Specification for

Screwdrivers and screwdriver accessories

BSI STANDARDS

Committees responsible for this British Standard

The preparation of this British Standard was entrusted by the Machine, Engineers and Hand Tools Standards Policy Committee (MTE/-) to Technical Committee MTE/15, upon which the following bodies were represented:

British Coal Corporation
British Telecommunications plc
Consumer Policy Committee of BSI
Federation of British Hand Tool Manufacturers
Handle Manufacturers' Association
Institute of Carpenters
Institute of Trading Standards Administration
Ministry of Defence

The following bodies were also represented in the drafting of the standard, through subcommittees and panels:

British Industrial Fasteners Federation
Society of Motor Manufacturers and Traders Limited

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Contents

Foreword

This British Standard has been prepared under the direction of the Machine, Engineers and Hand Tools Standards Policy Committee.

The main features of this revision are:

a) metrication of all dimensions;

b) consolidation of Parts 1, 2, 4 and 5 of the previous issue and the addition of jeweller's screwdrivers;

c) some rationalization of screwdriver sizes has been made.

This standard supersedes BS 2559 : Part 1 : 1971, BS 2559 : Part 2 : 1973, BS 2559 : Part 4 : 1973 and BS 2559 : Part 5 : 1974, which are now withdrawn.

NOTE. BS 2559 : Part 3 will be replaced by a European Standard on insulated tools, in due course.

The illustrations in this standard are examples only and are not intended to affect manufacturers' designs.

Compliance with a British Standard does not of itself confer immunity from legal obligations.

Specification

1 Scope

This British Standard specifies requirements for the manufacture, testing and prime dimensions relating to screwdrivers of the following types.

a) Screwdrivers and screwdriver blades and bits for use with slotted head screws.

b) Screwdrivers and screwdriver blades and bits for use with cross-recessed head screws.

NOTE 1. PZ Screwdrivers are suitable for driving Pozidriv (R) and Supadrive (R) cross-recessed head screws.

PH screwdrivers are suitable for driving Phillips (R) cross-recessed head screws only.[1)]

c) Screwdrivers with sleeved blades for use on low d.c. voltage apparatus up to and including 24 V d.c.

d) Screwdrivers that incorporate a ratchet mechanism capable of reverse drive.

e) Screwdrivers worked by a ratchet mechanism and a spindle having a double spiral track, the tool being operated by a reciprocating motion of the handle.

f) Jeweller's screwdrivers comprising a pencil-shaped body and rotating head, with either fixed or replaceable blades, for use on miniature screws.

2 References

2.1 Normative references

This British Standard incorporates, by reference, provisions from specific editions of other publications. These normative references are cited at the appropriate points in the text and the publications are listed on the inside back cover. Subsequent amendments to, or revisions of, any of these publications apply to this British Standard only when incorporated in it by updating or revision.

2.2 Informative reference

This British Standard refers to another publication that provides information. The edition of this publication current at the time of issue of this standard is given on the inside back cover, but reference should be made to the latest edition.

3 Nomenclature

For the purposes of this British Standard the nomenclature given in figures 1, 2, 3, 4, 5 and 6 applies.

4 Materials

4.1 Screwdriver blades and bits

Screwdriver blades and bits shall be manufactured from steel which, when suitably heat treated, satisfies the mechanical and performance criteria specified in this standard.

4.2 Handles

4.2.1 *Wood*

Wooden handles shall be manufactured from beech or other suitable hardwood. The wood shall be free from defects which could compromise performance.

The moisture content shall be within the range 10 % to 15 % by mass.

NOTE. Unsuitable atmospheres and environments can cause changes in the moisture content of tool handles which in turn can adversely affect performance.

4.2.2 *Plastics*

Plastics handles shall be manufactured from a material which will fully withstand the performance criteria specified in this standard.

4.3 Ferrules

Ferrules shall be made of a material conforming to either one of the following specifications.

a) Steel of minimum thickness 0.8 mm conforming to BS 1449 : Section 1.1 : 1991 or to BS 970 : Part 1 : 1991.

b) Brass 70/30 of minimum thickness 1.6 mm conforming to BS 2871 : Part 2 : 1972.

4.4 Blade sleeving

Screwdrivers for use on low d.c. voltage electrical apparatus up to 24 V d.c. shall be sleeved with a PVC or other material to provide insulation sufficient to meet the following conditions:

a) mechanical properties equivalent or superior to those of PVC;

b) minimum specific resistance; 10^{10} Ω/cm at 23 °C;

c) minimum thickness of sleeve; 0.8 mm.

NOTE. Plastics materials may be affected by contact with certain mineral and organic substances and can be changed mechanically over a period of time, resulting in the degradation of their insulation properties.

4.5 Ratchet screwdriver components

4.5.1 *Ratchet wheel*

The ratchet wheel shall be manufactured from steel conforming to BS 970 : Part 1 : 1991 and shall be capable of achieving the hardness requirements specified in **5.3.1**.

[1)] This information is given for the convenience of users of this British Standard and does not constitute an endorsement by BSI of the product.

4.5.2 *Ratchet pawls*

The pawl shall be manufactured from steel conforming to BS 1449 : Section 1.1 : 1991 and shall be capable of achieving the hardness requirements specified in **5.3.2.**

4.5.3 *Ratchet mechanism housing*

The housing shall be manufactured from either a zinc alloy conforming to BS 1004 : 1972 (alloy A) or a steel conforming to BS 970 : Part 1 : 1991.

4.5.4 *Ratchet sleeve*

The sleeve shall be manufactured from brass as specified in BS 2870 : 1980 or from steel conforming to BS 6323 : Part 2 : 1982.

4.5.5 *Switch spring*

The switch spring shall be manufactured from a suitable spring steel conforming to BS 1449 : Section 1.1 : 1991.

4.6 Spiral ratchet screwdriver components

4.6.1 *Spindle*

The spindle shall be manufactured from steel conforming to BS 970 : Part 1 : 1991.

4.6.2 *Nuts*

The nuts shall be made from brass conforming to BS 2874 : 1986.

4.6.3 *Pawl*

The pawl shall be manufactured from steel conforming to BS 1449 : Section 1.1 : 1991 and shall be capable of achieving the hardness requirements specified in **5.3.2.**

4.6.4 *Ratchet mechanism housing*

The housing shall be manufactured from either a zinc alloy conforming to BS 1004 : 1972 (alloy A) or a steel conforming to BS 970 : Part 1 : 1991.

4.6.5 *Ratchet sleeve*

The sleeve shall be manufactured from brass as specified in BS 2870 : 1980 or from steel conforming to BS 6323 : Part 2 : 1982.

4.6.6 *Return spring*

The return spring shall be manufactured from a steel conforming to BS 5216 : 1991.

4.6.7 *Chuck*

The chuck body shall be manufactured from a steel conforming to BS 970 : Part 1 : 1991.

4.6.8 *Handle tube*

The handle tube shall be manufactured from steel tube conforming to BS 6323 : Part 2 : 1982.

4.6.9 *Switch spring*

The switch spring shall be manufactured from a suitable spring steel conforming to BS 1449 : Section 1.1 : 1991.

4.7 Jeweller's screwdrivers

4.7.1 *Nose cap, collet and body*

The nose cap, collet and body shall be manufactured from steel conforming to BS 970 : Part 1 : 1991 or brass conforming to BS 2874 : 1986.

4.7.2 *Revolving head*

The revolving head shall be manufactured from either metal or plastics.

5 Heat treatment and hardness

5.1 Blades and bits for slotted head screws

The screwdriver blades and bits shall be hardened and tempered to a hardness on the Rockwell 'C' scale of 48 HRC to 56 HRC (see BS 891 : 1989) for a distance at least three times its tip width from the tip. The hardness shall be taken on a prepared flat surface of sufficient area to provide a reliable reading. The tang may be left untreated but the components shall be capable of meeting the torque criteria specified within this standard.

5.2 Blades and bits for cross-recessed head screws

The screwdriver blades and bits shall be hardened and tempered to a hardness on the Rockwell 'C' scale of 58 HRC to 64 HRC (see BS 891 : 1989).

The specified hardness values shall be maintained for a minimum distance of 3 × nominal blade diameter from the driving end.

The hardness shall be taken on a prepared flat surface of sufficient area to provide a reliable reading.

5.3 Ratchet screwdriver and spiral ratchet screwdriver components

5.3.1 *Ratchet wheel*

Where a case hardening steel is used, the ratchet wheel shall be case hardened to a minimum depth of 0.13 mm and offer a hardness within the range of 515 HV to 615 HV (see BS 427 : 1990).

5.3.2 *Pawls*

When pawls are manufactured from spring steel conforming to BS 1449 : Section 1.1 : 1991 they shall be heat treated to a hardness of 46 HRC to 50 HRC (see BS 891 : 1989) and when manufactured from steel suitable for case hardening, they shall be heat treated to a hardness in the range 515 HV to 615 HV (see BS 427 : 1990).

NOTE. Alternative values of hardness may be used in accordance with BS 860.

6 Assembly

6.1 General

Fully assembled screwdrivers shall be capable of achieving the proof test torque values as specified in table 1. After testing, the handle of the screwdriver shall have remained securely attached to the blade.

After the application of the proof torque appropriate to the size of screwdriver blade under test there shall be no sign of permanent deformation or fracture, or any other damage which could influence the usability of the tool.

6.2 Screwdrivers for slotted and cross-recessed head screws

The handle shall be securely fixed and shall be parallel to and concentric with the blade. The assembly shall be capable of meeting the torque criteria specified in this standard. Ferrules on wood handles shall be securely locked in position.

Insulation sleeves for screwdrivers intended for use on live electrical apparatus up to 24 V d.c. shall be shrunk into position over the full length of the sleeve resulting in a secure interference fit. There shall be no visible gap between the sleeve and the handle.

6.3 Ratchet screwdrivers

6.3.1 The tool shall have three main components: the blade, the ratchet mechanism and the handle.

Provision shall be made for withstanding the end thrust by means of a hardened steel ball or other suitable means.

6.3.2 The ratchet wheel shall be positively fixed to the blade.

Where a switch of the type shown in figure 3 is fitted, the ratchet mechanism shall have the following three positive working positions:

a) with the switch in the central position the blade shall be locked;

b) with the switch in the forward position the blade shall drive in a clockwise direction;

c) with the switch in the rear position the blade shall drive in an anti-clockwise direction.

The complete ratchet mechanism shall be suitably encased for user and mechanism protection.

The ratchet mechanism shall not slip in any working position under the torque requirements specified in this standard.

The maximum free rotational movement in the drive direction shall be 36°.

6.3.3 The handle shall be securely fixed and shall be parallel to and concentric with the blade. The assembly shall be capable of meeting the torque criteria specified in this standard.

6.4 Spiral ratchet screwdrivers

6.4.1 *Spindle*

The spindle shall have a double spiral track along its length and shall be so made that it will engage positively with the end of the screwdriver bit. It shall be fitted with a stop to retain it in the ratchet mechanism housing when extended as shown in figure 5.

6.4.2 *Switch*

Where a switch of the type shown in figure 5 is fitted, the ratchet mechanism shall have the following three positive working positions:

a) with the switch in the central position the blade shall be locked;

b) with the switch in the forward position the blade shall drive in a clockwise direction;

c) with the switch in the rear position the blade shall drive in an anti-clockwise direction.

6.4.3 *Mechanism*

The complete ratchet mechanism shall be encased for user and mechanism protection.

The ratchet mechanism shall not slip in any working position under the torque requirements specified in this standard.

6.4.4 *Nuts*

The nut shall be made with a minimum of eight and a maximum of eleven splines on the periphery to work in conjunction with the pawls as a ratchet and two spiral threads in the bore to fit the spirals on the spindle.

NOTE. As most of the driving work is done by the forward driving nut, it is usually made longer than the reversing nut to give a longer wearing life.

6.4.5 *Handle and tube*

The tube shall be securely fixed to the ratchet housing. This subassembly shall have a handle secured to it so as to satisfactorily meet the torque test specified within this standard.

6.4.6 *Chuck*

The chuck shall securely retain the bit, the bit being held or released by means of the sliding sleeve which locates or withdraws a securing pin.

6.4.7 *Screwdriver bits*

The bits shall be interchangeable in the chuck.

6.4.8 *Return springs*

The spring returns the spindle to its extended position and if fitted it shall be strong enough to extend the spindle to its maximum amount when the tool is held vertically with the blade uppermost.

NOTE. The return spring may be omitted by agreement between the purchaser and supplier.

6.4.9 ***Locking collar***

The locking collar is fitted for the purpose of retaining the spindle in the closed position.

6.4.10 ***End cap screws***

This screw enables easy access to be made to the spindle and nuts thereby allowing their replacement when worn or damaged. An optional system where the full handle is removed from the handle tube is permissible.

6.5 Jeweller's screwdrivers

6.5.1 An exploded view is shown in figure 6.

The screwdriver shall have four components; the body incorporating the collet, the nose cap, the rotating head and an interchangeable or fixed blade.

6.5.2 The body shall include a collet to hold the blade. This can be an integral part of the body or a composite in which case it shall be joined with sufficient strength to withstand a torque of 0.48 N·m.

6.5.3 The nose cap shall be screwed to the collet such that it shall progressively tighten the collet when rotated in a clockwise direction.

6.5.4 The blade shall be inserted into the collet through the nose cap such that the tang of the blade is keyed into the collet preventing blade rotation up to a torque of 0.48 N·m when the nose cap is fully tightened onto the collet.

6.5.5 The head shall be held captive to the body but free to rotate independently about its axis.

7 Finish

7.1 Screwdriver blades and bits for slotted head screws and recessed head screws

Screwdriver blades and bits shall be free from the following defects:

a) overheating during processing;

b) cracks, forging seams or laps;

c) stress raisers on the processed surfaces;

d) incomplete coverage of all anti-corrosion coating;

e) corrosion.

All blades, bits and ferrules shall be suitably finished to inhibit corrosion.

7.2 Handles

7.2.1 ***Wooden handles***

After assembly wooden handles shall have a smooth surface, free from pinholes, burrs and sharp edges, cracks or corners.

7.2.2 ***Plastics handles***

After assembly plastics handles shall have a smooth or finely textured surface, free from burrs, sharp edges, cracks, sharp corners and prominent injection gates and flashes.

7.3 Ratchet sleeves

Ratchet sleeves shall be smoothly finished, free from cracks, seams, laps and burrs and shall be treated to prevent corrosion.

7.4 Spiral ratchet screwdrivers

7.4.1 ***Tubes and sleeves***

Tubes and sleeves shall be smoothly finished, free from cracks, seams, laps and burrs and be appropriately treated to prevent corrosion.

7.4.2 ***Spindle***

The spindle and the spiral grooves shall be smoothly finished with all sharp corners removed and appropriately treated to prevent corrosion.

7.4.3 ***Chuck sleeve***

The chuck sleeve shall be knurled to obtain the necessary grip for releasing the screwdriver bit and shall be suitably treated to prevent corrosion.

7.4.4 ***End cap screw***

The end cap screw shall be finished flush with the handle and shall be smoothly finished with all burrs removed.

7.4.5 ***Assembly***

The finish and assembly of the ratchet mechanism and spiral movement shall be such that all action is positive and friction is at a minimum so that the spiral spindle will not tend to turn or operate during the return stroke of the handle.

7.5 Jeweller's screwdrivers

All metal components shall be free from the defects quoted in **7.1**. The head, when in plastic, shall be free from burrs, sharp edges or corners and prominent injection gates and flashes.

8 Design and dimensions

8.1 General

The tip of each screwdriver blade for slotted screws shall be square to the axis of the blade within 2° in both planes.

The point of each screwdriver blade or bit for cross-recessed head screws shall be concentric with its axis within 0.15 mm FIM (full indicator movement).

The designs of typical handles are shown in figures 3, 5, 6 and 7.

Insulation sleeves when fitted shall be of sufficient length such that the exposed, uninsulated length of the blade tip shall be no greater than 13 mm.

When a plated finish is used, the dimensions shall be satisfied after plating.

8.2 Screwdriver blades and bits for slotted head screws

The dimensions shall conform to the sizes given in tables 2, 3, 4, 5, 6 and 7 and figures 9 and 10 of this standard.

The included cannel angle at the tip shall be as specified in figure 8. (The design and dimensions of Cabinet screwdrivers and London pattern screwdrivers are shown in annexes A and B.)

8.3 Screwdriver blades and bits for cross-recessed head screws

The screwdriver blades and bits shall have cruciform points conforming to figures 11, 12 and 13 and the dimensions given in tables 8, 9, 10, 11, 12, 13 and 14 and in figures 14 and 15 of this standard.

8.4 Ratchet screwdrivers

8.4.1 ***Dimensions***

The design of a typical ratchet screwdriver is shown in figure 3 and typical interchangeable bits are shown in figure 4.

The dimensions shall conform to the sizes given in tables 4, 5, 6, 12 and 13.

8.4.2 ***Torque capability of ratchet screwdrivers***

All completely assembled screwdrivers shall be capable of withstanding the proof torque load with the switch in each of its working positions, as detailed in the ratchet screwdriver section in table 1.

8.5 Spiral ratchet screwdrivers

8.5.1 ***Dimensions***

The design of a typical spiral ratchet screwdriver is shown in figure 5.

The sizes of spiral ratchet bits for slotted screws shall conform to those given in table 6 and figure 13; tip forms shall be as shown in figure 10.

The sizes of spiral ratchet bits for cross-recessed head screws shall conform to those given in table 13 and figure 14; point forms and dimensions shall be as given in figures 11, 12 or 13 and tables 8, 9 10 and 11.

8.5.2 ***Working stroke***

The working stroke of the screwdriver varies according to size and shall not be less than:

size 1 : light duty, 75 mm;

size 2 : medium duty 120 mm;

size 3 : heavy duty 200 mm;

The maximum overall length (excluding screwdriver bit) shall be:

size 1 : light duty, 300 mm;

size 2 : medium duty, 450 mm;

size 3 : heavy duty, 650 mm.

The minimum number of turns per stroke shall be:

size 1 : light duty, 2 turns;

size 2 and 3 : medium and heavy duty, $2\frac{1}{2}$ turns.

8.5.3 ***Torque capability of assembled screwdrivers***

Each completely assembled screwdriver shall be capable of withstanding the proof torque loads as detailed in the spiral ratchet screwdriver section in table 1. When tested in accordance with annex C the screwdriver shall be fitted with the appropriate type C bit, which shall be ground back at the point to a thickness of 1.5 mm and the proof torque shall be applied with the point of the oversize bit positively located in a slot 1.78 mm in width and 2.0 mm in depth.

8.6 Jeweller's screwdriver blades

8.6.1 ***Blades for slotted head screws***

The design and dimensions shall conform to figure 9 and to the values given in table 7.

8.6.2 ***Blades for cross-recessed head screws***

The design and dimensions shall conform to figure 15 and to the values given in table 13.

9 Marking

All screwdrivers and interchangeable blades and bits covered by this standard shall be clearly and indelibly marked with the manufacturer's or supplier's name or trademark, for traceability purposes. In the case of jeweller's screwdrivers and components these shall be supplied in packaging which is marked with the above information.

NOTE. It is recommended that information on safe usage of screwdrivers should be supplied by the manufacturer with each screwdriver, based on annex D.

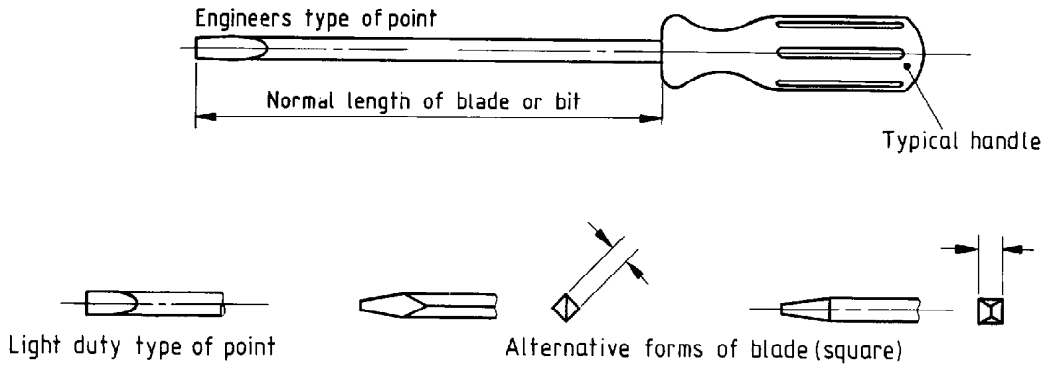


Figure 1. Slotted head screwdriver: nomenclature

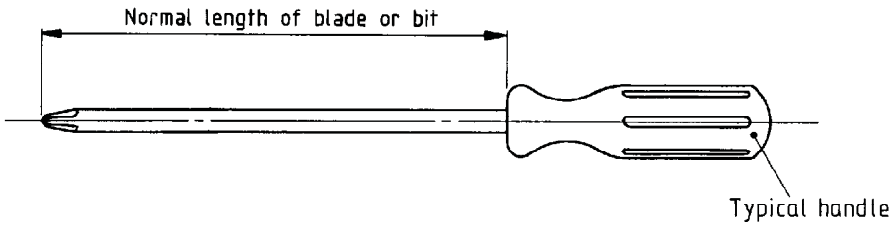


Figure 2. Crossed-recess head screwdriver: nomenclature

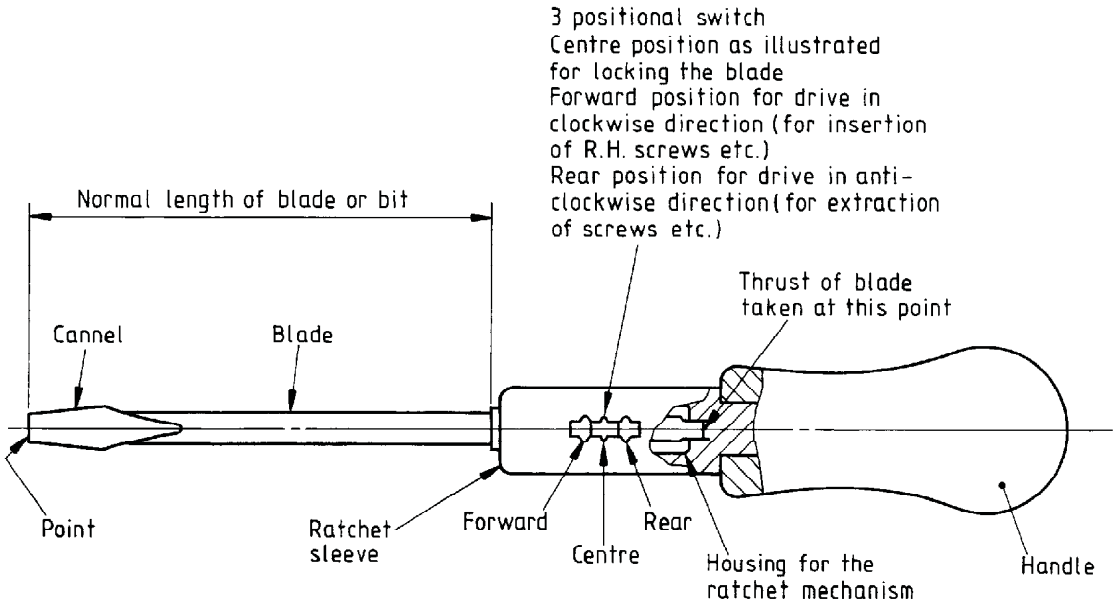
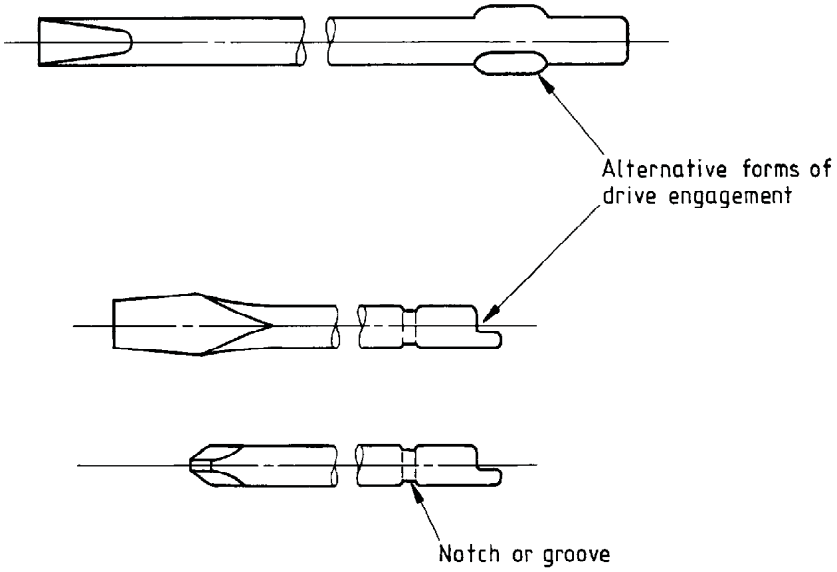
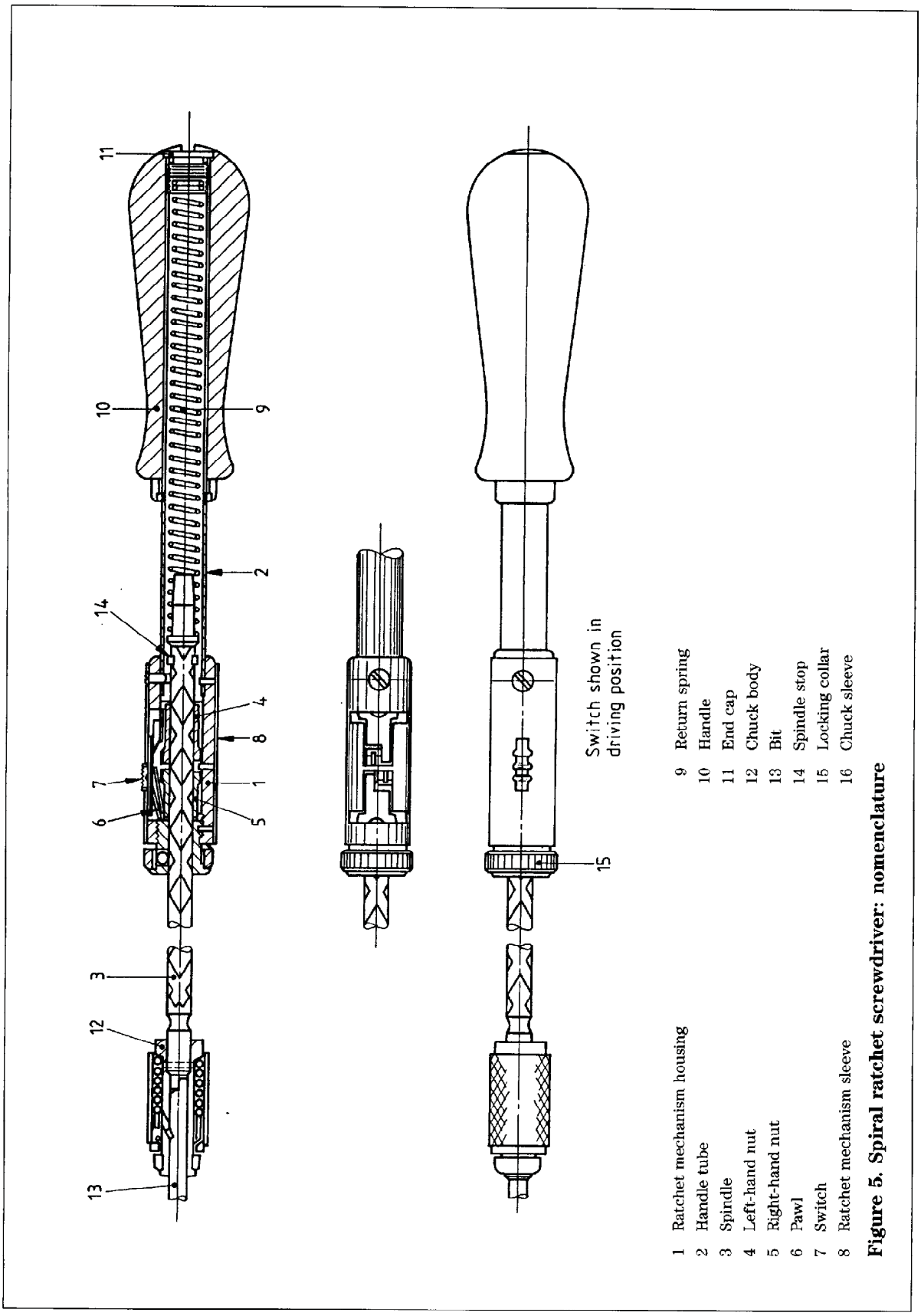


Figure 3. Ratchet screwdriver: nomenclature



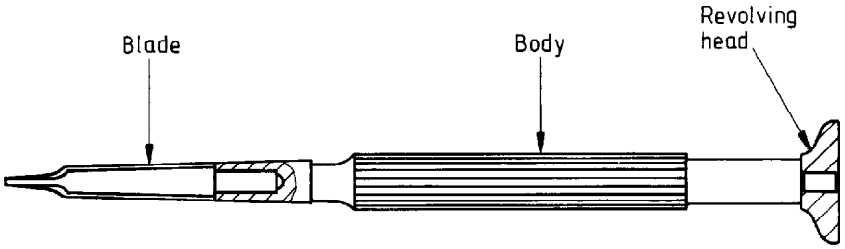
NOTE. Fitted blade length is 100 mm

Figure 4. Ratchet screwdriver: interchangeable bits: nomenclature

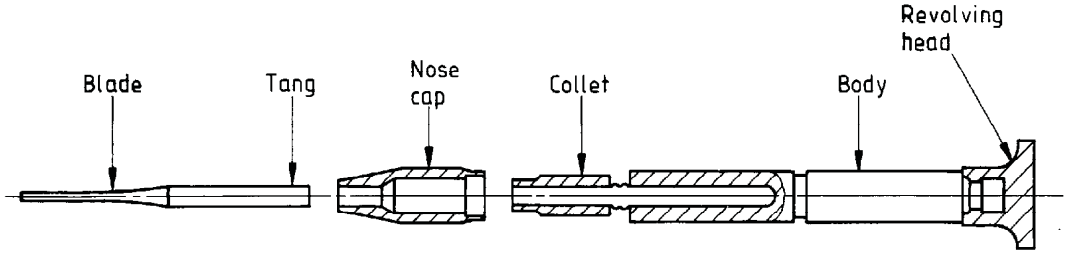


1 Ratchet mechanism housing
2 Handle tube
3 Spindle
4 Left-hand nut
5 Right-hand nut
6 Pawl
7 Switch
8 Ratchet mechanism sleeve
9 Return spring
10 Handle
11 End cap
12 Chuck body
13 Bit
14 Spindle stop
15 Locking collar
16 Chuck sleeve

Figure 5. Spiral ratchet screwdriver: nomenclature



Fixed blade design



Interchangeable blade design

Figure 6. Jeweller's screwdriver: nomenclature

Table 1. Proof torque requirements

Type of screwdriver	Thickness, *a* mm	Width, *b* mm	Point size	Proof torque, N·m min.	
				Blades and bits	Handle assembly
Slotted head	0.4	2.0	—	0.3	1.0
	0.4	2.5	—	0.4	1.0
	0.5	3.0	—	0.7	1.0
	0.6	3.5	—	1.3	1.0
	0.8	4.0	—	2.6	5.0
	0.8	5.0	—	3.3	5.0
	1.0	5.5	—	5.5	10.0
	1.2	6.5	—	9.4	10.0
	1.2	7.0	—	10.1	18.0
	1.2	8.0	—	11.5	18.0
	1.6	8.0	—	20.5	18.0
	1.6	10.0	—	25.6	20.0
	2.0	12.0	—	48.0	20.0
	2.5	14.0	—	87.5	20.0
Cross-recessed head: type PZ and PH	—	—	0	1.0	1.0
	—	—	1	4.0	4.0
	—	—	2	10.0	10.0
	—	—	3	23.0	18.0
	—	—	4	35.0	20.0
Ratchet				Complete assembly	
Light duty (0.8 × 5.0 & No. 1 PZ/PH)	—	—	—	4.0	
Heavy duty (1.2 × 6.5 & No. 2 PZ/PH)	—	—	—	10.0	
Ratchet with interchangeable bits (1.2 × 8.0 & No. 2 PZ/PH)	—	—	—	11.5	
Spiral ratchet					
Size 1 - Light duty	—	—	—	5	
Size 2 - Medium duty	—	—	—	10	
Size 3 - Heavy duty	—	—	—	15	
Jeweller's: slotted	0.15	0.64	—	0.12	
	0.15	1.02	—	0.13	
	0.20	1.40	—	0.16	
	0.20	1.78	—	0.24	
	0.25	2.16	—	0.37	
	0.25	2.49	—	0.48	
Jeweller's : cross-recessed	—	—	0^4	1.0	
	—	—	0^3	1.0	
	—	—	0^2	1.0	
	—	—	0	1.0	
	—	—	1	4.0	

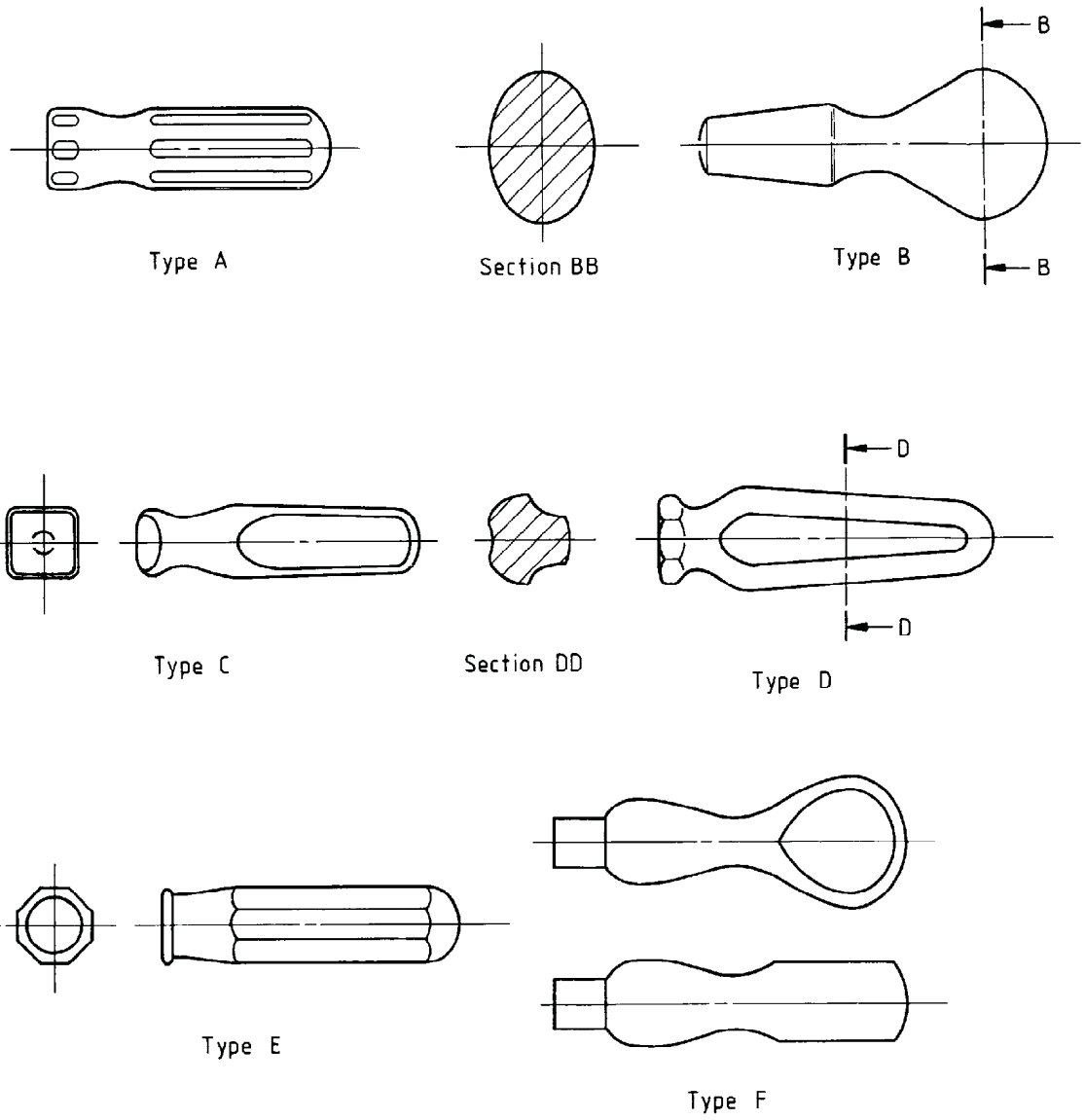


Figure 7. Typical handle shapes

Table 2. Slotted head screwdrivers: tip sizes

Thickness, a	Width, b	Tolerance		t_1	a_1 min.	t_2	Proof torque
		a	b				
mm	mm	mm	mm	mm	mm	mm	N·m
0.4	2.0			0.2	0.3	0.7	0.3
	2.5	$+0.06$ -0.06		0.2	0.3	0.7	0.4
0.5	3.0		0 -0.12	0.3	0.4	0.9	0.7
0.6	3.5			0.4	0.5	1.1	1.3
0.8	4.0			0.5	0.6	1.4	2.6
	5.0			0.5	0.6	1.4	3.3
1.0	5.5	$+0.06$ -0.12	0 -0.3	0.6	0.8	1.8	5.5
1.2	6.5			0.7	1.0	2.2	9.4
	7.0			0.7	1.0	2.2	10.1
	8.0			0.7	1.0	2.2	11.5
1.6	8.0			1.0	1.3	2.9	20.5
	10.0	$+0.06$ -0.18		1.0	1.3	2.9	25.6
2.0	12.0			1.2	1.6	3.6	48.0
2.5	14.0			1.5	2.0	4.5	87.5

Table 3. Slotted head screwdrivers: blade lengths

Thickness a	Width b	Blade lengths: tolerance $^{+5}_{0}$				
0.4	2.0	40				
0.4	2.5	50	75	100		
0.5	3.0	65	75	100	150	
0.6	3.5	25	75	100	125	
0.8	4.0	25	75	100	150	
0.8	5.0	75	100	150	200	250
1.0	5.5	125	150	200		
1.2	6.5	35(45)	100	150	200	250
1.2	7.0	150	200	250		
1.2	8.0	100	125	150	200	
1.6	8.0	125	150	175		
1.6	10.0	150	200	250	300	
2.0	12.0	150	200	250	300	
2.5	14.0	200	250	300		

Table 4. Ratchet screwdrivers for slotted head screws: light duty

Blade length	Tip width	Tip thickness	Proof torque
mm	mm	mm	N·m
75	$5.0\ ^{0}_{-0.3}$	$0.80\ ^{+0.06}_{-0.12}$	3.3
100 $^{+5}_{0}$			3.3
150			3.3

Table 5. Ratchet screwdrivers for slotted head screws: heavy duty

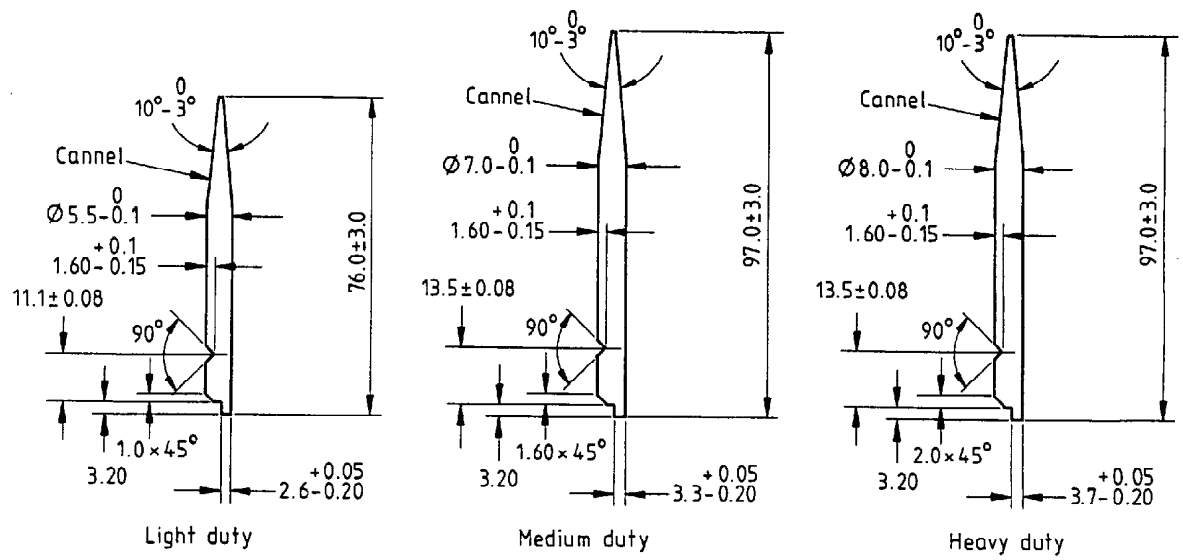
Blade length	Tip width	Tip thickness	Proof torque
mm	mm	mm	N·m
50			9.4
75			9.4
100			9.4
125 $^{+5}_{0}$	$6.5\ ^{0}_{-0.3}$	$1.20\ ^{+0.06}_{-0.12}$	9.4
150			9.4
200			9.4

Table 6. Spiral ratchet screwdrivers: bits for slotted head screws: tip dimensions

Bit designation	Width, b mm	thickness, a mm	Gauge point, t_1 mm	Proof torque N·m
A	4.0 $^{0}_{-0.12}$	0.80	0.5	2.6
B	5.0	0.80	0.5	3.3
C	5.5	1.00	0.6	5.5
Medium duty				
A	5.5	1.00 $^{+0.06}_{-0.12}$	0.6	5.5
B	6.5 $^{0}_{-0.3}$	1.00	0.6	6.5
C	7.0	1.20	0.7	10.1
Heavy duty				
A	6.5	1.00	0.6	6.5
B	7.0	1.20	0.7	10.1
C	8.0	1.20	0.7	11.5

Table 7. Jeweller's screwdriver for slotted head screws: blade/tip dimensions, proof torque

Tip dimensions		Blade dimensions		Proof torque
a	b	d	l	N·m
0.15	0.64	3.17	40	0.12
0.15	1.02	3.17	40	0.13
0.20	1.40	3.17	40	0.16
0.20	1.78	3.17	40	0.24
0.25	2.16	3.17	40	0.37
0.25	2.49	3.17	40	0.48



Dimensions are in millimetres

Figure 8. Spiral ratchet screwdrivers: bits for slotted head screws: overall dimensions

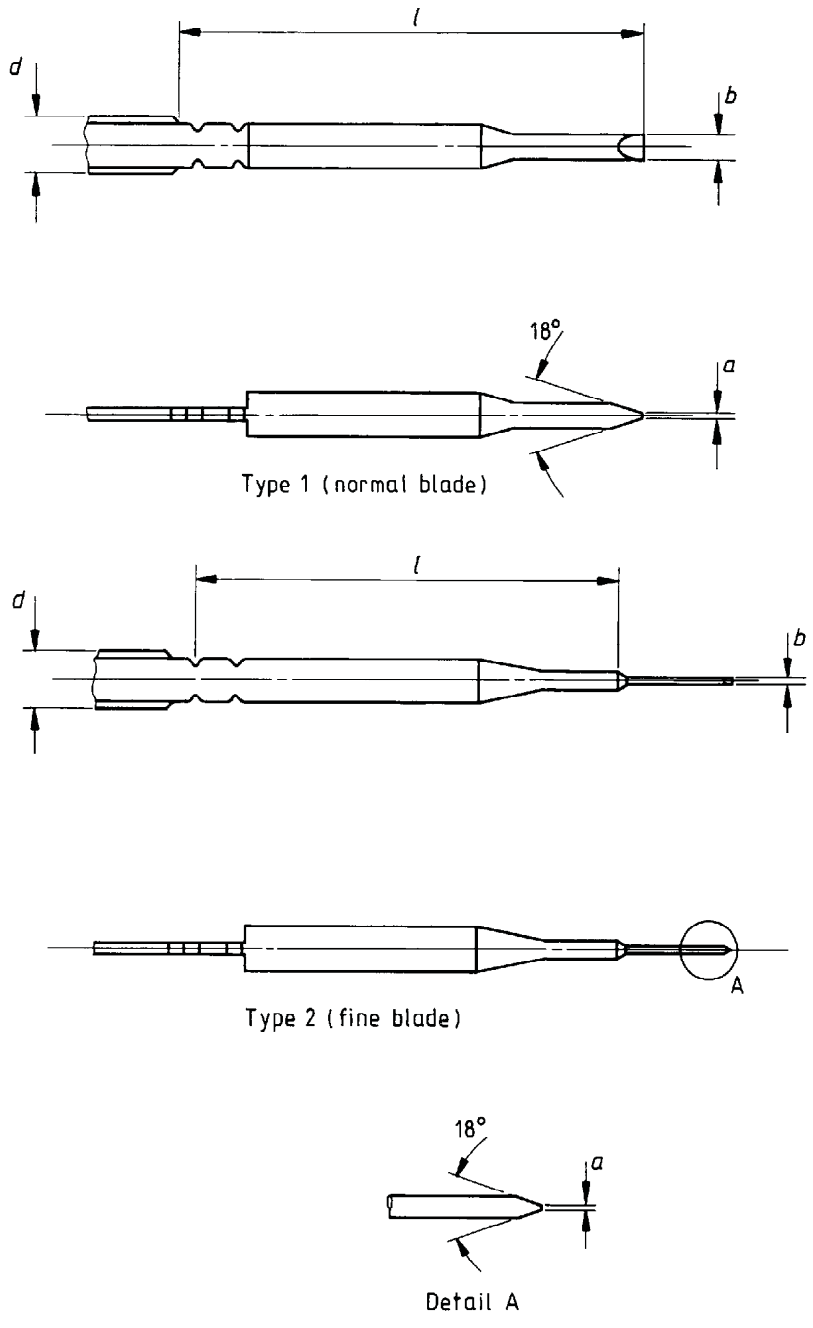
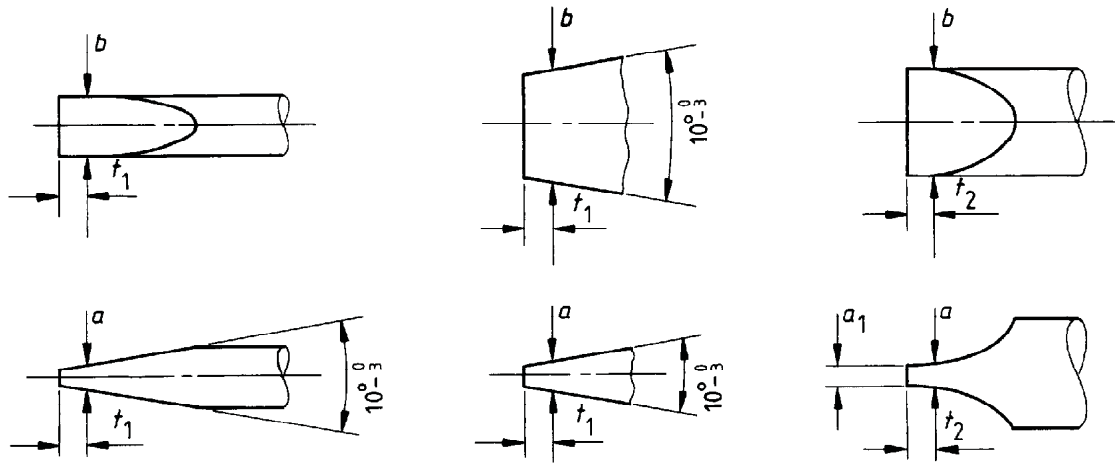


Figure 9. Jeweller's screwdriver: slotted head: design



Light and extra light form | Engineers form | Milled form

Figure 10. Slotted head screwdrivers: tip forms

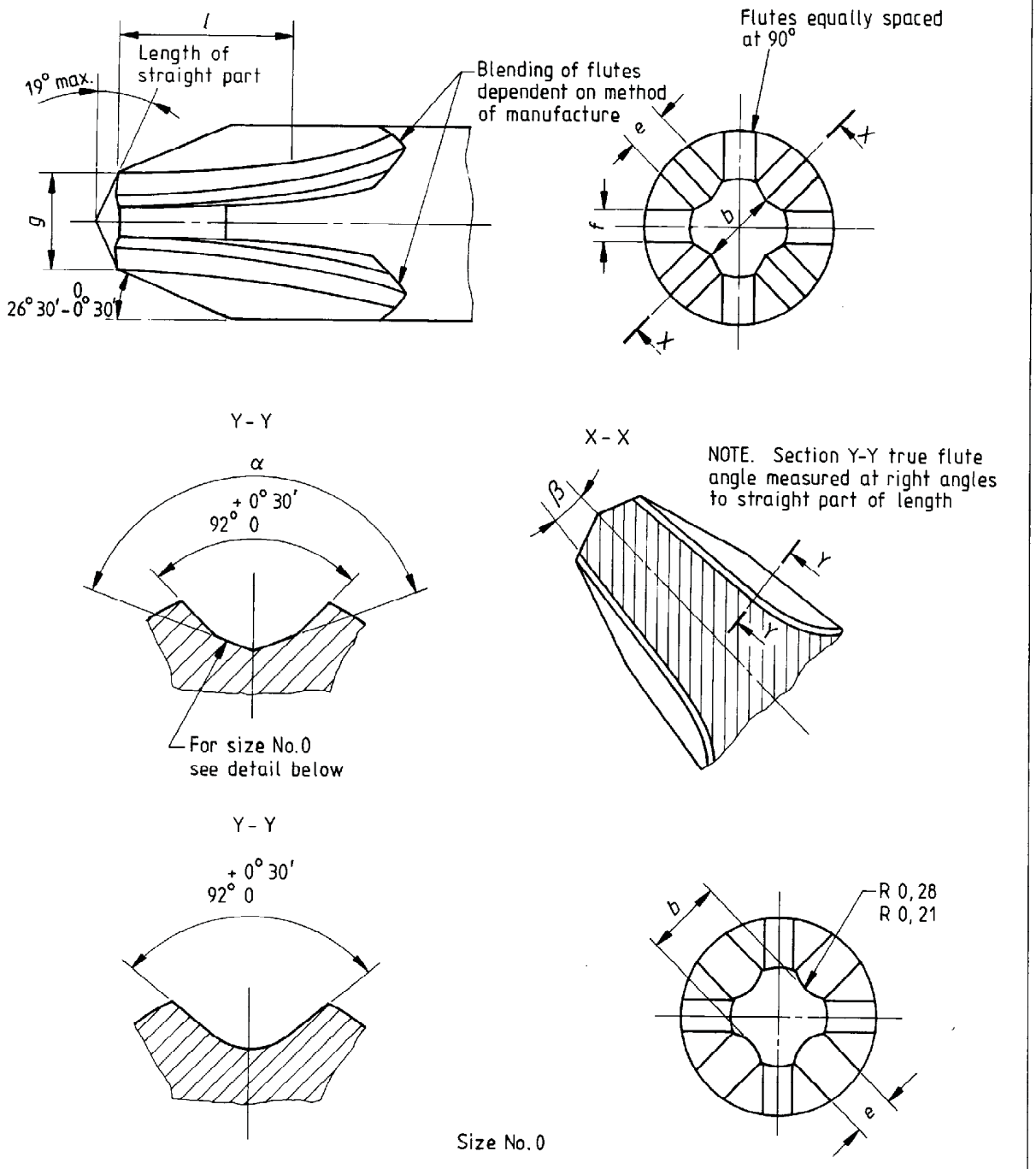


Figure 11. Crossed-recess head screwdrivers: details of point: type PH

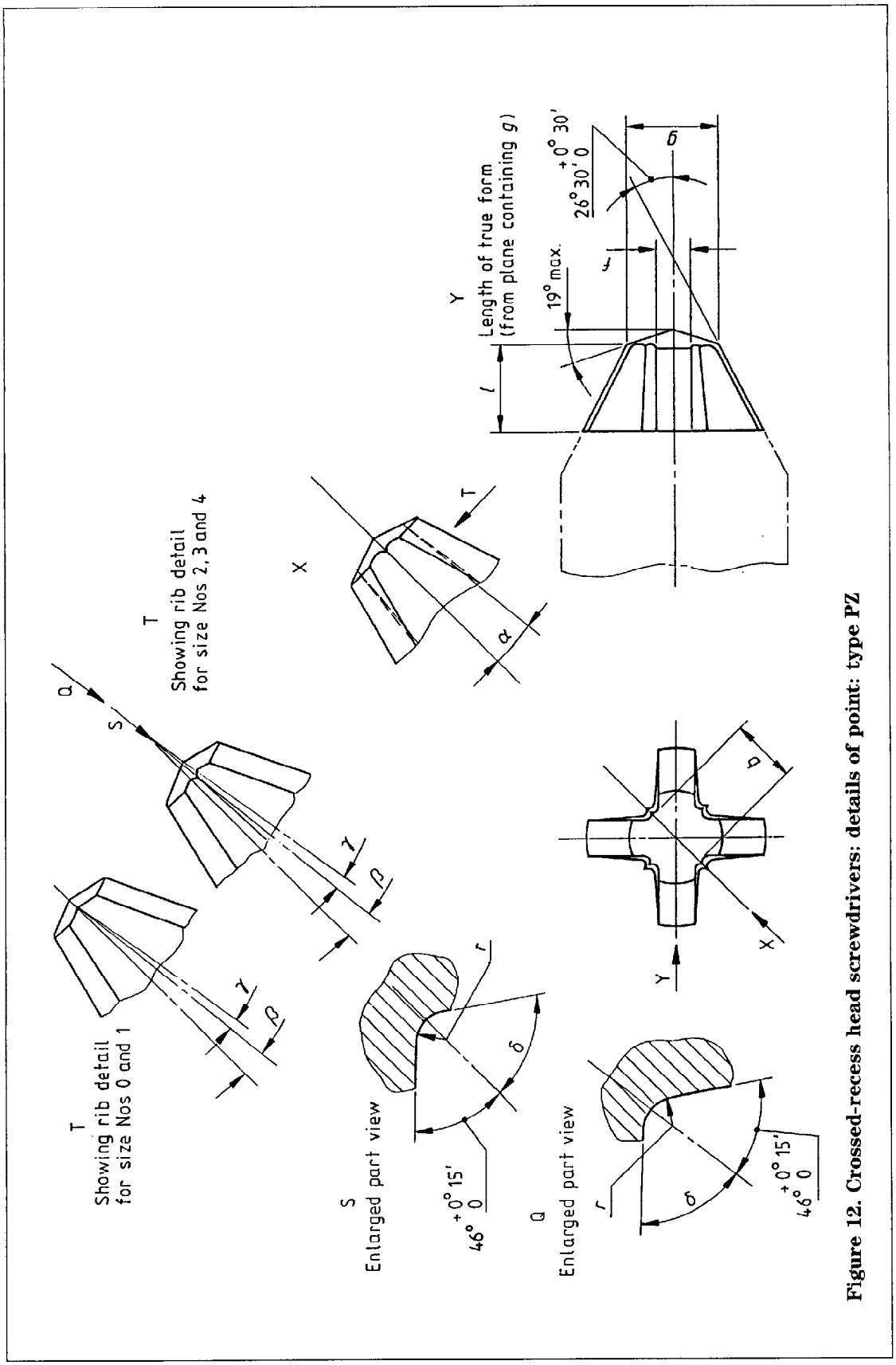


Figure 12. Crossed-recess head screwdrivers: details of point: type PZ

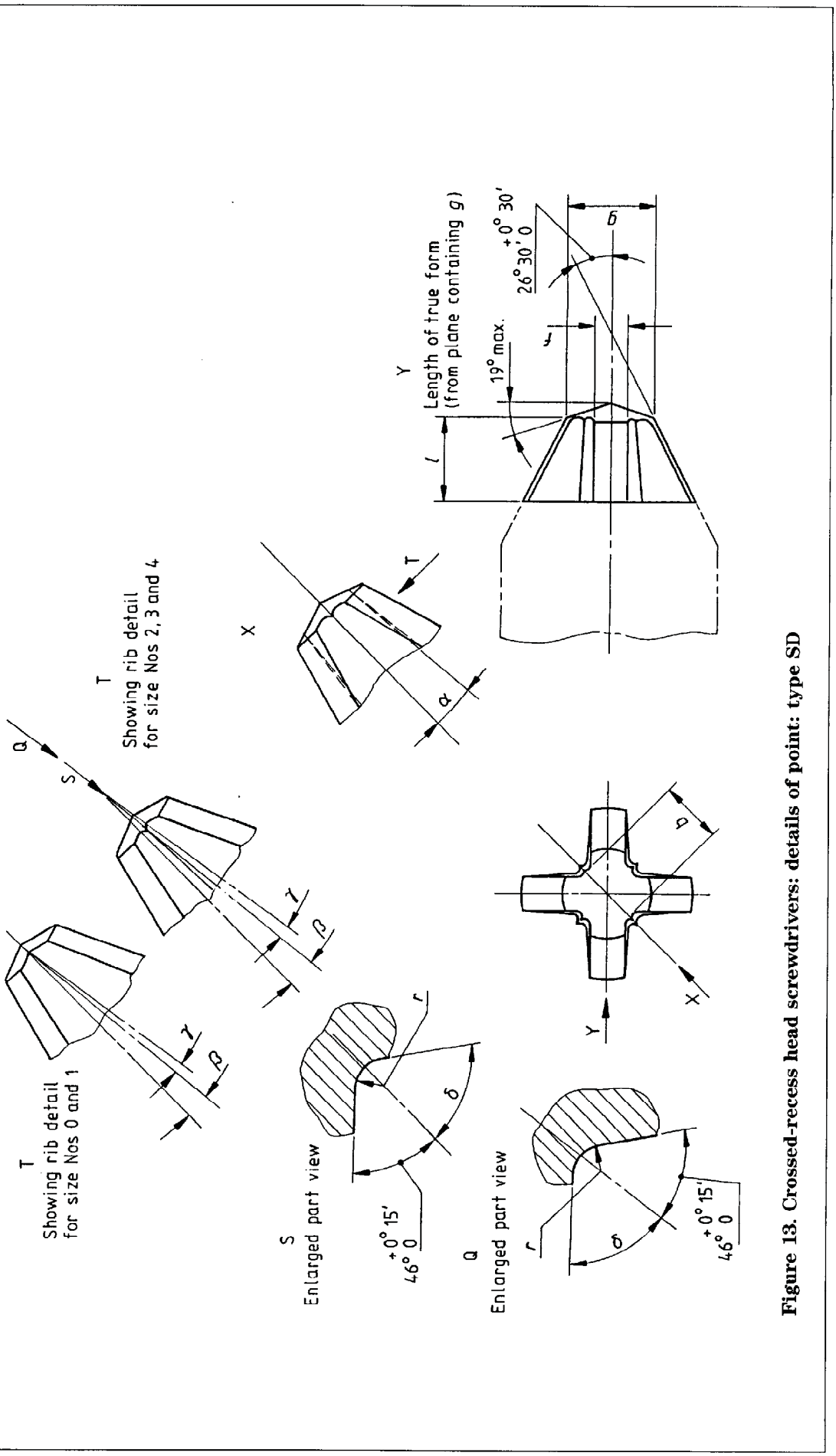


Figure 13. Crossed-recess head screwdrivers: details of point: type SD

Table 8. Crossed-recess head screwdrivers: dimensions of points: type PH

Point size	Blade diameter mm	*b* mm	*e* mm	*f* max. mm	*g* mm	*l* min. mm	α	β	Proof torque N·m
0	3	0.61 0.56	0.38 0.29	0.31	0.84 0.74	2.78	See figure 11	7° 00′ 6° 30′	1.0
1	4.5	1.03 0.98	0.54 0.49	0.53	1.30 1.25	2.78	138° 30′ 138° 00′	7° 00′ 6° 30′	4.0
2	6	1.56 1.51	1.13 1.08	0.64	2.31 2.26	4.37	140° 30′ 140° 00′	5° 45′ 5° 15′	10.0
3	8	2.52 2.47	2.12 2.07	0.81	3.84 3.79	6.74	146° 30′ 146° 00′	5° 45′ 5° 15′	23.0
4	10	3.60 3.55	2.76 2.71	1.12	5.11 5.06	8.34	153° 30′ 153° 00′	7° 00′ 6° 30′	35.0

Table 9. Crossed-recess head screwdrivers: dimensions of points: type PZ

Point size	Blade diameter mm	*b* mm	*f* mm	*g* mm	*l* min. mm	*r* mm	α	β	γ	δ
0	3	0.78 0.70	0.45 0.42	0.92 0.89	1.54	0.10 0.07	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	46° 15′ 46° 00′
1	4.5	1.19 1.11	0.71 0.68	1.40 1.37	2.02	0.13 0.10	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	46° 15′ 46° 00′
2	6	1.78 1.70	1.00 0.95	2.44 2.39	3.17	0.30 0.15	5° 45′ 5° 15′	6° 50′ 6° 20′	3° 30′ 3° 00′	46° 15′ 46° 00′
3	8	2.65 2.55	1.38 1.33	3.96 3.91	4	0.36 0.20	5° 45′ 5° 15′	6° 50′ 6° 20′	3° 30′ 3° 00′	56° 30′ 56° 15′
4	10	4.02 3.92	2.10 2.05	5.18 5.13	5.4	0.51 0.36	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	56° 30′ 56° 15′

Table 10. Crossed-recess head screwdrivers: dimensions of points: type SD

Point size	Blade diameter mm	b mm	f mm	g mm	l min. mm	r mm	α	β	γ	δ
0	3	0.78 0.70	0.45 0.42	1.24 1.19	1.54	0.10 0.07	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	46° 15′ 46° 00′
1	4.5	1.19 1.11	0.71 0.68	1.75 1.70	2.02	0.13 0.10	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	46° 15′ 46° 00′
2	6	1.78 1.70	1.00 0.95	2.84 2.79	3.17	0.30 0.15	5° 45′ 5° 15′	6° 50′ 6° 20′	3° 30′ 3° 00′	46° 15′ 46° 00′
3	8	2.65 2.55	1.38 1.33	4.27 4.22	4	0.36 0.20	5° 45′ 5° 15′	6° 50′ 6° 20′	3° 30′ 3° 00′	56° 30′ 56° 15′
4	10	4.02 3.92	2.10 2.05	5.82 5.77	5.4	0.51 0.36	7° 00′ 6° 30′	8° 15′ 7° 45′	4° 53′ 4° 23′	56° 30′ 56° 15′

Table 11. Crossed-recess head screwdrivers: blade lengths: all types PH, PZ, SD

Point size	Blade lengths: tolerance $^{+5}_{0}$
0	65 75 100
1	25 35 75 250
2	25 35 (45) 100 250
3	150 250
4	200

Table 12. Ratchet screwdrivers for cross-recessed head screws: heavy duty

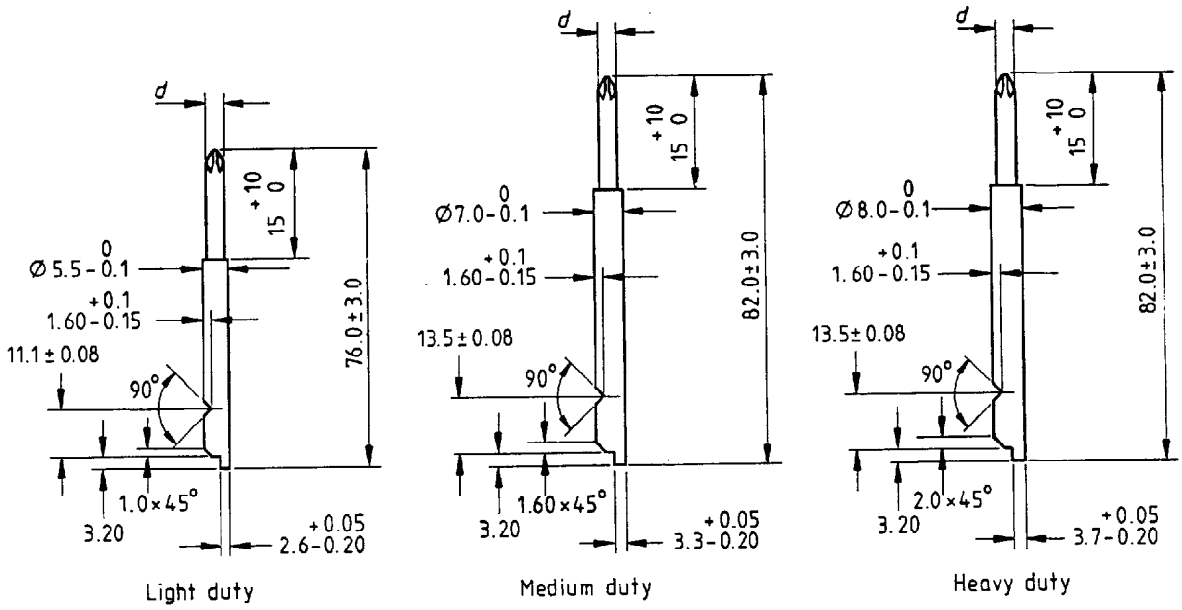
Description of point size	Blade length mm	Nominal point diameter mm	Proof torque point N·m
2 PH 2 PZ	100^{+5}_{0}	6	10.0

Table 13. Spiral ratchet screwdrivers: bits for cross-recessed head screws: tip dimensions

Bit designation		Front end diameter, d mm	Proof torque N·m
Light duty PZ/PH			
Point size	1	—	4.0
	2	—	10.0
Medium duty PZ/PH			
Point size	1	4.5	4.0
	2	—	10.0
	3	—	23.0
Heavy duty PZ/PH			
Point size	2	6.0	10.0
	3	8.0	23.0

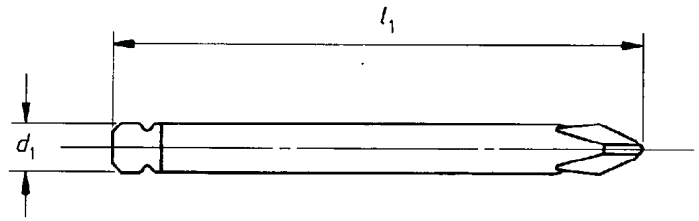
Table 14. Jeweller's screwdrivers for cross-recessed head screws: blade/tip dimensions, proof torque, type PH

Point size	Blade diameter mm		Nominal length, l_1	b	α	f	g	β	Size no. 0	e	l	Proof torque
	d_1	d_2	mm	mm		mm	mm			mm		N-m
0^4	3.17	1.40	40	0.61 0.56	138° 30′ 138° 0′	0.31 0.26	0.84 0.79	7° 00′ 6° 30′	92° 30′ 92° 00′	0.38 0.29	2.78	1.0
0^3	3.17	1.60	40	0.61 0.56	138° 30′ 138° 0′	0.31 0.26	0.84 0.79	7° 00′ 6° 30′	92° 30′ 92° 00′	0.38 0.29	2.78	1.0
0^2	3.17	2.00	40	0.61 0.56	138° 30′ 138° 0′	0.31 0.26	0.84 0.79	7° 00′ 6° 30′	92° 30′ 92° 00′	0.38 0.29	2.78	1.0
0	3.17	2.50	40	0.61 0.56	138° 30′ 138° 0′	0.31 0.26	0.84 0.79	7° 00′ 6° 30′	92° 30′ 92° 00′	0.38 0.29	2.78	1.0
1	3.17	-	40	1.03 0.98	138° 30′ 138° 0′	0.53 0.48	1.30 1.25	7° 00′ 6° 30′	92° 30′ 92° 00′	0.54 0.49	2.78	4.0

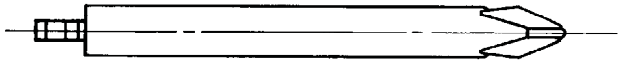


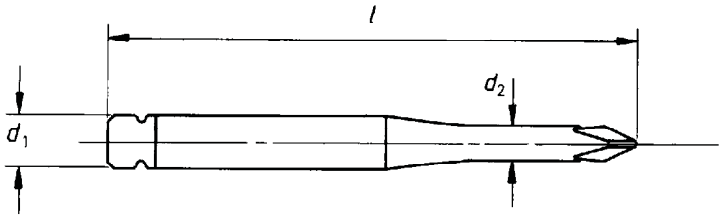
Dimensions are in millimetres

Figure 14. Spiral ratchet screwdrivers: bits for cross-recessed head screws: overall dimensions



a) Point size 1





b) Point size 0

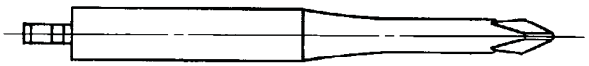
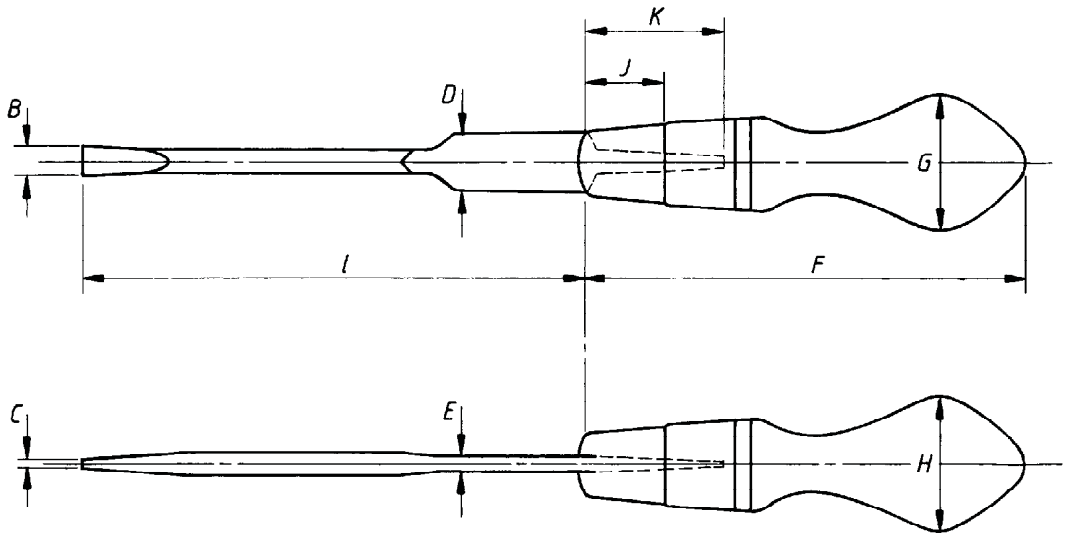


Figure 15. Jeweller's screwdriver: cross-recessed head: design

Annexes

Annex A (informative)
Cabinet screwdrivers

The design and dimensions of cabinet screwdrivers are shown in figure A.1 and table A.1 respectively.



NOTE. Spindle blades may be fitted

Figure A.1 Cabinet screwdriver: design

Table A.1 Cabinet screwdriver: dimensions

Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Length of blade	**Blade width at point**	**Tolerance on blade width**	**Blade thickness at point**	**Width at shoulder**	**Blade thickness at ferrule**	**Length of handle**	**Outside (full) width of handle**	**Outside (full) thickness of handle**	**Length of ferrule**	**Length of tang**	**Proof torque**	**Proof bend test**	**Torque test block slot dimensions**	
													Width	**Depth**
l	*B* nom.	(h12)	*C* max.	*D* min.	*E* min.	*F* min.	*G* min.	*H* min.	*J* min.	*K* min.	N·m	N·m	C11	Js 12
40	5	$^{0}_{-0.12}$	0.9	10	3	70	30	25	12	20	3	3	1.06	0.91
50	5	$^{0}_{-0.12}$	0.9	10	3	70	30	25	12	20	3	4.5	1.06	0.91
75	6.5	$^{0}_{-0.15}$	1.1	11	4	90	32	25	16	25	5.5	8.5	1.29	1.07
100	8	$^{0}_{-0.15}$	1.2	15	4	100	35	30	20	32	9	17	1.41	1.19
125	9	$^{0}_{-0.15}$	1.4	15	5	120	38	35	20	35	14	22.5	1.66	1.47
150	9.5	$^{0}_{-0.15}$	1.6	17	5	135	40	38	25	38	17	25.5	1.91	1.75
200	11	$^{0}_{-0.18}$	1.6	21	6	155	48	40	30	60	22.5	34	1.91	1.75
250	13	$^{0}_{-0.18}$	1.7	24	7	165	50	45	32	70	28	51	2.16	1.88
300	13	$^{0}_{-0.18}$	1.7	24	7	165	50	45	32	70	28	62	2.16	1.88

Annex B (informative)

London pattern screwdrivers

The design and dimensions of London pattern screwdrivers are shown in figure B.1 and table B.1 respectively.

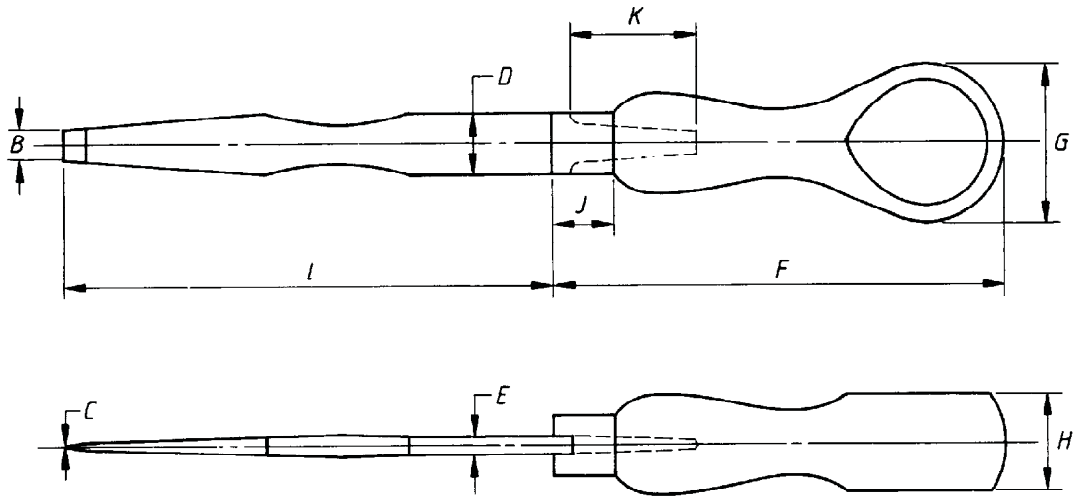


Figure B.1 Flat blade (London pattern) screwdriver: design

Table B.1 Flat blade (London pattern) screwdriver: dimensions

Dimensions in millimetres

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Length of blade	**Blade width at point**	**Tolerance on blade width**	**Blade thickness at point**	**Width at shoulder**	**Blade thickness at ferrule**	**Length of handle**	**Outside (full) width of handle**	**Outside (full) thickness of handle**	**Length of ferrule**	**Length of tang**	**Proof torque**	**Proof bend test**	**Torque test block slot dimensions**	
													Width	**Depth**
l	*B* nom.	(h12)	*C* max.	*D* min.	*E* min.	*F* min.	*G* min.	*H* min.	*J* min.	*K* min.	N·m	N·m	C11	Js 12
75	6.5	$^{0}_{-0.15}$	1.1	16	5	105	35	22	12	25	5.5	8.5	1.29	1.07
100	8	$^{0}_{-0.15}$	1.2	18	5	115	40	25	15	32	9	17	1.41	1.19
125	9.5	$^{0}_{-0.15}$	1.6	20	5	135	45	30	18	35	14	22.5	1.91	1.75
150	11	$^{0}_{-0.18}$	1.6	20	5	150	50	30	20	38	17	25.5	1.91	1.75
200	13	$^{0}_{-0.18}$	1.7	22	6	170	50	32	20	55	22.5	34	2.16	1.88
250	14.5	$^{0}_{-0.18}$	1.7	25	6	185	55	35	22	65	28	51	2.16	2.01
300	16	$^{0}_{-0.18}$	2.0	25	7	205	55	35	25	65	28	62	2.41	2.29
450	21	$^{0}_{-0.21}$	2.2	30	7	250	65	38	25	70	45	73.5	2.67	2.84

Annex C (normative)

Torque test

C.1 Apparatus

NOTE. Figure C.1 gives an example of a typical test rig.

C.1.1 *Test block for screwdriver blades and bits for slotted head screws*, with dimensions and tolerances as specified in table C.1. The length of the test slot shall be sufficient to accommodate fully the widest blade of the given thickness. The test block shall have sufficient strength not to deform and shall have a hardness of at least 62 HRC.

C.1.2 *Test block for screwdriver blades and bits for cross-recessed head screws*, which shall conform dimensionally to figure C.2 and table C.2, the appropriate size being selected for the test being carried out.

C.2 Procedure

Ensure that the screwdriver point to be tested is seated in the appropriate test block (see **C.1**) throughout the test.

NOTE. It is the intention of this test to apply a known torsional load through the handle of the screwdriver while the blade is positively located in the test block and therefore any apparatus which will enable this to be done can be employed.

Apply the load at right angles to the axis of the screwdriver blade. Increase the load on the blade to the value of the stated proof torque.

Ensure that the torque acts normally about the axis of the screwdriver and apply it to each screwdriver as follows:

a) with the switch in the central (locked) position;

b) with the switch in the forward position;

c) with the switch in the rear position.

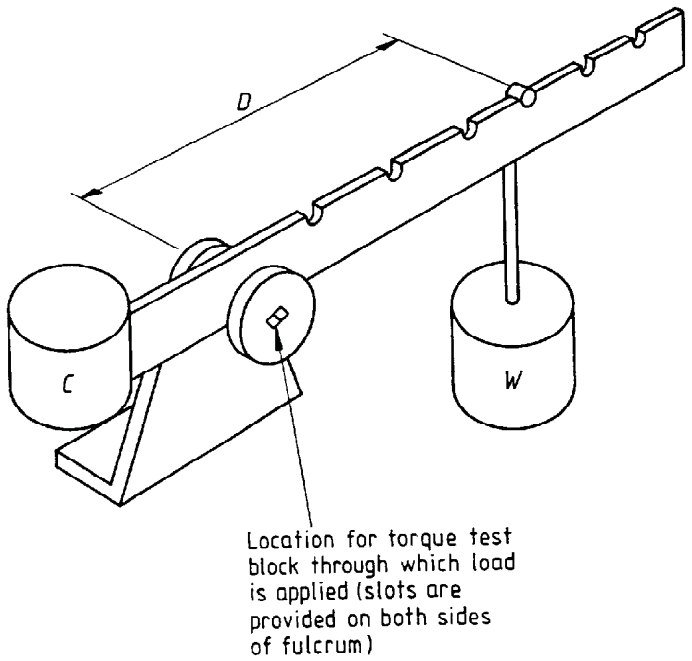
Calculate the applied torque by the following formula:

$9.807\ DW$ newton metres

where

D is the distance in metres;

W is the mass in kilograms.



Key

W = appropriate mass

C = counterbalance to mass of beam

D = distance from fulcrum to centre of W

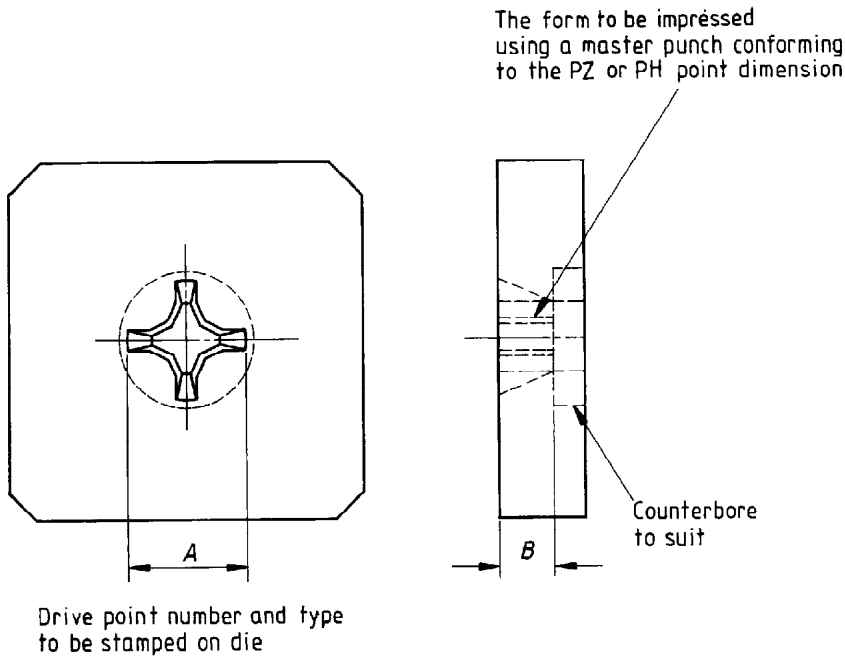
Figure C.1 Diagrammatic representation of the principle of a torque testing device

Table C.1 Torque testing die for screwdriver blades and bits: slotted head screws: dimensions

Dimensions in millimetres

Tip size		Slot	
Thickness *a*	**Width** *b*	**Width** Tolerance[1] C9	**Depth** Tolerances[1] H10, H13 (milled form only)
0.4	2.0	0.4	0.2
0.4	2.5	0.4	0.2
0.5	3.0	0.5	0.3
0.6	3.5	0.6	0.4
0.8	4.0	0.8	0.5
0.8	5.0	0.8	0.5
1.0	5.5	1.0	0.6
1.2	6.5	1.2	0.7
1.2	7.0	1.2	0.7
1.2	8.0	1.2	0.7
1.6	8.0	1.6	1.0
1.6	10.0	1.6	1.0
2.0	12.0	2.0	1.2
2.5	14.0	2.5	1.5
Jeweller's screwdrivers			
0.15	0.64	0.15	0.10
0.15	1.02	0.15	0.10
0.20	1.40	0.20	0.10
0.20	1.78	0.20	0.10
0.25	2.16	0.25	0.15
0.25	2.49	0.25	0.15

[1] See BS EN 20286-2 : 1993.



NOTE. Shape and outside dimensions of testing die to suit torque device being used.

Figure C.2 Torque testing die

Table C.2 Torque testing die for screwdriver blades and bits: cross-recessed head screws: dimensions

Dimensions in millimetres

Point size	PH type		PZ Type	
	A	*B*	*A*	*B*
0	2.34	1.52	2.20	1.20
	2.24	1.42	2.05	1.10
1	3.66	2.39	3.70	2.20
	3.56	2.29	3.55	2.10
2	3.97	3.68	3.30	2.95
	5.87	3.58	3.35	2.85
3	9.85	6.04	7.70	3.65
	9.75	5.94	7.55	3.55
4	12.39	7.31	9.85	4.60
	12.29	7.21	9.70	4.50

Annex D (informative)

Safe usage

The following notes are a guide to safe usage.

1) Never hold the screw whilst it is being driven. If necessary drill a pilot hole.

2) Screwdrivers with worn tips or damaged handles should not be used.

3) Use a correct screwdriver whose tip is a firm wedge fit in the screw concerned.

4) Never use a screwdriver near live wires or live electrical apparatus.

5) Never use a screwdriver for prising, levering, or as a punch, chisel, scraper or for scoring, and never strike it.

List of references (see clause 2)

Normative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 427 : 1990	*Method for Vickers hardness test and for verification of Vickers hardness testing machines*
BS 891 : 1989	*Method for hardness test (Rockwell method) and for verification of hardness testing machines (Rockwell method)*
BS 970 :	*Specification for wrought steels for mechanical and allied engineering purposes*
BS 970 : Part 1 : 1991	*General inspection and testing procedures and specific requirements for carbon, carbon manganese, alloy and stainless steels*
BS 1004 : 1972	*Specification for zinc alloys for die castings and zinc alloy die castings*
BS 1449 :	*Steel plate, sheet and strip*
BS 1449 : Part 1 :	*Carbon and carbon manganese plate, sheet and strip*
BS 1449 : Section 1.1 : 1991	*General specification*
BS 2870 : 1980	*Specification for rolled copper and copper alloys, sheet, strip and foil*
BS 2871 :	*Specification for copper and copper alloys. Tubes*
BS 2871 : Part 2 : 1972	*Tubes for general purposes*
BS 2874 : 1986	*Specification for copper and copper alloy rods and sections (other than forging stock)*
BS 5216 : 1991	*Specification for patented cold drawn steel wire for mechanical springs*
BS 6323 :	*Specification for seamless and welded steel tubes for automobile, mechanical and general engineering purposes*
BS 6323 : Part 2 : 1982	*Specific requirements for hot finished welded steel tubes*
BS EN 20286 :	*ISO system of limits and fits*
BS EN 20286 : Part 2 : 1993	*Tables of standard tolerance grades and limit deviations for holes and shafts*

Informative references

BSI publications

BRITISH STANDARDS INSTITUTION, London

BS 860 : 1967	*Tables for comparison of hardness scales*

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