



BS 4019: Part 1: 1974

UDC 550.822:622.143:622.243.5.05

Specification for
**Rotary core
drilling equipment**

Part 1. Basic equipment

British Standards Institution

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This British Standard, having been approved by the Mechanical Engineering Industry Standards Committee, was published under the authority of the Executive Board on 15 February 1974.

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First published, April 1966.
First revision, February, 1974.

ISBN: 0 580 08061 7

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Committee reference MEE/157. Draft for comment 71/30077.

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8408-11-0.2k-B

**BS 4019 : Part 1 : February 1974**

UDC 550.822 : 622.143 : 622.243.5.05

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Amendments issued since publication

Amd. No.	Date of issue	Text affected
1970	May 1976	Indicated by a line in the margin

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Foreword

This Part of this British Standard was first issued in 1966 as BS 4019 : Part 1 and this revision has been prepared under the authority of the Mechanical Engineering Industry Standards Committee. The revision is based on a proposal to ISO for an international standard. It has been prepared jointly by the United Kingdom, USA and Canada, and is supported by Australia and South Africa. The revised standard renders all the equipment made to conform with the respective national standards under consideration, or approved, by the United Kingdom, USA and Canada to be dimensionally identical and therefore interchangeable.

In this revision all dimensions have been converted to SI units and the purpose of the revision is to provide the dimensional interchangeability in essential rotary core drill fittings. These fittings are designed specifically for drilling with water as the circulating medium and are not necessarily suitable for use with air or mud as the circulating mediums. It is proposed to produce other Parts of the standard to cover equipment for use with air flush and wire line, and consideration is being given to equipment for mud flush.

The revision incorporates the following changes to BS 4019 : Part 1 : 1966:

- (1) In Table 1 the first letter in every case is a size identification symbol previously in use in the drilling industry or introduced in BS 4019 : Part 1 : 1966.
- (2) At Fig. 1 a system of dimensional identification letters has been devised for the sake of uniformity and clarity. An explanation of the letters is given at Table 2.
- (3) The nesting properties of all equipment remain as previously. For example, N core barrels will pass through NX or NW casing and will drill a hole to take BX or BW casing etc.
- (4) The letter W is in current use to denote a design of drill rod and core barrel which replaces all previous types. Where used with casing the letter W denotes flush jointed casing. The letter X previously widely used has been retained to identify flush coupled casing only.
- (5) The letter G has replaced the letter X in core barrel design as a suffix letter to denote a universal or general core barrel design.
- (6) The letter M is in current use to denote a range of core barrels with a modification in design from the G series core barrels, although possessing the same nesting properties as the G series.
- (7) The letter F has been used to denote core barrels of the face discharge type.
- (8) The letter T has been used in core barrel nomenclature to denote a new thin wall range. RWT now replaces the designation XRT previously used.
- (9) All core barrels have been fully dimensioned with the exception of the internal mechanism of the head, which enables all parts of every core barrel of the same designation to be fully interchangeable.
- (10) All reaming shells in the size range EWG to HWG are double box threaded. The previous standard X series reaming shells (EWX to NWX) were box and pin threaded, and therefore neither the reaming shells nor outer tubes are interchangeable between X and G series.
- (11) Minor dimensional changes have been made in order to widen and rationalize tolerances, and to increase wrench lengths where practicable.

British Standard Specification for Rotary core drilling equipment

Part 1. Basic equipment

1. Scope

This standard specifies the nomenclature and the leading dimensions necessary for interchangeability of the following core drilling equipment for drilling holes 30 mm to 200 mm in diameter, yielding cores of 17 mm to 165 mm in diameter:

- (a) Parallel wall drill rods and couplings.
- (b) Casing, casing couplings, casing bits, casing shoes, drive shoes and casing reaming shells.
- (c) Core barrels, core bits, core lifters and reaming shells.

Mechanical properties are specified for rods, casings and inner and outer tubes, casing couplings, and rod couplings and adaptors.

NOTE. The titles of the British Standards referred to in this standard are listed on the inside back cover.

2. Designation

Items complying with the requirements of this standard shall be designated by the BS number followed by the identification symbols given in Table 1.

3. Materials

Materials used in the manufacture of the core drill fittings specified in this standard, and ancillary equipment used in the drill string in association with equipment made in accordance with this standard, shall have the minimum mechanical properties specified in 3.1. The chemical analysis specified in 3.2 is for information only.

All tubes used in the manufacture of these components shall normally be seamless and cold drawn. Hot finished seamless or welded tubes may be used provided that they otherwise comply with the requirements of this standard.

3.1 Mechanical properties. The requirements for specified components shall comply with the values given in Table 2.

If welding is used the mechanical properties of the welded joint shall comply with the values given in Table 1 for upset or forged ends.

The requirements for all components listed in Table 2, except rod couplings and adaptors, may be obtained from material complying with the requirements of steel 080A37 in BS 970 : Part 1, heat treated as shown in Table 2.

The requirements for rod couplings and adaptors may be obtained from material complying with the requirements of steel 709M40, condition R in BS 970 : Part 2.

3.2 Compositions. The chemical compositions of materials are quoted in Table 3 for information purposes only.

4. Dimensions and tolerances

4.1 General. All dimensions and tolerances are in millimetres unless otherwise stated and shall be in accordance with Tables 3 to 65.

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4.2 Conformity. When drilling in conformity with American Diamond Core Drill Manufacturers' Association (DCDMA) and Canadian Diamond Drilling Association (CDDA) standards then lengths of rods and casings shall be 3048 mm, 1524 mm or 762 mm, but in those industries where drilling depths are measured in metres then rod and casing lengths may be 3 m, 1.5 m or 0.75 m.

4.3 Tolerances. The dimensional tolerance for blank tubing shall be in accordance with the appropriate tables.

4.3.1 General. This standard covers specific lengths of finished components and therefore it is incumbent on the manufacturer to specify to the tube supplier the tolerances required.

4.3.2 Tolerances on straightness. When measured over the whole length of the tube by rolling against a straightedge the maximum deviation shall be not greater than 1 in 1200.

4.3.3 Eccentricity. The eccentricity is defined as the distance between the centres of the outer and inner diameters and may not exceed 10 % of nominal wall thickness Q .

The eccentricity is calculated according to the formula:

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

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

Table 1. Identification symbols

Drill rods (see Tables 6, 8, 9 and 10)	RW	EW	AW	BW	NW	HW	—	—	—	—
Casing, flush coupled (see Tables 6, 11, 17 and 18)	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
Casing, flush jointed (see Tables 6 and 12)	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
WF design, face discharge core barrel (see Figs. 6 and 7)	—	EFW	AWF	BWF	NWF	HWF	PWF	SWF	UWF	ZWF
WG design, internal discharge core barrel (see Figs. 8 and 9)	—	EWG	AWG	BWG	NWG	HWG	—	—	—	—
WM design, internal discharge core barrel (see Fig. 10)*	—	EFW	AWM	BWM	NWM	—	—	—	—	—
WT design, thin wall, internal discharge core barrel (see Figs. 11, 12 and 13)	RWT	EW	AWT	BWT	NWT	HWT	—	—	—	—

* These may be used with face discharge bits.

Table 2. Mechanical properties of materials*

Component	Tensile strength, R_m , min.	Yield stress, R_e , min.	Elongation, $5.65\sqrt{S_0}$, min.	Hardness, HB, min. (see NOTE 1.) (For information only)	Heat treatment (see NOTE 2.)
Parallel wall rods	N/mm ² 620	N/mm ² 525	% 12	183	Tempered
Upset or forged ends of the above parallel wall rods	500	310	18	—	—
Casings and inner and outer tubes, sizes R to H	620	525	12	183	Tempered
Casing and inner and outer tubes, sizes P to Z	500	310	18	146	Normalized
Casing coupling, sizes R to H	620	525	12	183	Tempered
Casing coupling, sizes P to Z	500	310	18	146	Normalized
Rod coupling and adaptors	700	495	15	209	Quenched and tempered

NOTE 1. The Vickers or Rockwell methods for hardness testing as shown in BS 427 and BS 891 respectively, may be used in place of the Brinell method given in BS 240. For the necessary conversions see BS 860.

NOTE 2. Where hot finished tubes are used they need not be normalized provided that they comply with the appropriate mechanical properties.

* For special purposes, other materials may be used by agreement between the manufacturer and the purchaser.

Table 3. Compositions of materials

(These are quoted for information purposes only)

	Steel 080A37	Steel 709M40
	%	%
Carbon	0.35 to 0.40	0.36 to 0.44
Silicon	0.10 to 0.40	0.10 to 0.35
Manganese	0.70 to 0.90	0.70 to 1.00
Chromium	—	0.90 to 1.20
Molybdenum	—	0.25 to 0.35
Sulphur	0.050 max.	0.050 max.
Phosphorus	0.050 max.	0.040 max.

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Table 4. Core barrel designs

Core barrel designs				Core barrel components								Inner tube extension	Inner tube extension spacer	Inner tube	Outer tube	Core barrel head*
WF	WG	WM	WT	Core bit B/W	Core bit S/W	Core bit S/T	Core bit L/T	Reaming shell	Core lifter	Core lifter case						
EWF			RWT B/W	()	()	()		(x)	()					(x)	(x)	(x)
			RWT S/W					(x)	(-)	()	()	()		(x)	(x)	(x)
AWF	EWG S/T EWG D/T	EWM	EWT B/W EWT S/W	(x)				()	(x)					()	(x)	(x)
				(x)		()		()	(x)	(-)	()			()	(x)	(x)
				()	()			(x)	()					(-)	(-)	(-)
						()		(x)	(-)	()	()	()	()	(-)	(-)	(-)
BWF	AWG S/T AWG D/T	AWM	AWT B/W AWT S/W	(x)				()	(x)					()	(x)	(x)
				(x)		()		()	(x)	(-)	()			()	()	()
				()	()			(x)	()					(-)	(-)	(-)
						()		()	(-)	()	()	()	()	(x)	(x)	(x)
NWF	BWG S/T BWG D/T	BWM	BWT S/T BWT D/T	(x)				()	(x)					()	(x)	(x)
				(x)		()		()	(x)	(-)	()			(x)	()	()
				(-)				()	()					()	()	()
				(-)		()		()	(-)	()	()	()	()	(x)	(x)	(x)
	NWG S/T NWG D/T	NWM	NWT S/T NWT D/T	(x)				()	(x)					()	(x)	(x)
				(x)		()		()	(x)	(-)				(x)	()	()
				(-)				()	()					()	()	()
				(-)				()	()					()	()	(x)
HFW SHORT HFW LONG	HWG S/T HWG D/T		HWT S/T HWT D/T			()	()	()	(x)	(x)				(x)	(x)	(x)
				(x)				()	(-)					(x)	(x)	(x)
				(x)				()	(-)					()	()	(x)
				(-)				()	()					()	()	()
PWF SHORT PWF LONG						()	()	()	(x)	(x)				(x)	(x)	(x)
SWF SHORT SWF LONG						()	()	()	(x)	(x)				(x)	(x)	(x)
UWF SHORT UWF LONG						()	()	()	(x)	(x)				(x)	(x)	(x)
ZWF SHORT ZWF LONG						()	()	()	(x)	(x)				(x)	(x)	(x)

NOTE. The following is an explanation of the symbols and abbreviations used in the table.

S/T Single tube core barrel.

D/T Double tube core barrel.

B/W Bevel wall core bit.

S/W Straight wall core bit.

() Component required to make complete core barrel.

(x)

(-) Components identical and interchangeable with other designs of the same size and marked with the same symbol.

(:)

* Core barrel heads may be rigid or swivel but they are interchangeable.

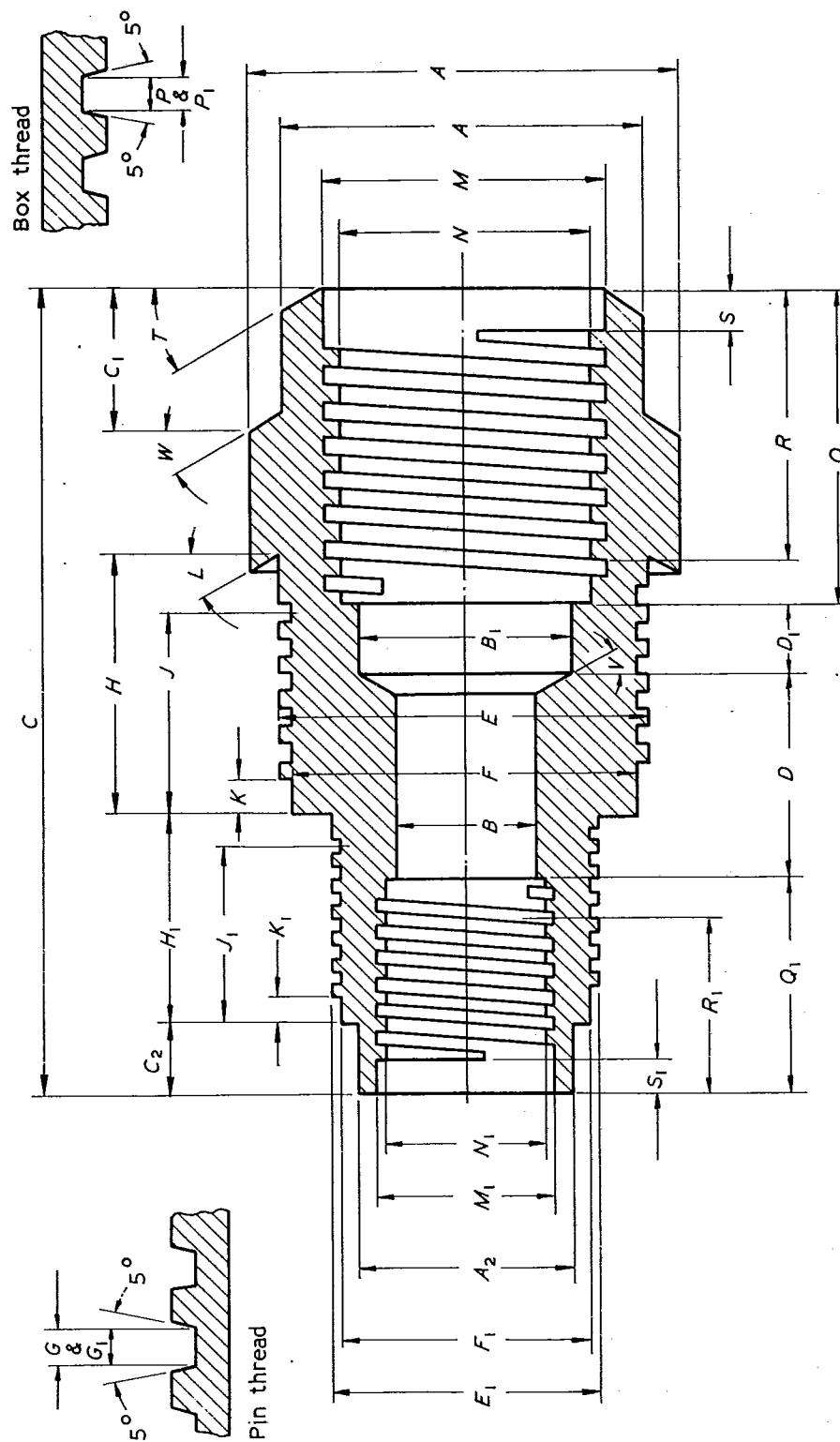


Fig. 1. System of dimensional identification letters

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Table 5. System of dimensional identification letters (see Fig. 1)

<i>A, A₁, etc.</i>	Outside diameters. <i>A</i> being largest; <i>A₁, A₂, etc.</i> progressively smaller.
<i>B, B₁, etc.</i>	Inside diameters. <i>B</i> being smallest; <i>B₁, B₂, etc.</i> progressively larger.
<i>C, C₁, etc.</i>	External lengths. <i>C</i> being longest; <i>C₁, C₂, etc.</i> progressively shorter.
<i>D, D₁, etc.</i>	Internal lengths. <i>D</i> being longest; <i>D₁, D₂, etc.</i> progressively shorter.
<i>E, E₁, etc.</i>	Major diameter of pin threads. <i>E</i> being largest; <i>E₁, E₂, etc.</i> to be smaller.
<i>F, F₁, etc.</i>	Minor diameter of pin threads. <i>F</i> being largest; <i>F₁, F₂, etc.</i> smaller.
Threads per inch	Pin threads.
<i>G, G₁, etc.</i>	Width at root of pin thread.
<i>H, H₁, etc.</i>	Length of o.d. machined for external threading.
<i>J, J₁, etc.</i>	Minimum length for full depth of pin threads.
<i>K, K₁, etc.</i>	Length of relief at the starting point of pin threads.
<i>L, L₁, etc.</i>	Angle of bevel for pin thread shoulder.
<i>M, M₁, etc.</i>	Major diameter of box threads. <i>M</i> being largest; <i>M₁, M₂, etc.</i> smaller.
<i>N, N₁, etc.</i>	Minor diameter of box threads. <i>N</i> being largest; <i>N₁, N₂, etc.</i> smaller.
Thread pitch	Box threads.
<i>P, P₁, etc.</i>	Width at root of box threads.
<i>Q, Q₁, etc.</i>	Length of i.d. machined for internal threading.
<i>R, R₁, etc.</i>	Minimum length for full depth of box threads.
<i>S, S₁, etc.</i>	Length of counter bore at the starting point of box threads.
<i>T, T₁, etc.</i>	Angle of bevel for box thread shoulder.
<i>U, U₁, etc.</i>	Included angles. Internal and external.
<i>V, V₁, etc.</i>	Internal angles, not pertaining to threaded connections.
<i>W, W₁, etc.</i>	External angles, not pertaining to threaded connections.
<i>X</i>	Diamond set dimensions. External. (o.d.)
<i>Y</i>	Diamond set dimensions. Internal. (i.d.)

(All decimal dimensions indicate allowable tolerances).

Table 6. Nomenclature and basic dimensions for drill rods casing and their related diamond set items

All dimensions are in millimetres

Drill rod	Rod tube	Rod coupling		Casing flush coupling	Casing tube		Casing coupling		Casing flush jointed	Casing		Casing reaming shell set	Casing bit set		Casing shoe set	
		o.d.	i.d.		o.d.	i.d.	o.d.	i.d.		o.d.	i.d.		o.d.	i.d.	o.d.	i.d.
RW	27.89	10.57	RX		36.63	30.48	RW			36.63	30.48	Not	37.85	25.53	37.85	30.18
	27.76	10.19			36.50	30.23				36.50	30.23	required	37.59	25.27	37.59	30.05
EW	35.05	11.35	EX		46.28	38.35	EW			46.28	38.35	48.13	47.75	35.81	47.75	38.02
	34.93	10.97			46.02	38.10				46.02	38.10	47.88	47.50	35.56	47.50	37.80
AW	43.89	16.13	AX		57.40	48.67	AW			57.40	48.67	60.07	59.69	45.34	59.69	48.31
	43.64	15.75			57.15	48.41				57.15	48.41	59.82	59.44	45.09	59.44	48.18
BW	54.23	19.30	BX		73.28	60.58	BW			73.28	60.58	75.82	75.44	56.39	75.44	60.25
	53.98	18.92			73.03	60.33				73.03	60.33	75.56	75.18	56.13	75.18	60.12
NW	66.93	35.18	NX		89.28	76.58	NW			89.28	76.58	92.33	91.95	72.26	91.95	76.12
	66.68	34.80			88.90	76.20				88.90	76.20	92.08	91.69	72.01	91.69	75.87
HW	89.28	60.71	HX		114.68	100.38	HW			114.68	101.60	Not	117.65	96.06	117.65	99.82
	88.90	60.32			114.30	100.00				114.30	101.22	required	117.27	95.81	117.27	99.57
PX					140.74	127.38	PW			140.74	127.38	Not	143.76	117.86	143.76	121.54
					138.66	122.30				138.66	123.57	required	143.26	117.48	143.26	121.16
SX					169.55	152.45	SW			169.55	155.55	Not	172.72	143.26	172.72	146.94
					167.00	147.70				167.00	151.21	required	172.21	142.88	172.21	146.56
UX					195.12	179.20	UW			195.12	180.54	Not	198.50	171.83	198.50	175.64
					192.23	176.20				192.23	175.79	required	197.74	171.32	197.74	175.13
ZX					220.73	205.94	ZW			220.73	208.46	Not	224.16	197.23	224.16	201.04
					217.42	201.60				217.42	203.00	required	223.39	196.72	223.39	200.53

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Table 7. Nomenclature, basic dimensions and tables for core barrels and their related diamond set items

Core barrel designs				Set i.d. coring bits	Set o.d. coring bits	Set o.d. reaming shells	Kerf width	Kerf area	Core area	Hole area	Core to hole ratio	Nominal core diameter	Nominal hole diameter
WF	WG	WM	WT										
RWT				mm	mm	mm	mm	cm ²	cm ²	cm ²	%	mm	mm
				18.80	29.59	29.97	5.59	4.25	2.74	6.99	39.1	18.5	30.0
EWF EWG EWM				18.54	29.34	29.72							
				21.59	37.46	37.85	8.13	7.55	3.62	11.17	32.4	21.5	38.0
EWT				21.34	37.21	37.59							
				23.11	37.46	37.85	7.37	7.03	4.15	11.17	37.1	23.0	38.0
AWF AWG AWM				22.86	37.21	37.59							
				30.23	47.75	48.13	8.94	10.99	7.12	18.10	39.3	30.0	48.0
AWT				29.97	47.50	47.88							
				32.66	47.75	48.13	7.72	9.79	8.32	18.10	45.9	32.5	48.0
BWF BWG BWM				32.41	47.50	47.88							
				42.16	59.69	60.07	8.94	14.34	13.88	28.22	49.1	42.0	60.0
BWT				41.91	59.44	59.82							
				44.58	59.69	60.07	7.75	12.70	15.52	28.22	55.0	44.5	60.0
NWF NWG NWM				44.32	59.44	59.82							
				54.86	75.44	75.82	10.46	21.46	23.53	44.99	52.2	54.5	76.0
NWT				54.61	75.18	75.56							
				58.88	75.44	75.82	8.46	17.88	27.11	44.99	60.0	58.5	76.0
HWF HWG				58.62	75.18	75.56							
				76.33	98.98	99.36	11.51	31.74	45.61	77.34	59.0	76.0	99.0
HWT				76.07	98.60	99.11							
				81.08	98.98	99.36	9.14	25.88	51.46	77.34	66.5	81.0	99.0
PWF				80.82	98.60	99.11							
				92.33	120.27	120.78	14.22	47.53	66.68	114.21	58.4	92.0	121.0
SWF				91.95	119.76	120.40							
				112.95	145.67	146.18	16.61	67.52	99.86	167.39	59.7	112.5	146.0
UWF				112.57	145.16	145.80							
				140.08	174.12	174.75	17.32	85.59	153.56	239.15	64.2	140.0	175.0
ZWF				139.57	173.36	174.24							
				165.48	199.52	200.15	17.32	99.43	214.41	313.84	68.3	165.0	200.0
				164.97	198.76	199.64							

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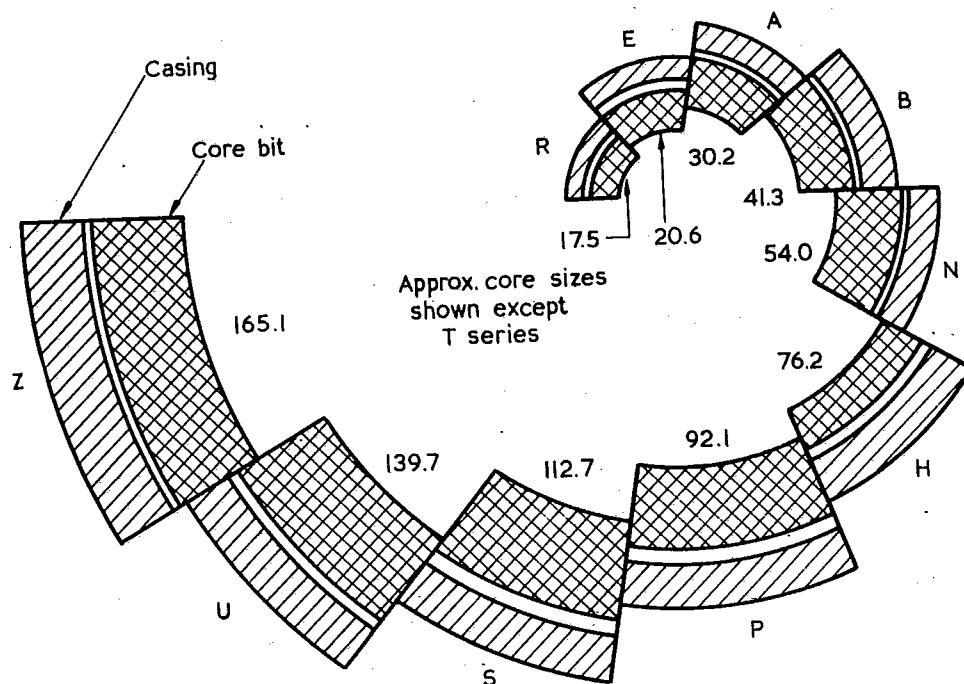


Fig. 2. General relation of casing to core bit

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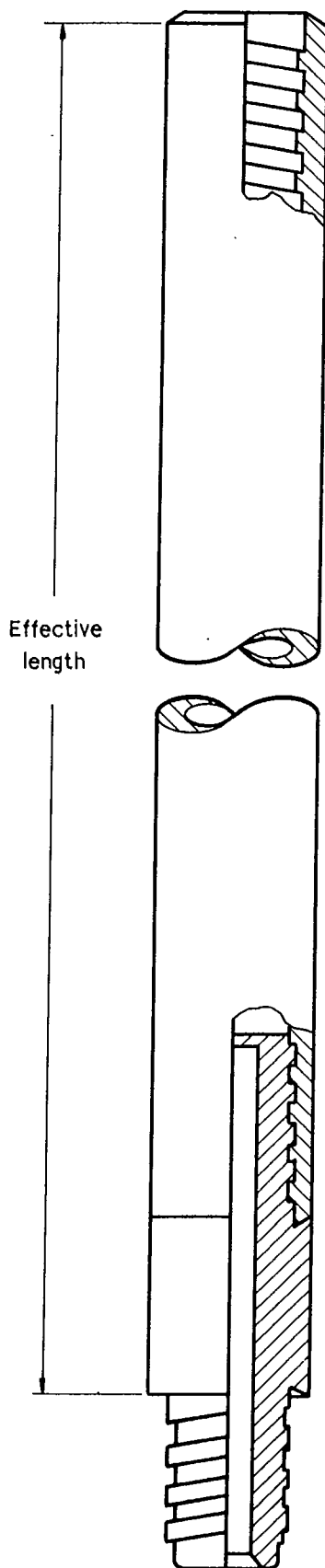


Table 8. Rod and coupling main dimensions

Nominal dimensions are in millimetres

Symbol	Rod o.d.	Coupling i.d.	Effective lengths (see 4.2)
RW	27.8	10.3	
EW	35.0	11.1	3000
AW	43.7	15.9	or 1500
BW	54.0	19.0	or 750
NW	66.8	34.9	
HW	89.0	60.5	

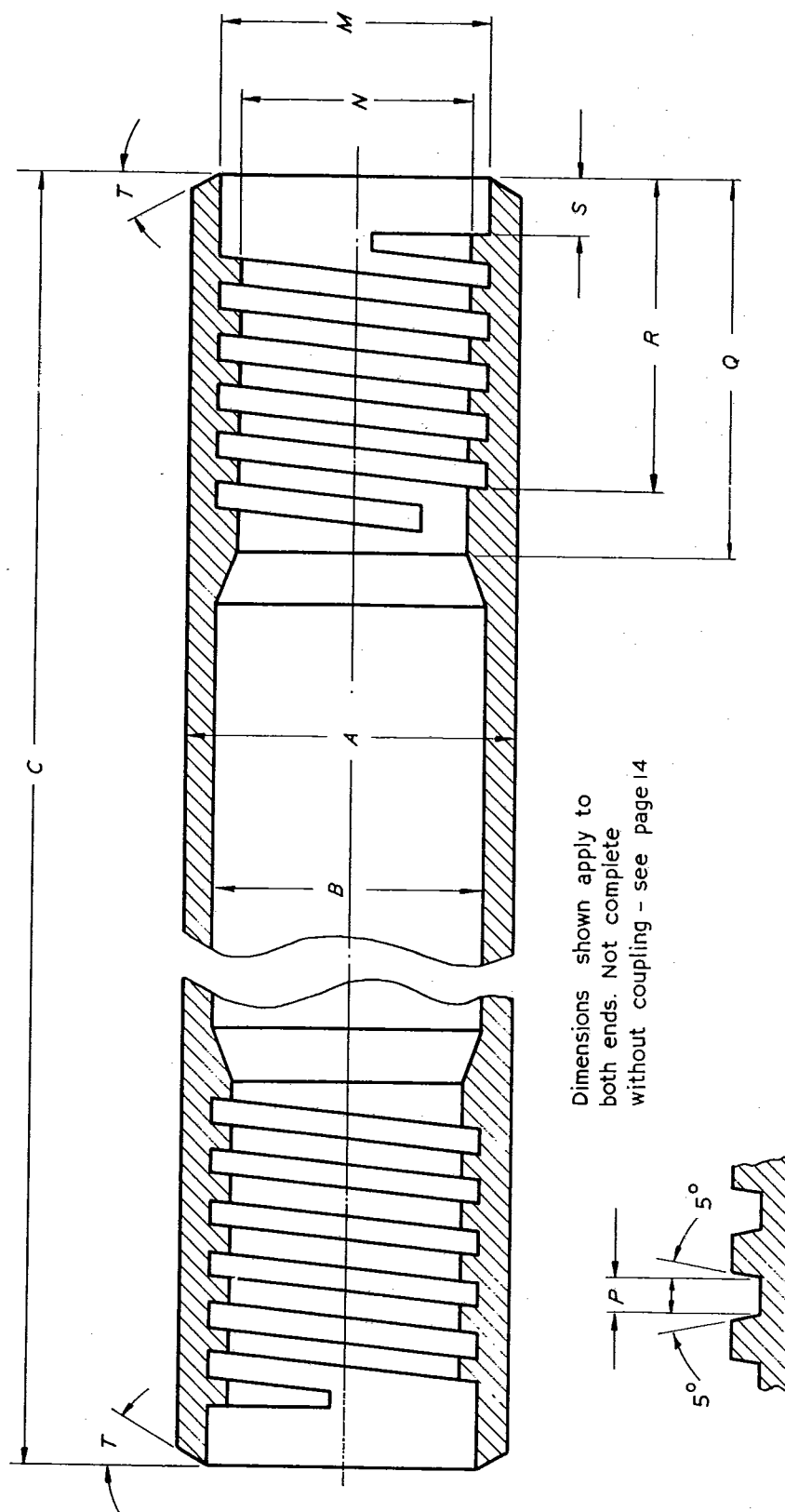
NOTE. Thread may be L.H. if required.

* For detailed dimensions see Tables 9 and 10.

Fig. 3. Drill rod and coupling

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Table 9. W design drill rod. Drill rod tube



NOTE: The B diameter dimension is a maximum and can apply equally to upset end rods and parallel wall rods.

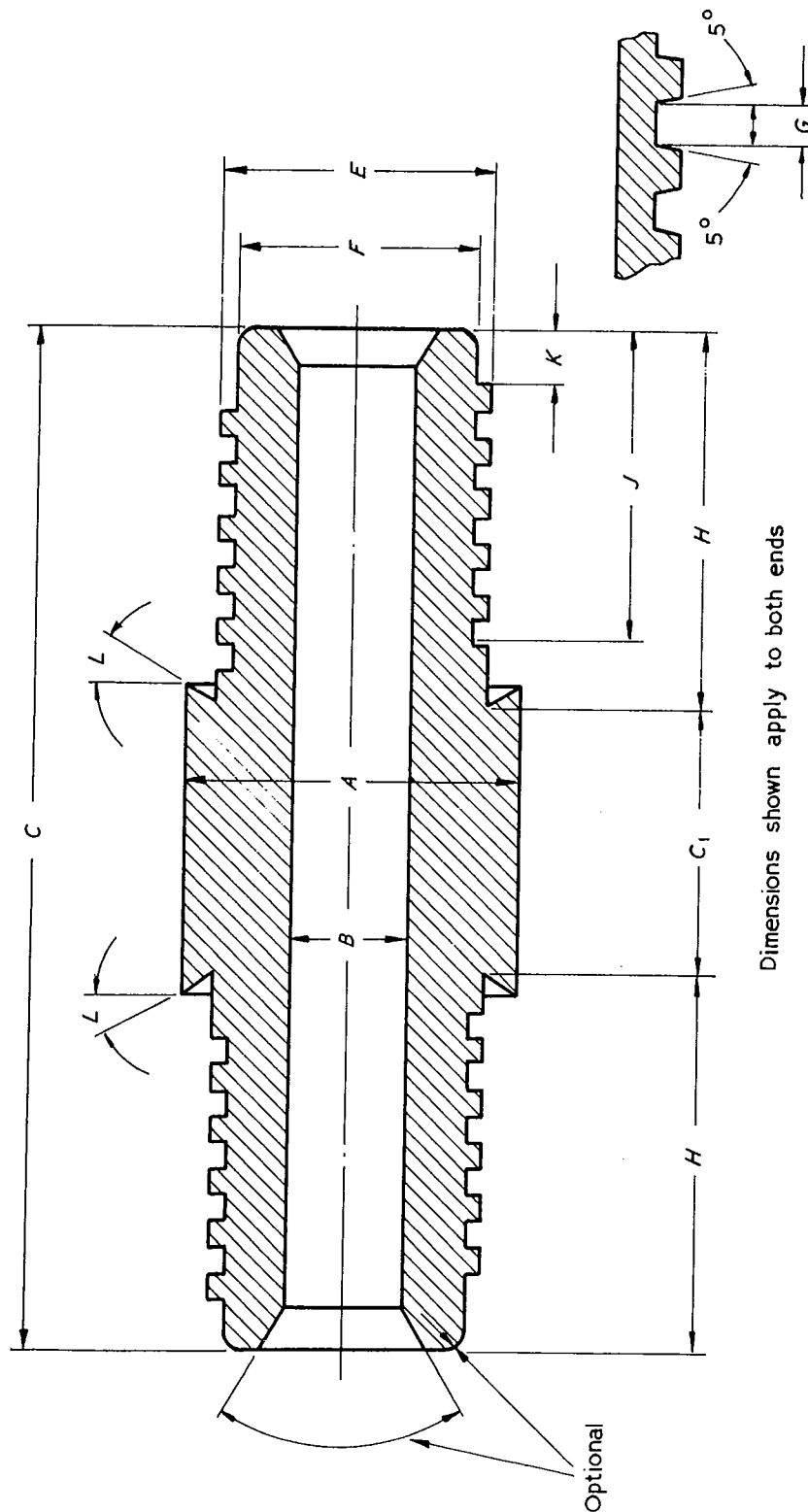
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All dimensions are in millimetres

	RW	EW	AW	BW	NW	HW
<i>A</i>	Max. 27.89 Min. 27.76	35.05 34.93	43.89 43.64	54.23 53.98	66.93 66.68	89.28 88.90
<i>B</i>	Max. 18.26	25.40	34.14	44.45	57.15	77.77
<i>C</i>	Max. 2972.57 Min. 2971.04	2967.23 2965.71	2968.12 2966.60	2956.44 2954.92	2955.93 2954.41	2943.61 2942.09
<i>M</i>	Max. 21.67 Min. 21.62	27.13 27.08	35.05 35.00	42.93 42.88	56.49 56.44	77.06 77.01
<i>N</i>	Max. 18.95 Min. 18.90	23.95 23.90	31.88 31.83	38.94 38.89	51.71 51.66	72.24 72.19
	Thread pitch	6.35	8.47	8.47	8.47	8.47
<i>P</i>	Max. 3.18 Min. 3.10	4.22 4.11	4.22 4.11	4.22 4.11	4.22 4.11	4.22 4.11
<i>Q</i>	Min. 39.67	44.45	53.98	63.50	76.20	90.47
<i>R</i>	Min. 36.50	39.67	47.63	57.15	69.85	82.55
<i>S</i>	Max. 6.60 Min. 6.10	8.18 7.67	9.78 9.27	9.78 9.27	9.78 9.27	9.78 9.27
<i>T</i>	30°	30°	30°	30°	30°	30°

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Table 10. W design drill rod. Drill rod coupling



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All dimensions are in mm.

	RW	EW	AW	BW	NW	HW
<i>A</i>	Max. 27.89 Min. 27.69	35.05 34.85	43.89 43.54	54.23 53.87	66.93 66.55	89.28 88.77
<i>B</i>	Max. 10.57 Min. 10.19	11.35 10.97	16.13 15.75	19.30 18.92	35.18 34.80	60.71 60.32
<i>C</i>	Reference 92.25	117.48	133.35	165.10	190.50	228.60
<i>C</i> ₁	Max. 28.45 Min. 27.94	33.78 33.27	32.89 32.39	44.58 44.07	45.08 44.58	57.40 56.90
<i>E</i>	Max. 21.56 Min. 21.51	26.97 26.92	34.90 34.85	42.77 42.72	56.34 56.29	76.91 76.86
<i>F</i>	Max. 18.85 Min. 18.72	23.80 23.67	31.72 31.60	38.79 38.66	51.56 51.44	72.09 71.96
Thread pitch	6.35	8.47	8.47	8.47	8.47	8.47
<i>G</i>	Max. 3.18 Min. 3.10	4.22 4.11	4.22 4.11	4.22 4.11	4.22 4.11	4.22 4.11
<i>H</i>	Max. 33.78 Min. 33.27	42.21 41.71	50.65 50.14	60.63 60.12	73.08 72.57	84.43 83.92
<i>J</i>	Min. 28.58	36.50	44.45	53.98	66.68	79.38
<i>K</i>	Max. 1.83 Min. 1.32	5.00 4.50	6.60 6.10	8.18 7.67	9.80 9.27	9.78 9.27
<i>L</i>	30°	30°	30°	30°	30°	30°

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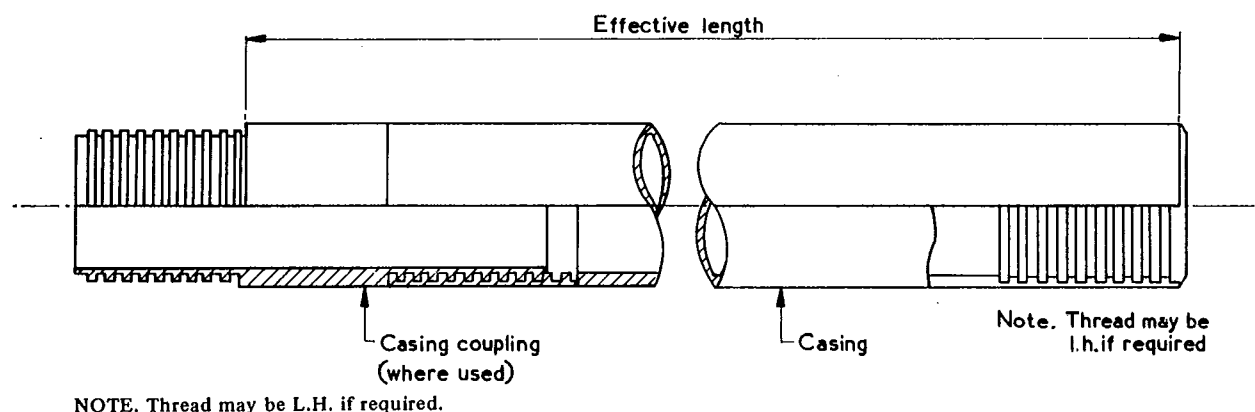


Fig. 4. Casing

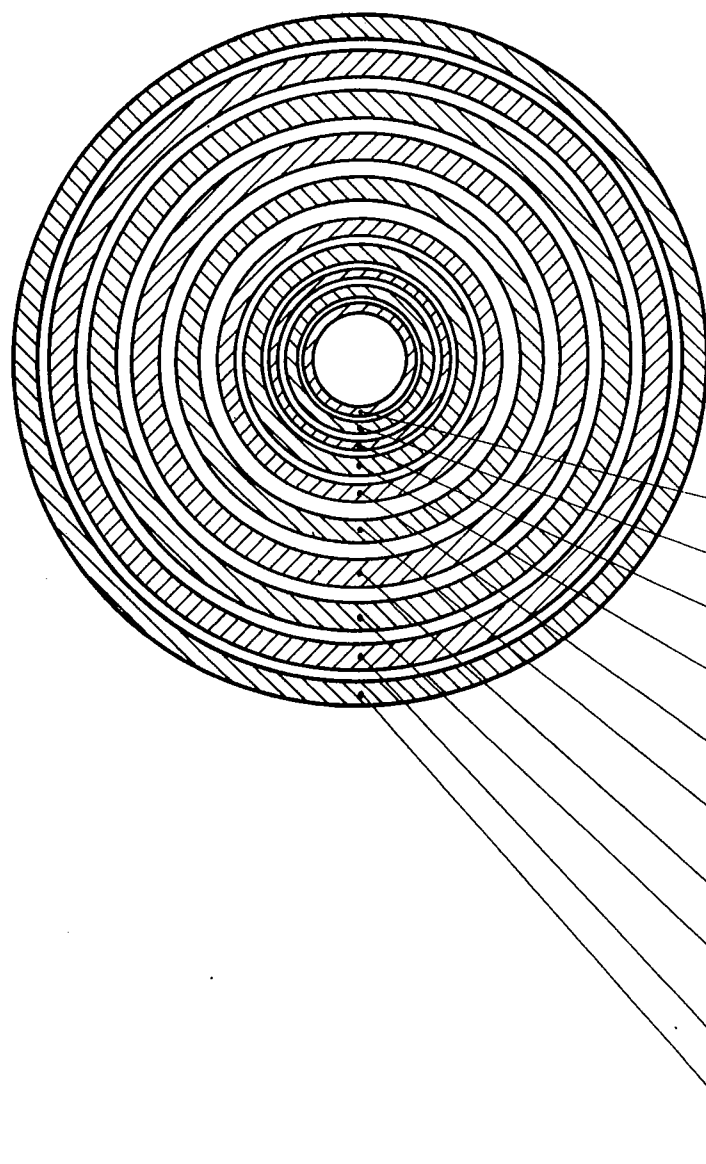


Table 11. Casing and casing coupling (where used) main dimensions*

All dimensions are in millimetres

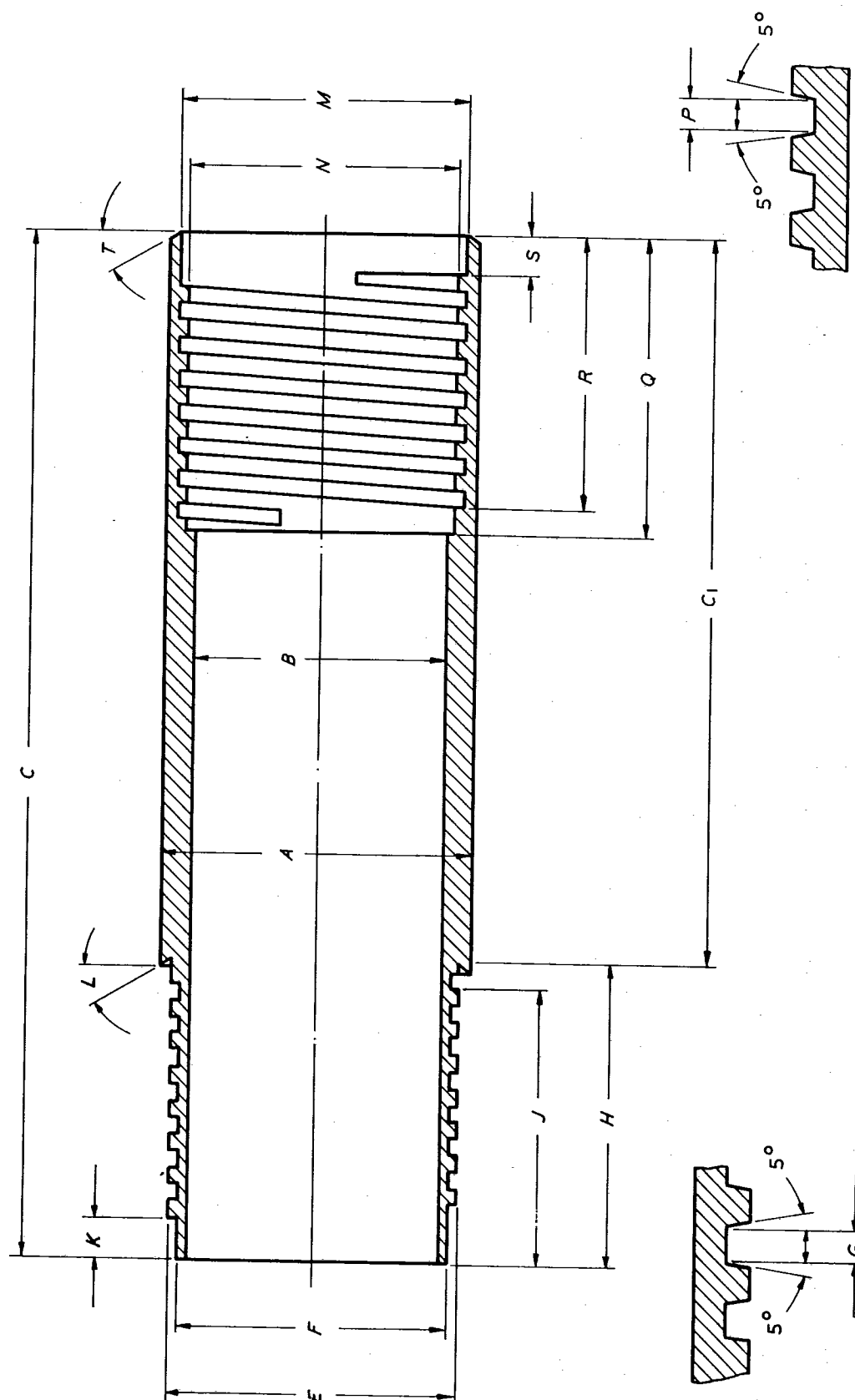
Reference	o.d. maximum	i.d. minimum	Effective lengths (see 4.2)
RX			
RW	36.63	30.23	
EX			
EW	46.28	38.10	
AX			
AW	57.40	48.41	
BX			
BW	73.28	60.33	
NX			
NW	89.28	76.20	3000 or 1500
HX			
HW	114.68	100.00	or 750
PX			
PW	140.74	122.30	
SX			
SW	169.55	147.70	
UX			
UW	195.12	176.20	
ZX			
ZW	220.73	201.60	

* For detailed dimensions see Tables 12a to 12e.

Fig. 5. Nesting of casing

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Table 12a. W design flush jointed casing. Casing



Exception to dimension B. Manufacturers shall be responsible to maintain a minimum B dimension for a minimum length of 100 mm from each end. This diameter shall be concentric within 0.10 mm of the thread diameter. Over remainder of bore stated tolerances must be maintained.

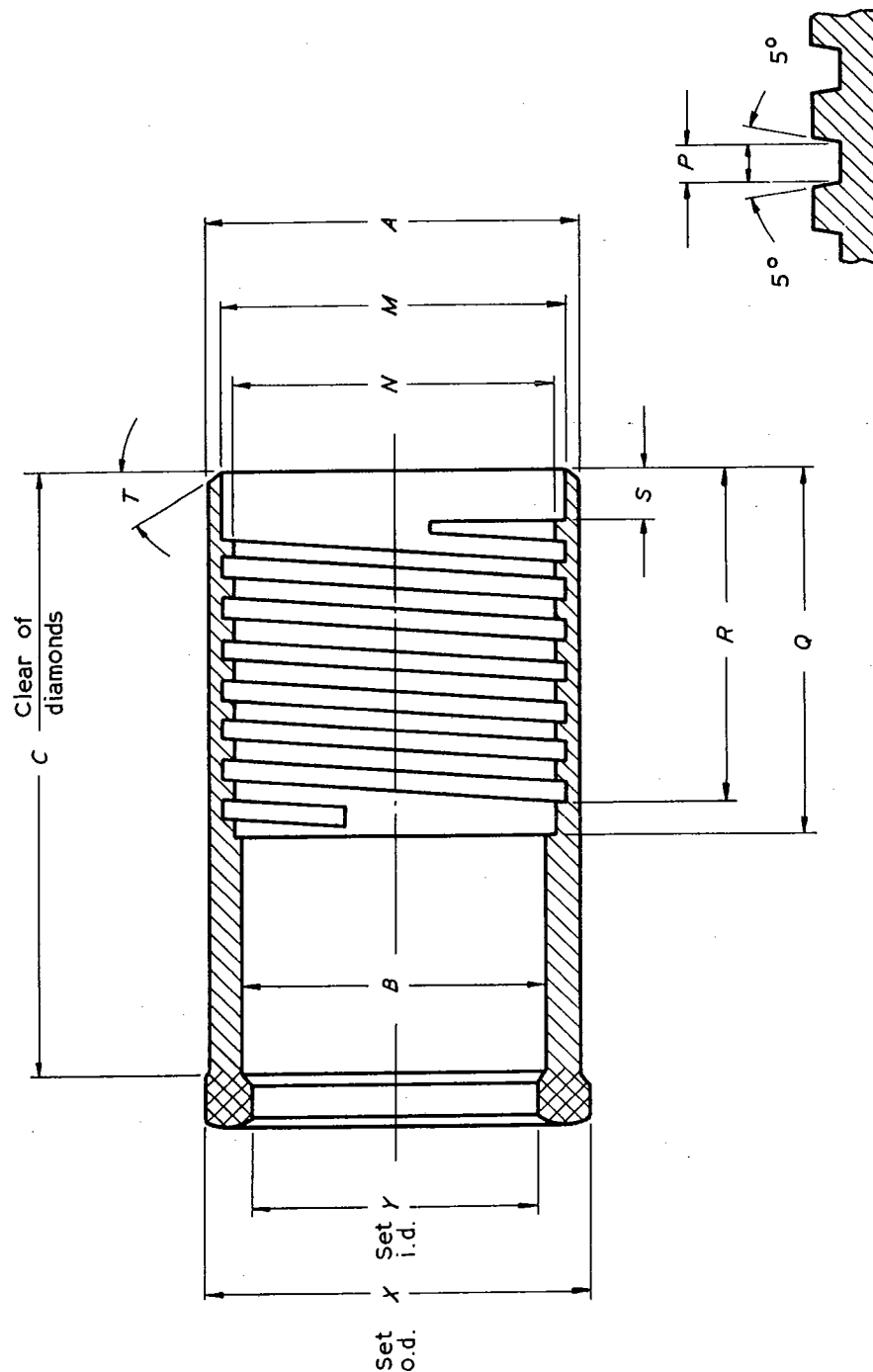
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All dimensions are in millimetres

	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
A	Max. 36.63 Min. 36.50	46.28 46.02	57.40 57.15	73.28 73.03	89.28 88.90	114.68 114.30	140.74 138.66	169.55 167.00	195.12 192.23	220.73 217.42
B	Max. 30.48 Min. 30.23	38.35 38.10	48.67 48.41	60.58 60.33	76.58 76.20	101.60 101.22	127.38 123.57	155.55 151.21	180.54 175.79	208.46 203.00
C	Max. (reference) 3045.52 Min. (reference) 3043.23	3051.87 3049.58	3058.22 3055.93	3064.57 3062.28	3070.92 3068.63	3077.27 3074.98	3083.62 3081.33	3089.97 3087.68	3096.32 3094.03	3102.67 3100.38
C₁	Max. 3001.19 Min. 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78	3001.19 2998.78
E	Max. 34.19 Min. 34.11	43.38 43.31	54.10 54.00	68.00 67.89	84.00 83.90	109.14 109.02	134.59 134.47	162.84 162.71	188.26 188.11	214.81 214.66
F	Max. 32.61 Min. 32.56	41.07 41.02	51.79 51.71	65.68 65.61	81.69 81.61	106.86 106.76	131.55 131.45	159.79 159.69	184.43 184.30	210.97 210.85
	Thread pitch 5.10	6.35	6.35	6.35	6.35	6.35	8.47	8.47	12.70	12.70
G	Max. 2.64 Min. 2.54	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	4.29 4.19	4.29 4.19	6.40 6.30	6.40 6.30
H	Max. 44.45 Min. 44.32	50.80 50.67	57.15 57.02	63.50 63.37	69.85 69.72	76.20 76.07	82.55 82.42	88.90 88.77	95.25 95.12	101.60 101.47
J	Min. 41.28	47.62	53.98	60.33	66.68	73.02	79.38	85.73	92.08	98.43
K	Max. 6.60 Min. 6.10	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	9.14 8.64	9.14 8.64	11.18 10.67	11.18 10.67
L	15°	15°	15°	15°	15°	15°	15°	15°	15°	15°
M	Max. 34.34 Min. 34.26	43.54 43.46	54.31 54.20	68.20 68.10	84.20 84.10	109.42 109.30	134.87 134.75	163.12 162.99	188.62 188.47	215.16 215.01
N	Max. 32.72 Min. 32.66	41.17 41.12	51.94 51.87	65.84 65.76	81.84 81.76	107.06 106.96	131.75 131.65	159.99 159.89	184.68 184.56	211.23 211.10
	Thread pitch 5.10	6.35	6.35	6.35	6.35	6.35	8.47	8.47	12.70	12.70
P	Max. 2.64 Min. 2.54	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	4.29 4.19	4.29 4.19	6.40 6.30	6.40 6.30
Q	Max. 44.58 Min. 44.45	50.93 50.80	57.28 57.15	63.63 63.50	69.98 69.85	76.33 76.20	82.68 82.55	89.03 88.90	95.38 95.25	101.73 101.60
R	Min. 41.28	47.63	53.98	60.33	66.68	73.03	79.38	85.73	92.08	98.43
S	Max. 6.60 Min. 6.10	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	9.14 8.64	9.14 8.64	11.18 10.67	11.18 10.67
T	15°	15°	15°	15°	15°	15°	15°	15°	15°	15°

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Table 12b. W design flush jointed casing. Casing shoe



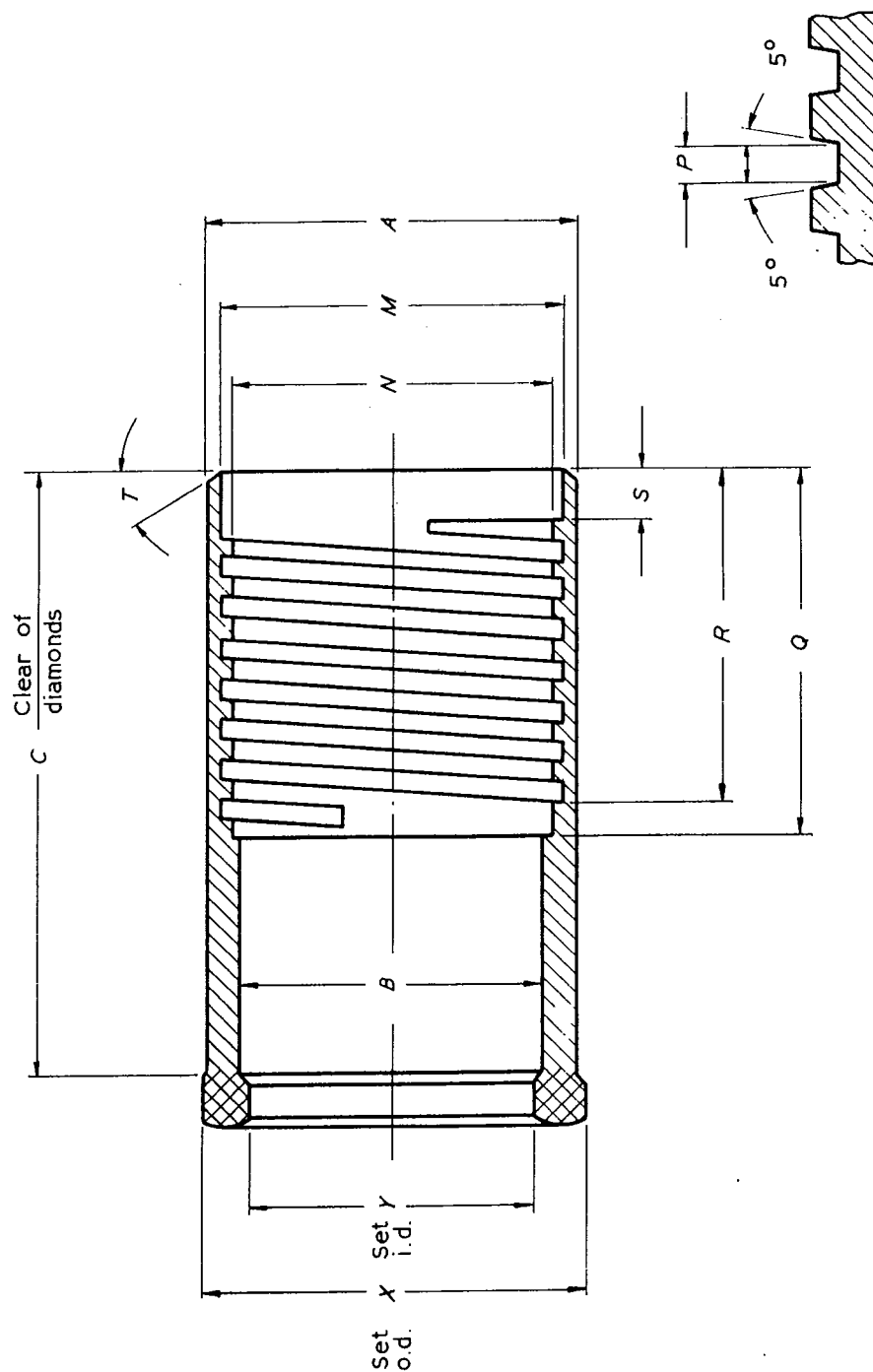
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
<i>A</i>	Max. 36.98 Min. 36.88	46.53 46.43	58.34 58.24	73.96 73.86	90.47 90.37	115.93 115.82	141.33 141.17	169.90 169.75	195.30 195.07	220.70 220.47
<i>B</i>	Max. 30.73 Min. 30.23	38.61 38.10	48.92 48.41	60.83 60.33	76.96 76.20	100.84 100.08	122.86 122.10	148.26 147.50	177.22 176.20	202.62 201.60
<i>C</i>	Max. 82.55	88.90	95.25	107.95	114.30	127.00	133.35	146.05	152.40	158.75
<i>M</i>	Max. 34.34 Min. 34.26	43.54 43.46	54.31 54.20	68.20 68.10	84.20 84.10	109.42 109.30	134.87 134.75	163.12 162.99	188.62 188.47	215.16 215.01
<i>N</i>	Max. 32.72 Min. 32.66	41.17 41.12	51.94 51.87	65.84 65.76	81.84 81.76	107.06 106.96	131.75 131.65	159.99 159.89	184.68 184.56	211.23 211.10
Thread pitch	5.10	6.35	6.35	6.35	6.35	6.35	8.47	8.47	12.70	12.70
<i>P</i>	Max. 2.64 Min. 2.54	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	4.29 4.19	4.29 4.19	6.40 6.30	6.40 6.30
<i>Q</i>	Max. 44.58 Min. 44.45	50.93 50.80	57.28 57.15	63.63 63.50	69.98 69.85	76.33 76.20	82.68 82.55	89.03 88.90	95.38 95.25	101.73 101.60
<i>R</i>	Max. 41.28	47.63	53.98	60.33	66.68	73.03	79.38	85.73	92.08	98.42
<i>S</i>	Max. 6.60 Min. 6.10	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	9.14 8.64	9.14 8.64	11.18 10.67	11.18 10.67
<i>T</i>	15°	15°	15°	15°	15°	15°	15°	15°	15°	15°
<i>X</i>	Max. 37.85 Min. 37.59	47.75 47.50	59.69 59.44	75.44 75.18	91.95 91.69	117.65 117.27	143.76 143.26	172.72 172.21	198.50 197.74	224.16 223.39
<i>Y</i>	Max. 30.18 Min. 30.05	38.02 37.90	48.31 48.18	60.25 60.12	76.12 75.87	99.82 99.57	121.54 121.16	146.94 146.56	175.64 175.13	201.04 200.53

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Table 12c. W design flush jointed casing. Casing bit



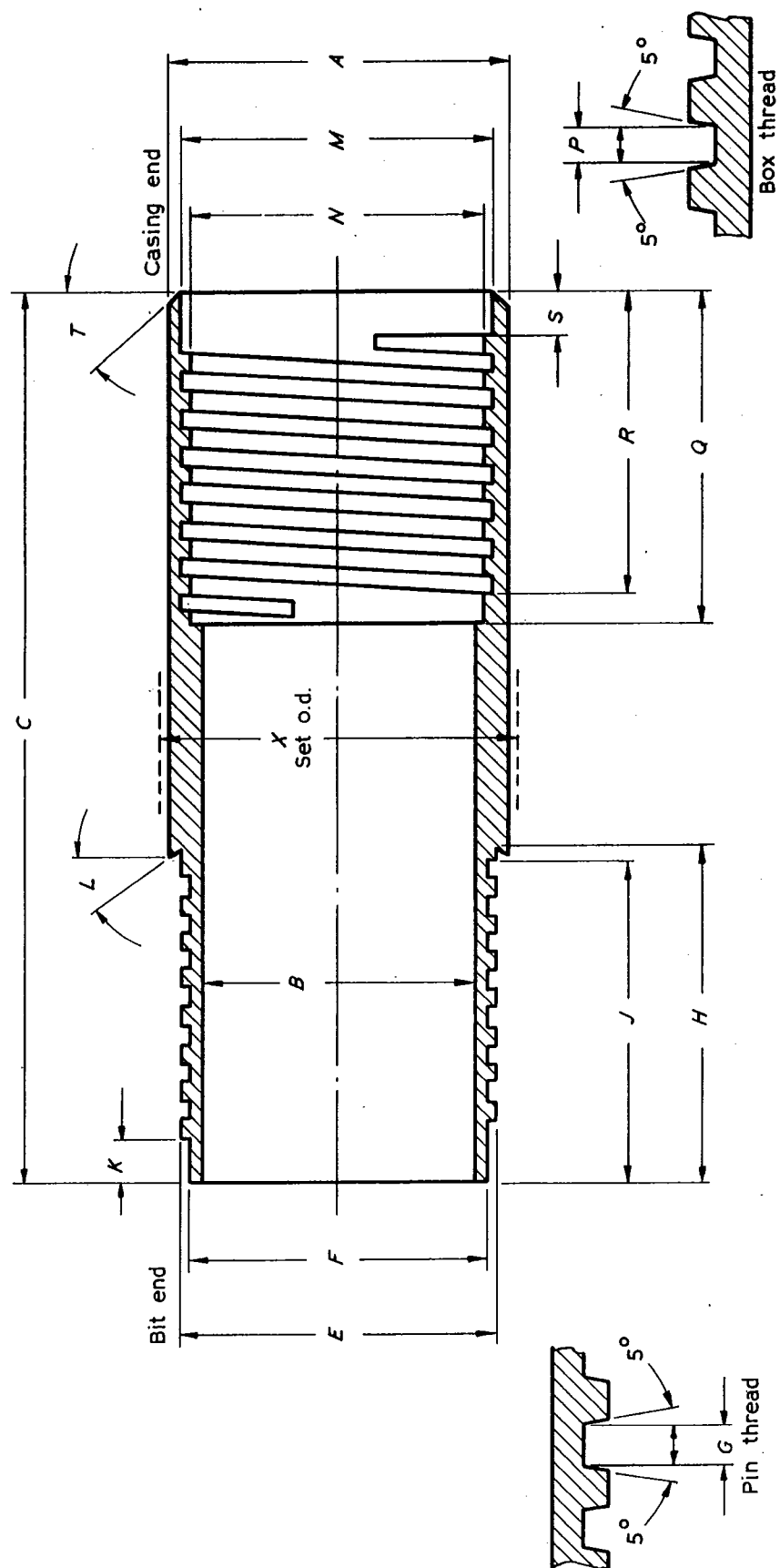
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
<i>A</i>	Max. 36.98 Min. 36.88	46.53 46.43	58.34 58.24	73.96 73.86	90.47 90.37	115.93 115.82	141.33 141.17	169.90 169.75	195.30 195.07	220.70 220.47
<i>B</i>	Max. 26.54 Min. 26.04	37.21 36.45	46.74 45.97	57.86 57.10	73.74 72.97	98.35 97.33	120.65 119.38	146.05 144.78	175.13 173.61	200.53 199.01
<i>C</i>	Min. 82.55	88.90	95.25	107.95	114.30	127.00	133.35	146.05	152.40	158.75
<i>M</i>	Max. 34.34 Min. 34.26	43.54 43.46	54.31 54.20	68.20 68.10	84.20 84.10	109.42 109.30	134.87 134.75	163.12 162.99	188.62 188.47	215.16 215.01
<i>N</i>	Max. 32.72 Min. 32.66	41.17 41.12	51.94 51.87	65.84 65.76	81.84 81.76	107.06 106.96	131.75 131.65	159.99 159.89	184.68 184.56	211.23 211.10
	Thread pitch 5.10	6.35	6.35	6.35	6.35	6.35	8.47	8.47	12.70	12.70
<i>P</i>	Max. 2.64 Min. 2.54	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	3.25 3.15	4.29 4.19	4.29 4.19	6.40 6.30	6.40 6.30
<i>Q</i>	Max. 44.58 Min. 44.45	50.93 50.80	57.28 57.15	63.63 63.50	69.98 69.85	76.33 76.20	82.68 82.55	89.03 88.90	95.38 95.25	101.73 101.60
<i>R</i>	Min. 41.28	47.63	53.98	60.33	66.68	73.03	79.38	85.73	92.08	98.43
<i>S</i>	Max. 6.60 Min. 6.10	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	7.62 7.11	9.14 8.64	9.14 8.64	11.18 10.67	11.18 10.67
<i>T</i>	15°	15°	15°	15°	15°	15°	15°	15°	15°	15°
<i>X</i>	Max. 37.85 Min. 37.59	47.75 47.50	59.69 59.44	75.44 75.18	91.95 91.69	117.65 117.27	143.76 143.26	172.72 172.21	198.50 197.74	224.16 223.39
<i>Y</i>	Max. 25.53 Min. 25.27	35.81 35.56	45.34 45.09	56.39 56.13	72.26 72.01	96.06 95.81	117.86 117.48	143.26 142.88	171.83 171.32	197.23 196.72

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Table 12d. W design flush jointed casing. Casing reaming shell



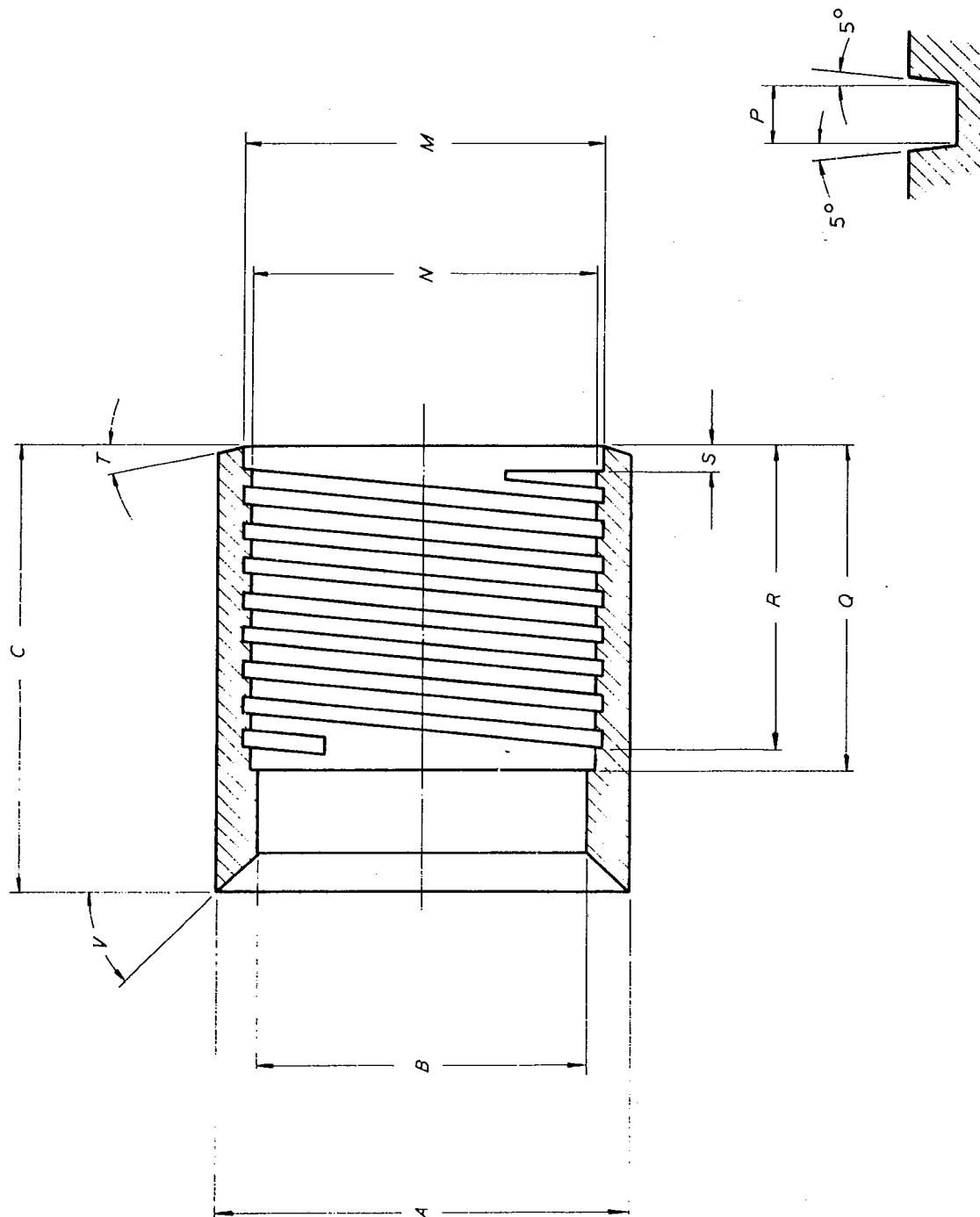
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

		EW	AW	BW	NW
A	Max.	46.53	58.34	73.96	90.47
	Min.	46.43	58.24	73.86	90.37
B	Max.	38.35	48.67	60.58	76.58
	Min.	38.10	48.41	60.33	76.20
C	Min.	139.70	152.40	171.45	184.15
	Max.	43.38	54.10	68.00	84.00
E	Min.	43.31	54.00	67.89	83.90
	Max.	41.07	51.79	65.68	81.69
F	Min.	41.02	51.71	65.61	81.61
	Thread pitch	6.35	6.35	6.35	6.35
G	Max.	3.25	3.25	3.25	3.25
	Min.	3.15	3.15	3.15	3.15
H	Max.	50.80	57.15	63.50	69.85
	Min.	50.67	57.02	63.37	69.72
J	Min.	47.62	53.98	60.32	66.68
	Max.	7.62	7.62	7.62	7.62
K	Min.	7.11	7.11	7.11	7.11
	15°	15°	15°	15°	15°
M	Max.	43.54	54.31	68.20	84.20
	Min.	43.46	54.20	68.10	84.10
N	Max.	41.17	51.94	65.84	81.84
	Min.	41.12	51.87	65.76	81.76
P	Thread pitch	6.35	6.35	6.35	6.35
	Max.	3.25	3.25	3.25	3.25
Q	Min.	3.15	3.15	3.15	3.15
	Max.	50.93	57.28	63.63	69.98
R	Min.	50.80	57.15	63.50	69.85
	Min.	47.63	53.98	60.33	66.68
S	Max.	7.62	7.62	7.62	7.62
	Min.	7.11	7.11	7.11	7.11
T	15°	15°	15°	15°	15°
	Max.	48.13	60.07	75.82	92.33
X	Min.	47.88	59.82	75.56	92.08

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Table 12e. W design flush jointed casing. Casing drive shoe



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All dimensions are in millimetres

	RW	EW	AW	BW	NW	HW	PW	SW	UW	ZW
A	Max.	36.98	58.34	73.96	90.47	115.93	142.37	171.20	196.72	222.38
	Min.	36.88	58.24	73.86	90.37	115.82	142.24	171.07	196.60	222.25
B	Max.	30.73	48.92	60.83	76.96	100.97	122.86	148.26	177.22	202.62
	Min.	30.23	48.41	60.33	76.20	100.20	122.10	147.50	176.20	201.60
C	Min.	82.55	95.25	107.95	114.30	127.00	133.35	146.05	152.40	158.75
M	Max.	34.34	54.31	68.20	84.20	109.42	134.87	163.12	188.62	215.16
	Min.	34.26	54.20	68.10	84.10	109.30	134.75	162.99	188.47	215.01
N	Max.	32.72	51.94	65.84	81.81	107.06	131.75	159.99	184.68	211.23
	Min.	32.66	51.87	65.76	81.76	106.96	131.65	159.89	184.56	211.10
Thread pitch										
P	Max.	5.10	6.35	6.35	6.35	6.35	8.47	8.47	12.70	12.70
	Min.	2.64	3.25	3.25	3.25	3.25	4.29	4.29	6.40	6.40
Q	Max.	2.54	3.15	3.15	3.15	3.15	4.19	4.19	6.30	6.30
	Min.	44.58	50.93	63.63	69.98	76.33	82.68	89.03	95.38	101.73
R	Max.	44.45	50.80	63.50	69.85	76.20	82.55	88.90	95.25	101.60
	Min.	41.28	47.63	60.33	66.68	73.03	79.38	85.73	92.08	98.42
S	Max.	6.60	7.62	7.62	7.62	7.62	9.14	9.14	11.18	11.18
	Min.	6.10	7.11	7.11	7.11	7.11	8.64	8.64	10.67	10.67
T	15°	15°	15°	15°	15°	15°	15°	15°	15°	15°
V	45°	45°	45°	45°	45°	45°	45°	45°	45°	45°

Technical drawing of a tapered roller bearing showing dimensions A through Q and angles T and V. A detail view of the outer race shows a 5-degree angle and dimension P.

Dimensions shown apply to both ends

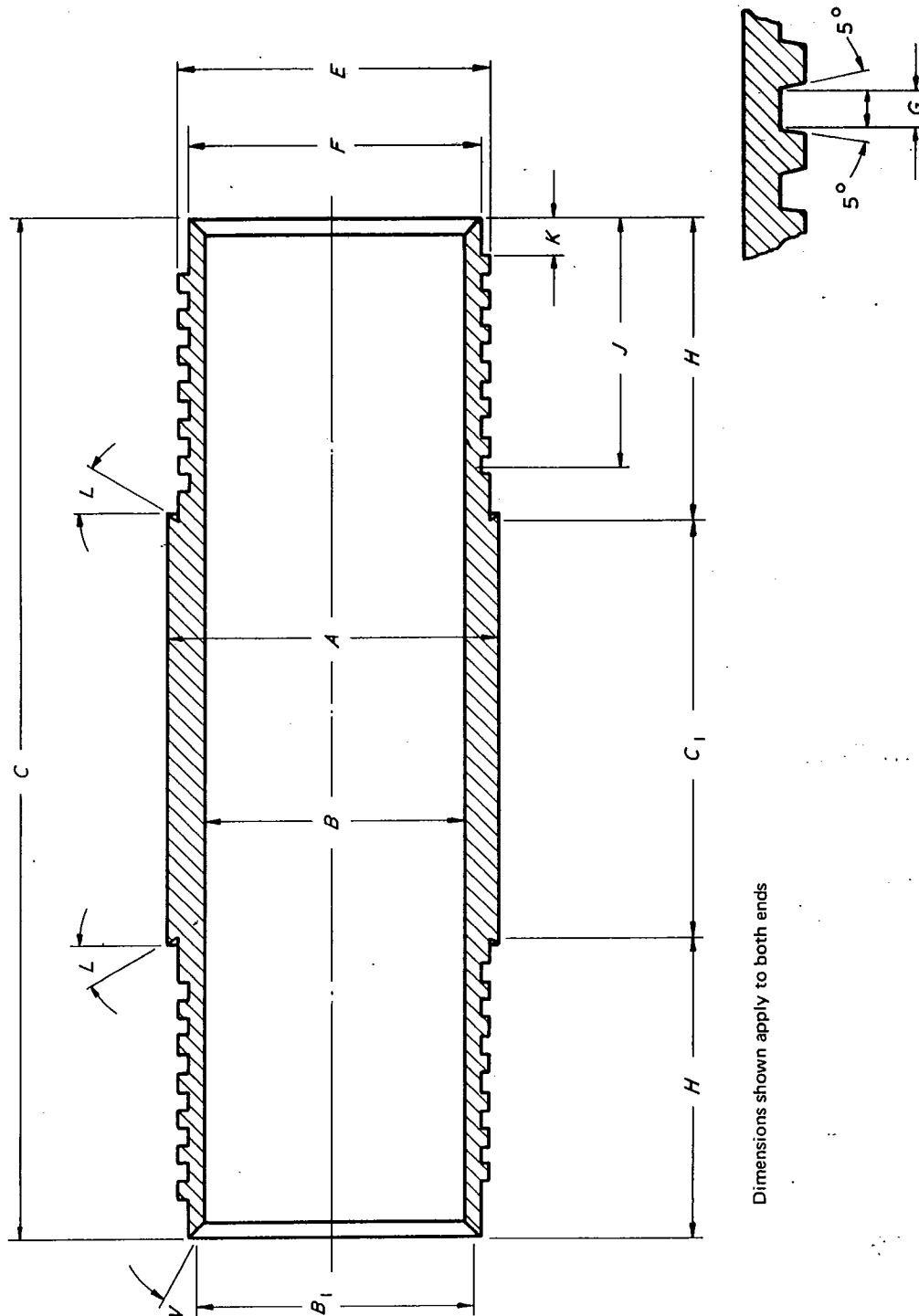
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
<i>A</i>	Max. 36.63 Min. 36.50	46.28 46.02	57.40 57.15	73.28 73.03	89.28 88.90	114.68 114.30	140.74 138.66	169.55 167.00	195.12 192.23	220.73 217.42
<i>B</i>	Max. 30.48 Min. 30.23	41.28 41.02	50.80 50.55	65.07 64.82	80.95 80.57	104.78 104.39	130.51 125.30	158.80 151.21	184.00 175.79	208.99 203.00
<i>C</i>	Max. 2946.76 Min. 2945.24	2964.19 2962.66	2926.54 2925.02	2914.81 2913.28	2914.81 2913.28	2902.72 2901.19	2900.94 2899.42	2888.19 2886.67	2875.74 2874.02	2862.48 2860.96
<i>M</i>	Max. 34.32 Min. 34.26	43.71 43.66	54.05 54.00	68.33 68.28	84.20 84.15	108.48 108.38	133.65 133.53	162.03 161.85	187.76 187.58	212.75 212.57
<i>N</i>	Max. 32.79 Min. 32.74	42.14 42.09	52.45 52.40	65.94 65.89	81.81 81.76	106.05 105.97	131.24 131.14	159.56 159.46	184.81 184.68	209.80 209.68
Thread pitch	3.18	3.18	3.18	3.18	3.18	5.10	5.10	5.10	6.35	6.35
<i>P</i>	Max. 1.63 Min. 1.55	1.63 1.55	1.63 1.55	1.60 1.52	1.60 1.52	2.59 2.51	2.57 2.46	2.57 2.46	3.18 3.07	3.18 3.07
<i>Q</i>	Min. 25.40	50.80	57.15	60.33	66.68	63.50	69.85	76.20	82.55	88.90
<i>R</i>	Min. 23.80	47.63	53.98	57.15	63.50	57.15	66.68	73.03	79.38	85.73
<i>S</i>	Max. 3.43 Min. 2.92	6.60 6.10	6.60 6.10	6.60 6.10	6.60 6.10	8.13 7.62	9.78 9.27	9.78 9.27	9.78 9.27	9.78 9.27
<i>T</i>	Angle 0°	30°	30°	30°	30°	30°	15°	15°	15°	15°
<i>V</i>	Angle —	—	Does not apply	Does not apply	—	—	30°	30°	30°	30°

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Table 13b. X design flush coupled casing. Casing coupling



Dimensions shown apply to both ends

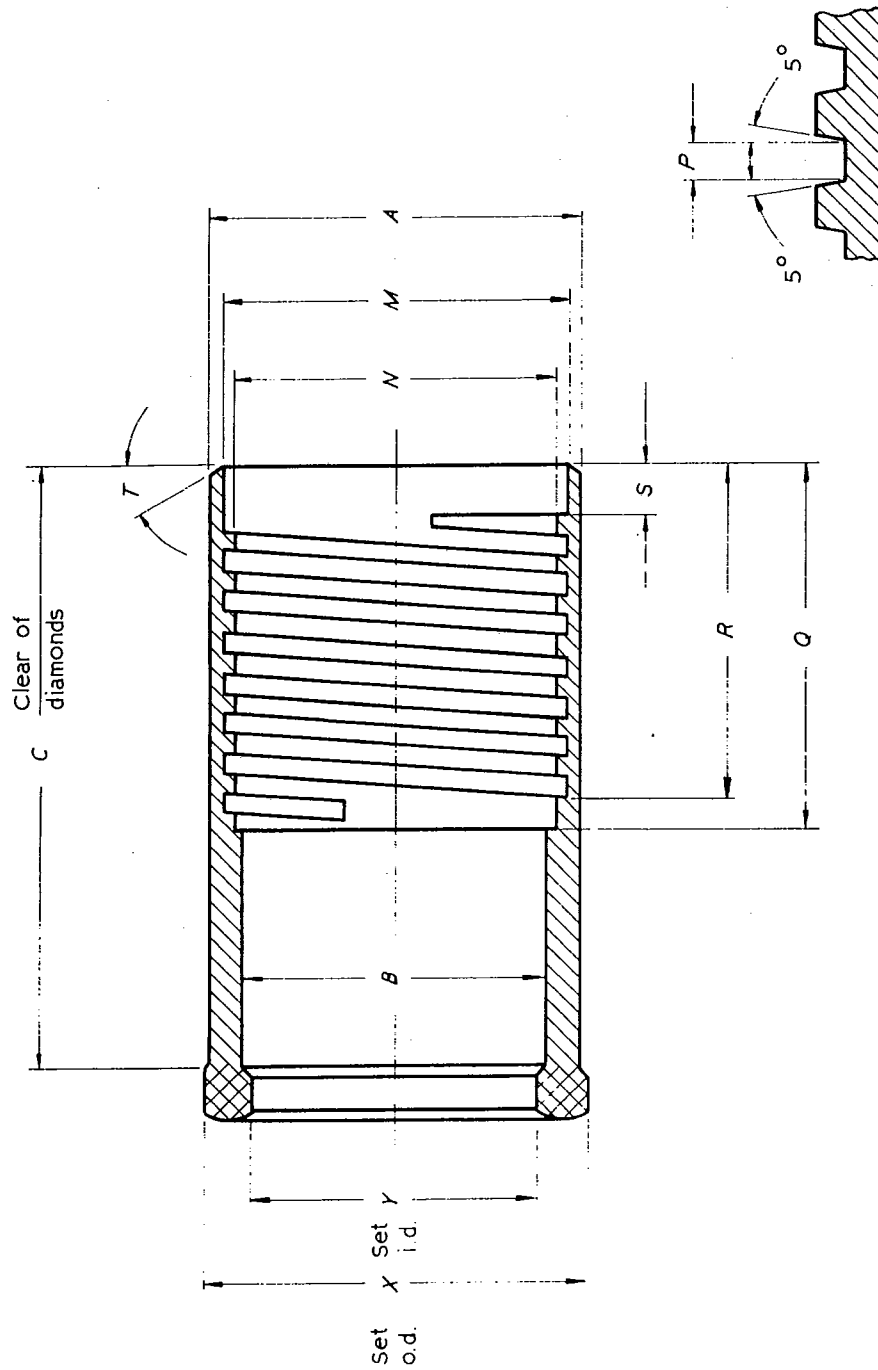
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
<i>A</i>	Max. 36.63 Min. 36.50	46.28 46.02	57.40 57.15	73.28 73.03	89.28 88.90	114.68 114.30	140.74 138.66	169.55 167.00	195.12 192.23	220.73 217.42
<i>B</i>	Max. 30.48 Min. 30.23	38.35 38.10	48.67 48.41	60.58 60.33	76.58 76.20	100.38 100.00	127.38 122.30	152.45 147.70	179.20 176.20	205.94 201.60
<i>B₁</i>	Max. 30.48 Min. 30.22	40.39 39.75	50.67 50.04	64.14 63.50	80.01 79.38	104.27 103.63	129.41 128.78	157.73 157.10	182.88 182.25	207.90 207.26
<i>C</i>	Reference 101.60	127.00	177.80	196.85	209.55	215.90	228.60	254.00	279.40	304.80
<i>C₁</i>	Max. 54.25 Min. 53.75	36.83 36.32	74.47 73.96	86.21 85.70	86.21 85.70	98.30 97.79	100.08 99.57	112.83 112.32	125.48 124.97	138.53 138.02
<i>E</i>	Max. 34.21 Min. 34.16	43.61 43.56	53.95 53.90	68.22 68.17	84.10 84.05	108.31 108.23	133.45 133.38	161.75 161.62	187.45 187.33	212.45 212.32
<i>F</i>	Max. 32.69 Min. 32.56	42.04 41.91	52.35 52.22	65.84 65.71	81.71 81.58	105.89 105.77	131.06 130.96	159.36 159.26	184.56 184.43	209.55 209.42
Thread pitch	3.18	3.18	3.18	3.18	3.18	5.10	5.10	5.10	6.35	6.35
<i>G</i>	Max. 1.63 Min. 1.55	1.63 1.55	1.63 1.55	1.60 1.52	1.60 1.52	2.59 2.51	2.57 2.46	2.57 2.46	3.18 3.07	3.18 3.07
<i>H</i>	Max. 24.05 Min. 23.55	45.47 44.96	52.07 51.56	55.75 55.25	61.98 61.47	59.18 58.67	64.64 64.14	70.97 70.46	77.32 76.81	83.52 83.01
<i>J</i>	Min. 22.22	41.28	47.62	50.80	57.15	53.98	60.33	66.68	73.03	79.38
<i>K</i>	Max. 3.43 Min. 2.92	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52	5.03 4.52
<i>L</i>	Angle 0°	30°	30°	30°	30°	30°	15°	15°	15°	15°
<i>V</i>	Angle 0°	30°	30°	30°	30°	30°	30°	30°	30°	30°

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Table 13c. X design flush coupled casing. Casing shoe



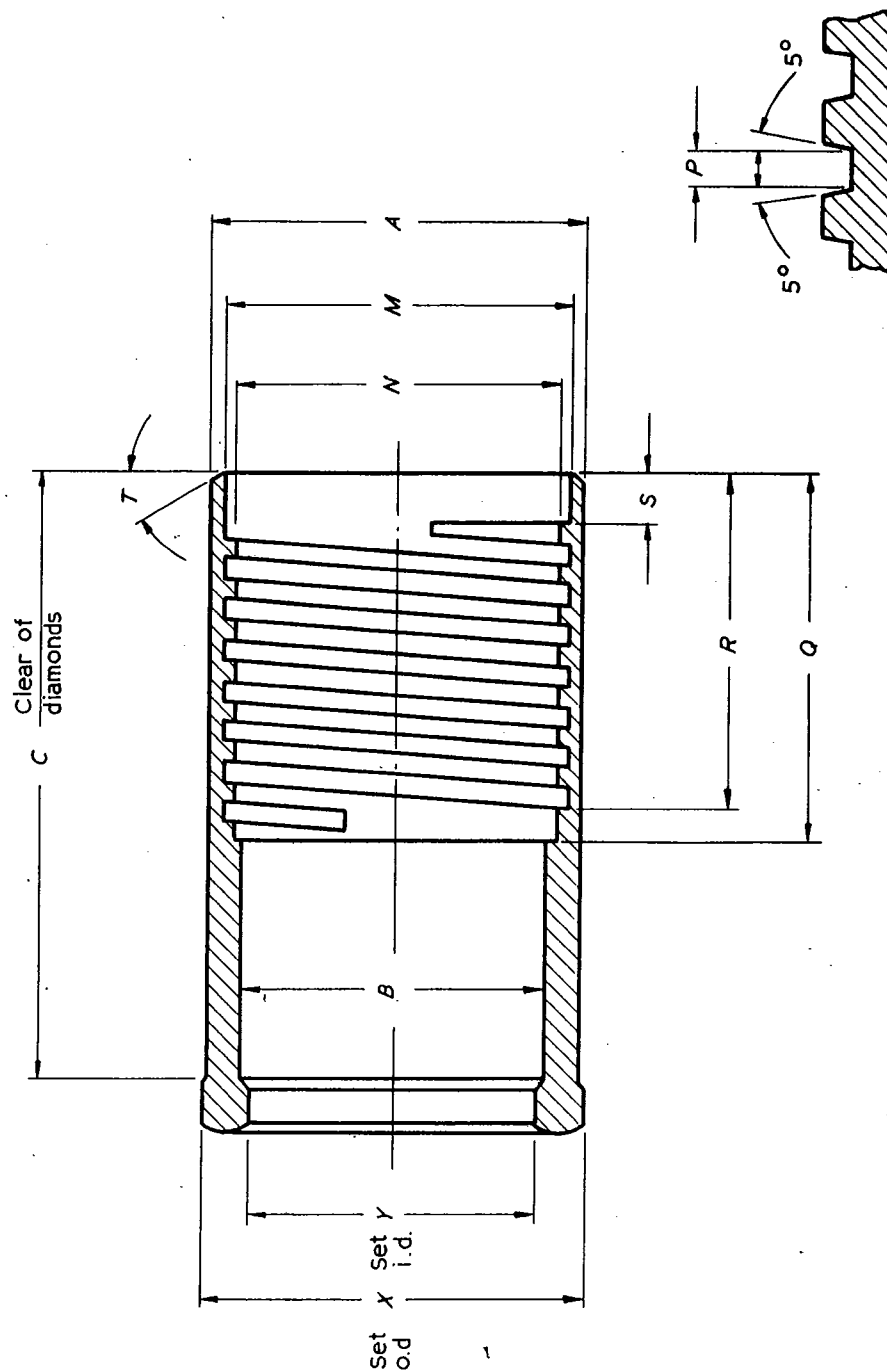
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
<i>A</i>	Max. 36.98 Min. 36.88	46.53 46.43	58.34 58.24	73.96 73.86	90.47 90.37	115.93 115.82	141.33 141.17	169.90 169.75	195.30 195.07	220.70 220.47
<i>B</i>	Max. 30.73 Min. 30.23	38.61 38.10	48.92 48.41	60.83 60.33	76.96 76.20	100.84 100.08	122.86 122.10	148.26 147.50	177.22 176.20	202.62 201.60
<i>C</i>	Min. 63.50	88.90	95.25	104.78	111.13	114.30	133.35	146.05	152.40	158.75
<i>M</i>	Max. 34.32 Min. 34.26	43.71 43.66	54.05 54.00	68.33 68.28	84.20 84.15	108.48 108.38	133.65 133.53	162.03 161.85	187.76 187.58	212.75 212.57
<i>N</i>	Max. 32.79 Min. 32.74	42.14 42.09	52.45 52.40	65.94 65.89	81.81 81.76	106.05 105.97	131.24 131.14	159.56 159.46	184.81 184.68	209.80 209.68
	Thread pitch 3.18	3.18	3.18	3.18	3.18	5.10	5.10	5.10	6.35	6.35
<i>P</i>	Max. 1.63 Min. 1.55	1.63 1.55	1.63 1.55	1.60 1.52	1.60 1.52	2.59 2.51	2.57 2.46	2.57 2.46	3.18 3.07	3.18 3.07
<i>Q</i>	Min. 25.40	50.80	57.15	60.33	66.68	63.50	69.85	76.20	82.55	88.90
<i>R</i>	Min. 23.80	47.63	53.98	57.15	63.5	57.15	66.68	73.03	79.38	85.73
<i>S</i>	Max. 3.43 Min. 2.92	6.60 6.10	6.60 6.10	6.60 6.10	6.60 6.10	8.13 7.62	9.78 9.27	9.78 9.27	9.78 9.27	9.78 9.27
<i>T</i>	0°	30°	30°	30°	30°	30°	15°	15°	15°	15°
<i>X</i>	Max. 37.85 Min. 37.59	47.75 47.50	59.69 59.44	75.44 75.18	91.95 91.69	117.65 117.27	143.76 143.26	172.72 172.21	198.50 197.74	224.16 223.39
<i>Y</i>	Max. 30.18 Min. 30.05	38.02 37.90	48.31 48.18	60.25 60.12	76.12 75.87	99.82 99.57	121.54 121.16	146.94 146.56	175.64 175.13	201.04 200.53

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Table 13d. X design flush coupled casing. Casing bit



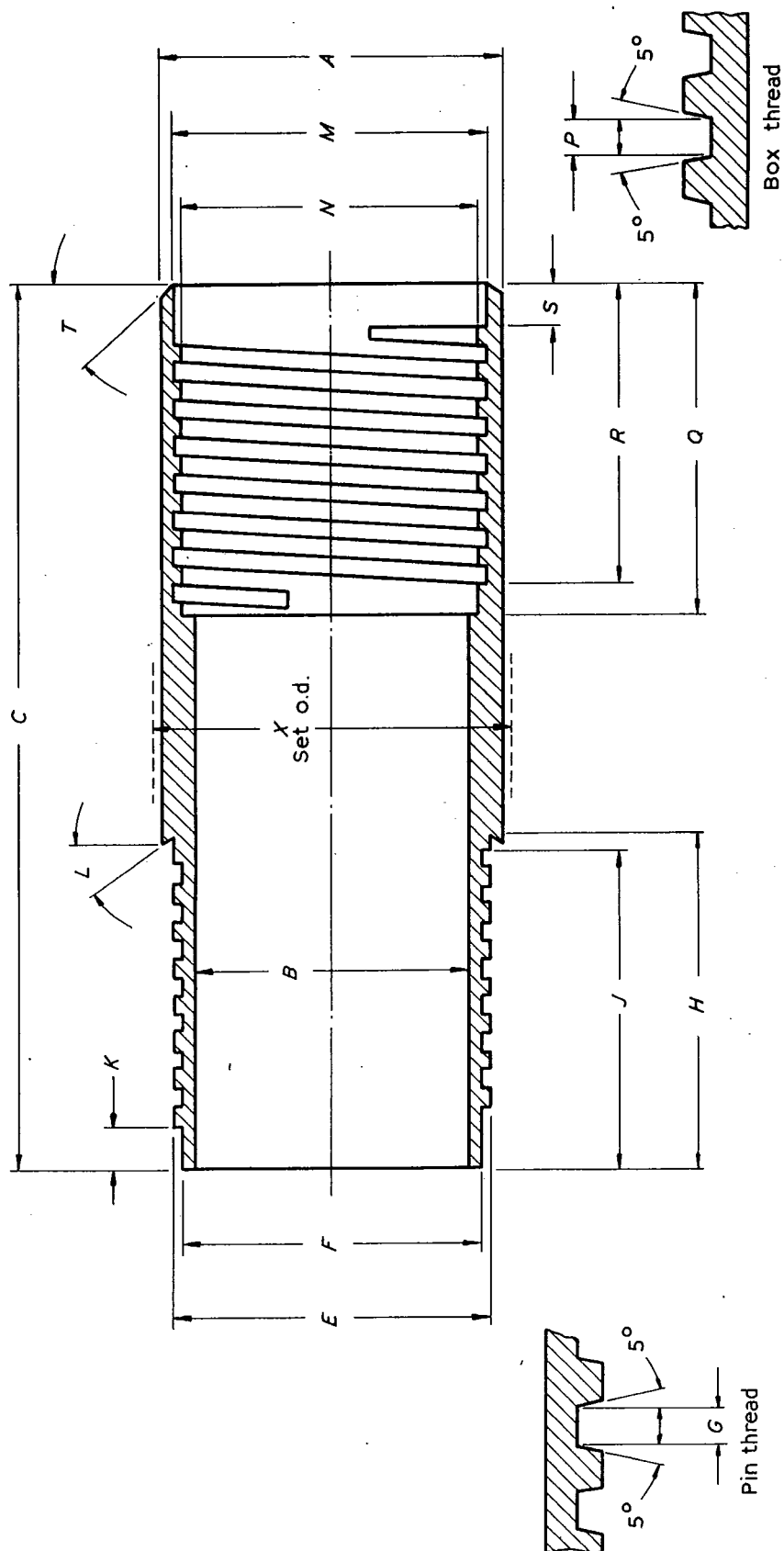
BS 4019 : Part 1 : 1974

All dimensions are in millimetres

	RX	EX	AX	BX	NX	HX	PX	SX	UX	ZX
<i>A</i>	Max. 36.98 Min. 36.88	46.53 46.43	58.34 58.24	73.96 73.86	90.47 90.37	115.93 115.82	141.33 141.17	169.90 169.75	195.30 195.07	220.70 220.47
<i>B</i>	Max. 26.54 Min. 26.04	37.21 36.45	46.74 45.97	57.86 57.10	73.74 72.97	98.35 97.33	120.65 119.38	146.05 144.78	175.13 173.61	200.53 199.01
<i>C</i>	Min. 63.50	88.90	95.25	104.78	111.13	114.3	133.35	146.05	152.40	158.75
<i>M</i>	Max. 34.32 Min. 34.26	43.71 43.66	54.05 54.00	68.33 68.28	84.20 84.15	108.48 108.38	133.65 133.53	162.03 161.85	187.76 187.58	212.75 212.57
<i>N</i>	Max. 32.79 Min. 32.74	42.14 42.09	52.45 52.40	65.94 65.89	81.81 81.76	106.05 105.97	131.24 131.14	159.56 159.46	184.81 184.68	209.80 209.68
Thread pitch	3.18	3.18	3.18	3.18	3.18	5.10	5.10	5.10	6.35	6.35
<i>P</i>	Max. 1.63 Min. 1.55	1.63 1.55	1.63 1.55	1.60 1.52	1.60 1.52	2.59 2.51	2.57 2.46	2.57 2.46	3.18 3.07	3.18 3.07
<i>Q</i>	Min. 25.40	50.80	57.15	60.33	66.68	63.50	69.85	76.20	82.55	88.90
<i>R</i>	Min. 23.80	47.63	53.98	57.15	63.50	57.15	66.68	73.03	79.38	85.73
<i>S</i>	Max. 3.43 Min. 2.92	6.60 6.10	6.60 6.10	6.60 6.10	6.60 6.10	8.13 7.62	9.78 9.27	9.78 9.27	9.78 9.27	9.78 9.27
<i>T</i>	0°	30°	30°	30°	30°	30°	15°	15°	15°	15°
<i>X</i>	Max. 37.85 Min. 37.59	47.75 47.50	59.69 59.44	75.44 75.18	91.95 91.69	117.65 117.27	143.76 143.26	172.72 172.21	198.50 197.74	224.16 223.39
<i>Y</i>	Max. 25.53 Min. 25.27	35.81 35.56	45.34 45.09	56.39 56.13	72.26 72.01	96.06 95.81	117.86 117.48	143.26 142.88	171.83 171.32	197.23 196.72

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Table 13e. X design flush coupled casing. Casing reaming shell



BS 4019 : Part 1 : 1974

All dimensions are in millimetres

		EX	AX	BX	NX
A	Max.	46.53	58.34	73.96	90.47
	Min.	46.43	58.24	73.86	90.37
B	Max.	38.35	48.67	60.58	76.58
	Min.	38.10	48.41	60.33	76.20
C	Max.	133.35	146.05	158.75	171.45
	Min.	133.35	146.05	158.75	171.45
E	Max.	43.61	53.95	68.22	84.10
	Min.	43.56	53.90	68.17	84.05
F	Max.	42.04	52.35	65.84	81.71
	Min.	41.91	52.22	65.71	81.58
Thread pitch		3.18	3.18	3.18	3.18
G	Max.	1.63	1.63	1.60	1.60
	Min.	1.55	1.55	1.52	1.52
H	Max.	45.47	52.07	55.75	61.98
	Min.	44.96	51.56	55.24	61.47
J	Max.	41.28	47.63	50.80	57.15
	Min.	41.28	47.63	50.80	57.15
K	Max.	5.03	5.03	5.03	5.03
	Min.	4.52	4.52	4.52	4.52
L	Max.	30°	30°	30°	30°
	Min.	30°	30°	30°	30°
M	Max.	43.71	54.05	68.33	84.20
	Min.	43.66	54.00	68.28	84.15
N	Max.	42.14	52.45	65.94	81.81
	Min.	42.09	52.40	65.89	81.76
Thread pitch		3.18	3.18	3.18	3.18
P	Max.	1.63	1.63	1.60	1.60
	Min.	1.55	1.55	1.52	1.52
Q	Max.	51.56	57.91	61.09	67.44
	Min.	50.8	57.15	60.33	66.68
R	Max.	47.63	53.98	57.15	63.50
	Min.	47.63	53.98	57.15	63.50
S	Max.	6.60	6.60	6.60	6.60
	Min.	6.10	6.10	6.10	6.10
T	Max.	30°	30°	30°	30°
	Min.	30°	30°	30°	30°
X	Max.	48.13	60.07	75.82	92.33
	Min.	47.88	59.82	75.56	92.08