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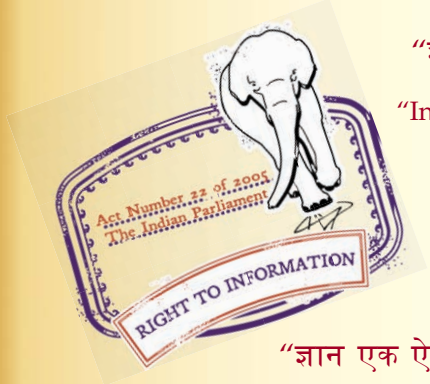
IS 6131 (1980): Technical requirements for hand operated wrenches (spanners) and sockets [PGD 5: Assembly Hand Tools]



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Bhartṛhari—Nītiśatakam
"Knowledge is such a treasure which cannot be stolen"

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UDC 621·883-871

(Reaffirmed 2003)

Indian Standard

TECHNICAL REQUIREMENTS FOR HAND OPERATED WRENCHES (SPANNERS) AND SOCKETS

(First Revision)

Hand Tools Sectional Committee, EDC 12; Spanners and Pliers Subcommittee, EDC 12:7 [Ref: Doc: EDC 12(3045)]

1. Scope — Specifies technical requirements, such as minimum values for hardness and test torque for hand-operated wrenches (spanners) and sockets of the following series:

Series A — Alloy steel ring wrenches (spanners), box wrenches (spanners) and tee wrenches (spanners)

Series B — Carbon steel ring wrenches (spanners) and box wrenches (spanners)

Series C — Alloy steel open jaw wrenches (spanners)

Series D — Carbon steel open jaw wrenches (spanners)

Series E — Hand-operated square-drive sockets.

2. Hardness

Width Across Flats	Minimum Hardness		
	For Open Jaw Wrenches (Spanners)		For All Other Wrenches (Spanners) and Sockets
s	Alloy Steel	Carbon Steel	
Up to and including 32 mm	382 *HV* or 39 *HRC*	355 *HV* or 36 *HRC*	382 *HV* or 39 *HRC*
Over 32 mm	382 *HV* or 39 *HRC*	355 *HV* or 36 *HRC*	345 *HV* or 35 *HRC*

3. Workmanship and Finish

3.1 Wrenches (spanners) and sockets shall be finished smooth all over. All sharp corners shall be removed. Wrenches (spanners) and sockets shall be free from burrs, cracks, seams or other manufacturing defects.

3.2 The wrenches (spanners) and sockets shall be greased or given any suitable anti-corrosive coating. The type of anti-corrosive coating depends upon the manufacturer unless specifically indicated by the user.

Following are given the suitable plating thicknesses in case of nickel-chromium and cadmium plating:

Nickel-chromium plating 5 μm *Min,* thickness of nickel coating

Cadmium plating 8 μm *Min,* thickness of cadmium coating [*see* IS : 1572-1968 Specification for electroplated coatings of cadmium on iron and steel (*first revision*)]

4. Marking — The wrenches (spanners) and sockets shall be clearly and legibly marked with the nominal width across flats and the manufacturer's initials or recognized trade-mark or both. The year of manufacture may also be marked if required by the purchaser.

4.1 *Certification Marking* — Details available with the Bureau of Indian Standards.

Adopted 15 May 1980 Gr 2

BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

5. Preservation and Packing — Wrenches (spanners) and sockets which are not given any protective treatment against rust, such as plating, shall be covered with grease or mineral jelly for rust-proofing.

5.1 Each wrench (spanner) or socket or a number of wrenches (spanners) or sockets may be wrapped in non-absorbent paper and packed in a carton.

5.2 Several wrenches (spanners) or sockets of different sizes may be packed to form a set. The sizes and number of wrenches (spanners) or sockets to comprise such a set shall depend on the job for which it is required, and shall be subject to agreement between the manufacturer and the purchaser.

6. Torque Testing

6.1 *Testing Method* — Take a hexagonal test mandrel having a nominal width across flats equal to the dimension *s* with a tolerance of h8 and a minimum hardness of 596 *HV* or 55 *HRC* (any device in which the mandrel can be rotated at a certain torque determined with an accuracy of $\pm 2{\cdot}5$ percent can also be used for this test). Place the wrench (spanner) or socket over the test mandrel and apply the corresponding torque *M* (*see* Table 1). Do not jerk or strike the tool while testing and apply the load gradually until the minimum testing torque is reached. (The load to be applied may be calculated by dividing the torque value *M* with the distance measured between the point of application of the load and the centre of the test mandrel.)

Following the application of the test torque, the wrench (spanner) or socket shall not show permanent deformation or other damage which may influence its usability.

6.1.1 *Testing of Ring Wrenches (Spanners) and Open-Jaw Wrenches (Spanners)* — The test mandrel shall touch the bottom of the jaw opening.

Apply the load along the handle of the wrench (spanner) as far as possible, perpendicular to its longitudinal axis. Use an extension tube when testing large wrenches (spanners).

Load the wrench once in each direction during the test.

6.1.2 *Testing of Box Wrenches (Spanners)* — The test mandrel shall be inserted in the wrench (spanner) up to a depth of $0{\cdot}8d$ with a tolerance of h13 where *d* is the thread diameter of the bolt according to the relevant Indian Standard.

Apply the load along the handle of the wrench (spanner) as far as possible, perpendicular to its longitudinal axis. Use an extension tube when testing large wrenches (spanners).

6.1.3 *Testing of Hand-Operated Square Drive Sockets* — The test mandrel shall be inserted in the socket up to a depth of $0{\cdot}8d$ where *d* is the thread diameter of the bolt according to the relevant Indian Standard.

A square mandrel having a minimum hardness value of 596 *HV* or 55 *HRC* shall be used for the driving socket. The nominal width across flats of this mandrel shall be equal to the maximum dimension, with a tolerance of h8, of the corresponding driving square.

6.2 *Minimum Test Torque Values* — The minimum test torque values *M* for different sizes of wrenches (spanners) and sockets shall be as given in Table 1 (*see* Explanatory Note).

7. Sampling

7.1 Unless otherwise agreed to between the supplier and the purchaser, the procedure given in IS : 2500 (Part I)-1973 'Sampling inspection table: Part I Inspection by attributes and by count of defects (*first revision*)', shall be followed for sampling inspection. For various characteristics, the sampling plan as given in **7.1.1** and **7.1.2** shall be followed.

7.1.1 For dimensions, workmanship and finish, the sampling plan with inspection level III and acceptable quality level (AQL) 4 percent given in Tables 1 and 2 of IS : 2500 (Part I)-1973 shall be followed.

7.1.2 For hardness and torque test, the sampling plan with inspection level II and acceptable quality level (AQL) 4 percent given in Tables 1 and 2 of IS : 2500 (Part I)-1973 shall be followed.

TABLE 1 MINIMUM TEST TORQUE VALUES

(*Clauses* 6.1 and 6.2)

Nominal Width Across Flats, *s*	Torque *M* for								
	Series *A*	Series *B*	Series *C*	Series *D*	Series *E*				
					Nominal Dimensions of the Driving Square				
					6·3 mm	10 mm	12·5 mm	20 mm	25 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
mm	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
3·0	—	—	—	0·50	—	—	—	—	—
3·2	4·04	1·27	1·02	0·51	7·08	—	—	—	—
3·5	4·98	1·64	1·31	0·65	8·26	—	—	—	—
4·0	6·81	2·37	1·90	0·95	10·40	—	—	—	—
4·5	8·97	3·30	2·64	1·32	12·60	—	—	—	—
5·0	11·50	4·44	3·55	1·77	15·10	—	—	—	—
5·5	14·4	5·80	4·64	2·32	17·80	—	—	—	—
6·0	17·6	7·40	5·92	2·96	20·60	—	—	—	—
7·0	25·2	11·40	9·12	4·56	26·80	33·2	—	—	—
8·0	34·5	16·6	13·3	6·65	33·60	45·5	—	—	—
9·0	45·4	23·0	18·4	9·20	41·10	59·9	—	—	—
10·0	58·1	31·0	24·8	12·40	49·10	76·7	147	—	—
11·0	72·7	40·4	32·3	16·10	57·80	96·0	178	—	—
12·0	89·1	51·5	41·2	20·60	67·00	118·0	212	—	—
13·0	107·0	64·5	51·6	25·00	68·6*	141·0	249	—	—
14·0	128	79·4	63·5	31·70	68·6*	169·0	288	—	—
15·0	150	96·2	77·0	38·50	—	198·0	331	—	—
16·0	175	115·0	92·3	46·10	—	225*	377	—	—
17·0	201	134·0	107	53·50	—	225*	425	—	—
18·0	230	160·0	128	64·00	—	225*	477	—	—
19·0	261	186·0	149	74·50	—	225*	531	—	—
20·0	294	215·0	172	86·0	—	225*	569*	—	—
21·0	330	247·0	198	99·0	—	225*	569*	—	—
22·0	368	281·0	225	112·0	—	225*	569*	569†	—
23	408	319	255	127	—	—	569*	569†	—
24	451	359	287	143	—	—	569*	569†	—
25	496	402	322	161	—	—	569*	583	—
26	544	449	359	179	—	—	569*	624	—
27	594	499	399	199	—	—	569*	665	—
28	647	552	442	221	—	—	569*	707	—
30	760	670	536	268	—	—	569*	795	—
32	884	804	643	321	—	—	569*	888	—
36	1 165	1 117	894	447	—	—	—	1 084	—
41	1 579	1 442	1 154	577	—	—	—	1 353	—
46	2 067	1 816	1 453	726	—	—	—	1 569*	2 143
50	2 512	2 145	1 716	858	—	—	—	1 569*	2 329
55	3 140	2 596	2 077	1 038	—	—	—	—	2 562
60	3 849	3 089	2 471	1 235	—	—	—	—	2 795*
65	4 021	—	2 844	1 422	—	—	—	—	2 795*
70	4 658	—	—	1 618	—	—	—	—	2 795*
75	5 394	—	—	1 765	—	—	—	—	2 795*
80	6 178	—	—	1 912	—	—	—	—	2 795*
85	6 963	—	—	2 059	—	—	—	—	—
90	7 845	—	—	—	—	—	—	—	—
95	8 336	—	—	—	—	—	—	—	—

*The value of the test torque has been voluntarily limited. Driving squares have lower strengths than sockets for the same steel grade.

†These values are greater than those which might have been obtained by computation. They were nevertheless adopted as it would be abnormal for the strength of sockets with driving squares of 20 mm to be lower than the strength of sockets with driving squares of 12·5 mm.

EXPLANATORY NOTE

This standard was first published in 1971. At that time the test torque values of the hand-operated wrenches (spanners) and sockets were classified into three series A, C and E, which covered only alloy steel wrenches (spanners) and sockets whereas the torque values for ring wrenches (spanners) and open jaw wrenches (spanners) made from carbon steel were not specified.

In this revision, the minimum test torque values have been distinctly laid down for carbon steel wrenches (spanners) and alloy steel wrenches (spanners) which have been covered under separate series, namely, A, B, C, and D. Series E continues to cover hand-operated square drive sockets as specified earlier.

This standard is based on ISO 1711-1975 'Hand operated wrenches and sockets — Technical specification' issued by the International Organization for Standardization (ISO). Assistance has also been derived from DIN 899-1976 'Schraubenschlussel Technische Lieferbedingungen fur Handbetatigte Schraubenschlussel', issued by Deutsches Institut für Normung (DIN).

Torque values specified in **6.2** for the various sizes of width across flats have been determined by the following imperical formulae.

Series			Test Torque M (s=width across flats in mm)
A			$0{\cdot}2657s^{2{\cdot}34}$
B			$1{\cdot}25 \times C^*$
C		$s \leqslant 36$ mm	$0{\cdot}0392s^{2{\cdot}8}$
		$s > 36$ mm	$0{\cdot}6865s^2$
D			$0{\cdot}5 \times C\dagger$
E	Dimensions for driving square mm	6·3	$0{\cdot}9807s^{1{\cdot}7}$
		10·0	$0{\cdot}3507s^{2{\cdot}34}$
		12·5	$1{\cdot}4710s^2$
		20·0	$2{\cdot}4517s^{1{\cdot}7}$
		25·0	$46{\cdot}5816s$

*Torque M applicable to series 'C' multiplied by the coefficient 1·25.
†Torque M applicable to series 'C' multiplied by the coefficient 0·5.

AMENDMENT NO. 1 JANUARY 1987

TO

IS : 6131 - 1980 TECHNICAL REQUIREMENTS FOR HAND OPERATED WRENCHES (SPANNERS) AND SOCKETS

(First Revision)

(*Page* 3, *Table* 1) — Add the following entry at the appropriate place under the respective columns:

Nominal Width Across Flats, s	Torque M for								
	Series A	Series B	Series C	Series D	Series E				
					Nominal Dimensions of the Driving Square				
					6·3 mm	10 mm	12·5 mm	20 mm	25 mm
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
mm	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m	N.m
34	1 019	951	761	381	—	—	569*	984	—

(EDC 12)

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