

INTERNATIONAL STANDARD

ISO
3552-1

First edition
1992-07-01

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

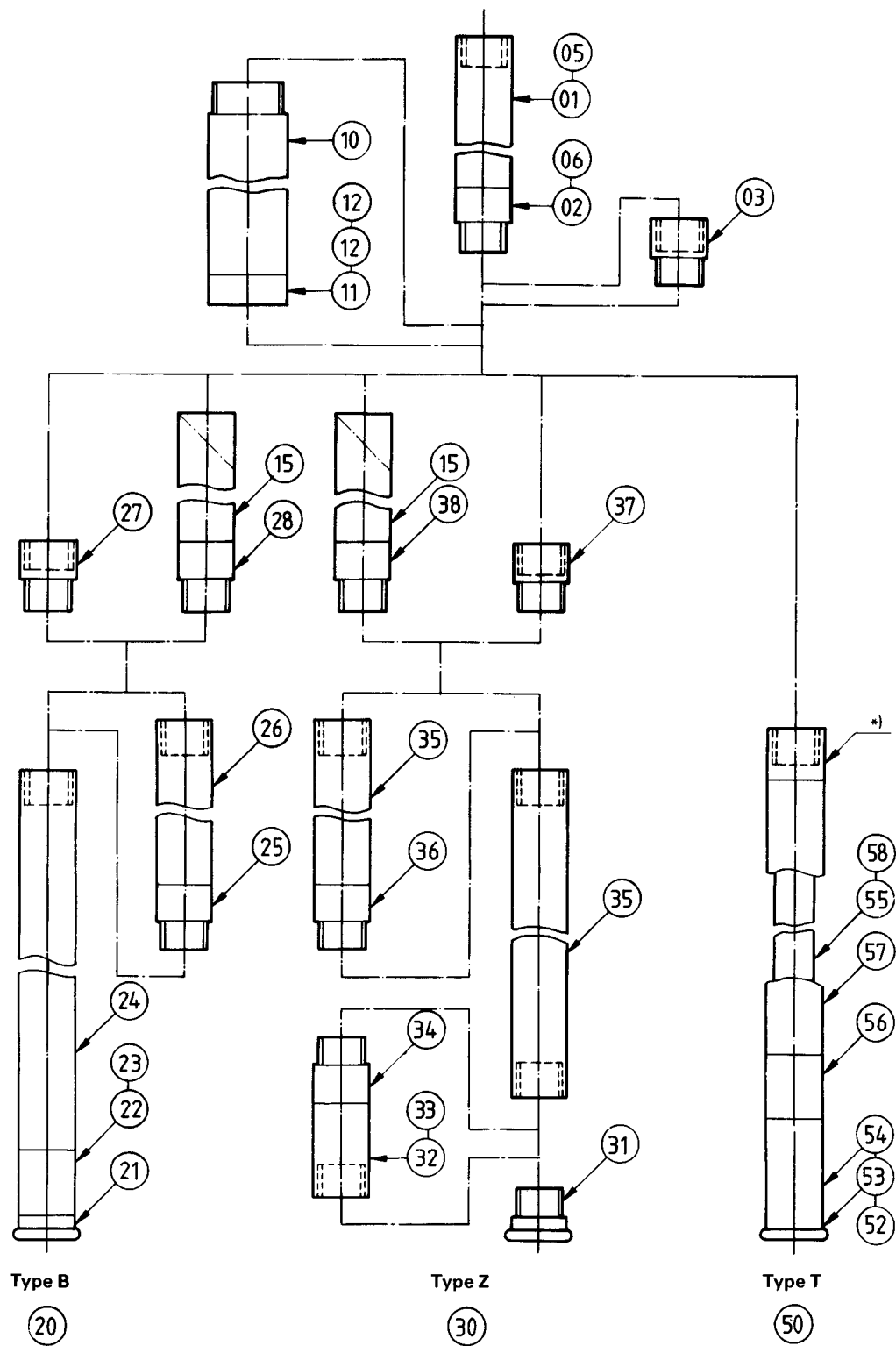
drilled hole diameter (size designation), core diameter (set inside diameter of the bit) and outside diameter and inside diameter ($D_1 \times D_2$) for core barrels, coring tubes and sediment tubes is shown in table 1.

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 (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 R_m , min. N/mm ² (MPa)	Yield stress R_e , min. N/mm ² (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 $\pm 0,20$ 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 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

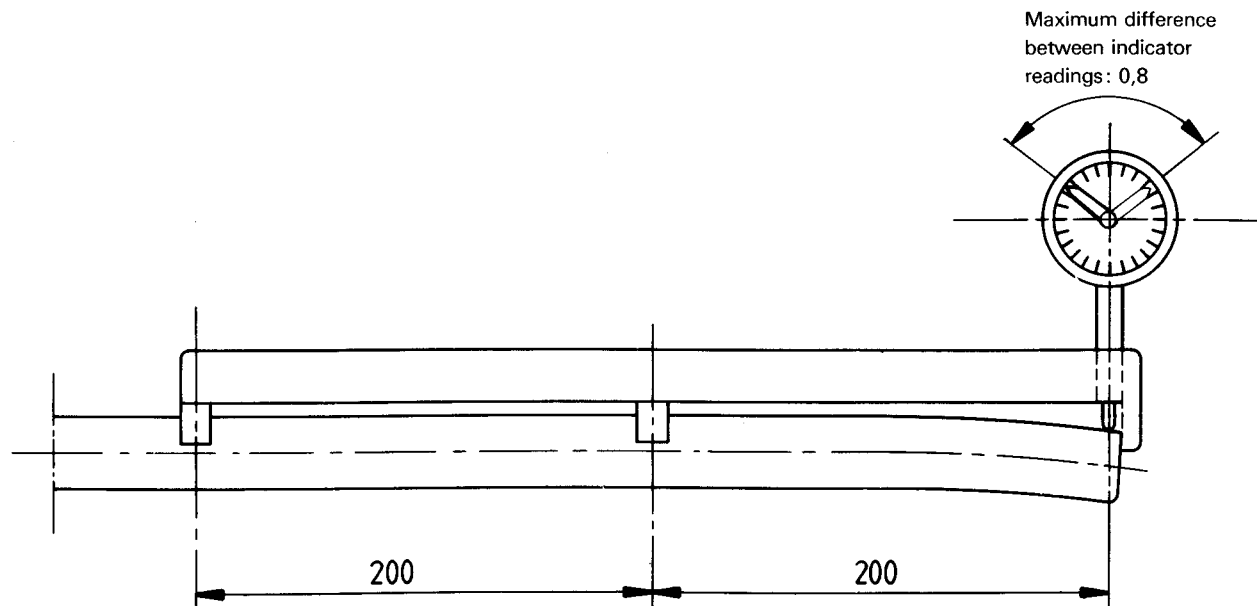


Figure 2 — Requirements for straightness at the tube ends

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	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 mm	Kerf area cm ²	Core area cm ²	Hole area cm ²	Core-to-hole ratio %
B	T	Z	Set I.D.	Set O.D.	Set O.D.					
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

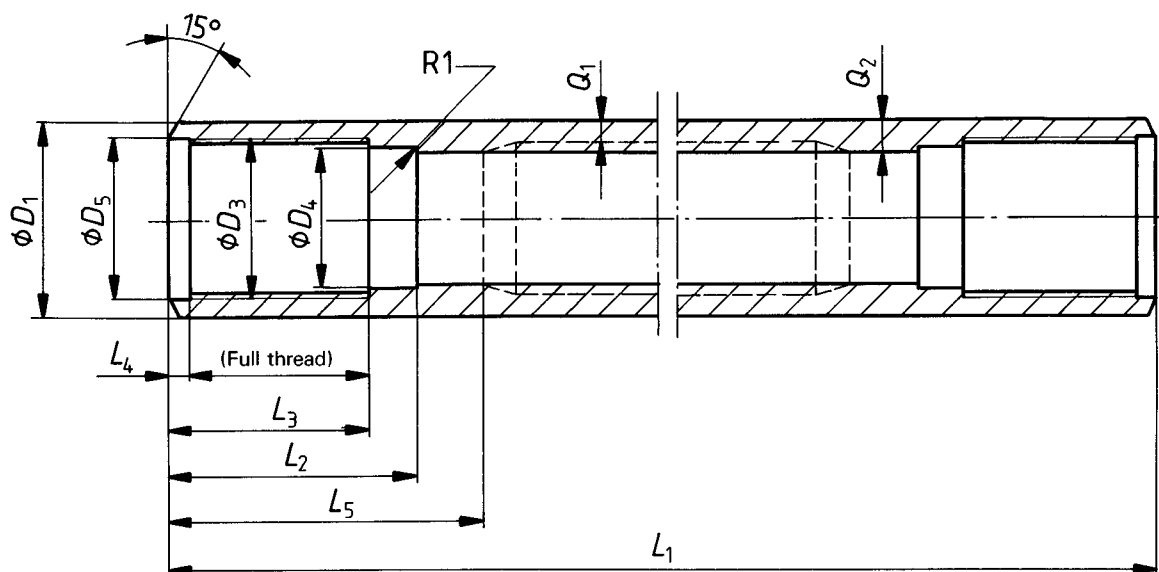


Figure 3 — Drill rod (see table 7)

Table 7 — Drill rod

Size	Nominal length (including coupling)	L_1		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 CR1	H11	$+ 0,20$ $+ 0,12$	min.	min.	js14	min.	js14	min.
33	500	440	$\pm 1,5$	33,5	28	24,4	28	3,25	4,70	45	35	6	55
42	1 500	1 440	$\pm 1,5$	42	36	32,8	36	3,50	4,75	55	45	6	65
50	3 000	2 940	$\pm 2,5$	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.

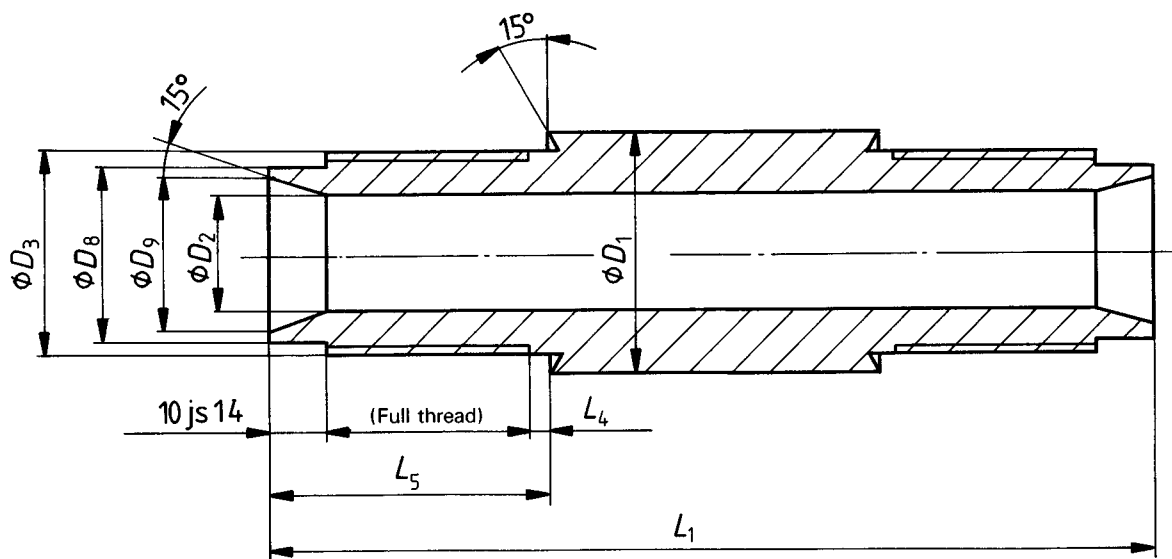


Figure 4 — Drill-rod coupling (see table 8)

Table 8 – Drill-rod coupling

Size	D_1 + 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

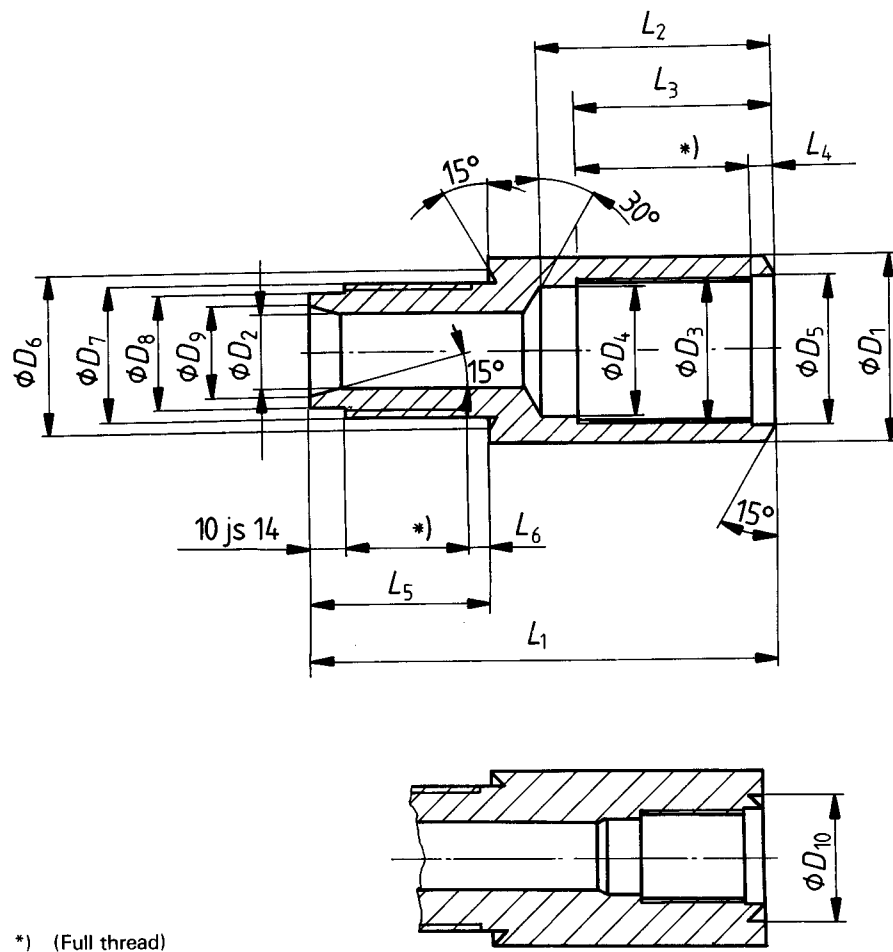


Figure 5 — Drill-rod substitute (see table 9)

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		36	32,8	27		120	65	55	8		
42 × 50 ¹⁾	22	28	24,4	28	—	41,5				37,8	32				130	
42 × 33 ²⁾		42	36	32,8			36	42	110			120	130	55	45	60
50 × 33 ²⁾		50			36	32,8				36	42					
50 × 42 ²⁾		50		36			32,8	36	42			130	55	45		

1) Pin thread smaller than box thread.

2) Pin thread larger than box thread.

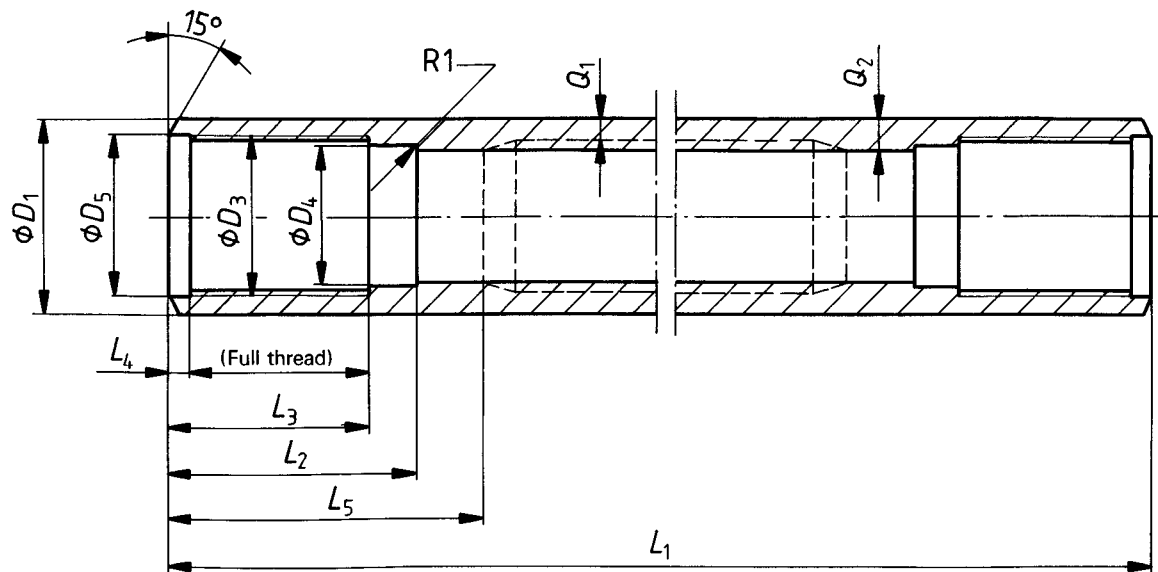


Figure 6 — Fishing rod (see table 10)

Table 10 — Fishing rod

Size	Nominal length (including coupling)	L_1		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 CR1 ^{*)}	H11	+ 0,20 + 0,12	min.	min.	js14	min.	js14	min.
33	3 000 6 000	2 940	$\pm 2,5$	33,5	28	24,4	28	3,25	4,70	45	35	6	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

*) 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.

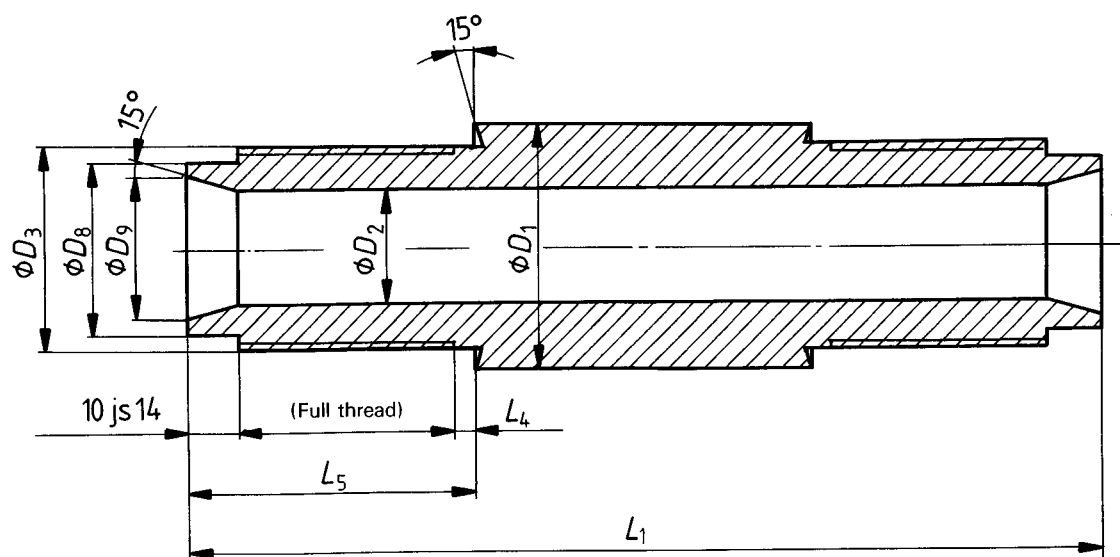


Figure 7 — Fishing-rod coupling (see table 11)

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.