INTERNATIONAL STANDARD

ISO 2936

Sixth edition
2014-05-01

Assembly tools for screws and nuts — Hexagon socket screw keys

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

Reference number
ISO 2936:2014(E)

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

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.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 29, *Small tools*, Subcommittee SC 10, *Assembly tools for screws and nuts, pliers and nippers*.

This sixth edition cancels and replaces the fifth edition (ISO 2936:2001), of which it constitutes a minor revision, and Clause 3 and Table 1 of which have been revised. It also incorporates the Technical Corrigendum ISO 2936:2001/Cor 1:2007.

Assembly tools for screws and nuts — Hexagon socket screw keys

1 Scope

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

The specifications of this International Standard apply for tightening of hexagon socket 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 listed under reference number 4 1 03 01 0 in ISO 1703.

2 Normative references

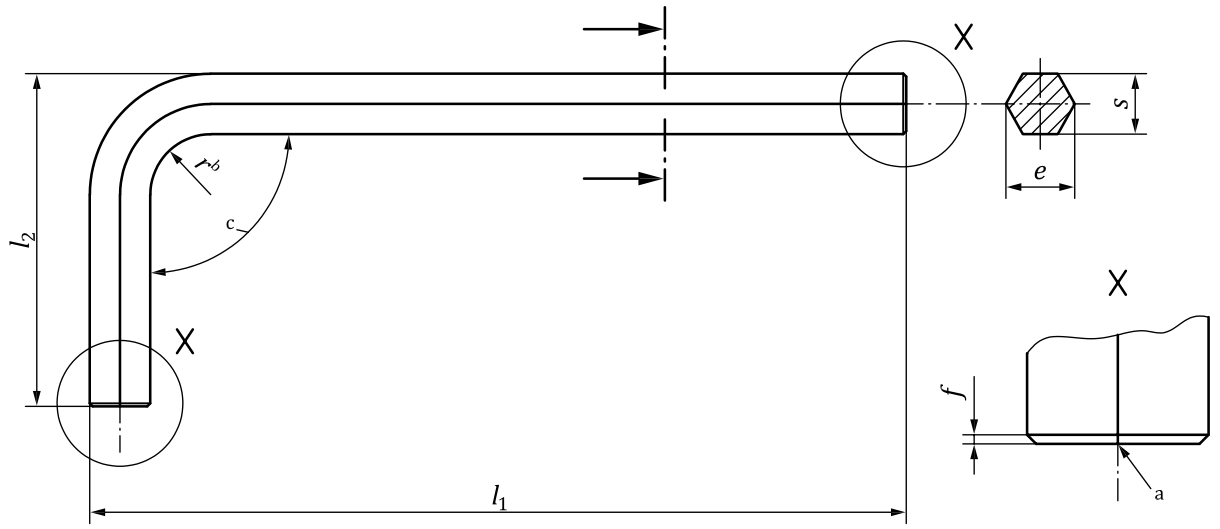
The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 898-1, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 1: Bolts, screws and studs with specified property classes — Coarse thread and fine pitch thread*

ISO 898-5, *Mechanical properties of fasteners made of carbon steel and alloy steel — Part 5: Set screws and similar threaded fasteners with specified hardness classes — Coarse thread and fine pitch thread*

3 Dimensions

See Figure 1 and Table 1.



Key

a The corners can be sharp, rounded, or chamfered, and the radius of curvature or the chamfer, *f*, respectively, shall not be greater than half the difference between width across corners, *e*, and width across flats, *s*.

$$f_{max} = \frac{e_{max} - s_{min}}{2}$$

Each end shall be square with the axis of each arm within ±1°.

b *r* shall not be smaller than 1,5 mm, $r \geq s$.

c $90° {}^{+2°}_{-1°}$ for width across flats ≤ 17 mm;

$90° {}^{+3°}_{-1°}$ for width across flats > 17 mm.

Figure 1 — Hexagon socket screw key

Table 1 — Dimensions

Dimensions in millimetres

Width across flats s			Width across corners e^a		l_1				l_2	
nom.	**max.**	**min.**	**max.**	**min.**	**Standard**	**Long**	**Extra-long**	**Limit deviations**		**Limit deviations**
0,7	0,71	0,70	0,79	0,76	33	—	—	0 −2	7	0 −2
0,9	0,89	0,88	0,99	0,96	33	—	—		11	
1,3	1,27	1,24	1,42	1,37	41	63,5	81		13	
1,5	1,50	1,48	1,68	1,63[b]	46,5	63,5	91,5		15,5	
2	2,00	1,96	2,25	2,18[c]	52	77	102		18	
2,5	2,50	2,46	2,82	2,75[c]	58,5	87,5	114,5	0 −4	20,5	
3	3,00	2,96	3,39	3,31[c]	66	93	129		23	
3,5	3,50	3,45	3,96	3,91	69,5	98,5	140		25,5	
4	4,00	3,95	4,53	4,43[c]	74	104	144		29	
4,5	4,50	4,45	5,10	5,04	80	114,5	156		30,5	
5	5,00	4,95	5,67	5,57[d]	85	120	165		33	
6	6,00	5,95	6,81	6,70[d]	96	141	186		38	
7	7,00	6,94	7,95	7,85	102	147	197	0 −6	41	
8	8,00	7,94	9,09	8,97	108	158	208		44	
9	9,00	8,94	10,23	10,10	114	169	219		47	
10	10,00	9,94	11,37	11,23	122	180	234		50	
11	11,00	10,89	12,51	12,31	129	191	247		53	
12	12,00	11,89	13,65	13,44	137	202	262		57	

Table 1 *(continued)*

Width across flats s			Width across corners e^a		l_1				l_2	
nom.	**max.**	**min.**	**max.**	**min.**	**Standard**	**Long**	**Extra-long**	**Limit deviations**		**Limit deviations**
13	13,00	12,89	14,79	14,57	145	213	277		63	
14	14,00	13,89	15,93	15,70	154	229	294		70	
15	15,00	14,89	17,07	16,83	161	240	307		73	
16	16,00	15,89	18,21	17,96	168	240	307	0 −7	76	0 −3
17	17,00	16,89	19,35	19,09	177	262	337		80	
18	18,00	17,89	20,49	20,22	188	262	358		84	
19	19,00	18,87	21,63	21,32	199	—	—		89	
21	21,00	20,87	23,91	23,58	211	—	—		96	
22	22,00	21,87	25,05	24,71	222	—	—		102	
23	23,00	22,87	26,19	25,84	233	—	—		108	
24	24,00	23,87	27,33	26,97	248	—	—		114	
27	27,00	26,87	30,75	30,36	277	—	—	0 −12	127	0 −5
29	29,00	28,87	33,03	32,62	311	—	—		141	
30	30,00	29,87	34,17	33,75	315	—	—		142	
32	32,00	31,84	36,45	35,98	347	—	—		157	
36	36,00	35,84	41,01	40,50	391	—	—		176	

a $e_{max} = 1{,}14\ s_{max} - 0{,}03$ (from $1{,}5 \le s \le 36$);
$e_{min} = 1{,}13\ s_{min}$ (from $8 \le s \le 36$).

b $e_{min} = 1{,}13\ s_{min} - 0{,}04$.

c $e_{min} = 1{,}13\ s_{min} - 0{,}03$.

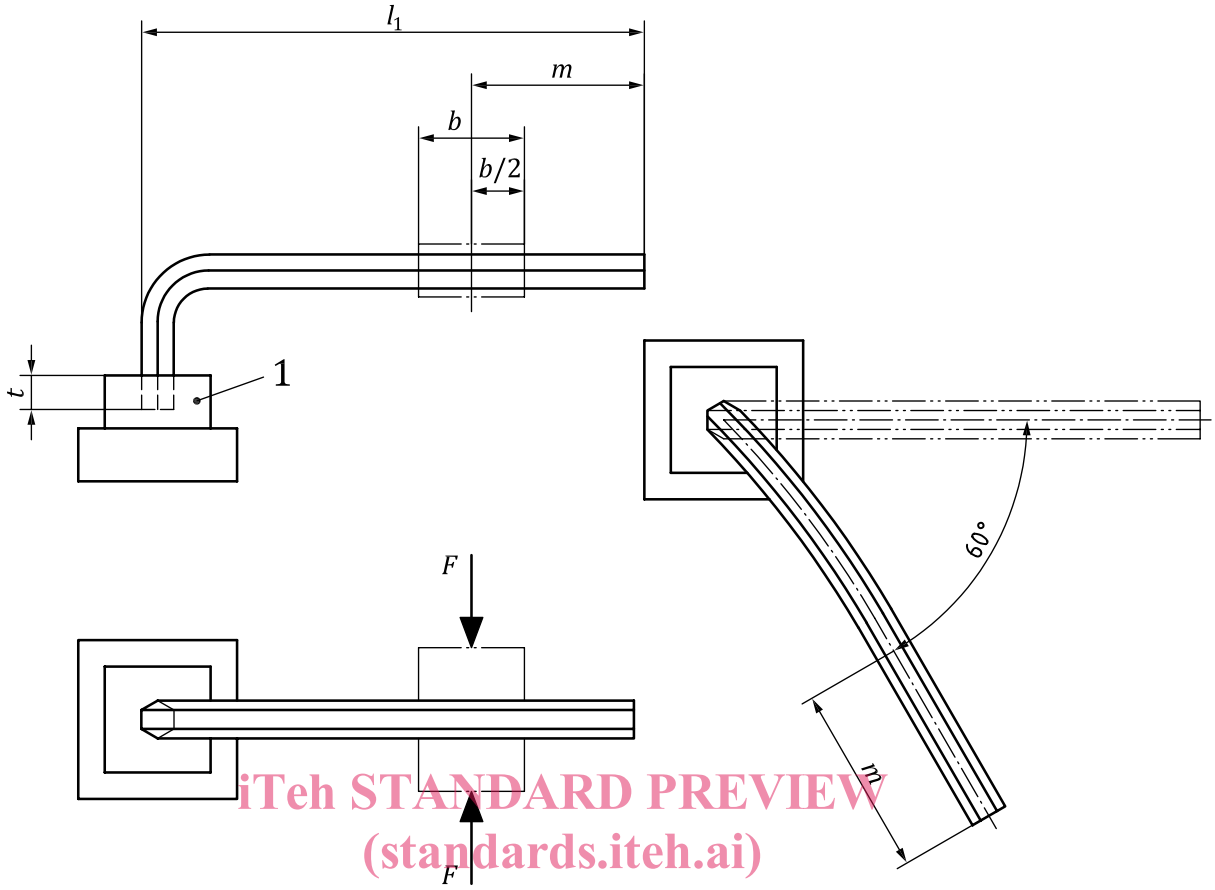
d $e_{min} = 1{,}13\ s_{min} - 0{,}02$.

4 Method of test

Insert the short arm of the key into a female hexagon socket adapter having a Rockwell hardness as given in Table 3. Smoothly apply an increasing load at a distance m from the end of the long arm of the key (where $m = l_1/3$, with a tolerance of ±2 mm) until the proof torque is reached. It shall be ensured throughout the whole test procedure that the friction lock contact with the tool surface is maintained over the total area of the force-initiating contact area b as given in Table 2. 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 3.

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 14 mm, the hexagon socket screw key shall show a total deformation, to torsion fracture, of at least 60° under load and a permanent deformation before failure.



Key

1 female hexagon socket adapter

Figure 2 — Test configuration

Table 2 — Test dimensions for force-initiating contact area

Dimensions in millimetres

Width across flats nom.	b
0,7 to 5	10 ± 1
> 5 to 17	20 ± 1
> 17	50 ± 1