INTERNATIONAL STANDARD

ISO 3601-1

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Fluid power systems — O-rings —

Part 1: Inside diameters, cross-sections, tolerances and designation codes

Transmissions hydrauliques et pneumatiques — Joints toriques —

Partie 1: Diamètres intérieurs, sections, tolérances et codes d'identification dimensionnelle

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ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

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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 preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established 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. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

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 3601-1 was prepared by Technical Committee ISO/TC 131, *Fluid power systems*, Subcommittee SC 7, *Sealing devices*.

This fifth edition cancels and replaces the fourth edition (ISO 3601-1:2008), which has been technically revised. It also incorporates the Technical Corrigenda ISO 3601-1:2008/Cor 1:2009 and ISO 3601-1:2008/Cor 2:2009.

ISO 3601 consists of the following parts, under the general title *Fluid power systems — O-rings*:

— *Part 1: Inside diameters, cross-sections, tolerances and designation codes*

— *Part 2: Housing dimensions for general applications*

— *Part 3: Quality acceptance criteria*

— *Part 4: Anti-extrusion rings (back-up rings)*

— *Part 5: Suitability of elastomeric materials for industrial applications*

Introduction

In fluid power systems, power is transmitted and controlled through a fluid (liquid or gas) under pressure within an enclosed circuit. To avoid leakage or to seal different chambers of a component from each other, sealing devices are used. O-rings are one type of sealing device.

Fluid power systems — O-rings —

Part 1: Inside diameters, cross-sections, tolerances and designation codes

1 Scope

This part of ISO 3601 specifies the inside diameters, cross-sections, tolerances and designation codes for O-rings used in fluid power systems for general industrial and aerospace applications.

The dimensions and tolerances specified in this part of ISO 3601 are suitable for any elastomeric material, provided that suitable tooling is available.

NOTE The tooling most commonly available is based on 70 IRHD NBR shrinkage rates (see ISO 48). For materials that shrink differently from this standard NBR compound, a special mould can be required to maintain the mean diameters and the tolerance limits listed.

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 48, *Rubber, vulcanized or thermoplastic — Determination of hardness (hardness between 10 IRHD and 100 IRHD)*

ISO 3601-3, *Fluid power systems — O-rings — Part 3: Quality acceptance criteria*

ISO 5598, *Fluid power systems and components — Vocabulary*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in ISO 5598 apply.

4 Symbols

The following symbols are used in this part of ISO 3601:

— d_1 O-ring inside diameter;

— d_2 O-ring cross-section diameter.

5 Configuration

The shape of the O-ring shall be toroidal, as shown in Figure 1.

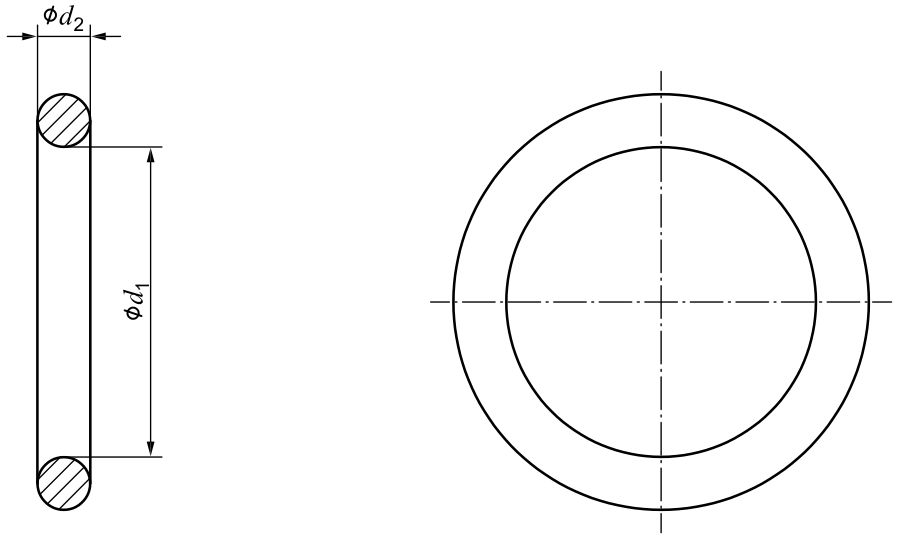


Figure 1 — Typical O-ring configuration

6 Inside diameters, d_1, cross-sections (section diameter), d_2, and tolerances

6.1 The combinations of inside diameters and cross-section diameters shall be chosen depending on the application:

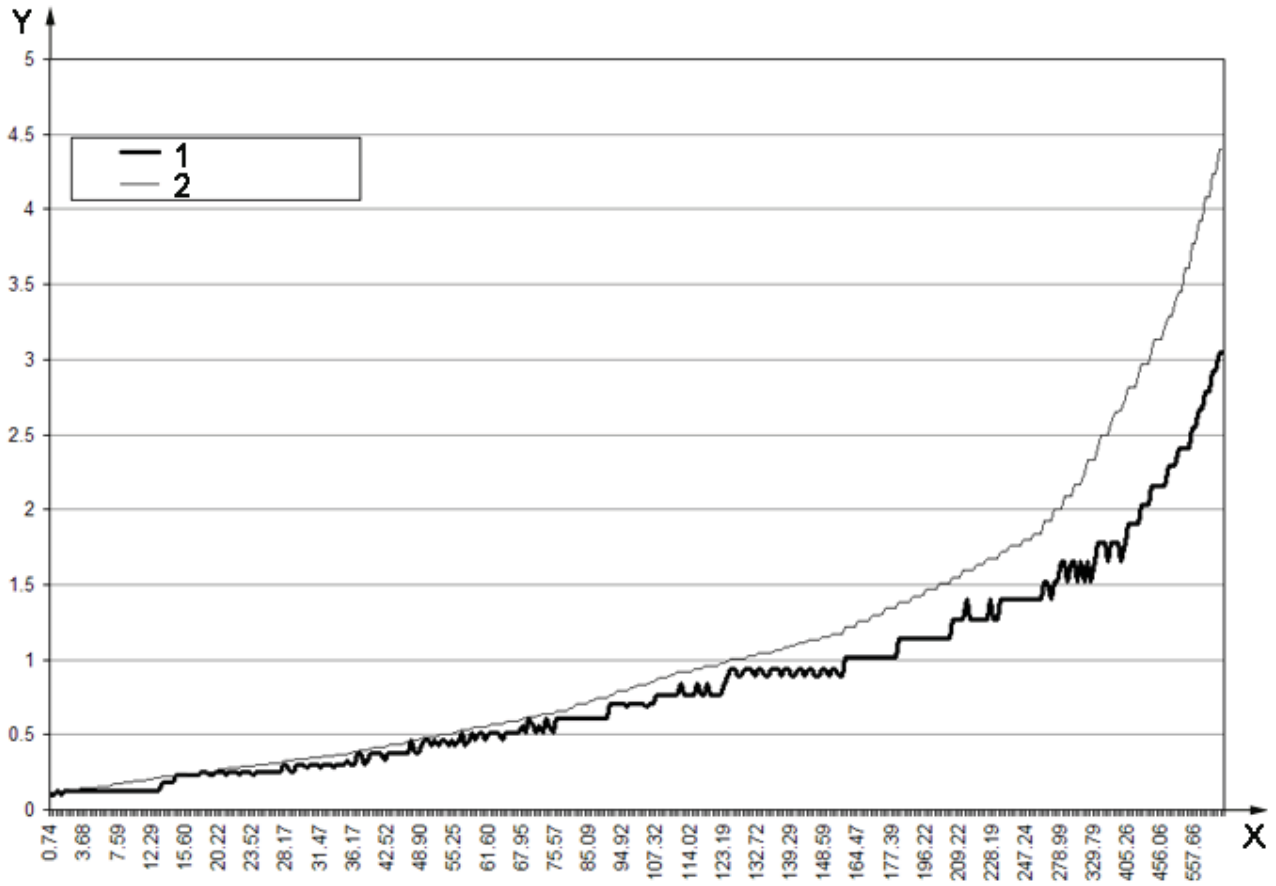
— from Tables 1 through 6 for general industrial applications;

— from Tables 7 through 11 for aerospace applications.

6.2 For industrial applications, two classes of inside diameter tolerances, class A and class B, are specified. The tolerance of class B O-rings is based on Equation (A.1). Class A O-rings have tighter inside diameter tolerances than class B O-rings and are suitable for industrial or aerospace applications when the application or the housing require tighter tolerances. Class B O-rings have dimensions and tolerances suitable for general-purpose applications. The inside diameter tolerances are based on Equation (A.1). For information, Figure 2 shows a graphical comparison of the inside-diameter tolerances for class A and class B O-rings.

6.3 Cross-section tolerances for non-standard (custom) O-rings for general industrial applications not listed in Tables 1 through 6 can be chosen from Table A.1. Tolerances for inside diameters for non-standard (custom) class A O-rings are listed in Table A.2. Equation (A.1) can be used to calculate inside diameter tolerances for non-standard (custom) class B O-rings.

In marginal cases, the compliance with the limits of the shape deviations and surface imperfections should be considered besides the dimensional tolerances. See ISO 3601-3.



Key

X O-ring inside diameter, d_1, expressed in millimetres

Y ± tolerances, expressed in millimetres

1 class A tolerance

2 class B tolerance

Figure 2 — Graphical comparison of inside diameter tolerances for class A and class B O-rings

7 Designation codes

7.1 O-rings for general industrial applications that conform to this part of ISO 3601 shall be designated as follows:

a) the word “O-ring” followed by a hyphen;

b) “ISO3601-1” followed by a hyphen;

c) the size code from the relevant table (see Tables 1 through 6) and “A” or “B” for the inside diameter tolerance class, followed by a hyphen;

d) the nominal inside diameter and cross-section dimensions, separated by an “×” and followed by a hyphen;

e) the grade letter (N, S or CS), in accordance with ISO 3601-3.

EXAMPLE 1 O-ring-ISO3601-1-011A-7,65×1,78-S

EXAMPLE 2 O-ring-ISO3601-1-125B-32,99×2,62-N

7.2 O-rings for aerospace applications that conform to this part of ISO 3601 shall be designated as follows:

a) the word “O-ring” followed by a hyphen;

b) “ISO3601-1” followed by the letter “A” (to designate an aerospace application), followed by a hyphen;

c) the size code from the relevant table (see Tables 7 through 11), followed by a hyphen;

d) the nominal inside diameter and cross-section dimensions, separated by an “×” and followed by a hyphen;

e) the grade letter (N, S or CS), in accordance with ISO 3601-3.

EXAMPLE 1 O-ring-ISO3601-1A-C0545-54,5×3,55-S

EXAMPLE 2 O-ring-ISO3601-1A-D1250-125×5,3-CS

8 Methods of measuring for receiving inspection

When it is necessary to inspect O-rings that conform to this part of ISO 3601 at the time of customer receipt, the inspection procedure shall be agreed upon by the supplier and purchaser at the time of order. Annex B provides possible methods for such a procedure for information.

9 Identification statement (reference to this part of ISO 3601)

Manufacturers are strongly recommended to use the following statement in test reports, catalogues and sales literature when electing to comply with this part of ISO 3601:

“O-ring inside diameters, cross-sections, tolerances and designation code are in accordance with ISO 3601-1:2011, *Fluid power systems — O-rings — Part 1: Inside diameters, cross-sections, tolerances and designation codes.*”

Table 1 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 1,02 mm, 1,27 mm and 1,52 mm

Size code	Size	Inside diameter						Cross-section diameter				Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in		d_2 nom.	Tol.	d_2 nom.	Tol.		
		mm	Class A	Class B	in	Class A	Class B	mm		in		cm^3	in^3
001	0,74 × 1,02	0,74	± 0,10	± 0,12	0,029	± 0,004	± 0,005	1,02	± 0,08	0,040	± 0,003	0,005	0,000 3
002	1,07 × 1,27	1,07			0,042			1,27		0,050		0,010	0,000 6
003	1,42 × 1,52	1,42			0,056			1,52		0,060		0,016	0,001 0

Table 2 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 1,78 mm ± 0,08 mm (0,070 in ± 0,003 in)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
004	1,78 × 1,78	1,78	± 0,13	± 0,13	0,070	± 0,005	± 0,005	0,028	0,001 7
005	2,57 × 1,78	2,57			0,101			0,034	0,002 1
006	2,90 × 1,78	2,90			0,114			0,036	0,002 2
007	3,68 × 1,78	3,68		± 0,14	0,145		± 0,006	0,043	0,002 6
008	4,47 × 1,78	4,47		± 0,15	0,176			0,049	0,003 0
009	5,28 × 1,78	5,28			0,208			0,056	0,003 4
010	6,07 × 1,78	6,07		± 0,16	0,239			0,061	0,003 7
011	7,65 × 1,78	7,65		± 0,17	0,301		± 0,007	0,074	0,004 5
012	9,25 × 1,78	9,25		± 0,18	0,364			0,085	0,005 2
013	10,82 × 1,78	10,82		± 0,20	0,426		± 0,008	0,098	0,006 0
014	12,42 × 1,78	12,42		± 0,21	0,489			0,111	0,006 8
015	14,00 × 1,78	14,00	± 0,18	± 0,22	0,551	± 0,007	± 0,009	0,123	0,007 5
016	15,60 × 1,78	15,60	± 0,23	± 0,23	0,614	± 0,009		0,136	0,008 3
017	17,17 × 1,78	17,17		± 0,24	0,676		± 0,010	0,147	0,009 0
018	18,77 × 1,78	18,77		± 0,26	0,739			0,161	0,009 8
019	20,35 × 1,78	20,35		± 0,27	0,801		± 0,011	0,172	0,010 5
020	21,95 × 1,78	21,95		± 0,28	0,864			0,185	0,011 3
021	23,52 × 1,78	23,52		± 0,29	0,926			0,197	0,012 0
022	25,12 × 1,78	25,12	± 0,25	± 0,30	0,989	± 0,010	± 0,012	0,210	0,012 8
023	26,70 × 1,78	26,70		± 0,31	1,051			0,223	0,013 6
024	28,30 × 1,78	28,30		± 0,33	1,114		± 0,013	0,234	0,014 3
025	29,87 × 1,78	29,87	± 0,28	± 0,34	1,176	± 0,011		0,247	0,015 1
026	31,47 × 1,78	31,47		± 0,35	1,239		± 0,014	0,259	0,015 8
027	33,05 × 1,78	33,05		± 0,36	1,301			0,272	0,016 6
028	34,65 × 1,78	34,65	± 0,33	± 0,37	1,364	± 0,013	± 0,015	0,283	0,017 3
029	37,82 × 1,78	37,82		± 0,39	1,489		± 0,016	0,308	0,018 8
030	41,00 × 1,78	41,00		± 0,42	1,614			0,334	0,020 4
031	44,17 × 1,78	44,17	± 0,38	± 0,44	1,739	± 0,015	± 0,017	0,359	0,021 9
032	47,35 × 1,78	47,35		± 0,46	1,864		± 0,018	0,383	0,023 4

Table 2 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
033	50,52 × 1,78	50,52	± 0,46	± 0,48	1,989	± 0,018	± 0,019	0,408	0,024 9
034	53,70 × 1,78	53,70		± 0,51	2,114		± 0,020	0,433	0,026 4
035	56,87 × 1,78	56,87		± 0,53	2,239		± 0,021	0,457	0,027 9
036	60,05 × 1,78	60,05		± 0,55	2,364		± 0,022	0,482	0,029 4
037	63,22 × 1,78	63,22		± 0,57	2,489		± 0,023	0,506	0,030 9
038	66,40 × 1,78	66,40	± 0,51	± 0,59	2,614	± 0,020		0,533	0,032 5
039	69,57 × 1,78	69,57		± 0,62	2,739		± 0,024	0,557	0,034 0
040	72,75 × 1,78	72,75		± 0,64	2,864		± 0,025	0,582	0,035 5
041	75,92 × 1,78	75,92	± 0,61	± 0,66	2,989	± 0,024	± 0,026	0,606	0,037 0
042	82,27 × 1,78	82,27		± 0,70	3,239		± 0,028	0,655	0,040 0
043	88,62 × 1,78	88,62		± 0,75	3,489		± 0,029	0,705	0,043 0
044	94,97 × 1,78	94,97	± 0,69	± 0,79	3,739	± 0,027	± 0,031	0,755	0,046 1
045	101,32 × 1,78	101,32		± 0,83	3,989		± 0,033	0,805	0,049 1
046	107,67 × 1,78	107,67	± 0,76	± 0,88	4,239	± 0,030	± 0,035	0,854	0,052 1
047	114,02 × 1,78	114,02		± 0,92	4,489		± 0,036	0,903	0,055 1
048	120,37 × 1,78	120,37		± 0,96	4,739		± 0,038	0,952	0,058 1
049	126,72 × 1,78	126,72	± 0,94	± 1,01	4,989	± 0,037	± 0,040	1,003	0,061 2
050	133,07 × 1,78	133,07		± 1,05	5,239		± 0,041	1,052	0,064 2
051 through 101	unassigned	—	—	—	—	—	—	—	—

Table 3 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 2,62 mm ± 0,08 mm (0,103 in ± 0,003 in) for class A O-rings and cross-section diameter, d_2, of 2,62 mm ± 0,09 mm (0,103 in ± 0,004 in) for class B O-rings

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
102	1,24 × 2,62	1,24	± 0,13	± 0,12	0,049	± 0,005	± 0,005	0,066	0,004 0
103	2,06 × 2,62	2,06		± 0,13	0,081			0,079	0,004 8
104	2,84 × 2,62	2,84			0,112			0,092	0,005 6
105	3,63 × 2,62	3,63		± 0,14	0,143		± 0,006	0,105	0,006 4
106	4,42 × 2,62	4,42		± 0,15	0,174			0,120	0,007 3
107	5,23 × 2,62	5,23			0,206			0,133	0,008 1
108	6,02 × 2,62	6,02		± 0,16	0,237			0,146	0,008 9
109	7,59 × 2,62	7,59		± 0,17	0,299		± 0,007	0,172	0,010 5
110	9,19 × 2,62	9,19		± 0,18	0,362			0,200	0,012 2
111	10,77 × 2,62	10,77		± 0,20	0,424		± 0,008	0,226	0,013 8
112	12,37 × 2,62	12,37		± 0,21	0,487			0,252	0,015 4
113	13,94 × 2,62	13,94	± 0,18	± 0,22	0,549	± 0,007	± 0,009	0,280	0,017 1
114	15,54 × 2,62	15,54	± 0,23	± 0,23	0,612	± 0,009		0,306	0,018 7
115	17,12 × 2,62	17,12		± 0,24	0,674		± 0,010	0,333	0,020 3
116	18,72 × 2,62	18,72		± 0,26	0,737			0,361	0,022 0
117	20,29 × 2,62	20,29	± 0,25	± 0,27	0,799	± 0,010	± 0,011	0,387	0,023 6
118	21,89 × 2,62	21,89		± 0,28	0,862			0,415	0,025 3
119	23,47 × 2,62	23,47		± 0,29	0,924			0,441	0,026 9
120	25,07 × 2,62	25,07		± 0,30	0,987		± 0,012	0,467	0,028 5
121	26,64 × 2,62	26,64		± 0,31	1,049			0,495	0,030 2
122	28,24 × 2,62	28,24		± 0,33	1,112		± 0,013	0,521	0,031 8
123	29,82 × 2,62	29,82	± 0,30	± 0,34	1,174	± 0,012		0,547	0,033 4
124	31,42 × 2,62	31,42		± 0,35	1,237		± 0,014	0,575	0,035 1
125	32,99 × 2,62	32,99		± 0,36	1,299			0,601	0,036 7
126	34,59 × 2,62	34,59		± 0,37	1,362		± 0,015	0,628	0,038 3
127	36,17 × 2,62	36,17		± 0,38	1,424			0,655	0,040 0
128	37,77 × 2,62	37,77		± 0,39	1,487			0,682	0,041 6
129	39,34 × 2,62	39,34	± 0,38	± 0,40	1,549	± 0,015	± 0,016	0,708	0,043 2
130	40,94 × 2,62	40,94		± 0,42	1,612			0,736	0,044 9
131	42,52 × 2,62	42,52		± 0,43	1,674		± 0,017	0,762	0,046 5
132	44,12 × 2,62	44,12		± 0,44	1,737			0,790	0,048 2
133	45,69 × 2,62	45,69		± 0,45	1,799		± 0,018	0,816	0,049 8
134	47,29 × 2,62	47,29		± 0,46	1,862			0,842	0,051 4

Table 3 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
135	48,90 × 2,62	48,90	± 0,43	± 0,47	1,925	± 0,017	± 0,019	0,870	0,053 1
136	50,47 × 2,62	50,47		± 0,48	1,987			0,896	0,054 7
137	52,07 × 2,62	52,07		± 0,49	2,050			0,924	0,056 4
138	53,64 × 2,62	53,64		± 0,51	2,112		± 0,020	0,950	0,058 0
139	55,25 × 2,62	55,25		± 0,52	2,175			0,977	0,059 6
140	56,82 × 2,62	56,82		± 0,53	2,237		± 0,021	1,005	0,061 3
141	58,42 × 2,62	58,42	± 0,51	± 0,54	2,300	± 0,020		1,031	0,062 9
142	59,99 × 2,62	59,99		± 0,55	2,362		± 0,022	1,057	0,064 5
143	61,60 × 2,62	61,60		± 0,56	2,425			1,085	0,066 2
144	63,17 × 2,62	63,17		± 0,57	2,487		± 0,023	1,111	0,067 8
145	64,77 × 2,62	64,77		± 0,58	2,550			1,137	0,069 4
146	66,34 × 2,62	66,34		± 0,59	2,612			1,165	0,071 1
147	67,95 × 2,62	67,95	± 0,56	± 0,61	2,675	± 0,022	± 0,024	1,191	0,072 7
148	69,52 × 2,62	69,52		± 0,62	2,737			1,218	0,074 3
149	71,12 × 2,62	71,12		± 0,63	2,800		± 0,025	1,245	0,076 0
150	72,69 × 2,62	72,69		± 0,64	2,862			1,272	0,077 6
151	75,87 × 2,62	75,87	± 0,61	± 0,66	2,987	± 0,024	± 0,026	1,326	0,080 9
152	82,22 × 2,62	82,22		± 0,70	3,237		± 0,028	1,432	0,087 4
153	88,57 × 2,62	88,57		± 0,75	3,487		± 0,029	1,540	0,094 0
154	94,92 × 2,62	94,92	± 0,71	± 0,79	3,737	± 0,028	± 0,031	1,647	0,100 5
155	101,27 × 2,62	101,27		± 0,83	3,987		± 0,033	1,755	0,107 1
156	107,62 × 2,62	107,62	± 0,76	± 0,88	4,237	± 0,030	± 0,035	1,862	0,113 6
157	113,97 × 2,62	113,97		± 0,92	4,487		± 0,036	1,970	0,120 2
158	120,32 × 2,62	120,32		± 0,96	4,737		± 0,038	2,076	0,126 7
159	126,67 × 2,62	126,67	± 0,89	± 1,00	4,987	± 0,035	± 0,040	2,183	0,133 2
160	133,02 × 2,62	133,02		± 1,05	5,237		± 0,041	2,291	0,139 8
161	139,37 × 2,62	139,37		± 1,09	5,487		± 0,043	2,397	0,146 3
162	145,72 × 2,62	145,72		± 1,13	5,737		± 0,045	2,506	0,152 9
163	152,07 × 2,62	152,07		± 1,17	5,987		± 0,046	2,612	0,159 4
164	158,42 × 2,62	158,42	± 1,02	± 1,22	6,237	± 0,040	± 0,048	2,720	0,166 0
165	164,77 × 2,62	164,77		± 1,26	6,487		± 0,050	2,827	0,172 5
166	171,12 × 2,62	171,12		± 1,30	6,737		± 0,051	2,933	0,179 0
167	177,47 × 2,62	177,47		± 1,34	6,987		± 0,053	3,041	0,185 6

Table 3 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
168	183,82 × 2,62	183,82	± 1,14	± 1,38	7,237	± 0,045	± 0,055	3,148	0,192 1
169	190,17 × 2,62	190,17		± 1,43	7,487		± 0,056	3,256	0,198 7
170	196,52 × 2,62	196,52		± 1,47	7,737		± 0,058	3,363	0,205 2
171	202,87 × 2,62	202,87		± 1,51	7,987		± 0,059	3,471	0,211 8
172	209,22 × 2,62	209,22	± 1,27	± 1,55	8,237	± 0,050	± 0,061	3,577	0,218 3
173	215,57 × 2,62	215,57		± 1,59	8,487		± 0,063	3,685	0,224 9
174	221,92 × 2,62	221,92		± 1,63	8,737		± 0,064	3,792	0,231 4
175	228,27 × 2,62	228,27		± 1,68	8,987		± 0,066	3,898	0,237 9
176	234,62 × 2,62	234,62	± 1,40	± 1,72	9,237	± 0,055	± 0,068	4,007	0,244 5
177	240,97 × 2,62	240,97		± 1,76	9,487		± 0,069	4,113	0,251 0
178	247,32 × 2,62	247,32		± 1,80	9,737		± 0,071	4,221	0,257 6
179 through 200	unassigned	—	—	—	—	—	—	—	—

Table 4 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 3,53 mm ± 0,10 mm (0,139 in ± 0,004 in)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
201	4,34 × 3,53	4,34	± 0,13	± 0,15	0,171	± 0,005	± 0,006	0,243	0,014 8
202	5,94 × 3,53	5,94		± 0,16	0,234			0,292	0,017 8
203	7,52 × 3,53	7,52		± 0,17	0,296		± 0,007	0,339	0,020 7
204	9,12 × 3,53	9,12		± 0,18	0,359			0,388	0,023 7
205	10,69 × 3,53	10,69		± 0,20	0,421		± 0,008	0,438	0,026 7
206	12,29 × 3,53	12,29		± 0,21	0,484			0,487	0,029 7
207	13,87 × 3,53	13,87	± 0,18	± 0,22	0,546	± 0,007	± 0,009	0,536	0,032 7
208	15,47 × 3,53	15,47	± 0,23	± 0,23	0,609	± 0,009		0,585	0,035 7
209	17,04 × 3,53	17,04		± 0,24	0,671			0,633	0,038 6
210	18,64 × 3,53	18,64	± 0,25	± 0,25	0,734	± 0,010	± 0,010	0,682	0,041 6
211	20,22 × 3,53	20,22		± 0,27	0,796			0,731	0,044 6
212	21,82 × 3,53	21,82		± 0,28	0,859		± 0,011	0,780	0,047 6
213	23,39 × 3,53	23,39		± 0,29	0,921			0,828	0,050 5
214	24,99 × 3,53	24,99		± 0,30	0,984		± 0,012	0,877	0,053 5
215	26,57 × 3,53	26,57		± 0,31	1,046			0,926	0,056 5
216	28,17 × 3,53	28,17	± 0,30	± 0,32	1,109	± 0,012	± 0,013	0,975	0,059 5
217	29,74 × 3,53	29,74		± 0,34	1,171			1,024	0,062 5
218	31,34 × 3,53	31,34		± 0,35	1,234		± 0,014	1,073	0,065 5
219	32,92 × 3,53	32,92		± 0,36	1,296			1,121	0,068 4
220	34,52 × 3,53	34,52		± 0,37	1,359		± 0,015	1,170	0,071 4
221	36,09 × 3,53	36,09		± 0,38	1,421			1,219	0,074 4
222	37,69 × 3,53	37,69	± 0,38	± 0,39	1,484	± 0,015		1,268	0,077 4
223	40,87 × 3,53	40,87		± 0,42	1,609		± 0,016	1,365	0,083 3
224	44,04 × 3,53	44,04		± 0,44	1,734		± 0,017	1,463	0,089 3
225	47,22 × 3,53	47,22	± 0,46	± 0,46	1,859	± 0,018	± 0,018	1,56	0,095 2
226	50,39 × 3,53	50,39		± 0,48	1,984		± 0,019	1,658	0,101 2
227	53,57 × 3,53	53,57		± 0,51	2,109		± 0,020	1,757	0,107 2
228	56,74 × 3,53	56,74	± 0,51	± 0,53	2,234	± 0,020	± 0,021	1,853	0,113 1
229	59,92 × 3,53	59,92		± 0,55	2,359		± 0,022	1,952	0,119 1
230	63,09 × 3,53	63,09		± 0,57	2,484		± 0,023	2,048	0,125 0
231	66,27 × 3,53	66,27		± 0,59	2,609			2,147	0,131 0

Table 4 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
232	69,44 × 3,53	69,44	± 0,61	± 0,62	2,734	± 0,024	± 0,024	2,245	0,137 0
233	72,62 × 3,53	72,62		± 0,64	2,859		± 0,025	2,342	0,142 9
234	75,79 × 3,53	75,79		± 0,66	2,984		± 0,026	2,440	0,148 9
235	78,97 × 3,53	78,97		± 0,68	3,109		± 0,027	2,537	0,154 8
236	82,14 × 3,53	82,14		± 0,70	3,234		± 0,028	2,635	0,160 8
237	85,32 × 3,53	85,32		± 0,72	3,359		± 0,029	2,733	0,166 8
238	88,49 × 3,53	88,49		± 0,75	3,484			2,830	0,172 7
239	91,67 × 3,53	91,67	± 0,71	± 0,77	3,609	± 0,028	± 0,030	2,928	0,178 7
240	94,84 × 3,53	94,84		± 0,79	3,734		± 0,031	3,025	0,184 6
241	98,02 × 3,53	98,02		± 0,81	3,859		± 0,032	3,123	0,190 6
242	101,19 × 3,53	101,19		± 0,83	3,984		± 0,033	3,222	0,196 6
243	104,37 × 3,53	104,37		± 0,85	4,109		± 0,034	3,318	0,202 5
244	107,54 × 3,53	107,54	± 0,76	± 0,88	4,234	± 0,030	± 0,034	3,417	0,208 5
245	110,72 × 3,53	110,72		± 0,90	4,359		± 0,035	3,513	0,214 4
246	113,89 × 3,53	113,89		± 0,92	4,484		± 0,036	3,612	0,220 4
247	117,07 × 3,53	117,07		± 0,94	4,609		± 0,037	3,708	0,226 3
248	120,24 × 3,53	120,24		± 0,96	4,734		± 0,038	3,807	0,232 3
249	123,42 × 3,53	123,42	± 0,89	± 0,98	4,859	± 0,035	± 0,039	3,905	0,238 3
250	126,59 × 3,53	126,59		± 1,00	4,984		± 0,040	4,002	0,244 2
251	129,77 × 3,53	129,77		± 1,03	5,109			4,100	0,250 2
252	132,94 × 3,53	132,94		± 1,05	5,234		± 0,041	4,197	0,256 1
253	136,12 × 3,53	136,12		± 1,07	5,359		± 0,042	4,295	0,262 1
254	139,29 × 3,53	139,29		± 1,09	5,484		± 0,043	4,393	0,268 1
255	142,47 × 3,53	142,47		± 1,11	5,609		± 0,044	4,490	0,274 0
256	145,64 × 3,53	145,64		± 1,13	5,734		± 0,045	4,588	0,280 0
257	148,82 × 3,53	148,82		± 1,15	5,859			4,685	0,285 9
258	151,99 × 3,53	151,99		± 1,17	5,984		± 0,046	4,783	0,291 9
259	158,34 × 3,53	158,34	± 1,02	± 1,22	6,234	± 0,040	± 0,048	4,978	0,303 8
260	164,69 × 3,53	164,69		± 1,26	6,484		± 0,050	5,173	0,315 7
261	171,04 × 3,53	171,04		± 1,30	6,734		± 0,051	5,370	0,327 7
262	177,39 × 3,53	177,39		± 1,34	6,984		± 0,053	5,565	0,339 6

Table 4 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
263	183,74 × 3,53	183,74	± 1,14	± 1,38	7,234	± 0,045	± 0,054	5,760	0,351 5
264	190,09 × 3,53	190,09		± 1,43	7,484		± 0,056	5,955	0,363 4
265	196,44 × 3,53	196,44		± 1,47	7,734		± 0,058	6,150	0,375 3
266	202,79 × 3,53	202,79		± 1,51	7,984		± 0,059	6,345	0,387 2
267	209,14 × 3,53	209,14	± 1,27	± 1,55	8,234	± 0,050	± 0,061	6,542	0,399 2
268	215,49 × 3,53	215,49		± 1,59	8,484		± 0,063	6,737	0,411 1
269	221,84 × 3,53	221,84		± 1,63	8,734		± 0,064	6,932	0,423 0
270	228,19 × 3,53	228,19		± 1,68	8,984		± 0,066	7,127	0,434 9
271	234,54 × 3,53	234,54	± 1,40	± 1,72	9,234	± 0,055	± 0,068	7,322	0,446 8
272	240,89 × 3,53	240,89		± 1,76	9,484		± 0,069	7,518	0,458 8
273	247,24 × 3,53	247,24		± 1,80	9,734		± 0,071	7,713	0,470 7
274	253,59 × 3,53	253,59		± 1,84	9,984		± 0,072	7,908	0,482 6
275	266,29 × 3,53	266,29		± 1,92	10,484		± 0,076	8,298	0,506 4
276	278,99 × 3,53	278,99	± 1,65	± 2,00	10,984	± 0,065	± 0,079	8,690	0,530 3
277	291,69 × 3,53	291,69		± 2,09	11,484		± 0,082	9,080	0,554 1
278	304,39 × 3,53	304,39		± 2,17	11,984		± 0,085	9,470	0,577 9
279	329,79 × 3,53	329,79		± 2,33	12,984		± 0,092	10,252	0,625 6
280	355,19 × 3,53	355,19		± 2,49	13,984		± 0,098	11,033	0,673 3
281	380,59 × 3,53	380,59		± 2,65	14,984		± 0,105	11,815	0,721 0
282	405,26 × 3,53	405,26	± 1,91	± 2,81	15,955	± 0,075	± 0,111	12,572	0,767 2
283	430,66 × 3,53	430,66	± 2,03	± 2,97	16,955	± 0,080	± 0,117	13,354	0,814 9
284	456,06 × 3,53	456,06	± 2,16	± 3,13	17,955	± 0,085	± 0,123	14,136	0,862 6
285 through 308	unassigned	—	—	—	—	—	—	—	—

Table 5 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 5,33 mm ± 0,13 mm (0,210 in ± 0,005 in)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
309	10,46 × 5,33	10,46	± 0,13	± 0,19	0,412	± 0,005	± 0,008	1,109	0,067 7
310	12,07 × 5,33	12,07		± 0,21	0,475			1,221	0,074 5
311	13,64 × 5,33	13,64	± 0,18	± 0,22	0,537	± 0,007	± 0,009	1,332	0,081 3
312	15,24 × 5,33	15,24	± 0,23	± 0,23	0,600	± 0,009		1,444	0,088 1
313	16,81 × 5,33	16,81		± 0,24	0,662		± 0,010	1,555	0,094 9
314	18,42 × 5,33	18,42	± 0,25	± 0,25	0,725	± 0,010		1,667	0,101 7
315	19,99 × 5,33	19,99		± 0,26	0,787			1,778	0,108 5
316	21,59 × 5,33	21,59		± 0,28	0,850		± 0,011	1,889	0,115 3
317	23,16 × 5,33	23,16		± 0,29	0,912			2,001	0,122 1
318	24,77 × 5,33	24,77		± 0,30	0,975		± 0,012	2,112	0,128 9
319	26,34 × 5,33	26,34		± 0,31	1,037			2,224	0,135 7
320	27,94 × 5,33	27,94	± 0,30	± 0,32	1,100	± 0,012	± 0,013	2,335	0,142 5
321	29,51 × 5,33	29,51		± 0,33	1,162			2,447	0,149 3
322	31,12 × 5,33	31,12		± 0,35	1,225		± 0,014	2,558	0,156 1
323	32,69 × 5,33	32,69		± 0,36	1,287			2,669	0,162 9
324	34,29 × 5,33	34,29		± 0,37	1,350		± 0,015	2,781	0,169 7
325	37,47 × 5,33	37,47	± 0,38	± 0,39	1,475	± 0,015		3,004	0,183 3
326	40,64 × 5,33	40,64		± 0,41	1,600		± 0,016	3,228	0,197 0
327	43,82 × 5,33	43,82		± 0,44	1,725		± 0,017	3,451	0,201 6
328	46,99 × 5,33	46,99		± 0,46	1,850		± 0,018	3,674	0,224 2
329	50,17 × 5,33	50,17	± 0,46	± 0,48	1,975	± 0,018	± 0,019	3,897	0,237 8
330	53,34 × 5,33	53,34		± 0,50	2,100		± 0,020	4,120	0,251 4
331	56,52 × 5,33	56,52		± 0,53	2,225		± 0,021	4,343	0,265 0
332	59,69 × 5,33	59,69		± 0,55	2,350		± 0,022	4,565	0,278 6
333	62,87 × 5,33	62,87	± 0,51	± 0,57	2,475	± 0,020		4,788	0,292 2
334	66,04 × 5,33	66,04		± 0,59	2,600		± 0,023	5,011	0,305 8
335	69,22 × 5,33	69,22		± 0,61	2,725		± 0,024	5,234	0,319 4
336	72,39 × 5,33	72,39		± 0,64	2,850		± 0,025	5,457	0,330 0
337	75,57 × 5,33	75,57	± 0,61	± 0,66	2,975	± 0,024	± 0,026	5,680	0,346 6
338	78,74 × 5,33	78,74		± 0,68	3,100		± 0,027	5,903	0,360 2
339	81,92 × 5,33	81,92		± 0,70	3,225		± 0,028	6,125	0,373 8
340	85,09 × 5,33	85,09		± 0,72	3,350			6,348	0,387 4
341	88,27 × 5,33	88,27		± 0,74	3,475		± 0,029	6,571	0,401 0

Table 5 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
342	91,44 × 5,33	91,44	± 0,71	± 0,77	3,600	± 0,028	± 0,030	6,796	0,414 6
343	94,62 × 5,33	94,62		± 0,79	3,725		± 0,031	7,017	0,428 2
344	97,79 × 5,33	97,79		± 0,81	3,850		± 0,032	7,240	0,441 8
345	100,97 × 5,33	100,97		± 0,83	3,975		± 0,033	7,463	0,455 4
346	104,14 × 5,33	104,14		± 0,85	4,100		± 0,034	7,686	0,469 0
347	107,32 × 5,33	107,32	± 0,76	± 0,87	4,225	± 0,030		7,908	0,482 6
348	110,49 × 5,33	110,49		± 0,90	4,350		± 0,035	8,131	0,496 2
349	113,67 × 5,33	113,67		± 0,92	4,475		± 0,036	8,354	0,509 8
350	116,84 × 5,33	116,84		± 0,94	4,600		± 0,037	8,577	0,523 4
351	120,02 × 5,33	120,02		± 0,96	4,725		± 0,038	8,800	0,537 0
352	123,19 × 5,33	123,19		± 0,98	4,850		± 0,039	9,023	0,550 6
353	126,37 × 5,33	126,37	± 0,94	± 1,00	4,975	± 0,037	± 0,039	9,246	0,564 2
354	129,54 × 5,33	129,54		± 1,02	5,100		± 0,040	9,468	0,577 8
355	132,72 × 5,33	132,72		± 1,05	5,225		± 0,041	9,691	0,591 4
356	135,89 × 5,33	135,89		± 1,07	5,350		± 0,042	9,914	0,605 0
357	139,07 × 5,33	139,07		± 1,09	5,475		± 0,043	10,137	0,618 6
358	142,24 × 5,33	142,24		± 1,11	5,600		± 0,044	10,360	0,632 2
359	145,42 × 5,33	145,42		± 1,13	5,725		± 0,045	10,583	0,645 8
360	148,59 × 5,33	148,59		± 1,15	5,850			10,806	0,659 4
361	151,77 × 5,33	151,77		± 1,17	5,975		± 0,046	11,029	0,673 0
362	158,12 × 5,33	158,12	± 1,02	± 1,21	6,225	± 0,040	± 0,048	11,474	0,700 2
363	164,47 × 5,33	164,47		± 1,26	6,475		± 0,049	11,920	0,727 4
364	170,82 × 5,33	170,82		± 1,30	6,725		± 0,051	12,366	0,754 6
365	177,17 × 5,33	177,17		± 1,34	6,975		± 0,053	12,811	0,781 8
366	183,52 × 5,33	183,52	± 1,14	± 1,38	7,225	± 0,045	± 0,054	13,257	0,809 0
367	189,87 × 5,33	189,87		± 1,42	7,475		± 0,056	13,703	0,836 2
368	196,22 × 5,33	196,22		± 1,47	7,725		± 0,058	14,149	0,863 4
369	202,57 × 5,33	202,57		± 1,51	7,975		± 0,059	14,594	0,890 6
370	208,92 × 5,33	208,92	± 1,27	± 1,55	8,225	± 0,050	± 0,061	15,040	0,917 8
371	215,27 × 5,33	215,27		± 1,59	8,475		± 0,063	15,486	0,945 0
372	221,62 × 5,33	221,62		± 1,63	8,725		± 0,064	15,932	0,972 2
373	227,97 × 5,33	227,97		± 1,67	8,975		± 0,066	16,377	0,999 4

Table 5 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
374	234,32 × 5,33	234,32	± 1,40	± 1,72	9,225	± 0,055	± 0,068	16,823	1,026 6
375	240,67 × 5,33	240,67		± 1,76	9,475		± 0,069	17,269	1,053 8
376	247,02 × 5,33	247,02		± 1,80	9,725		± 0,071	17,716	1,081 1
377	253,37 × 5,33	253,37		± 1,84	9,975		± 0,072	18,162	1,108 3
378	266,07 × 5,33	266,07	± 1,52	± 1,92	10,475	± 0,060	± 0,076	19,053	1,162 7
379	278,77 × 5,33	278,77		± 2,00	10,975		± 0,079	19,945	1,217 1
380	291,47 × 5,33	291,47	± 1,65	± 2,09	11,475	± 0,065	± 0,082	20,836	1,271 5
381	304,17 × 5,33	304,17		± 2,17	11,975		± 0,085	21,728	1,325 9
382	329,57 × 5,33	329,57		± 2,33	12,975		± 0,092	23,511	1,434 7
383	354,97 × 5,33	354,97	± 1,78	± 2,49	13,975	± 0,070	± 0,098	25,293	1,543 5
384	380,37 × 5,33	380,37		± 2,65	14,975		± 0,104	27,076	1,652 3
385	405,26 × 5,33	405,26	± 1,91	± 2,81	15,955	± 0,075	± 0,111	28,825	1,759 0
386	430,66 × 5,33	430,66	± 2,03	± 2,97	16,955	± 0,080	± 0,117	30,608	1,867 8
387	456,06 × 5,33	456,06	± 2,16	± 3,13	17,955	± 0,085	± 0,123	32,391	1,976 6
388	481,46 × 5,33	481,46	± 2,29	± 3,29	18,955	± 0,090	± 0,130	34,174	2,085 4
389	506,86 × 5,33	506,86	± 2,41	± 3,45	19,955	± 0,095	± 0,136	35,957	2,194 2
390	532,26 × 5,33	532,26		± 3,61	20,955		± 0,142	37,739	2,303 0
391	557,66 × 5,33	557,66	± 2,54	± 3,77	21,955	± 0,100	± 0,148	39,522	2,411 8
392	582,68 × 5,33	582,68	± 2,67	± 3,92	22,940	± 0,105	± 0,154	41,279	2,519 0
393	608,08 × 5,33	608,08	± 2,79	± 4,08	23,940	± 0,110	± 0,161	43,062	2,627 8
394	633,48 × 5,33	633,48	± 2,92	± 4,24	24,940	± 0,115	± 0,167	44,485	2,736 6
395	658,88 × 5,33	658,88	± 3,05	± 4,40	25,940	± 0,120	± 0,173	46,628	2,845 4
396 through 424	unassigned	—	—	—	—	—	—	—	—

Table 6 — Size code, size, inside diameter and inside diameter tolerances of class A and class B O-rings for general industrial applications — Cross-section diameter, d_2, of 6,99 mm ± 0,15 mm (0,275 in ± 0,006 in)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
425	113,67 × 6,99	113,67	± 0,84	± 0,92	4,475	± 0,033	± 0,036	14,524	0,886 3
426	116,84 × 6,99	116,84		± 0,94	4,600		± 0,037	14,907	0,909 7
427	120,02 × 6,99	120,02		± 0,96	4,725		± 0,038	15,289	0,933 0
428	123,19 × 6,99	123,19		± 0,98	4,850		± 0,039	15,671	0,956 3
429	126,37 × 6,99	126,37	± 0,94	± 1,00	4,975	± 0,037		16,053	0,979 6
430	129,54 × 6,99	129,54		± 1,02	5,100		± 0,040	16,436	1,003 0
431	132,72 × 6,99	132,72		± 1,05	5,225		± 0,041	16,818	1,026 3
432	135,89 × 6,99	135,89		± 1,07	5,350		± 0,042	17,200	1,049 6
433	139,07 × 6,99	139,07		± 1,09	5,475		± 0,043	17,582	1,072 9
434	142,24 × 6,99	142,24		± 1,11	5,600		± 0,044	17,965	1,096 3
435	145,42 × 6,99	145,42		± 1,13	5,725		± 0,045	18,347	1,119 6
436	148,59 × 6,99	148,59		± 1,15	5,850			18,729	1,142 9
437	151,77 × 6,99	151,77		± 1,17	5,975		± 0,046	19,111	1,166 2
438	158,12 × 6,99	158,12	± 1,02	± 1,21	6,225	± 0,040	± 0,048	19,876	1,212 9
439	164,47 × 6,99	164,47		± 1,26	6,475		± 0,049	20,640	1,259 5
440	170,82 × 6,99	170,82		± 1,30	6,725		± 0,051	21,405	1,306 2
441	177,17 × 6,99	177,17		± 1,34	6,975		± 0,053	22,168	1,352 8
442	183,52 × 6,99	183,52	± 1,14	± 1,38	7,225	± 0,045	± 0,054	22,934	1,399 5
443	189,87 × 6,99	189,87		± 1,42	7,475		± 0,056	23,697	1,446 1
444	196,22 × 6,99	196,22		± 1,47	7,725		± 0,058	24,463	1,492 8
445	202,57 × 6,99	202,57		± 1,51	7,975		± 0,059	25,226	1,539 4
446	215,27 × 6,99	215,27	± 1,40	± 1,59	8,475	± 0,055	± 0,063	26,755	1,632 7
447	227,97 × 6,99	227,97		± 1,67	8,975		± 0,066	28,284	1,726 0
448	240,67 × 6,99	240,67		± 1,76	9,475		± 0,069	29,813	1,819 3
449	253,37 × 6,99	253,37		± 1,84	9,975		± 0,072	31,342	1,912 6
450	266,07 × 6,99	266,07	± 1,52	± 1,92	10,475	± 0,060	± 0,076	32,871	2,005 9
451	278,77 × 6,99	278,77		± 2,00	10,975		± 0,079	34,400	2,099 2
452	291,47 × 6,99	291,47		± 2,09	11,475		± 0,082	35,929	2,192 5
453	304,17 × 6,99	304,17		± 2,17	11,975		± 0,085	37,458	2,285 8
454	316,87 × 6,99	316,87		± 2,25	12,475		± 0,089	38,987	2,379 1
455	329,57 × 6,99	329,57		± 2,33	12,975		± 0,092	40,515	2,472 4

Table 6 (*continued*)

Size code	Size	Inside diameter						Volume ref.	
		d_1 nom.	Tolerance mm		d_1 nom.	Tolerance in			
		mm	Class A	Class B	in	Class A	Class B	cm^3	in^3
456	342,27 × 6,99	342,27	± 1,78	± 2,41	13,475	± 0,070	± 0,095	42,044	2,565 7
457	354,97 × 6,99	354,97		± 2,49	13,975		± 0,098	43,573	2,659 0
458	367,67 × 6,99	367,67		± 2,57	14,475		± 0,101	45,102	2,752 3
459	380,37 × 6,99	380,37		± 2,65	14,975		± 0,104	46,631	2,845 6
460	393,07 × 6,99	393,07		± 2,73	15,475		± 0,108	48,160	2,938 9
461	405,26 × 6,99	405,26	± 1,91	± 2,81	15,955	± 0,075	± 0,111	49,628	3,028 5
462	417,96 × 6,99	417,96		± 2,89	16,455		± 0,114	51,157	3,121 8
463	430,66 × 6,99	430,66	± 2,03	± 2,97	16,955	± 0,080	± 0,117	52,686	3,210 1
464	443,36 × 6,99	443,36	± 2,16	± 3,05	17,455	± 0,085	± 0,120	54,210	3,308 4
465	456,06 × 6,99	456,06		± 3,13	17,955		± 0,123	55,744	3,401 7
466	468,76 × 6,99	468,76		± 3,21	18,455		± 0,126	57,273	3,495 0
467	481,46 × 6,99	481,46	± 2,29	± 3,29	18,955	± 0,090	± 0,130	58,802	3,588 3
468	494,16 × 6,99	494,16		± 3,37	19,455		± 0,133	60,331	3,681 6
469	506,86 × 6,99	506,86	± 2,41	± 3,45	19,955	± 0,095	± 0,136	61,860	3,774 9
470	532,26 × 6,99	532,26		± 3,61	20,955		± 0,142	64,917	3,961 5
471	557,66 × 6,99	557,66	± 2,54	± 3,77	21,955	± 0,100	± 0,148	67,975	4,148 1
472	582,68 × 6,99	582,68	± 2,67	± 3,92	22,940	± 0,105	± 0,154	70,987	4,331 9
473	608,08 × 6,99	608,08	± 2,79	± 4,08	23,940	± 0,110	± 0,161	74,043	4,518 4
474	633,48 × 6,99	633,48	± 2,92	± 4,24	24,940	± 0,115	± 0,167	77,101	4,705 0
475	658,88 × 6,99	658,88	± 3,05	± 4,40	25,940	± 0,120	± 0,173	80,159	4,891 6

Table 7 — Size code, size, inside diameter and inside diameter tolerances of O-rings for aerospace applications — Cross-section diameter, d_2, of 1,80 mm ± 0,08 mm (0,071 in ± 0,003 in)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
A0018	1,8 × 1,8	1,80	± 0,13	0,071	± 0,005	0,029	0,001 8
A0020	2 × 1,8	2,00		0,079		0,030	0,001 9
A0022	2,24 × 1,8	2,24		0,088		0,032	0,002 0
A0025	2,5 × 1,8	2,50		0,098		0,034	0,002 1
A0028	2,8 × 1,8	2,80		0,110		0,037	0,002 3
A0032	3,15 × 1,8	3,15		0,124		0,037	0,002 4
A0036	3,55 × 1,8	3,55		0,140		0,040	0,002 6
A0038	3,75 × 1,8	3,75		0,148		0,043	0,002 6
A0040	4 × 1,8	4,00		0,157		0,044	0,002 8
A0045	4,5 × 1,8	4,50		0,177		0,046	0,003 1
A0049	4,87 × 1,8	4,87		0,192		0,053	0,003 3
A0050	5 × 1,8	5,00		0,197		0,054	0,003 3
A0052	5,15 × 1,8	5,15		0,203		0,056	0,003 4
A0053	5,3 × 1,8	5,30		0,209		0,057	0,003 5
A0056	5,6 × 1,8	5,60		0,220		0,059	0,003 6
A0060	6 × 1,8	6,00		0,236		0,062	0,003 8
A0063	6,3 × 1,8	6,30		0,248		0,065	0,004 0
A0067	6,7 × 1,8	6,70		0,264		0,068	0,004 2
A0069	6,9 × 1,8	6,90	± 0,14	0,272	± 0,006	0,070	0,004 3
A0071	7,1 × 1,8	7,10		0,280		0,071	0,004 4
A0075	7,5 × 1,8	7,50		0,295		0,074	0,004 6
A0080	8 × 1,8	8,00		0,315		0,078	0,004 8
A0085	8,5 × 1,8	8,50	± 0,15	0,335	± 0,006	0,082	0,005 0
A0088	8,75 × 1,8	8,75		0,344		0,084	0,005 2
A0090	9 × 1,8	9,00		0,354		0,086	0,005 3
A0095	9,5 × 1,8	9,50		0,374		0,090	0,005 5
A0100	10 × 1,8	10,00		0,394		0,094	0,005 8
A0106	10,6 × 1,8	10,60	± 0,16	0,471		0,099	0,067
A0112	11,2 × 1,8	11,20		0,441		0,104	0,006 4

Table 7 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
A0118	11,8 × 1,8	11,80	± 0,17	0,465	± 0,007	0,109	0,006 7
A0125	12,5 × 1,8	12,50		0,492		0,114	0,007 0
A0132	13,2 × 1,8	13,20		0,520		0,120	0,007 4
A0140	14 × 1,8	14,00	± 0,18	0,551		0,126	0,007 7
A0150	15 × 1,8	15,00		0,591		0,134	0,008 2
A0160	16 × 1,8	16,00	± 0,19	0,630		0,142	0,008 7
A0170	17 × 1,8	17,00	± 0,20	0,669	± 0,008	0,150	0,009 2
A0180	18 × 1,8	18,00		0,709		0,158	0,009 7
A0190	19 × 1,8	19,00	± 0,21	0,748		0,166	0,010 2
A0200	20 × 1,8	20,00		0,787		0,174	0,010 7
A0212	21,2 × 1,8	21,20	± 0,22	0,835	± 0,009	0,184	0,011 3
A0224	22,4 × 1,8	22,40	± 0,23	0,882		0,193	0,011 9
A0236	23,6 × 1,8	23,60	± 0,24	0,929		0,203	0,012 4
A0250	25 × 1,8	25,00		0,984		0,214	0,013 1
A0258	25,8 × 1,8	25,80	± 0,25	1,016	± 0,010	0,221	0,013 5
A0265	26,5 × 1,8	26,50		1,043		0,226	0,013 9
A0280	28 × 1,8	28,00	± 0,26	1,102	± 0,010	0,238	0,014 6
A0300	30 × 1,8	30,00		1,181		0,254	0,015 6
A0315	31,5 × 1,8	31,50	± 0,28	1,240	± 0,011	0,266	0,016 3
A0325	32,5 × 1,8	32,50	± 0,29	1,280		0,274	0,016 8
A0335	33,5 × 1,8	33,50		1,319		0,282	0,017 3
A0345	34,5 × 1,8	34,50	± 0,30	1,358	± 0,012	0,290	0,017 8
A0355	35,5 × 1,8	35,50	± 0,31	1,398		0,298	0,018 3
A0365	36,5 × 1,8	36,50		1,437		0,306	0,018 8
A0375	37,5 × 1,8	37,50	± 0,32	1,476	± 0,013	0,314	0,019 2
A0387	38,7 × 1,8	38,70		1,524		0,324	0,019 8
A0400	40 × 1,8	40,00	± 0,33	1,575		0,334	0,020 5
A0412	41,2 × 1,8	41,20	± 0,34	1,622		0,344	0,021 1
A0425	42,5 × 1,8	42,50	± 0,35	1,673	± 0,014	0,354	0,021 7
A0437	43,7 × 1,8	43,70		1,720		0,364	0,022 3
A0450	45 × 1,8	45,00	± 0,36	1,772		0,374	0,022 9
A0475	47,5 × 1,8	47,50	± 0,38	1,870	± 0,015	0,394	0,024 1
A0500	50 × 1,8	50,00	± 0,39	1,969		0,414	0,025 4

Table 7 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
A0530	53 × 1,8	53,00	± 0,41	2,087	± 0,016	0,438	0,026 8
A0560	56 × 1,8	56,00	± 0,42	2,205	± 0,017	0,462	0,028 3
A0600	60 × 1,8	60,00	± 0,45	2,362	± 0,018	0,494	0,030 3
A0630	63 × 1,8	63,00	± 0,46	2,480		0,518	0,031 7
A0670	67 × 1,8	67,00	± 0,49	2,638	± 0,019	0,550	0,033 7
A0710	71 × 1,8	71,00	± 0,51	2,795	± 0,020	0,582	0,035 6
A0750	75 × 1,8	75,00	± 0,53	2,953	± 0,021	0,614	0,037 6
A0800	80 × 1,8	80,00	± 0,56	3,150	± 0,022	0,654	0,040 1
A0850	85 × 1,8	85,00	± 0,59	3,346	± 0,023	0,694	0,042 5
A0900	90 × 1,8	90,00	± 0,62	3,543	± 0,024	0,734	0,045 0
A0950	95 × 1,8	95,00	± 0,64	3,740	± 0,025	0,774	0,047 4
A1000	100 × 1,8	100,00	± 0,67	3,937	± 0,026	0,814	0,049 9
A1060	106 × 1,8	106,00	± 0,71	4,173	± 0,028	0,862	0,052 8
A1120	112 × 1,8	112,00	± 0,74	4,409	± 0,029	0,910	0,055 7
A1180	118 × 1,8	118,00	± 0,77	4,646	± 0,030	0,958	0,058 7
A1250	125 × 1,8	125,00	± 0,81	4,921	± 0,032	1,014	0,062 1

Table 8 — Size code, size, inside diameter and inside diameter tolerances of O-rings for aerospace applications — Cross-section diameter, d_2, of 2,65 mm ± 0,09 mm (0,104 in ± 0,004 in)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
B0045	4,5 × 2,65	4,50	± 0,13	0,177	± 0,005	0,124	0,007 5
B0053	5,3 × 2,65	5,30		0,209		0,138	0,008 4
B0060	6 × 2,65	6,00		0,236		0,150	0,009 1
B0069	6,9 × 2,65	6,90	± 0,14	0,272	± 0,006	0,165	0,010 0
B0080	8 × 2,65	8,00		0,315		0,185	0,011 2
B0090	9 × 2,65	9,00	± 0,15	0,354		0,202	0,012 2
B0095	9,5 × 2,65	9,50		0,374		0,211	0,012 8
B0100	10 × 2,65	10,00		0,394		0,219	0,013 3
B0106	10,6 × 2,65	10,60	± 0,16	0,417		0,230	0,013 9
B0112	11,2 × 2,65	11,20		0,441		0,240	0,014 5
B0118	11,8 × 2,65	11,80	± 0,17	0,465	± 0,007	0,250	0,015 2
B0125	12,5 × 2,65	12,50		0,492		0,263	0,015 9
B0132	13,2 × 2,65	13,20		0,520		0,275	0,016 7
B0140	14 × 2,65	14,00	± 0,18	0,551		0,288	0,017 5
B0150	15 × 2,65	15,00		0,591		0,306	0,018 5
B0160	16 × 2,65	16,00	± 0,19	0,630		0,323	0,019 6
B0170	17 × 2,65	17,00	± 0,20	0,669	± 0,008	0,340	0,020 6
B0180	18 × 2,65	18,00		0,709		0,358	0,021 7
B0190	19 × 2,65	19,00	± 0,21	0,748		0,375	0,022 7
B0200	20 × 2,65	20,00		0,787		0,392	0,023 8
B0212	21,2 × 2,65	21,20	± 0,22	0,835	± 0,009	0,413	0,025 1
B0224	22,4 × 2,65	22,40	± 0,23	0,882		0,434	0,026 3
B0236	23,6 × 2,65	23,60	± 0,24	0,929		0,455	0,027 6
B0250	25 × 2,65	25,00		0,984		0,479	0,029 0
B0258	25,8 × 2,65	25,80	± 0,25	1,016	± 0,010	0,493	0,029 9
B0265	26,5 × 2,65	26,50		1,043		0,505	0,030 6
B0280	28 × 2,65	28,00	± 0,26	1,102		0,531	0,032 2
B0300	30 × 2,65	30,00	± 0,27	1,181	± 0,011	0,566	0,034 3
B0315	31,5 × 2,65	31,50	± 0,28	1,240		0,592	0,035 9
B0325	32,5 × 2,65	32,50	± 0,29	1,280		0,609	0,036 9
B0335	33,5 × 2,65	33,50		1,319		0,626	0,038 0

Table 8 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
B0345	34,5 × 2,65	34,50	± 0,30	1,358	± 0,012	0,644	0,039 0
B0355	35,5 × 2,65	35,50	± 0,31	1,398		0,661	0,040 1
B0365	36,5 × 2,65	36,50		1,437		0,678	0,041 1
B0375	37,5 × 2,65	37,50	± 0,32	1,476	± 0,013	0,696	0,042 2
B0387	38,7 × 2,65	38,70		1,524		0,716	0,043 4
B0400	40 × 2,65	40,00	± 0,33	1,575		0,739	0,044 8
B0412	41,2 × 2,65	41,20	± 0,34	1,622		0,760	0,046 1
B0425	42,5 × 2,65	42,50	± 0,35	1,673	± 0,014	0,782	0,047 4
B0437	43,7 × 2,65	43,70		1,720		0,803	0,048 7
B0450	45 × 2,65	45,00	± 0,36	1,772		0,826	0,050 1
B0462	46,2 × 2,65	46,20	± 0,37	1,819	± 0,015	0,846	0,051 3
B0475	47,5 × 2,65	47,50	± 0,38	1,870		0,869	0,052 7
B0487	48,7 × 2,65	48,70		1,917		0,890	0,053 9
B0500	50 × 2,65	50,00	± 0,39	1,969	± 0,015	0,912	0,055 3
B0515	51,5 × 2,65	51,50	± 0,40	2,028	± 0,016	0,938	0,056 9
B0530	53 × 2,65	53,00	± 0,41	2,087		0,964	0,058 5
B0545	54,5 × 2,65	54,50	± 0,42	2,146	± 0,017	0,990	0,060 0
B0560	56 × 2,65	56,00		2,205		1,016	0,061 6
B0580	58 × 2,65	58,00	± 0,44	2,283		1,051	0,063 7
B0600	60 × 2,65	60,00	± 0,45	2,362	± 0,018	1,086	0,065 8
B0615	61,5 × 2,65	61,50		2,421		1,112	0,067 4
B0630	63 × 2,65	63,00	± 0,46	2,480		1,138	0,069 0
B0650	65 × 2,65	65,00	± 0,48	2,559	± 0,019	1,172	0,071 1
B0670	67 × 2,65	67,00	± 0,49	2,638		1,207	0,073 2
B0690	69 × 2,65	69,00	± 0,50	2,717	± 0,020	1,242	0,075 3
B0710	71 × 2,65	71,00	± 0,51	2,795		1,276	0,077 4
B0730	73 × 2,65	73,00	± 0,52	2,874		1,311	0,079 5
B0750	75 × 2,65	75,00	± 0,53	2,953	± 0,021	1,345	0,081 6
B0800	80 × 2,65	80,00	± 0,56	3,150	± 0,022	1,432	0,086 8
B0850	85 × 2,65	85,00	± 0,59	3,346	± 0,023	1,519	0,092 1
B0900	90 × 2,65	90,00	± 0,62	3,543	± 0,024	1,605	0,097 3
B0950	95 × 2,65	95,00	± 0,64	3,740	± 0,025	1,692	0,102 6
B1000	100 × 2,65	100,00	± 0,67	3,937	± 0,026	1,779	0,107 8
B1060	106 × 2,65	106,00	± 0,71	4,173	± 0,028	1,883	0,114 1

Table 8 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
B1120	112 × 2,65	112,00	± 0,74	4,409	± 0,029	1,987	0,120 4
B1180	118 × 2,65	118,00	± 0,77	4,646	± 0,030	2,091	0,126 8
B1250	125 × 2,65	125,00	± 0,81	4,921	± 0,032	2,212	0,134 1
B1320	132 × 2,65	132,00	± 0,85	5,197	± 0,033	2,333	0,141 5
B1400	140 × 2,65	140,00	± 0,89	5,512	± 0,035	2,472	0,149 9
B1500	150 × 2,65	150,00	± 0,95	5,906	± 0,037	2,645	0,160 4
B1600	160 × 2,65	160,00	± 1,00	6,299	± 0,039	2,818	0,170 9
B1700	170 × 2,65	170,00	± 1,06	6,693	± 0,042	2,992	0,181 4
B1800	180 × 2,65	180,00	± 1,11	7,087	± 0,044	3,165	0,191 9
B1900	190 × 2,65	190,00	± 1,17	7,480	± 0,046	3,338	0,202 4
B2000	200 × 2,65	200,00	± 1,22	7,874	± 0,048	3,511	0,212 9
B2120	212 × 2,65	212,00	± 1,29	8,346	± 0,051	3,719	0,225 5
B2240	224 × 2,65	224,00	± 1,35	8,819	± 0,053	3,927	0,238 1
B2300	230 × 2,65	230,00	± 1,39	9,055	± 0,055	4,031	0,244 4
B2360	236 × 2,65	236,00	± 1,42	9,291	± 0,056	4,135	0,250 7
B2430	243 × 2,65	243,00	± 1,46	9,567	± 0,057	4,256	0,258 1
B2500	250 × 2,65	250,00	± 1,49	9,843	± 0,059	4,378	0,265 5

Table 9 — Size code, size, inside diameter and inside diameter tolerances of O-rings for aerospace applications — Cross-section diameter, d_2, of 3,55 mm ± 0,10 mm (0,140 in ± 0,004 in)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
C0140	14 × 3,55	14,00	± 0,18	0,551	± 0,007	0,546	0,033 4
C0150	15 × 3,55	15,00		0,591		0,577	0,035 4
C0160	16 × 3,55	16,00	± 0,19	0,630		0,608	0,037 2
C0170	17 × 3,55	17,00	± 0,20	0,669	± 0,008	0,639	0,039 1
C0180	18 × 3,55	18,00		0,709		0,670	0,041 1
C0190	19 × 3,55	19,00	± 0,21	0,748		0,701	0,042 9
C0200	20 × 3,55	20,00		0,787		0,732	0,044 8
C0212	21,2 × 3,55	21,20	± 0,22	0,835	± 0,009	0,770	0,047 2
C0224	22,4 × 3,55	22,40	± 0,23	0,882		0,807	0,049 4
C0236	23,6 × 3,55	23,60	± 0,24	0,929		0,844	0,051 7
C0250	25 × 3,55	25,00		0,984		0,888	0,054 4
C0258	25,8 × 3,55	25,80	± 0,25	1,016	± 0,010	0,913	0,055 9
C0265	26,5 × 3,55	26,50		1,043		0,934	0,057 2
C0280	28 × 3,55	28,00	± 0,26	1,102		0,981	0,060 1
C0300	30 × 3,55	30,00	± 0,27	1,181	± 0,011	1,043	0,063 9
C0315	31,5 × 3,55	31,50	± 0,28	1,240		1,090	0,066 7
C0325	32,5 × 3,55	32,50	± 0,29	1,280		1,121	0,068 7
C0335	33,5 × 3,55	33,50		1,319		1,152	0,070 6
C0345	34,5 × 3,55	34,50	± 0,30	1,358	± 0,012	1,183	0,072 4
C0355	35,5 × 3,55	35,50	± 0,31	1,398		1,214	0,074 4
C0365	36,5 × 3,55	36,50		1,437		1,245	0,076 3
C0375	37,5 × 3,55	37,50	± 0,32	1,476		1,276	0,078 2
C0387	38,7 × 3,55	38,70		1,524	± 0,013	1,314	0,080 5
C0400	40 × 3,55	40,00	± 0,33	1,575		1,354	0,082 9
C0412	41,2 × 3,55	41,20	± 0,34	1,622		1,392	0,085 2
C0425	42,5 × 3,55	42,50	± 0,35	1,673	± 0,014	1,432	0,087 7
C0437	43,7 × 3,55	43,70		1,720		1,469	0,090 0
C0450	45 × 3,55	45,00	± 0,36	1,772		1,510	0,092 5
C0462	46,2 × 3,55	46,20	± 0,37	1,819	± 0,015	1,547	0,094 7
C0475	47,5 × 3,55	47,50	± 0,38	1,870		1,587	0,097 2
C0487	48,7 × 3,55	48,70		1,917		1,625	0,099 5
C0500	50 × 3,55	50,00	± 0,39	1,969		1,665	0,102 0

Table 9 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
C0515	51,5 × 3,55	51,50	± 0,40	2,028	± 0,016	1,712	0,104 8
C0530	53 × 3,55	53,00	± 0,41	2,087		1,758	0,107 7
C0545	54,5 × 3,55	54,50	± 0,42	2,146	± 0,017	1,805	0,110 6
C0560	56 × 3,55	56,00		2,205		1,852	0,113 4
C0580	58 × 3,55	58,00	± 0,44	2,283		1,914	0,117 2
C0600	60 × 3,55	60,00	± 0,45	2,362	± 0,018	1,976	0,121 0
C0615	61,5 × 3,55	61,50		2,421		2,023	0,123 9
C0630	63 × 3,55	63,00	± 0,46	2,480		2,069	0,126 7
C0650	65 × 3,55	65,00	± 0,48	2,559	± 0,019	2,132	0,130 5
C0670	67 × 3,55	67,00	± 0,49	2,638		2,194	0,134 3
C0690	69 × 3,55	69,00	± 0,50	2,717	± 0,020	2,256	0,138 2
C0710	71 × 3,55	71,00	± 0,51	2,795		2,318	0,141 9
C0730	73 × 3,55	73,00	± 0,52	2,874	± 0,020	2,380	0,145 8
C0750	75 × 3,55	75,00	± 0,53	2,953	± 0,021	2,443	0,149 6
C0775	77,5 × 3,55	77,50	± 0,55	3,051	± 0,022	2,520	0,154 3
C0800	80 × 3,55	80,00	± 0,56	3,150		2,598	0,159 1
C0825	82,5 × 3,55	82,50	± 0,57	3,248		2,676	0,163 8
C0850	85 × 3,55	85,00	± 0,59	3,346	± 0,023	2,753	0,168 6
C0875	87,5 × 3,55	87,50	± 0,60	3,445	± 0,024	2,831	0,173 4
C0900	90 × 3,55	90,00	± 0,62	3,543		2,909	0,178 1
C0925	92,5 × 3,55	92,50	± 0,63	3,642	± 0,025	2,987	0,182 9
C0950	95 × 3,55	95,00	± 0,64	3,740		3,064	0,187 6
C0975	97,5 × 3,55	97,50	± 0,66	3,839	± 0,026	3,142	0,192 4
C1000	100 × 3,55	100,00	± 0,67	3,937		3,220	0,197 2
C1030	103 × 3,55	103,00	± 0,69	4,055	± 0,027	3,313	0,202 9
C1060	106 × 3,55	106,00	± 0,71	4,173	± 0,028	3,407	0,208 6
C1090	109 × 3,55	109,00	± 0,72	4,291		3,500	0,214 3
C1120	112 × 3,55	112,00	± 0,74	4,409	± 0,029	3,593	0,220 0
C1150	115 × 3,55	115,00	± 0,76	4,528	± 0,030	3,686	0,225 7
C1180	118 × 3,55	118,00	± 0,77	4,646		3,780	0,231 5
C1220	122 × 3,55	122,00	± 0,80	4,803	± 0,031	3,904	0,239 0
C1250	125 × 3,55	125,00	± 0,81	4,921	± 0,032	3,997	0,244 8
C1280	128 × 3,55	128,00	± 0,83	5,039	± 0,033	4,091	0,250 5
C1320	132 × 3,55	132,00	± 0,85	5,197		4,215	0,258 1

Table 9 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
C1360	136 × 3,55	136,00	± 0,87	5,354	± 0,034	4,339	0,265 7
C1400	140 × 3,55	140,00	± 0,89	5,512	± 0,035	4,464	0,273 3
C1450	145 × 3,55	145,00	± 0,92	5,709	± 0,036	4,619	0,282 9
C1500	150 × 3,55	150,00	± 0,95	5,906	± 0,037	4,775	0,292 4
C1550	155 × 3,55	155,00	± 0,98	6,102	± 0,039	4,930	0,301 9
C1600	160 × 3,55	160,00	± 1,00	6,299		5,086	0,311 4
C1650	165 × 3,55	165,00	± 1,03	6,496	± 0,041	5,241	0,320 9
C1700	170 × 3,55	170,00	± 1,06	6,693	± 0,042	5,397	0,330 5
C1750	175 × 3,55	175,00	± 1,09	6,890	± 0,043	5,552	0,340 0
C1800	180 × 3,55	180,00	± 1,11	7,087	± 0,044	5,708	0,349 5
C1850	185 × 3,55	185,00	± 1,14	7,283	± 0,045	5,863	0,359 0
C1900	190 × 3,55	190,00	± 1,17	7,480	± 0,046	6,019	0,368 5
C1950	195 × 3,55	195,00	± 1,20	7,677	± 0,047	6,174	0,378 0
C2000	200 × 3,55	200,00	± 1,22	7,874	± 0,048	6,329	0,387 6
C2120	212 × 3,55	212,00	± 1,29	8,346	± 0,051	6,703	0,410 4
C2180	218 × 3,55	218,00	± 1,32	8,523	± 0,052	6,889	0,419 0
C2240	224 × 3,55	224,00	± 1,35	8,819	± 0,053	7,076	0,433 3
C2300	230 × 3,55	230,00	± 1,39	9,055	± 0,055	7,262	0,444 7
C2360	236 × 3,55	236,00	± 1,42	9,291	± 0,056	7,449	0,456 1
C2500	250 × 3,55	250,00	± 1,49	9,843	± 0,059	7,884	0,482 8
C2580	258 × 3,55	258,00	± 1,54	10,157	± 0,061	8,133	0,498 0
C2650	265 × 3,55	265,00	± 1,57	10,433	± 0,062	8,351	0,511 3
C2800	280 × 3,55	280,00	± 1,65	11,024	± 0,065	8,817	0,533 9
C2900	290 × 3,55	290,00	± 1,71	11,417	± 0,067	9,128	0,558 9
C3000	300 × 3,55	300,00	± 1,76	11,811	± 0,069	9,439	0,578 0
C3070	307 × 3,55	307,00	± 1,80	12,087	± 0,071	9,657	0,591 3
C3150	315 × 3,55	315,00	± 1,84	12,402	± 0,072	9,905	0,606 5
C3350	335 × 3,55	335,00	± 1,95	13,189	± 0,077	10,527	0,644 6
C3550	355 × 3,55	355,00	± 2,06	13,976	± 0,081	11,149	0,682 7

Table 10 — Size code, size, inside diameter and inside diameter tolerances of O-rings for aerospace applications — Cross-section diameter, d_2, of 5,30 mm ± 0,13 mm (0,209 in ± 0,005 in)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
D0375	37,5 × 5,3	37,50	± 0,32	1,476	± 0,012	2,966	0,182
D0387	38,7 × 5,3	38,70		1,524	± 0,013	3,050	0,187
D0400	40 × 5,3	40,00	± 0,33	1,575		3,140	0,192
D0412	41,2 × 5,3	41,20	± 0,34	1,622		3,223	0,197
D0425	42,5 × 5,3	42,50	± 0,35	1,673	± 0,014	3,313	0,203
D0437	43,7 × 5,3	43,70		1,720		3,396	0,208
D0450	45 × 5,3	45,00	± 0,36	1,772		3,486	0,214
D0462	46,2 × 5,3	46,20	± 0,37	1,819	± 0,015	3,569	0,219
D0475	47,5 × 5,3	47,50	± 0,38	1,870		3,660	0,224
D0487	48,7 × 5,3	48,70		1,917		3,743	0,229
D0500	50 × 5,3	50,00	± 0,39	1,969		3,833	0,235
D0515	51,5 × 5,3	51,50	± 0,40	2,028	± 0,016	3,937	0,241
D0530	53 × 5,3	53,00	± 0,41	2,087		4,041	0,247
D0545	54,5 × 5,3	54,50	± 0,42	2,146	± 0,017	4,145	0,254
D0560	56 × 5,3	56,00		2,205		4,249	0,260
D0580	58 × 5,3	58,00	± 0,44	2,283		4,387	0,269
D0600	60 × 5,3	60,00	± 0,45	2,362	± 0,018	4,526	0,277
D0615	61,5 × 5,3	61,50		2,421		4,630	0,283
D0630	63 × 5,3	63,00	± 0,46	2,480		4,734	0,290
D0650	65 × 5,3	65,00	± 0,48	2,559	± 0,019	4,872	0,298
D0670	67 × 5,3	67,00	± 0,49	2,638		5,011	0,307
D0690	69 × 5,3	69,00	± 0,50	2,717	± 0,020	5,150	0,315
D0710	71 × 5,3	71,00	± 0,51	2,795		5,288	0,324
D0730	73 × 5,3	73,00	± 0,52	2,874		5,427	0,332
D0750	75 × 5,3	75,00	± 0,53	2,953	± 0,021	5,566	0,341
D0775	77,5 × 5,3	77,50	± 0,55	3,051	± 0,022	5,739	0,351
D0800	80 × 5,3	80,00	± 0,56	3,150		5,912	0,362
D0825	82,5 × 5,3	82,50	± 0,57	3,248		6,085	0,373
D0850	85 × 5,3	85,00	± 0,59	3,346	± 0,023	6,259	0,383
D0875	87,5 × 5,3	87,50	± 0,60	3,445	± 0,024	6,432	0,394
D0900	90 × 5,3	90,00	± 0,62	3,543		6,605	0,404

Table 10 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
D0925	92,5 × 5,3	92,50	± 0,63	3,642	± 0,025	6,778	0,415
D0950	95 × 5,3	95,00	± 0,64	3,740		6,952	0,426
D0975	97,5 × 5,3	97,50	± 0,66	3,839	± 0,026	7,125	0,437
D1000	100 × 5,3	100,00	± 0,67	3,937		7,298	0,447
D1030	103 × 5,3	103,00	± 0,69	4,055	± 0,027	7,506	0,460
D1060	106 × 5,3	106,00	± 0,71	4,173	± 0,028	7,714	0,472
D1090	109 × 5,3	109,00	± 0,72	4,291		7,922	0,485
D1120	112 × 5,3	112,00	± 0,74	4,409	± 0,029	8,130	0,498
D1150	115 × 5,3	115,00	± 0,76	4,528	± 0,030	8,338	0,510
D1180	118 × 5,3	118,00	± 0,77	4,646		8,546	0,523
D1220	122 × 5,3	122,00	± 0,80	4,803	± 0,031	8,823	0,540
D1250	125 × 5,3	125,00	± 0,81	4,921	± 0,032	9,031	0,553
D1280	128 × 5,3	128,00	± 0,83	5,039	± 0,033	9,239	0,566
D1320	132 × 5,3	132,00	± 0,85	5,197		9,516	0,583
D1360	136 × 5,3	136,00	± 0,87	5,354	± 0,034	9,793	0,600
D1400	140 × 5,3	140,00	± 0,89	5,512	± 0,035	10,071	0,617
D1450	145 × 5,3	145,00	± 0,92	5,709	± 0,036	10,417	0,638
D1500	150 × 5,3	150,00	± 0,95	5,906	± 0,037	10,764	0,659
D1550	155 × 5,3	155,00	± 0,98	6,102	± 0,039	11,110	0,681
D1600	160 × 5,3	160,00	± 1,00	6,299		11,457	0,701
D1650	165 × 5,3	165,00	± 1,03	6,496	± 0,041	11,803	0,723
D1700	170 × 5,3	170,00	± 1,06	6,693	± 0,042	12,150	0,744
D1750	175 × 5,3	175,00	± 1,09	6,890	± 0,043	12,496	0,765
D1800	180 × 5,3	180,00	± 1,11	7,087	± 0,044	12,843	0,786
D1850	185 × 5,3	185,00	± 1,14	7,283	± 0,045	13,190	0,807
D1900	190 × 5,3	190,00	± 1,17	7,480	± 0,046	13,536	0,829
D1950	195 × 5,3	195,00	± 1,20	7,677	± 0,047	13,883	0,850
D2000	200 × 5,3	200,00	± 1,22	7,874	± 0,048	14,229	0,871

Table 11 — Size code, size, inside diameter and inside diameter tolerances of O-rings for aerospace applications — Cross-section diameter, d_2, of 7,00 mm ± 0,15 mm (0,276 in ± 0,006 in)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
E1090	109 × 7	109,00	± 0,72	4,291	± 0,028	14,025	0,856
E1120	112 × 7	112,00	± 0,74	4,409	± 0,029	14,387	0,878
E1150	115 × 7	115,00	± 0,76	4,528	± 0,030	14,750	0,900
E1180	118 × 7	118,00	± 0,77	4,646		15,113	0,922
E1220	122 × 7	122,00	± 0,80	4,803	± 0,031	15,596	0,952
E1250	125 × 7	125,00	± 0,81	4,921	± 0,032	15,959	0,974
E1280	128 × 7	128,00	± 0,83	5,039	± 0,033	16,322	0,996
E1320	132 × 7	132,00	± 0,85	5,197		16,805	1,025
E1360	136 × 7	136,00	± 0,87	5,354	± 0,034	17,289	1,058
E1400	140 × 7	140,00	± 0,89	5,512	± 0,035	17,773	1,088
E1450	145 × 7	145,00	± 0,92	5,709	± 0,036	18,377	1,125
E1500	150 × 7	150,00	± 0,95	5,906	± 0,037	18,982	1,162
E1550	155 × 7	155,00	± 0,98	6,102	± 0,039	19,586	1,199
E1600	160 × 7	160,00	± 1,00	6,299		20,191	1,236
E1650	165 × 7	165,00	± 1,03	6,496	± 0,041	20,795	1,273
E1700	170 × 7	170,00	± 1,06	6,693	± 0,042	21,400	1,310
E1750	175 × 7	175,00	± 1,09	6,890	± 0,043	22,004	1,347
E1800	180 × 7	180,00	± 1,11	7,087	± 0,044	22,609	1,384
E1850	185 × 7	185,00	± 1,14	7,283	± 0,045	23,213	1,421
E1900	190 × 7	190,00	± 1,17	7,480	± 0,046	23,818	1,458
E1950	195 × 7	195,00	± 1,20	7,677	± 0,047	24,422	1,495
E2000	200 × 7	200,00	± 1,22	7,874	± 0,048	25,027	1,532
E2060	206 × 7	206,00	± 1,26	8,110	± 0,050	25,752	1,576
E2120	212 × 7	212,00	± 1,29	8,346	± 0,051	26,478	1,621
E2180	218 × 7	218,00	± 1,32	8,523	± 0,052	27,203	1,665
E2240	224 × 7	224,00	± 1,35	8,819	± 0,053	27,929	1,709
E2300	230 × 7	230,00	± 1,39	9,055	± 0,055	28,654	1,754
E2360	236 × 7	236,00	± 1,42	9,291	± 0,056	29,379	1,798
E2430	243 × 7	243,00	± 1,46	9,567	± 0,057	30,226	1,850
E2500	250 × 7	250,00	± 1,49	9,843	± 0,059	31,072	1,902
E2580	258 × 7	258,00	± 1,54	10,157	± 0,061	32,039	1,961
E2650	265 × 7	265,00	± 1,57	10,433	± 0,062	32,886	2,013
E2720	272 × 7	272,00	± 1,61	10,709	± 0,063	33,732	2,065

Table 11 (*continued*)

Size code	Size	Inside diameter				Volume ref.	
		d_1 nom.	Tolerance	d_1 nom.	Tolerance		
		mm	mm	in	in	cm^3	in^3
E2800	280 × 7	280,00	± 1,65	11,024	± 0,065	34,699	2,124
E2900	290 × 7	290,00	± 1,71	11,417	± 0,067	35,908	2,200
E3000	300 × 7	300,00	± 1,76	11,811	± 0,069	37,117	2,272
E3070	307 × 7	307,00	± 1,80	12,087	± 0,071	37,963	2,324
E3150	315 × 7	315,00	± 1,84	12,402	± 0,072	38,931	2,383
E3250	325 × 7	325,00	± 1,90	12,795	± 0,075	40,140	2,457
E3350	335 × 7	335,00	± 1,95	13,189	± 0,077	41,349	2,531
E3450	345 × 7	345,00	± 2,00	13,583	± 0,079	42,558	2,605
E3550	355 × 7	355,00	± 2,06	13,976	± 0,081	43,767	2,679
E3650	365 × 7	365,00	± 2,11	14,370	± 0,083	44,976	2,753
E3750	375 × 7	375,00	± 2,16	14,764	± 0,085	46,185	2,827
E3870	387 × 7	387,00	± 2,23	15,236	± 0,088	47,636	2,916
E4000	400 × 7	400,00	± 2,29	15,748	± 0,090	49,207	3,012

Annex A
(normative)

Recommended inside diameter tolerances and cross-section tolerances for non-standard (custom) O-ring values

A.1 In some instances, it can be necessary to use O-rings that are not specified in this part of ISO 3601. This annex provides directions for determining the tolerances that should be applied to the inside diameter, d_1, and cross-section, d_2, of such O-rings.

A.2 For non-standard O-rings, tolerances for the cross-section diameters should be selected from Table A.1.

Table A.1 — Tolerances of cross-section diameters for non-standard O-rings

Cross-section d_2 mm	Tolerance mm	Cross-section d_2 in	Tolerance in
$0{,}80 < d_2 \leq 3{,}15$ [a]	± 0,08	$0{,}031 < d_2 \leq 0{,}124$	± 0,003
$0{,}80 < d_2 \leq 2{,}25$ [b]	± 0,08	$0{,}031 < d_2 \leq 0{,}089$	± 0,003
$2{,}25 < d_2 \leq 3{,}15$ [b]	± 0,09	$0{,}089 < d_2 \leq 0{,}124$	± 0,004 [c]
$3{,}15 < d_2 \leq 4{,}50$	± 0,10	$0{,}124 < d_2 \leq 0{,}177$	± 0,004 [c]
$4{,}50 < d_2 \leq 6{,}30$	± 0,13	$0{,}177 < d_2 \leq 0{,}248$	± 0,005
$6{,}30 < d_2 \leq 8{,}40$	± 0,15	$0{,}248 < d_2 \leq 0{,}331$	± 0,006

[a] Applies to class A only.

[b] Applies to class B only.

[c] Differences between tolerance values are due to conversion of dimensions from metric to inch and rounding rules.

A.3 For non-standard class A O-rings, tolerances for the inside diameter should be selected from Table A.2.

Table A.2 — Tolerances for the inside diameters of non-standard class A O-rings

Inside diameter d_1 mm	Tolerance mm	Inside diameter d_1 in	Tolerance in
0,68 to 1,53	± 0,10	0,027 to 0,060	± 0,004
1,54 to 11,69	± 0,13	0,061 to 0,460	± 0,005
11,70 to 13,46	± 0,15	0,461 to 0,530	± 0,006
13,47 to 17,53	± 0,18	0,531 to 0,690	± 0,007
17,5 to 20,57	± 0,20	0,691 to 0,810	± 0,008
20,58 to 23,88	± 0,23	0,811 to 0,940	± 0,009
23,89 to 28,70	± 0,25	0,941 to 1,130	± 0,010
28,71 to 35,56	± 0,30	1,131 to 1,400	± 0,012
35,57 to 43,18	± 0,36	1,401 to 1,700	± 0,014
43,19 to 50,80	± 0,41	1,701 to 2,000	± 0,016
50,81 to 58,42	± 0,46	2,001 to 2,300	± 0,018
58,43 to 66,55	± 0,51	2,301 to 2,620	± 0,020
66,56 to 74,93	± 0,56	2,621 to 2,950	± 0,022
74,94 to 83,57	± 0,61	2,951 to 3,290	± 0,024
83,58 to 92,20	± 0,66	3,291 to 3,630	± 0,026
92,21 to 101,60	± 0,71	3,631 to 4,000	± 0,028
101,61 to 117,35	± 0,76	4,001 to 4,620	± 0,030
117,36 to 141,22	± 0,89	4,621 to 5,560	± 0,035
141,23 to 166,37	± 1,02	5,561 to 6,550	± 0,040
166,38 to 192,02	± 1,14	6,551 to 7,560	± 0,045
192,03 to 218,69	± 1,27	7,561 to 8,610	± 0,050
218,70 to 253,37	± 1,40	8,611 to 9,975	± 0,055
253,38 to 289,56	± 1,52	9,976 to 11,400	± 0,060
289,57 to 347,98	± 1,78	11,401 to 13,700	± 0,070
347,99 to 408,94	± 2,03	13,701 to 16,100	± 0,080
408,95 to 472,44	± 2,29	16,101 to 18,600	± 0,090
472,45 to 571,50	± 2,54	18,601 to 22,500	± 0,100
571,51 to 711,20	± 3,05	22,501 to 28,000	± 0,120
711,21 to 855,98	± 3,56	28,001 to 33,700	± 0,140
855,99 to 1005,84	± 4,06	33,701 to 39,600	± 0,160
1 005,85 to 1 163,32	± 4,57	39,601 to 45,800	± 0,180
1 163,33 to 1 320,80	± 5,08	45,801 to 52,000	± 0,200

A.4 Equation (A.1) was used to calculate the inside-diameter tolerances, Δd_1, of class B O-rings in the normative part of this part of ISO 3601:

$$\Delta d_1 = \pm [(d_1^{0,95} \times 0,009) + 0,11] \quad \text{(A.1)}$$

Equation (A.1) may be used to calculate the inside-diameter tolerances (class B) of non-standard O-rings.

EXAMPLE

The tolerance, Δd_1, for the inside diameter of an O-ring with $d_1 = 500$ mm:

$$\Delta d_1 = \pm [(500^{0,95} \times 0,009) + 0,11]$$

$$= \pm [(366,455\,7 \times 0,009) + 0,11]$$

$$= \pm (3,30 + 0,11)$$

$$= \pm 3,41 \text{ mm}$$

Annex B
(informative)

Example method of measuring for receiving inspection

B.1 General

B.1.1 Measuring gauges and O-rings shall be maintained at a temperature of 21 °C to 25 °C and a relative humidity of 45 % to 55 % for a sufficient time to stabilize their dimensions. Actual measurements shall be taken at ambient temperature, and no lubrication shall be used on either the gauges or the O-rings during the inspection process.

B.1.2 Inspection shall take place under a minimum 37,2 lux of illumination.

B.1.3 O-rings shall be handled in such a way as to avoid dimensional distortion.

B.1.4 The contact areas of the inspection gauges shall have a surface that is flat, clean and free of scratches.

B.2 Measurement of the cross-section dimension, d_2

B.2.1 The cross-section dimension shall be determined by one of the following means:

— micrometer (ball-type anvils);

— vernier calipers;

— optical comparator;

— rotating-type fixture with dial indicator;

— visual or laser dimensioning equipment.

B.2.2 Micrometers and calipers may be preset to the dimension being checked. Measurements shall be taken in four locations, approximately 90° apart, around the circumference of the O-ring.

B.2.3 The rotating fixture may be either cylindrical with a packing mounted on a cylinder having a predetermined diameter and a rotatable dial indicator attachment or a surface plate with a 12,70 mm diameter flat contact disk attached to an indicator. If the latter instrumentation is used, the cross-section dimension of the O-ring shall be centred under the contact button and the O-ring shall be rotated so the parting line projection, if any, does not interfere.

B.2.4 Dial indicators shall be graduated in increments of 0,025 mm maximum and shall have no more than 28,35 g of contact pressure. Care should be taken that the contact pressure does not significantly affect the accuracy of the reading. The indicator reading shall not exceed the tolerance limit for any nominal cross-section dimension when rotated through 360°, except for allowable parting line projections.

B.2.5 An optical comparator with a magnification of 10x, a video system, or a laser system that provides similar magnification ability should be used to verify compliance with the dimensional requirements of the drawing.

B.3 Measurement of the inside diameter, d_1

B.3.1 The inside diameter shall be determined by one of the following means:

— "go/no-go" plug gauge;

— flat plug gauge;

— calibrated or tapered-stepped gauge;

— travelling microscope;

— optical comparator or a video system that is calibrated for dimensional measurements.

B.3.2 For inside diameters smaller than 63 mm, diameters shall be gauged for a sliding fit over a standard cylindrical "go/no-go" plug gauge, flat gauge, tapered-stepped gauge or tapered gauge.

B.3.3 For inside diameters larger than or equal to 63 mm, diameters may be gauged for a sliding fit over a flat plug gauge, a tapered-stepped gauge (calibrated or uncalibrated) machined with the minimum and maximum diameters.

B.3.4 The tapered-stepped gauge may be multi-purpose by having a series of truncated cones in the form of layers. Each step shall consist of a taper of such angularity that the sloping portion of the step covers the "go" dimension and the flat step the "no-go" diameter. It is necessary to have a gauge for each cross-section size. The top of each step shall be sized so that when an O-ring with the minimum inside diameter and maximum cross-section diameter is dropped freely in a radial plane over the step, the top of the step and the top of the O-ring are in the same plane. Similarly, the bottom of each step shall be sized so that an O-ring with the maximum inside diameter and maximum cross-section diameter just clears the flat-bottom step of the gauge.

B.3.4.1 Mandrels with a taper of 0,02 mm per 1 mm, calibrated with a height gauge, can be used to measure O-ring inside diameters. The height gauge is arranged so that the tolerance spread is indicated for the particular O-ring measured. A micrometer adjustment shall be provided to permit realignment of the pointers for readings taken at the outside surfaces of, rather than the centreline of, the O-ring.

B.3.4.2 A typical calibrated taper gauge with a taper of 0,2 mm per 12 mm measured on the diameter and along the axis has lines that are scribed or etched on the gauge at 0,51 mm intervals. The length of the taper gauge can vary depending on the O-ring applications.

B.3.5 Other methods may be used to determine the inside diameters of larger O-rings after the cross-sectional and parting line projection dimensions have been verified and found to be within tolerance limits, such as a flat gauge with a predetermined rectangular groove that has an inside diameter equal to the minimum O-ring inside diameter and an outside diameter equal to the maximum O-ring inside diameter plus twice the maximum cross-section dimension. The depth of the groove shall be at least 50 % of the cross-section diameter, but no more than the cross-section diameter. If the O-ring falls into the predetermined groove without stretching, then it shall be considered to be within tolerance.

Bibliography

[1] ISO 1629, *Rubber and latices — Nomenclature*

[2] ISO 16031-1, *Aerospace fluid systems — O-rings, inch series: Inside diameters and cross sections, tolerances and size-identification codes — Part 1: Close tolerances for hydraulic systems*

[3] ISO 16031-2, *Aerospace fluid systems — O-rings, inch series: Inside diameters and cross-sections, tolerances and size-identification codes — Part 2: Standard tolerances for non-hydraulic systems*

[4] SAE AS568B, *Aerospace Size Standard for O-Rings*[1)]

1) SAE International, Warrendale, PA, USA.

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