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Aerospace — Drives, internal, TORX® PARALOBE® drive — Geometrical definition, gaging and technical requirements

Aéronautique et espace — Empreintes, TORX® PARALOBE® entraînement — Définition géométrique, calibrage et exigences techniques

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Foreword

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This document was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 4, *Aerospace fastener systems*.

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Introduction

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Aerospace — Drives, internal, TORX® PARALOBE® drive — Geometrical definition, gaging and technical requirements

1 Scope

This document specifies basic dimensions, characteristics and engineering requirements for TORX® PARALOBE®[1)] recesses in aerospace fasteners.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements 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 4580, *Aerospace — Drives, internal, TORX® PARALOBE® driver bit — Geometrical definition, gaging and technical requirements*

NASM1312-25, *Fastener Test Methods – Method 25 – Driving Recess Torque Quality Conformance Test*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at http://www.electropedia.org/

3.1
recess
geometry in a fastener that allows attaching a tool in order to induce a torque to enable tightening and untightening of a fastener

3.2
driver bit
tool to induce a torque into a fastener's *recess* (3.1)

3.3
configuration
shape and geometry of the cross section of a *recess* (3.1) or external drive

3.4
optimum recess torque
torque in a *recess* (3.1) when the recess is able to transfer the ultimate torque of the *driver bit* (3.2)

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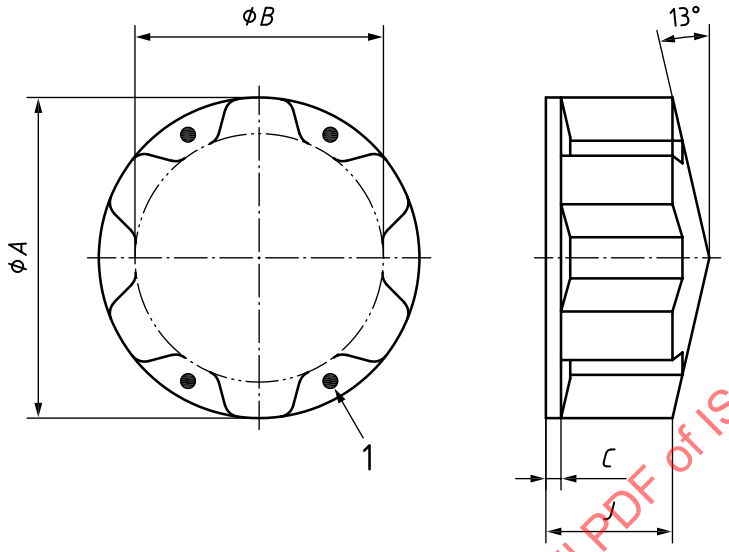
4 Basic fastener recess configuration

4.1 General

The basic recess configuration shall be in accordance with Figure 1.



Key

⌀*A* recess diameter

⌀*B* recess inscribed diameter

C recess counterbore depth (per fastener standard)

J recess depth (per fastener standard)

1 recess trademark (the recess trademark appears as four raised dots as shown and is used for drive sizes 10SI and larger)

Figure 1 — Basic recess configuration

4.2 Recess dimensions — metric and inch

Table 1 — Recess dimensions — metric and inch[a]

Drive code	Drive size descriptor	⌀*A* Recess diameter		⌀*B* Recess inscribed diameter	
		mm	inch	mm	inch
001	1SI	0,94	0.037	0,69	0.027
002	2SI	1,07	0.042	0,76	0.030
003	3SI	1,27	0.050	0,90	0.036
004	4SI	1,44	0.057	1,05	0.042
005	5SI	1,56	0.062	1,17	0.046
006	6SI	1,87	0.074	1,45	0.057
007	7SI	2,20	0.087	1,69	0.067
008	8SI	2,54	0.100	1,96	0.077
009	9SI	2,74	0.108	2,11	0.083
010	10SI	3,00	0.118	2,29	0.090

[a] The dimensions in this table are rounded. Therefore the general formula for converting inches into mm cannot be used.

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Table 1 *(continued)*

Drive code	Drive size descriptor	⌀*A* Recess diameter		⌀*B* Recess inscribed diameter	
		mm	inch	mm	inch
015	15SI	3,56	0.140	2,74	0.108
020	20SI	4,18	0.165	3,25	0.128
025	25SI	4,80	0.189	3,67	0.145
027	27SI	5,38	0.212	4,19	0.165
030	30SI	5,96	0.235	4,62	0.182
040	40SI	7,16	0.282	5,55	0.219
045	45SI	8,41	0.331	6,62	0.261
050	50SI	9,49	0.374	7,35	0.290
055	55SI	12,03	0.474	9,59	0.378
060	60SI	14,24	0.561	11,14	0.439
070	70SI	16,66	0.656	13,14	0.518
080	80SI	18,82	0.741	14,66	0.577
090	90SI	21,40	0.843	16,88	0.665
100	100SI	23,74	0.935	18,73	0.738
110	110SI	25,64	1.010	19,66	0.774

[a] The dimensions in this table are rounded. Therefore the general formula for converting inches into mm cannot be used.

4.3 Recess drive designation

The recess drive designation shall be as shown in the following example:

ISO 4579-025

- 025 — Drive code as listed in Table 1
- ISO 4579 — Drive standard

5 Recess inspection

5.1 Gaging equipment

The recess is inspected with a penetration gage (see Figure 2).

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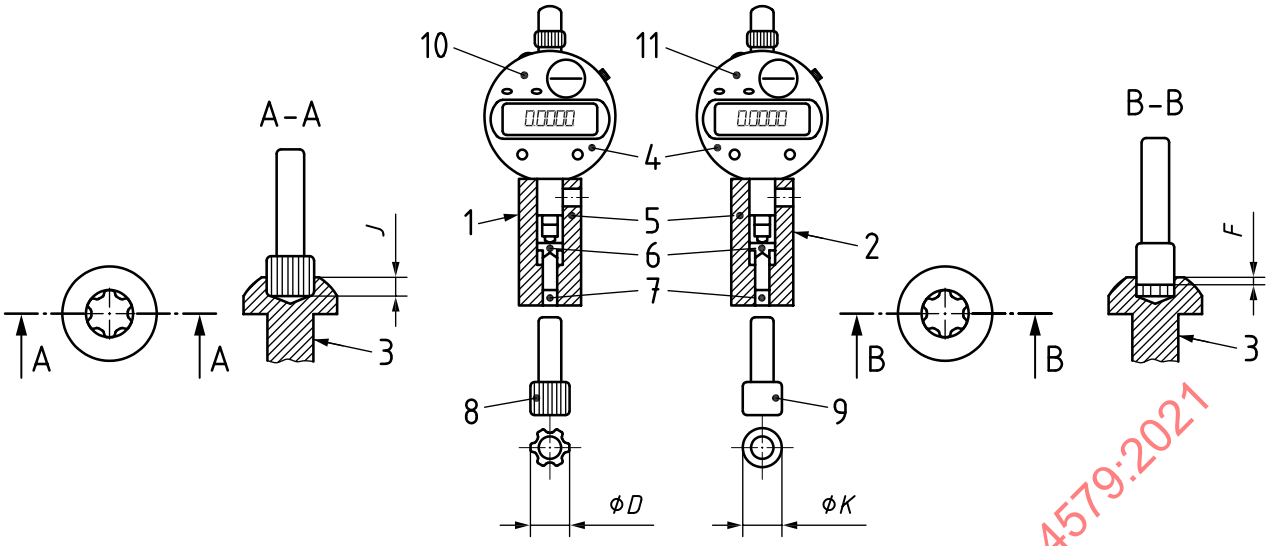

Key

J	recess depth (per fastener standard)
⌀*D*	go gage element diameter (see Table 2)
⌀*K*	no-go gage element diameter (see Table 2)
F	no-go recess depth (per fastener standard)
1	go-gage identification marking
2	no-go gage identification marking
3	fastener
4	indicator
5	body
6	bushing
7	element
8	go gage element
9	no-go gage element
10	go gage assembly
11	no-go gage assembly

Figure 2 — Go and no-go recess depth gages, penetration type gage assembly

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The gage identification marking shall appear on the surface of the assembly body, along with the drive size descriptor and gage series number.

EXAMPLE 1: For go gage:

25SI

TORX® PARALOBE®

25-SDI-770 Go

EXAMPLE 2: For no-go gage:

25SI

TORX® PARALOBE®

25-SDI-710 No-Go

5.2 Gaging procedure

Using the appropriate size gage (see Table 2), check the zero adjustment against a known flat surface. Insert the gage element into the recess and firmly push the top of the recess against the bottom of the gage body. Measure and record the gage depth. The reading shall be within acceptable limits per application fastener standard.

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5.3 Penetration type gage dimensions — metric and inch

Table 2 — Go/No-go gage dimensions[a]

Drive size descriptor	Go gage element series number	⌀*D* Go gage diameter		No-go gage element series number	⌀*K* No-go gage diameter	
		mm	inch		mm	inch
1SI	01-SDI-770	0,90	0.035	01-SDI-710	0,70	0.028
2SI	02-SDI-770	1,02	0.040	02-SDI-710	0,78	0.031
3SI	03-SDI-770	1,22	0.048	03-SDI-710	0,93	0.037
4SI	04-SDI-770	1,38	0.054	04-SDI-710	1,08	0.043
5SI	05-SDI-770	1,51	0.059	05-SDI-710	1,20	0.047
6SI	06-SDI-770	1,81	0.071	06-SDI-710	1,48	0.058
7SI	07-SDI-770	2,12	0.083	07-SDI-710	1,72	0.068
8SI	08-SDI-770	2,46	0.097	08-SDI-710	1,98	0.078
9SI	09-SDI-770	2,66	0.105	09-SDI-710	2,14	0.084
10SI	10-SDI-770	2,92	0.115	10-SDI-710	2,31	0.091
15SI	15-SDI-770	3,48	0.137	15-SDI-710	2,77	0.109
20SI	20-SDI-770	4,10	0.161	20-SDI-710	3,28	0.129
25SI	25-SDI-770	4,72	0.186	25-SDI-710	3,70	0.146
27SI	27-SDI-770	5,30	0.209	27-SDI-710	4,23	0.167
30SI	30-SDI-770	5,88	0.231	30-SDI-710	4,66	0.184
40SI	40-SDI-770	7,07	0.278	40-SDI-710	5,60	0.221
45SI	45-SDI-770	8,31	0.327	45-SDI-710	6,67	0.263
50SI	50-SDI-770	9,39	0.370	50-SDI-710	7,41	0.292
55SI	55-SDI-770	11,92	0.469	55-SDI-710	9,65	0.380
60SI	60-SDI-770	14,08	0.554	60-SDI-710	11,22	0.442
70SI	70-SDI-770	16,51	0.650	70-SDI-710	13,22	0.521
80SI	80-SDI-770	18,67	0.735	80-SDI-710	14,75	0.581
90SI	90-SDI-770	21,19	0.834	90-SDI-710	16,97	0.668
100SI	100-SDI-770	23,53	0.926	100-SDI-710	18,84	0.742
110SI	110-SDI-770	25,43	1.001	110-SDI-710	19,76	0.778

[a] The dimensions in this table are rounded. Therefore the general formula for converting inches into mm cannot be used.

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6 Fastener recess torque test

6.1 Fixture

The test fixture shall be capable of maintaining alignment with the fastener axis, ensuring non-rotation of the fastener, applying a specified end load and applying torque in both clockwise and anti-clockwise directions. The fixture shall not resist any tendency of the driver bit to cam out of the recess during the test.

6.2 Torque wrench/torsion machine

Hand torque wrench shall conform to applicable requirements.

Torsion machines or other power tools shall conform to applicable requirements.

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