INTERNATIONAL STANDARD

ISO 1711-2

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Assembly tools for screws and nuts — Technical specifications —

Part 2: Machine-operated sockets ("impact")

Outils de manœuvre pour vis et écrous — Spécifications techniques —

Partie 2: Douilles à machine («impact»)

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Foreword

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International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of technical committees is to prepare International Standards. 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.

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.

ISO 1711-2 was prepared by Technical Committee ISO/TC 29, *Small tools*, Subcommittee SC 10, *Assembly tools for screws and nuts, pliers and nippers*.

ISO 1711 consists of the following parts, under the general title *Assembly tools for screws and nuts — Technical specifications*:

— *Part 1: Hand-operated wrenches and sockets*

— *Part 2: Machine-operated sockets ("impact")*

Introduction

When testing machine-operated impact sockets, there are three types of testing that could be relevant:

— torsional testing;

— impact testing;

— endurance testing.

This part of ISO 1711 covers only torsional testing of machine-operated sockets. The torsional test and hardness values given in this part of ISO 1711 will ensure that sockets have a reasonable impact life if the appropriate tool is used.

An impact test or endurance test is desired, but at present there is no procedure suitable for standardization available. This will be a subject of consideration in a future revision of this part of ISO 1711.

Assembly tools for screws and nuts — Technical specifications —

Part 2: Machine-operated sockets (“impact”)

1 Scope

This part of ISO 1711 specifies hardness and minimum torsional strength for machine-operated square drive sockets in accordance with ISO 2725-2 intended for use with impact wrenches.

2 Normative references

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

ISO 2725-2, *Assembly tools for screws and nuts — Square drive sockets — Part 2: Machine-operated sockets (“impact”)*

ISO 6508-1, *Metallic materials — Rockwell hardness test — Part 1: Test method (scales A, B, C, D, E, F, G, H, K, N, T)*

3 Materials

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

The chemical composition and heat treatment shall be such as to produce tools conforming to the requirements specified in Clauses 4 and 5.

4 Hardness testing

The hardness test shall be carried out in accordance with ISO 6508-1.

Sockets and attachments shall be hardened and tempered to Rockwell hardness values given in Table 1.

Table 1 — Rockwell hardness values for machine-operated sockets as function of driving square and hexagon width across flats, s

Dimensions in millimetres

Hardness HRC	Driving square nominal size [a]								
	6,3	10	12,5	16	20	25	40	63	90
	Width across flats, s [b]								
40 to 48	$3{,}2 \leqslant s \leqslant 16$	$7 \leqslant s \leqslant 13$	$8 \leqslant s \leqslant 13$						
38 to 46		$15 \leqslant s \leqslant 24$	$15 \leqslant s \leqslant 34$	$15 \leqslant s \leqslant 36$	$18 \leqslant s \leqslant 60$	$27 \leqslant s \leqslant 70$	$36 \leqslant s \leqslant 70$		

[a] According to ISO 1174-2.

[b] According to ISO 272.

5 Torque testing

5.1 Method

The minimum test torsion torque values to be applied are given in Table 2.

The socket shall be fully engaged in a hexagon test mandrel, as shown in Figure 1. The height, h, and the width across corners, e_{min}, of the mandrel are specified in Table 2.

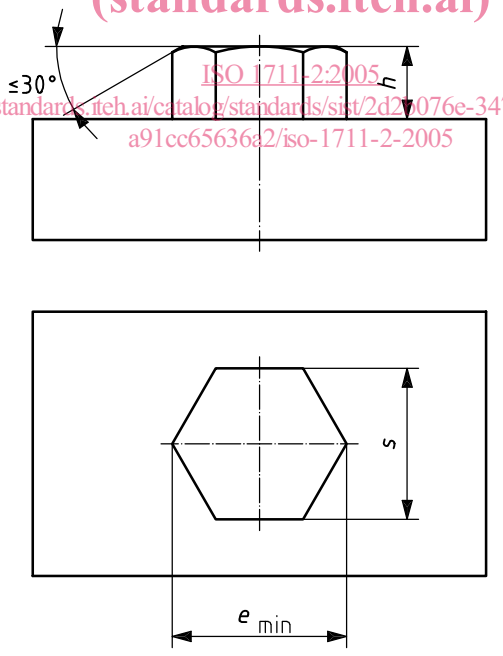

Figure 1 — Test mandrel height, h, and width across flats, s

Smoothly apply the load until the minimum testing torque as given in Table 2 is reached.

The nominal across-flats dimension of the test mandrel shall be equal to the nominal dimension, s, with a tolerance of h8. The mandrel shall be hardened to not less than hardness 55 HRC.

A device in which the mandrel can be rotated at a certain torque determined with an accuracy of ± 2,5 % may also be used for this test.

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

Table 2 — Minimum test torsion torque and test mandrel height as a function of width across flats

Dimensions in millimetres

Nominal width across flats [a]	Minimum test torsion torque [b] M N·m							Test mandrel	
	Driving square nominal size [c]							Height h	Width across corners [d]
s	6,3	10	12,5	16	20	25	40	h13	e_{min}
3,2	7,08							1,3	3,62
4	10,4							1,6	4,52
5	15,1							2	5,65
5,5	17,8							2,4	6,22
7	26,8	33,2						3,2	7,91
8	33,6	45,5	94					4	9,04
10	49,1	76,7	147					4,8	11,30
11	57,8	96	178					5,6	12,43
13	68,6	141	249					6,4	14,69
15	68,6[e]	215	400	850				7,4	16,95
16	68,6[e]	260	500	930				8	18,08
18		280[e]	650	1 220	1 320			9,6	20,34
21		280[e]	650[e]	1 220[e]	2 000			11,2	23,73
24		280[e]	650[e]	1 220[e]	2 200[e]			12,8	27,12
27			650[e]	1 220[e]	2 200[e]	3 600		14,4	30,51
30			650[e]	1 220[e]	2 200[e]	4 000		16	33,90
34			650[e]	1 220[e]	2 200[e]	4 000[e]		17,6	38,42
36				1 220[e]	2 200[e]	4 000[e]	15 100	19,2	40,68
41					2 200[e]	4 000[e]	15 100[e]	21,6	46,33
46					2 200[e]	4 000[e]	15 100[e]	24	51,98
50					2 200[e]	4 000[e]	15 100[e]	26,4	56,50
55					2 200[e]	4 000[e]	15 100[e]	28,8	62,15
60					2 200[e]	4 000[e]	15 100[e]	31,2	67,80
65						4 000[e]	15 100[e]	33,6	73,45
70						4 000[e]	15 100[e]	36	79,10

[a] According to ISO 272.

[b] Hexagons larger than tabled sizes are required to pass the highest tabled test torsion torque value shown for the applicable driving square.

[c] According to ISO 1174-2.

[d] $e_{min} = s_{nom} \times 1{,}13$. Values of e_{min} are rounded to two decimal places.

[e] The test torsion torque values have been limited due to the strength of the driving square for that hexagon size.

5.2 Test of machine-operated square drive sockets

A square mandrel of hardness not less than 55 HRC shall be used for driving the socket for nominal width across flats 22 mm and smaller. A square mandrel of hardness not less than 50 HRC shall be used for driving the socket for nominal width across flats 24 mm and larger. The nominal width across-flats dimension of this mandrel shall be equal to the maximum dimension, with a tolerance of h8, of the corresponding square drive.

The axes of the two mandrels and the socket shall remain coaxial during the test.

Bibliography

[1] ISO 272, *Fasteners — Hexagon products — Widths across flats*

[2] ISO 1174-2, *Assembly tools for screws and nuts — Driving squares — Part 2: Driving squares for power socket tools*