

Specification for

Square-drive sockets, driving squares and accessories for power-driven socket wrenches

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Committees responsible for this British Standard

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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
Coopted members

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Foreword

This British Standard has been prepared by Technical Committee MTE/15.

In this standard, six sizes of male and female square drives are given, for use with power-driven socket wrenches of the following series:

- metric
- Unified (inch)
- BSF and BSW
- Whitworth large

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

Specification

1 Scope

This British Standard specifies design and dimensional requirements for the following components of power-driven socket wrenches:

- a) square-drive sockets for metric bolts, nuts and machine screws specified in:
BS 3692 : 1967, BS 4183 : 1967, BS 4190 : 1967,
BS 4395 : Parts 1 and 2 : 1969, BS 4929 : 1973;
- b) driving squares;
- c) accessories: square-drive converters, extensions and universal joints.

The dimensional requirements for comparable sockets for the inch series of bolts, nuts and machine screws are specified in annexes A and B. Annex C gives notes on the safe usage of power-driven sockets and accessories, and annex D describes two types of retaining device.

2 References

2.1 Normative references

This British Standard incorporates, by dated or undated reference, provisions from other publications. These normative references are made at the appropriate places in the text and the cited publications are listed on the inside back cover. For dated references, only the edition cited applies; any subsequent amendments to or revisions of the cited publication apply to this British Standard only when incorporated in the reference by amendment or revision. For undated references, the latest edition of the cited publication applies, together with any amendments.

2.2 Informative references

This British Standard refers to other publications that provide information or guidance. Editions of these publications current at the time of issue of this standard are listed on the inside back cover, but reference should be made to the latest editions.

3 Definitions

For the purposes of this British Standard, the following definitions apply.

3.1 socket wrench

A wrench consisting of the assembly of a socket with its driving components, designed solely for the purpose of applying a torque to screwed fasteners with hexagonal, bi-hexagonal or square heads.

3.2 socket

A steel component of cylindrical form having at one end a female form to suit the head of a screwed fastener and at the other end a female driven square for receipt of the male square on a driving component.

3.3 drive

An arrangement whereby a male driving square fits into a female driven square in such a manner that abutment between the surfaces on the male square and corresponding surfaces in the female square prevents either member from rotating separately and enables torque applied to one member to be transmitted to the other member.

3.4 bi-hexagon

Two internal hexagons formed coaxially at 30° radial displacement to each other.

3.5 bi-square

Two internal squares formed coaxially at 45° radial displacement to each other.

4 Materials

Sockets, driving squares and accessories shall be manufactured from chrome alloy steel.

5 Hardness

Sockets not exceeding 65 mm nominal size, and accessories, shall have hardness values within the range 39 HRC to 46 HRC inclusive. See BS 891 : 1989.

Sockets larger than 65 mm nominal size shall have hardness values within the range 35 HRC to 42 HRC inclusive. See BS 891 : 1989.

6 Design and manufacture

6.1 The sockets and all accessories shall be free from cracks, burrs, flashes, scale and other deleterious defects.

6.2 The outer end of the hexagon, bi-hexagon or bi-square opening shall be slightly chamfered at a 120° inclusive angle from the across-corners dimension to facilitate engagement onto the fastener.

7 Finish

Any protective finish shall, where applicable, conform to the appropriate British Standard. Chrome plating or nickel plating shall not be used.

8 Dimensions and tolerances

The dimensions and tolerances of sockets, driving squares and accessories shall be as specified in tables 1 to 11. (See guide table overleaf.)

9 Designation and marking

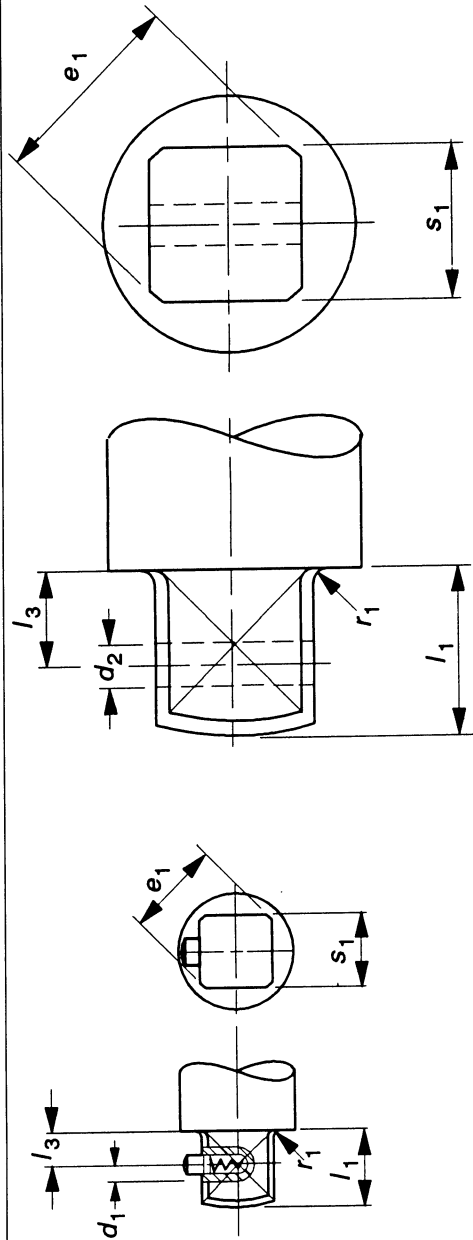
Each socket and driving component shall be plainly and indelibly marked with the manufacturer's name or trademark.

Sockets shall also be marked with the designating size, which shall be the nominal size across flats of the hexagon in millimetres. e.g. Documents



Guide to tables for dimensions

Item	Nominal size range mm	See table	See figure
Male driving squares	6.3 to 63	1	1
Female driving squares	6.3 to 63	2	2
Sockets with 6.3 mm square drives	3.2 to 13.0	3	3
Sockets with 10 mm square drives	7 to 19	4	4
Sockets with 12.5 mm square drives	10 to 27	5	5
Sockets with 20 mm square drives	19 to 46	6	6
Sockets with 25 mm square drives	24 to 80	7	7
Sockets with 40 mm square drives	36 to 100	8	8
Power square drive converters	10 to 90	9	9
Power square drive extensions	10 to 63 drive size	10	10
Power square drive universal joints	10 to 63 drive size	11	11



a) Form A

b) Form B

Figure 1. Male driving squares

Table 1. Male driving squares

Form	Nominal dimensions	Across flats s_1		Across corners e_1		Length l_1		Centre line of hole or plunger to shoulder l_3		Radius r_1	Plunger diameter d_1	Hole diameter d_2
		min.	max.	min.	max.	min.	max.	min.	max.	max.	max.	
A and B	6.3	6.29	6.35	8	8.4	7.1	7.5	3.82	4.18	0.5	1.5	2
A and B	10	9.46	9.52	12.2	12.7	10.0	10.7	5.32	5.68	0.6	2.5	3
A and B	12.5	12.63	12.70	16.3	16.9	14.2	15.4	7.68	8.12	0.8	3	4
B	20	18.96	19.05	24.4	25.4	20.9	22.9	9.93	10.47	1.2	—	6
B	25	25.31	25.40	32.4	34	25.5	27.6	14.73	15.27	1.6	—	6.5
B	40	38.00	38.10	48	50	26.3	29.3	15.83	16.37	2.5	—	8
B	63	63.38	63.50	82	84	51.0	55.6	37.71	38.49	4	—	10

All dimensions in millimetres

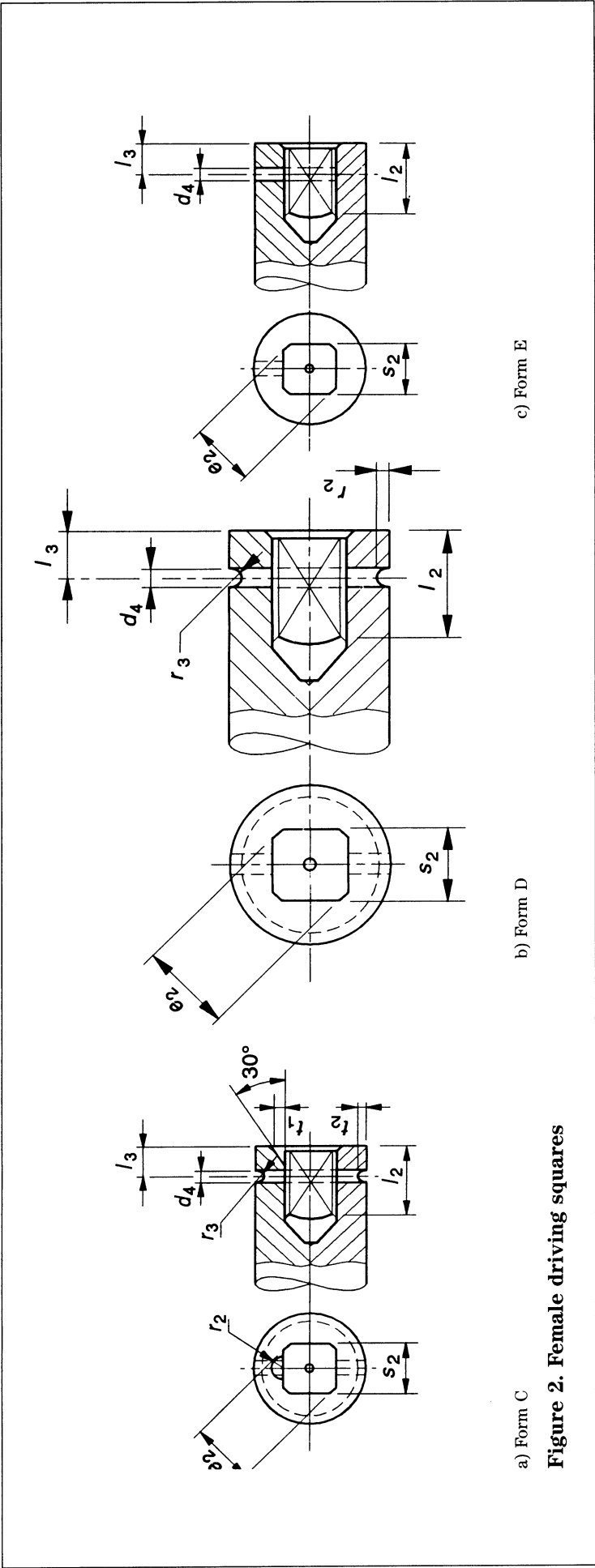
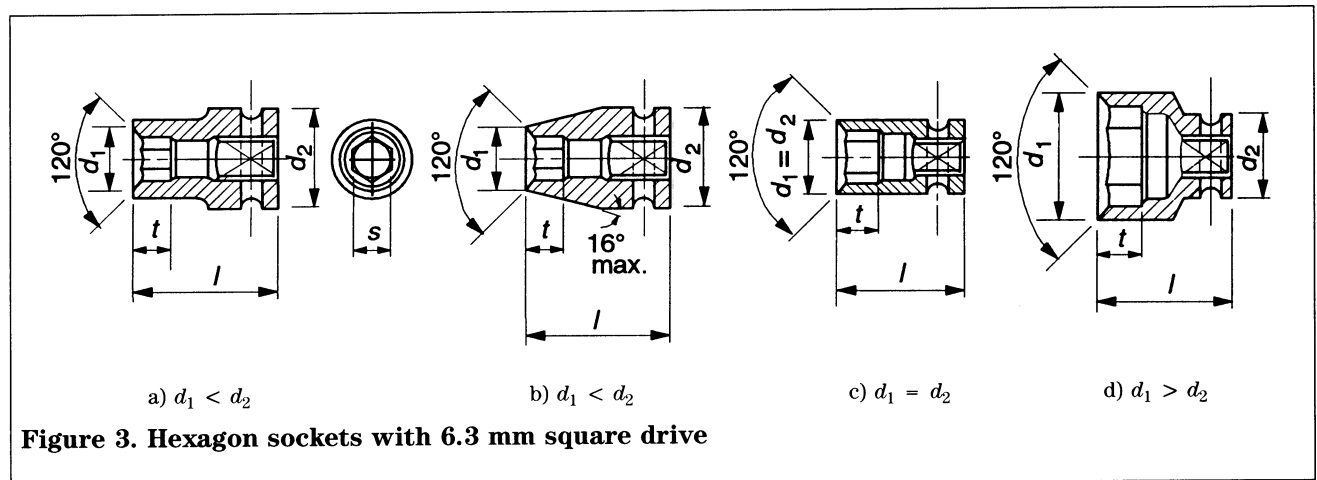


Table 2. Female driving squares													All dimensions in millimetres			
Form	Nominal dimensions	s ₂		d ₄	e ₂	l ₂	l ₃		r ₂	r ₃	t ₁	t ₂				
		min.	max.				min.	max.								
C and E	6.3	6.41	6.49	3.0	8.5	8.0	3.82	4.18	2	1.2	1.5	1				
C and E	10	9.58	9.67	5.0	12.9	11.2	5.32	5.68	3	2	2.5	1.6				
C and E	12.5	12.76	12.86	5.6	17.1	15.9	7.68	8.12	4	2.5	3	2				
D	20	19.11	19.23	6.0	25.6	23.9	9.93	10.47	—	3	—	3				
D	25	25.46	25.58	6.5	34.3	28.6	14.73	15.27	—	4	—	4				
D	40	38.19	38.35	8.0	50.4	41.3	15.83	16.37	—	5	—	5				
D	63	63.60	63.79	10.0	85.0	57.6	37.71	38.49	—	6	—	6				

**Table 3. Hexagon sockets with 6.3 mm square drive**

All dimensions in millimetres

Across-flats s			t	d_1	d_2	l
Nominal	min.	max.	min.	max.	max.	max.
3.2	3.22	3.33	1.3	6.8	14	25
4.0	4.02	4.15	1.7	7.8	14	25
4.5	4.52	4.65	1.9	8.5	14	25
5.0	5.02	5.15	2.1	9.1	14	25
5.5	5.52	5.65	2.3	9.7	14	25
6.0	6.03	6.18	2.6	10.3	14	25
7.0	7.03	7.18	3.0	11.6	14	25
8.0	8.03	8.18	3.5	12.8	14	25
9.0	9.03	9.18	4.0	14.1	16	25
10.0	10.04	10.24	4.4	15.3	16	25
11.0	11.04	11.24	4.9	16.6	16	25
12.0	12.04	12.30	5.3	17.8	16	25
13.0	13.04	13.30	5.8	19.1	16	25

NOTE. A hole for the retaining device through one face only is optional.