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)

Contents

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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.

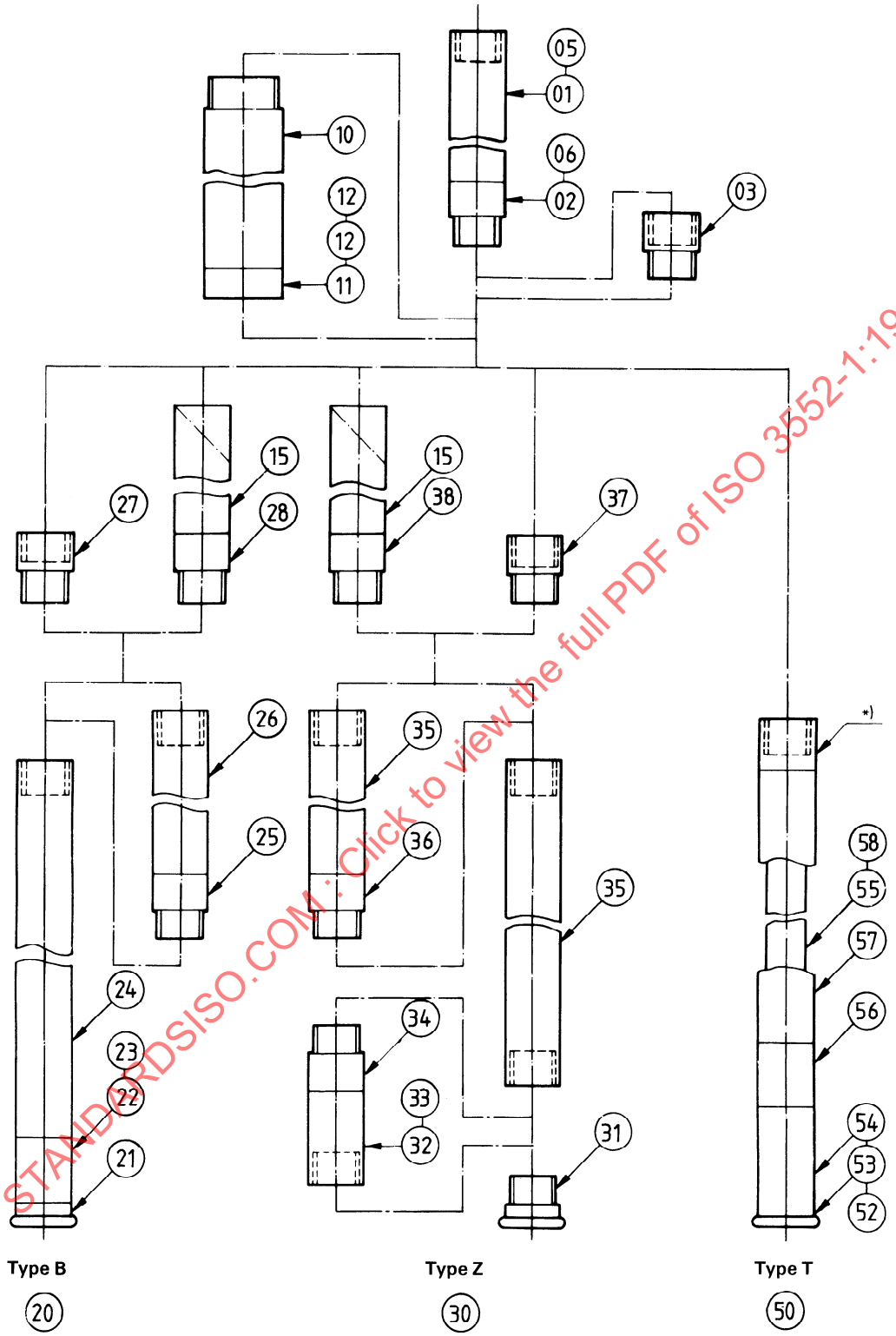
It specifies the characteristics of a range of equipment for drilling holes having diameters from 36 mm to 146 mm and yielding cores from 22 mm to 120 mm in diameter. The relation between drilled hole diameter (size designation), core diameter (set inside diameter of the bit) and outside diameter and 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 (hole diameter)	Core diameter			Outside diameter × inside diameter (D_1 × D_2)				
	Type			Casing tube	Sediment tube	Core barrel (outer tube)		
	B	T	Z			B	T	Z
36	22	22	—	—	—	33,5 × 23,3	35,2 × 29	—
46	32	32	28	44,15 × 37,15	—	44,15 × 37,15	45,2 × 39,8	44,15 × 32,9
56	42	42	34	54,15 × 47,15	54,15 × 47,15	54,15 × 47,15	55,2 × 49	54,15 × 42,9
66	52	52	44	64,25 × 57,25	64,25 × 57,25	64,25 × 57,25	65,2 × 59	64,25 × 52,9
76	62	62	54	74,25 × 67,25	74,25 × 67,25	74,25 × 67,25	75,2 × 69	74,25 × 62,9
86	72	72	62	84,25 × 77,25	84,25 × 77,25	84,25 × 77,25	85,2 × 79	84,25 × 72,9
101	87	—	75	98 × 88,3	98 × 88,3	98 × 88,3	—	98 × 88,3
116	102	—	90	113 × 103,3	113 × 103,3	113 × 103,3	—	113 × 103,3
131	117	—	105	128 × 118,3	128 × 118,3	128 × 118,3	—	128 × 118,3
146	132	—	120	143 × 133,3	143 × 133,3	143 × 133,3	—	143 × 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 R_m, min. N/mm² (MPa)	Yield stress R_e, min. N/mm² (MPa)	Percent elongation after fracture A, min. %
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 ± 0,20 mm for diameters less than 40 mm and ± 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:

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

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 m	Maximum difference between indicator readings 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

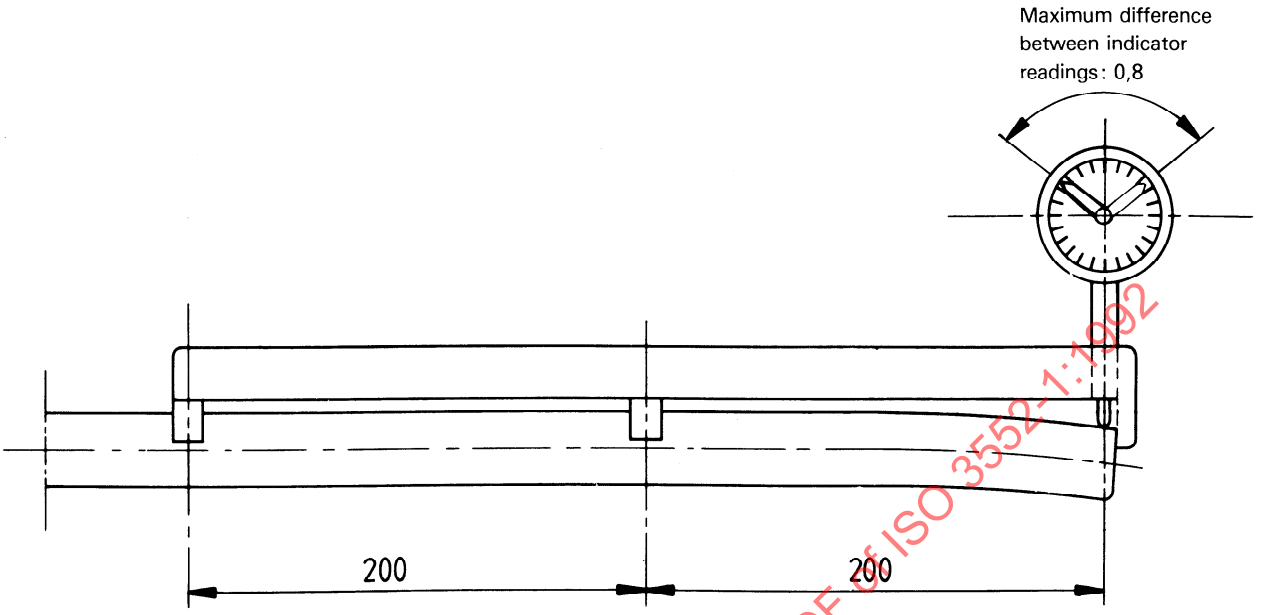


Figure 2 — Requirements for straightness at the tube ends

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 33,3	15,14 14,86	**46**	44,35 43,95	37,4 36,9	46,1 45,9	35,1 34,9	46,1 45,9	37,1 36,9
42	42,2 41,8	22,16 21,84	**56**	54,35 53,95	47,4 46,9	56,1 55,9	45,1 44,9	56,1 55,9	47,1 46,9
50	50,2 49,8	22,16 21,84	**66**	64,55 63,95	57,5 57,0	66,1 65,9	55,1 54,9	66,1 65,9	57,1 56,9
			76	74,55 73,95	67,5 67,0	76,1 75,9	65,1 64,9	76,1 75,9	67,1 66,9
			86	84,65 83,85	77,5 77,0	86,1 85,9	75,1 74,9	86,1 85,9	77,1 76,9
			101	98,4 97,6	88,7 87,9	101,1 100,9	86,6 86,4	101,1 100,9	88,1 87,9
			116	113,5 112,5	103,8 102,8	116,1 115,9	101,6 101,4	116,1 115,9	103,1 102,9
			131	128,5 127,5	118,8 117,8	131,1 130,9	116,6 116,4	131,1 130,9	118,1 117,9
			146	143,5 142,5	134,2 132,8	146,1 145,9	131,6 131,4	146,1 145,9	133,1 132,9

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

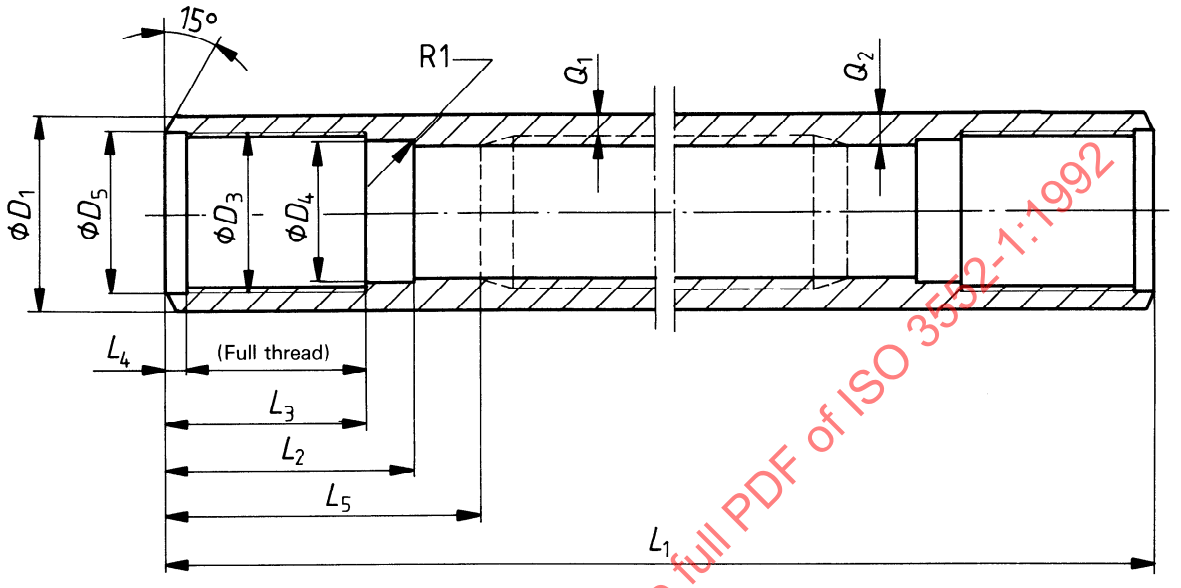


Figure 3 — Drill rod (see table 7)

Table 7 — Drill rod

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

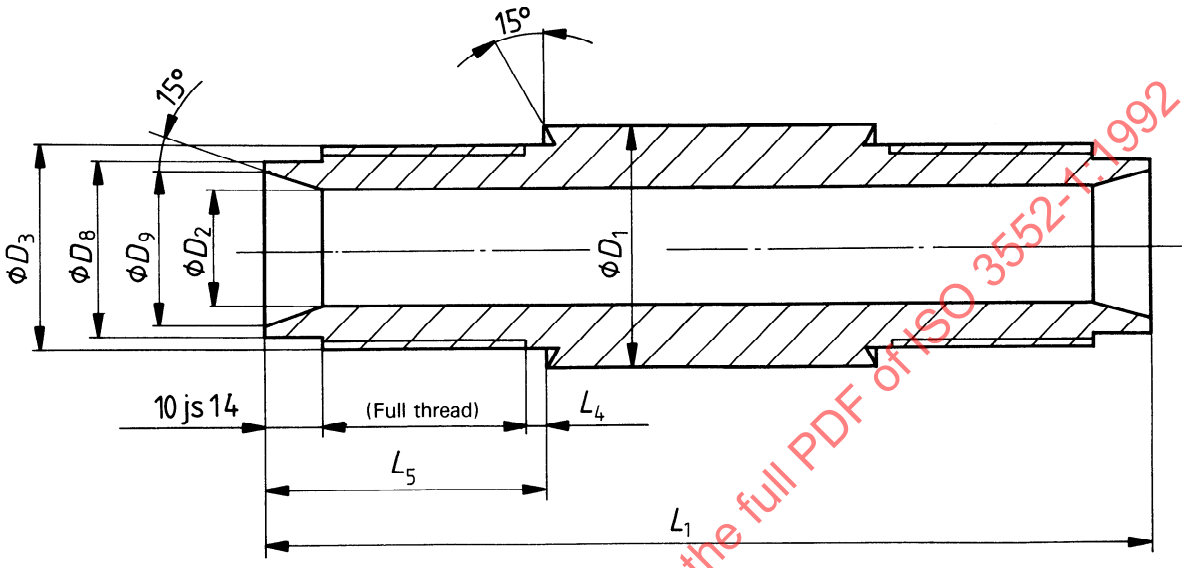
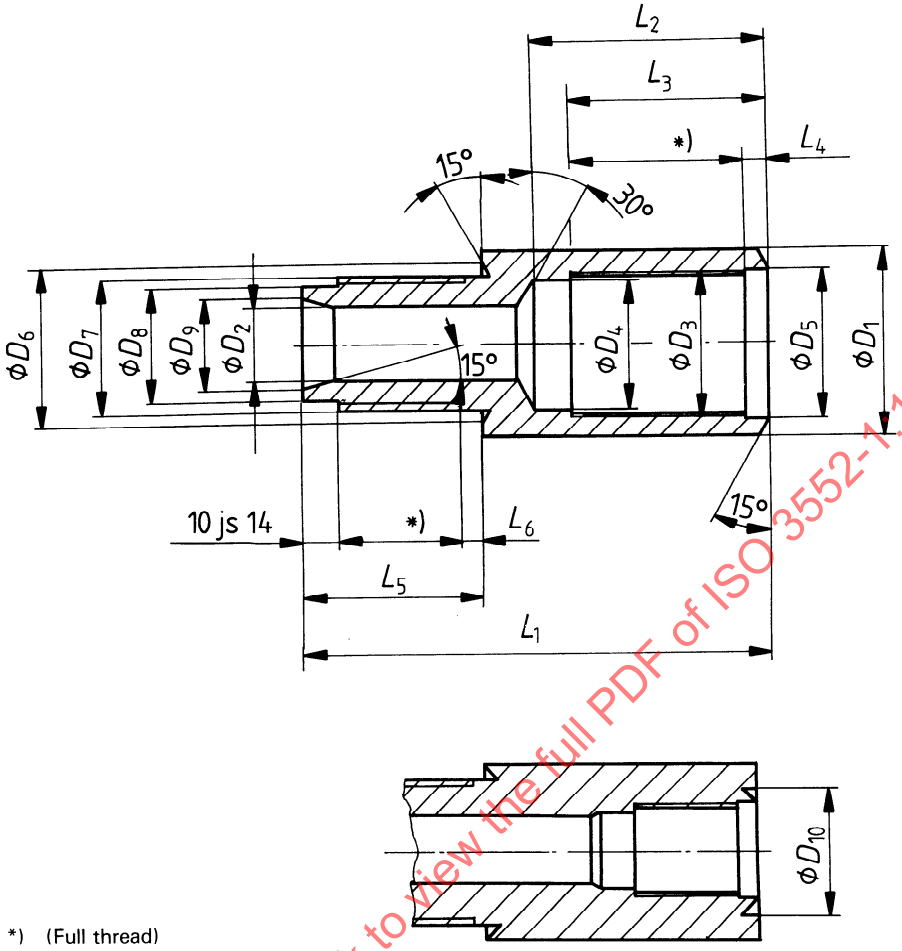


Figure 4 — Drill-rod coupling (see table 8)

Table 8 — Drill-rod coupling

Size	D_1 $^{+0,2}_{0}$	D_2 JS13	D_3 Thread CR1	D_8 d11	D_9 JS13	L_1 js14	L_4 max.	L_5 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



*) (Full thread)

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

Table 9 — Drill-rod substitute

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

1) Pin thread smaller than box thread.

2) Pin thread larger than box thread.

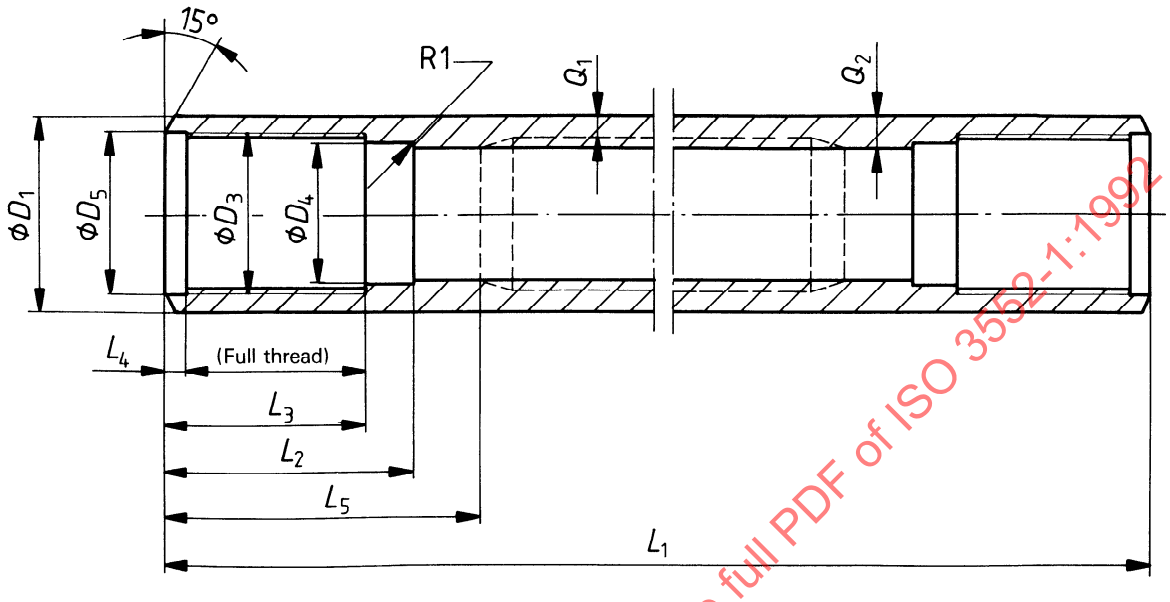


Figure 6 — Fishing rod (see table 10)

Table 10 — Fishing rod

Size	Nominal length (including coupling)	L_1	tol	D_1 ± 0,2	D_3 Thread CR1*)	D_4 H11	D_5 + 0,20 + 0,12	Q_1**) min.	Q_2**) min.	L_2 js14	L_3 min.	L_4 js14	L_5 min.
33	3 000 6 000	2 940 5 940	± 2,5 ± 2,5	33,5	28	24,4	28	3,25	4,70	45	35	6	55
42				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	8	75

*) 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.

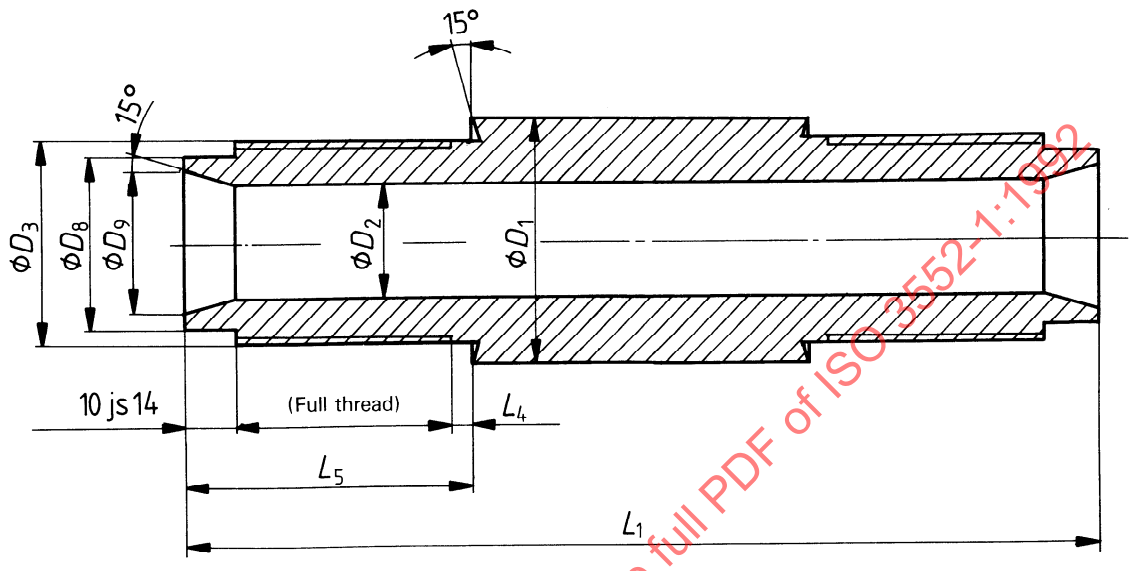


Figure 7 — Fishing-rod coupling (see table 11)

Table 11 — Fishing-rod coupling

Size	D_1 $^{+0,2}_{0}$	D_2 JS13	D_3 Thread CR1*)	D_8 d11	D_9 JS13	L_1 js14	L_4 max.	L_5 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.

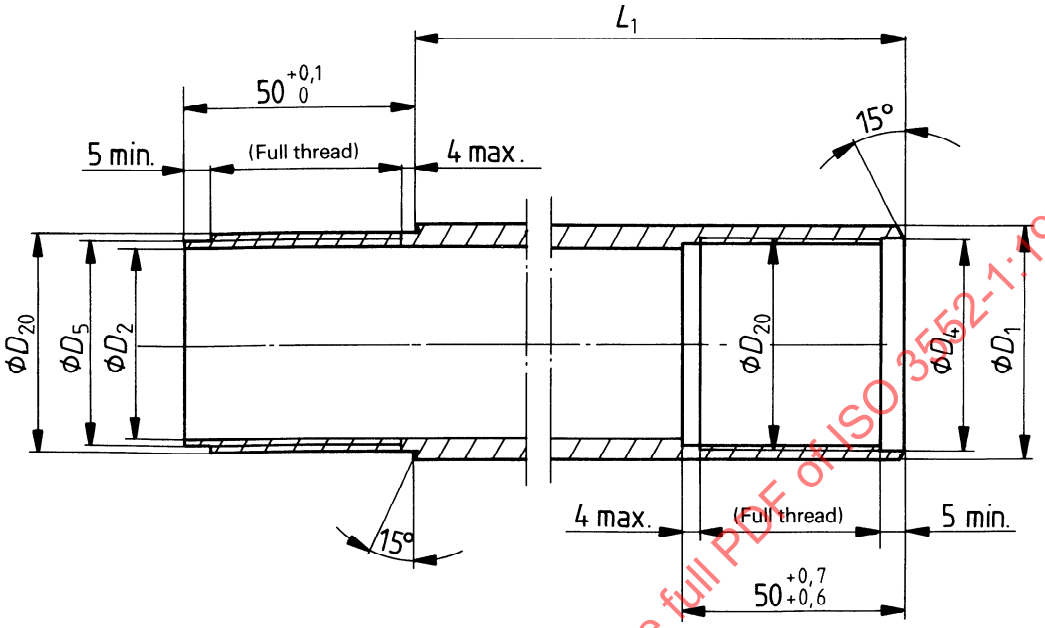


Figure 8 — Casing tube (see table 12)

Table 12 — Casing tube

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

*) Right-hand or left-hand thread.

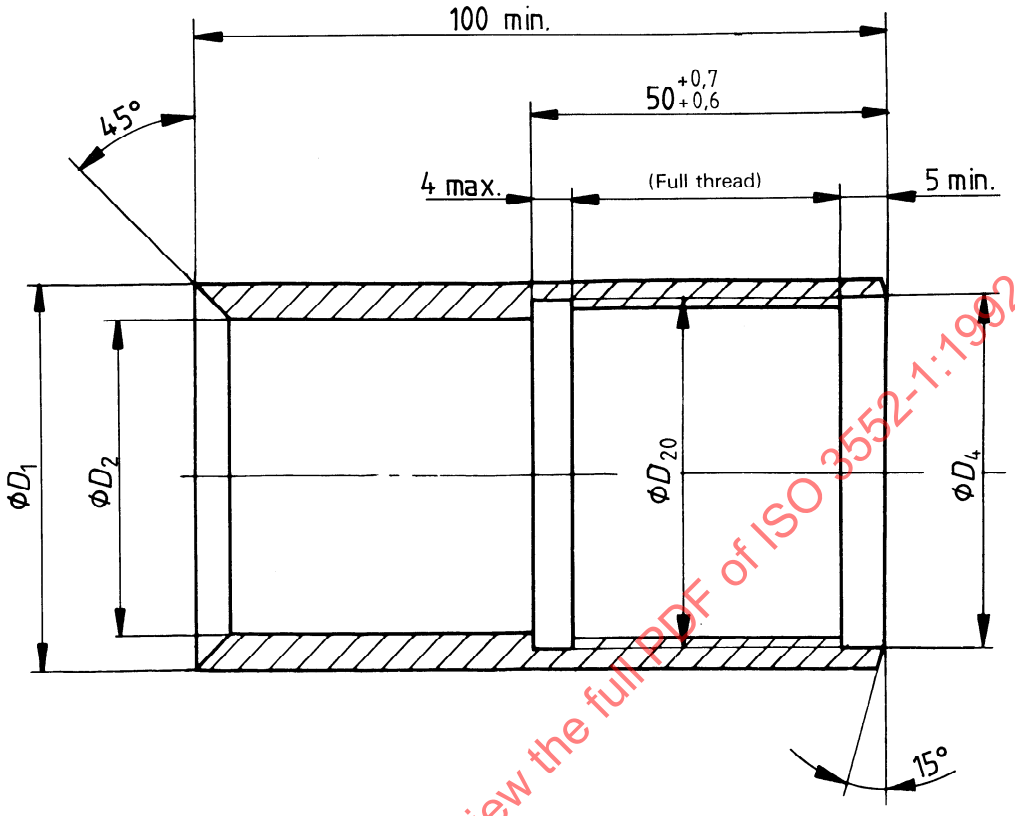


Figure 9 — Casing drive shoe (see table 13)

Table 13 — Casing drive shoe

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

*) Right-hand or left-hand thread.

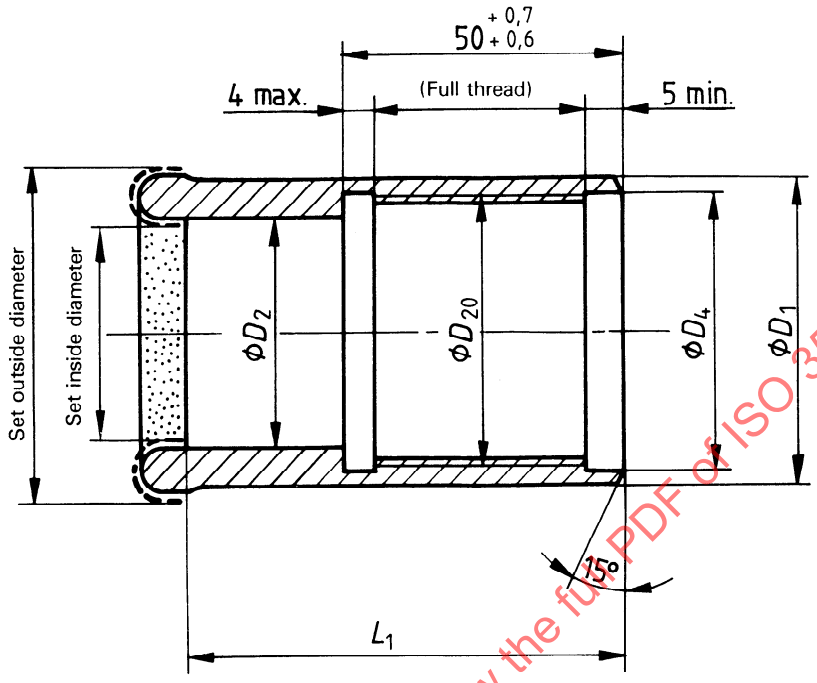


Figure 10 — Casing shoe bit (see table 14)

Table 14 — Casing shoe bit

Size	Set outside diameter ± 0,1	Set inside diameter ± 0,1	D_1 ± 0,1	D_2 + 0,1 0	D_4 + 0,20 + 0,12	D_{20} Thread CR6	L_1 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	

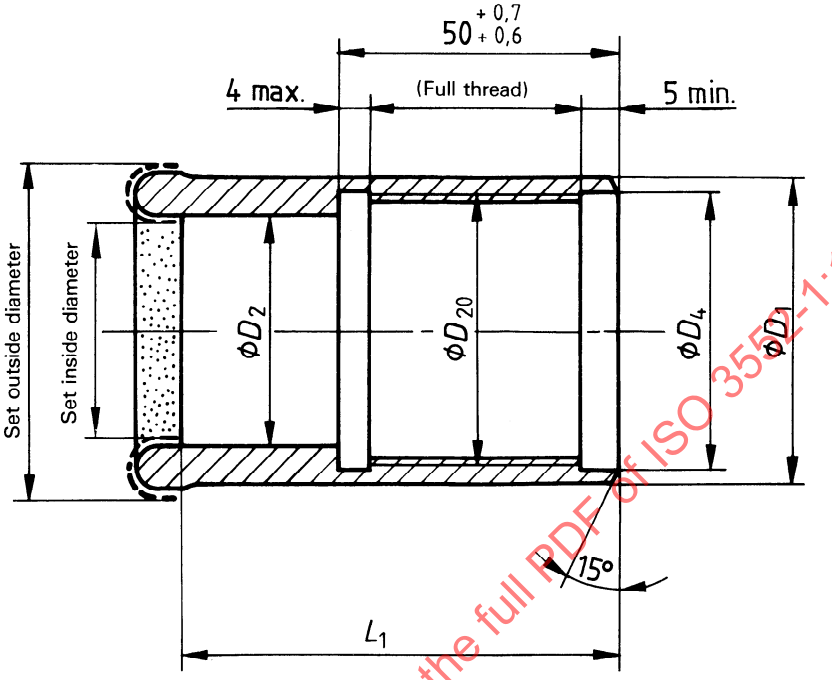


Figure 11 — Casing bit (see table 15)

Table 15 — Casing bit

Size	Set outside diameter ± 0,1	Set inside diameter ± 0,1	D_1 ± 0,1	D_2 ± 0,1	D_4 + 0,20 + 0,12	D_{20} Thread CR6	L_1 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	

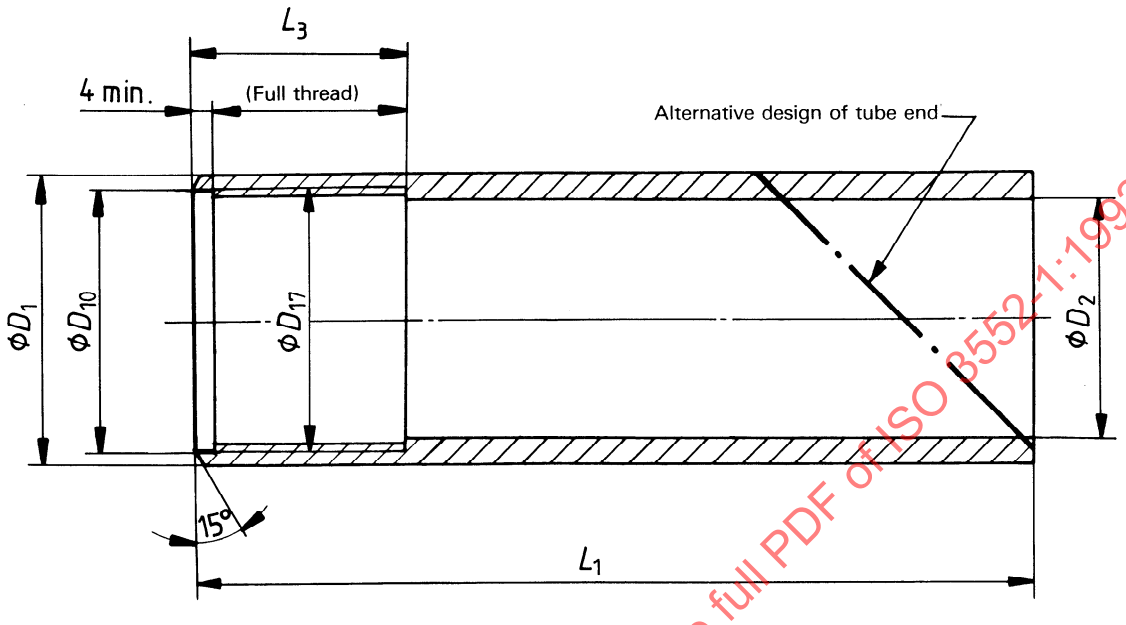


Figure 12 — Sediment tube (see table 16)

Table 16 — Sediment tube

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

*) Left-hand thread.

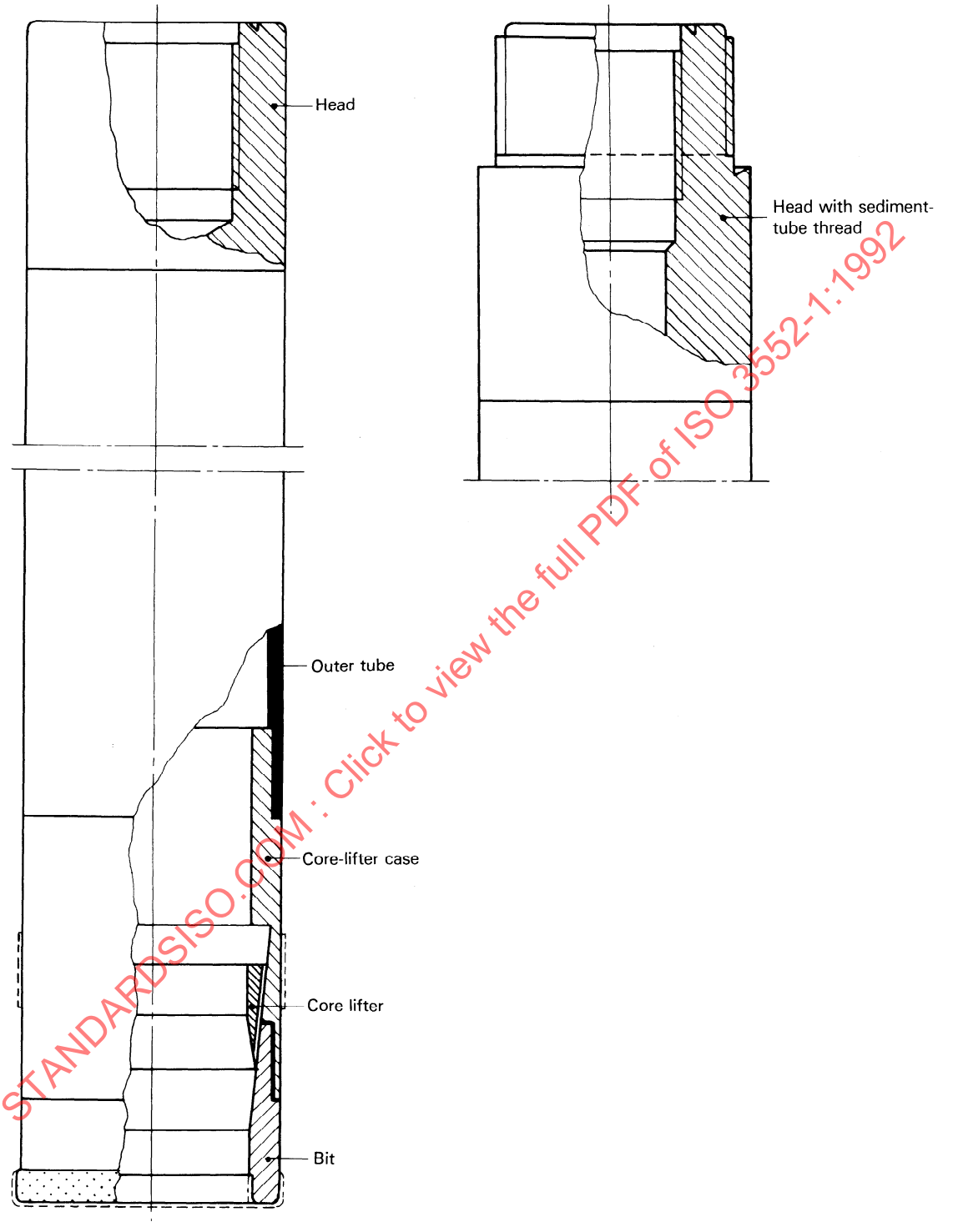


Figure 13 — Core barrel, Type B — Assembly

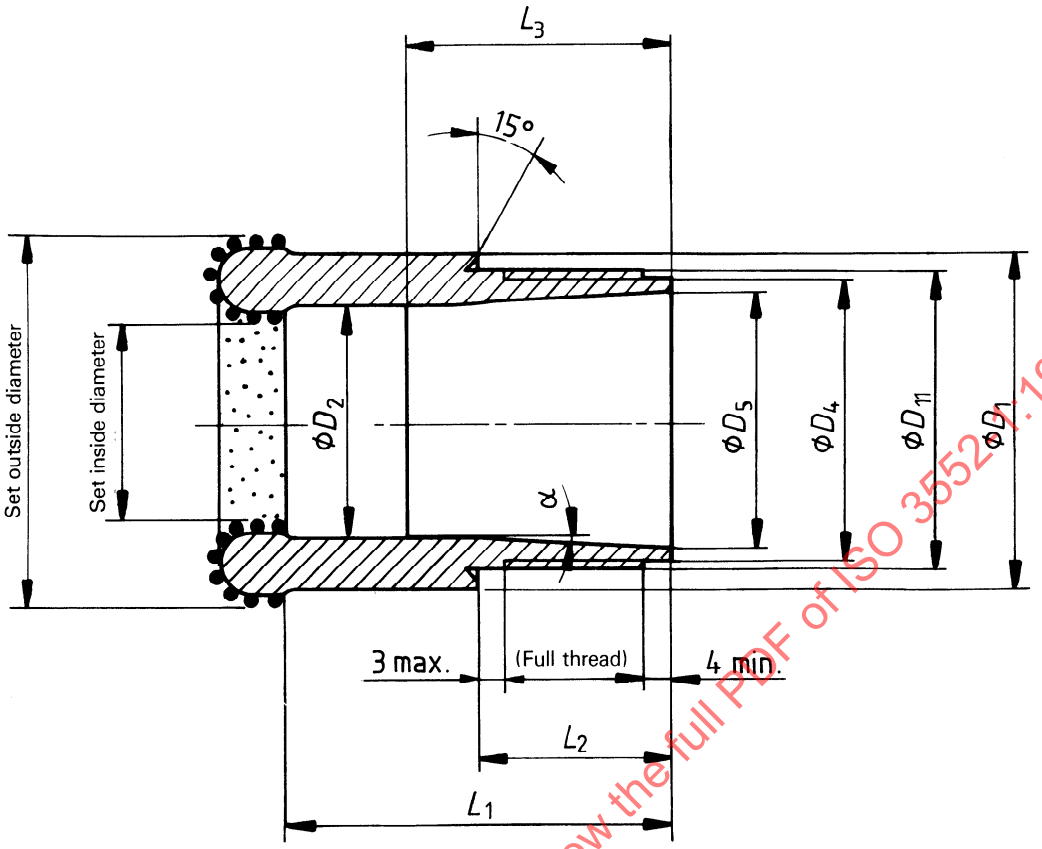


Figure 14 — Core barrel, Type B — Bit (see table 17)

Table 17 — Core barrel, Type B — Bit

Size	Set outside diameter ± 0,1	Set inside diameter $^{-0,2}_{-0,4}$	D_1 h9	D_2 H9	D_4 $^{-0,15}_{-0,35}$	D_5 ± 0,05	D_{11} Thread CR5	L_1 js14	L_2 js14	L_3 js14	α
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				

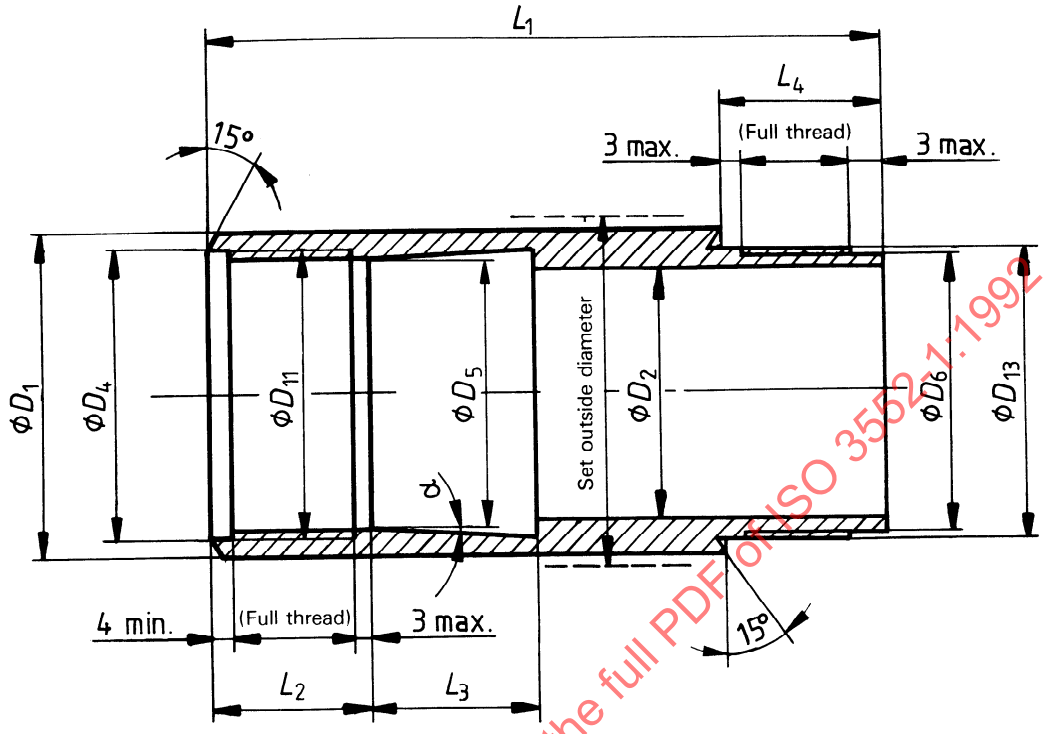


Figure 15 — Core barrel, Type B — Core-lifter case (see table 18)

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

Size	Set outside diameter ± 0,1	D_1 h9	D_2 H9	D_4 + 0,20 + 0,12	D_5 ± 0,05	D_6 − 0,15 − 0,35	D_{11} Thread CR5	D_{13} Thread CR3	L_1 min.	L_2 js14	L_3 ± 0,1	L_4 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		2,5°
66	66,3	65	54	61,5	57,7	58	61,5	60	109			22	
76	76,3	75	64	71,5	67,9	68	71,5	70	140	35	45		1,5°
86	86,3	85	74	81,5	77,9	78	81,5	80	145			25	
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					

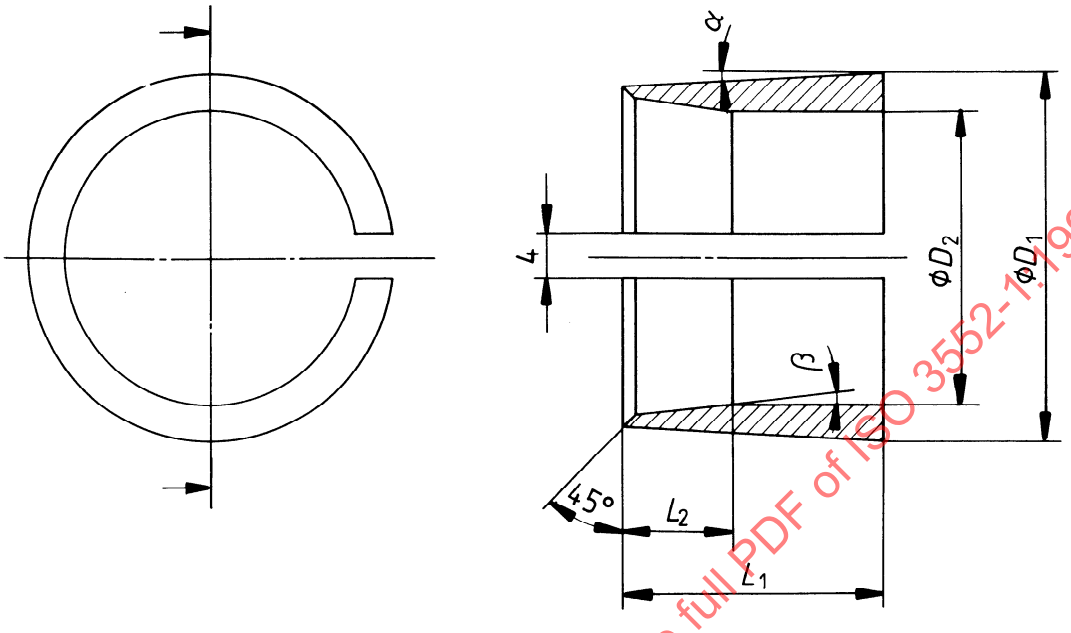


Figure 16 — Core barrel, Type B — Core lifter (see table 19)

Table 19 — Core barrel, Type B — Core lifter

Size	D_1 ± 0,05	D_2 ± 0,1	L_1 ± 0,2	L_2 js14	α	β
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				2,8°
146	139,4	131,5				

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

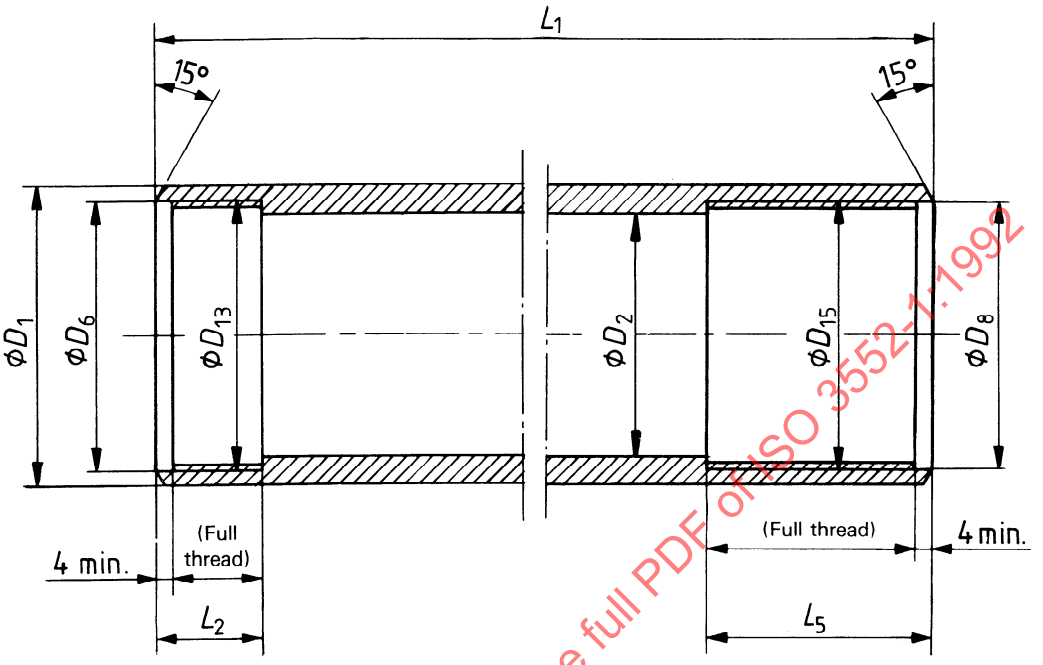


Figure 17 — Core barrel, Type B — Core tube (see table 20)

Table 20 — Core barrel, Type B — Core tube

Size	D_1	tol.	D_2	tol.	D_6 + 0,20 + 0,12	D_8 + 0,20 + 0,12	D_{13} Thread CR3	D_{15} Thread	L_1	L_2 js14	L_5 js14
36	33,5	± 0,2	23,3	± 0,25	30	28	30	CR1 28	500 ± 1,5 1 500 ± 1,5 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			
66	64,25	± 0,3	57,25		60	60	60	CR4 60		23	
76	74,25		67,25		70	70	70	CR4 70			
86	84,25	± 0,4	77,25		80	80	80	CR4 80		26	
101	98		88,3	± 0,4	95	93	95	CR4 93			
116	113	± 0,5	103,3	± 0,5	110	108	110	CR4 108		28	45
131	128		118,3		125	123	125	CR4 123			
146	143		133,3	± 0,7	140	138	140	CR4 138			

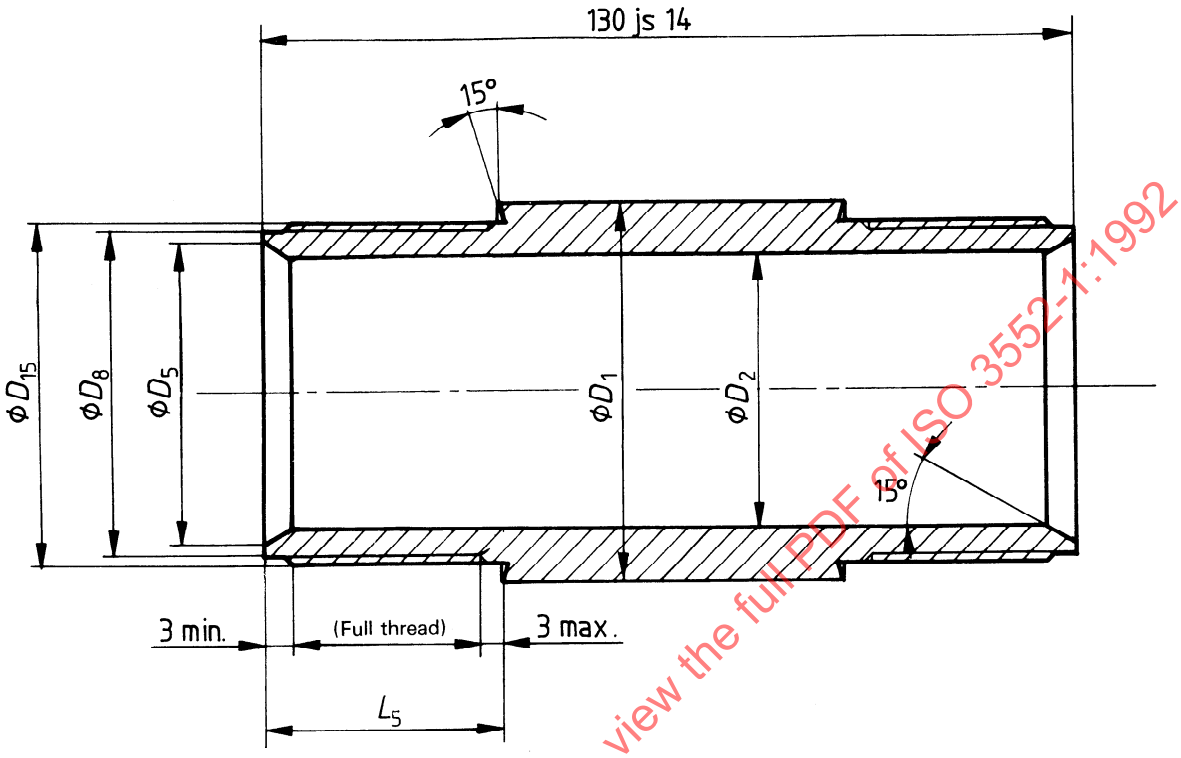


Figure 18 — Core barrel, Type B — Extension coupling (see table 21)

Table 21 — Core barrel, Type B — Extension coupling

Size	D_1 h11	D_2 JS13	D_5 JS13	D_8 − 0,15 − 0,35	D_{15} Thread CR4	L_5 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	

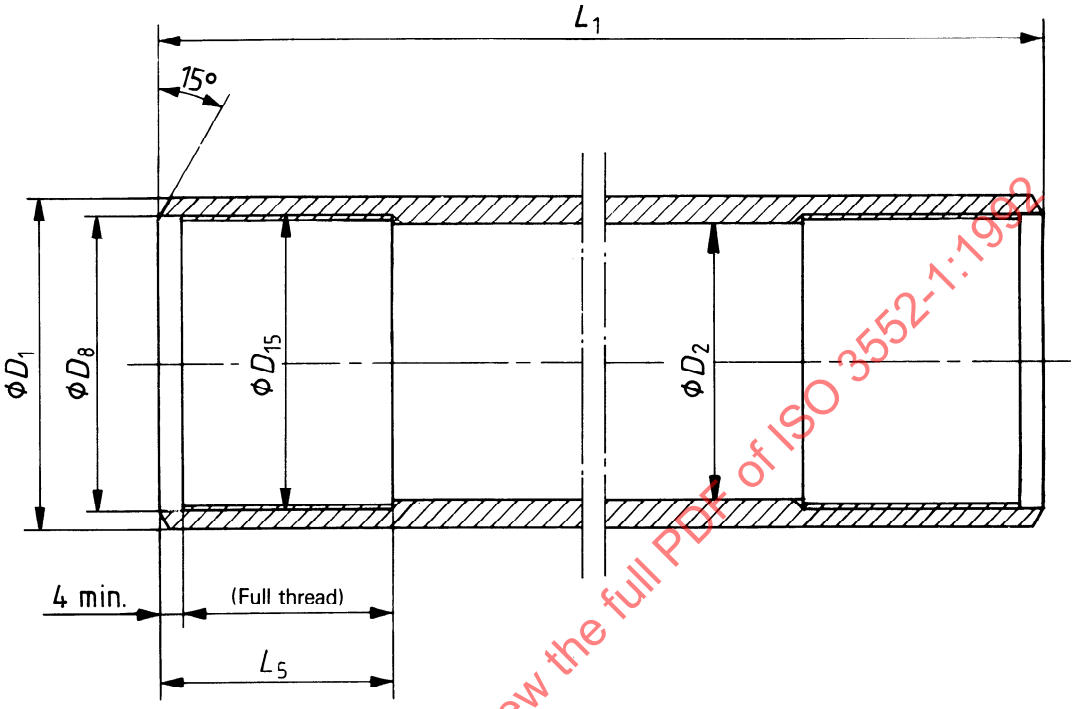


Figure 19 — Core barrel, Type B — Extension tube (see table 22)

Table 22 — Core barrel, Type B — Extension tube

Size	Nominal length (including coupling)	L_1	D_1		D_2		D_8	D_{15}	L_5
				tol.		tol.	+ 0,20 + 0,12	Thread CR4	js14
46	1 500 3 000	1 440 ± 1,5 2 940 ± 2,5	44,15	± 0,2	37,15	± 0,25	40	40	40
56			54,15	± 0,25	47,15		50	50	
66			64,25	± 0,3	57,25		60	60	
76			74,25		67,25		70	70	
86			84,25	± 0,4	77,25		80	80	

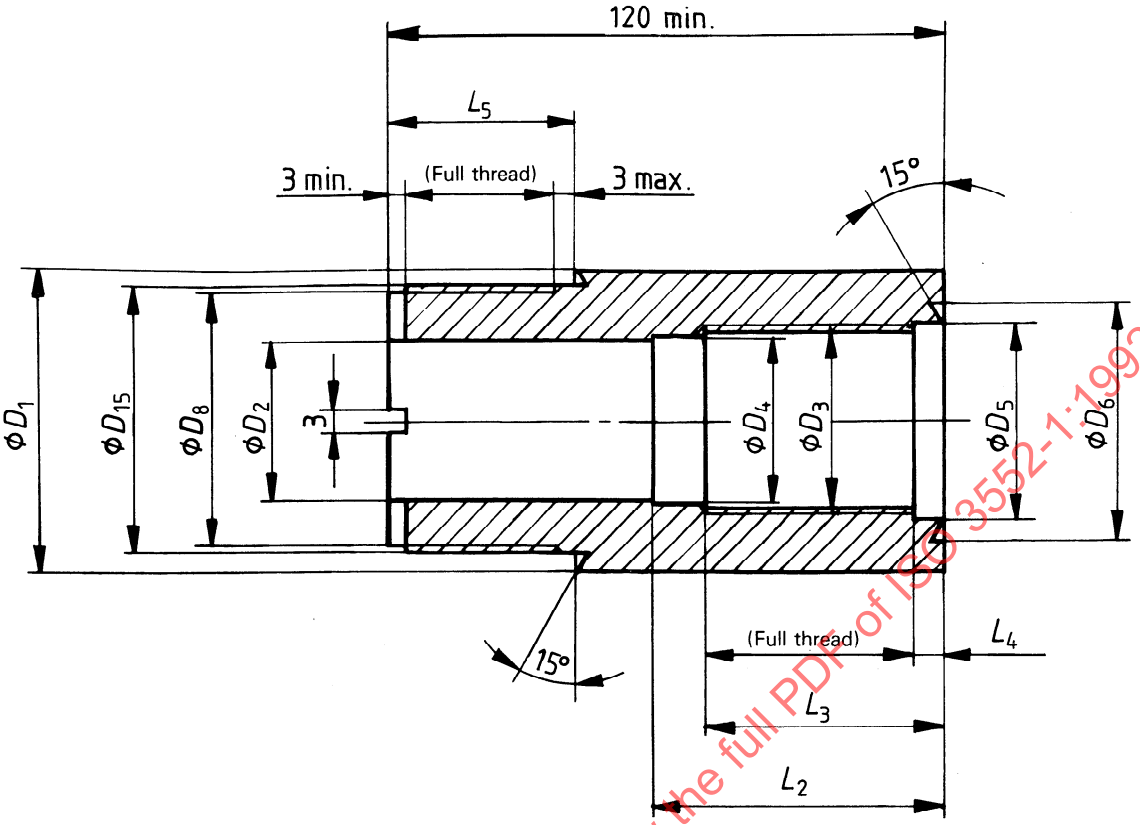


Figure 20 — Core barrel, Type B — Head (see table 23)

Table 23 — Core barrel, Type B — Head

Size	D_1 h11	D_2 JS13	D_3 Thread CR1	D_4 H11	D_5 + 0,20 + 0,12	D_6 + 0,5 + 0,2	D_8 − 0,15 − 0,35	D_{15} Thread CR4	L_2 js14	L_3 js14	L_4 js14	L_5 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						48	50				
56 × 50												
66 × 50	64,5						58	60				
76 × 50	74,5						68	70				
86 × 50	84,5	37	41,5	37,8	41,5	50	78	80	65	55	8	
101 × 50	98						91	93				
116 × 50	113						106	108				
131 × 50	128						121	123				40
146 × 50	143						136	138				

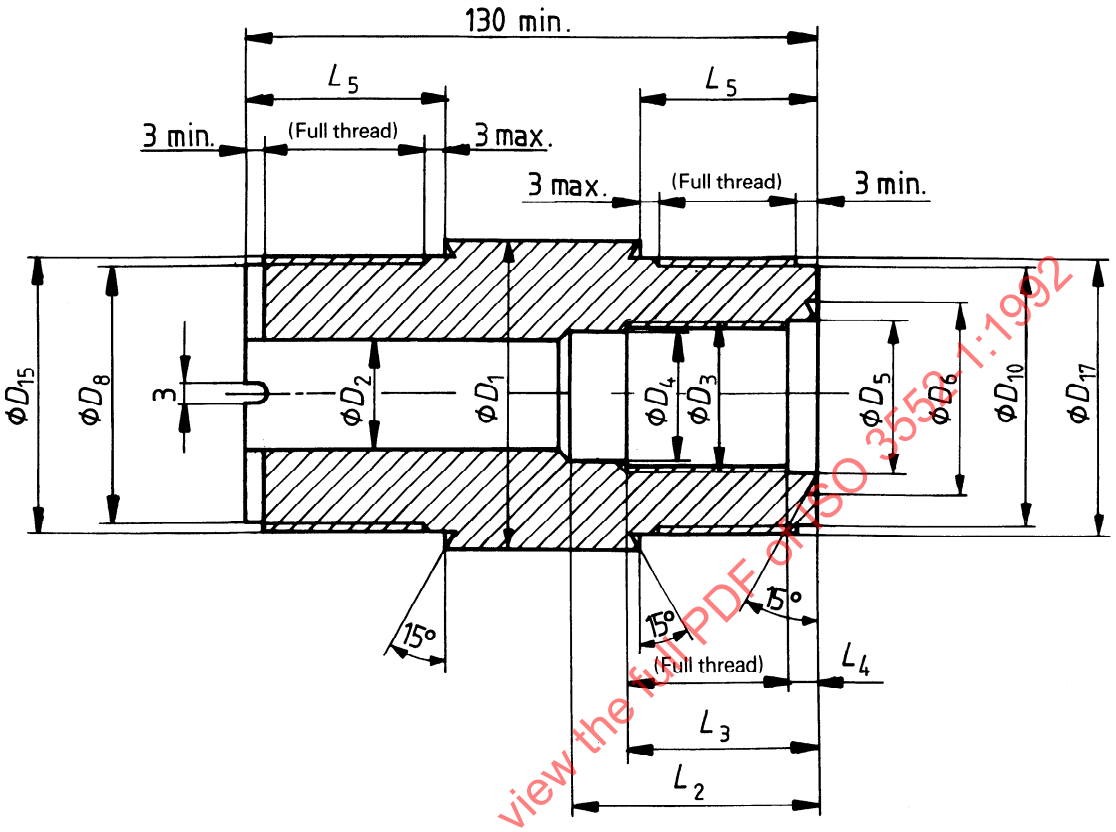


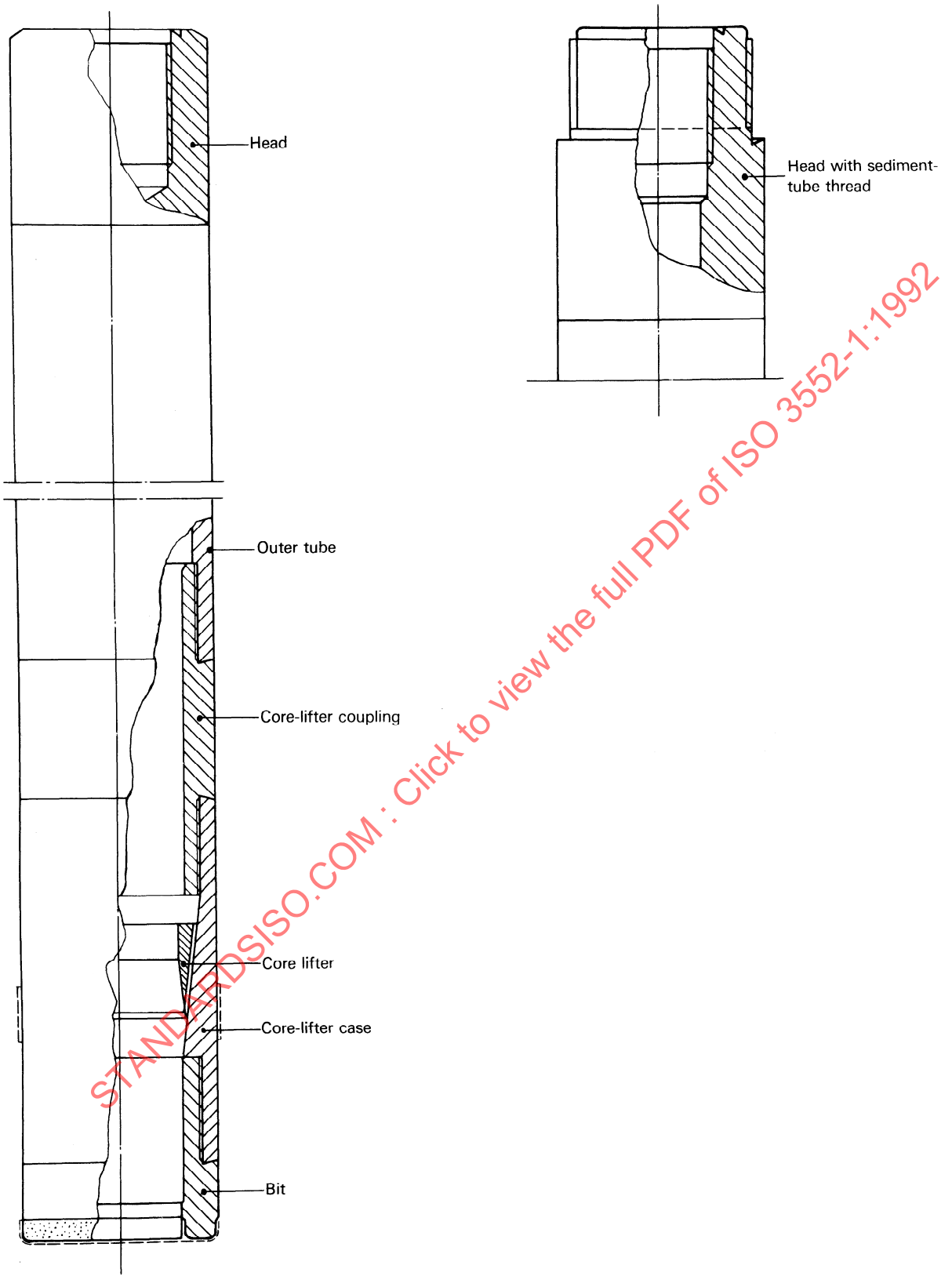
Figure 21 — Core barrel, Type B — Head with sediment-tube thread (see table 24)

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 + 0,20 + 0,12	D_6 + 0,5 + 0,2	D_8 − 0,15 − 0,35	D_{10} − 0,15 − 0,35	D_{15} Thread CR4 *)	D_{17} Thread CR4 **)	L_2 js14	L_3 js14	L_4 js14	L_5 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	
86 × 50	84,5						78	78	80	80				
101 × 50	98						91	91	93	93				
116 × 50	113						106	106	108	108				40
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

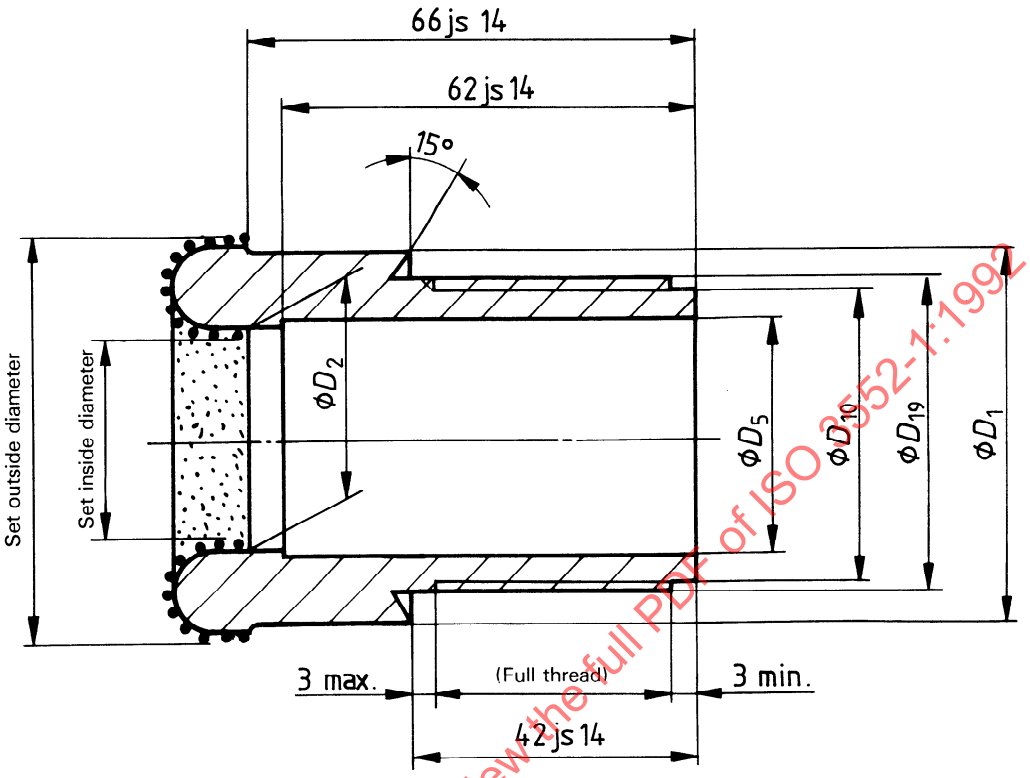


Figure 23 — Core barrel, Type Z — Bit (see table 25)

Table 25 — Core barrel, Type Z — Bit

Size	Set outside diameter ± 0,1	Set inside diameter − 0,2 − 0,4	D_1 h9	D_2 H9	D_5 ± 0,1	D_{10} − 0,15 − 0,35	D_{19} 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

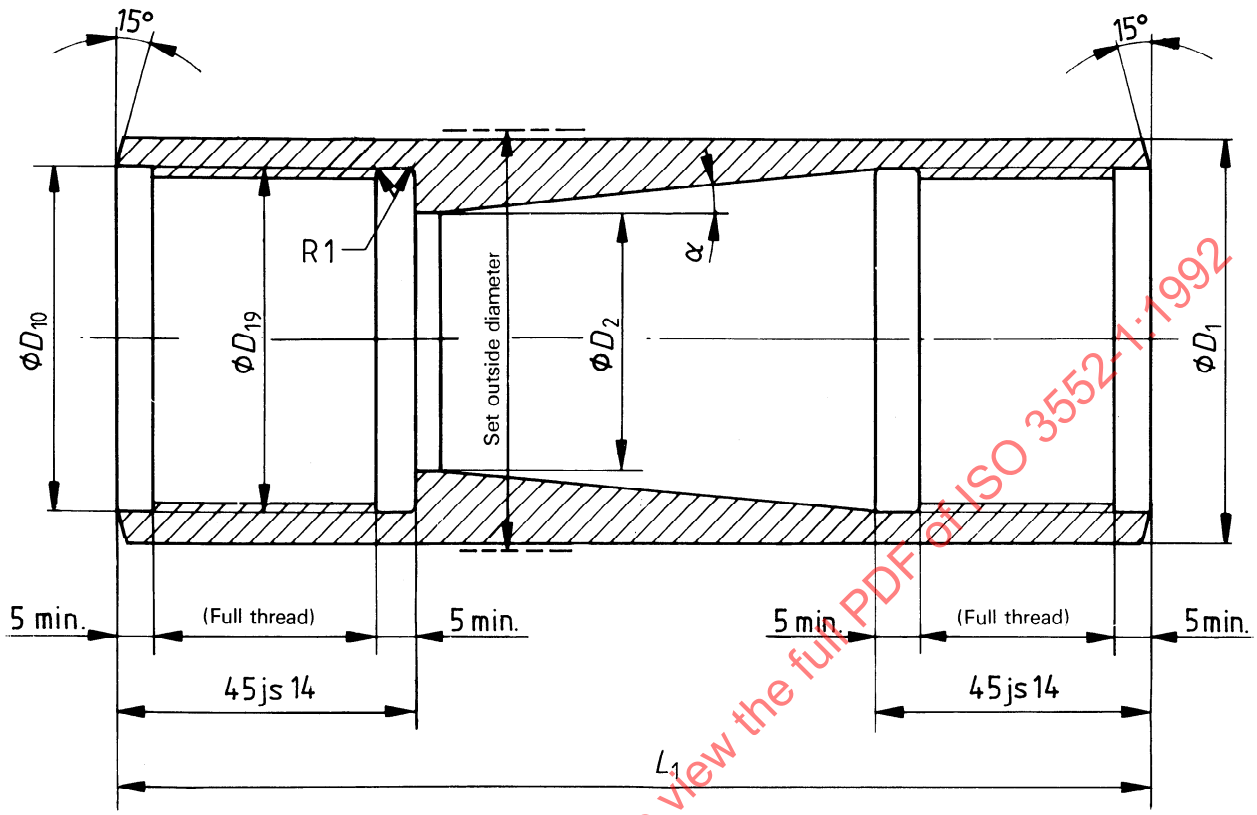


Figure 24 — Core barrel, Type Z — Core-lifter case (see table 26)

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

Size	Set outside diameter ± 0,1	D_1 h11	D_2 JS13	D_{10} + 0,20 + 0,12	D_{19} Thread CR2	L_1 min.	α
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		
86	86,3	85	64	76,5	76,5	168	
101	101,3	100	78	92	92		
116	116,3	115	92,1	107	107	173	
131	131,3	130	107,1	122	122		
146	146,3	145	122	137	137	183	4,5°

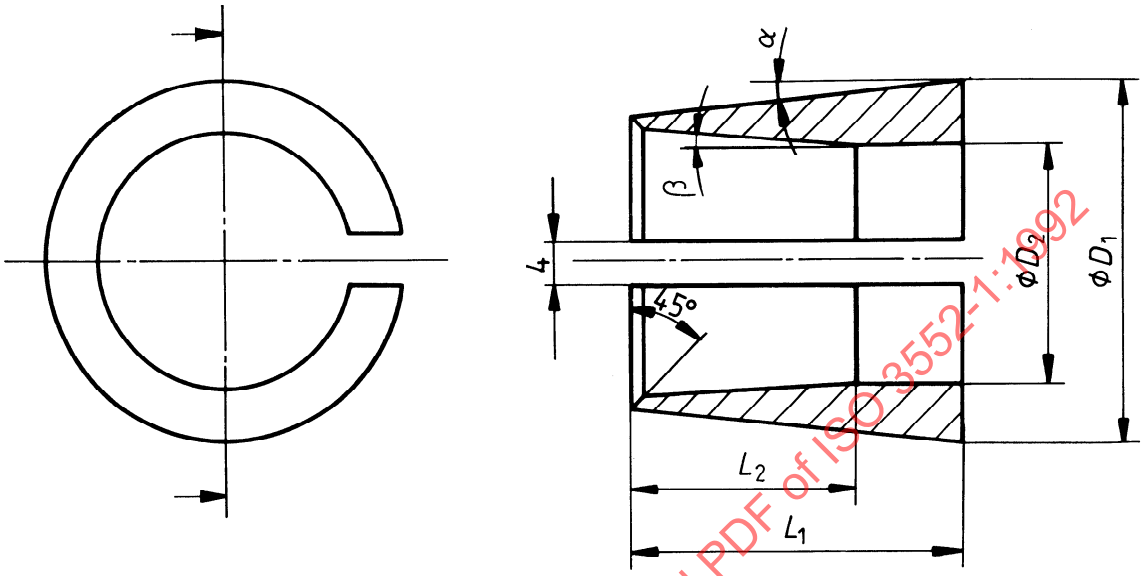


Figure 25 — Core barrel, Type Z — Core lifter (see table 27)

Table 27 — Core barrel, Type Z — Core lifter

Size	D_1 ± 0,05	D_2 ± 0,1	L_1 js14	L_2 js14	α	β
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.

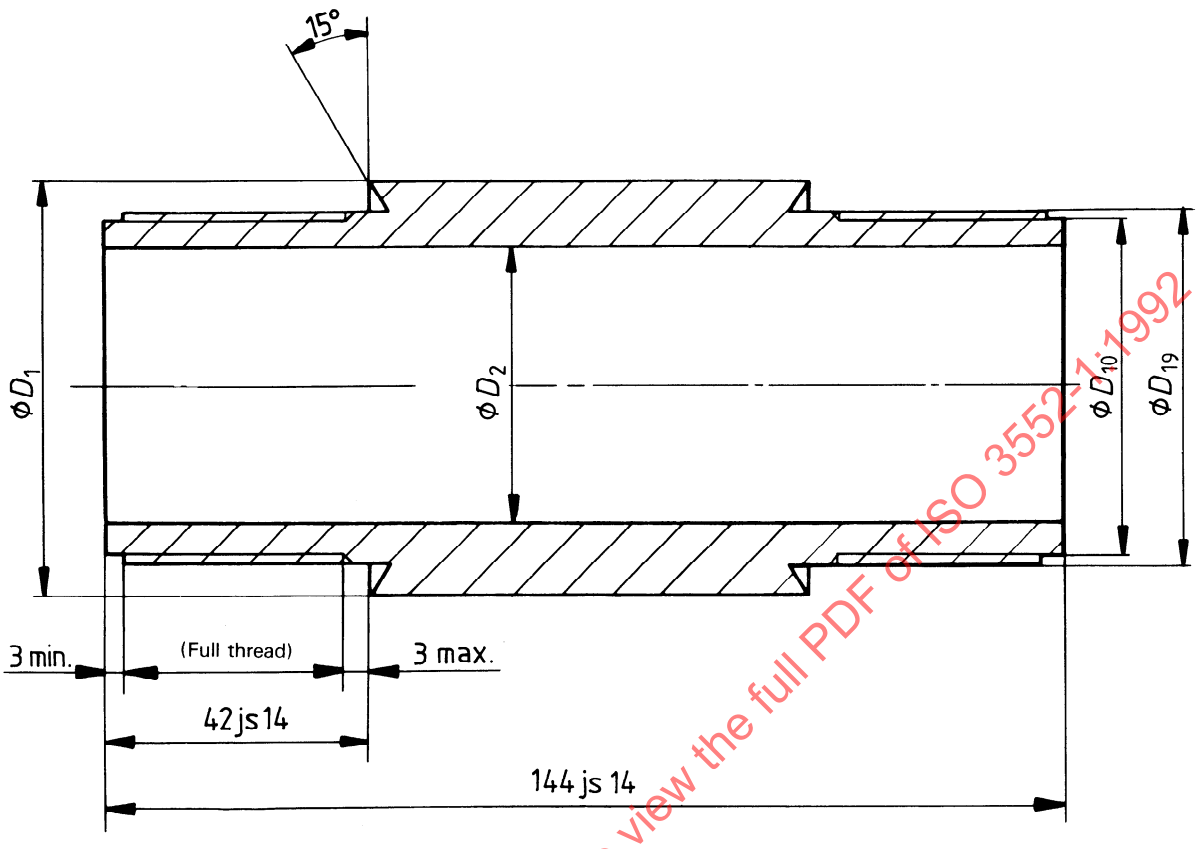


Figure 26 — Core barrel, Type Z — Core-lifter coupling (see table 28)

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

Size	D_1 h11	D_2 JS13	D_{10} $^{-0,15}_{-0,35}$	D_{19} Thread 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

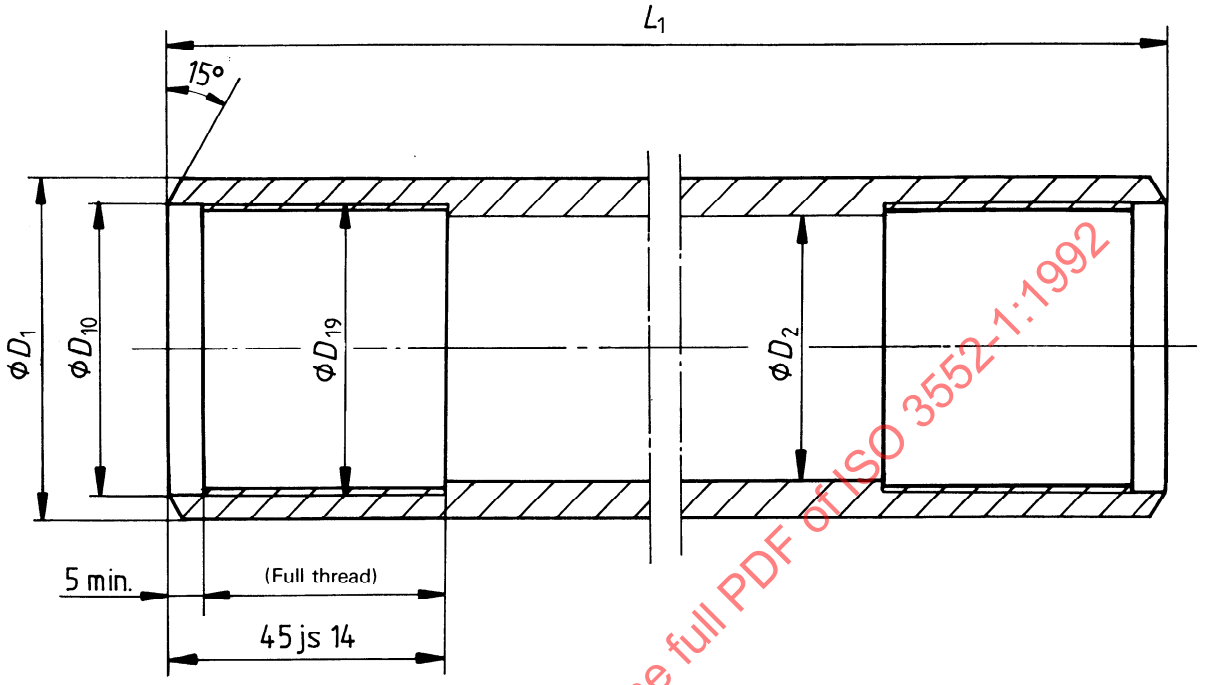


Figure 27 — Core barrel, Type Z — Core and extension tube (see table 29)

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

Size	Nominal length (including coupling)	L_1	D_1		D_2		D_{10}	D_{19}
				tol.		tol.	+ 0,20 + 0,12	Thread CR2
46	500 1 500 3 000	440 ± 1,5 1 440 ± 1,5 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

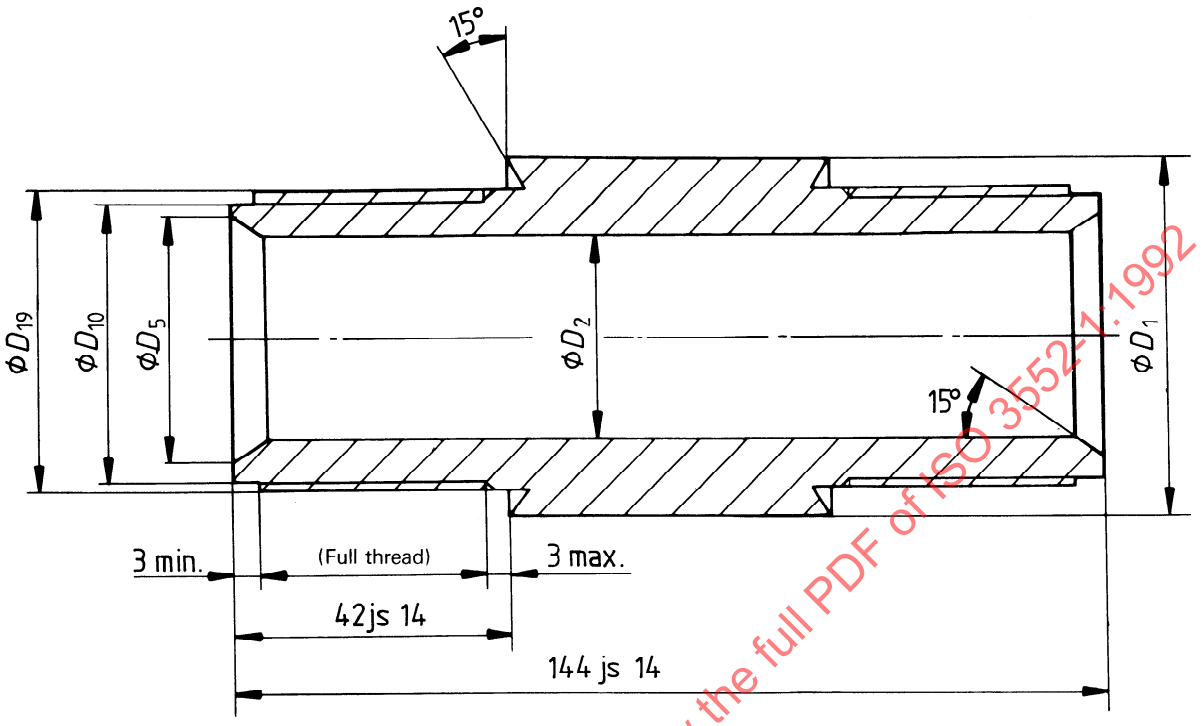


Figure 28 — Core barrel, Type Z — Extension coupling (see table 30)

Table 30 — Core barrel, Type Z — Extension coupling

Size	D_1 h11	D_2 JS13	D_5 JS13	D_{10} $^{-0,15}_{-0,35}$	D_{19} Thread 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

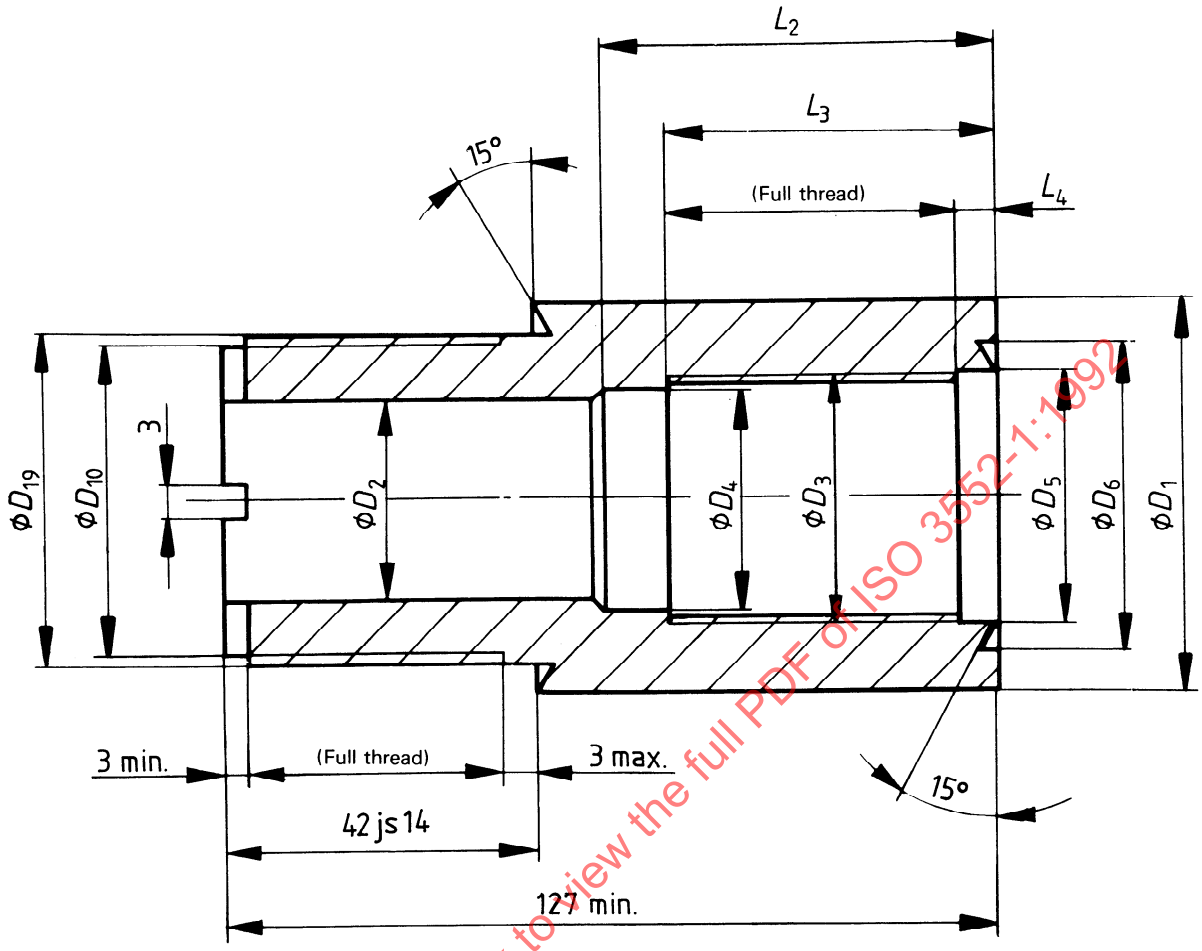


Figure 29 — Core barrel, Type Z — Head (see table 31)

Table 31 — Core barrel, Type Z — Head

Size	D_1 h11	D_2 JS13	D_3 Thread CR1	D_4 H11	D_5 + 0,20 + 0,12	D_6 + 0,5 + 0,2	D_{10} − 0,15 − 0,35	D_{19} Thread CR2	L_2 js14	L_3 js14	L_4 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						44,5	46,5			
56 × 50		37	41,5	37,8	41,5	50			65	55	8
66 × 50	64,5						54,5	56,5			
76 × 50	74,5						64,5	66,5			
86 × 50	84,5						74,5	76,5			
101 × 50	98						90	92			
116 × 50	113						105	107			
131 × 50	128						120	122			
146 × 50	143						135	137			

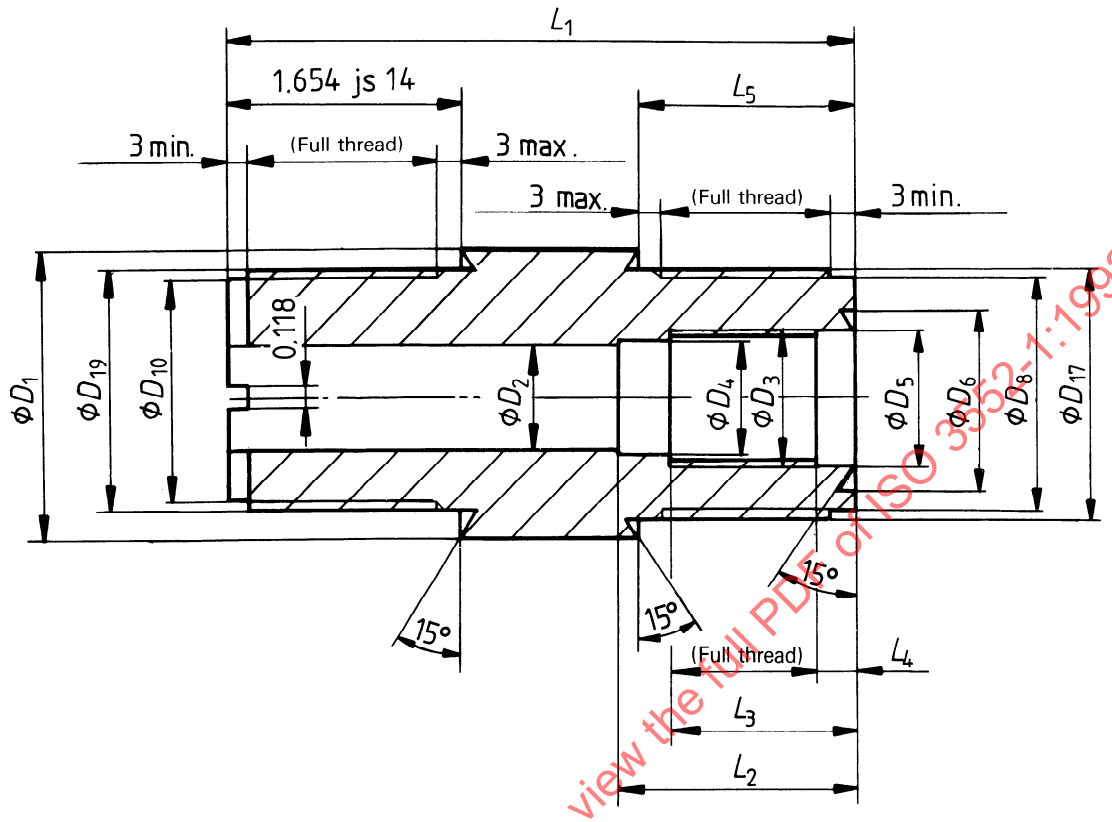


Figure 30 — Core barrel, Type Z — Head with sediment-tube thread (see table 32)

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 + 0,20 + 0,12	D_6 + 0,5 + 0,2	D_8 − 0,15 − 0,35	D_{10} − 0,15 − 0,35	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	54,5	22	28	24,4	28	33,5	48	44,5	50	46,5		45	35	6	
66 × 42	64,5	30	36	32,8	36	42	58	54,5	60	56,5		55	45		
76 × 50	74,5						68	64,5	70	66,5	137				35
86 × 50	84,5						78	74,5	80	76,5					
101 × 50	98	37	41,5	37,8	41,5	50	91	90	93	92		65	55	8	
116 × 50	113						106	105	108	107					
131 × 50	128						121	120	123	122	142				40
146 × 50	143						136	135	138	137					

*) Right-hand thread.

**) Left-hand thread.