
International Standard



7403

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

**Fasteners for aerospace construction — Spline drive
wrenching configuration — Metric series**

Éléments de fixation pour les constructions aérospatiales — Entraînement cannelé — Série métrique

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of developing International Standards is carried out through ISO technical committees. Every member body interested in a subject for which a technical committee has been authorized 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.

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 7403 was developed by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, and was circulated to the member bodies in June 1981.

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

Australia	Egypt, Arab Rep. of	Spain
Austria	Ireland	Sweden
Belgium	Italy	United Kingdom
Brazil	Japan	USA
Canada	Netherlands	USSR
China	Romania	
Czechoslovakia	South Africa, Rep. of	

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

France
Germany, F. R.

Fasteners for aerospace construction — Spline drive wrenching configuration — Metric series

0 Introduction

Users of this document are advised that proprietary rights apply to metric spline drive. Patent holders have agreed to negotiate licenses on terms and conditions defined in statements that are available upon request from the ISO Central Secretariat.

1 Scope

This International Standard specifies the maximum and minimum dimensional requirements for a spline wrenching configuration for externally driven metric fasteners and for the associated wrenches. The configuration described is a design standard.

2 Field of application

This configuration is intended for use in aerospace construction and other critical areas where superior wrenchability is required, i.e., high tensile or high seizure applications.

3 References

ISO 128, *Engineering drawing — General principles of presentation*.

ISO 1101, *Technical drawings — Geometric tolerancing — Tolerancing of form, orientation, location and run-out — Generalities, definitions, symbols, indications on drawings*.

ISO 2692, *Technical drawings — Geometrical tolerancing — Maximum material principle*.¹⁾

4 Required characteristics

4.1 Dimensions

The dimensions are in millimetres. The tolerances for form and position shall be interpreted in accordance with ISO 1101 and ISO 2692. Variations in size, form, and position of the twelve splines are permitted within the wrenching length, providing the actual profile falls within the maximum and minimum material conditions shown in figures 1 and 2.

4.1.1 External wrenching element (see figure 1 and table 1)

Dimensions are prior to forming of the locking element on self-locking nuts. The locking element shall not prevent the assembly of the wrench on the nut wrenching element.

4.1.2 Internal wrenching element (see figure 2 and table 2)

Tools conforming to this International Standard shall wrench fasteners having wrenching configurations as shown in figure 1. The nominal wrenching size value corresponds to the nominal width across the flats of comparable hexagon and double hexagon (12 point) wrenching configurations.

The wrench will fit all three configurations, hexagonal, double hexagonal and spline drive.

5 Designation

A spline drive wrenching configuration in accordance with this International Standard shall be designated as follows :

Wrenching configuration ISO 7403 — YYY

where "YYY" corresponds to the appropriate Dash No. of this International Standard.

1) At present at the stage of draft. (Revision of ISO/R 1101/2-1974.)

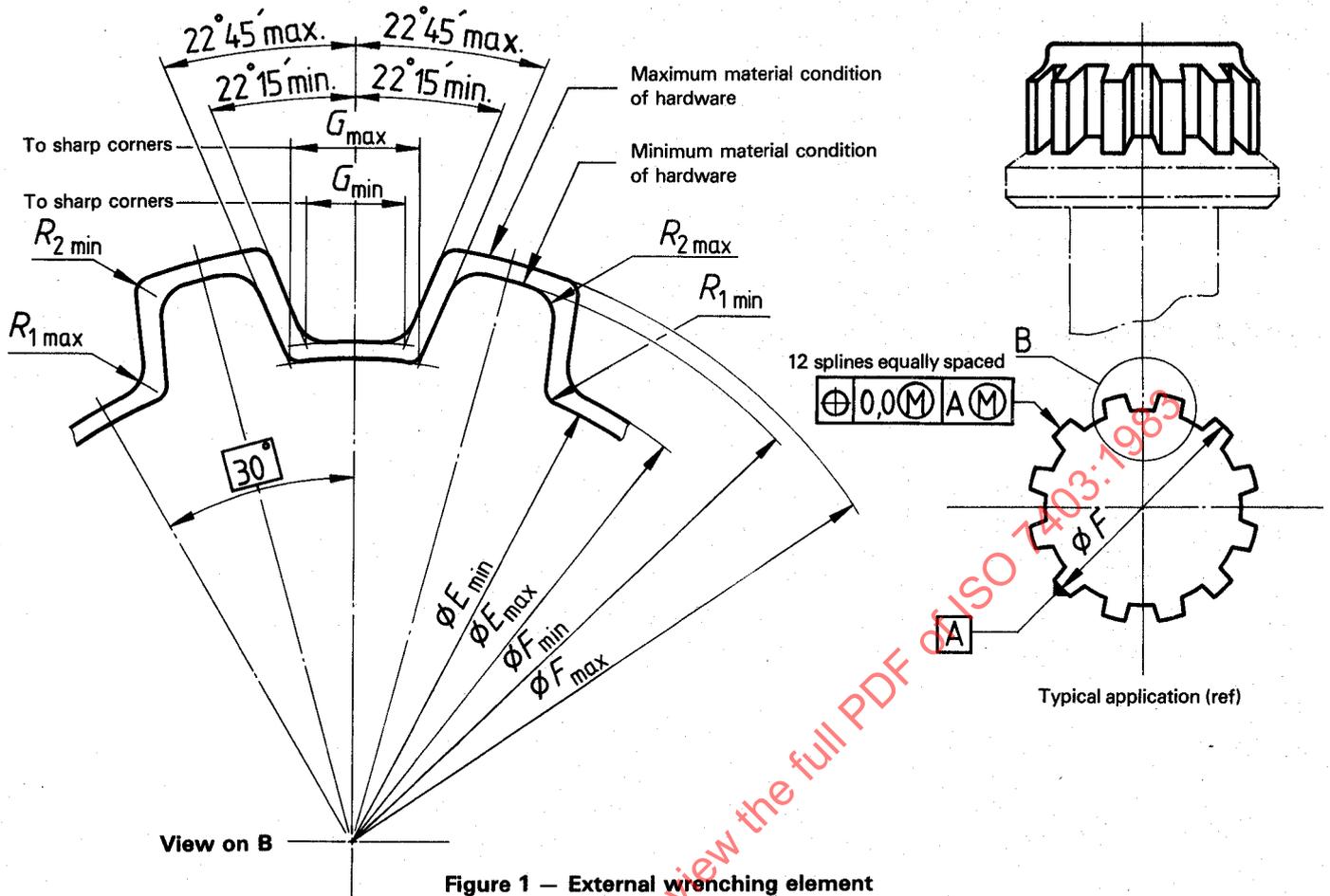


Figure 1 — External wrenching element

Table 1 — Dimensions for external spline wrenching element

Dash No.	Nominal wrench size	Maximum material condition					Minimum material condition				
		ϕE_{max}	ϕF_{max}	G_{min}	$R1_{max}$	$R2_{min}$	ϕE_{min}	ϕF_{min}	G_{max}	$R1_{min}$	$R2_{max}$
050	5	5,14	6,20	0,53	0,20	0,08	5,01	6,02	0,68	0,08	0,20
055	5,5	5,66	6,79	0,58	0,20	0,08	5,54	6,61	0,73	0,08	0,20
060	6	6,18	7,38	0,62	0,20	0,08	6,03	7,20	0,77	0,08	0,20
070	7	7,23	8,56	0,71	0,25	0,13	7,08	8,36	0,86	0,13	0,25
080	8	8,27	9,75	0,80	0,25	0,13	8,12	9,54	0,95	0,13	0,25
090	9	9,31	10,93	0,89	0,25	0,13	9,16	10,70	1,04	0,13	0,25
100	10	10,36	12,12	0,98	0,25	0,13	10,21	11,89	1,13	0,13	0,25
110	11	11,40	13,30	1,07	0,25	0,13	11,22	13,07	1,25	0,13	0,25
120	12	12,44	14,48	1,16	0,38	0,13	12,27	14,23	1,34	0,13	0,38
130	13	13,49	15,67	1,25	0,38	0,13	13,31	15,41	1,43	0,13	0,38
140	14	14,53	16,85	1,34	0,38	0,13	14,35	16,57	1,52	0,13	0,38
150	15	15,58	18,03	1,43	0,38	0,13	15,40	17,75	1,64	0,13	0,38
160	16	16,62	19,22	1,52	0,38	0,13	16,44	18,94	1,73	0,13	0,38
170	17	17,66	20,40	1,61	0,51	0,13	17,48	20,12	1,82	0,13	0,51
180	18	18,70	21,58	1,70	0,51	0,13	18,50	21,31	1,91	0,13	0,51
190	19	19,75	22,77	1,79	0,51	0,13	19,55	22,49	2,00	0,13	0,51
210	21	21,84	25,13	1,97	0,64	0,13	21,63	24,86	2,20	0,13	0,64
220	22	22,88	26,32	2,07	0,64	0,13	22,68	26,01	2,29	0,13	0,64
240	24	24,97	28,69	2,25	0,64	0,13	24,76	28,38	2,47	0,13	0,64
270	27	28,10	32,24	2,52	0,76	0,25	27,89	31,93	2,75	0,25	0,76
300	30	31,23	35,79	2,79	0,89	0,25	30,97	35,46	3,02	0,25	0,89
320	32	33,31	38,15	2,97	0,89	0,25	33,06	37,82	3,20	0,25	0,89
360	36	37,49	42,89	3,33	1,02	0,25	37,23	42,56	3,56	0,25	1,02
400	40	41,66	47,62	3,69	1,14	0,38	41,41	47,29	3,94	0,38	1,14
410	41	42,70	48,81	3,78	1,14	0,38	42,45	48,48	4,04	0,38	1,14
460	46	47,92	54,72	4,23	1,27	0,38	47,67	54,39	4,49	0,38	1,27
500	50	52,09	59,46	4,59	1,27	0,38	51,84	59,10	4,85	0,38	1,27

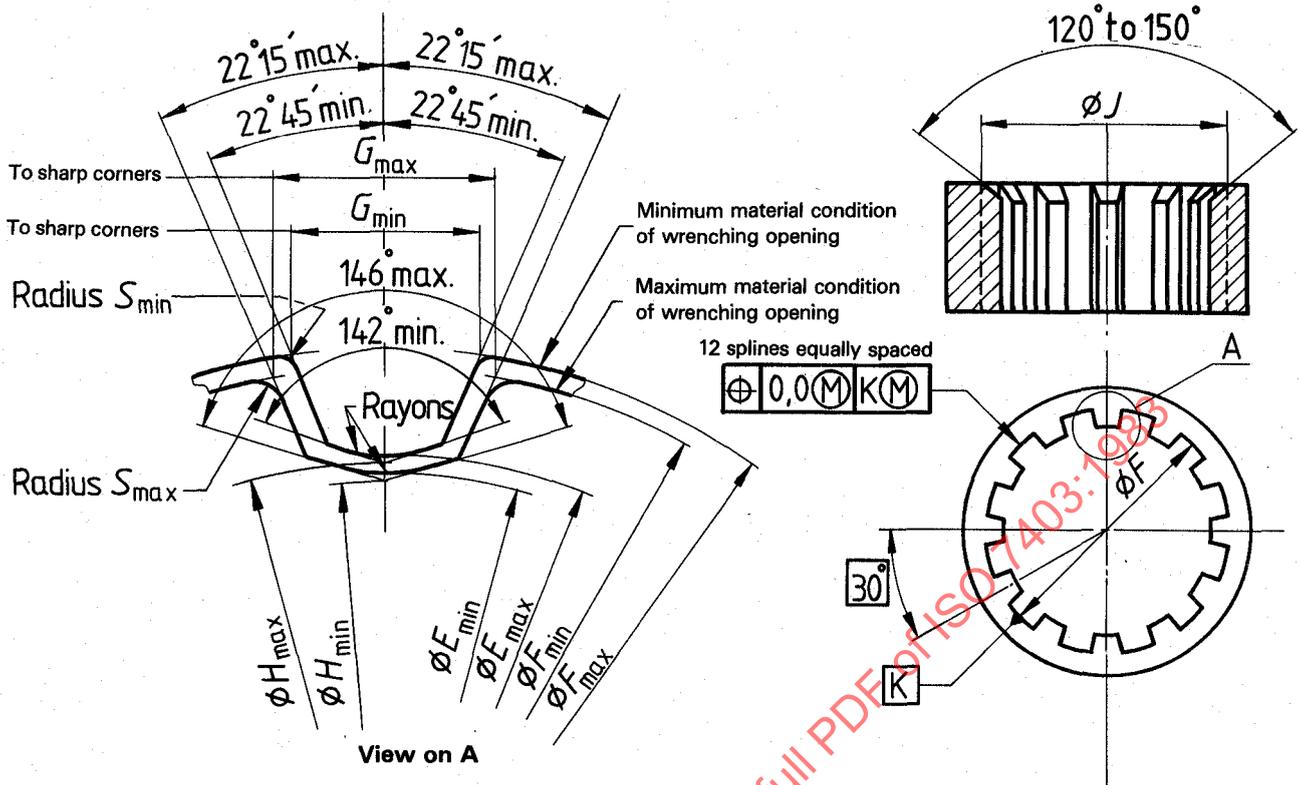


Figure 2 - Internal wrenching element

Table 2 - Dimensions for internal spline wrenching element

Dash No.	Nominal wrench size	Maximum material condition						Minimum material condition					
		ϕE_{min}	ϕF_{min}	G_{max}	ϕH_{min}	ϕJ_{min}	Radius S_{max}	ϕE_{max}	ϕF_{max}	G_{min}	ϕH_{max}	ϕJ_{max}	Radius S_{min}
050	5	5,23	6,32	0,94	5,20	6,43	0,25	5,34	6,43	0,83	5,30	6,83	0,13
055	5,5	5,75	6,92	1,01	5,72	7,02	0,25	5,86	7,02	0,91	5,82	7,42	0,13
060	6	6,28	7,51	1,08	6,24	7,61	0,25	6,42	7,61	0,98	6,37	8,01	0,13
070	7	7,32	8,69	1,23	7,28	8,79	0,25	7,46	8,79	1,13	7,40	9,19	0,13
080	8	8,36	9,87	1,38	8,31	9,98	0,25	8,50	9,98	1,28	8,44	10,38	0,13
090	9	9,41	11,06	1,53	9,35	11,16	0,25	9,55	11,16	1,43	9,47	11,56	0,13
100	10	10,46	12,24	1,68	10,39	12,34	0,25	10,63	12,34	1,55	10,55	12,74	0,13
110	11	11,50	13,43	1,83	11,43	13,55	0,38	11,67	13,55	1,70	11,58	13,95	0,25
120	12	12,54	14,61	1,97	12,46	14,74	0,38	12,77	14,74	1,85	12,67	15,14	0,25
130	13	13,58	15,79	2,12	13,50	15,92	0,38	13,81	15,92	2,00	13,71	16,32	0,25
140	14	14,64	16,98	2,27	14,55	17,10	0,38	14,89	17,10	2,14	14,77	17,50	0,25
150	15	15,68	18,16	2,42	15,58	18,31	0,38	15,93	18,31	2,27	15,81	18,71	0,25
160	16	16,72	19,34	2,57	16,62	19,50	0,38	16,97	19,50	2,42	16,84	19,90	0,25
170	17	17,76	20,53	2,72	17,65	20,68	0,38	18,05	20,68	2,56	17,91	21,08	0,25
180	18	18,80	21,71	2,86	18,69	21,86	0,38	19,09	21,86	2,71	18,95	22,26	0,25
190	19	19,85	22,89	3,01	19,73	23,05	0,38	20,20	23,05	2,86	20,04	23,45	0,25
210	21	21,94	25,26	3,31	21,80	25,44	0,38	22,28	25,44	3,13	22,11	25,84	0,25
220	22	22,98	26,44	3,46	22,84	26,62	0,38	23,33	26,62	3,28	23,15	27,02	0,25
240	24	25,06	28,81	3,75	24,91	28,99	0,38	25,41	28,99	3,58	25,22	29,39	0,25
270	27	28,21	32,36	4,20	28,04	32,54	0,51	28,67	32,54	4,02	28,45	32,94	0,25
300	30	31,33	35,91	4,65	31,14	36,09	0,51	31,80	36,09	4,47	31,56	36,49	0,25
320	32	33,42	38,28	4,94	33,21	38,46	0,51	33,88	38,46	4,76	33,63	38,86	0,25
360	36	37,60	43,01	5,54	37,37	43,19	0,51	38,18	43,19	5,36	37,89	43,59	0,25
400	40	41,77	47,75	6,13	41,52	47,95	0,64	42,35	47,95	5,93	42,03	48,35	0,25
410	41	42,81	48,93	6,28	42,55	49,14	0,64	43,40	49,14	6,07	43,07	49,54	0,25
460	46	48,02	54,85	7,02	47,73	55,05	0,64	48,62	55,05	6,82	48,24	55,45	0,25
500	50	52,19	59,58	7,61	51,87	59,79	0,64	52,79	59,79	7,41	52,38	60,19	0,25

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