INTERNATIONAL STANDARD

ISO 2936

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Assembly tools for screws and nuts — Hexagon socket screw keys

Outils de manœuvre pour vis et écrous — Clés mâles coudées pour vis à six pans creux

Reference number
ISO 2936:1995(E)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75 % of the member bodies casting a vote.

International Standard ISO 2936 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 10, *Spanners and wrenches*.

This fourth edition cancels and replaces the third edition (ISO 2936:1983), which has been technically revised (clauses 4, 5 and 6).

Annex A of this International Standard is for information only.

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Assembly tools for screws and nuts — Hexagon socket screw keys

1 Scope

This International Standard specifies the dimensions, method of test, designation and marking of hexagon socket screw keys. It also specifies the minimum values of Rockwell hardness that shall be met.

The specifications of this International Standard apply for tightening of screws for property class less than or equal to 12.9 as defined in ISO 898-1 and for tightening of socket set screws as defined in ISO 898-5.

NOTE 1 Hexagon socket screw keys are designated as number 112 in ISO 1703.

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO 898-1:1988, *Mechanical properties of fasteners — Part 1: Bolts, screws and studs.*

ISO 898-5:1980, *Mechanical properties of fasteners — Part 5: Set screws and similar threaded fasteners not under tensile stresses.*

3 Dimensions

See figure 1 and table 1.

4 Method of test

Insert the short arm of the key into a female hexagon socket adapter having a Rockwell hardness of not less than 60 HRC. Smoothly apply an increasing load as near as possible to the end of the long arm until the proof torque is reached. The load shall be applied perpendicular to the axis of the key and the torque is calculated as the product of the applied load and the distance between the point of application of the load and the axis of the adapter. Test values are given in table 2.

Following the application of the minimum test torque, any possible damage or deformation shall not affect the usability of the key.

For a key with a width across the flats of up to and including 14 mm, to torsion fracture, the hexagon socket screw key should show a deformation of at least 60° before failure.

5 Designation

A socket screw key conforming to this International Standard shall be designated by:

a) "Socket screw key";

b) reference to this International Standard;

c) its width across the flats, s, in millimetres.

EXAMPLE

A hexagon socket screw key with a width across the flats $s = 10$ mm is designated as follows:

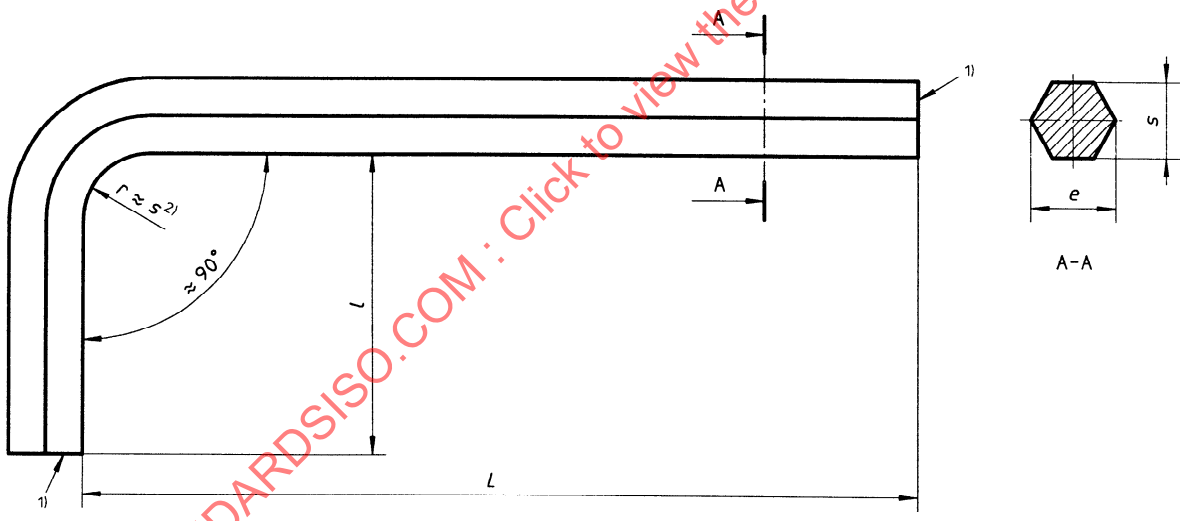
Socket screw key ISO 2936-10

6 Marking

Hexagon socket screw keys of 3 mm size and above shall be marked, legibly and permanently with at least:

— the name or trademark of the manufacturer (or responsible supplier);

— the width across flats size.



1) The corners may be sharp, rounded or chamfered and the radius of curvature or the chamfer respectively shall not be greater than half the difference between width across corners e and width across flats s.
Each end shall be square with the axis of each arm within ±4°.

2) r shall not be smaller than 1,5 mm.

Figure 1 — Hexagon socket screw key

Table 1 — Dimensions

Dimensions in millimetres

Width across flats s				Width across corners e [1]		L	l
nom.	tol.	max.	min.	max.	min.		
0,7	$^{+0,011}_{-0,002}$	0,711	0,698	0,79	0,76	32	6
0,9	$^{-0,011}_{-0,024}$	0,889	0,876	0,99	0,96	32	10
1,3	$^{-0,030}_{-0,056}$	1,270	1,244	1,42	1,37	40	12
1,5	h9	1,500	1,475	1,68	1,63 [2]	45	14
2	h10	2,00	1,96	2,25	2,18 [3]	50	16
2,5		2,50	2,46	2,82	2,75 [3]	56	18
3		3,00	2,96	3,39	3,31 [3]	63	20
4		4,000	3,952	4,53	4,44 [3]	70	25
5		5,000	4,952	5,67	5,58 [4]	80	28
6		6,000	5,952	6,81	6,71 [4]	90	32
8		8,000	7,942	9,09	8,97	100	36
10		10,000	9,942	11,37	11,23	112	40
12	h11	12,00	11,89	13,65	13,44	125	45
14		14,00	13,89	15,93	15,70	140	56
17		17,00	16,89	19,35	19,09	160	63
19		19,00	18,87	21,63	21,32	180	70
22		22,00	21,87	25,05	24,71	200	80
24		24,00	23,87	27,33	26,97	224	90
27		27,00	26,87	30,75	30,36	250	100
32		32,00	31,84	36,45	35,98	315	125
36		36,00	35,84	41,01	40,50	355	140

1) $e_{max} = 1{,}14\ s_{max} - 0{,}03$ (from $s = 1{,}5$ up to $s = 36$)

$e_{min} = 1{,}13\ s_{min}$ (from $s = 8$ up to $s = 36$)

2) $e_{min} = 1{,}13\ s_{min} - 0{,}04$

3) $e_{min} = 1{,}13\ s_{min} - 0{,}03$

4) $e_{min} = 1{,}13\ s_{min} - 0{,}02$

Table 2 — Test values

Width across flats of key s	Minimum Rockwell hardness of key	Minimum proof torque[1] M_d	Width across flats of hexagon socket adapter		Key engagement[2] t min.
			max.	min.	
mm		N·m	mm	mm	mm
0,7	52 HRC	0,08	0,724	0,711	1,5
0,9		0,18	0,902	0,889	1,7
1,3		0,53	1,295	1,270	2
1,5		0,82	1,545	1,520	2
2		1,9	2,045	2,020	2,5
2,5		3,8	2,560	2,520	3
3		6,6	3,080	3,020	3,5
4		16	4,095	4,020	5
5		30	5,095	5,020	6
6		52	6,095	6,020	8
8	50 HRC	120	8,115	8,025	10
10	48 HRC	220	10,115	10,025	12
12		370	12,142	12,032	15
14		590	14,142	14,032	17
17	45 HRC	980	17,230	17,050	20
19		1 360	19,275	19,065	23
22		2 110	22,275	22,065	26
24		2 750	24,275	24,065	29
27		3 910	27,275	27,065	32
32		6 510	32,330	32,080	38
36		9 260	36,330	36,080	43

1) $M_d = 0{,}85\ (0{,}7\ R_m)\left(0{,}224\ 5\ s^3\right)$ where R_m is the tensile strength.

2) $t \approx 1{,}2\ s$ ($t \approx 1{,}5\ s$ for sizes smaller than 1,5 mm).

These values apply to the test only. In practice, key engagement is less.