

INTERNATIONAL STANDARD

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Rotary core diamond drilling equipment — System B —

Part 2: Inch units

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

Partie 2: Unités en inches



Reference number
ISO 3552-2 : 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 3552-2 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 3551-2 : 1992, *Rotary core diamond drilling equipment — System A — Part 2: Inch 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 are selected from ISO 3551-2.

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 metric units shall be taken as the authentic values. (System B drawn up in metric units is dealt with in ISO 3552-1).

Rotary core diamond drilling equipment — System B —

Part 2: Inch 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 1.42 in to 5.74 in and yielding cores from 0.87 in to 4.72 in in diameter. The relation between

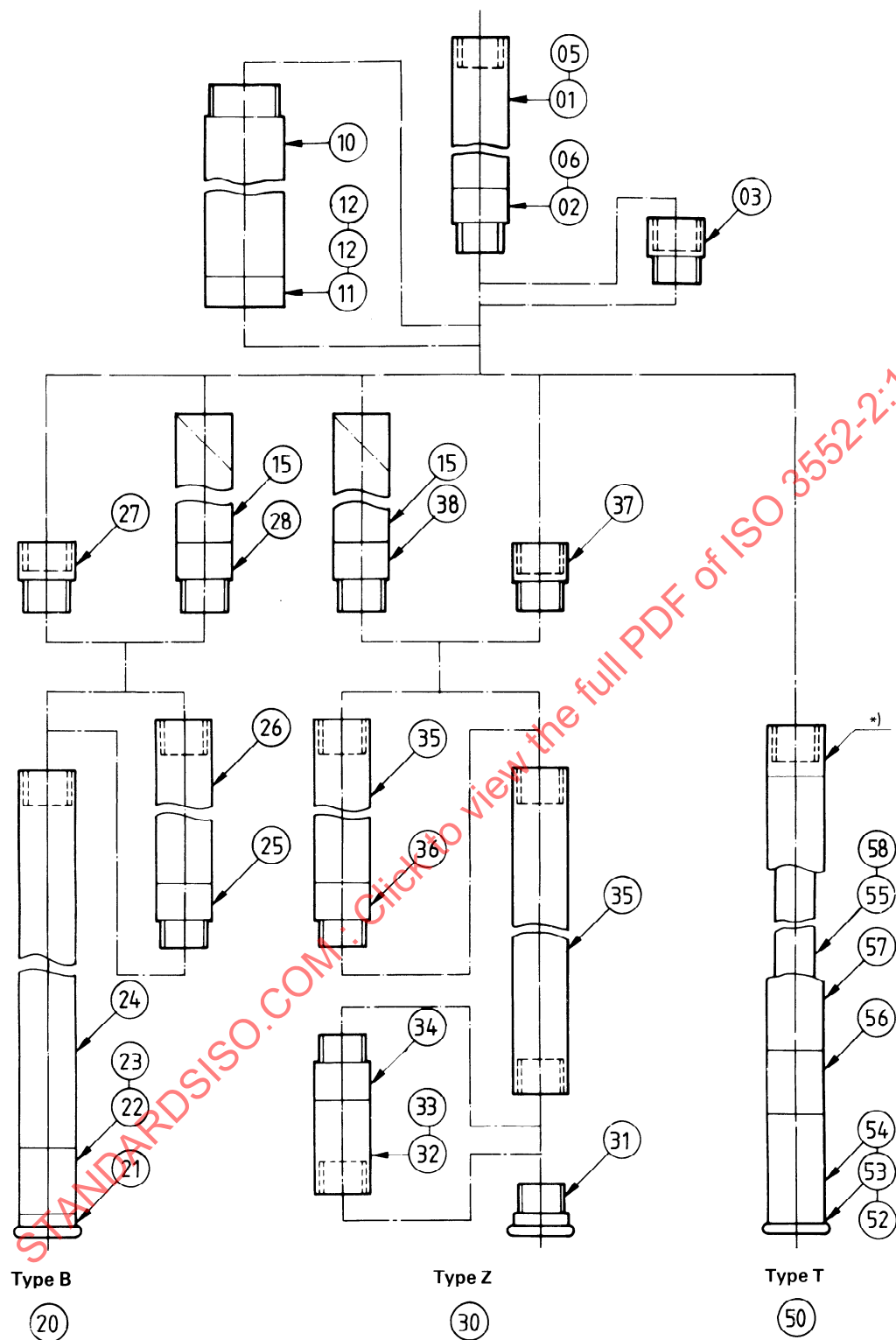
drilled hole diameter (size designation), core diameter (set inside diameter of the bit) and outside diameter and inside diameter ($D_1 \times D_2$) for core barrels, coring tubes and sediment tubes is shown in table 1.

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 (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	0.866	0.866	—	—	—	1.319 $\times$ 0.917	1.386 $\times$ 1.142	—
46	1.26	1.26	1.102	1.738 $\times$ 1.463	—	1.738 $\times$ 1.463	1.78 $\times$ 1.567	1.738 $\times$ 1.295
56	1.653	1.653	1.338	2.132 $\times$ 1.856	2.132 $\times$ 1.856	2.132 $\times$ 1.856	2.173 $\times$ 1.929	2.132 $\times$ 1.689
66	2.047	2.047	1.732	2.53 $\times$ 2.254	2.53 $\times$ 2.254	2.53 $\times$ 2.254	2.567 $\times$ 2.323	2.53 $\times$ 2.083
76	2.441	2.441	2.126	2.923 $\times$ 2.648	2.923 $\times$ 2.648	2.923 $\times$ 2.648	2.961 $\times$ 2.717	2.923 $\times$ 2.476
86	2.835	2.835	2.441	3.317 $\times$ 3.041	3.317 $\times$ 3.041	3.317 $\times$ 3.041	3.354 $\times$ 3.11	3.317 $\times$ 2.87
101	3.425	—	2.953	3.858 $\times$ 3.476	3.858 $\times$ 3.476	3.858 $\times$ 3.476	—	3.858 $\times$ 3.476
116	4.016	—	3.543	4.449 $\times$ 4.067	4.449 $\times$ 4.067	4.449 $\times$ 4.067	—	4.449 $\times$ 4.067
131	4.606	—	4.134	5.039 $\times$ 4.657	5.039 $\times$ 4.657	5.039 $\times$ 4.657	—	5.309 $\times$ 4.657
146	5.197	—	4.274	5.63 $\times$ 5.248	5.63 $\times$ 5.248	5.63 $\times$ 5.248	—	5.63 $\times$ 5.248

Table 2 — Designation reference numbers

Drill and fishing rods		30 Core barrels, Type Z	
01	Drill rods	31	Bits
02	Drill-rod couplings	32	Core-lifter cases
03	Drill-rod substitutes	33	Core lifter
05	Fishing rods	34	Core-lifter couplings
06	Fishing-rod couplings	35	Core and extension tubes
Casing tubes		36	Extension couplings
10	Casing tubes	37	Heads
11	Casing drive shoes	38	Heads with sediment-tube threads
12	Casing shoe bits	50 Double-tube core barrels, Type T	
13	Casing bits	52	Bits
Sediment tubes		53	Core-lifter cases
15	Sediment tubes	54	Core lifters
20 Core barrels, Type B		55	Inner tubes
21	Bits	56	Reaming shells
22	Core-lifter cases	57	Outer tubes
23	Core lifter	58	Extension tubes
24	Core tubes	Threads	
25	Extension couplings	61	Threads
26	Extension tubes		
27	Heads		
28	Heads with sediment-tube 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 R_m , min. lbf/in ²	Yield stress R_e , min. lbf/in ²	Percentage elongation after fracture A_{2in} , min. %
Parallel wall rods	100 000	80 000	13
Upset or forged ends of rods	95 000	55 000	14
Rod couplings and adaptors	114 000	100 000	15
Casing outside diameter < 3.543 in	100 000	80 000	13
Casing outside diameter > 3.543 in	95 000	55 000	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 inches (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*.¹⁾

4.2 Tolerances for blank tubing

4.2.1 Tolerances on outside diameters shall be ± 0.008 in for diameters less than 1.6 in and ± 0.5 % for diameters greater than or equal to 1.6 in.

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 in	Maximum difference between indicator readings in
Up to 59 (incl.)	0.079
From 59 up to 118 (incl.)	0.118
From 118 up to 177 (incl.)	0.157
From 177 up to 236 (incl.)	0.197

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

1) In ISO 286-2, the limit deviations are given only in metric units. The corresponding values in inches are to be found by conversion.

Dimensions in inches

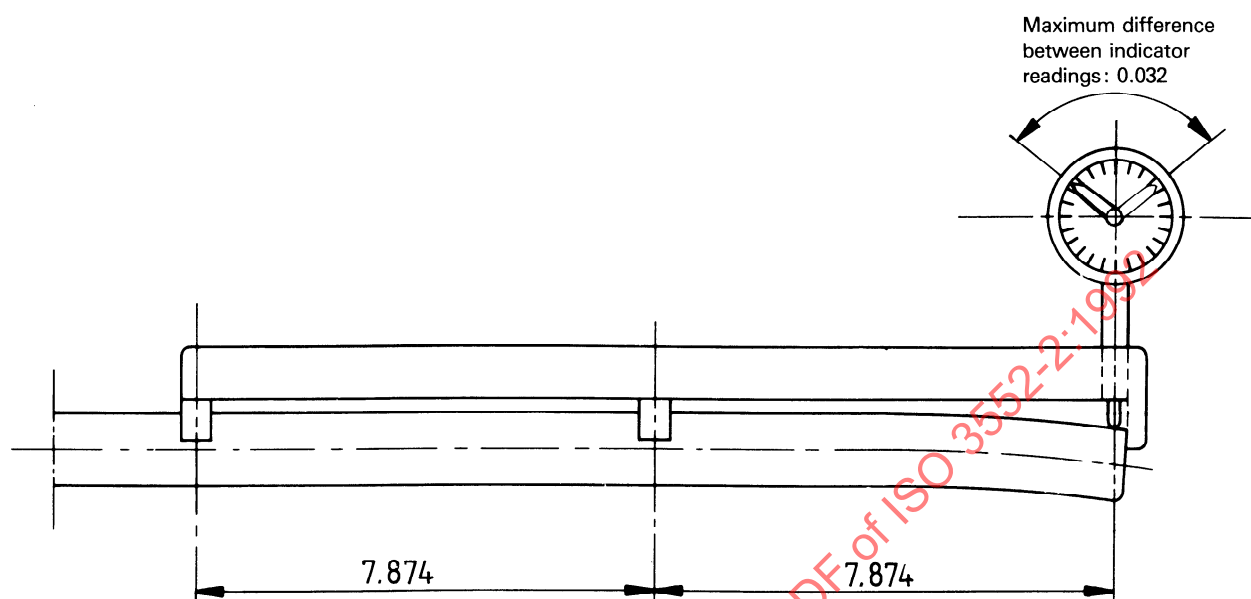


Figure 2 — Requirements for straightness at the tube ends

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	1.327	0.596	46	1.746	1.473	1.815	1.382	1.815	1.461
	1.311	0.585		1.730	1.453	1.807	1.374	1.807	1.453
42	1.661	0.872	56	2.140	1.866	2.209	1.776	2.209	1.854
	1.646	0.860		2.124	1.846	2.201	1.768	2.201	1.846
50	1.976	0.872	66	2.541	2.264	2.602	2.169	2.602	2.248
	1.961	0.860		2.518	2.244	2.594	2.161	2.594	2.240
			76	2.935	2.658	2.996	2.563	2.996	2.642
				2.911	2.638	2.988	2.555	2.988	2.634
			86	3.333	3.051	3.390	2.967	3.390	3.035
				3.301	3.031	3.382	2.959	3.382	3.027
			101	3.874	3.492	3.980	3.410	3.980	3.469
				3.843	3.460	3.972	3.402	3.972	3.461
			116	4.469	4.087	4.571	4.000	4.571	4.059
				4.429	4.047	4.563	3.992	4.563	4.051
			131	5.059	4.677	5.161	4.591	5.161	4.650
				5.020	4.637	5.154	4.583	5.154	4.642
			146	5.65	5.284	5.752	5.181	5.752	5.241
				5.61	5.228	5.744	5.173	5.744	5.233

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	Kerf area	Core area	Hole area	Core-to-hole ratio
B	T	Z	Set I.D.	Set O.D.	Set O.D.	in	in ²	in ²	in ²	%
36	36		0.858 0.850	1.421 1.413	1.433 1.425	0.281	1.015	0.589	1.604	36.5
46	46		1.258 1.244	1.815 1.807	1.827 1.819	0.281	1.364	1.246	2.61	47.8
		46	1.094 1.086	1.815 1.807	1.827 1.819	0.36	1.655	0.955	2.61	36.5
56	56		1.646 1.638	2.209 2.201	2.220 2.213	0.281	1.711	2.146	3.857	55.9
		56	1.331 1.323	2.209 2.201	2.220 2.213	0.438	2.45	1.407	3.857	36.5
66	66		2.039 2.031	2.602 2.594	2.614 2.606	0.281	2.058	3.292	5.35	61.6
		66	1.724 1.716	2.602 2.594	2.614 2.606	0.438	2.993	2.357	5.35	44.1
76	76		2.433 2.425	2.996 2.988	3.008 3.000	0.281	2.407	4.68	7.087	66.7
		76	2.118 2.110	2.996 2.988	3.008 3.000	0.438	3.537	3.55	7.087	50
86	86		2.827 2.819	3.390 3.382	3.402 3.394	0.281	2.756	6.311	9.067	69.8
		86	2.433 2.425	3.390 3.382	3.402 3.394	0.438	4.387	4.68	9.067	53
101			3.417 3.409	3.980 3.972	3.992 3.984	0.281	3.278	9.215	12.493	72.7
		101	2.955 2.947	3.980 3.972	3.992 3.984	0.517	5.645	6.848	12.493	54.9
116			4.008 4.000	4.571 4.563	4.583 4.575	0.281	3.801	12.666	16.467	76.8
		116	3.535 3.527	4.571 4.563	4.583 4.575	0.517	6.605	9.862	16.467	59.7
131			4.658 4.650	5.161 5.154	5.173 5.165	0.281	4.323	16.655	20.988	79.4
		131	4.126 4.118	5.161 5.154	5.173 5.165	0.517	7.566	13.422	20.988	64
146			5.189 5.181	5.752 5.744	5.764 5.756	0.281	4.846	21.213	26.059	81.4
		146	4.716 4.708	5.752 5.744	5.764 5.756	0.517	8.527	17.532	26.059	67.3

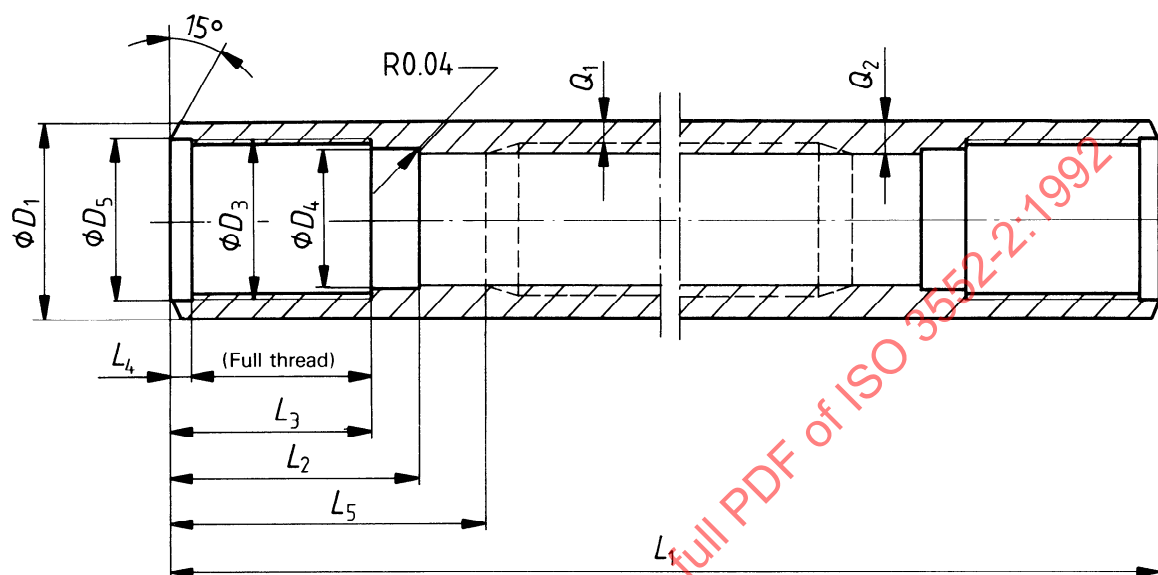


Figure 3 — Drill rod (see table 7)

Table 7 — Drill rod

Size	Nominal length (including coupling)	L_1 tol.	D_1 ± 0.008	D_3 Thread CR1	D_4 H11	D_5 $+ 0.008$ $+ 0.005$	$Q_1^{*)}$ min.	$Q_2^{*)}$ min.	L_2 js14	L_3 min.	L_4 js14	L_5 min.
33	19.685	17.323	± 0.059	1.319	28	0.961	0.128	0.185	1.772	1.378	0.236	2.165
42	59.055	56.693	± 0.059	1.654	36	1.291	0.138	0.187	2.165	1.772	0.236	2.559
50	118.11	115.748	± 0.098	1.969	41.5	1.488	0.177	0.246	2.559	2.165	0.315	2.953

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

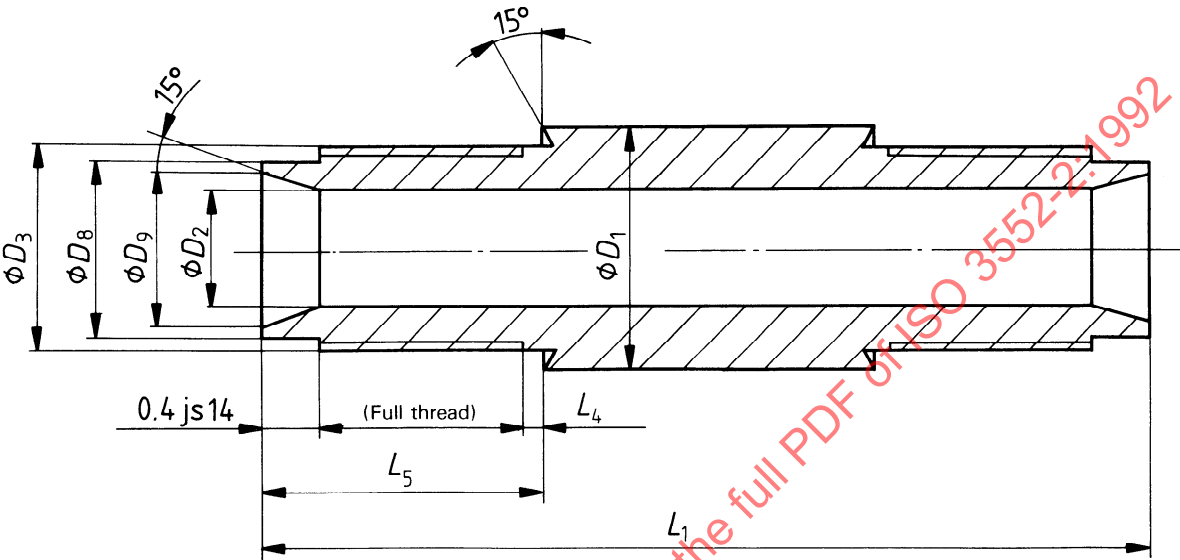


Figure 4 — Drill-rod coupling (see table 8)

Table 8 — Drill-rod coupling

Size	D_1 + 0.008 0	D_2 JS13	D_3 Thread CR1	D_8 d11	D_9 JS13	L_1 js14	L_4 max.	L_5 js14
33	1.319	0.591	28	0.961	0.748	5.512	0.197	1.575
42	1.654	0.866	36	1.291	1.063	6.299	0.197	1.969
50	1.969	0.866	41.5	1.488	1.26	7.087	0.276	2.362

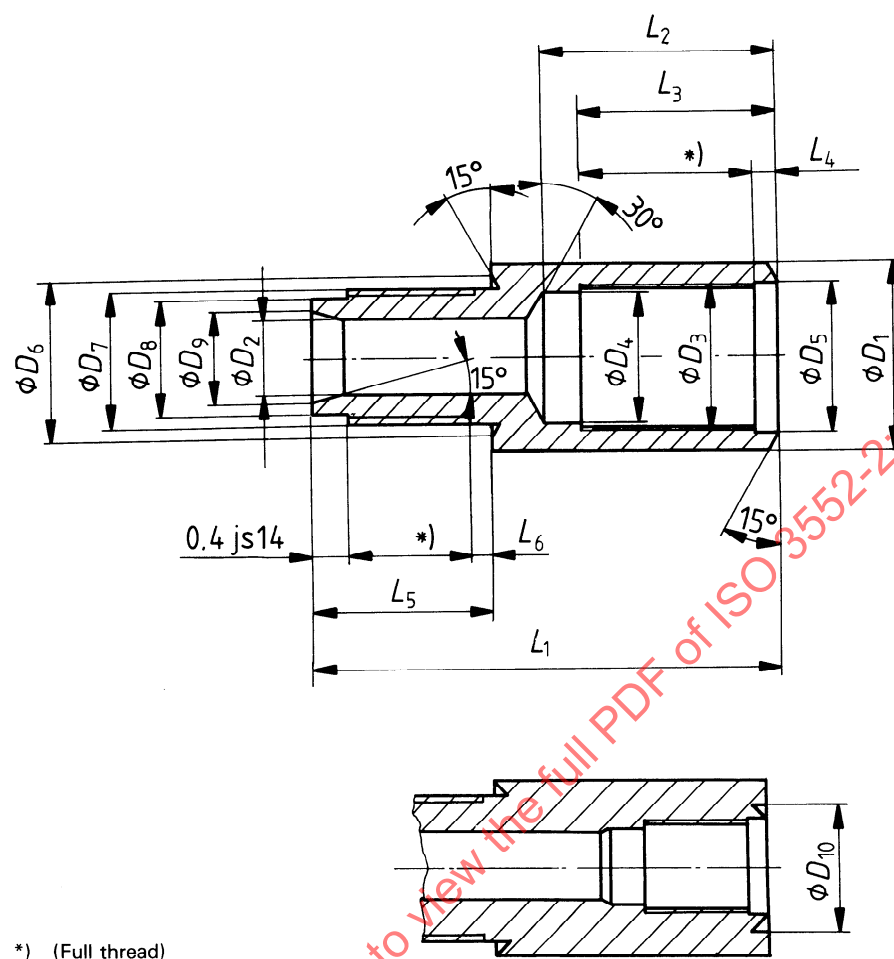


Figure 5 — Drill-rod substitute (see table 9)

Table 9 — Drill-rod substitute

Size	D_1 + 0.008 0	D_2 JS13	D_3 Thread CR1	D_4 H11	D_5 + 0.008 + 0.005	D_6 + 0.020 + 0.008	D_7 Thread CR1	D_8 d11	D_9 JS13	D_{10} + 0.020 + 0.008	L_1 js14	L_2 js14	L_3 js14	L_4 js14	L_5 js14	L_6 max.
33 × 42 ¹⁾	1.654	0.591	36	1.291	1.417	1.319	28	0.961	0.748	—	4.331	2.165	1.772	0.236	1.575	0.197
33 × 50 ¹⁾	1.969		41.5	1.488	1.634						1.654	36	1.291	1.063		
42 × 50 ¹⁾		0.866				28	0.961	1.102	—						41.5	
42 × 33 ²⁾	1.654		2.362	0.276												
50 × 33 ²⁾	1.969				5.118					2.165	1.772					
50 × 42 ²⁾																

1) Pin thread smaller than box thread.

2) Pin thread larger than box thread.

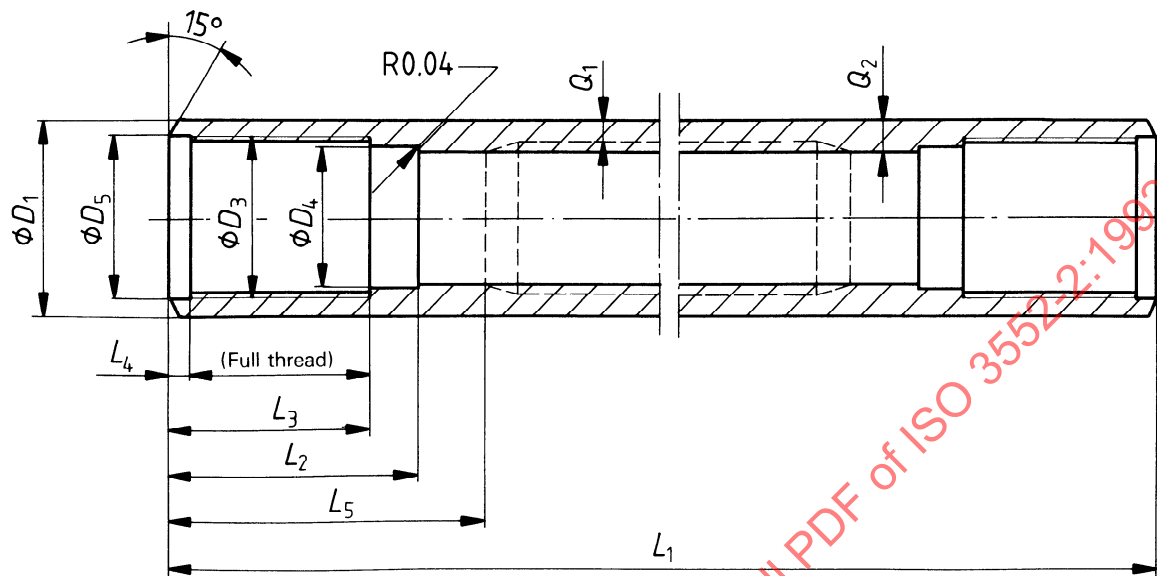


Figure 6 — Fishing rod (see table 10)

Table 10 — Fishing rod

Size	Nominal length (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.	$+0.008$	Thread CR1 ^{*)}	H11	± 0.008 $+0.005$	min.	min.	js14	min.	js14	min.
33	118.1	115.748	± 0.098	1.319	28	0.961	1.102	0.128	0.185	1.772	1.378	2.165
42	236.2	233.858	± 0.098	1.654	36	1.291	1.417	0.138	0.187	2.165	1.772	2.559
50				1.969	41.5	1.488	1.634	0.177	0.246	2.559	2.165	2.953

^{*)} Left-hand thread.

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

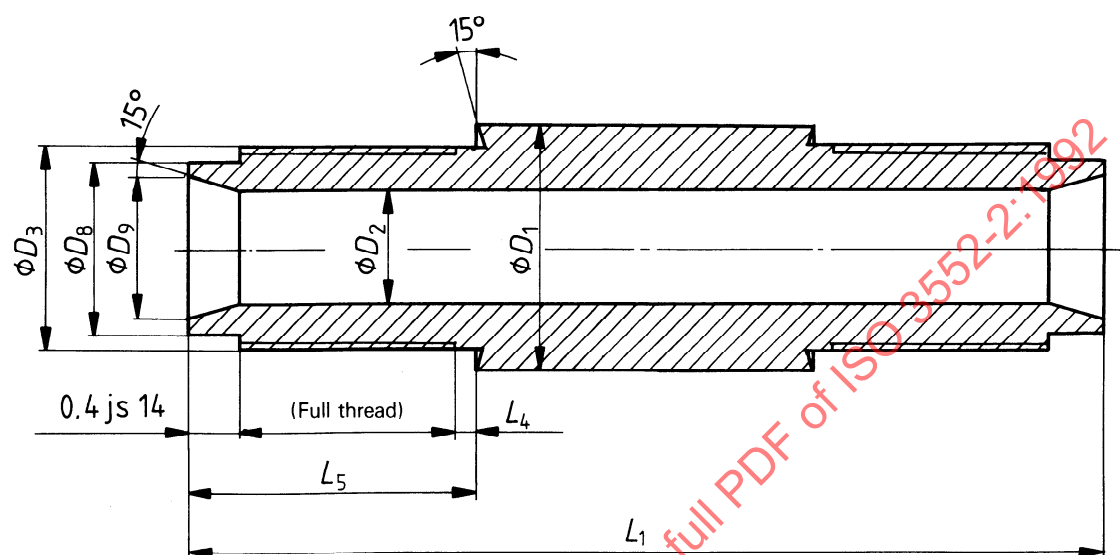


Figure 7 — Fishing-rod coupling (see table 11)

Table 11 — Fishing-rod coupling

Size	D_1 + 0.008 0	D_2 JS13	D_3 Thread CR1*)	D_8 d11	D_9 JS13	L_1 js14	L_4 max.	L_5 js14
33	1.319	0.591	28	0.961	0.748	5.512	0.197	1.575
42	1.654	0.866	36	1.291	1.063	6.299		1.969
50	1.969		41.5	1.488	1.26	7.087	0.276	2.362

*) Left-hand thread.

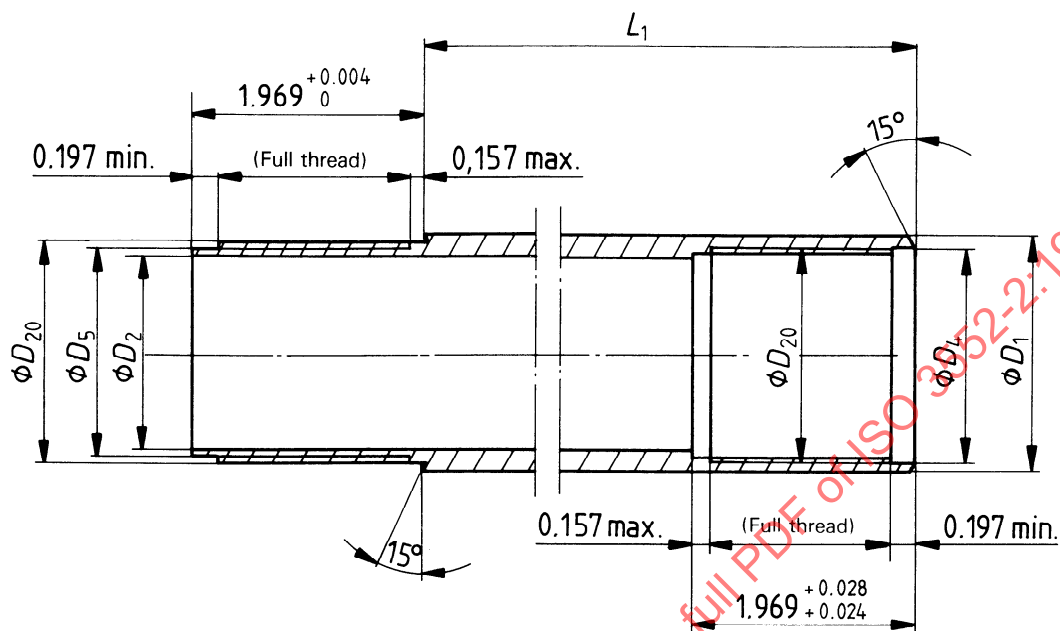


Figure 8 — Casing tube (see table 12)

Table 12 — Casing tube

Size	D_1	D_2	D_4	D_5	D_{20}	L_1
	tol.	tol.	$+ 0.008$ $+ 0.005$	$- 0.006$ $- 0.014$	Thread CR6 *)	± 0.118
46	1.738 ± 0.008	1.463	1.634	1.575	41.5	9.843 19.685 59.055 118.11
56	2.132 ± 0.01	1.856	2.028	1.969	51.5	
66	2.53 ± 0.012	2.254	2.421	2.362	61.5	
76	2.923 ± 0.016	2.648	2.815	2.756	71.5	
86	3.317 ± 0.016	3.041	3.209	3.15	81.5	
101	3.858 ± 0.016	3.476	3.72	3.642	94.5	
116	4.449 ± 0.02	4.067	4.311	4.232	109.5	
131	5.039 ± 0.02	4.657	4.902	4.823	124.5	
146	5.63 ± 0.028	5.248	5.492	5.413	139.5	

*) Right-hand or left-hand thread.

Table 13 — Casing drive shoe

Size	D_1		D_2		D_4 + 0.008 + 0.005	D_{20} Thread CR6 *)
		tol.		tol.		
46	1.738	± 0.008	1.463	± 0.01	1.634	41.5
56	2.132	± 0.01	1.856		2.028	51.5
66	2.53	± 0.012	2.254		2.421	61.5
76	2.923		2.648		2.815	71.5
86	3.317	± 0.016	3.041		3.209	81.5
101	3.858		3.476	± 0.016	3.72	94.5
116	4.449	± 0.02	4.067	± 0.02	4.311	109.5
131	5.039		4.657		4.902	124.5
146	5.63		5.248	± 0.028	5.492	139.5

*) Right-hand or left-hand thread.

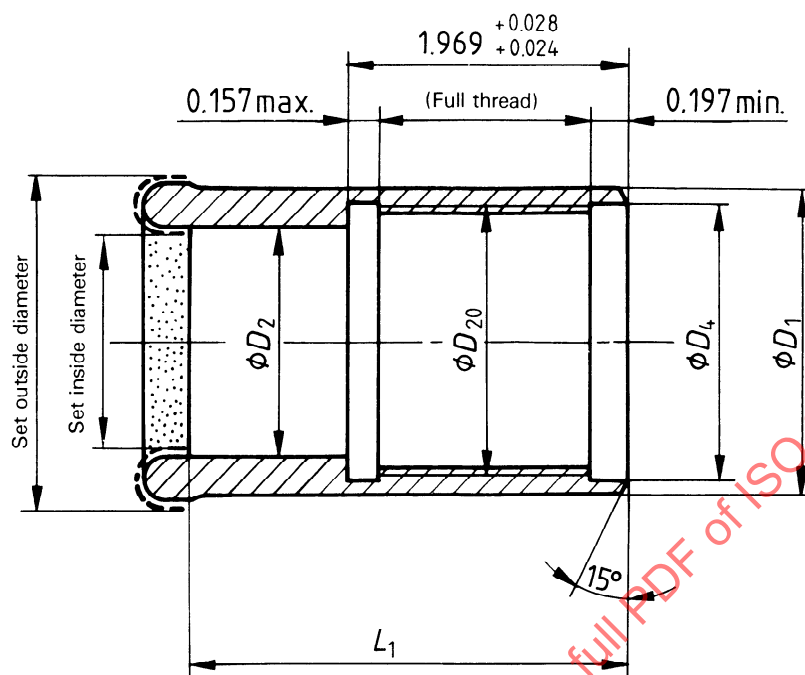


Figure 10 — Casing shoe bit (see table 14)

Table 14 — Casing shoe bit

Size	Set outside diameter ± 0.004	Set inside diameter ± 0.004	D_1 ± 0.004	D_2 $+ 0.004$ 0	D_4 $+ 0.008$ $+ 0.005$	D_{20} Thread CR6	L_1 min.
46	1.811	1.457	1.772	1.457	1.634	41.5	3.031
56	2.205	1.85	2.165	1.85	2.028	51.5	
66	2.598	2.244	2.559	2.244	2.421	61.5	
76	2.992	2.638	2.953	2.638	2.815	71.5	4.213
86	3.386	3.031	3.346	3.031	3.209	81.5	
101	3.976	3.465	3.917	3.504	3.72	94.5	
116	4.567	4.055	4.508	4.094	4.311	109.5	5.394
131	5.157	4.646	5.098	4.685	4.902	124.5	
146	5.748	5.237	5.689	5.276	5.492	139.5	

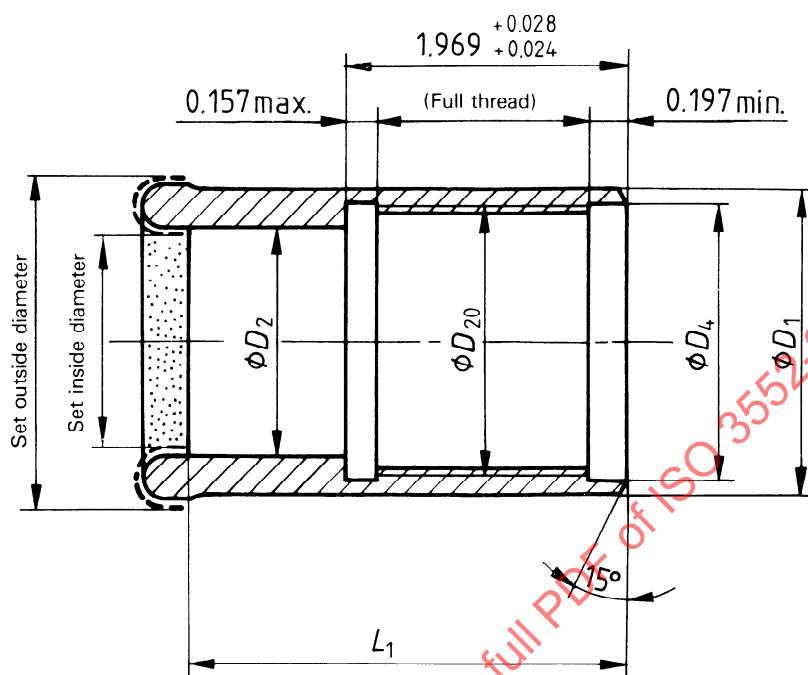


Figure 11 — Casing bit (see table 15)

Table 15 — Casing bit

Size	Set outside diameter. $+ 0.004$	Set inside diameter ± 0.004	D_1 ± 0.004	D_2 ± 0.004	D_4 $+ 0.008$ $+ 0.005$	D_{20} Thread CR6	L_1 min.
46	1.811	1.378	1.772	1.417	1.634	41.5	3.031
56	2.205	1.772	2.165	1.811	2.028	51.5	
66	2.598	2.165	2.559	2.205	2.421	61.5	
76	2.992	2.559	2.953	2.598	2.815	71.5	4.213
86	3.386	2.953	3.346	2.992	3.209	81.5	
101	3.976	3.406	3.917	3.445	3.72	94.5	
116	4.567	3.996	4.508	4.055	4.311	109.5	5.394
131	5.157	4.587	5.098	4.645	4.902	124.5	
146	5.748	5.177	5.689	5.236	5.492	139.5	

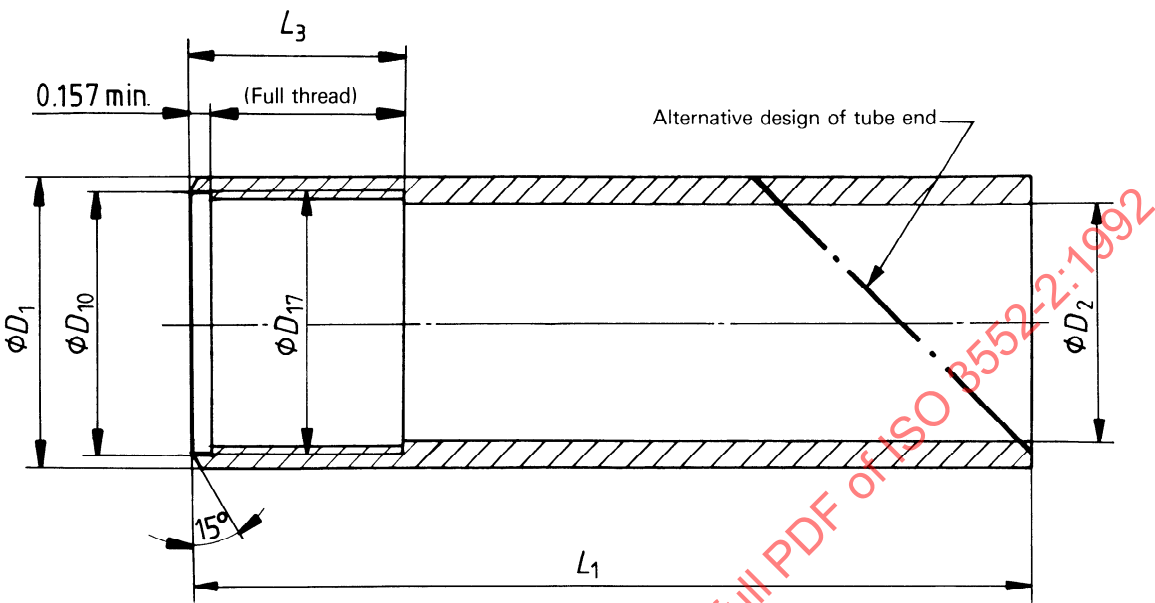


Figure 12 — Sediment tube (see table 16)

Table 16 — Sediment tube

Size	D_1		D_2		D_{10}	D_{17}	L_1	L_3
		tol.		tol.	+ 0.008 + 0.005	Thread CR4*)		
56	2.132	± 0.01	1.856	± 0.01	1.969	50	19.68 39.37	1.575
66	2.53	± 0.012	2.254		2.362	60		
76	2.923		2.648		2.756	70		
86	3.317	± 0.016	3.041		3.15	80		
101	3.858		3.476	± 0.016	3.661	93		1.772
116	4.449	± 0.02	4.067	± 0.02	4.252	108		
131	5.039		4.657		4.843	123		
146	5.63		5.248	± 0.028	5.433	138		

*) Left-hand thread.

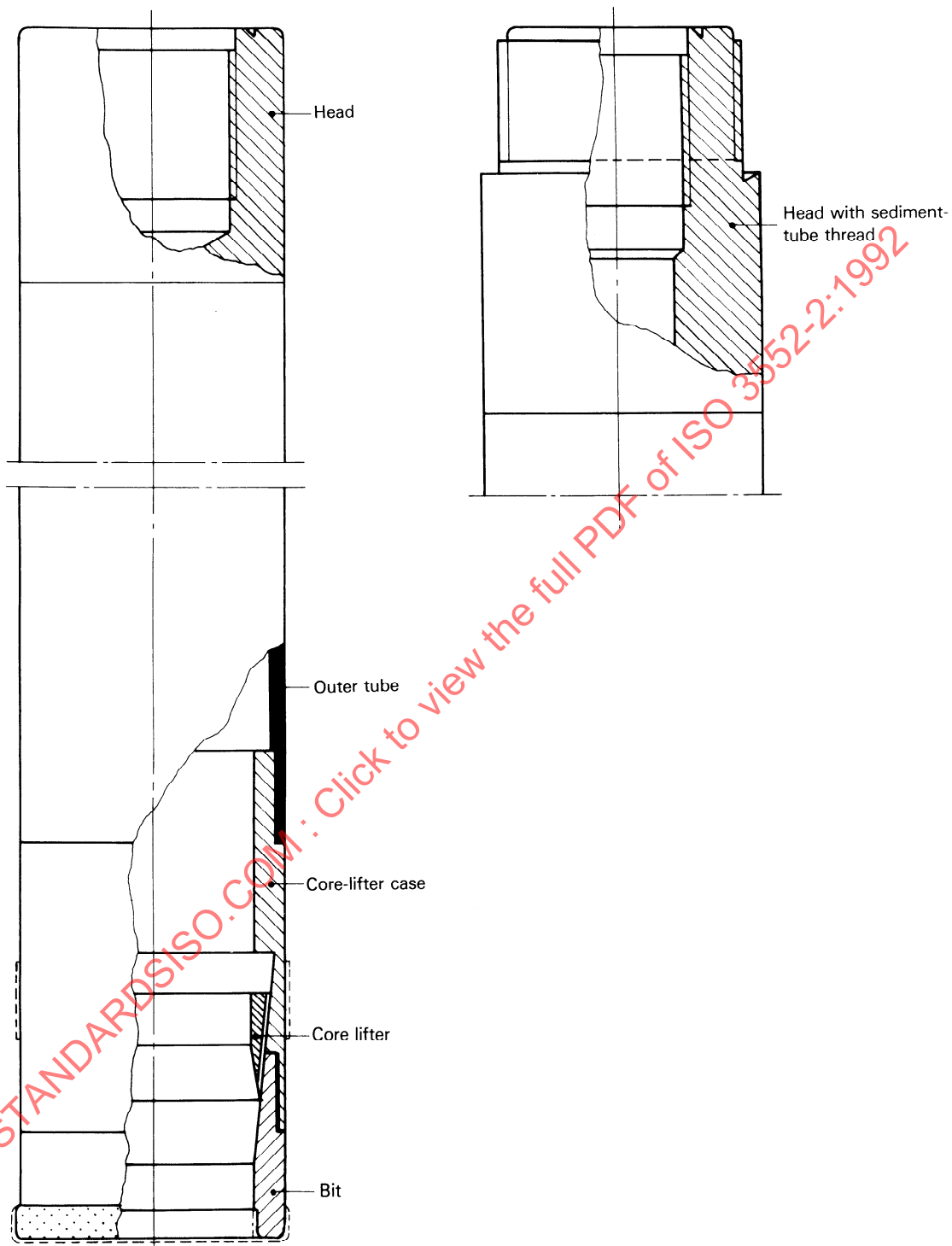


Figure 13 — Core barrel, Type B — Assembly

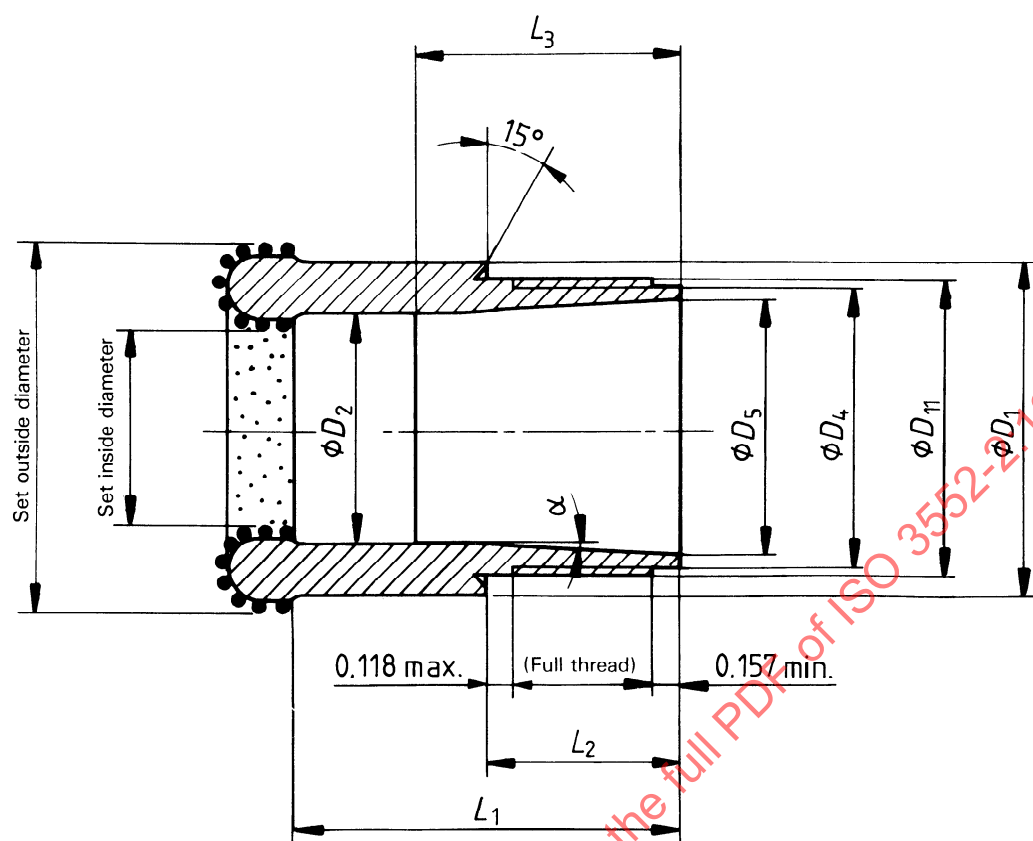


Figure 14 — Core barrel, Type B — Bit (see table 17)

Table 17 — Core barrel, Type B — Bit

Size	Set outside diameter ± 0.004	Set inside diameter -0.008 $+0.016$	D_1 h9	D_2 H9	D_4 -0.006 -0.014	D_5 ± 0.002	D_{11} Thread CR5	L_1 js14	L_2 js14	L_3 js14	α
36	1.417	0.866	1.378	0.906	1.161	1.098	31.5	1.772	0.709	1.142	3.5°
46	1.811	1.26	1.772	1.299	1.555	1.492	41.5				
56	2.204	1.654	2.165	1.693	1.949	1.866	51.5	2.087	1.024	1.496	2.5°
66	2.598	2.047	2.559	2.087	2.343	2.26	61.5				
76	2.992	2.441	2.953	2.48	2.736	2.661	71.5	2.402	1.339	1.732	1.5°
86	3.386	2.835	3.346	2.874	3.13	3.055	81.5				
101	3.976	3.425	3.937	3.465	3.76	3.661	97.5	2.638	1.339	1.732	1.5°
116	4.567	4.016	4.528	4.055	4.35	4.252	112.5				
131	5.157	4.606	5.118	4.646	4.941	4.843	127.5				
146	5.748	5.197	5.709	5.236	5.531	5.433	142.5				

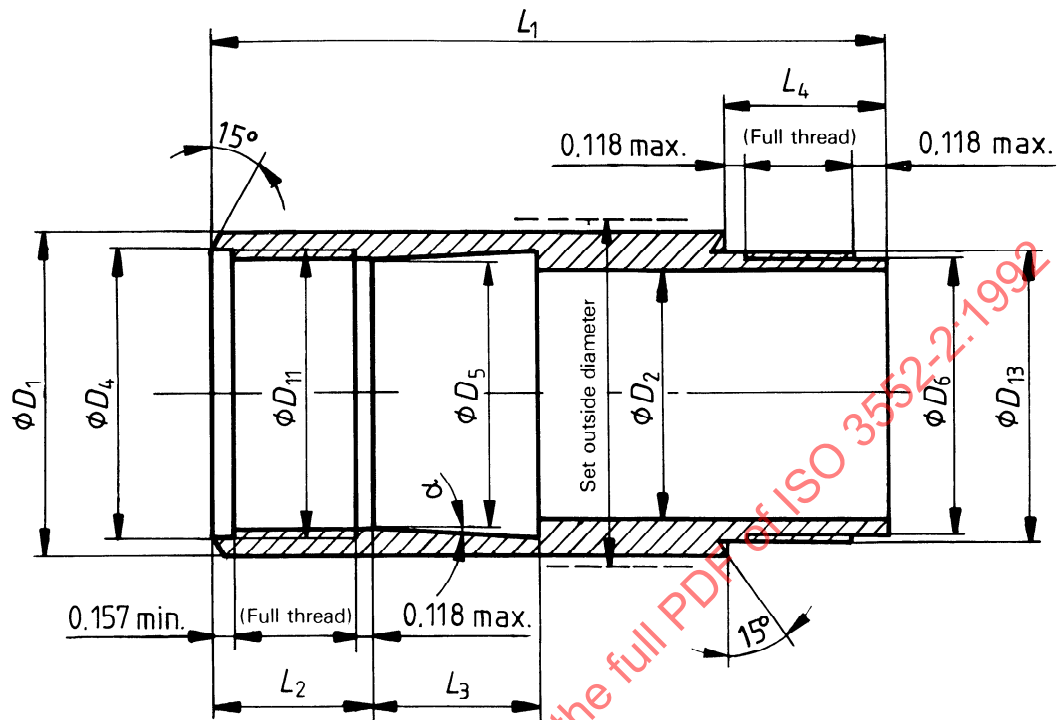


Figure 15 — Core barrel, Type B — Core-lifter case (see table 18)

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

Size	Set outside diameter ± 0.004	D ₁ h9	D ₂ H9	D ₄ + 0.008 + 0.005	D ₅ ± 0.002	D ₆ − 0.006 − 0.014	D ₁₁ Thread CR5	D ₁₃ Thread CR3	L ₁ min.	L ₂ js14	L ₃ ± 0.004	L ₄ js14	α
36	1.429	1.378	0.921	1.24	1.11	1.122	31.5	30	3.386	0.748	0.709	0.709	3.5°
46	1.823	1.772	1.319	1.634	1.504	1.496	41.5	40	3.425		0.748		
56	2.217	2.165	1.732	2.028	1.878	1.89	51.5	50	4.213	1.142	1.063	0.866	2.5°
66	2.61	2.559	2.126	2.421	2.272	2.283	61.5	60	4.291				
76	3.004	2.953	2.52	2.815	2.673	2.677	71.5	70	5.512	1.378	1.772	0.984	1.5°
86	3.398	3.346	2.913	3.209	3.067	3.071	81.5	80	5.709				
101	3.988	3.937	3.504	3.839	3.665	3.661	97.5	95	6.102				
116	4.579	4.528	4.094	4.429	4.256	4.252	112.5	110	6.181				
131	5.169	5.118	4.685	5.02	4.846	4.843	127.5	125					
146	5.76	5.709	5.394	5.61	5.437	5.433	142.5	140					

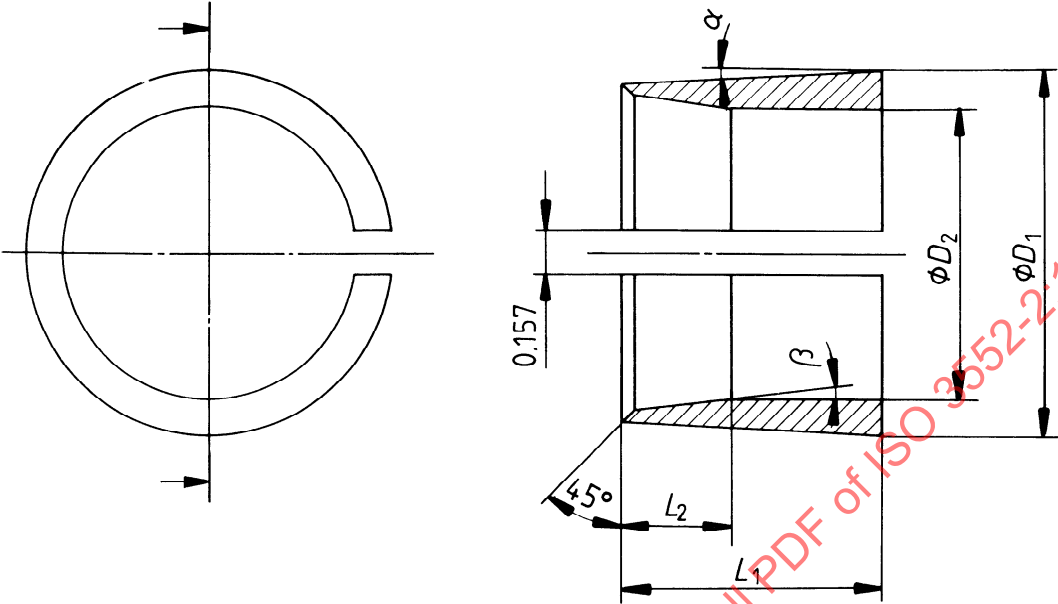


Figure 16 — Core barrel, Type B — Core lifter (see table 19)

Table 19 — Core barrel, Type B — Core lifter

Size	D_1 ± 0.002	D_2 ± 0.004	L_1 ± 0.008	L_2 js14	α	β
36	1.142	0.846	0.866	0.472	3.5°	9°
46	1.535	1.24				8.5°
56	1.929	1.634	1.378	0.846	2.5°	4°
66	2.323	2.028		0.866		3.5°
76	2.717	2.421	1.929	1.378	1.5°	2.5°
86	3.11	2.815				
101	3.717	3.406				
116	4.307	3.996				
131	4.898	4.587				
146	5.488	5.177				2.8°
NOTE — Minor variations are permissible according to the manufacturer's decision.						

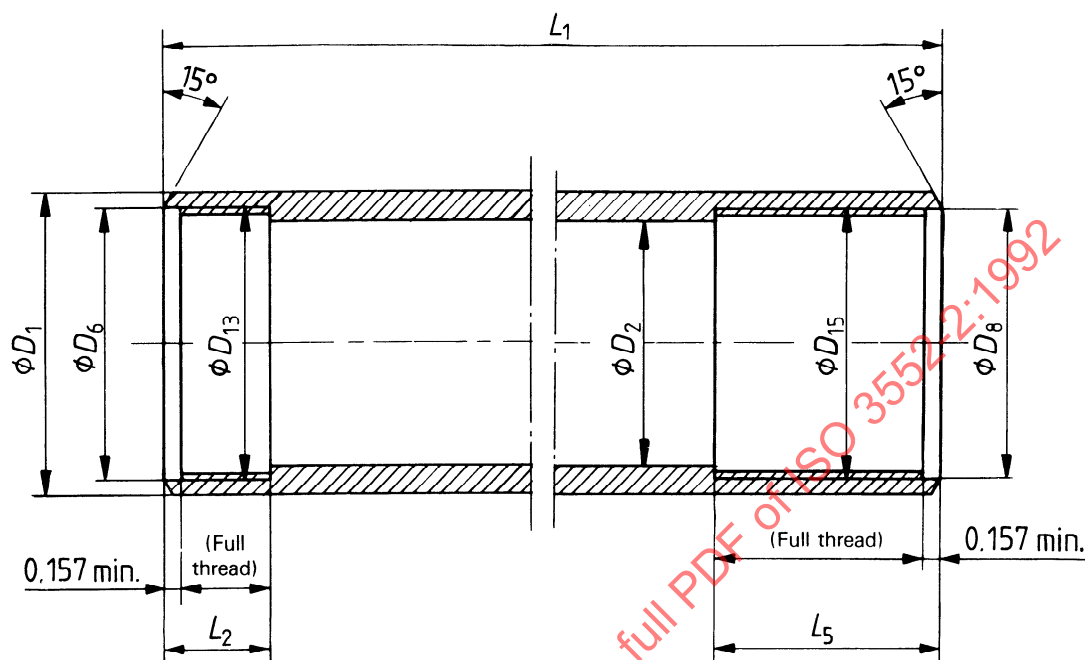


Figure 17 — Core barrel, Type B — Core tube (see table 20)

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.	+ 0.008 + 0.005	+ 0.008 + 0.005	Thread CR3	Thread		js14	js14
36	1.319	± 0.008	0.917	± 0.01	1.181	1.102	30	CR1 28	19.68 ± 0.059 59.05 ± 0.059 118.11 ± 0.098	0.728	1.575
46	1.738		1.463		1.575	1.575	40	CR4 40		0.748	
56	2.132	± 0.01	1.856		1.969	1.969	50	CR4 50		0.906	
66	2.53	± 0.012	2.254		2.362	2.362	60	CR4 60			
76	2.923		2.648		2.756	2.756	70	CR4 70		1.024	
86	3.317	± 0.016	3.041		3.15	3.15	80	CR4 80			
101	3.858		3.476	± 0.016	3.74	3.661	95	CR4 93	1.102	1.772	
116	4.449	± 0.02	4.067	± 0.02	4.331	4.252	110	CR4 108			
131	5.039		4.657	4.921	4.843	125	CR4 123				
146	5.63		5.248	± 0.028	5.512	5.433	140	CR4 138			

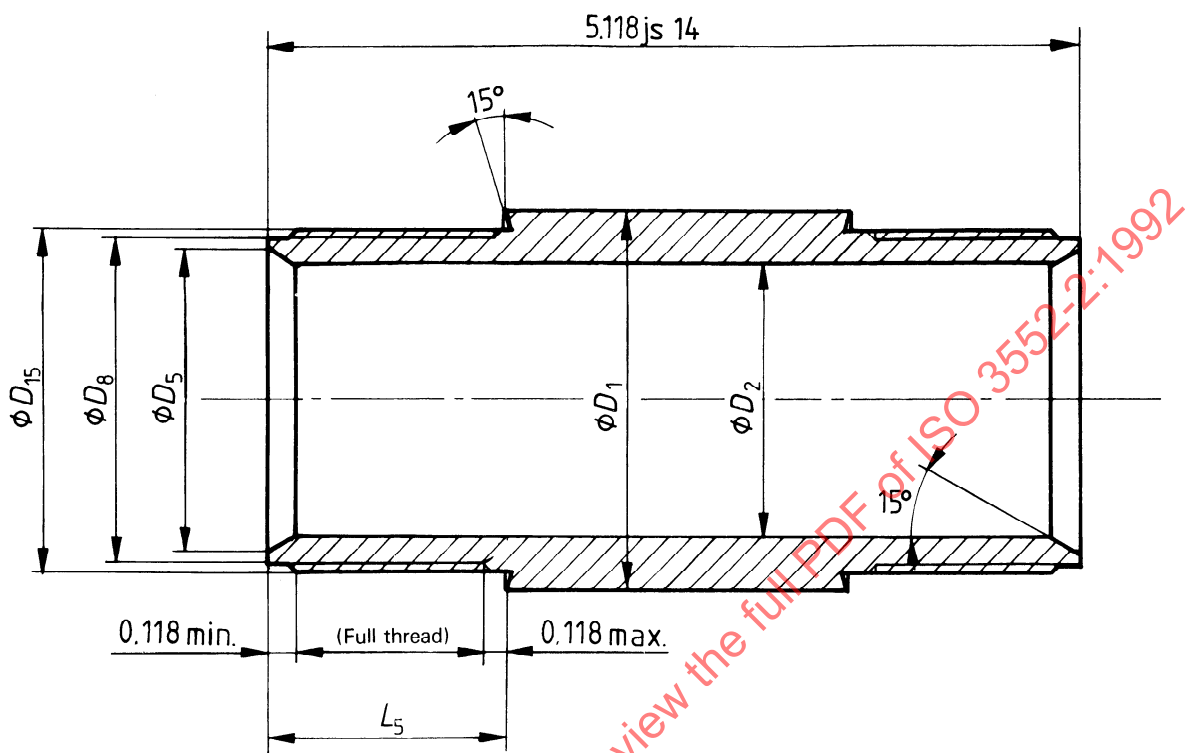


Figure 18 — Core barrel, Type B — Extension coupling (see table 21)

Table 21 — Core barrel, Type B — Extension coupling

Size	D_1 h11	D_2 JS13	D_5 JS13	D_8 - 0.006 - 0.014	D_{15} Thread CR4	L_5 js14
46	1.752	1.299	1.417	1.496	40	1.378
56	2.146	1.693	1.811	1.89	50	
66	2.539	2.087	2.205	2.283	60	
76	2.933	2.48	2.598	2.677	70	
86	3.327	2.874	2.992	3.071	80	

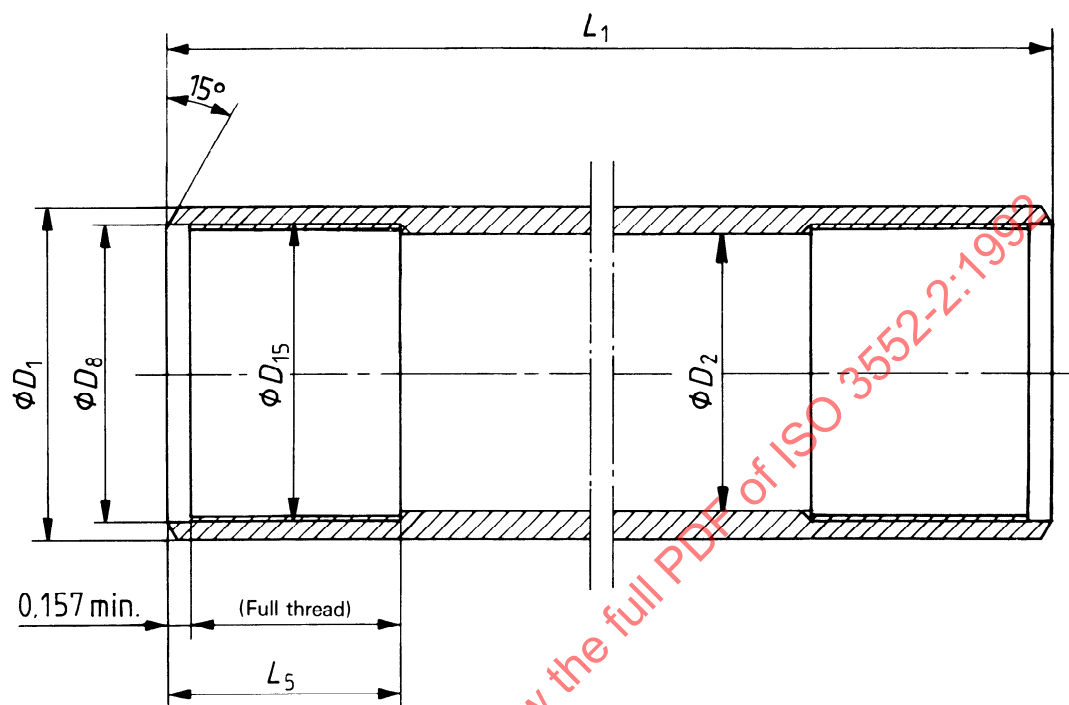


Figure 19 — Core barrel, Type B — Extension tube (see table 22)

Table 22 — Core barrel, Type B — Extension tube

Size	Nominal length (including coupling)	L_1	D_1		D_2		D_8	D_{15}	L_5
				tol.		tol.	+ 0.008 + 0.005	Thread CR4	
46	59.05 118.11	56.693 ± 0.059 115.748 ± 0.098	1.738	± 0.008	1.463	± 0.01	1.575	40	1.575
56			2.132	± 0.01	1.856		1.969	50	
66			2.53	± 0.012	2.254		2.362	60	
76			2.923		2.648		2.756	70	
86			3.317	± 0.016	3.041		3.15	80	

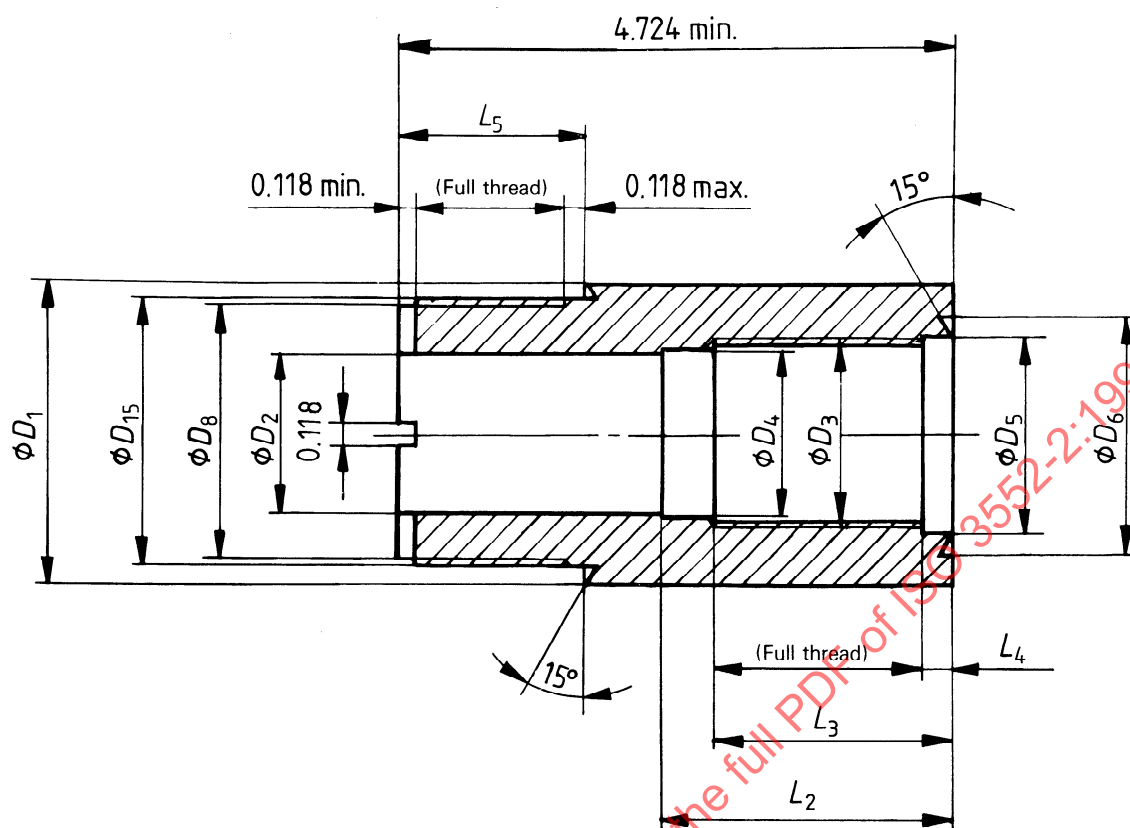


Figure 20 — Core barrel, Type B — Head (see table 23)

Table 23 — Core barrel, Type B — Head

Size	D_1 h11	D_2 JS13	D_3 Thread CR1	D_4 H11	D_5 + 0.008 + 0.005	D_6 + 0.020 + 0.008	D_8 − 0.006 − 0.014	D_{15} Thread CR4	L_2 js14	L_3 js14	L_4 js14	L_5 js14
46 × 33	1.752	0.866	28	0.961	1.102	1.319	1.496	40	1.772	1.378	0.236	1.378
46 × 42		1.181	36	1.291	1.417	1.654		50	2.165	1.772		
56 × 42	1.457						41.5					
56 × 50												
66 × 50												
76 × 50												
86 × 50												
101 × 50												
116 × 50												
131 × 50												
146 × 50												

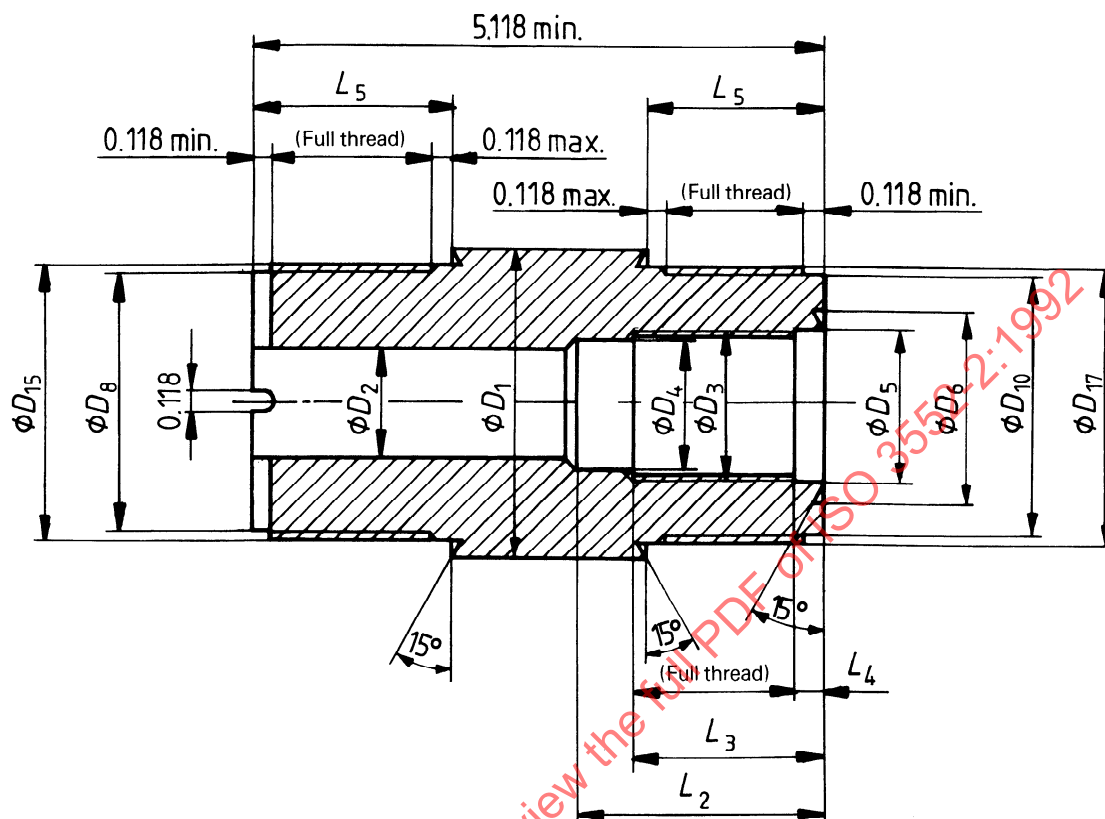


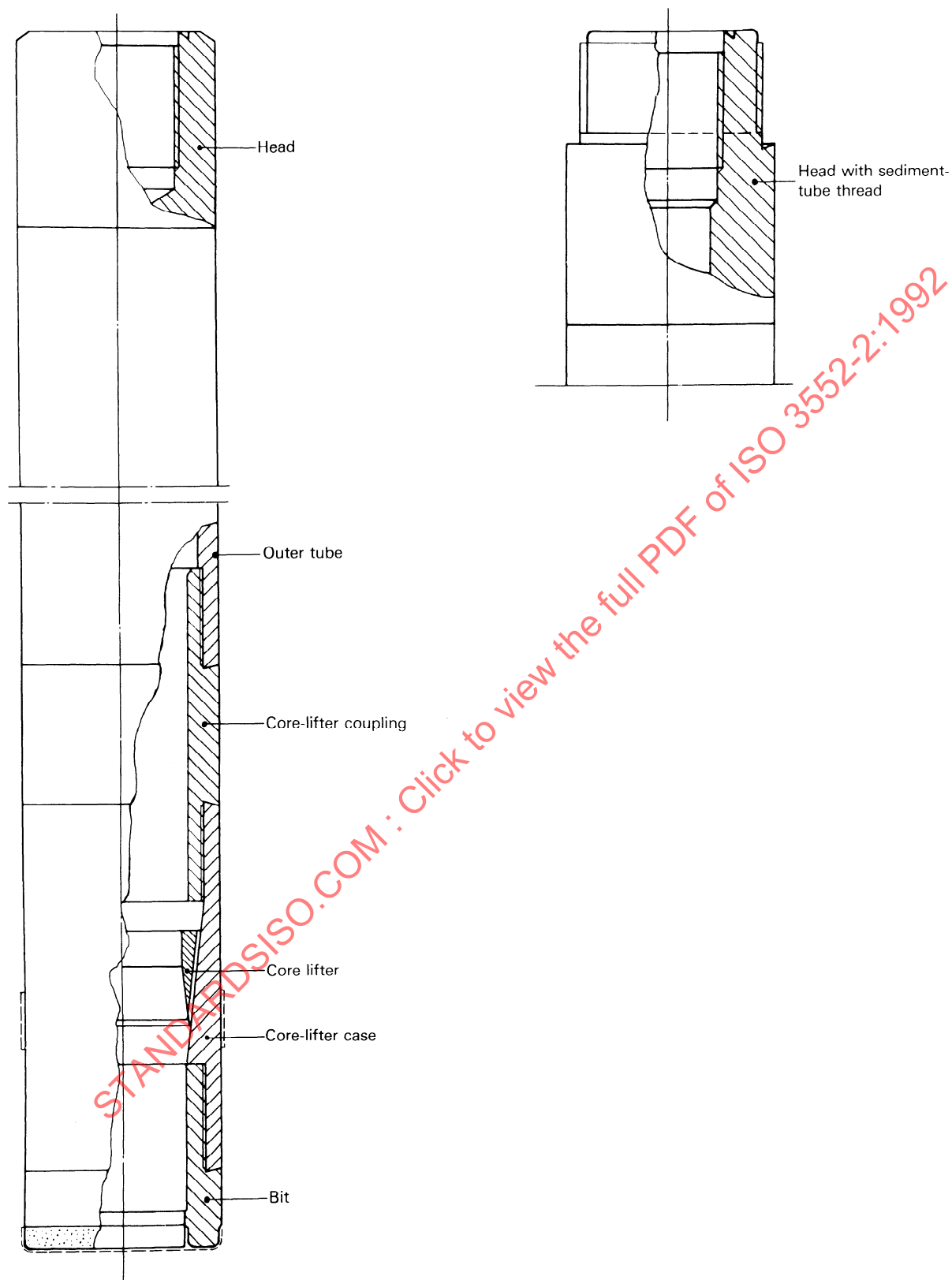
Figure 21 — Core barrel, Type B — Head with sediment-tube thread (see table 24)

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

Size	D_1 h11	D_2 JS13	D_3 Thread CR1*)	D_4 H11	D_5 + 0.008 + 0.005	D_6 + 0.020 + 0.008	D_8 − 0.006 − 0.014	D_{10} − 0.006 − 0.014	D_{15} Thread CR4*)	D_{17} Thread CR4**)	L_2 js14	L_3 js14	L_4 js14	L_5 js14	
56 × 33	2.146	0.866	28	0.961	1.102	1.319	1.89	1.89	50	50	1.771	1.377	0.236	1.378	
66 × 42	2.539	1.181	36	1.291	1.417	1.654	2.283	2.283	60	60	2.165	1.771			
76 × 50	2.933	1.457	41,5	1.488	1.634	1.969	2.677	2.677	70	70	2.559	2.165	0.314		1.575
86 × 50	3.327						3.071	3.071	80	80					
101 × 50	3.858						3.583	3.583	93	93					
116 × 50	4.449						4.173	4.173	108	108					
131 × 50	5.039						4.764	4.764	123	123					
146 × 50	5.63						5.354	5.354	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

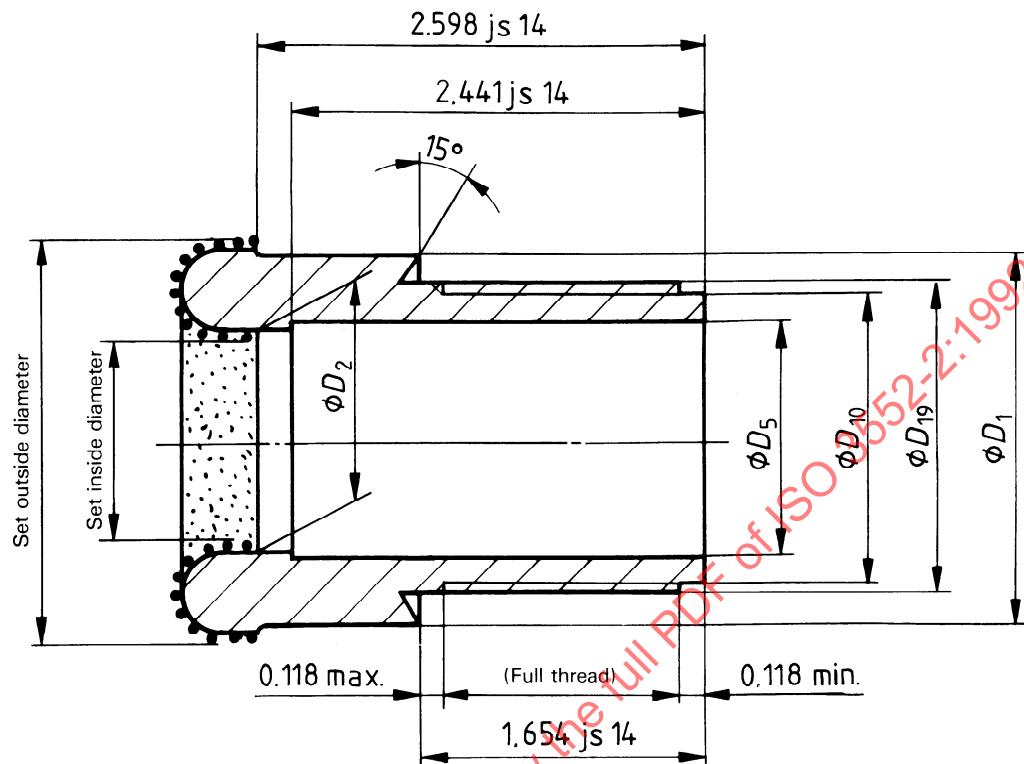


Figure 23 — Core barrel, Type Z — Bit (see table 25)

Table 25 – Core barrel, Type Z – Bit

Size	Set outside diameter ± 0.004	Set inside diameter - 0.008 - 0.016	D_1 h9	D_2 H9	D_5 ± 0.004	D_{10} - 0.006 - 0.014	D_{19} Thread CR2
46	1.811	1.102	1.772	1.142	1.181	1.358	36.5
56	2.205	1.339	2.165	1.378	1.417	1.752	46.5
66	2.598	1.732	2.559	1.772	1.811	2.146	56.5
76	2.992	2.126	2.953	2.165	2.205	2.539	66.5
86	3.386	2.441	3.346	2.48	2.52	2.933	76.5
101	3.976	2.953	3.937	2.992	3.031	3.543	92
116	4.567	3.543	4.528	3.583	3.622	4.134	107
131	5.157	4.134	5.118	4.173	4.213	4.724	122
146	5.748	4.724	5.709	4.764	4.803	5.315	137

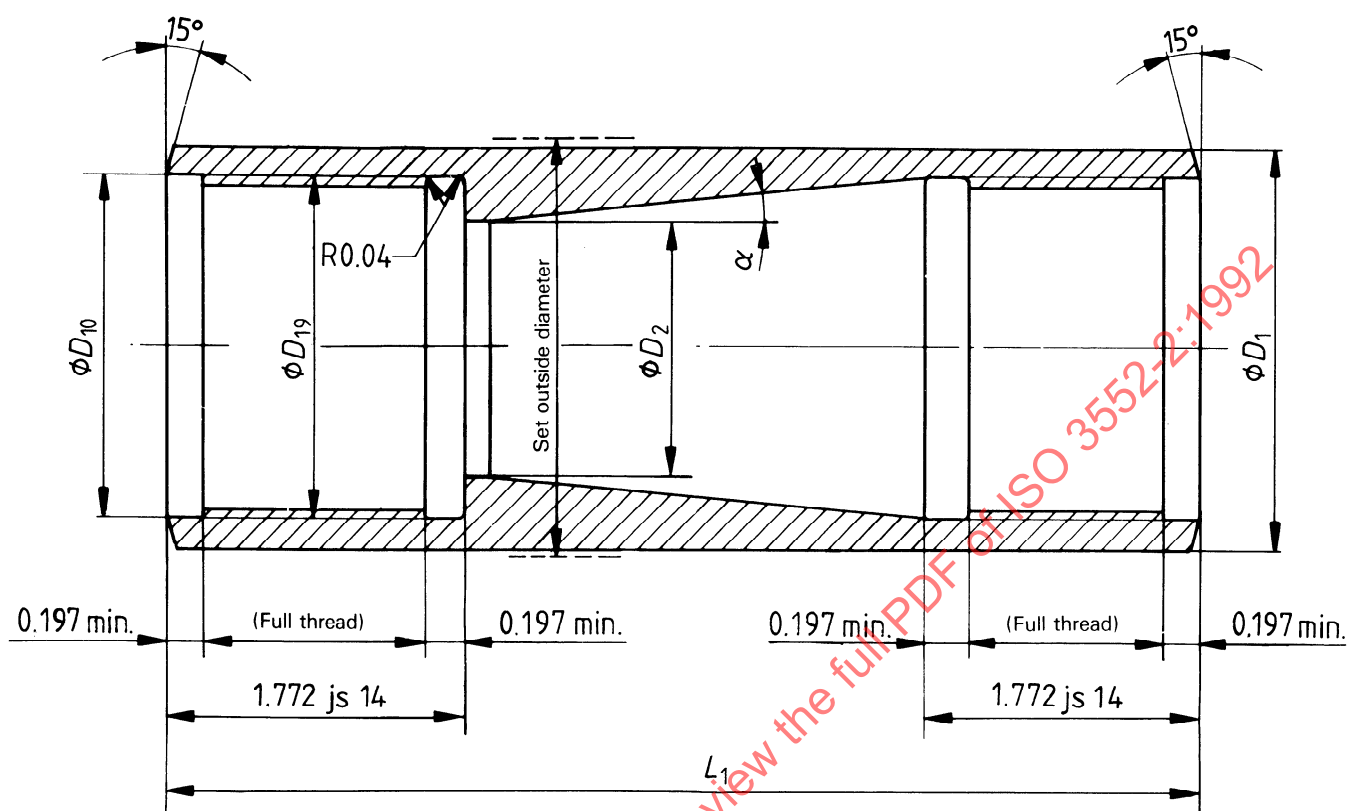


Figure 24 — Core barrel, Type Z — Core-lifter case (see table 26)

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

Size	Set outside diameter ± 0.004	D_1 h11	D_2 JS13	D_{10} + 0.008 + 0.005	D_{19} Thread CR2	L_1 min.	α °
46	1.823	1.772	1.181	1.437	36.5	5.906	3°
56	2.217	2.165	1.417	1.831	46.5	6.063	5°
66	2.61	2.559	1.811	2.224	56.5	6.181	
76	3.004	2.953	2.205	2.618	66.5	6.614	
86	3.398	3.346	2.52	3.012	76.5		
101	3.988	3.937	3.071	3.622	92		
116	4.579	4.528	3.626	4.213	107	6.811	
131	5.169	5.118	4.217	4.803	122	4.5°	
146	5.76	5.709	4.803	5.394	137		7.205

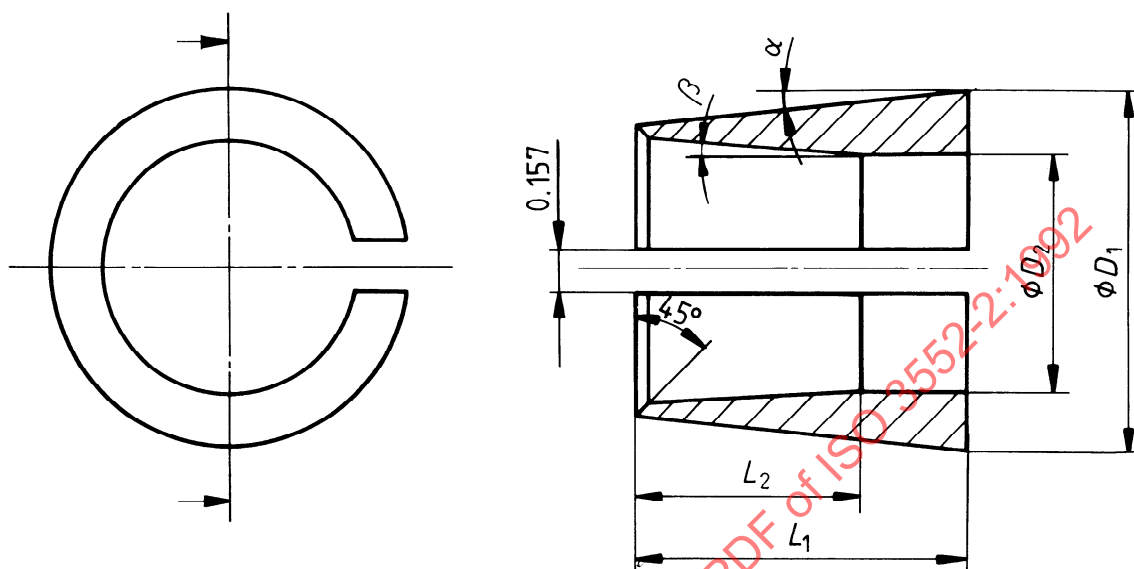


Figure 25 — Core barrel, Type Z — Core lifter (see table 27)

Table 27 — Core barrel, Type Z — Core lifter

Size	D_1 ± 0.002	D_2 ± 0.004	L_1 js14	L_2 js14	α	β
46	1.339	1.043	1.378	0.906	3°	2.7°
56	1.654	1.22	1.575	1.102	5°	2.8°
66	2.047	1.634				2°
76	2.441	2.008				2.2°
86	2.795	2.264	1.772	1.181		4°
101	3.406	2.795				5.8°
116	3.957	3.386				3.2°
131	4.547	3.937	1.969	1.378		4°
146	5.118	4.508		1.575	4.5°	3.5°

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

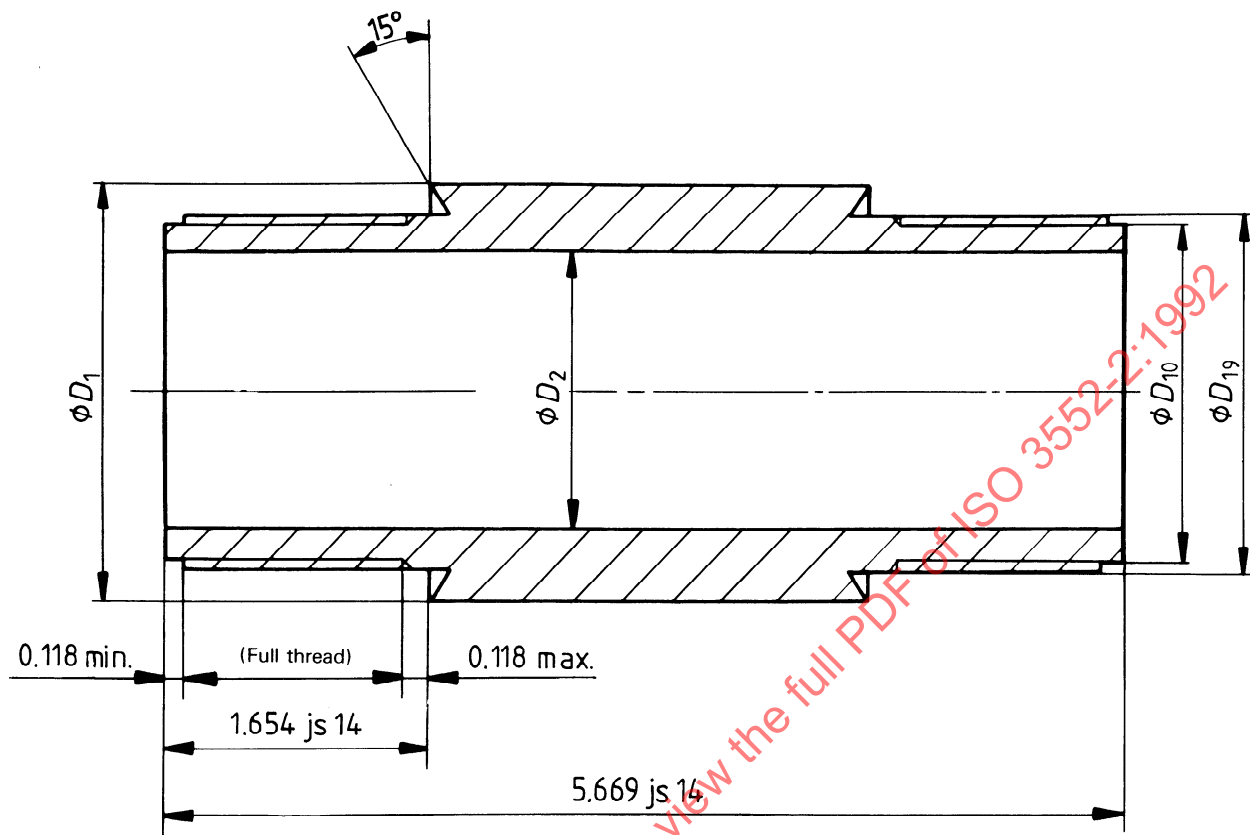


Figure 26 — Core barrel, Type Z — Core-lifter coupling (see table 28)

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

Size	D_1 h11	D_2 JS13	D_{10} - 0.006 - 0.014	D_{19} Thread CR2
46	1.772	1.181	1.358	36.5
56	2.165	1.457	1.752	46.5
66	2.559	1.85	2.146	56.5
76	2.953	2.244	2.539	66.5
86	3.346	2.638	2.933	76.5
101	3.937	3.15	3.543	92
116	4.528	3.74	4.134	107
131	5.118	4.331	4.724	122
146	5.709	4.921	5.315	137

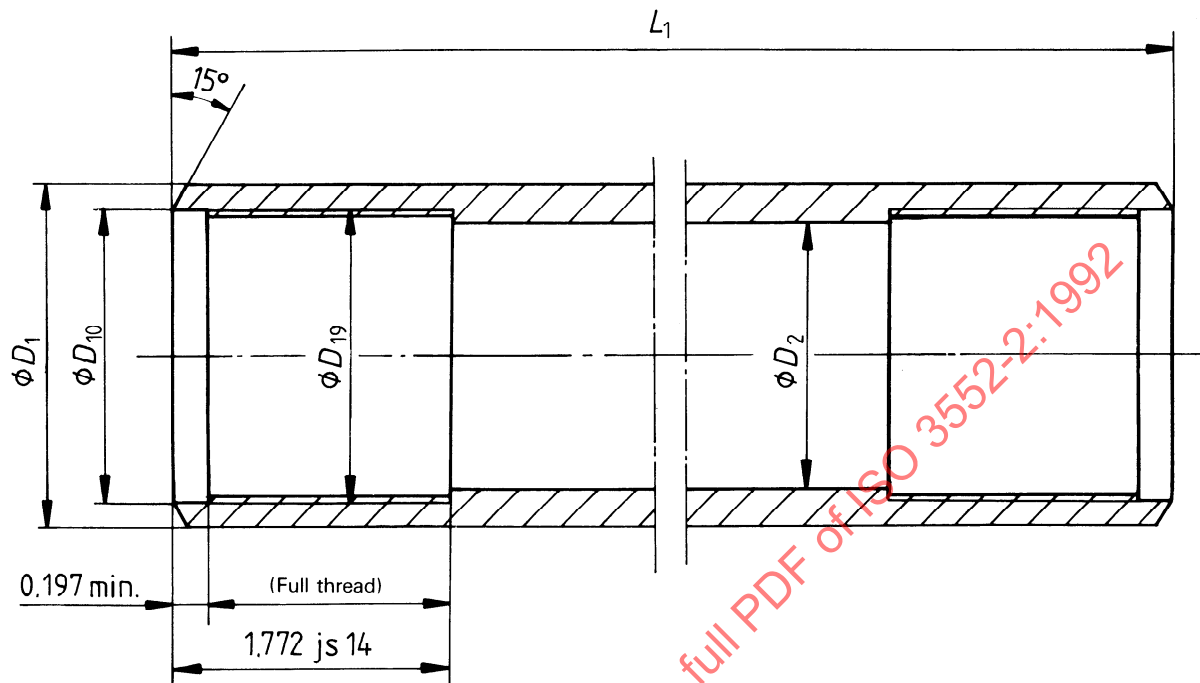


Figure 27 — Core barrel, Type Z — Core and extension tube (see table 29)

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

Size	Nominal length (including coupling)	L_1	D_1		D_2		D_{10}	D_{19}
				tol.		tol.	+ 0.008 + 0.006	Thread CR2
46	19.685 59.055 118.11	17.323 ± 0.059 56.693 ± 0.059 115.748 ± 0.098	1.738	± 0.008	1.295	± 0.01	1.437	36.5
56			2.132		1.689		1.831	46.5
66			2.53	± 0.012	2.083		2.224	56.5
76			2.923		2.476		2.618	66.5
86			3.317	± 0.016	2.87	± 0.016	3.012	76.5
101			3.858		3.476		3.622	92
116			4.449	± 0.02	4.067	± 0.02	4.213	107
131			5.039		4.657		4.803	122
146			5.63		5.248	± 0.028	5.394	137

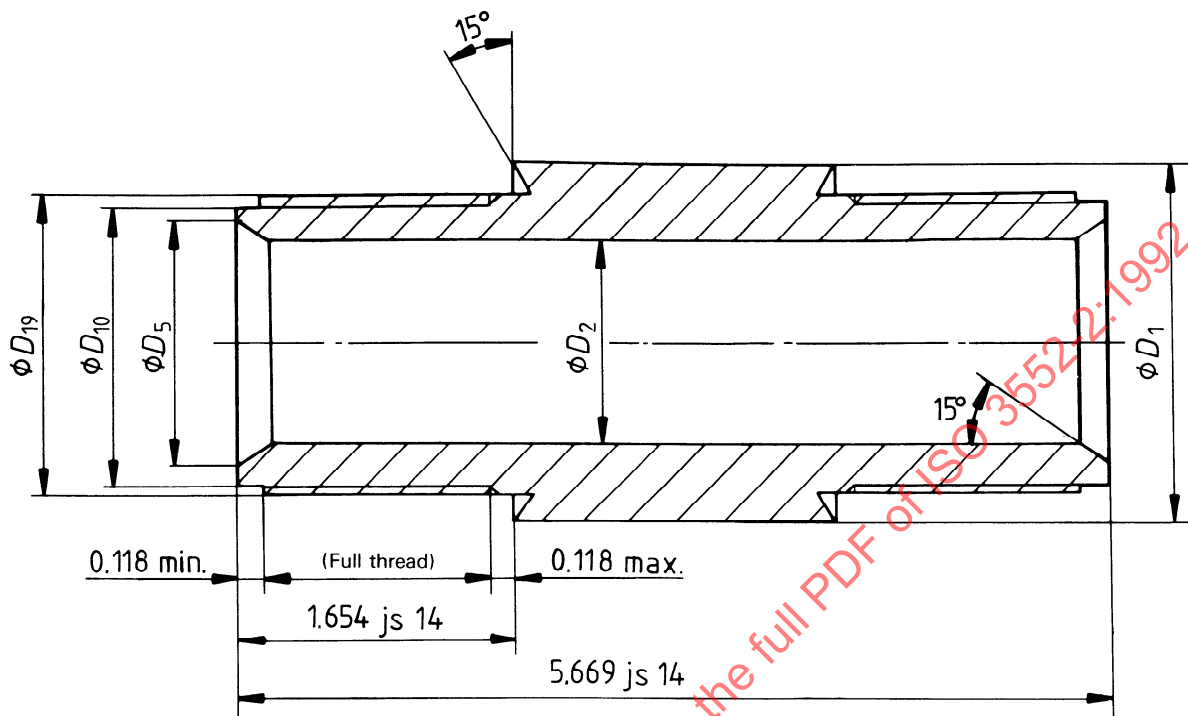


Figure 28 — Core barrel, Type Z — Extension coupling (see table 30)

Table 30 — Core barrel, Type Z — Extension coupling

Size	D_1 h11	D_2 JS13	D_5 JS13	D_{10} - 0.006 - 0.014	D_{19} Thread CR2
46	1.752	1.181	1.26	1.358	36.5
56	2.146	1.417	1.654	1.752	46.5
66	2.539	1.811	2.047	2.146	56.5
76	2.933	2.205	2.441	2.539	66.5
86	3.327	2.52	2.835	2.933	76.5
101	3.858	3.15	3.465	3.543	92
116	4.449	3.74	4.055	4.134	107
131	5.039	4.331	4.646	4.724	122
146	5.63	4.921	5.236	5.315	137

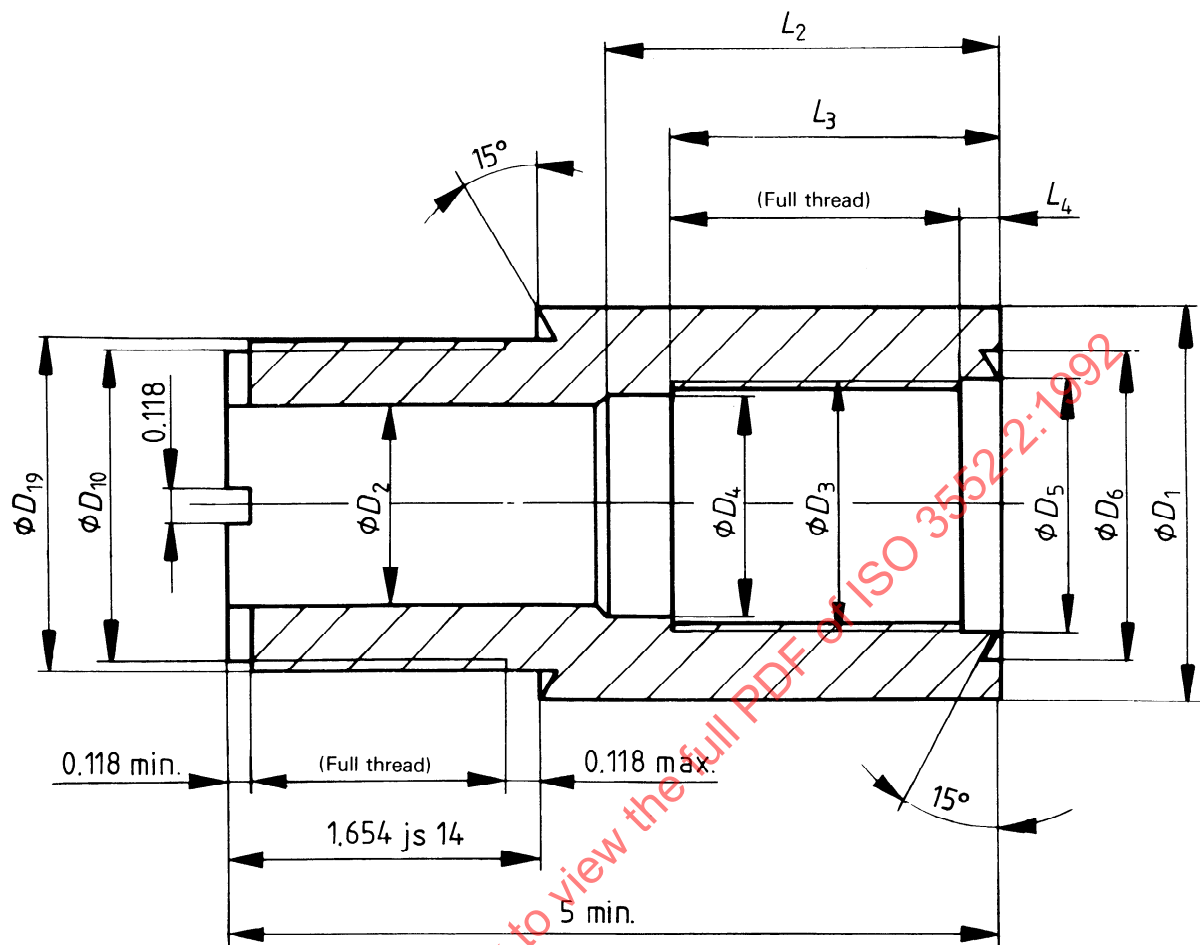


Figure 29 — Core barrel, Type Z — Head (see table 31)

Table 31 — Core barrel, Type Z — Head

Size	D_1 h11	D_2 JS13	D_3 Thread CR1	D_4 H11	D_5 + 0.008 + 0.005	D_6 + 0.020 + 0.008	D_{10} − 0.006 − 0.014	D_{19} Thread CR2	L_2 js14	L_3 js14	L_4 js14
46 × 33	1.752	0.866	28	0.961	1.102	1.319	1.358	36.5	1.772	1.378	0.236
46 × 42		1.181	36	1.291	1.417	1.654			2.165	1.772	
56 × 42	2.146						1.752	46.5			0.315
56 × 50							2.146	56.5			
66 × 50	2.539						2.539	66.5			
76 × 50	2.933						2.933	76.5			
86 × 50	3.327	1.457	41.5	1.488	1.634	1.969	3.543	92	2.559	2.165	
101 × 50	3.858						4.134	107			
116 × 50	4.449						4.724	122			
131 × 50	5.039						5.315	137			
146 × 50	5.63										

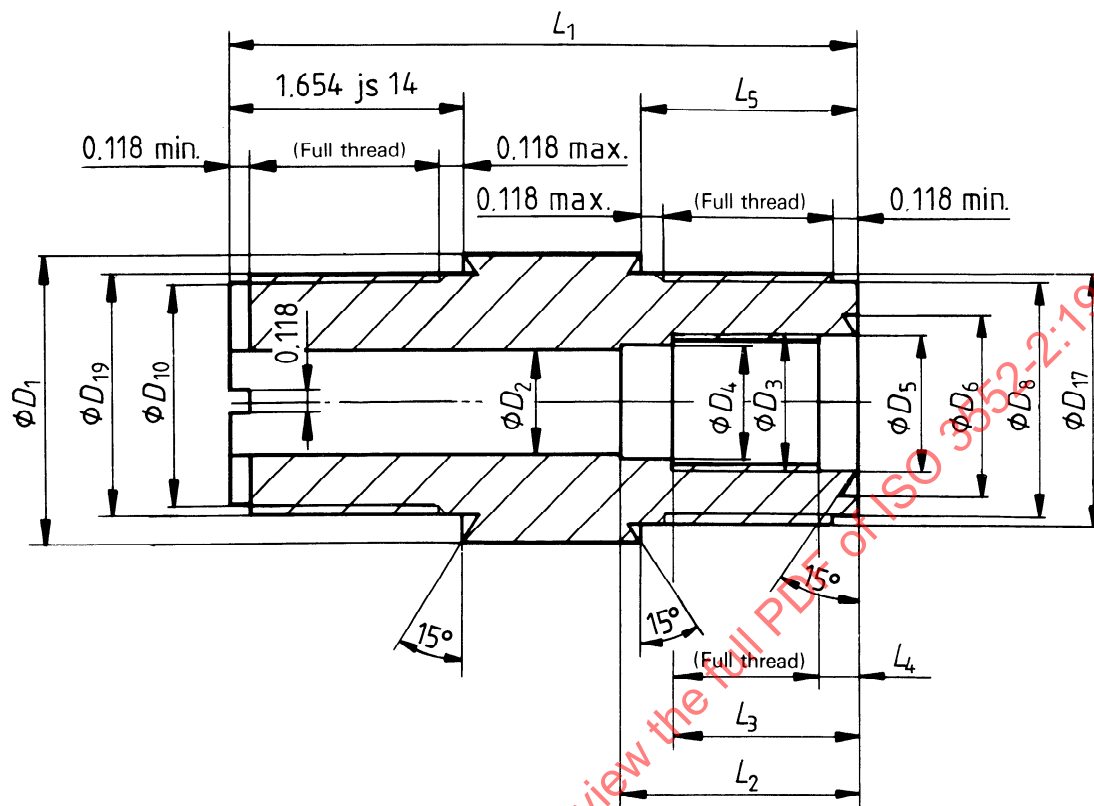


Figure 30 — Core barrel, Type Z — Head with sediment-tube thread (see table 32)

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

Size	D ₁ h11	D ₂ JS13	D ₃ Thread CR1*)	D ₄ H11	D ₅ + 0.008 + 0.005	D ₆ + 0.020 + 0.008	D ₈ − 0.006 − 0.014	D ₁₀ − 0.006 − 0.014	D ₁₇ Thread CR4**)	D ₁₉ Thread CR2*)	L ₁ min.	L ₂ js14	L ₃ js14	L ₄ js14	L ₅ js14	
56 × 33	2.146	0.866	28	0.961	1.102	1.319	1.89	1.752	50	46.5	5.394	1.772	1.378	0.236	1.378	
66 × 42	2.539	1.181	36	1.291	1.417	1.654	2.283	2.146	60	56.5		2.165	1.772			
76 × 50	2.933	1.457	41.5	1.488	1.634	1.969	2.677	2.539	70	66.5		2.559	2.165	0.315		1.575
86 × 50	3.327						3.071	2.933	80	76.5						
101 × 50	3.858						3.583	3.543	93	92						
116 × 50	4.449						4.173	4.134	108	107						
131 × 50	5.039						4.764	4.724	123	122	5.591				138	137
146 × 50	5.63	5.354	5.315													
*) Right-hand thread.																
**) Left-hand thread.																