 5 to 39. The dimensions and tolerances for the threads specified in tables 5 to 39 are given in table 40.

All dimensions given in this part of ISO 3552, unless otherwise stated, are in millimetres (see Introduction).

All items shown in the different figures have a right-hand thread. Where a left-hand thread is necessary, it is stipulated for each individual case in the footnotes to the figure or to the corresponding table.

NOTE — In System B, tolerances are specified in accordance with ISO 286-2 : 1988, *ISO system of limits and fits — Part 2: Tables of standard tolerance grades and limit deviations for holes and shafts*.

### 4.2 Tolerances for blank tubing

**4.2.1** Tolerances on outside diameters shall be  $\pm 0,20$  mm for diameters less than 40 mm and  $\pm 0,5$  % for diameters greater than or equal to 40 mm.

**4.2.2** Tolerances on the inside diameter shall be within the limits imposed by the outside diameter and the eccentricity tolerances (see 4.3).

### 4.3 Eccentricity

The eccentricity is defined as the distance between the centres of the outside and inside diameters expressed as a percentage of the nominal wall thickness  $Q$  and may not exceed 10 %. The eccentricity is calculated according to the following formula :

$$\frac{Q_{\max} - Q_{\min}}{2 Q_{\text{nom}}} \times 100$$

where  $Q_{\max}$  and  $Q_{\min}$  are values of the wall thickness measured in the same section.

The value of the nominal wall thickness shall be calculated according to the following formula :

$$\frac{D_1 - D_2}{2}$$

where  $D_1$  and  $D_2$  are mean values for the outside and inside diameters, respectively, determined in accordance with stated tolerances.

### 4.4 Straightness

The straightness, along the entire length of the tubes as well as at the tube ends, shall be checked by rotating the tube against a calibrated straightedge provided with a suitable measuring device. Along the total length of the tube, the maximum difference between indicator readings shall not be greater than the values indicated in table 4.

**Table 4 — Maximum permissible deviations in straightness**

| Length of tube<br>m      | Maximum difference between indicator readings<br>mm |
|--------------------------|-----------------------------------------------------|
| Up to 1,5 (incl.)        | 2                                                   |
| From 1,5 up to 3 (incl.) | 3                                                   |
| From 3 up to 4,5 (incl.) | 4                                                   |
| From 4,5 up to 6 (incl.) | 5                                                   |

The requirement for straightness at the tube ends is illustrated in figure 2.

Dimensions in millimetres

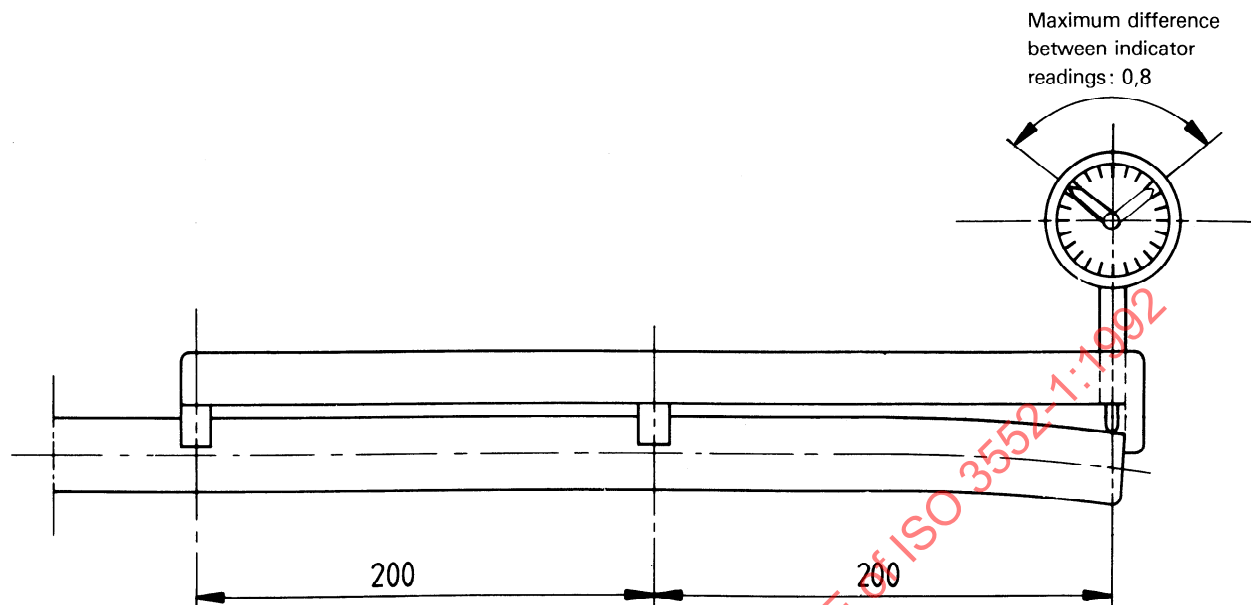


Figure 2 — Requirements for straightness at the tube ends

Table 5 — Nomenclature and basic dimensions for drill rods and casings and their related diamond set items

| Drill rod size | Rod tube | Rod coupling | Casing flush jointed size | Casing |       | Casing bit |          | Casing shoe |          |
|----------------|----------|--------------|---------------------------|--------|-------|------------|----------|-------------|----------|
|                | O.D.     | I.D.         |                           | O.D.   | I.D.  | Set O.D.   | Set I.D. | Set O.D.    | Set I.D. |
| 33             | 33,7     | 15,14        | 46                        | 44,35  | 37,4  | 46,1       | 35,1     | 46,1        | 37,1     |
|                | 33,3     | 14,86        |                           | 43,95  | 36,9  | 45,9       | 34,9     | 45,9        | 36,9     |
| 42             | 42,2     | 22,16        | 56                        | 54,35  | 47,4  | 56,1       | 45,1     | 56,1        | 47,1     |
|                | 41,8     | 21,84        |                           | 53,95  | 46,9  | 55,9       | 44,9     | 55,9        | 46,9     |
| 50             | 50,2     | 22,16        | 66                        | 64,55  | 57,5  | 66,1       | 55,1     | 66,1        | 57,1     |
|                | 49,8     | 21,84        |                           | 63,95  | 57,0  | 65,9       | 54,9     | 65,9        | 56,9     |
|                |          |              | 76                        | 74,55  | 67,5  | 76,1       | 65,1     | 76,1        | 67,1     |
|                |          |              |                           | 73,95  | 67,0  | 75,9       | 64,9     | 75,9        | 66,9     |
|                |          |              | 86                        | 84,65  | 77,5  | 86,1       | 75,1     | 86,1        | 77,1     |
|                |          |              |                           | 83,85  | 77,0  | 85,9       | 74,9     | 85,9        | 76,9     |
|                |          |              | 101                       | 98,4   | 88,7  | 101,1      | 86,6     | 101,1       | 88,1     |
|                |          |              |                           | 97,6   | 87,9  | 100,9      | 86,4     | 100,9       | 87,9     |
|                |          |              | 116                       | 113,5  | 103,8 | 116,1      | 101,6    | 116,1       | 103,1    |
|                |          |              |                           | 112,5  | 102,8 | 115,9      | 101,4    | 115,9       | 102,9    |
|                |          |              | 131                       | 128,5  | 118,8 | 131,1      | 116,6    | 131,1       | 118,1    |
|                |          |              |                           | 127,5  | 117,8 | 130,9      | 116,4    | 130,9       | 117,9    |
|                |          |              | 146                       | 143,5  | 134,2 | 146,1      | 131,6    | 146,1       | 133,1    |
|                |          |              |                           | 142,5  | 132,8 | 145,9      | 131,4    | 145,9       | 132,9    |

NOTE — The following common abbreviations are sometimes used in tables in the English version for the sake of simplicity:

O.D. = outside diameter

I.D. = inside diameter.

Table 6 — Nomenclature and basic dimensions for core barrels and their related diamond set items

| Core barrel type |    |     | Coring bits    |                | Reaming shells | Kerf width<br>mm | Kerf area<br>cm <sup>2</sup> | Core area<br>cm <sup>2</sup> | Hole area<br>cm <sup>2</sup> | Core-to-hole ratio<br>% |
|------------------|----|-----|----------------|----------------|----------------|------------------|------------------------------|------------------------------|------------------------------|-------------------------|
| B                | T  | Z   | Set I.D.       | Set O.D.       | Set O.D.       |                  |                              |                              |                              |                         |
| 36               | 36 |     | 21,8<br>21,6   | 36,1<br>35,9   | 36,4<br>36,2   | 7,15             | 6,55                         | 3,8                          | 10,35                        | 36,5                    |
| 46               | 46 |     | 31,8<br>31,6   | 46,1<br>45,9   | 46,4<br>46,2   | 7,15             | 8,8                          | 8,04                         | 16,84                        | 47,8                    |
|                  |    | 46  | 27,8<br>27,6   | 46,1<br>45,9   | 46,4<br>46,2   | 9,15             | 10,68                        | 6,16                         | 16,84                        | 36,5                    |
| 56               | 56 |     | 41,8<br>41,6   | 56,1<br>55,9   | 56,4<br>56,2   | 7,15             | 11,04                        | 13,85                        | 24,89                        | 55,9                    |
|                  |    | 56  | 33,8<br>33,6   | 56,1<br>55,9   | 56,4<br>56,2   | 11,15            | 15,81                        | 9,08                         | 24,89                        | 36,5                    |
| 66               | 66 |     | 51,8<br>51,6   | 66,1<br>65,9   | 66,4<br>66,2   | 7,15             | 13,28                        | 21,24                        | 34,52                        | 61,6                    |
|                  |    | 66  | 43,8<br>43,6   | 66,1<br>65,9   | 66,4<br>66,2   | 11,15            | 19,31                        | 15,21                        | 34,52                        | 44,1                    |
| 76               | 76 |     | 61,8<br>61,6   | 76,1<br>75,9   | 76,4<br>76,2   | 7,15             | 15,53                        | 30,19                        | 45,72                        | 66,7                    |
|                  |    | 76  | 53,8<br>53,6   | 76,1<br>75,9   | 76,4<br>76,2   | 11,15            | 22,83                        | 22,9                         | 45,72                        | 50                      |
| 86               | 86 |     | 71,8<br>71,6   | 86,1<br>85,9   | 86,4<br>86,2   | 7,15             | 17,78                        | 40,71                        | 58,49                        | 69,8                    |
|                  |    | 86  | 61,8<br>61,6   | 86,1<br>85,9   | 86,4<br>86,2   | 11,15            | 28,3                         | 30,19                        | 58,49                        | 53                      |
| 101              |    |     | 86,8<br>86,6   | 101,1<br>100,9 | 101,4<br>101,2 | 7,15             | 21,25                        | 59,45                        | 80,6                         | 72,7                    |
|                  |    | 101 | 74,8<br>74,6   | 101,1<br>100,9 | 101,4<br>101,2 | 13,15            | 36,42                        | 44,18                        | 80,6                         | 54,9                    |
| 116              |    |     | 101,8<br>101,6 | 116,1<br>115,9 | 116,4<br>116,2 | 7,15             | 24,52                        | 81,71                        | 106,23                       | 76,8                    |
|                  |    | 116 | 89,8<br>89,6   | 116,1<br>115,9 | 116,4<br>116,2 | 13,15            | 42,61                        | 63,62                        | 106,23                       | 59,7                    |
| 131              |    |     | 116,8<br>116,6 | 131,1<br>130,9 | 131,4<br>131,2 | 7,15             | 27,89                        | 107,51                       | 135,4                        | 79,4                    |
|                  |    | 131 | 104,8<br>104,6 | 131,1<br>130,9 | 131,4<br>131,2 | 13,15            | 48,81                        | 86,59                        | 135,4                        | 64                      |
| 146              |    |     | 131,8<br>131,6 | 146,1<br>145,9 | 146,4<br>146,2 | 7,15             | 31,26                        | 136,85                       | 168,11                       | 81,4                    |
|                  |    | 146 | 119,8<br>119,6 | 146,1<br>145,9 | 146,4<br>146,2 | 13,15            | 55,01                        | 113,1                        | 168,11                       | 67,3                    |

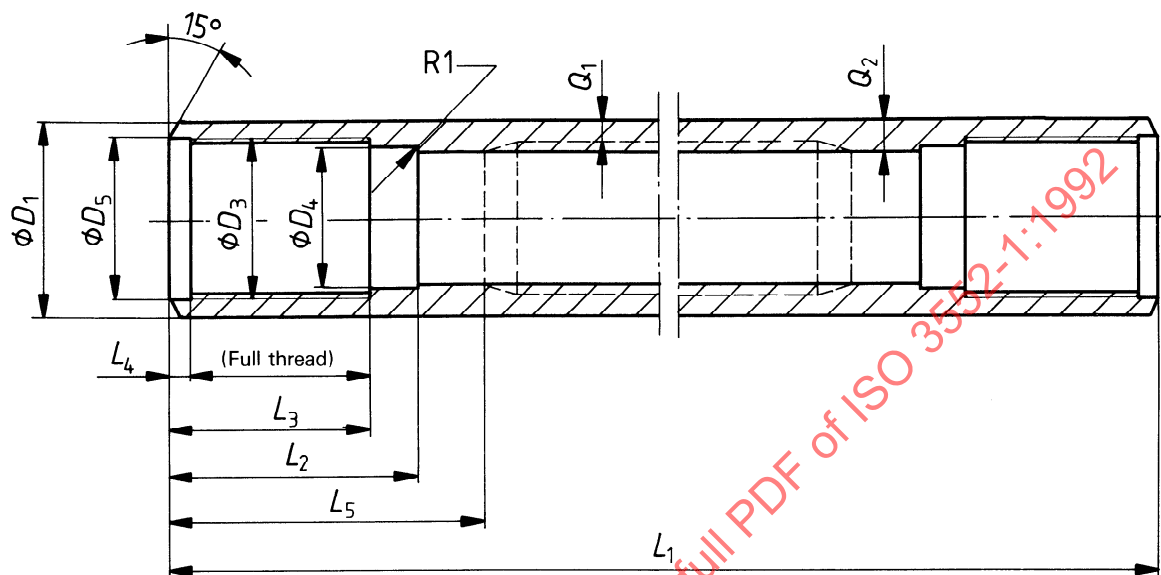


Figure 3 — Drill rod (see table 7)

Table 7 — Drill rod

| Size | Nominal length<br>(including coupling) | $L_1$<br>tol.      | $D_1$<br>$\pm 0,2$ | $D_3$<br>Thread<br>CR1 | $D_4$<br>H11 | $D_5$<br>$+ 0,20$<br>$+ 0,12$ | $Q_1^{*)}$<br>min. | $Q_2^{*)}$<br>min. | $L_2$<br>js14 | $L_3$<br>min. | $L_4$<br>js14 | $L_5$<br>min. |
|------|----------------------------------------|--------------------|--------------------|------------------------|--------------|-------------------------------|--------------------|--------------------|---------------|---------------|---------------|---------------|
| 33   | 500                                    | 440<br>$\pm 1,5$   | 33,5               | 28                     | 24,4         | 28                            | 3,25               | 4,70               | 45            | 35            | 6             | 55            |
| 42   | 1 500                                  | 1 440<br>$\pm 1,5$ | 42                 | 36                     | 32,8         | 36                            | 3,50               | 4,75               | 55            | 45            | 6             | 65            |
| 50   | 3 000                                  | 2 940<br>$\pm 2,5$ | 50                 | 41,5                   | 37,8         | 41,5                          | 4,50               | 6,25               | 65            | 55            | 8             | 75            |

\*) The choice of dimensions  $Q_1$  and  $Q_2$  is left to the manufacturer provided that they are not less than the stated values.

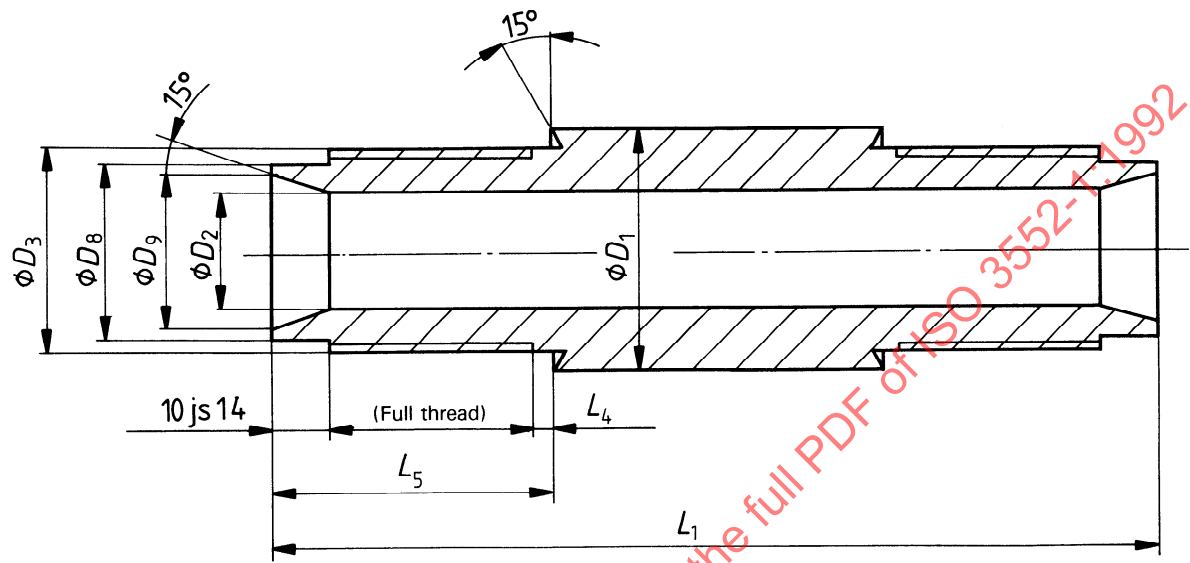


Figure 4 — Drill-rod coupling (see table 8)

Table 8 — Drill-rod coupling

| Size | $D_1$<br>+ 0,2<br>0 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 | $D_8$<br>d11 | $D_9$<br>JS13 | $L_1$<br>js14 | $L_4$<br>max. | $L_5$<br>js14 |
|------|---------------------|---------------|------------------------|--------------|---------------|---------------|---------------|---------------|
| 33   | 33,5                | 15            | 28                     | 24,4         | 19            | 140           | 5             | 40            |
| 42   | 42                  | 22            | 36                     | 32,8         | 27            | 160           | 5             | 50            |
| 50   | 50                  | 22            | 41,5                   | 37,8         | 32            | 180           | 7             | 60            |

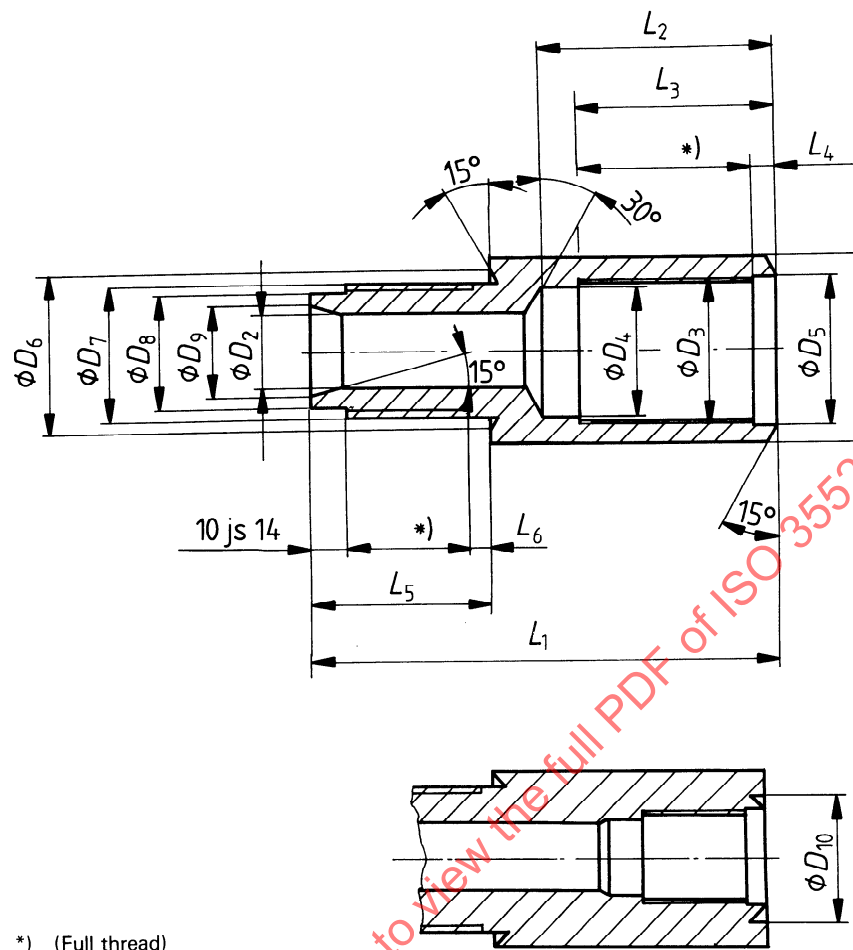


Figure 5 — Drill-rod substitute (see table 9)

Table 9 — Drill-rod substitute

| Size                  | $D_1$<br>+ 0,2<br>0 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 | $D_4$<br>H11 | $D_5$<br>+ 0,20<br>+ 0,12 | $D_6$<br>+ 0,5<br>+ 0,2 | $D_7$<br>Thread<br>CR1 | $D_8$<br>d11 | $D_9$<br>JS13 | $D_{10}$<br>+ 0,5<br>+ 0,2 | $L_1$<br>js14 | $L_2$<br>js14 | $L_3$<br>js14 | $L_4$<br>js14 | $L_5$<br>js14 | $L_6$<br>max. |
|-----------------------|---------------------|---------------|------------------------|--------------|---------------------------|-------------------------|------------------------|--------------|---------------|----------------------------|---------------|---------------|---------------|---------------|---------------|---------------|
| 33 × 42 <sup>1)</sup> | 42                  | 15            | 36                     | 32,8         | 36                        | 33,5                    | 28                     | 24,4         | 19            | —                          | 110           | 55            | 45            | 6             | 40            | 5             |
| 33 × 50 <sup>1)</sup> | 50                  |               | 41,5                   | 37,8         | 41,5                      |                         | 36                     | 32,8         | 27            |                            | 120           | 65            | 55            | 8             |               |               |
| 42 × 50 <sup>1)</sup> |                     | 130           |                        |              |                           | 50                      |                        |              |               |                            |               |               |               |               |               |               |
| 42 × 33 <sup>2)</sup> | 42                  | 22            | 28                     | 24,4         | 28                        | —                       | 41,5                   | 37,8         | 32            | 33,5                       | 110           | 45            | 35            | 5             | 60            | 7             |
| 50 × 33 <sup>2)</sup> | 50                  |               | 36                     | 32,8         | 36                        |                         |                        |              |               |                            | 120           |               |               |               |               |               |
| 50 × 42 <sup>2)</sup> |                     |               |                        |              |                           |                         |                        |              |               |                            | 130           |               |               |               |               |               |

1) Pin thread smaller than box thread.

2) Pin thread larger than box thread.

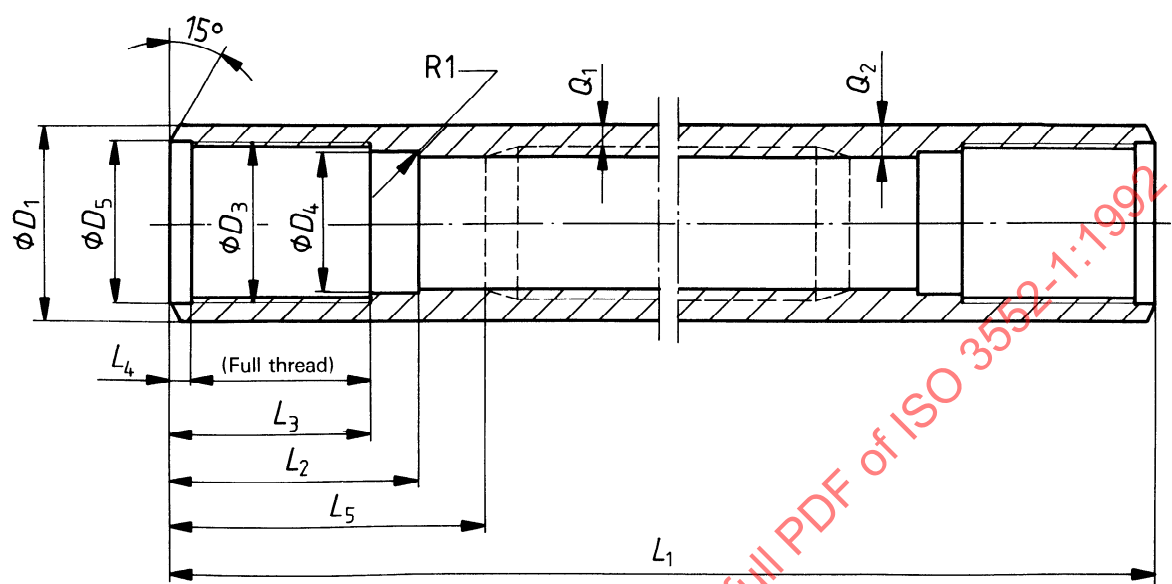


Figure 6 — Fishing rod (see table 10)

Table 10 — Fishing rod

| Size | Nominal length<br>(including coupling) | $L_1$ | $D_1$     | $D_3$                       | $D_4$ | $D_5$                | $Q_1^{**})$ | $Q_2^{**})$ | $L_2$ | $L_3$ | $L_4$ | $L_5$ |
|------|----------------------------------------|-------|-----------|-----------------------------|-------|----------------------|-------------|-------------|-------|-------|-------|-------|
|      |                                        | tol.  | $\pm 0,2$ | Thread<br>CR1 <sup>*)</sup> | H11   | $+ 0,20$<br>$+ 0,12$ | min.        | min.        | js14  | min.  | js14  | min.  |
| 33   | 3 000<br>6 000                         | 2 940 | $\pm 2,5$ | 33,5                        | 28    | 24,4                 | 28          | 3,25        | 4,70  | 45    | 35    | 55    |
| 42   |                                        | 5 940 | $\pm 2,5$ | 42                          | 36    | 32,8                 | 36          | 3,50        | 4,75  | 55    | 45    | 65    |
| 50   |                                        |       |           | 50                          | 41,5  | 37,8                 | 41,5        | 4,50        | 6,25  | 65    | 55    | 75    |

<sup>\*)</sup> Left-hand thread.  
<sup>\*\*)</sup> The choice of dimensions  $Q_1$  and  $Q_2$  is left to the manufacturer provided that they are not less than the stated values.

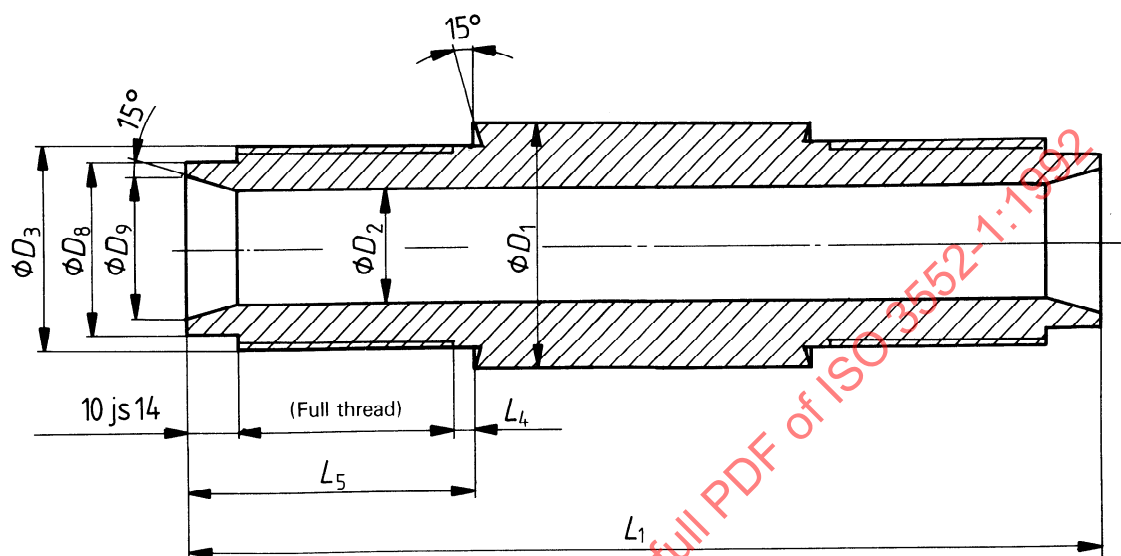


Figure 7 — Fishing-rod coupling (see table 11)

Table 11 — Fishing-rod coupling

| Size | $D_1$<br>+ 0,2<br>0 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 <sup>*)</sup> | $D_8$<br>d11 | $D_9$<br>JS13 | $L_1$<br>js14 | $L_4$<br>max. | $L_5$<br>js14 |
|------|---------------------|---------------|--------------------------------------|--------------|---------------|---------------|---------------|---------------|
| 33   | 33,5                | 15            | 28                                   | 24,4         | 19            | 140           | 5             | 40            |
| 42   | 42                  | 22            | 36                                   | 32,8         | 27            | 160           |               | 50            |
| 50   | 50                  |               | 41,5                                 | 37,8         | 32            | 180           | 7             | 60            |

\*) Left-hand thread.

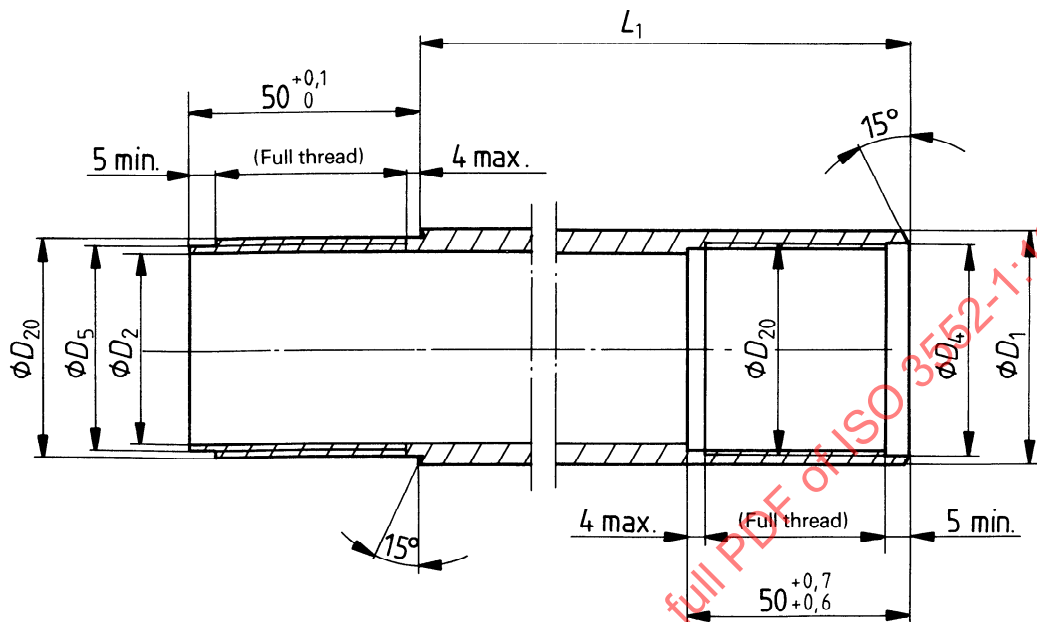


Figure 8 — Casing tube (see table 12)

Table 12 — Casing tube

| Size | $D_1$            | $D_2$ | $D_4$                | $D_5$                | $D_{20}$        | $L_1$                        |
|------|------------------|-------|----------------------|----------------------|-----------------|------------------------------|
|      | tol.             | tol.  | $+ 0,20$<br>$+ 0,12$ | $- 0,15$<br>$- 0,35$ | Thread<br>CR6*) | $\pm 3$                      |
| 46   | 44,15 $\pm 0,2$  | 37,15 | 41,5                 | 40                   | 41,5            | 250<br>500<br>1 500<br>3 000 |
| 56   | 54,15 $\pm 0,25$ | 47,15 | 51,5                 | 50                   | 51,5            |                              |
| 66   | 64,25 $\pm 0,3$  | 57,25 | 61,5                 | 60                   | 61,5            |                              |
| 76   | 74,25 $\pm 0,4$  | 67,25 | 71,5                 | 70                   | 71,5            |                              |
| 86   | 84,25 $\pm 0,5$  | 77,25 | 81,5                 | 80                   | 81,5            |                              |
| 101  | 98 $\pm 0,7$     | 88,3  | 94,5                 | 92,5                 | 94,5            |                              |
| 116  | 113 $\pm 0,7$    | 103,3 | 109,5                | 107,5                | 109,5           |                              |
| 131  | 128 $\pm 0,7$    | 118,3 | 124,5                | 122,5                | 124,5           |                              |
| 146  | 143 $\pm 0,7$    | 133,3 | 139,5                | 137,5                | 139,5           |                              |

\*) Right-hand or left-hand thread.

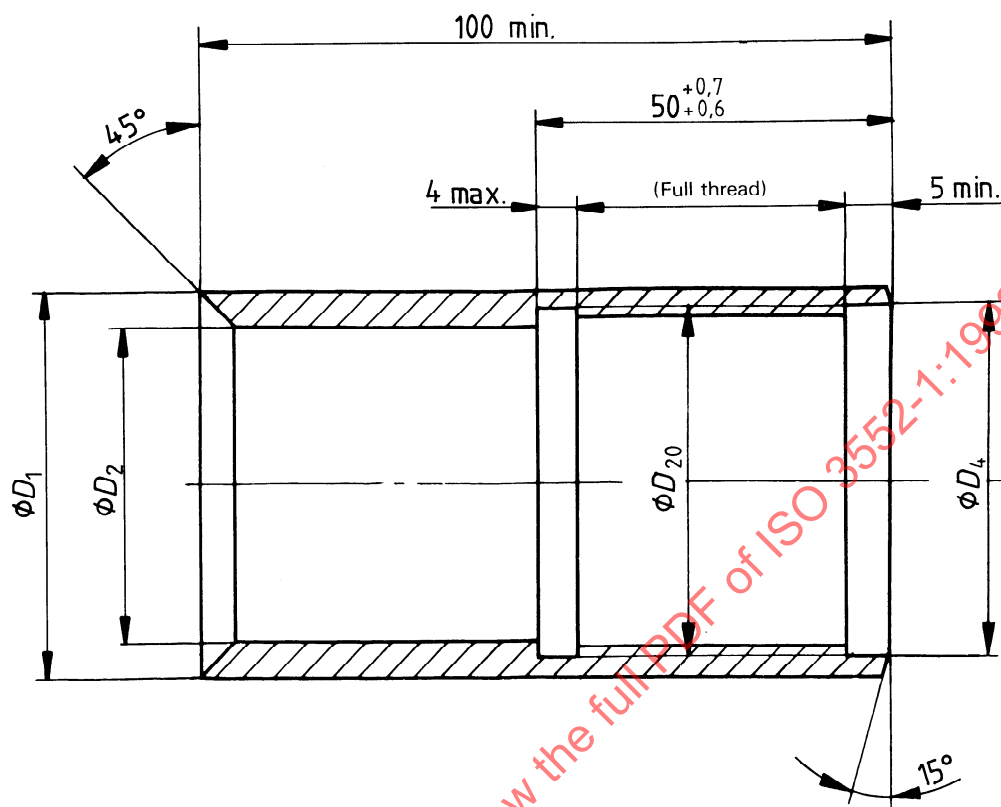


Figure 9 — Casing drive shoe (see table 13)

Table 13 — Casing drive shoe

| Size | $D_1$ |            | $D_2$ |            | $D_4$<br>+ 0,20<br>+ 0,12 | $D_{20}$<br>Thread<br>CR6*) |
|------|-------|------------|-------|------------|---------------------------|-----------------------------|
|      |       | tol.       |       | tol.       |                           |                             |
| 46   | 44,15 | $\pm 0,2$  | 37,15 | $\pm 0,25$ | 41,5                      | 41,5                        |
| 56   | 54,15 | $\pm 0,25$ | 47,15 |            | 51,5                      | 51,5                        |
| 66   | 64,25 | $\pm 0,3$  | 57,25 |            | 61,5                      | 61,5                        |
| 76   | 74,25 |            | 67,25 |            | 71,5                      | 71,5                        |
| 86   | 84,25 | $\pm 0,4$  | 77,25 | $\pm 0,4$  | 81,5                      | 81,5                        |
| 101  | 98    |            | 88,3  |            | 94,5                      | 94,5                        |
| 116  | 113   | $\pm 0,5$  | 103,3 | $\pm 0,5$  | 109,5                     | 109,5                       |
| 131  | 128   |            | 118,3 |            | 124,5                     | 124,5                       |
| 146  | 143   |            | 133,3 | $\pm 0,7$  | 139,5                     | 139,5                       |

\*) Right-hand or left-hand thread.

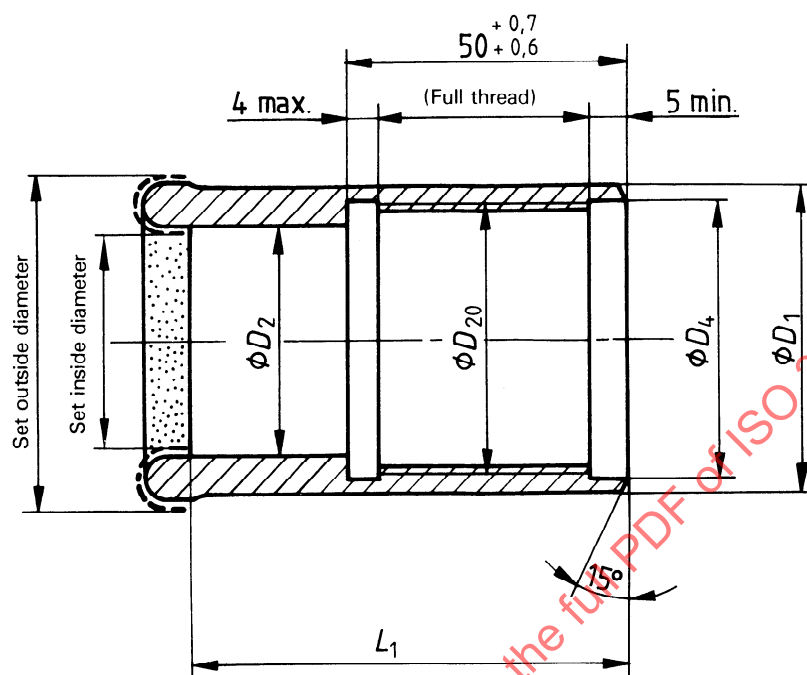


Figure 10 — Casing shoe bit (see table 14)

Table 14 — Casing shoe bit

| Size | Set outside diameter<br>$\pm 0,1$ | Set inside diameter<br>$\pm 0,1$ | $D_1$<br>$\pm 0,1$ | $D_2$<br>$+ 0,1$<br>$0$ | $D_4$<br>$+ 0,20$<br>$+ 0,12$ | $D_{20}$<br>Thread<br>CR6 | $L_1$<br>min. |
|------|-----------------------------------|----------------------------------|--------------------|-------------------------|-------------------------------|---------------------------|---------------|
| 46   | 46                                | 37                               | 45                 | 37                      | 41,5                          | 41,5                      | 77            |
| 56   | 56                                | 47                               | 55                 | 47                      | 51,5                          | 51,5                      |               |
| 66   | 66                                | 57                               | 65                 | 57                      | 61,5                          | 61,5                      |               |
| 76   | 76                                | 67                               | 75                 | 67                      | 71,5                          | 71,5                      | 107           |
| 86   | 86                                | 77                               | 85                 | 77                      | 81,5                          | 81,5                      |               |
| 101  | 101                               | 88                               | 99,5               | 89                      | 94,5                          | 94,5                      |               |
| 116  | 116                               | 103                              | 114,5              | 104                     | 109,5                         | 109,5                     | 137           |
| 131  | 131                               | 118                              | 129,5              | 119                     | 124,5                         | 124,5                     |               |
| 146  | 146                               | 133                              | 144,5              | 134                     | 139,5                         | 139,5                     |               |

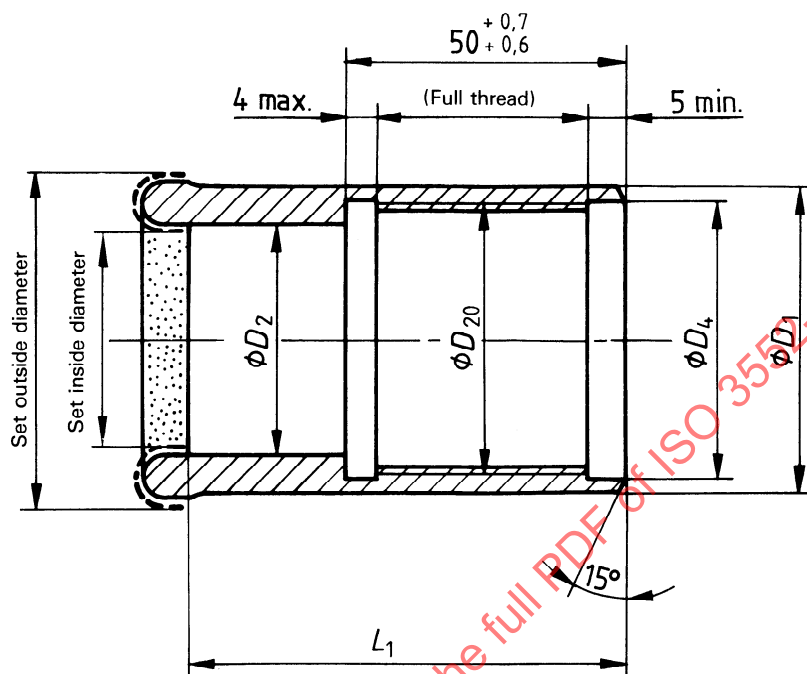


Figure 11 — Casing bit (see table 15)

Table 15 — Casing bit

| Size | Set outside diameter<br>$\pm 0,1$ | Set inside diameter<br>$\pm 0,1$ | $D_1$<br>$\pm 0,1$ | $D_2$<br>$\pm 0,1$ | $D_4$<br>$+ 0,20$<br>$+ 0,12$ | $D_{20}$<br>Thread<br>CR6 | $L_1$<br>min. |
|------|-----------------------------------|----------------------------------|--------------------|--------------------|-------------------------------|---------------------------|---------------|
| 46   | 46                                | 35                               | 45                 | 36                 | 41,5                          | 41,5                      | 77            |
| 56   | 56                                | 45                               | 55                 | 46                 | 51,5                          | 51,5                      |               |
| 66   | 66                                | 55                               | 65                 | 56                 | 61,5                          | 61,5                      |               |
| 76   | 76                                | 65                               | 75                 | 66                 | 71,5                          | 71,5                      | 107           |
| 86   | 86                                | 75                               | 85                 | 76                 | 81,5                          | 81,5                      |               |
| 101  | 101                               | 86,5                             | 99,5               | 87,5               | 94,5                          | 94,5                      |               |
| 116  | 116                               | 101,5                            | 114,5              | 103                | 109,5                         | 109,5                     | 137           |
| 131  | 131                               | 116,5                            | 129,5              | 118                | 124,5                         | 124,5                     |               |
| 146  | 146                               | 131,5                            | 144,5              | 133                | 139,5                         | 139,5                     |               |

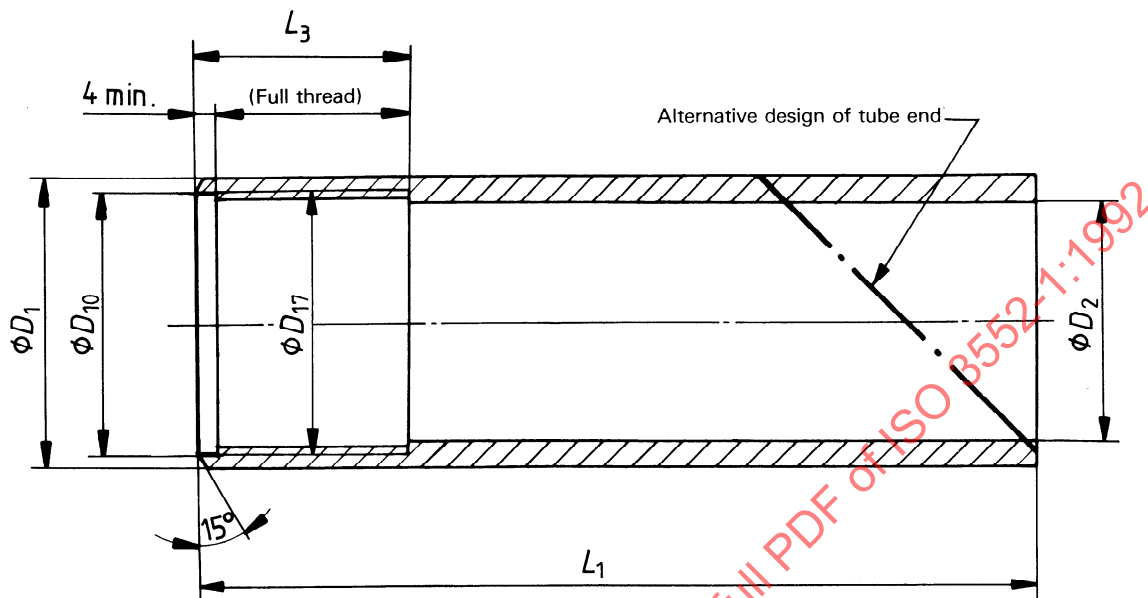


Figure 12 — Sediment tube (see table 16)

Table 16 — Sediment tube

| Size | $D_1$ |            | $D_2$ |            | $D_{10}$<br>+ 0,20<br>+ 0,12 | $D_{17}$<br>Thread<br>CR4*) | $L_1$<br>$\pm 1,5$ | $L_3$<br>js14 |
|------|-------|------------|-------|------------|------------------------------|-----------------------------|--------------------|---------------|
| 56   | 54,15 | $\pm 0,25$ | 47,15 | $\pm 0,25$ | 50                           | 50                          | 500<br>1 000       | 40            |
| 66   | 64,25 | $\pm 0,3$  | 57,25 |            | 60                           | 60                          |                    |               |
| 76   | 74,25 |            | 67,25 |            | 70                           | 70                          |                    |               |
| 86   | 84,25 | $\pm 0,4$  | 77,25 |            | 80                           | 80                          |                    |               |
| 101  | 98    |            | 88,3  | $\pm 0,4$  | 93                           | 93                          |                    |               |
| 116  | 113   | $\pm 0,5$  | 103,3 | $\pm 0,5$  | 108                          | 108                         |                    | 45            |
| 131  | 128   |            | 118,3 |            | 123                          | 123                         |                    |               |
| 146  | 143   |            | 133,3 | $\pm 0,7$  | 138                          | 138                         |                    |               |

\*) Left-hand thread.

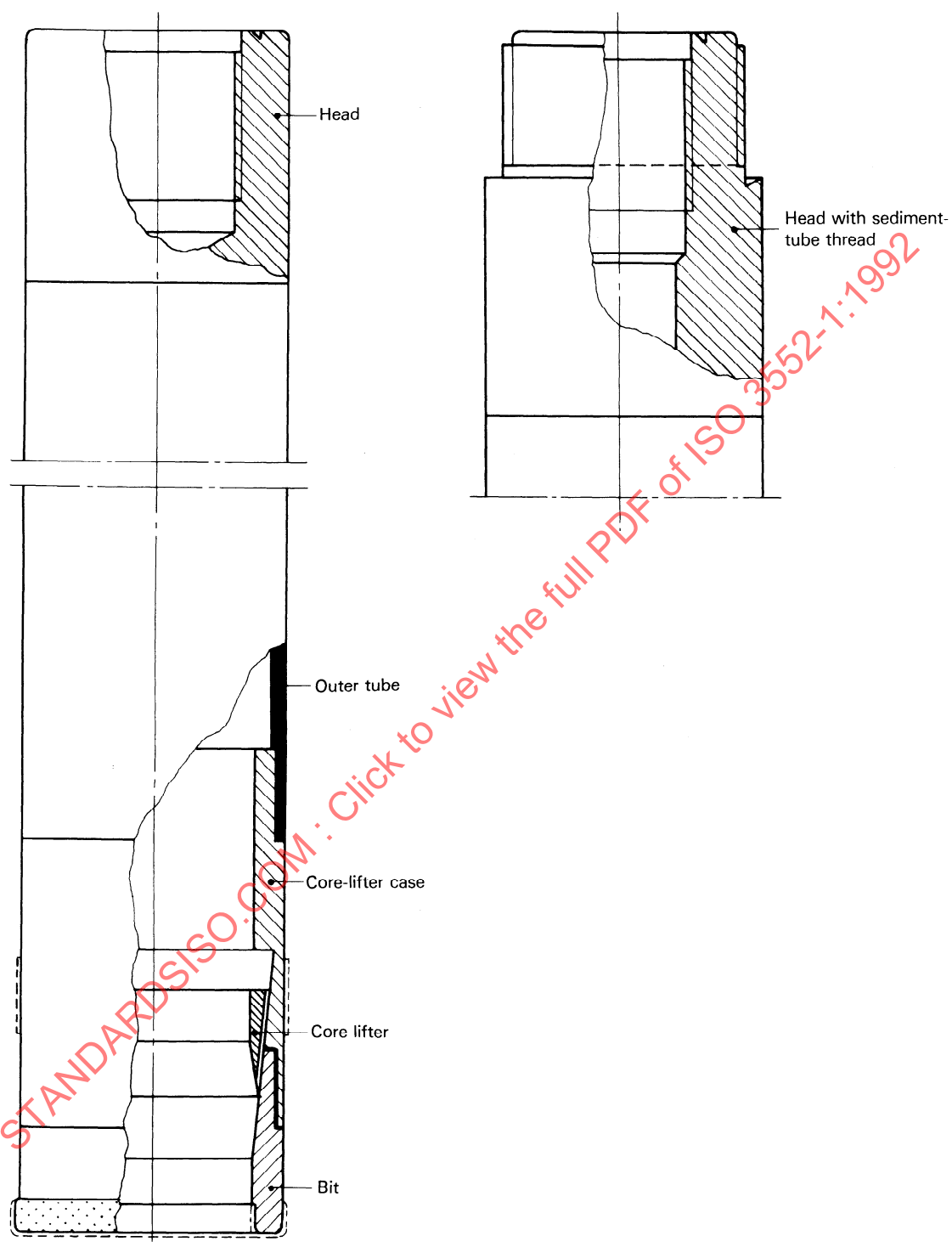


Figure 13 — Core barrel, Type B — Assembly

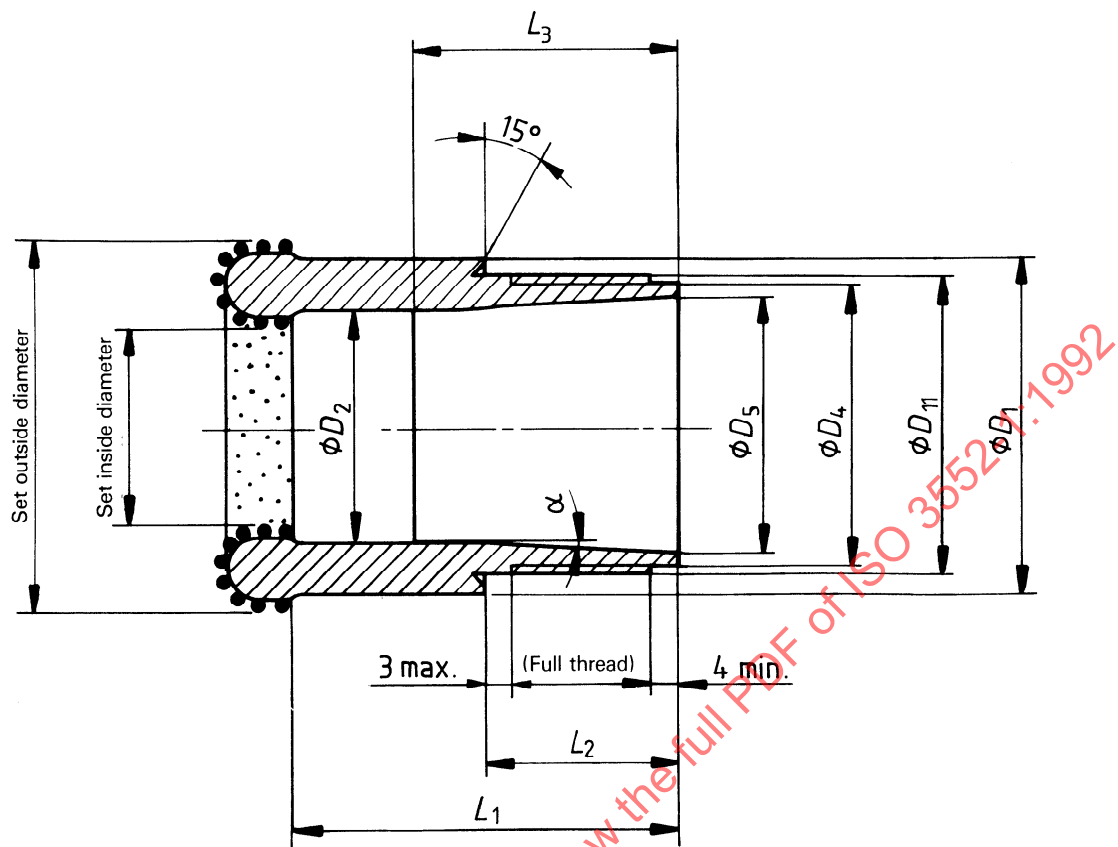


Figure 14 — Core barrel, Type B — Bit (see table 17)

Table 17 — Core barrel, Type B — Bit

| Size | Set outside diameter<br>± 0,1 | Set inside diameter<br>0,2<br>- 0,4 | $D_1$<br>h9 | $D_2$<br>H9 | $D_4$<br>- 0,15<br>- 0,35 | $D_5$<br>± 0,05 | $D_{11}$<br>Thread<br>CR5 | $L_1$<br>js14 | $L_2$<br>js14 | $L_3$<br>js14 | $\alpha$ |
|------|-------------------------------|-------------------------------------|-------------|-------------|---------------------------|-----------------|---------------------------|---------------|---------------|---------------|----------|
| 36   | 36                            | 22                                  | 35          | 23          | 29,5                      | 27,9            | 31,5                      | 45            | 18            | 29            | 3,5°     |
| 46   | 46                            | 32                                  | 45          | 33          | 39,5                      | 37,9            | 41,5                      |               |               |               |          |
| 56   | 56                            | 42                                  | 55          | 43          | 49,5                      | 47,4            | 51,5                      | 53            | 26            | 38            | 2,5°     |
| 66   | 66                            | 52                                  | 65          | 53          | 59,5                      | 57,4            | 61,5                      |               |               |               |          |
| 76   | 76                            | 62                                  | 75          | 63          | 69,5                      | 67,6            | 71,5                      | 61            | 34            | 44            | 1,5°     |
| 86   | 86                            | 72                                  | 85          | 73          | 79,5                      | 77,6            | 81,5                      |               |               |               |          |
| 101  | 101                           | 87                                  | 100         | 88          | 95,5                      | 93              | 97,5                      | 67            | 34            | 44            | 1,5°     |
| 116  | 116                           | 102                                 | 115         | 103         | 110,5                     | 108             | 112,5                     |               |               |               |          |
| 131  | 131                           | 117                                 | 130         | 118         | 125,5                     | 123             | 127,5                     |               |               |               |          |
| 146  | 146                           | 132                                 | 145         | 133         | 140,5                     | 138             | 142,5                     |               |               |               |          |

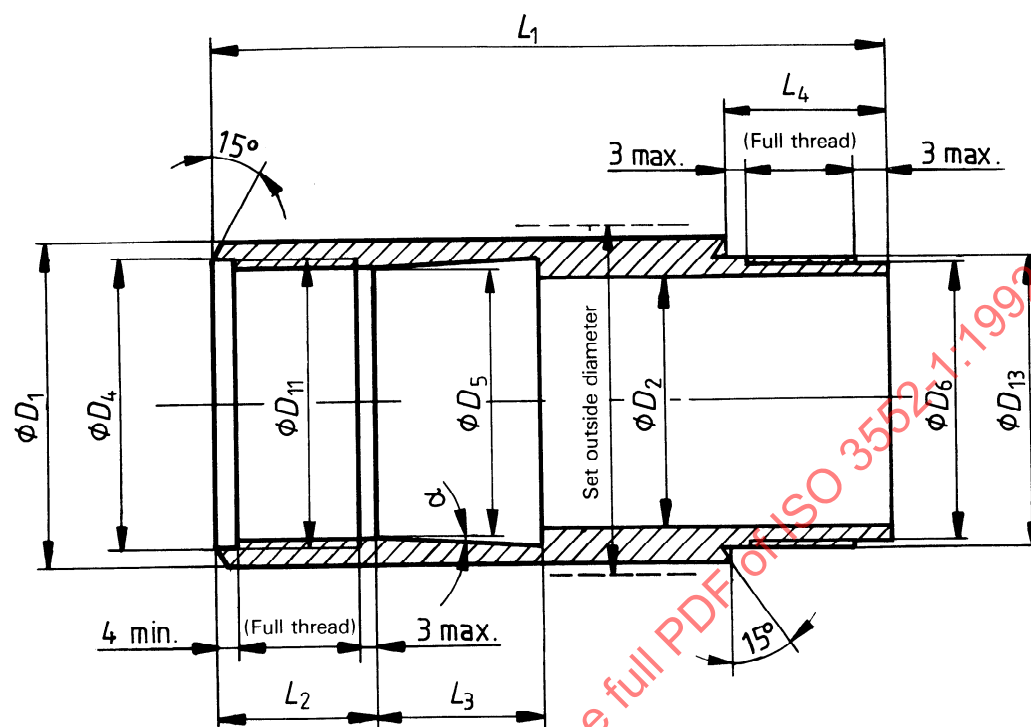


**Figure 15 — Core barrel, Type B — Core-lifter case (see table 18)**

**Table 18 — Core barrel, Type B — Core-lifter case**

| Size | Set outside diameter<br>± 0,1 | D <sub>1</sub><br>h9 | D <sub>2</sub><br>H9 | D <sub>4</sub><br>+ 0,20<br>+ 0,12 | D <sub>5</sub><br>± 0,05 | D <sub>6</sub><br>- 0,15<br>- 0,35 | D <sub>11</sub><br>Thread<br>CR5 | D <sub>13</sub><br>Thread<br>CR3 | L <sub>1</sub><br>min. | L <sub>2</sub><br>js14 | L <sub>3</sub><br>± 0,1 | L <sub>4</sub><br>js14 | α    |
|------|-------------------------------|----------------------|----------------------|------------------------------------|--------------------------|------------------------------------|----------------------------------|----------------------------------|------------------------|------------------------|-------------------------|------------------------|------|
| 36   | 36,3                          | 35                   | 23,4                 | 31,5                               | 28,2                     | 28,5                               | 31,5                             | 30                               | 86                     | 19                     | 18                      | 18                     | 3,5° |
| 46   | 46,3                          | 45                   | 33,5                 | 41,5                               | 38,2                     | 38                                 | 41,5                             | 40                               | 87                     |                        | 19                      |                        |      |
| 56   | 56,3                          | 55                   | 44                   | 51,5                               | 47,7                     | 48                                 | 51,5                             | 50                               | 107                    | 29                     | 27                      | 22                     | 2,5° |
| 66   | 66,3                          | 65                   | 54                   | 61,5                               | 57,7                     | 58                                 | 61,5                             | 60                               | 109                    |                        |                         |                        |      |
| 76   | 76,3                          | 75                   | 64                   | 71,5                               | 67,9                     | 68                                 | 71,5                             | 70                               | 140                    | 35                     | 45                      | 25                     | 1,5° |
| 86   | 86,3                          | 85                   | 74                   | 81,5                               | 77,9                     | 78                                 | 81,5                             | 80                               | 145                    |                        |                         |                        |      |
| 101  | 101,3                         | 100                  | 89                   | 97,5                               | 93,1                     | 93                                 | 97,5                             | 95                               | 155                    |                        |                         |                        |      |
| 116  | 116,3                         | 115                  | 104                  | 112,5                              | 108,1                    | 108                                | 112,5                            | 110                              | 157                    |                        |                         | 27                     |      |
| 131  | 131,3                         | 130                  | 119                  | 127,5                              | 123,1                    | 123                                | 127,5                            | 125                              |                        |                        |                         |                        |      |
| 146  | 146,3                         | 145                  | 137                  | 142,5                              | 138,1                    | 138                                | 142,5                            | 140                              |                        |                        |                         |                        |      |

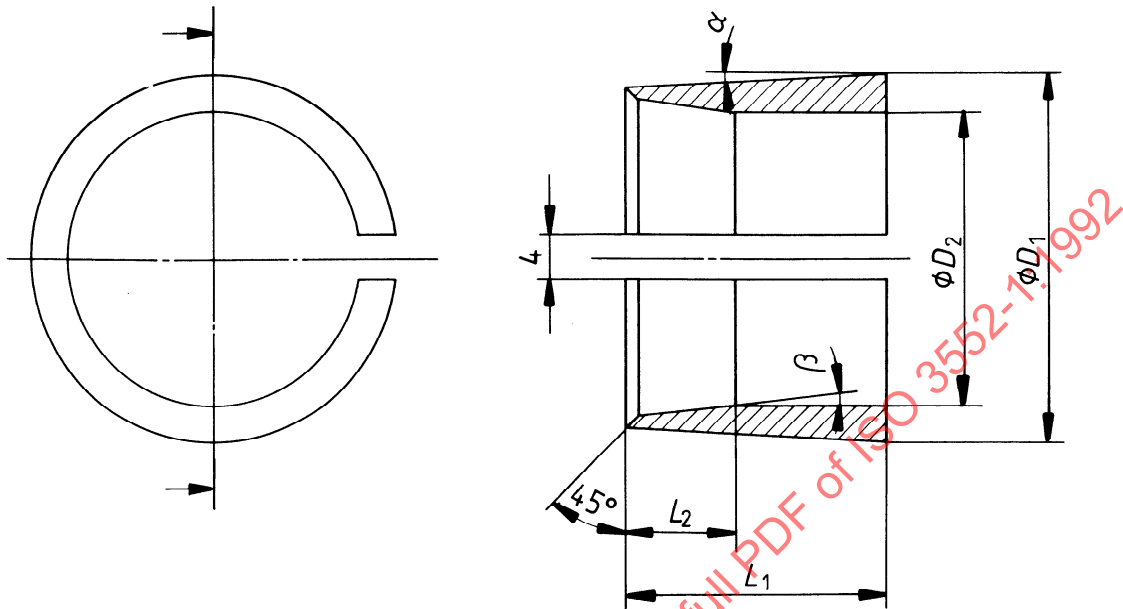


Figure 16 — Core barrel, Type B — Core lifter (see table 19)

Table 19 — Core barrel, Type B — Core lifter

| Size | $D_1$<br>$\pm 0,05$ | $D_2$<br>$\pm 0,1$ | $L_1$<br>$\pm 0,2$ | $L_2$<br>js14 | $\alpha$ | $\beta$ |
|------|---------------------|--------------------|--------------------|---------------|----------|---------|
| 36   | 29                  | 21,5               | 22                 | 12            | 3,5°     | 9°      |
| 46   | 39                  | 31,5               |                    |               |          | 8,5°    |
| 56   | 49                  | 41,5               | 35                 | 21,5          | 2,5°     | 4°      |
| 66   | 59                  | 51,5               |                    | 22            |          | 3,5°    |
| 76   | 69                  | 61,5               | 49                 | 35            | 1,5°     | 2,5°    |
| 86   | 79                  | 71,5               |                    |               |          |         |
| 101  | 94,4                | 86,5               |                    |               |          |         |
| 116  | 109,4               | 101,5              |                    |               |          |         |
| 131  | 124,4               | 116,5              |                    |               |          |         |
| 146  | 139,4               | 131,5              |                    |               |          | 2,8°    |

NOTE — Minor variations are permissible according to the manufacturer's decision.

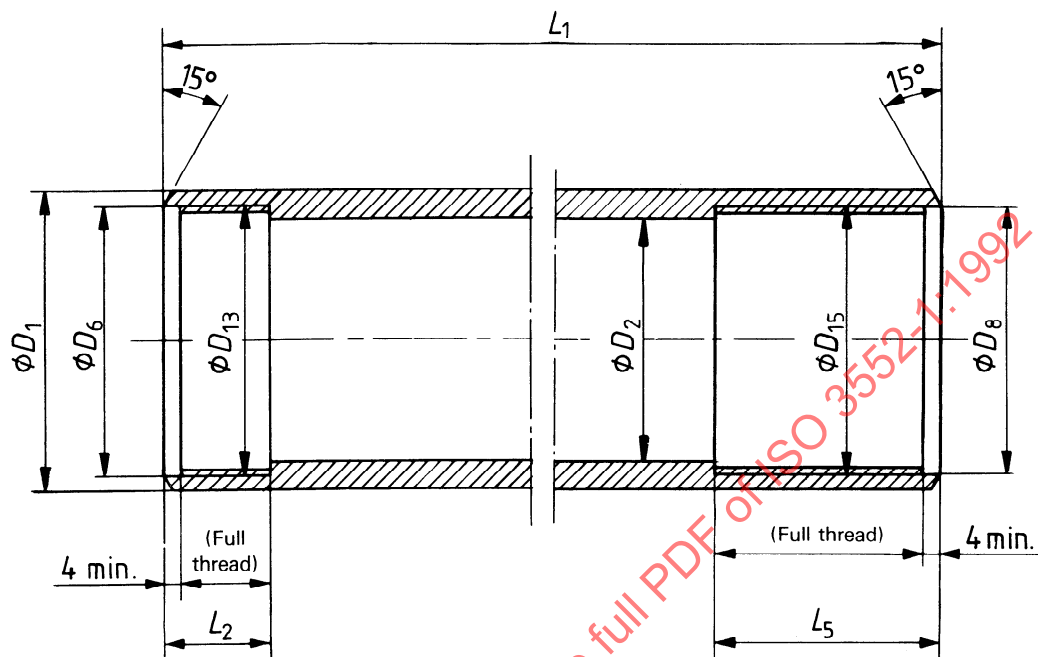


Figure 17 — Core barrel, Type B — Core tube (see table 20)

Table 20 — Core barrel, Type B — Core tube

| Size | $D_1$ |        | $D_2$ |        | $D_6$            | $D_8$            | $D_{13}$      | $D_{15}$ | $L_1$                                   | $L_2$ | $L_5$ |
|------|-------|--------|-------|--------|------------------|------------------|---------------|----------|-----------------------------------------|-------|-------|
|      |       | tol.   |       | tol.   | + 0,20<br>+ 0,12 | + 0,20<br>+ 0,12 | Thread<br>CR3 | Thread   |                                         |       |       |
| 36   | 33,5  | ± 0,2  | 23,3  | ± 0,25 | 30               | 28               | 30            | CR1 28   | 500 ± 1,5<br>1 500 ± 1,5<br>3 000 ± 2,5 | 18,5  | 40    |
| 46   | 44,15 |        | 37,15 |        | 40               | 40               | 40            | CR4 40   |                                         | 19    |       |
| 56   | 54,15 | ± 0,25 | 47,15 |        | 50               | 50               | 50            | CR4 50   |                                         | 23    |       |
| 66   | 64,25 | ± 0,3  | 57,25 |        | 60               | 60               | 60            | CR4 60   |                                         |       |       |
| 76   | 74,25 |        | 67,25 |        | 70               | 70               | 70            | CR4 70   |                                         | 26    |       |
| 86   | 84,25 | ± 0,4  | 77,25 |        | 80               | 80               | 80            | CR4 80   |                                         |       |       |
| 101  | 98    |        | 88,3  | ± 0,4  | 95               | 93               | 95            | CR4 93   |                                         | 28    | 45    |
| 116  | 113   | ± 0,5  | 103,3 | ± 0,5  | 110              | 108              | 110           | CR4 108  |                                         |       |       |
| 131  | 128   |        | 118,3 | 125    | 123              | 125              | CR4 123       |          |                                         |       |       |
| 146  | 143   |        | 133,3 | ± 0,7  | 140              | 138              | 140           | CR4 138  |                                         |       |       |

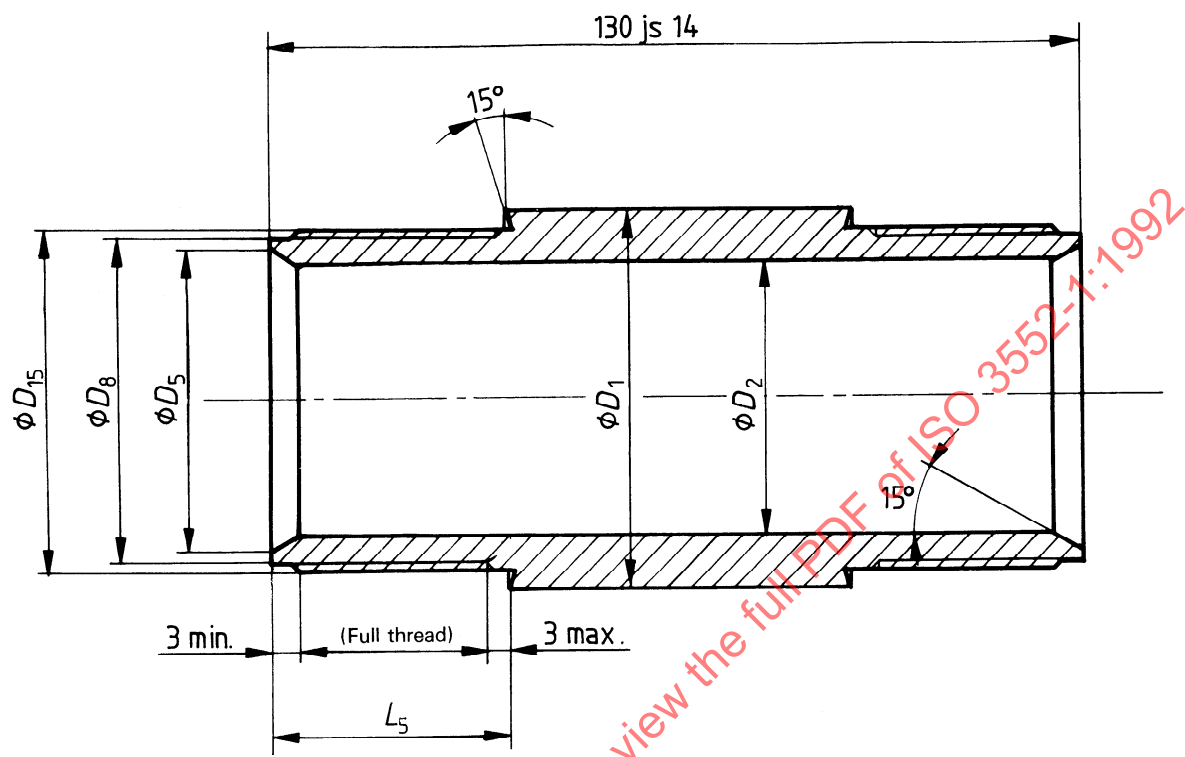


Figure 18 — Core barrel, Type B — Extension coupling (see table 21)

Table 21 — Core barrel, Type B — Extension coupling

| Size | $D_1$<br>h11 | $D_2$<br>JS13 | $D_5$<br>JS13 | $D_8$<br>− 0,15<br>− 0,35 | $D_{15}$<br>Thread<br>CR4 | $L_5$<br>js14 |
|------|--------------|---------------|---------------|---------------------------|---------------------------|---------------|
| 46   | 44,5         | 33            | 36            | 38                        | 40                        | 35            |
| 56   | 54,5         | 43            | 46            | 48                        | 50                        |               |
| 66   | 64,5         | 53            | 56            | 58                        | 60                        |               |
| 76   | 74,5         | 63            | 66            | 68                        | 70                        |               |
| 86   | 84,5         | 73            | 76            | 78                        | 80                        |               |

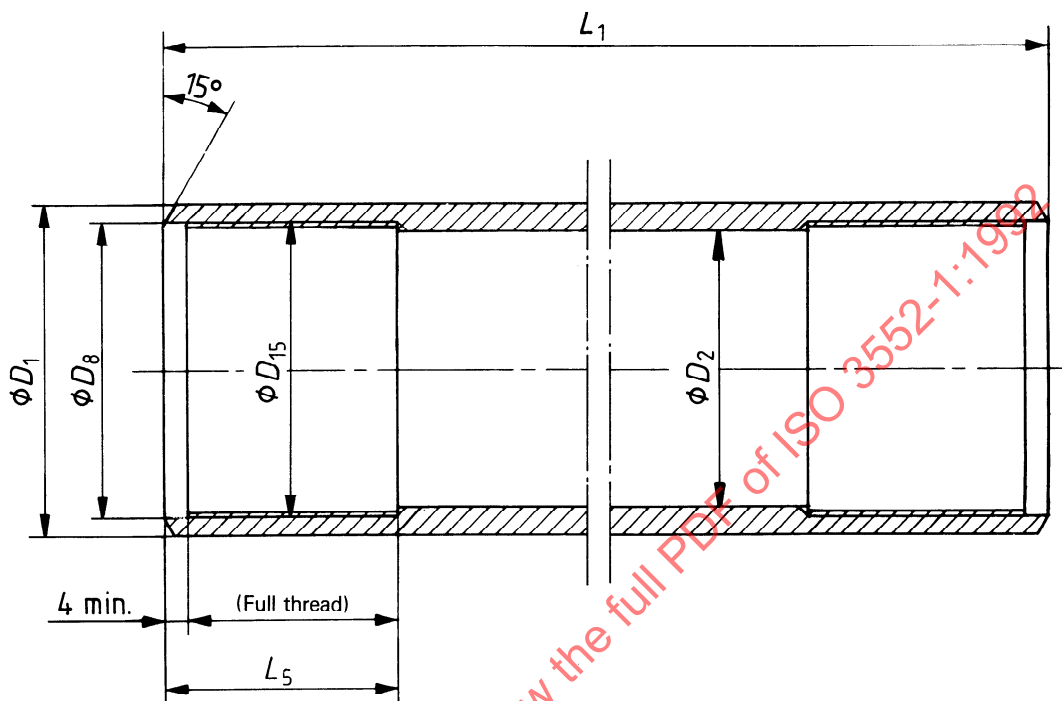


Figure 19 — Core barrel, Type B — Extension tube (see table 22)

Table 22 — Core barrel, Type B — Extension tube

| Size | Nominal length<br>(including coupling) | $L_1$                                | $D_1$ |            | $D_2$ |            | $D_8$            | $D_{15}$      | $L_5$ |
|------|----------------------------------------|--------------------------------------|-------|------------|-------|------------|------------------|---------------|-------|
|      |                                        |                                      |       | tol.       |       | tol.       | + 0,20<br>+ 0,12 | Thread<br>CR4 |       |
| 46   | 1 500<br>3 000                         | $1\,440 \pm 1,5$<br>$2\,940 \pm 2,5$ | 44,15 | $\pm 0,2$  | 37,15 | $\pm 0,25$ | 40               | 40            | 40    |
| 56   |                                        |                                      | 54,15 | $\pm 0,25$ | 47,15 |            | 50               | 50            |       |
| 66   |                                        |                                      | 64,25 | $\pm 0,3$  | 57,25 |            | 60               | 60            |       |
| 76   |                                        |                                      | 74,25 |            | 67,25 |            | 70               | 70            |       |
| 86   |                                        |                                      | 84,25 | $\pm 0,4$  | 77,25 |            | 80               | 80            |       |

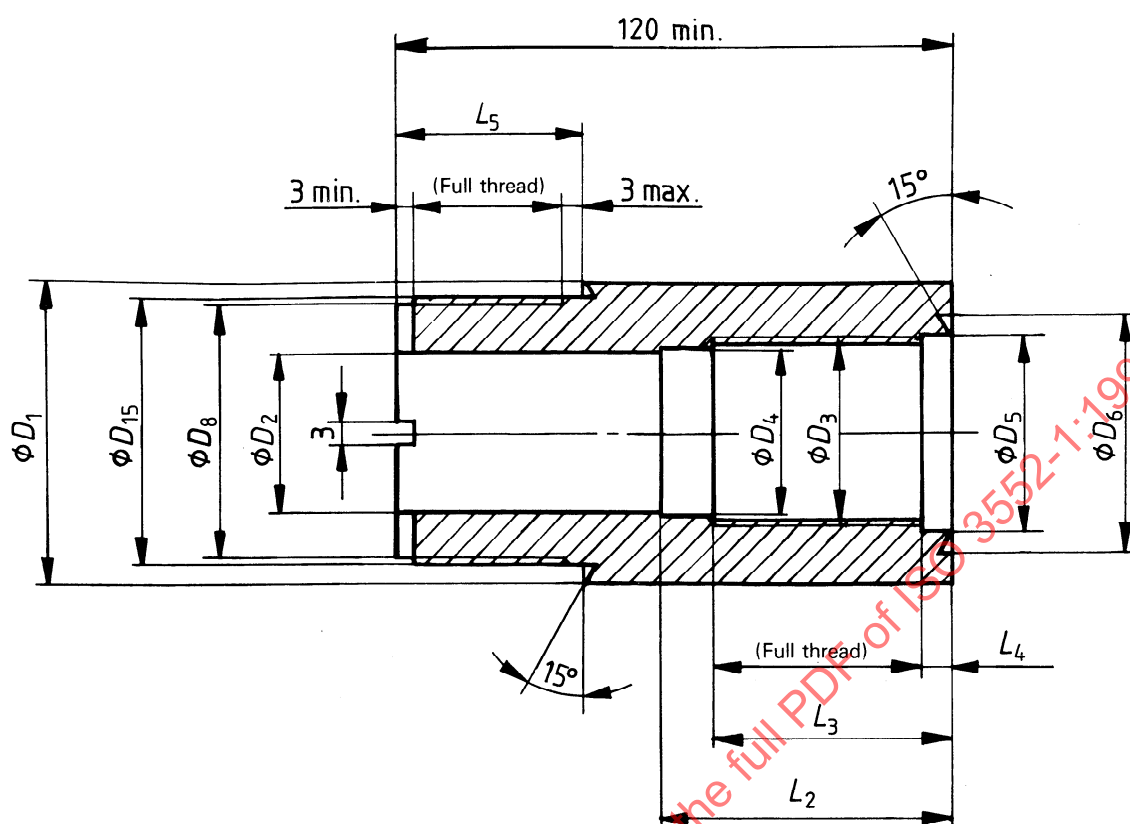


Figure 20 — Core barrel, Type B — Head (see table 23)

Table 23 — Core barrel, Type B — Head

| Size     | $D_1$<br>h11 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 | $D_4$<br>H11 | $D_5$<br>+ 0,20<br>+ 0,12 | $D_6$<br>+ 0,5<br>+ 0,2 | $D_8$<br>- 0,15<br>- 0,35 | $D_{15}$<br>Thread<br>CR4 | $L_2$<br>js14 | $L_3$<br>js14 | $L_4$<br>js14 | $L_5$<br>js14 |
|----------|--------------|---------------|------------------------|--------------|---------------------------|-------------------------|---------------------------|---------------------------|---------------|---------------|---------------|---------------|
| 46 × 33  | 44,5         | 22            | 28                     | 24,4         | 28                        | 33,5                    | 38                        | 40                        | 45            | 35            | 6             | 35            |
| 46 × 42  |              | 30            | 36                     | 32,8         | 36                        | 42                      |                           |                           | 55            | 45            |               |               |
| 56 × 42  | 54,5         | 37            | 41,5                   | 37,8         | 41,5                      | 50                      | 48                        | 50                        | 65            | 55            | 8             |               |
| 56 × 50  |              |               |                        |              |                           |                         | 58                        | 60                        |               |               |               |               |
| 66 × 50  | 64,5         |               |                        |              |                           |                         | 68                        | 70                        |               |               |               |               |
| 76 × 50  | 74,5         |               |                        |              |                           |                         | 78                        | 80                        |               |               |               |               |
| 86 × 50  | 84,5         |               |                        |              |                           |                         | 91                        | 93                        |               |               |               |               |
| 101 × 50 | 98           |               |                        |              |                           |                         | 106                       | 108                       |               |               |               |               |
| 116 × 50 | 113          |               |                        |              |                           |                         | 121                       | 123                       |               |               |               |               |
| 131 × 50 | 128          |               |                        |              |                           |                         | 136                       | 138                       |               |               |               | 40            |
| 146 × 50 | 143          |               |                        |              |                           |                         |                           |                           |               |               |               |               |

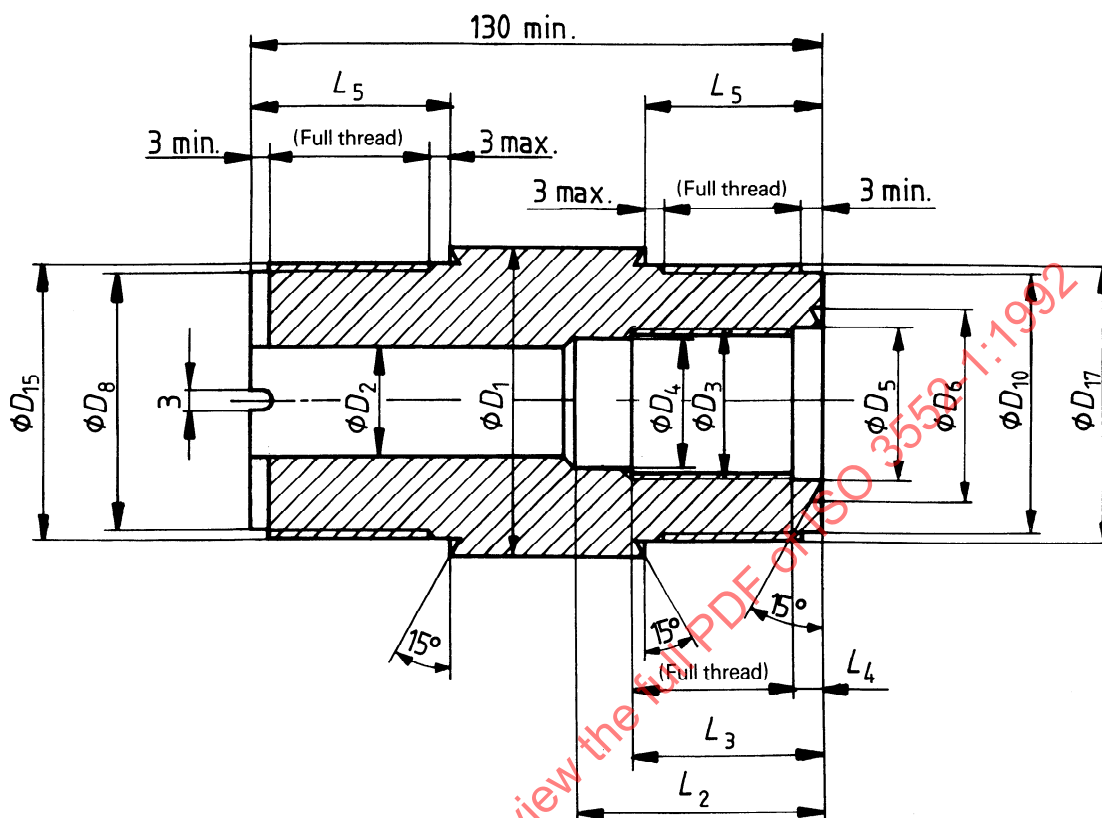
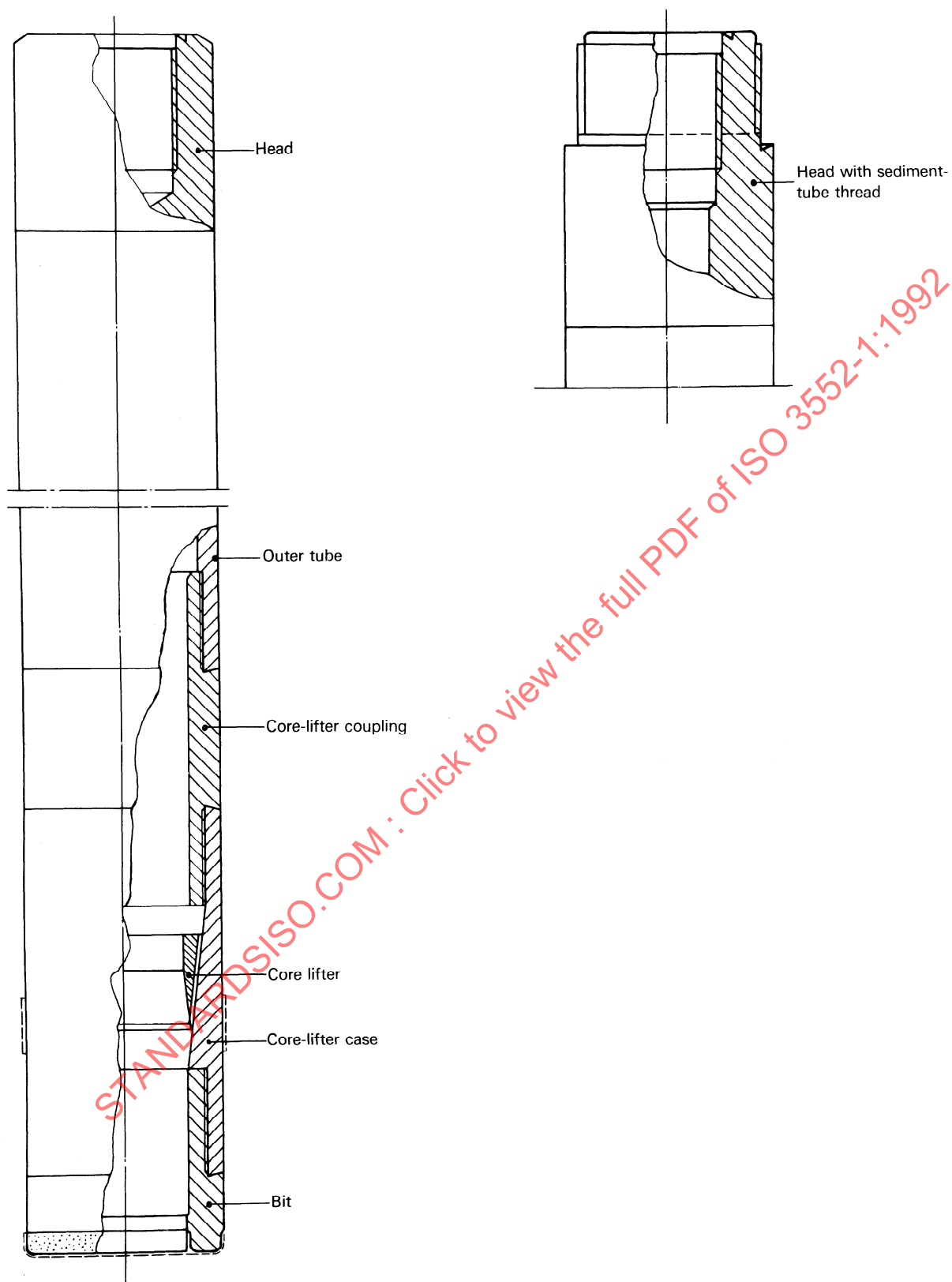


Figure 21 — Core barrel, Type B — Head with sediment-tube thread (see table 24)

Table 24 — Core barrel, Type B — Head with sediment-tube thread

| Size                  | $D_1$<br>h11 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 *) | $D_4$<br>H11 | $D_5$<br>+ 0,20<br>+ 0,12 | $D_6$<br>+ 0,5<br>+ 0,2 | $D_8$<br>- 0,15<br>- 0,35 | $D_{10}$<br>- 0,15<br>- 0,35 | $D_{15}$<br>Thread<br>CR4 *) | $D_{17}$<br>Thread<br>CR4 **) | $L_2$<br>js14 | $L_3$<br>js14 | $L_4$<br>js14 | $L_5$<br>js14 |    |
|-----------------------|--------------|---------------|---------------------------|--------------|---------------------------|-------------------------|---------------------------|------------------------------|------------------------------|-------------------------------|---------------|---------------|---------------|---------------|----|
| 56 × 33               | 54,5         | 22            | 28                        | 24,4         | 28                        | 33,5                    | 48                        | 48                           | 50                           | 50                            | 45            | 35            | 6             | 35            |    |
| 66 × 42               | 64,5         | 30            | 36                        | 32,8         | 36                        | 42                      | 58                        | 58                           | 60                           | 60                            | 55            | 45            |               |               |    |
| 76 × 50               | 74,5         | 37            | 41,5                      | 37,8         | 41,5                      | 50                      | 68                        | 68                           | 70                           | 70                            | 65            | 55            | 8             |               | 40 |
| 86 × 50               | 84,5         |               |                           |              |                           |                         | 78                        | 78                           | 80                           | 80                            |               |               |               |               |    |
| 101 × 50              | 98           |               |                           |              |                           |                         | 91                        | 91                           | 93                           | 93                            |               |               |               |               |    |
| 116 × 50              | 113          |               |                           |              |                           |                         | 106                       | 106                          | 108                          | 108                           |               |               |               |               |    |
| 131 × 50              | 128          |               |                           |              |                           |                         | 121                       | 121                          | 123                          | 123                           |               |               |               |               |    |
| 146 × 50              | 143          |               |                           |              |                           |                         | 136                       | 136                          | 138                          | 138                           |               |               |               |               |    |
| *) Right-hand thread. |              |               |                           |              |                           |                         |                           |                              |                              |                               |               |               |               |               |    |
| **) Left-hand thread. |              |               |                           |              |                           |                         |                           |                              |                              |                               |               |               |               |               |    |



NOTE — Extension tube for Type Z core barrel is identical to outer tube.

Figure 22 — Core barrel, Type Z — Assembly

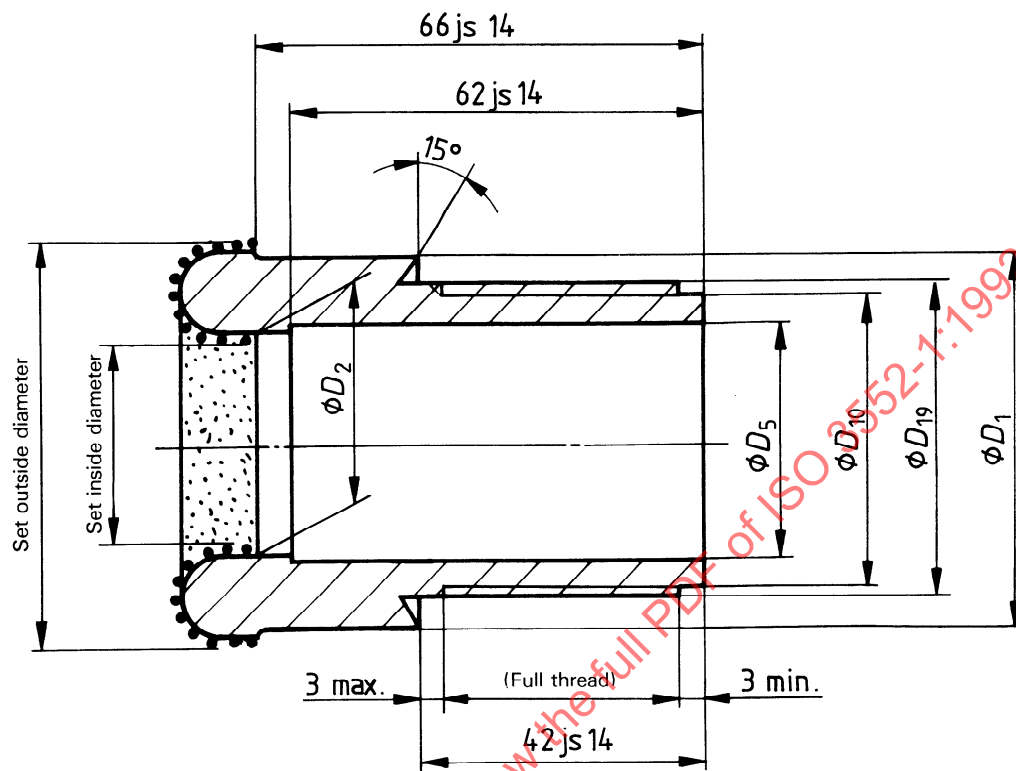


**Figure 23 — Core barrel, Type Z — Bit (see table 25)**

**Table 25 — Core barrel, Type Z — Bit**

| Size | Set outside diameter<br>$\pm 0,1$ | Set inside diameter<br>$\begin{matrix} -0,2 \\ -0,4 \end{matrix}$ | $D_1$<br>h9 | $D_2$<br>H9 | $D_5$<br>$\pm 0,1$ | $D_{10}$<br>$\begin{matrix} -0,15 \\ -0,35 \end{matrix}$ | $D_{19}$<br>Thread CR2 |
|------|-----------------------------------|-------------------------------------------------------------------|-------------|-------------|--------------------|----------------------------------------------------------|------------------------|
| 46   | 46                                | 28                                                                | 45          | 29          | 30                 | 34,5                                                     | 36,5                   |
| 56   | 56                                | 34                                                                | 55          | 35          | 36                 | 44,5                                                     | 46,5                   |
| 66   | 66                                | 44                                                                | 65          | 45          | 46                 | 54,5                                                     | 56,5                   |
| 76   | 76                                | 54                                                                | 75          | 55          | 56                 | 64,5                                                     | 66,5                   |
| 86   | 86                                | 62                                                                | 85          | 63          | 64                 | 74,5                                                     | 76,5                   |
| 101  | 101                               | 75                                                                | 100         | 76          | 77                 | 90                                                       | 92                     |
| 116  | 116                               | 90                                                                | 115         | 91          | 92                 | 105                                                      | 107                    |
| 131  | 131                               | 105                                                               | 130         | 106         | 107                | 120                                                      | 122                    |
| 146  | 146                               | 120                                                               | 145         | 121         | 122                | 135                                                      | 137                    |

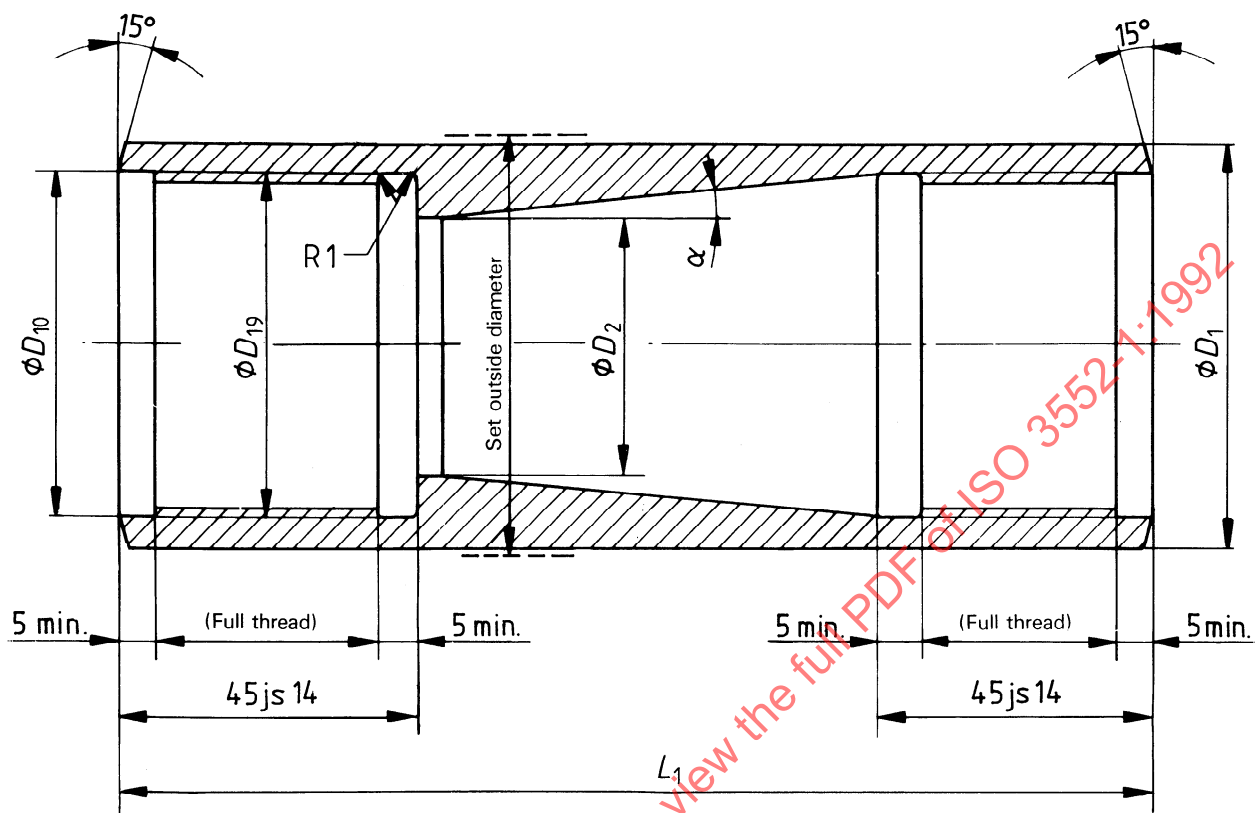


Table 26 — Core barrel, Type Z — Core-lifter case

| Size | Set outside diameter<br>± 0,1 | $D_1$<br>h11 | $D_2$<br>JS13 | $D_{10}$<br>+ 0,20<br>+ 0,12 | $D_{19}$<br>Thread<br>CR2 | $L_1$<br>min. | $\alpha$ |
|------|-------------------------------|--------------|---------------|------------------------------|---------------------------|---------------|----------|
| 46   | 46,3                          | 45           | 30            | 36,5                         | 36,5                      | 150           | 3°       |
| 56   | 56,3                          | 55           | 36            | 46,5                         | 46,5                      | 154           | 5°       |
| 66   | 66,3                          | 65           | 46            | 56,5                         | 56,5                      | 157           |          |
| 76   | 76,3                          | 75           | 56            | 66,5                         | 66,5                      | 168           |          |
| 86   | 86,3                          | 85           | 64            | 76,5                         | 76,5                      | 173           |          |
| 101  | 101,3                         | 100          | 78            | 92                           | 92                        | 173           |          |
| 116  | 116,3                         | 115          | 92,1          | 107                          | 107                       | 173           | 4,5°     |
| 131  | 131,3                         | 130          | 107,1         | 122                          | 122                       | 183           |          |
| 146  | 146,3                         | 145          | 122           | 137                          | 137                       | 183           |          |

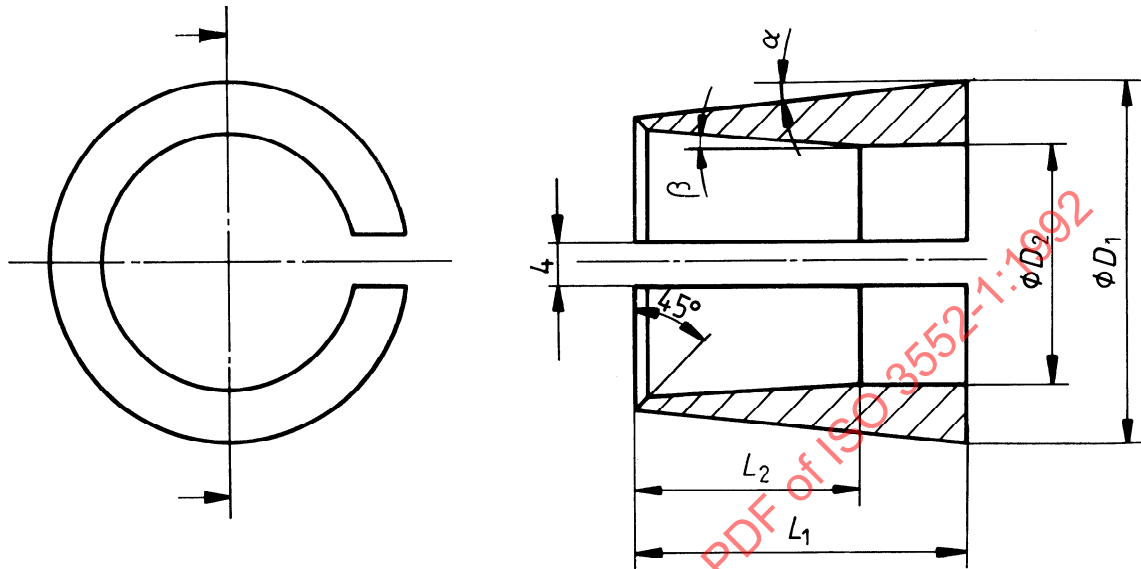


Figure 25 — Core barrel, Type Z — Core lifter (see table 27)

Table 27 — Core barrel, Type Z — Core lifter

| Size | $D_1$<br>± 0,05 | $D_2$<br>± 0,1 | $L_1$<br>js14 | $L_2$<br>js14 | $\alpha$ | $\beta$ |
|------|-----------------|----------------|---------------|---------------|----------|---------|
| 46   | 34              | 26,5           | 35            | 23            | 3°       | 2,7°    |
| 56   | 42              | 31             | 40            | 28            | 5°       | 2,8°    |
| 66   | 52              | 41,5           |               |               |          | 2°      |
| 76   | 62              | 51             |               |               |          | 2,2°    |
| 86   | 71              | 57,5           | 45            | 30            |          | 4°      |
| 101  | 86,5            | 71             |               |               |          | 5,8°    |
| 116  | 100,5           | 86             | 50            | 35            |          | 3,2°    |
| 131  | 115,5           | 100            |               |               |          | 4°      |
| 146  | 130             | 114,5          |               | 40            | 4,5°     | 3,5°    |

NOTE — Minor variations are permissible according to the manufacturer's decision.

NOTE — Minor variations are permissible according to the manufacturer's decision.

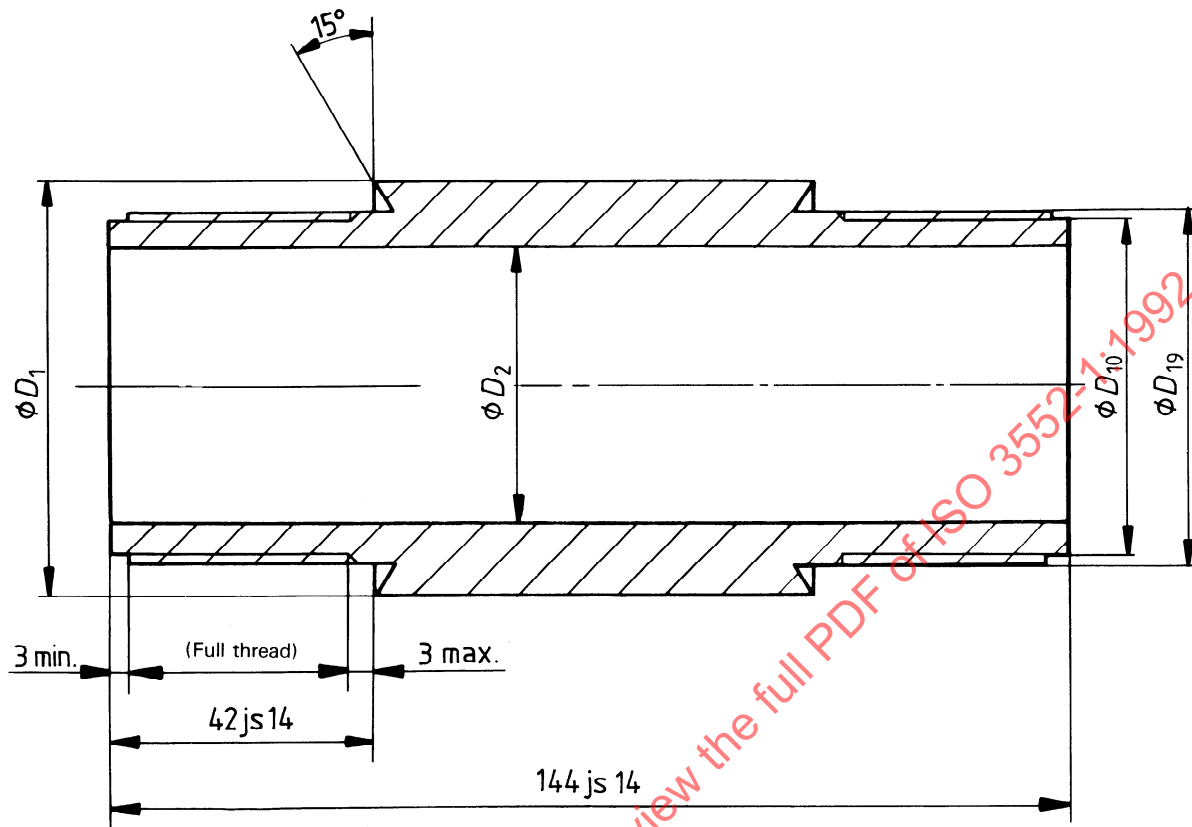


Figure 26 — Core barrel, Type Z — Core-lifter coupling (see table 28)

Table 28 — Core barrel, Type Z — Core-lifter coupling

| Size | $D_1$<br>h11 | $D_2$<br>JS13 | $D_{10}$<br>- 0,15<br>- 0,35 | $D_{19}$<br>Thread<br>CR2 |
|------|--------------|---------------|------------------------------|---------------------------|
| 46   | 45           | 30            | 34,5                         | 36,5                      |
| 56   | 55           | 37            | 44,5                         | 46,5                      |
| 66   | 65           | 47            | 54,5                         | 56,5                      |
| 76   | 75           | 57            | 64,5                         | 66,5                      |
| 86   | 85           | 67            | 74,5                         | 76,5                      |
| 101  | 100          | 80            | 90                           | 92                        |
| 116  | 115          | 95            | 105                          | 107                       |
| 131  | 130          | 110           | 120                          | 122                       |
| 146  | 145          | 125           | 135                          | 137                       |

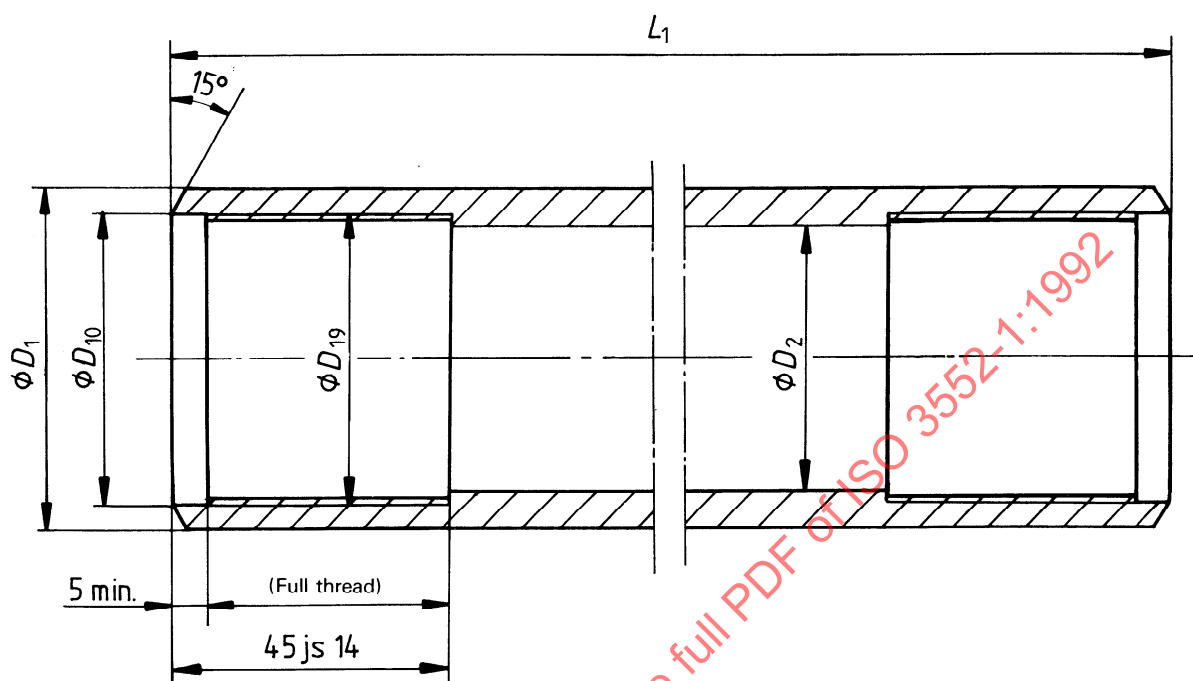


Figure 27 — Core barrel, Type Z — Core and extension tube (see table 29)

Table 29 — Core barrel, Type Z — Core and extension tube

| Size | Nominal length<br>(including coupling) | $L_1$                                   | $D_1$ |       | $D_2$ |        | $D_{10}$         | $D_{19}$      |
|------|----------------------------------------|-----------------------------------------|-------|-------|-------|--------|------------------|---------------|
|      |                                        |                                         |       | tol.  |       | tol.   | + 0,20<br>+ 0,12 | Thread<br>CR2 |
| 46   | 500<br>1 500<br>3 000                  | 440 ± 1,5<br>1 440 ± 1,5<br>2 940 ± 2,5 | 44,15 | ± 0,2 | 32,9  | ± 0,25 | 36,5             | 36,5          |
| 56   |                                        |                                         | 54,15 |       | 42,9  |        | 46,5             | 46,5          |
| 66   |                                        |                                         | 64,25 | ± 0,3 | 52,9  |        | 56,5             | 56,5          |
| 76   |                                        |                                         | 74,25 |       | 62,9  |        | 66,5             | 66,5          |
| 86   |                                        |                                         | 84,25 | ± 0,4 | 72,9  | ± 0,4  | 76,5             | 76,5          |
| 101  |                                        |                                         | 98    |       | 88,3  |        | 92               | 92            |
| 116  |                                        |                                         | 113   | + 0,5 | 103,3 | ± 0,5  | 107              | 107           |
| 131  |                                        |                                         | 128   |       | 118,3 |        | 122              | 122           |
| 146  |                                        |                                         | 143   |       | 133,3 | ± 0,7  | 137              | 137           |

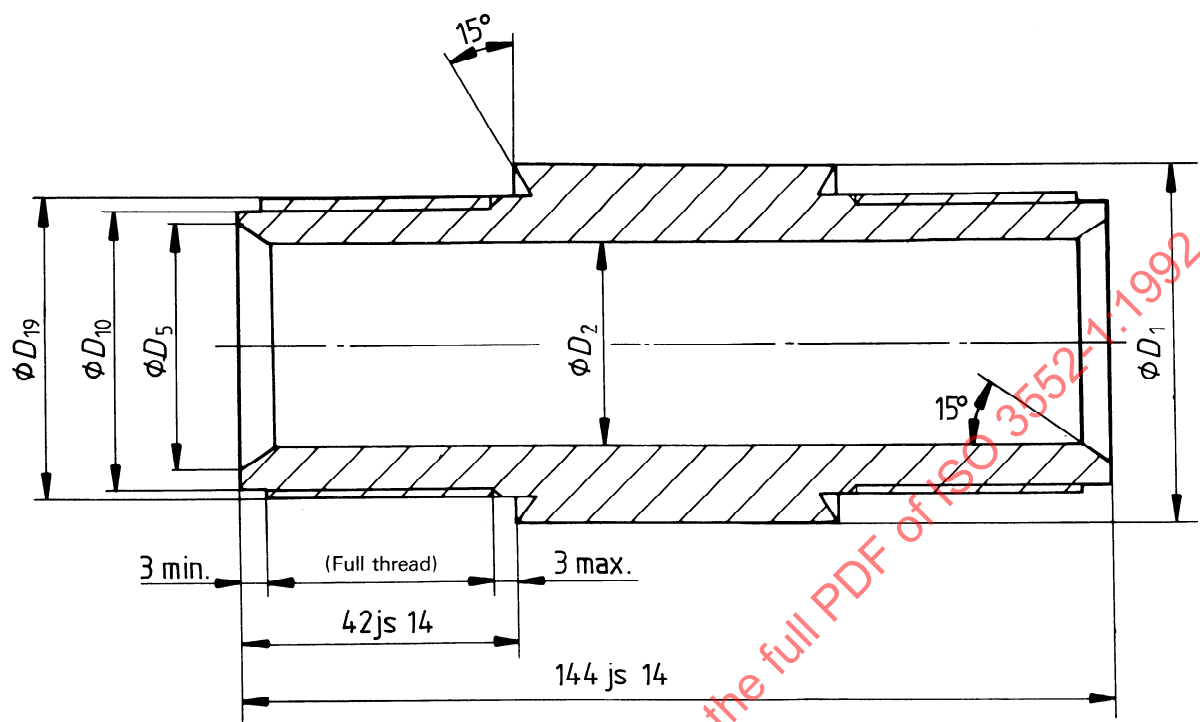


Figure 28 — Core barrel, Type Z — Extension coupling (see table 30)

Table 30 — Core barrel, Type Z — Extension coupling

| Size | $D_1$<br>h11 | $D_2$<br>JS13 | $D_5$<br>JS13 | $D_{10}$<br>– 0,15<br>– 0,35 | $D_{19}$<br>Thread<br>CR2 |
|------|--------------|---------------|---------------|------------------------------|---------------------------|
| 46   | 44,5         | 30            | 32            | 34,5                         | 36,5                      |
| 56   | 54,5         | 36            | 42            | 44,5                         | 46,5                      |
| 66   | 64,5         | 46            | 52            | 54,5                         | 56,5                      |
| 76   | 74,5         | 56            | 62            | 64,5                         | 66,5                      |
| 86   | 84,5         | 64            | 72            | 74,5                         | 76,5                      |
| 101  | 98           | 80            | 88            | 90                           | 92                        |
| 116  | 113          | 95            | 103           | 105                          | 107                       |
| 131  | 128          | 110           | 118           | 120                          | 122                       |
| 146  | 143          | 125           | 133           | 135                          | 137                       |

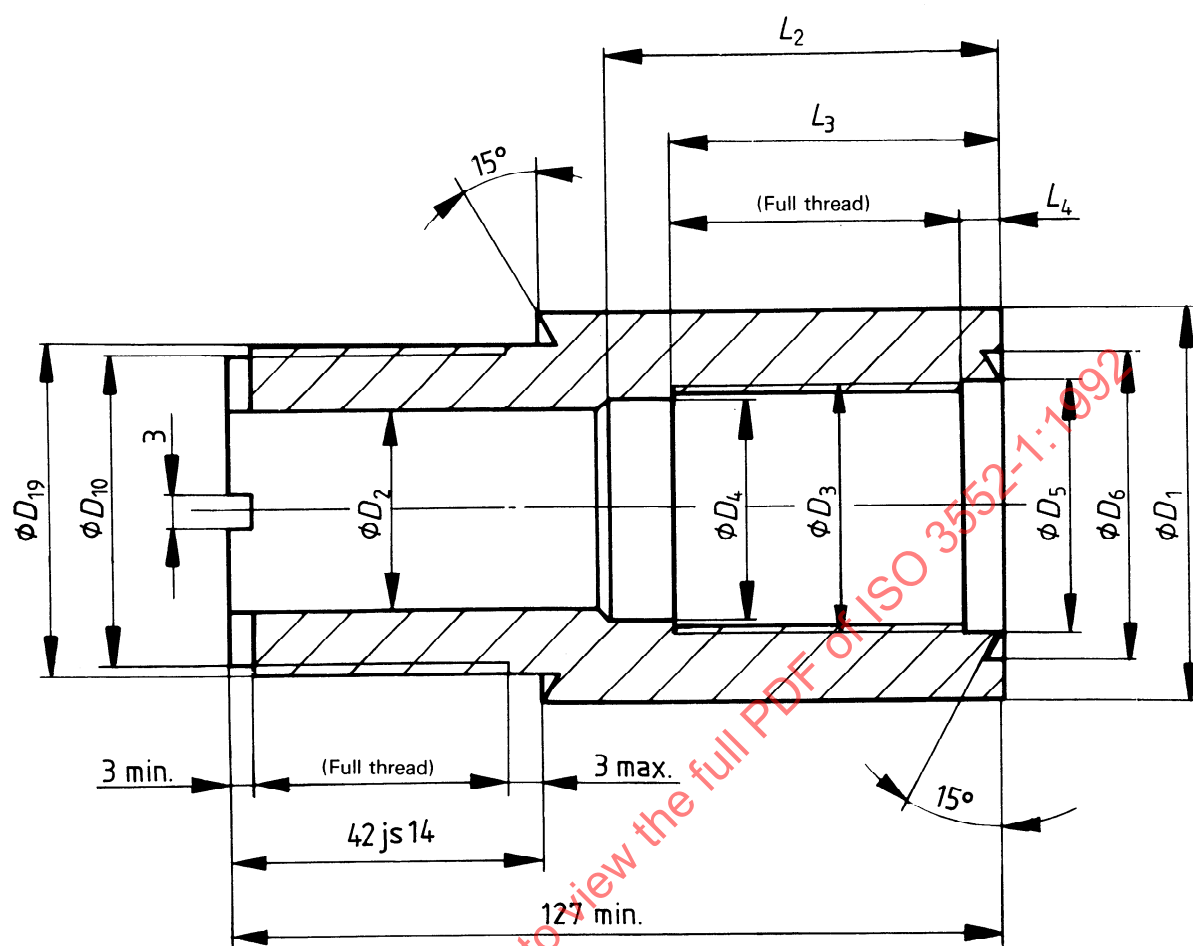


Figure 29 — Core barrel, Type Z — Head (see table 31)

Table 31 — Core barrel, Type Z — Head

| Size     | $D_1$<br>h11 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1 | $D_4$<br>H11 | $D_5$<br>+ 0,20<br>+ 0,12 | $D_6$<br>+ 0,5<br>+ 0,2 | $D_{10}$<br>- 0,15<br>- 0,35 | $D_{19}$<br>Thread<br>CR2 | $L_2$<br>js14 | $L_3$<br>js14 | $L_4$<br>js14 |
|----------|--------------|---------------|------------------------|--------------|---------------------------|-------------------------|------------------------------|---------------------------|---------------|---------------|---------------|
| 46 × 33  | 44,5         | 22            | 28                     | 24,4         | 28                        | 33,5                    | 34,5                         | 36,5                      | 45            | 35            | 6             |
| 46 × 42  |              | 30            | 36                     | 32,8         | 36                        | 42                      |                              |                           | 55            | 45            |               |
| 56 × 42  | 54,5         | 37            | 41,5                   | 37,8         | 41,5                      | 50                      | 44,5                         | 46,5                      | 65            | 55            | 8             |
| 56 × 50  |              |               |                        |              |                           |                         | 54,5                         | 56,5                      |               |               |               |
| 66 × 50  | 64,5         |               |                        |              |                           |                         | 64,5                         | 66,5                      |               |               |               |
| 76 × 50  | 74,5         |               |                        |              |                           |                         | 74,5                         | 76,5                      |               |               |               |
| 86 × 50  | 84,5         |               |                        |              |                           |                         | 90                           | 92                        |               |               |               |
| 101 × 50 | 98           |               |                        |              |                           |                         | 105                          | 107                       |               |               |               |
| 116 × 50 | 113          |               |                        |              |                           |                         | 120                          | 122                       |               |               |               |
| 131 × 50 | 128          |               |                        |              |                           |                         | 135                          | 137                       |               |               |               |
| 146 × 50 | 143          |               |                        |              |                           |                         |                              |                           |               |               |               |

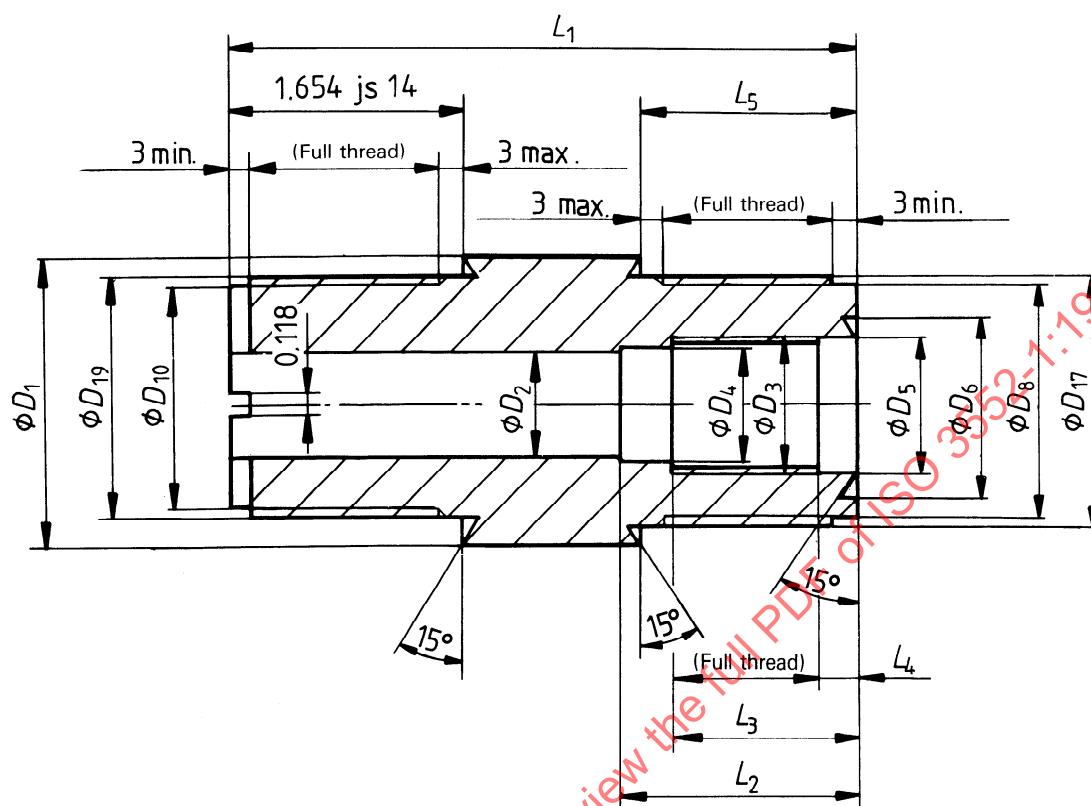


Figure 30 — Core barrel, Type Z — Head with sediment-tube thread (see table 32)

Table 32 — Core barrel, Type Z — Head with sediment-tube thread

| Size     | $D_1$<br>h11 | $D_2$<br>JS13 | $D_3$<br>Thread<br>CR1*) | $D_4$<br>H11 | $D_5$<br>+ 0,20<br>+ 0,12 | $D_6$<br>+ 0,5<br>+ 0,2 | $D_8$<br>- 0,15<br>- 0,35 | $D_{10}$<br>- 0,15<br>- 0,35 | $D_{17}$<br>Thread<br>CR4**) | $D_{19}$<br>Thread<br>CR2*) | $L_1$<br>min. | $L_2$<br>js14 | $L_3$<br>js14 | $L_4$<br>js14 | $L_5$<br>js14 |    |
|----------|--------------|---------------|--------------------------|--------------|---------------------------|-------------------------|---------------------------|------------------------------|------------------------------|-----------------------------|---------------|---------------|---------------|---------------|---------------|----|
| 56 × 33  | 54,5         | 22            | 28                       | 24,4         | 28                        | 33,5                    | 48                        | 44,5                         | 50                           | 46,5                        | 137           | 45            | 35            | 6             | 35            |    |
| 66 × 42  | 64,5         | 30            | 36                       | 32,8         | 36                        | 42                      | 58                        | 54,5                         | 60                           | 56,5                        |               | 55            | 45            |               |               |    |
| 76 × 50  | 74,5         | 37            | 41,5                     | 37,8         | 41,5                      | 50                      | 68                        | 64,5                         | 70                           | 66,5                        |               | 65            | 55            | 8             |               | 40 |
| 86 × 50  | 84,5         |               |                          |              |                           |                         | 78                        | 74,5                         | 80                           | 76,5                        |               |               |               |               |               |    |
| 101 × 50 | 98           |               |                          |              |                           |                         | 91                        | 90                           | 93                           | 92                          |               |               |               |               |               |    |
| 116 × 50 | 113          |               |                          |              |                           |                         | 106                       | 105                          | 108                          | 107                         |               |               |               |               |               |    |
| 131 × 50 | 128          |               |                          |              |                           |                         | 121                       | 120                          | 123                          | 122                         |               |               |               |               |               |    |
| 146 × 50 | 143          |               |                          |              |                           |                         | 136                       | 135                          | 138                          | 137                         | 142           |               |               |               |               |    |

\*) Right-hand thread.

\*\*) Left-hand thread.