International Standard ISO 2936

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION•МЕЖДУНАРОДНАЯ ОРГАНИЗАЦИЯ ПО СТАНДАРТИЗАЦИИ•ORGANISATION INTERNATIONALE DE NORMALISATION

Assembly tools for screws and nuts — Hexagon socket screw keys — Metric series

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

Second edition — 1983-12-01

UDC 621.883.14 **Ref. No. ISO 2936-1983 (E)**

Descriptors : tools, assembly tools, wrenches, socket head screws, dimensions, tests.

Price based on 3 pages

Foreword

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Draft International Standards adopted by the technical committees are circulated to the member bodies for approval before their acceptance as International Standards by the ISO Council.

International Standard ISO 2936 was developed by Technical Committee ISO/TC 29, *Small tools*, and was circulated to the member bodies in August 1981.

It has been approved by the member bodies of the following countries :

Australia	India	Romania
Austria	Israel	South Africa, Rep. of
Belgium	Italy	Sri Lanka
Brazil	Japan	Sweden
Egypt, Arab Rep. of	Korea, Dem. P. Rep. of	Switzerland
France	Korea, Rep. of	United Kingdom
Germany, F. R.	Mexico	USSR
Hungary	Poland	Yugoslavia

The member bodies of the following countries expressed disapproval of the document on technical grounds :

Czechoslovakia
USA

This second edition cancels and replaces the first edition (i.e. ISO 2936-1977).

Printed in Switzerland

Assembly tools for screws and nuts — Hexagon socket screw keys — Metric series

1 Scope and field of application

This International Standard, relating to assembly tools for screws and nuts, deals with hexagon socket screw keys designated as number 112 in ISO 1703.

It includes a table of dimensions of these keys and a method of test.

In addition it specifies the minimum hardness value that shall be met.

The specifications of this International Standard apply for tightening of screws of 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.

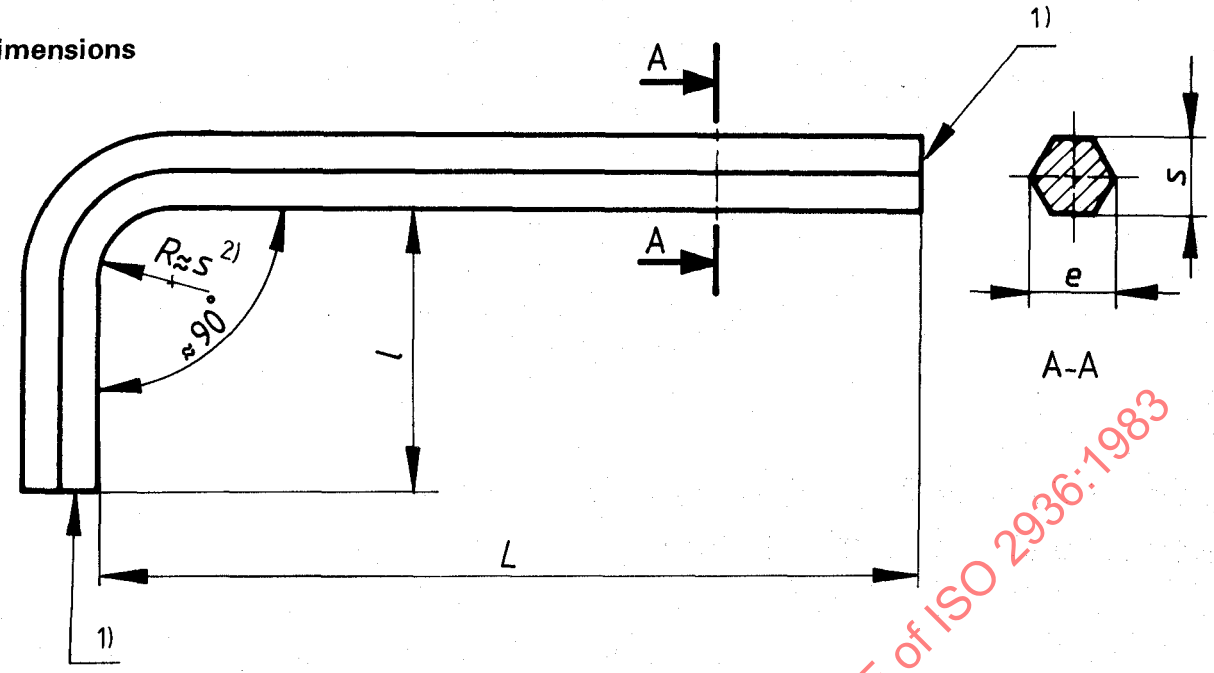
2 References

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

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

ISO 1703, *Assembly tools for screws and nuts — Nomenclature.*

3 Dimensions



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.

Table 1 — Dimensions

Dimensions in millimetres

s				*e* 1)			
Size of key	**Tolerance**	max.	min.	max.	min.	*L*	*l*
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	1,50	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		4,00	3,952	4,53	4,44 3)	70	25
5		5,00	4,952	5,67	5,58 4)	80	28
6		6,00	5,952	6,81	6,71 4)	90	32
8		8,00	7,942	9,09	8,97	100	36
10		10,00	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) $e_{min} = 1{,}13\, s_{min} - 0{,}02$

4 Test values

Table 2 — Test values

Size of key s	Minimum hardness	Minimum proof torque [1]	Size across flats of socket adapter s		Key engagement [2] t
			max.	min.	min.
mm	HRC	N·m	mm	mm	mm
0,7	52	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	120	8,115	8,025	10
10	48	220	10,115	10,025	12
12		370	12,142	12,032	15
14		590	14,142	14,032	17
17	45	980	17,230	17,050	20
19		1360	19,275	19,065	23
22		2110	22,275	22,065	26
24		2750	24,275	24,065	29
27		3910	27,275	27,065	32
32		6510	32,330	32,080	38
36		9260	36,330	36,080	43

1) $M_d = 0{,}85\ (0{,}7\ \sigma_B)\ (0{,}224\ 5\ s^3)$

σ_B = 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.

5 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 and apply the appropriate torque. Do not jerk or strike the key. Apply a steadily increasing load as near as possible to the end of the long arm until the proof torque is reached. 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 test torque, the key shall show no permanent deformation or other damage which could influence usability.