
INTERNATIONAL STANDARD



2853

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

Metal pipes and fittings — Stainless steel screwed couplings for the food industry

Tuyauteries et raccords métalliques — Raccords filetés en acier inoxydable pour l'industrie alimentaire

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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 2853 was drawn up by Technical Committee ISO/TC 5, *Metal pipes and fittings*, and circulated to the Member Bodies in July 1974.

It has been approved by the Member Bodies of the following countries:

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Australia
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Metal pipes and fittings — Stainless steel screwed couplings for the food industry

1 SCOPE

This International Standard specifies the dimensions, tolerances, surface roughness, materials, assembling and hygienic requirements for :

- a) welded and expanded type male parts and liners,
- b) nuts and gaskets,

in screwed pipe couplings with trapezoidal thread for the food industry.

2 FIELD OF APPLICATION

Male parts and liners for screwed couplings with trapezoidal threads for the food industry are intended to be applied to stainless steel tubes specified in ISO 2037.

3 REFERENCES

ISO 48, *Vulcanized rubbers — Determination of hardness (Hardness between 30 and 85 IRHD)*.

ISO/R 79, *Brinell hardness test for steel and cast iron*.

ISO/R 80, *Rockwell hardness test (B and C scales) for steel*.

ISO/R 81, *Vickers hardness test for steel*.

ISO/R 468, *Surface roughness*.

ISO 2037, *Pipes and fittings — Stainless steel tubes for the food industry*.

ISO 2604/II, *Steel products for pressure purposes — Quality requirements — Part II : Wrought seamless tubes*.

4 SYMBOLS

A = allowance of male part thread

B_1 = inside diameter of support ring

B_2 = outside diameter of support ring

C_1 = spigot diameter of expanded type male part and liner

C_2 = spigot diameter of welded type male part and liner

C_3 = inside diameter of hexagon and round nut

C_4 = inside diameter of gasket

C_5 = inside diameter of expanded type male part and liner

C_6 = inside diameter of welded type male part and liner

C_7 = outside diameter of expanded and welded type liner

C_8 = outside diameter of round nut

C_9 = centring inside diameter of nut

C_{10} = outside diameter of neck of welded type male part and liner

d = major diameter of male part thread

d_1 = minor diameter of male part thread

d_2 = pitch diameter of male part thread

D = major diameter of nut thread

D_1 = minor diameter of nut thread

D_2 = pitch diameter of nut thread

E = inside diameter of gasket lip

F_1 = total length of expanded type male part

F_2 = total length of welded type male part and liner

F_3 = total length of expanded type liner

F_4 = total length of hexagon and round nut

F_5 = inside width of support ring

G_1 = length of external thread of expanded and welded type male part

G_2 = length of internal thread of hexagon and round nut

H = height of fundamental triangle of thread

J = chamfer diameter of round nut

K = length of spigot of expanded and welded type male part and liner

L_1 = flange thickness of expanded and welded type liner

L_2 = inside flange thickness of hexagon and round nut

M_1 = outside diameter of lip of gasket to be used with support ring

M_2 = outside diameter of lip of gasket to be used without support ring

N_1 = width across slots of round nut

N_2 = width across flats of hexagon nut

O = width of slot of round nut

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P = pitch of thread

R_1 = fillet radius of welded type male part

R_2 = fillet radius of welded type liner

S = outside diameter of gasket (lip excluded) to be used with support ring

T_2 = length of lip of gasket to be used with support ring

T_3 = wall thickness of support ring

U = total thickness of gasket

V = compression thickness of gasket

w = root width of male part threads on GO side profile

W = root width of nut threads on GO side profile

X_1 = lock ring groove diameter

X_2 = lock ring outside diameter

α_1 = angle of chamfer of round nut

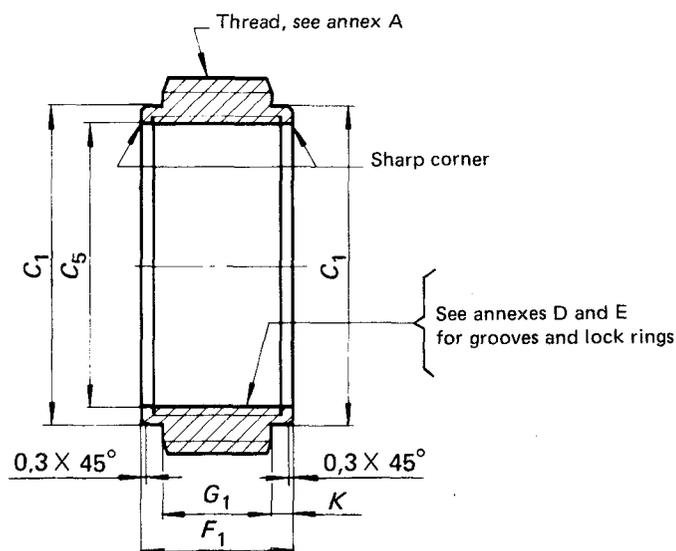
α_2 = angle of flange of support ring

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5 EXPANDED TYPE MALE PART

5.1 Dimensions

$G_1 = 13,5 \text{ mm (0.531 in)}$
 $K = 3 \text{ mm (0.118 in)}$



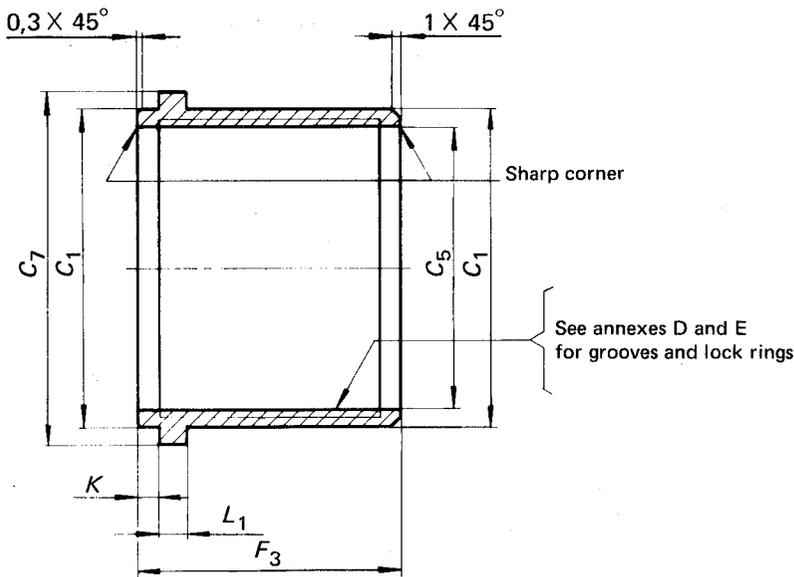
Nominal size		C_1		C_5		F_1	
mm	in	mm	in	mm	in	mm	in
12	—	15,0	0.591	12,0	0.472	17	0.669
18	—	21,2	0.835	18,0	0.709	17	0.669
22	—	25,4	1.000	22,0	0.866	17	0.669
25	—	29,0	1.142	25,0	0.984	17	0.669
28	—	31,8	1.252	28,0	1.102	17	0.669
33,7	1.327	38,0	1.496	33,7	1.327	20	0.787
38	1.500	42,5	1.673	38,0	1.496	20	0.787
40	—	44,5	1.752	40,0	1.575	20	0.787
51	2.000	56,0	2.205	51,0	2.008	20	0.787
63,5	2.500	69,7	2.744	63,5	2.500	25	0.984
70	2.750	76,2	3.000	70,0	2.756	25	0.984
76,1	3.000	82,3	3.240	76,1	2.996	30	1.181
88,9	3.500	95,4	3.756	88,9	3.500	30	1.181
101,6	4.000	108,4	4.268	101,6	4.000	30	1.181

5.2 Tolerances

Spigot diameter C_1 : h10
 Inside diameter C_5 : A10
 Total length F_1 : $\pm 0,2 \text{ mm (0.008 in)}$
 Length of thread G_1 : $\pm 0,2 \text{ mm (0.008 in)}$
 Length of spigot K : $\pm 0,1 \text{ mm (0.004 in)}$

6 EXPANDED TYPE LINER

6.1 Dimensions



K = 3 mm (0.118 in)
L₁ = 4 mm (0.157 in)

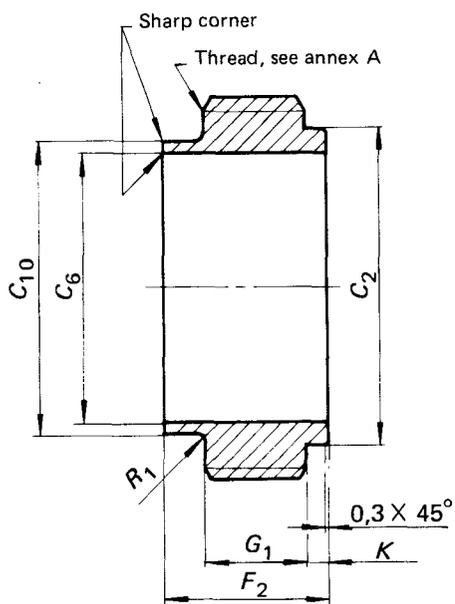
Nominal size		C ₁		C ₅		C ₇		F ₃	
mm	in	mm	in	mm	in	mm	in	mm	in
12	—	15,0	0.591	12,0	0.472	19,6	0.772	16	0.630
18	—	21,2	0.835	18,0	0.709	25,8	1.016	18	0.709
22	—	25,4	1.000	22,0	0.866	30,0	1.181	20	0.787
25	—	29,0	1.142	25,0	0.984	33,8	1.331	20	0.787
28	—	31,8	1.252	28,0	1.102	36,6	1.441	20	0.787
33,7	1.327	38,0	1.496	33,7	1.327	42,5	1.673	20	0.787
38	1.500	42,5	1.673	38,0	1.496	47,0	1.850	20	0.787
40	—	44,5	1.752	40,0	1.575	49,0	1.929	20	0.787
51	2.000	56,0	2.205	51,0	2.008	60,5	2.382	25	0.984
63,5	2.500	69,7	2.744	63,5	2.500	74,0	2.913	30	1.181
70	2.750	76,2	3.000	70,0	2.756	80,9	3.185	30	1.181
76,1	3.000	82,3	3.240	76,1	2.996	87,5	3.445	30	1.181
88,9	3.500	95,4	3.756	88,9	3.500	101,0	3.976	30	1.181
101,6	4.000	108,4	4.268	101,6	4.000	114,1	4.492	30	1.181

6.2 Tolerances

Spigot diameter C₁ : h10
 Inside diameter C₅ : A10
 Outside diameter C₇ : h10
 Length of spigot K : ± 0,1 mm (0.004 in)
 Flange thickness L₁ : ± 0,2 mm (0.008 in)
 Total length F₃ : ± 0,2 mm (0.008 in)

7 WELDED TYPE MALE PART

7.1 Dimensions



$G_1 = 13,5 \text{ mm (0.531 in)}$
 $F_2 = 21,5 \text{ mm (0.846 in)}$
 $K = 3 \text{ mm (0.118 in)}$
 $R_1 = 2,5 \text{ mm (0.098 in)}$

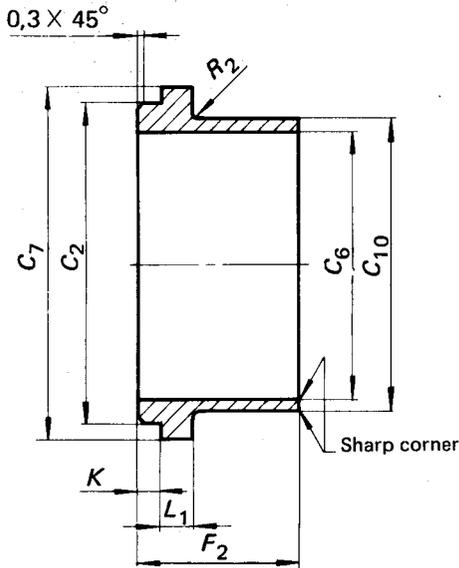
Nominal size		C_2		C_6		C_{10}	
mm	in	mm	in	mm	in	mm	in
25	—	29,2	1.150	22,6	0.890	25,6	1.008
28	—	32,0	1.260	25,6	1.008	28,6	1.126
33,7	1.327	38,2	1.504	31,3	1.232	34,3	1.350
38	1.500	42,7	1.681	35,6	1.402	38,6	1.520
40	—	44,7	1.760	37,6	1.480	40,6	1.598
51	2.000	56,2	2.213	48,6	1.913	51,6	2.031
63,5	2.500	69,9	2.752	60,3	2.374	64,1	2.524
70	2.750	76,4	3.008	66,8	2.630	70,6	2.780
76,1	3.000	82,6	3.252	72,9	2.870	76,7	3.020
88,9	3.500	95,7	3.768	84,9	3.343	89,8	3.535
101,6	4.000	108,7	4.280	97,6	3.843	102,5	4.035

7.2 Tolerances

Spigot diameter C_2 : h10
 Inside diameter C_6 : H11
 Total length F_2 : $\pm 0,2 \text{ mm (0.008 in)}$
 Length of thread G_1 : $\pm 0,2 \text{ mm (0.008 in)}$
 Length of spigot K : $\pm 0,1 \text{ mm (0.004 in)}$
 Fillet radius R_1 : $\pm 0,2 \text{ mm (0.008 in)}$
 Outside diameter of neck C_{10} : h11

8 WELDED TYPE LINER

8.1 Dimensions



$K = 3 \text{ mm (0.118 in)}$
 $L_1 = 4 \text{ mm (0.157 in)}$
 $F_2 = 21,5 \text{ mm (0.846 in)}$
 $R_2 = 2 \text{ mm (0.079 in)}$

Nominal size		C_2		C_6		C_7		C_{10}	
mm	in	mm	in	mm	in	mm	in	mm	in
25	—	29,2	1.150	22,6	0.890	33,8	1.331	25,6	1.008
28	—	32,0	1.260	25,6	1.008	36,6	1.441	28,6	1.126
33,7	1.327	38,2	1.504	31,3	1.232	42,5	1.673	34,3	1.350
38	1.500	42,7	1.681	35,6	1.402	47,0	1.850	38,6	1.520
40	—	44,7	1.760	37,6	1.480	49,0	1.929	40,6	1.598
51	2.000	56,2	2.213	48,6	1.913	60,5	2.382	51,6	2.031
63,5	2.500	69,9	2.752	60,3	2.374	74,0	2.913	64,1	2.524
70	2.750	76,4	3.008	66,8	2.630	80,9	3.185	70,6	2.780
76,1	3.000	82,6	3.252	72,9	2.870	87,5	3.445	76,7	3.020
88,9	3.500	95,7	3.768	84,9	3.343	101,0	3.976	89,8	3.535
101,6	4.000	108,7	4.280	97,6	3.843	114,1	4.492	102,5	4.035

8.2 Tolerances

Spigot diameter C_2 : h10

Inside diameter C_6 : H11

Outside diameter C_7 : h10

Length of spigot K : $\pm 0,1 \text{ mm (0.004 in)}$

Flange thickness L_1 : $\pm 0,2 \text{ mm (0.008 in)}$

Total length F_2 : $\pm 0,2 \text{ mm (0.008 in)}$

Fillet radius R_2 : $\pm 0,2 \text{ mm (0.008 in)}$

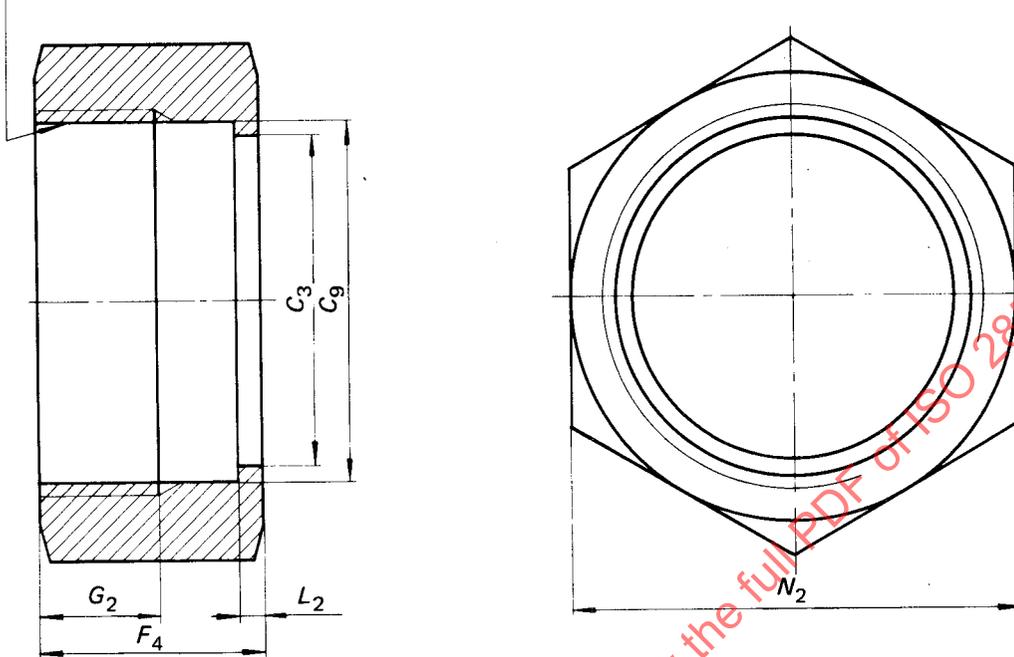
Outside diameter of neck C_{10} : h11

9 HEXAGON NUT

9.1 Dimensions

$F_4 = 30 \text{ mm (1.181 in)}$
 $G_2 = 16 \text{ mm (0.630 in)}$
 $L_2 = 3,5 \text{ mm (0.138 in)}$

Thread, see annex A



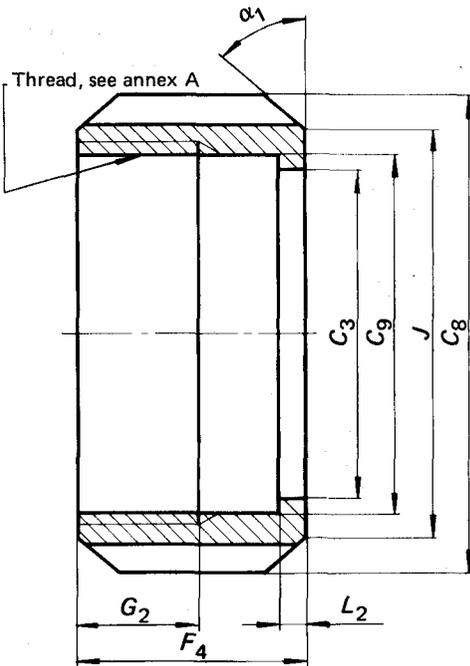
Nominal size		C_3		C_9		N_2	
mm	in	mm	in	mm	in	mm	in
12	—	16,0	0.630	20,10	0.791	32	1.260
18	—	22,2	0,874	26,47	1.042	41	1.614
22	—	26,4	1.039	30,74	1.210	46	1.811
25	—	30,5	1.201	34,34	1.352	46	1.811
28	—	32,8	1.291	37,11	1.461	50	1.969
33,7	1.327	39,0	1.535	43,18	1.700	60	2.362
38	1.500	43,5	1.713	47,86	1.884	60	2.362
40	—	45,5	1.791	49,89	1.964	65	2.560
51	2.000	57,0	2.244	61,37	2.416	75	2.953
63,5	2.500	70,7	2.783	74,88	2.948	90	3.543
70	2.750	77,2	3.039	81,79	3.220	100	3.937
76,1	3.000	83,3	3.280	88,40	3.480	105	4.134
88,9	3.500	97,0	3.819	101,91	4.012	115	4.528
101,6	4.000	110,0	4.331	115,42	4.544	135	5.315

9.2 Tolerances

Inside diameter C_3 : H11
 Centring diameter C_9 : $+ 0,16 \text{ mm (0.006 in)}$
 0
 Total length F_4 : $\pm 0,2 \text{ mm (0.008 in)}$
 Length of thread G_2 : $\pm 1 \text{ mm (0.039 in)}$
 Inside flange thickness L_2 : $\pm 0,2 \text{ mm (0.008 in)}$
 Width across flats N_2 : h15

10 ROUND NUT

10.1 Dimensions



$F_4 = 30 \text{ mm (1.181 in)}$
 $G_2 = 16 \text{ mm (0.630 in)}$
 $L_2 = 3,5 \text{ mm (0.138 in)}$
 $\alpha_1 = 50^\circ$

Nominal size		C_3		C_8		C_9		J		N_1		O	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
12	—	16,0	0.630	33	1.299	20,10	0.791	26	1.024	27	1.063	6	0.236
18	—	22,2	0.874	40	1.575	26,47	1.042	35	1.378	36	1.417	6	0.236
22	—	26,4	1.039	44	1.732	30,74	1.210	37	1.457	38	1.496	6	0.236
25	—	30,5	1.201	48	1.890	34,34	1.352	41	1.614	42	1.654	6	0.236
28	—	32,8	1.291	49	1.929	37,11	1.461	42	1.654	43	1.693	6	0.236
33,7	1.327	39,0	1,535	58	2.283	43,18	1.700	49	1.929	50	1.969	8	0.315
38	1.500	43,5	1.713	64	2.520	47,86	1,884	55	2.165	56	2.205	8	0.315
40	—	45,5	1.791	65	2.559	49,89	1.964	57	2.244	58	2.283	8	0.315
51	2.000	57,0	2.244	77	3.031	61,37	2.416	68	2.677	69	2.717	8	0.315
63,5	2.500	70,7	2.783	91	3.583	74,88	2.948	82	3.228	83	3.268	10	0.394
70	2.750	77,2	3.039	98	3.858	81,79	3.220	89	3.504	90	3.543	10	0.394
76,1	3.000	83,3	3.280	106	4.173	88,40	3.480	97	3.819	98	3.858	10	0.394
88,9	3.500	97,0	3.819	122	4.803	101,91	4.012	112	4.409	113	4.449	12	0.472
101,6	4.000	110,0	4.331	135	5.315	115,42	4.544	125	4.921	126	4.961	12	0.472

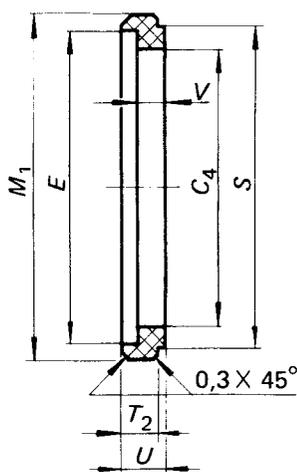
10.2 Tolerances

- Outside diameter C_8 : h13
- Chamfer diameter J : $\pm 1 \text{ mm (0.039 in)}$
- Inside diameter C_3 : H11
- Length of thread G_2 : $\pm 1 \text{ mm (0.039 in)}$
- Inside flange thickness L_2 : $\pm 0,2 \text{ mm (0.008 in)}$
- Total length F_4 : $\pm 0,2 \text{ mm (0.008 in)}$
- Width across slots N_1 : h15
- Width of slot O : H13
- Centring diameter C_9 : $+ 0,16 \text{ mm (0.006 in)}$

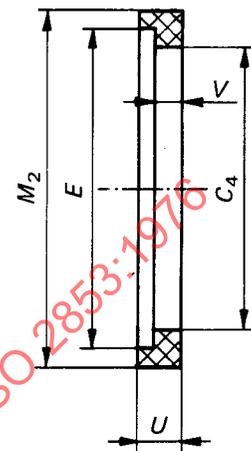
11 GASKET

Specification of the gasket, see annex C.

11.1 Dimensions



$T_2 = 5,2 \text{ mm (0.205 in)}$
 $U = 6 \text{ mm (0.236 in)}$
 $V = 4 \text{ mm (0.157 in)}$



Gasket to be used with the support ring in clause 12

Gasket to be used without the support ring

Nominal size		C ₄		E		M ₁		M ₂		S	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
12	—	11,0	0.433	14,8	0.583	18,2	0.717	18,5	0.728	15,5	0.610
18	—	17,0	0.669	21,0	0.827	24,4	0.961	24,7	0.972	21,7	0.854
22	—	21,0	0.827	25,2	0.992	28,6	1.126	28,9	1.138	25,9	1.020
25	—	23,6	0.929	28,8	1.134	32,2	1.268	32,5	1.280	29,5	1.161
28	—	26,6	1.047	31,6	1.244	35,0	1.378	35,3	1.390	32,3	1.272
33,7	1.327	32,3	1.272	37,8	1.488	41,2	1.622	41,5	1.634	38,5	1.516
38	1.500	36,6	1.441	42,3	1.665	45,7	1.799	46,0	1.811	43,0	1.693
40	—	38,6	1.520	44,3	1.744	47,7	1.878	48,0	1.890	45,0	1.772
51	2.000	49,6	1.953	55,8	2.197	59,2	2.331	59,5	2.343	56,5	2.224
63,5	2.500	61,3	2.413	69,5	2.736	72,9	2.870	73,2	2.882	70,2	2.764
70	2.750	67,8	2.669	76,0	2.992	79,4	3.126	80,0	3.150	76,7	3.020
76,1	3.000	73,9	2.909	82,2	3.236	85,6	3.370	86,5	3.406	82,9	3.264
88,9	3.500	85,9	3.382	95,3	3.752	98,7	3.886	99,5	3.917	96,0	3.780
101,6	4.000	98,6	3.882	108,3	4.264	111,7	4.398	112,5	4.429	109,0	4.291

11.2 Tolerances

Inside diameter of gasket C₄ : + 0,5 mm (0.020 in)
 0

Inside diameter of gasket lip E : ± 0,25 mm (0.010 in)

Outside diameter of gasket lip M₁ and M₂ : ± 0,25 mm (0.010 in)

Outside diameter of gasket S (lip excluded) : - 0,5 mm (0.020 in)
 0

Length of gasket lip T₂ : ± 0,1 mm (0.004 in)

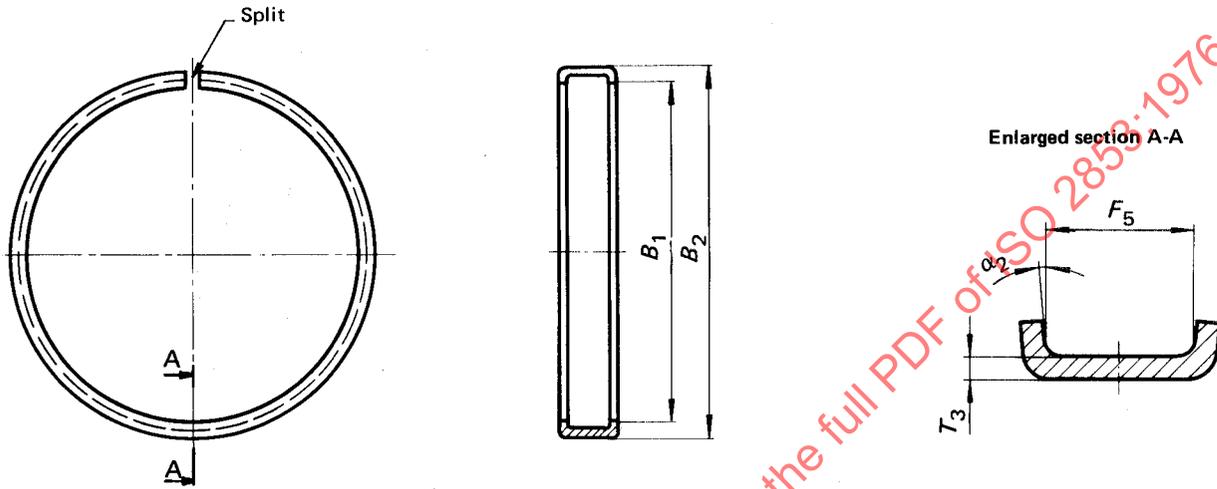
Total thickness of gasket U : ± 0,1 mm (0.004 in)

Compression thickness of gasket V : ± 0,1 mm (0.004 in)

12 SUPPORT RING

12.1 Dimensions

$F_5 = 5,3 \text{ mm (0.209 in)}$
 $T_3 = 0,7 \text{ mm (0.028 in)}$
 $\alpha_2 = 1,5^\circ \text{ max.}$



Nominal size		B_1		B_2	
mm	in	mm	in	mm	in
12	—	15,8	0.622	19,6	0.772
18	—	22,0	0.866	25,8	1.016
22	—	26,2	1.031	30,0	1.181
25	—	29,8	1.173	33,6	1.323
28	—	32,6	1.283	36,4	1.433
33,7	1.327	38,8	1.528	42,6	1.677
38	1.500	43,3	1.705	47,1	1.854
40	—	45,3	1.783	49,1	1.933
51	2.000	56,8	2.236	60,6	2.386
63,5	2.500	70,5	2.776	74,3	2.925
70	2.750	77,0	3.031	80,8	3.181
76,1	3.000	83,2	3.276	87,0	3.425
88,9	3.500	96,3	3.791	100,1	3.941
101,6	4.000	109,3	4.303	113,1	4.453

12.2 Tolerances

Inside diameter of ring B_1 : $\pm 0,13 \text{ mm (0.005 in)}$
 Outside diameter of ring B_2 : $\pm 0,13 \text{ mm (0.005 in)}$
 Inside width of ring F_5 : $\pm 0,04 \text{ mm (0.002 in)}$
 Wall thickness of ring T_3 : $\pm 0,05 \text{ mm (0.002 in)}$

13 ASSEMBLING

13.1 Welding

Welded type male parts and liners shall be attached to the pipe ends by means of a butt weld.

13.2 Expanding

Expanded type male parts and liners shall be attached to the pipe ends by expanding. A method for carrying out the expansion is described in annex F. This method can be applied to pipes up to and including 101,6 mm (4.000 in).

14 HYGIENIC REQUIREMENTS

14.1 All surfaces of the coupling in contact with the foodstuff shall be easily accessible for cleaning, either by cleaning in place (CIP) methods or by manual cleaning when disassembled. Removable parts shall be readily demountable.

14.2 Welded type male parts and liners shall be internally clean and smooth. They shall be free from harmful surface defects or inclusions.

14.3 The gasket shall be of a material compatible under processing conditions with the foodstuffs and cleaning fluids utilized. It shall not, for example, impart an odour or taste to the foodstuff.

15 SURFACE ROUGHNESS

Surface roughness of expanded and welded male parts and liners, nuts and support rings shall be specified in accordance with ISO/R 468. For finely finished surfaces, $R_a \leq 1,0 \mu\text{m}$ (40 μin).

16 MATERIALS

16.1 Male parts, liners, nuts and support rings

Austenitic stainless steel shall be selected from ISO 2604/11.

Suitable materials for general applications are the steel types TS 47, TS 60 and TS 61.

16.2 Gaskets

The gaskets shall be of natural or synthetic rubber with a hardness from 80 to 85 IRHD according to ISO 48. The material shall meet the hygienic requirements and have a reasonable life expectancy.

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ANNEX A

TRAPEZOIDAL THREADS INTENDED FOR SCREWED COUPLINGS

A.1 EXPLANATION OF TERMS

A.1.1 **basic profile** : Joint profile to which tolerances are referred for male part and nut threads (see figure 1).

A.1.2 **pitch (P)** : Axial lead per turn of the screw thread. Nominal value adopted for the pitch is 8 threads per inch.

$P = 3,175 \text{ mm (0,125 in)}$

A.1.3 **major diameter** : Diameter over crests of the male part thread and over roots of the nut thread (see figure 1).

A.1.4 **pitch diameter** : see figure 1.

A.1.5 **minor diameter** : see figure 1.

A.1.6 **GO side profile** : Profile forming the limiting thread profile of the "GO" side (see figure 2).

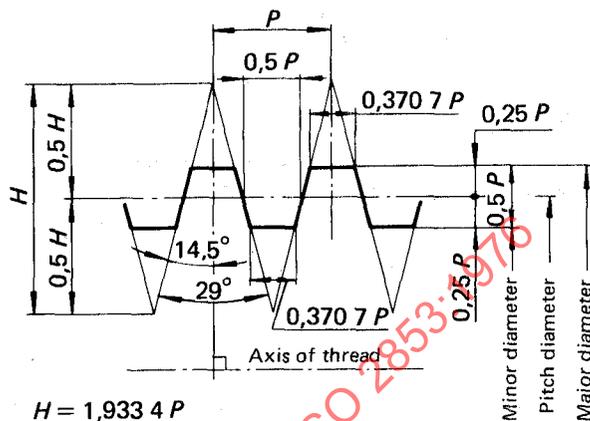
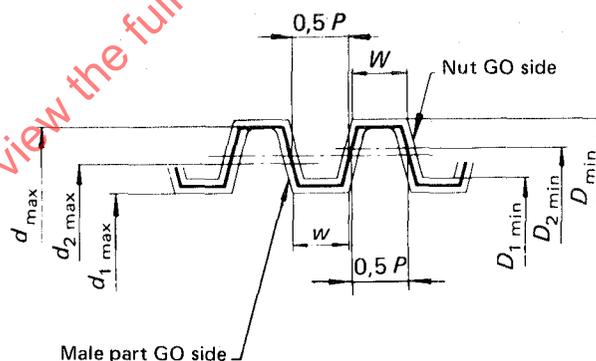


FIGURE 1



The thick line indicates the basic profile.

FIGURE 2

A.2 DETERMINATION OF THREAD LIMITING DIMENSIONS

A.2.1 Thread diameters

A.2.1.1 Male parts

	Major diameter d		Pitch diameter $d_2 = d - 0,5 P$		Minor diameter $d_1 = d - P$	
	GO side limit	Lower limit	GO side limit	Lower limit	GO side limit	Lower limit
mm	0	$- 0,05 P$	$- A$	$- (A + T)$	$- 0,508$	$- (0,508 + 1,5 T)$
in	0	$- 0,05 P$	$- A$	$- (A + T)$	$- 0,02$	$- (0,02 + 1,5 T)$

A.2.1.2 Nuts

	Major diameter $D (= d)$		Pitch diameter $D_2 = D - 0,5 P$		Minor diameter $D_1 = D - P$	
	GO side limit	Upper limit	GO side limit	Upper limit	GO side limit	Upper limit
mm	+ 0,889	+ 1,397	+ 0,368	+ (0,368 + T)	+ 0,381	+ (0,381 + 0,05 P)
in	+ 0.035	+ 0.055	+ 0.014 5	+ (0.014 5 + T)	+ 0.015	+ (0.015 + 0.05 P)

Tolerances T

$$T_{\text{mm}} = 0,070\ 56 \sqrt{P} + 0,014\ 11 \sqrt{d}$$

$$T_{\text{in}} = 0.014 \sqrt{P} + 0.002\ 8 \sqrt{d}$$

Allowances A

$$A_{\text{mm}} = 0,030\ 24 \sqrt{d}$$

$$A_{\text{in}} = 0.006 \sqrt{d}$$

A.2.2 Root width of threads (w, W) on GO side profile

A.2.2.1 Male parts

$$w_{\text{mm}} = 0,370\ 7 P - 0,127 + 0,008\ 064 \sqrt{d}$$

$$w_{\text{in}} = 0.370\ 7 P - 0.005 + 0.001\ 6 \sqrt{d}$$

A.2.2.2 Nuts

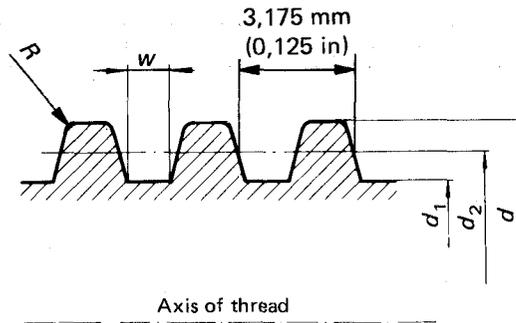
$$W_{\text{mm}} = 0,370\ 7 P - 0,135$$

$$W_{\text{in}} = 0.370\ 7 P - 0.005\ 3$$

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A.3 THREAD DIMENSIONS

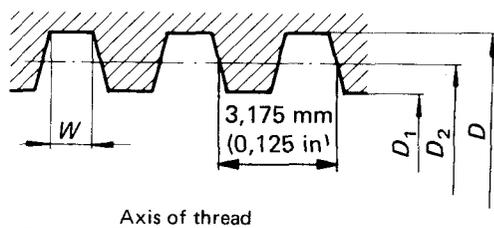
A.3.1 Male part



Male part threads shall be provided with a radius (R) max. 0,2 mm (0.008 in) or a corresponding chamfer at an angle of 45° to the axis.

Nominal size		d				d_2				d_1				w	
		max.		min.		max.		min.		max.		min.			
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
12	—	22,89	0.901	22,73	0.895	21,16	0.833	20,96	0.825	19,21	0.756	18,92	0.745	1,089	0.0429
18	—	29,26	1.152	29,10	1.146	27,51	1.083	27,31	1.075	25,58	1.007	25,27	0.995	1,094	0.043 1
22	—	33,53	1.320	33,37	1.314	31,77	1.251	31,56	1.243	29,85	1.175	29,54	1.163	1,097	0.043 2
25	—	37,13	1.462	36,97	1.456	35,36	1.392	35,15	1.384	33,45	1.317	33,13	1.304	1,097	0.043 2
28	—	39,90	1.571	39,74	1.565	38,12	1.501	37,91	1.493	36,22	1.426	35,89	1.413	1,101	0.043 3
33,7	1.327	45,97	1.810	45,81	1.804	44,18	1.739	43,96	1.730	42,29	1.665	41,95	1.652	1,105	0.043 5
38	1.500	50,65	1.994	50,49	1.988	48,85	1.923	48,62	1.914	46,97	1.849	46,63	1.836	1,107	0.043 6
40	—	52,68	2.074	52,52	2.068	50,87	2.003	50,64	1.994	49,00	1.929	48,65	1.916	1,109	0.043 7
51	2.000	64,16	2.526	64,00	2.520	62,33	2.454	62,09	2.444	60,48	2.381	60,12	2.367	1,115	0.043 9
63,5	2.500	77,67	3.058	77,51	3.052	75,82	2.985	75,57	2.975	73,99	2.913	73,61	2.898	1,121	0.044 1
70	2.750	84,58	3.330	84,42	3.324	82,71	3.256	82,45	3.246	80,90	3.185	80,51	3.170	1,124	0.044 3
76,1	3.000	91,19	3.590	91,03	3.584	89,31	3.516	89,05	3.506	87,51	3.445	87,12	3.430	1,127	0.044 4
88,9	3.500	104,70	4.122	104,54	4.116	102,80	4.047	102,53	4.037	101,02	3.977	100,61	3.961	1,132	0.044 6
101,6	4.000	118,21	4.654	118,06	4.648	116,29	4.578	116,01	4.567	114,53	4.509	114,11	4.492	1,138	0.044 8

A.3.2 Nut



$W = 1,042 \text{ mm}$ (0.041 in)

Nominal size		D				D_2				D_1			
		max.		min.		max.		min.		max.		min.	
mm	in	mm	in	mm	in	mm	in	mm	in	mm	in	mm	in
12	—	24,28	0.956	23,78	0.936	21,86	0.861	21,67	0.853	20,25	0.797	20,10	0.791
18	—	30,66	1.207	30,15	1.187	28,24	1.111	28,04	1.104	26,62	1.048	26,47	1.042
22	—	34,93	1.375	34,42	1.355	32,52	1.280	32,31	1.272	30,89	1.216	30,74	1.210
25	—	38,53	1.517	38,02	1.497	36,12	1.422	35,91	1.414	34,49	1.358	34,34	1.352
28	—	41,30	1.626	40,79	1.606	38,90	1.531	38,68	1.523	37,26	1.467	37,11	1.461
33,7	1.327	47,37	1.865	46,86	1.845	44,97	1.771	44,75	1.762	43,33	1.706	43,18	1.700
38	1.500	52,05	2.049	51,54	2.029	49,66	1.955	49,43	1.946	48,01	1.890	47,86	1.884
40	—	54,08	2.129	53,57	2.109	51,69	2.035	51,46	2.026	50,04	1.970	49,89	1.964
51	2.000	65,56	2.581	65,05	2.561	63,18	2.487	62,94	2.478	61,52	2.422	61,37	2.416
63,5	2.500	79,07	3.113	78,56	3.093	76,70	3.020	76,45	3.010	75,03	2.954	74,88	2.948
70	2.750	85,98	3.385	85,47	3.365	83,62	3.292	83,36	3.282	81,94	3.226	81,79	3.220
76,1	3.000	92,59	3.645	92,08	3.625	90,23	3.552	89,97	3.542	88,55	3.486	88,40	3.480
88,9	3.500	106,10	4.177	105,59	4.157	103,75	4.085	103,48	4.074	102,06	4.018	101,91	4.012
101,6	4.000	119,61	4.709	119,10	4.689	117,27	4.617	116,99	4.606	115,57	4.550	115,42	4.544

ANNEX B

CROSS-SECTION OF SCREWED COUPLING ASSEMBLY

This annex illustrates the assembling of welded and expanded type couplings.

B.1 EXPANDED TYPE COUPLING

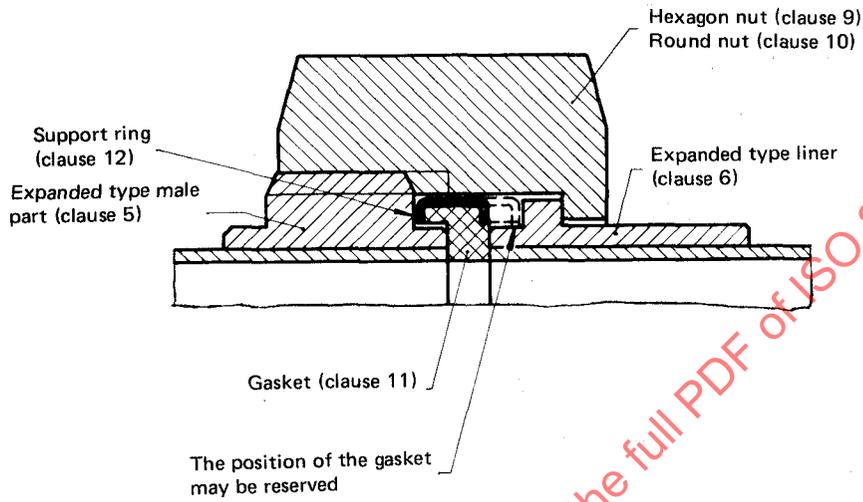


FIGURE 3

B.2 WELDED TYPE COUPLING

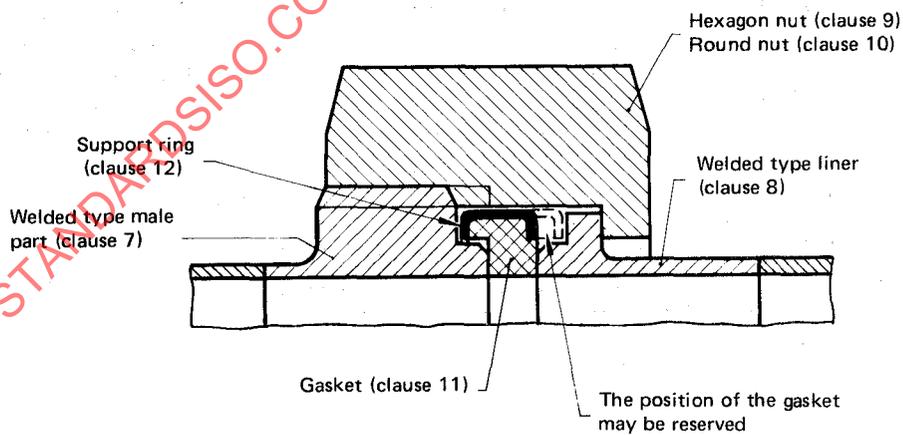


FIGURE 4