# INTERNATIONAL STANDARD

# ISO 16031-1

First edition
2002-06-15

# Aerospace fluid systems — O-rings, inch series: Inside diameters and cross sections, tolerances and size-identification codes —

## Part 1:
## Close tolerances for hydraulic systems

*Systèmes aérospatiaux de fluides — Joints toriques, série en inches: diamètres intérieurs et sections, tolérances et codes d'identification dimensionnelle —*

*Partie 1: Tolérances serrées pour systèmes hydrauliques*

Reference number
ISO 16031-1:2002(E)

© ISO 2002

---

**PDF disclaimer**

This PDF file may contain embedded typefaces. In accordance with Adobe's licensing policy, this file may be printed or viewed but shall not be edited unless the typefaces which are embedded are licensed to and installed on the computer performing the editing. In downloading this file, parties accept therein the responsibility of not infringing Adobe's licensing policy. The ISO Central Secretariat accepts no liability in this area.

Adobe is a trademark of Adobe Systems Incorporated.

Details of the software products used to create this PDF file can be found in the General Info relative to the file; the PDF-creation parameters were optimized for printing. Every care has been taken to ensure that the file is suitable for use by ISO member bodies. In the unlikely event that a problem relating to it is found, please inform the Central Secretariat at the address given below.

---

# 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 3.

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 part of ISO 16031 may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights.

ISO 16031-1 was prepared by Technical Committee ISO/TC 20, *Aircraft and space vehicles*, Subcommittee SC 10, *Aerospace fluid systems and components*.

ISO 16031 consists of the following parts, under the general title *Aerospace fluid systems — O-rings, inch series: Inside diameters and cross sections, tolerances and size-identification codes*:

— *Part 1: Close tolerances for hydraulic systems*

— *Part 2: Standard tolerances (for non-hydraulic systems)*

iii

# Introduction

In fluid power systems, power is transmitted through a fluid (liquid or gas) under pressure within an enclosed circuit. Components are designed to meet these requirements under varying conditions. Testing of components to meet performance requirements provides users with a basis of assurance for determining design applications and for checking component compliance with their stated requirements.

# Aerospace fluid systems — O-rings, inch series: Inside diameters and cross sections, tolerances and size-identification codes —

## Part 1:
## Close tolerances for hydraulic systems

## 1   Scope

This part of ISO 16031 specifies the inside diameters, cross-sections, tolerances and size identification codes for inch O-rings used in aerospace fluid systems.

The dimensions and high precision tolerances specified in this part of ISO 16031 are suitable for nitrile and ethylene propylene materials intended for use in high pressure hydraulic fluid systems provided that suitable tooling be available.

## 2   Normative reference

The following normative document contains provisions which, through reference in this text, constitute provisions of this part of ISO 16031. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However parties to agreements based on this part of ISO 16031 are encouraged to investigate the possibility of applying the most recent edition of the normative document indicated below. For undated references, the latest edition of the document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO 5598:1985, *Fluid power systems and components — Vocabulary*

## 3   Terms and definitions

For the purposes of this part of ISO 16031 the terms and definitions given in ISO 5598 apply.

NOTE      Throughout ISO 16301, the term "O-ring" has been adopted although the correct technical term is "toroidal sealing ring".

## 4   Configuration

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

## 5   Inside diameters, cross-sections and tolerances

The combinations of inside diameters, $d_1$, cross-sections, $d_2$, and O-ring tolerances shall be chosen from Tables 1 and 2. For each of these combinations there is a corresponding size identification code.

**1**
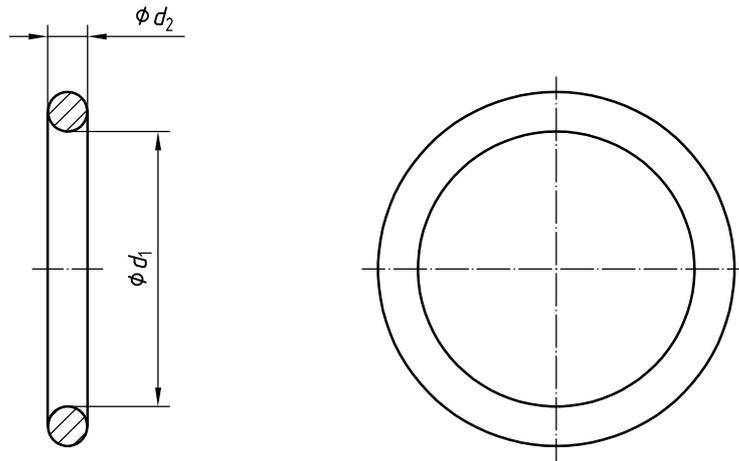
**Figure 1 — Typical O-ring configuration**

## 6 Size identification code

**6.1** Table 1 lists the dimensions of O-rings and their corresponding size identification code from -001 to -475. The size identification codes are divided into groups of one hundred and within each group are sequential and not significant. Each group of one hundred identifies the cross-section size of the O-rings within the group (except for sizes -001 to -003 which have unique cross-section sizes).

EXAMPLE

```
- 0 2 5    O-ring size identification code

           Reference number allocated to an O-ring internal diameter size

           Signifies that the O-ring has a cross-section of  0,070 in (1,78 mm)
```
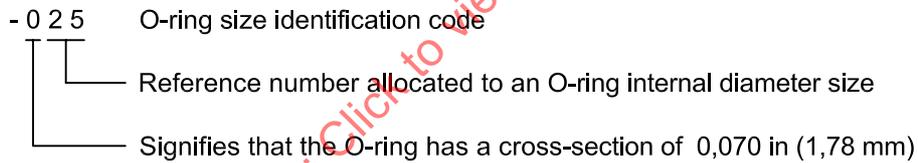
Reference to Table 1 establishes that -025 represents an O-ring with a cross-section of 0,070 in (1,78 mm) and an internal diameter of 1,170 in to 1,182 in (29,72 mm to 30,02 mm).

**6.2** Table 2, lists the dimensions of O-rings and their corresponding size identification code for the 900 series, which includes all of the currently standardized O-rings for sealing straight thread tube fitting bosses. This series utilizes a significant dash numbering system, where the dash number designates the tube size in 1/16ths in, with the exception of the -901, which is intended for a 0,093 8 in (2,38 mm) nominal outside diameter tube.

EXAMPLE

```
- 9 1 8    O-ring size identification code

           Signifies that the O-ring is for an 18/16ths, i.e. 1,125 in (28,58 mm) tube size

           Signifies that the O-ring is for a straight thread tube fitting boss
```

### Table 1 — Inside diameters, cross-sections and tolerances

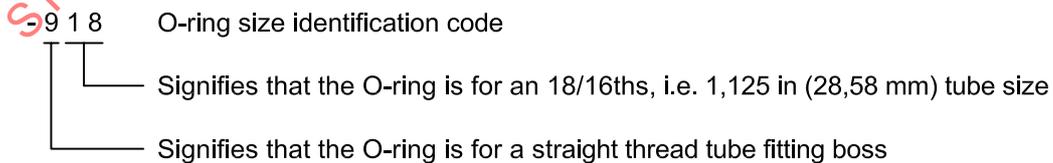| Size identifi- cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in³ | cm³ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -001 | 0,025 | 0,033 | 0,64 | 0,84 | 0,037 | 0,043 | 0,94 | 1,09 | 0,000 3 | 0,005 |
| -002 | 0,038 | 0,046 | 0,97 | 1,17 | 0,047 | 0,053 | 1,19 | 1,35 | 0,000 6 | 0,010 |
| -003 | 0,052 | 0,060 | 1,32 | 1,52 | 0,057 | 0,063 | 1,45 | 1,60 | 0,001 0 | 0,016 |
| -004 | 0,065 | 0,075 | 1,65 | 1,90 | 0,067 | 0,073 | 1,70 | 1,85 | 0,001 7 | 0,028 |
| -005 | 0,096 | 0,106 | 2,44 | 2,69 | 0,067 | 0,073 | 1,70 | 1,85 | 0,002 1 | 0,034 |
| -006 | 0,109 | 0,119 | 2,77 | 3,02 | 0,067 | 0,073 | 1,70 | 1,85 | 0,002 2 | 0,036 |
| -007 | 0,140 | 0,150 | 3,56 | 3,81 | 0,067 | 0,073 | 1,70 | 1,85 | 0,002 6 | 0,043 |
| -008 | 0,171 | 0,181 | 4,34 | 4,60 | 0,067 | 0,073 | 1,70 | 1,85 | 0,003 0 | 0,049 |
| -009 | 0,203 | 0,213 | 5,16 | 5,41 | 0,067 | 0,073 | 1,70 | 1,85 | 0,003 4 | 0,056 |
| -010 | 0,234 | 0,244 | 5,94 | 6,20 | 0,067 | 0,073 | 1,70 | 1,85 | 0,003 7 | 0,061 |
| -011 | 0,296 | 0,306 | 7,52 | 7,77 | 0,067 | 0,073 | 1,70 | 1,85 | 0,004 5 | 0,074 |
| -012 | 0,359 | 0,369 | 9,12 | 9,37 | 0,067 | 0,073 | 1,70 | 1,85 | 0,005 2 | 0,085 |
| -013 | 0,421 | 0,431 | 10,69 | 10,95 | 0,067 | 0,073 | 1,70 | 1,85 | 0,006 0 | 0,098 |
| -014 | 0,484 | 0,494 | 12,29 | 12,55 | 0,067 | 0,073 | 1,70 | 1,85 | 0,006 8 | 0,111 |
| -015 | 0,546 | 0,556 | 13,87 | 14,12 | 0,067 | 0,073 | 1,70 | 1,85 | 0,007 5 | 0,123 |
| -016 | 0,609 | 0,619 | 15,47 | 15,72 | 0,067 | 0,073 | 1,70 | 1,85 | 0,0083 | 0,136 |
| -017 | 0,671 | 0,681 | 17,04 | 17,30 | 0,067 | 0,073 | 1,70 | 1,85 | 0,009 0 | 0,147 |
| -018 | 0,734 | 0,744 | 18,64 | 18,90 | 0,067 | 0,073 | 1,70 | 1,85 | 0,009 8 | 0,161 |
| -019 | 0,795 | 0,807 | 20,19 | 20,50 | 0,067 | 0,073 | 1,70 | 1,85 | 0,010 5 | 0,172 |
| -020 | 0,858 | 0,870 | 21,79 | 22,10 | 0,067 | 0,073 | 1,70 | 1,85 | 0,011 3 | 0,185 |
| -021 | 0,920 | 0,932 | 23,36 | 23,67 | 0,067 | 0,073 | 1,70 | 1,85 | 0,012 0 | 0,197 |
| -022 | 0,983 | 0,995 | 24,97 | 25,27 | 0,067 | 0,073 | 1,70 | 1,85 | 0,012 8 | 0,210 |
| -023 | 1,045 | 1,057 | 26,54 | 26,85 | 0,067 | 0,073 | 1,70 | 1,85 | 0,013 6 | 0,223 |
| -024 | 1,108 | 1,120 | 28,14 | 28,45 | 0,067 | 0,073 | 1,70 | 1,85 | 0,014 3 | 0,234 |
| -025 | 1,170 | 1,182 | 29,72 | 30,02 | 0,067 | 0,073 | 1,70 | 1,85 | 0,015 1 | 0,247 |
| -026 | 1,233 | 1,245 | 31,32 | 31,62 | 0,067 | 0,073 | 1,70 | 1,85 | 0,015 8 | 0,259 |
| -027 | 1,295 | 1,307 | 32,89 | 33,20 | 0,067 | 0,073 | 1,70 | 1,85 | 0,016 6 | 0,272 |
| -028 | 1,358 | 1,370 | 34,49 | 34,80 | 0,067 | 0,073 | 1,70 | 1,85 | 0,017 3 | 0,283 |
| -029 | 1,479 | 1,499 | 37,57 | 38,07 | 0,067 | 0,073 | 1,70 | 1,85 | 0,018 8 | 0,308 |
| -030 | 1,604 | 1,624 | 40,74 | 41,25 | 0,067 | 0,073 | 1,70 | 1,85 | 0,020 4 | 0,334 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in³ | cm³ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -031 | 1,729 | 1,749 | 43,92 | 44,42 | 0,067 | 0,073 | 1,70 | 1,85 | 0,021 9 | 0,359 |
| -032 | 1,854 | 1,874 | 47,09 | 47,60 | 0,067 | 0,073 | 1,70 | 1,85 | 0,023 4 | 0,383 |
| -033 | 1,979 | 1,999 | 50,27 | 50,77 | 0,067 | 0,073 | 1,70 | 1,85 | 0,024 9 | 0,408 |
| -034 | 2,104 | 2,124 | 53,44 | 53,95 | 0,067 | 0,073 | 1,70 | 1,85 | 0,026 4 | 0,433 |
| -035 | 2,229 | 2,249 | 56,62 | 57,12 | 0,067 | 0,073 | 1,70 | 1,85 | 0,027 9 | 0,457 |
| | | | | | | | | | | |
| -036 | 2,354 | 2,374 | 59,79 | 60,30 | 0,067 | 0,073 | 1,70 | 1,85 | 0,029 4 | 0,482 |
| -037 | 2,479 | 2,499 | 62,97 | 63,47 | 0,067 | 0,073 | 1,70 | 1,85 | 0,030 9 | 0,506 |
| -038 | 2,604 | 2,624 | 66,14 | 66,65 | 0,067 | 0,073 | 1,70 | 1,85 | 0,032 5 | 0,533 |
| -039 | 2,724 | 2,754 | 69,19 | 69,95 | 0,067 | 0,073 | 1,70 | 1,85 | 0,034 0 | 0,557 |
| -040 | 2,849 | 2,879 | 72,36 | 73,13 | 0,067 | 0,073 | 1,70 | 1,85 | 0,035 5 | 0,582 |
| | | | | | | | | | | |
| -041 | 2,974 | 3,004 | 75,54 | 76,30 | 0,067 | 0,073 | 1,70 | 1,85 | 0,037 0 | 0,606 |
| -042 | 3,224 | 3,254 | 81,89 | 82,65 | 0,067 | 0,073 | 1,70 | 1,85 | 0,040 0 | 0,655 |
| -043 | 3,474 | 3,504 | 88,24 | 89,00 | 0,067 | 0,073 | 1,70 | 1,85 | 0,043 0 | 0,705 |
| -044 | 3,724 | 3,754 | 94,59 | 95,35 | 0,067 | 0,073 | 1,70 | 1,85 | 0,046 1 | 0,755 |
| -045 | 3,974 | 4,004 | 100,94 | 101,70 | 0,067 | 0,073 | 1,70 | 1,85 | 0,049 1 | 0,805 |
| -046 | 4,224 | 4,254 | 107,29 | 108,05 | 0,067 | 0,073 | 1,70 | 1,85 | 0,052 1 | 0,854 |
| -047 | 4,474 | 4,504 | 113,64 | 114,40 | 0,067 | 0,073 | 1,70 | 1,85 | 0,055 1 | 0,903 |
| -048 | 4,724 | 4,754 | 119,99 | 120,75 | 0,067 | 0,073 | 1,70 | 1,85 | 0,058 1 | 0,952 |
| -049 | 4,966 | 5,012 | 126,14 | 127,30 | 0,067 | 0,073 | 1,70 | 1,85 | 0,061 2 | 1,003 |
| -050 | 5,216 | 5,262 | 132,49 | 133,65 | 0,067 | 0,073 | 1,70 | 1,85 | 0,064 2 | 1,052 |
| | | | | | | | | | | |
| *051 THRU *101 | O-ring sizes not assigned | | | | | | | | | |
| | | | | | | | | | | |
| -102 | 0,044 | 0,054 | 1,12 | 1,37 | 0,100 | 0,106 | 2,54 | 2,69 | 0,004 0 | 0,066 |
| -103 | 0,076 | 0,086 | 1,93 | 2,18 | 0,100 | 0,106 | 2,54 | 2,69 | 0,004 8 | 0,079 |
| -104 | 0,107 | 0,117 | 2,72 | 2,97 | 0,100 | 0,106 | 2,54 | 2,69 | 0,005 6 | 0,092 |
| -105 | 0,138 | 0,148 | 3,51 | 3,76 | 0,100 | 0,106 | 2,54 | 2,69 | 0,006 4 | 0,105 |
| | | | | | | | | | | |
| -106 | 0,169 | 0,179 | 4,29 | 4,55 | 0,100 | 0,106 | 2,54 | 2,69 | 0,007 3 | 0,120 |
| -107 | 0,201 | 0,211 | 5,11 | 5,36 | 0,100 | 0,106 | 2,54 | 2,69 | 0,008 1 | 0,133 |
| -108 | 0,232 | 0,242 | 5,89 | 6,15 | 0,100 | 0,106 | 2,54 | 2,69 | 0,008 9 | 0,146 |
| -109 | 0,294 | 0,304 | 7,47 | 7,72 | 0,100 | 0,106 | 2,54 | 2,69 | 0,010 5 | 0,172 |
| -110 | 0,357 | 0,367 | 9,07 | 9,32 | 0,100 | 0,106 | 2,54 | 2,69 | 0,012 2 | 0,200 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in$^3$ | cm$^3$ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -111 | 0,419 | 0,429 | 10,64 | 10,90 | 0,100 | 0,106 | 2,54 | 2,69 | 0,013 8 | 0,226 |
| -112 | 0,482 | 0,492 | 12,24 | 12,50 | 0,100 | 0,106 | 2,54 | 2,69 | 0,015 4 | 0,252 |
| -113 | 0,544 | 0,554 | 13,82 | 14,07 | 0,100 | 0,106 | 2,54 | 2,69 | 0,017 1 | 0,280 |
| -114 | 0,607 | 0,617 | 15,42 | 15,67 | 0,100 | 0,106 | 2,54 | 2,69 | 0,018 7 | 0,306 |
| -115 | 0,669 | 0,679 | 16,99 | 17,25 | 0,100 | 0,106 | 2,54 | 2,69 | 0,020 3 | 0,333 |
| -116 | 0,732 | 0,742 | 18,59 | 18,85 | 0,100 | 0,106 | 2,54 | 2,69 | 0,022 0 | 0,361 |
| -117 | 0,793 | 0,805 | 20,14 | 20,45 | 0,100 | 0,106 | 2,54 | 2,69 | 0,023 6 | 0,387 |
| -118 | 0,856 | 0,868 | 21,74 | 22,05 | 0,100 | 0,106 | 2,54 | 2,69 | 0,025 3 | 0,415 |
| -119 | 0,918 | 0,930 | 23,32 | 23,62 | 0,100 | 0,106 | 2,54 | 2,69 | 0,026 9 | 0,441 |
| -120 | 0,981 | 0,993 | 24,92 | 25,22 | 0,100 | 0,106 | 2,54 | 2,69 | 0,028 5 | 0,467 |
| -121 | 1,043 | 1,055 | 26,49 | 26,80 | 0,100 | 0,106 | 2,54 | 2,69 | 0,030 2 | 0,495 |
| -122 | 1,106 | 1,118 | 28,09 | 28,40 | 0,100 | 0,106 | 2,54 | 2,69 | 0,031 8 | 0,521 |
| -123 | 1,168 | 1,180 | 29,67 | 29,97 | 0,100 | 0,106 | 2,54 | 2,69 | 0,033 4 | 0,547 |
| -124 | 1,231 | 1,243 | 31,27 | 31,57 | 0,100 | 0,106 | 2,54 | 2,69 | 0,035 1 | 0,575 |
| -125 | 1,293 | 1,305 | 32,84 | 33,15 | 0,100 | 0,106 | 2,54 | 2,69 | 0,036 7 | 0,601 |
| -126 | 1,356 | 1,368 | 34,44 | 34,74 | 0,100 | 0,106 | 2,54 | 2,69 | 0,038 3 | 0,628 |
| -127 | 1,418 | 1,430 | 36,02 | 36,32 | 0,100 | 0,106 | 2,54 | 2,69 | 0,040 0 | 0,655 |
| -128 | 1,481 | 1,493 | 37,62 | 37,92 | 0,100 | 0,106 | 2,54 | 2,69 | 0,041 6 | 0,682 |
| -129 | 1,539 | 1,559 | 39,09 | 39,60 | 0,100 | 0,106 | 2,54 | 2,69 | 0,043 2 | 0,708 |
| -130 | 1,602 | 1,622 | 40,69 | 41,20 | 0,100 | 0,106 | 2,54 | 2,69 | 0,044 9 | 0,736 |
| -131 | 1,664 | 1,684 | 42,27 | 42,77 | 0,100 | 0,106 | 2,54 | 2,69 | 0,046 5 | 0,762 |
| -132 | 1,727 | 1,747 | 43,87 | 44,37 | 0,100 | 0,106 | 2,54 | 2,69 | 0,048 2 | 0,790 |
| -133 | 1,789 | 1,809 | 45,44 | 45,95 | 0,100 | 0,106 | 2,54 | 2,69 | 0,049 8 | 0,816 |
| -134 | 1,852 | 1,872 | 47,04 | 47,55 | 0,100 | 0,106 | 2,54 | 2,69 | 0,051 4 | 0,842 |
| -135 | 1,915 | 1,935 | 48,64 | 49,15 | 0,100 | 0,106 | 2,54 | 2,69 | 0,053 1 | 0,870 |
| -136 | 1,977 | 1,997 | 50,22 | 50,72 | 0,100 | 0,106 | 2,54 | 2,69 | 0,054 7 | 0,896 |
| -137 | 2,040 | 2,060 | 51,82 | 52,32 | 0,100 | 0,106 | 2,54 | 2,69 | 0,056 4 | 0,924 |
| -138 | 2,102 | 2,122 | 53,39 | 53,90 | 0,100 | 0,106 | 2,54 | 2,69 | 0,058 0 | 0,950 |
| -139 | 2,165 | 2,185 | 54,99 | 55,50 | 0,100 | 0,106 | 2,54 | 2,69 | 0,059 6 | 0,977 |
| -140 | 2,227 | 2,247 | 56,57 | 57,07 | 0,100 | 0,106 | 2,54 | 2,69 | 0,061 3 | 1,005 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in$^3$ | cm$^3$ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -141 | 2,290 | 2,310 | 58,17 | 58,67 | 0,100 | 0,106 | 2,54 | 2,69 | 0,062 9 | 1,031 |
| -142 | 2,352 | 2,372 | 59,74 | 60,25 | 0,100 | 0,106 | 2,54 | 2,69 | 0,064 5 | 1,057 |
| -143 | 2,415 | 2,435 | 61,34 | 61,85 | 0,100 | 0,106 | 2,54 | 2,69 | 0,066 2 | 1,085 |
| -144 | 2,477 | 2,497 | 62,92 | 63,42 | 0,100 | 0,106 | 2,54 | 2,69 | 0,067 8 | 1,111 |
| -145 | 2,540 | 2,560 | 64,52 | 65,02 | 0,100 | 0,106 | 2,54 | 2,69 | 0,069 4 | 1,137 |
| | | | | | | | | | | |
| -146 | 2,602 | 2,622 | 66,09 | 66,60 | 0,100 | 0,106 | 2,54 | 2,69 | 0,071 1 | 1,165 |
| -147 | 2,660 | 2,690 | 67,56 | 68,33 | 0,100 | 0,106 | 2,54 | 2,69 | 0,072 7 | 1,191 |
| -148 | 2,722 | 2,752 | 69,14 | 69,90 | 0,100 | 0,106 | 2,54 | 2,69 | 0,074 3 | 1,218 |
| -149 | 2,785 | 2,815 | 70,74 | 71,50 | 0,100 | 0,106 | 2,54 | 2,69 | 0,076 0 | 1,245 |
| -150 | 2,847 | 2,877 | 72,31 | 73,07 | 0,100 | 0,106 | 2,54 | 2,69 | 0,077 6 | 1,272 |
| | | | | | | | | | | |
| -151 | 2,972 | 3,002 | 75,49 | 76,25 | 0,100 | 0,106 | 2,54 | 2,69 | 0,080 9 | 1,326 |
| -152 | 3,222 | 3,252 | 81,84 | 82,60 | 0,100 | 0,106 | 2,54 | 2,69 | 0,087 4 | 1,432 |
| -153 | 3,472 | 3,502 | 88,19 | 88,95 | 0,100 | 0,106 | 2,54 | 2,69 | 0,094 0 | 1,540 |
| -154 | 3,722 | 3,752 | 94,54 | 95,30 | 0,100 | 0,106 | 2,54 | 2,69 | 0,100 5 | 1,647 |
| -155 | 3,972 | 4,002 | 100,89 | 101,65 | 0,100 | 0,106 | 2,54 | 2,69 | 0,107 1 | 1,755 |
| | | | | | | | | | | |
| -156 | 4,222 | 4,252 | 107,24 | 108,00 | 0,100 | 0,106 | 2,54 | 2,69 | 0,113 6 | 1,862 |
| -157 | 4,472 | 4,502 | 113,59 | 114,35 | 0,100 | 0,106 | 2,54 | 2,69 | 0,120 2 | 1,970 |
| -158 | 4,722 | 4,752 | 119,94 | 120,70 | 0,100 | 0,106 | 2,54 | 2,69 | 0,126 7 | 2,076 |
| -159 | 4,972 | 5,002 | 126,29 | 127,05 | 0,100 | 0,106 | 2,54 | 2,69 | 0,133 2 | 2,183 |
| -160 | 5,214 | 5,260 | 132,43 | 133,60 | 0,100 | 0,106 | 2,54 | 2,69 | 0,139 8 | 2,291 |
| | | | | | | | | | | |
| -161 | 5,464 | 5,510 | 138,79 | 139,95 | 0,100 | 0,106 | 2,54 | 2,69 | 0,146 3 | 2,397 |
| -162 | 5,714 | 5,760 | 145,14 | 146,30 | 0,100 | 0,106 | 2,54 | 2,69 | 0,152 9 | 2,506 |
| -163 | 5,964 | 6,010 | 151,49 | 152,65 | 0,100 | 0,106 | 2,54 | 2,69 | 0,159 4 | 2,612 |
| -164 | 6,214 | 6,260 | 157,84 | 159,00 | 0,100 | 0,106 | 2,54 | 2,69 | 0,166 0 | 2,720 |
| -165 | 6,464 | 6,510 | 164,19 | 165,35 | 0,100 | 0,106 | 2,54 | 2,69 | 0,172 5 | 2,827 |
| | | | | | | | | | | |
| -166 | 6,714 | 6,760 | 170,54 | 171,70 | 0,100 | 0,106 | 2,54 | 2,69 | 0,179 0 | 2,933 |
| -167 | 6,964 | 7,010 | 176,89 | 178,05 | 0,100 | 0,106 | 2,54 | 2,69 | 0,185 6 | 3,041 |
| -168 | 7,207 | 7,267 | 183,06 | 184,58 | 0,100 | 0,106 | 2,54 | 2,69 | 0,192 1 | 3,148 |
| -169 | 7,457 | 7,517 | 189,41 | 190,93 | 0,100 | 0,106 | 2,54 | 2,69 | 0,198 7 | 3,256 |
| -170 | 7,707 | 7,767 | 195,76 | 197,28 | 0,100 | 0,106 | 2,54 | 2,69 | 0,205 2 | 3,363 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in$^3$ | cm$^3$ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -171 | 7,957 | 8,017 | 202,11 | 203,63 | 0,100 | 0,106 | 2,54 | 2,69 | 0,211 8 | 3,471 |
| -172 | 8,207 | 8,267 | 208,46 | 209,98 | 0,100 | 0,106 | 2,54 | 2,69 | 0,218 3 | 3,577 |
| -173 | 8,457 | 8,517 | 214,81 | 216,33 | 0,100 | 0,106 | 2,54 | 2,69 | 0,224 9 | 3,685 |
| -174 | 8,707 | 8,767 | 221,16 | 222,68 | 0,100 | 0,106 | 2,54 | 2,69 | 0,231 4 | 3,792 |
| -175 | 8,957 | 9,017 | 227,51 | 229,03 | 0,100 | 0,106 | 2,54 | 2,69 | 0,237 9 | 3,898 |
| -176 | 9,207 | 9,267 | 233,86 | 235,38 | 0,100 | 0,106 | 2,54 | 2,69 | 0,244 5 | 4,007 |
| -177 | 9,457 | 9,517 | 240,21 | 241,73 | 0,100 | 0,106 | 2,54 | 2,69 | 0,251 0 | 4,113 |
| -178 | 9,707 | 9,767 | 246,56 | 248,08 | 0,100 | 0,106 | 2,54 | 2,69 | 0,257 6 | 4,221 |
| *179 THRU *200 | O-ring sizes not assigned | | | | | | | | | |
| -201 | 0,166 | 0,176 | 4,22 | 4,47 | 0,135 | 0,143 | 3,43 | 3,63 | 0,014 8 | 0,243 |
| -202 | 0,229 | 0,239 | 5,82 | 6,07 | 0,135 | 0,143 | 3,43 | 3,63 | 0,017 8 | 0,292 |
| -203 | 0,291 | 0,301 | 7,39 | 7,65 | 0,135 | 0,143 | 3,43 | 3,63 | 0,020 7 | 0,339 |
| -204 | 0,354 | 0,364 | 8,99 | 9,25 | 0,135 | 0,143 | 3,43 | 3,63 | 0,023 7 | 0,388 |
| -205 | 0,416 | 0,426 | 10,57 | 10,82 | 0,135 | 0,143 | 3,43 | 3,63 | 0,026 7 | 0,438 |
| -206 | 0,479 | 0,489 | 12,17 | 12,42 | 0,135 | 0,143 | 3,43 | 3,63 | 0,029 7 | 0,487 |
| -207 | 0,541 | 0,551 | 13,74 | 14,00 | 0,135 | 0,143 | 3,43 | 3,63 | 0,032 7 | 0,536 |
| -208 | 0,604 | 0,614 | 15,34 | 15,60 | 0,135 | 0,143 | 3,43 | 3,63 | 0,035 7 | 0,585 |
| -209 | 0,666 | 0,676 | 16,92 | 17,17 | 0,135 | 0,143 | 3,43 | 3,63 | 0,038 6 | 0,633 |
| -210 | 0,728 | 0,740 | 18,49 | 18,80 | 0,135 | 0,143 | 3,43 | 3,63 | 0,041 6 | 0,682 |
| -211 | 0,790 | 0,802 | 20,07 | 20,37 | 0,135 | 0,143 | 3,43 | 3,63 | 0,044 6 | 0,731 |
| -212 | 0,853 | 0,865 | 21,67 | 21,97 | 0,135 | 0,143 | 3,43 | 3,63 | 0,047 6 | 0,780 |
| -213 | 0,915 | 0,927 | 23,24 | 23,55 | 0,135 | 0,143 | 3,43 | 3,63 | 0,050 5 | 0,828 |
| -214 | 0,978 | 0,990 | 24,84 | 25,15 | 0,135 | 0,143 | 3,43 | 3,63 | 0,053 5 | 0,877 |
| -215 | 1,040 | 1,052 | 26,42 | 26,72 | 0,135 | 0,143 | 3,43 | 3,63 | 0,056 5 | 0,926 |
| -216 | 1,103 | 1,115 | 28,02 | 28,32 | 0,135 | 0,143 | 3,43 | 3,63 | 0,059 5 | 0,975 |
| -217 | 1,165 | 1,177 | 29,59 | 29,90 | 0,135 | 0,143 | 3,43 | 3,63 | 0,062 5 | 1,024 |
| -218 | 1,228 | 1,240 | 31,19 | 31,50 | 0,135 | 0,143 | 3,43 | 3,63 | 0,065 5 | 1,073 |
| -219 | 1,290 | 1,302 | 32,77 | 33,07 | 0,135 | 0,143 | 3,43 | 3,63 | 0,068 4 | 1,121 |
| -220 | 1,353 | 1,365 | 34,37 | 34,67 | 0,135 | 0,143 | 3,43 | 3,63 | 0,071 4 | 1,170 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in$^3$ | cm$^3$ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -221 | 1,415 | 1,427 | 35,94 | 36,25 | 0,135 | 0,143 | 3,43 | 3,63 | 0,074 4 | 1,219 |
| -222 | 1,478 | 1,490 | 37,54 | 37,85 | 0,135 | 0,143 | 3,43 | 3,63 | 0,077 4 | 1,268 |
| -223 | 1,599 | 1,619 | 40,61 | 41,12 | 0,135 | 0,143 | 3,43 | 3,63 | 0,083 3 | 1,365 |
| -224 | 1,724 | 1,744 | 43,79 | 44,30 | 0,135 | 0,143 | 3,43 | 3,63 | 0,089 3 | 1,463 |
| -225 | 1,849 | 1,869 | 46,96 | 47,47 | 0,135 | 0,143 | 3,43 | 3,63 | 0,095 2 | 1,560 |
| | | | | | | | | | | |
| -226 | 1,974 | 1,994 | 50,14 | 50,65 | 0,135 | 0,143 | 3,43 | 3,63 | 0,101 2 | 1,658 |
| -227 | 2,099 | 2,119 | 53,31 | 53,82 | 0,135 | 0,143 | 3,43 | 3,63 | 0,107 2 | 1,757 |
| -228 | 2,224 | 2,244 | 56,49 | 57,00 | 0,135 | 0,143 | 3,43 | 3,63 | 0,113 1 | 1,853 |
| -229 | 2,349 | 2,369 | 59,66 | 60,17 | 0,135 | 0,143 | 3,43 | 3,63 | 0,119 1 | 1,952 |
| -230 | 2,474 | 2,494 | 62,84 | 63,35 | 0,135 | 0,143 | 3,43 | 3,63 | 0,125 0 | 2,048 |
| | | | | | | | | | | |
| -231 | 2,599 | 2,619 | 66,01 | 66,52 | 0,135 | 0,143 | 3,43 | 3,63 | 0,131 0 | 2,147 |
| -232 | 2,719 | 2,749 | 69,06 | 69,82 | 0,135 | 0,143 | 3,43 | 3,63 | 0,137 0 | 2,245 |
| -233 | 2,844 | 2,874 | 72,24 | 73,00 | 0,135 | 0,143 | 3,43 | 3,63 | 0,142 9 | 2,342 |
| -234 | 2,969 | 2,999 | 75,41 | 76,17 | 0,135 | 0,143 | 3,43 | 3,63 | 0,148 9 | 2,440 |
| -235 | 3,094 | 3,124 | 78,59 | 79,35 | 0,135 | 0,143 | 3,43 | 3,63 | 0,154 8 | 2,537 |
| -236 | 3,219 | 3,249 | 81,76 | 82,52 | 0,135 | 0,143 | 3,43 | 3,63 | 0,160 8 | 2,635 |
| -237 | 3,344 | 3,374 | 84,94 | 85,70 | 0,135 | 0,143 | 3,43 | 3,63 | 0,166 8 | 2,733 |
| -238 | 3,469 | 3,499 | 88,11 | 88,87 | 0,135 | 0,143 | 3,43 | 3,63 | 0,172 7 | 2,830 |
| -239 | 3,594 | 3,624 | 91,29 | 92,05 | 0,135 | 0,143 | 3,43 | 3,63 | 0,178 7 | 2,928 |
| -240 | 3,719 | 3,749 | 94,46 | 95,22 | 0,135 | 0,143 | 3,43 | 3,63 | 0,184 6 | 3,025 |
| | | | | | | | | | | |
| -241 | 3,844 | 3,874 | 97,64 | 98,40 | 0,135 | 0,143 | 3,43 | 3,63 | 0,190 6 | 3,123 |
| -242 | 3,969 | 3,999 | 100,81 | 101,57 | 0,135 | 0,143 | 3,43 | 3,63 | 0,196 6 | 3,222 |
| -243 | 4,094 | 4,124 | 103,99 | 104,75 | 0,135 | 0,143 | 3,43 | 3,63 | 0,202 5 | 3,318 |
| -244 | 4,219 | 4,249 | 107,16 | 107,92 | 0,135 | 0,143 | 3,43 | 3,63 | 0,208 5 | 3,417 |
| -245 | 4,344 | 4,374 | 110,34 | 111,10 | 0,135 | 0,143 | 3,43 | 3,63 | 0,214 4 | 3,513 |
| | | | | | | | | | | |
| -246 | 4,469 | 4,499 | 113,51 | 114,27 | 0,135 | 0,143 | 3,43 | 3,63 | 0,220 4 | 3,612 |
| -247 | 4,594 | 4,624 | 116,69 | 117,45 | 0,135 | 0,143 | 3,43 | 3,63 | 0,226 3 | 3,708 |
| -248 | 4,719 | 4,749 | 119,86 | 120,62 | 0,135 | 0,143 | 3,43 | 3,63 | 0,232 3 | 3,807 |
| -249 | 4,844 | 4,874 | 123,04 | 123,80 | 0,135 | 0,143 | 3,43 | 3,63 | 0,238 3 | 3,905 |
| -250 | 4,969 | 4,999 | 126,21 | 126,97 | 0,135 | 0,143 | 3,43 | 3,63 | 0,244 2 | 4,002 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in³ | cm³ |
| | min. | max. | min. | max. | min. | max. | min. | max. | in³ | cm³ |
| -251 | 5,086 | 5,132 | 129,18 | 130,35 | 0,135 | 0,143 | 3,43 | 3,63 | 0,250 2 | 4,100 |
| -252 | 5,211 | 5,257 | 132,36 | 133,53 | 0,135 | 0,143 | 3,43 | 3,63 | 0,256 1 | 4,197 |
| -253 | 5,336 | 5,382 | 135,53 | 136,70 | 0,135 | 0,143 | 3,43 | 3,63 | 0,262 1 | 4,295 |
| -254 | 5,461 | 5,507 | 138,71 | 139,88 | 0,135 | 0,143 | 3,43 | 3,63 | 0,268 1 | 4,393 |
| -255 | 5,586 | 5,632 | 141,88 | 143,05 | 0,135 | 0,143 | 3,43 | 3,63 | 0,274 0 | 4,490 |
| -256 | 5,711 | 5,757 | 145,06 | 146,23 | 0,135 | 0,143 | 3,43 | 3,63 | 0,280 0 | 4,588 |
| -257 | 5,836 | 5,882 | 148,23 | 149,40 | 0,135 | 0,143 | 3,43 | 3,63 | 0,285 9 | 4,685 |
| -258 | 5,961 | 6,007 | 151,41 | 152,58 | 0,135 | 0,143 | 3,43 | 3,63 | 0,291 9 | 4,783 |
| -259 | 6,211 | 6,257 | 157,76 | 158,93 | 0,135 | 0,143 | 3,43 | 3,63 | 0,303 8 | 4,978 |
| -260 | 6,461 | 6,507 | 164,11 | 165,28 | 0,135 | 0,143 | 3,43 | 3,63 | 0,315 7 | 5,173 |
| -261 | 6,711 | 6,757 | 170,46 | 171,63 | 0,135 | 0,143 | 3,43 | 3,63 | 0,327 7 | 5,370 |
| -262 | 6,961 | 7,007 | 176,81 | 177,98 | 0,135 | 0,143 | 3,43 | 3,63 | 0,339 6 | 5,565 |
| -263 | 7,204 | 7,264 | 182,98 | 184,51 | 0,135 | 0,143 | 3,43 | 3,63 | 0,351 5 | 5,760 |
| -264 | 7,454 | 7,514 | 189,33 | 190,86 | 0,135 | 0,143 | 3,43 | 3,63 | 0,363 4 | 5,955 |
| -265 | 7,704 | 7,764 | 195,68 | 197,21 | 0,135 | 0,143 | 3,43 | 3,63 | 0,375 3 | 6,150 |
| -266 | 7,954 | 8,014 | 202,03 | 203,56 | 0,135 | 0,143 | 3,43 | 3,63 | 0,387 2 | 6,345 |
| -267 | 8,204 | 8,264 | 208,38 | 209,91 | 0,135 | 0,143 | 3,43 | 3,63 | 0,399 2 | 6,542 |
| -268 | 8,454 | 8,514 | 214,73 | 216,26 | 0,135 | 0,143 | 3,43 | 3,63 | 0,411 1 | 6,737 |
| -269 | 8,704 | 8,764 | 221,08 | 222,61 | 0,135 | 0,143 | 3,43 | 3,63 | 0,423 0 | 6,932 |
| -270 | 8,954 | 9,014 | 227,43 | 228,96 | 0,135 | 0,143 | 3,43 | 3,63 | 0,434 9 | 7,127 |
| -271 | 9,204 | 9,264 | 233,78 | 235,31 | 0,135 | 0,143 | 3,43 | 3,63 | 0,446 8 | 7,322 |
| -272 | 9,454 | 9,514 | 240,13 | 241,66 | 0,135 | 0,143 | 3,43 | 3,63 | 0,458 8 | 7,518 |
| -273 | 9,704 | 9,764 | 246,48 | 248,00 | 0,135 | 0,143 | 3,43 | 3,63 | 0,470 7 | 7,713 |
| -274 | 9,954 | 10,014 | 252,83 | 254,36 | 0,135 | 0,143 | 3,43 | 3,63 | 0,482 6 | 7,908 |
| -275 | 10,454 | 10,514 | 265,53 | 267,06 | 0,135 | 0,143 | 3,43 | 3,63 | 0,506 4 | 8,298 |
| -276 | 10,954 | 11,014 | 278,23 | 279,76 | 0,135 | 0,143 | 3,43 | 3,63 | 0,530 3 | 8,690 |
| -277 | 11,454 | 11,514 | 290,93 | 292,46 | 0,135 | 0,143 | 3,43 | 3,63 | 0,554 1 | 9,080 |
| -278 | 11,954 | 12,014 | 303,63 | 305,16 | 0,135 | 0,143 | 3,43 | 3,63 | 0,577 9 | 9,470 |
| -279 | 12,954 | 13,014 | 329,03 | 330,56 | 0,135 | 0,143 | 3,43 | 3,63 | 0,625 6 | 10,252 |
| -280 | 13,954 | 14,014 | 354,43 | 355,96 | 0,135 | 0,143 | 3,43 | 3,63 | 0,673 3 | 11,033 |

**Table 1** (*continued*)

| Size identifi- cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in$^3$ | cm$^3$ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -281 | 14,954 | 15,014 | 379,83 | 381,36 | 0,135 | 0,143 | 3,43 | 3,63 | 0,721 0 | 11,815 |
| -282 | 15,910 | 16,000 | 404,11 | 406,40 | 0,135 | 0,143 | 3,43 | 3,63 | 0,767 2 | 12,572 |
| -283 | 16,910 | 17,000 | 429,51 | 431,80 | 0,135 | 0,143 | 3,43 | 3,63 | 0,814 9 | 13,354 |
| -284 | 17,910 | 18,000 | 454,91 | 457,20 | 0,135 | 0,143 | 3,43 | 3,63 | 0,862 6 | 14,136 |
| *285 THRU *308 | O-ring sizes not assigned | | | | | | | | | |
| -309 | ,407 | ,417 | 10,34 | 10,59 | 0,205 | 0,215 | 5,21 | 5,46 | 0,067 7 | 1,109 |
| -310 | ,470 | ,480 | 11,94 | 12,19 | 0,205 | 0,215 | 5,21 | 5,46 | 0,074 5 | 1,221 |
| -311 | ,532 | ,542 | 13,51 | 13,77 | 0,205 | 0,215 | 5,21 | 5,46 | 0,081 3 | 1,332 |
| -312 | ,595 | ,605 | 15,11 | 15,37 | 0,205 | 0,215 | 5,21 | 5,46 | 0,088 1 | 1,444 |
| -313 | ,657 | ,667 | 16,69 | 16,94 | 0,205 | 0,215 | 5,21 | 5,46 | 0,094 9 | 1,555 |
| -314 | ,719 | ,731 | 18,26 | 18,57 | 0,205 | 0,215 | 5,21 | 5,46 | 0,101 7 | 1,667 |
| -315 | ,781 | ,793 | 19,84 | 20,14 | 0,205 | 0,215 | 5,21 | 5,46 | 0,108 5 | 1,778 |
| -316 | ,844 | ,856 | 21,44 | 21,74 | 0,205 | 0,215 | 5,21 | 5,46 | 0,115 3 | 1,889 |
| -317 | ,906 | ,918 | 23,01 | 23,32 | 0,205 | 0,215 | 5,21 | 5,46 | 0,122 1 | 2,001 |
| -318 | ,969 | ,981 | 24,61 | 24,92 | 0,205 | 0,215 | 5,21 | 5,46 | 0,128 9 | 2,112 |
| -319 | 1,031 | 1,043 | 26,19 | 26,49 | 0,205 | 0,215 | 5,21 | 5,46 | 0,135 7 | 2,224 |
| -320 | 1,094 | 1,106 | 27,79 | 28,09 | 0,205 | 0,215 | 5,21 | 5,46 | 0,142 5 | 2,335 |
| -321 | 1,156 | 1,168 | 29,36 | 29,67 | 0,205 | 0,215 | 5,21 | 5,46 | 0,149 3 | 2,447 |
| -322 | 1,219 | 1,231 | 30,96 | 31,27 | 0,205 | 0,215 | 5,21 | 5,46 | 0,156 1 | 2,558 |
| -323 | 1,281 | 1,293 | 32,54 | 32,84 | 0,205 | 0,215 | 5,21 | 5,46 | 0,162 9 | 2,669 |
| -324 | 1,344 | 1,356 | 34,14 | 34,44 | 0,205 | 0,215 | 5,21 | 5,46 | 0,169 7 | 2,781 |
| -325 | 1,465 | 1,485 | 37,21 | 37,72 | 0,205 | 0,215 | 5,21 | 5,46 | 0,183 3 | 3,004 |
| -326 | 1,590 | 1,610 | 40,39 | 40,89 | 0,205 | 0,215 | 5,21 | 5,46 | 0,197 0 | 3,228 |
| -327 | 1,715 | 1,735 | 43,56 | 44,07 | 0,205 | 0,215 | 5,21 | 5,46 | 0,210 6 | 3,451 |
| -328 | 1,840 | 1,860 | 46,74 | 47,24 | 0,205 | 0,215 | 5,21 | 5,46 | 0,224 2 | 3,674 |
| -329 | 1,965 | 1,985 | 49,91 | 50,42 | 0,205 | 0,215 | 5,21 | 5,46 | 0,237 8 | 3,897 |
| -330 | 2,090 | 2,110 | 53,09 | 53,59 | 0,205 | 0,215 | 5,21 | 5,46 | 0,251 4 | 4,120 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | | |
| | min. | max. | min. | max. | min. | max. | min. | max. | in³ | cm³ |
| -331 | 2,215 | 2,235 | 56,26 | 56,77 | 0,205 | 0,215 | 5,21 | 5,46 | 0,265 0 | 4,343 |
| -332 | 2,340 | 2,360 | 59,44 | 59,94 | 0,205 | 0,215 | 5,21 | 5,46 | 0,278 6 | 4,565 |
| -333 | 2,465 | 2,485 | 62,61 | 63,12 | 0,205 | 0,215 | 5,21 | 5,46 | 0,292 2 | 4,788 |
| -334 | 2,590 | 2,610 | 65,79 | 66,29 | 0,205 | 0,215 | 5,21 | 5,46 | 0,305 8 | 5,011 |
| -335 | 2,710 | 2,740 | 68,83 | 69,60 | 0,205 | 0,215 | 5,21 | 5,46 | 0,319 4 | 5,234 |
| | | | | | | | | | | |
| -336 | 2,835 | 2,865 | 72,01 | 72,77 | 0,205 | 0,215 | 5,21 | 5,46 | 0,333 0 | 5,457 |
| -337 | 2,960 | 2,990 | 75,18 | 75,95 | 0,205 | 0,215 | 5,21 | 5,46 | 0,346 6 | 5,680 |
| -338 | 3,085 | 3,115 | 78,36 | 79,12 | 0,205 | 0,215 | 5,21 | 5,46 | 0,360 2 | 5,903 |
| -339 | 3,210 | 3,240 | 81,53 | 82,30 | 0,205 | 0,215 | 5,21 | 5,46 | 0,373 8 | 6,125 |
| -340 | 3,335 | 3,365 | 84,71 | 85,47 | 0,205 | 0,215 | 5,21 | 5,46 | 0,387 4 | 6,348 |
| | | | | | | | | | | |
| -341 | 3,460 | 3,490 | 87,88 | 88,65 | 0,205 | 0,215 | 5,21 | 5,46 | 0,401 0 | 6,571 |
| -342 | 3,585 | 3,615 | 91,06 | 91,82 | 0,205 | 0,215 | 5,21 | 5,46 | 0,414 6 | 6,796 |
| -343 | 3,710 | 3,740 | 94,23 | 95,00 | 0,205 | 0,215 | 5,21 | 5,46 | 0,428 2 | 7,017 |
| -344 | 3,835 | 3,865 | 97,41 | 98,17 | 0,205 | 0,215 | 5,21 | 5,46 | 0,441 8 | 7,240 |
| -345 | 3,960 | 3,990 | 100,58 | 101,35 | 0,205 | 0,215 | 5,21 | 5,46 | 0,455 4 | 7,463 |
| | | | | | | | | | | |
| -346 | 4,085 | 4,115 | 103,76 | 104,52 | 0,205 | 0,215 | 5,21 | 5,46 | 0,469 0 | 7,686 |
| -347 | 4,210 | 4,240 | 106,93 | 107,70 | 0,205 | 0,215 | 5,21 | 5,46 | 0,482 6 | 7,908 |
| -348 | 4,335 | 4,365 | 110,11 | 110,87 | 0,205 | 0,215 | 5,21 | 5,46 | 0,496 2 | 8,131 |
| -349 | 4,460 | 4,490 | 113,28 | 114,05 | 0,205 | 0,215 | 5,21 | 5,46 | 0,509 8 | 8,354 |
| -350 | 4,585 | 4,615 | 116,46 | 117,22 | 0,205 | 0,215 | 5,21 | 5,46 | 0,523 4 | 8,577 |
| | | | | | | | | | | |
| -351 | 4,710 | 4,740 | 119,63 | 120,40 | 0,205 | 0,215 | 5,21 | 5,46 | 0,537 0 | 8,800 |
| -352 | 4,835 | 4,865 | 122,81 | 123,57 | 0,205 | 0,215 | 5,21 | 5,46 | 0,550 6 | 9,023 |
| -353 | 4,960 | 4,990 | 125,98 | 126,75 | 0,205 | 0,215 | 5,21 | 5,46 | 0,564 2 | 9,246 |
| -354 | 5,077 | 5,123 | 128,96 | 130,12 | 0,205 | 0,215 | 5,21 | 5,46 | 0,577 8 | 9,468 |
| -355 | 5,202 | 5,248 | 132,13 | 133,30 | 0,205 | 0,215 | 5,21 | 5,46 | 0,591 4 | 9,691 |
| | | | | | | | | | | |
| -356 | 5,327 | 5,373 | 135,31 | 136,47 | 0,205 | 0,215 | 5,21 | 5,46 | 0,605 0 | 9,914 |
| -357 | 5,452 | 5,498 | 138,48 | 139,65 | 0,205 | 0,215 | 5,21 | 5,46 | 0,618 6 | 10,137 |
| -358 | 5,577 | 5,623 | 141,66 | 142,82 | 0,205 | 0,215 | 5,21 | 5,46 | 0,632 2 | 10,360 |
| -359 | 5,702 | 5,748 | 144,83 | 146,00 | 0,205 | 0,215 | 5,21 | 5,46 | 0,645 8 | 10,583 |
| -360 | 5,827 | 5,873 | 148,00 | 149,17 | 0,205 | 0,215 | 5,21 | 5,46 | 0,659 4 | 10,806 |

**Table 1** (*continued*)

| Size identifi-cation code | Internal diameter $d_1$ | | | | Cross section $d_2$ | | | | Volume (Ref.) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | in | | mm | | in | | mm | | in³ | cm³ |
| | min. | max. | min. | max. | min. | max. | min. | max. | | |
| -361 | 5,952 | 5,998 | 151,18 | 152,35 | 0,205 | 0,215 | 5,21 | 5,46 | 0,673 0 | 11,029 |
| -362 | 6,202 | 6,248 | 157,53 | 158,70 | 0,205 | 0,215 | 5,21 | 5,46 | 0,700 2 | 11,474 |
| -363 | 6,452 | 6,498 | 163,88 | 165,05 | 0,205 | 0,215 | 5,21 | 5,46 | 0,727 4 | 11,920 |
| -364 | 6,702 | 6,748 | 170,23 | 171,40 | 0,205 | 0,215 | 5,21 | 5,46 | 0,754 6 | 12,366 |
| -365 | 6,952 | 6,998 | 176,58 | 177,75 | 0,205 | 0,215 | 5,21 | 5,46 | 0,781 8 | 12,811 |
| | | | | | | | | | | |
| -366 | 7,195 | 7,255 | 182,75 | 184,28 | 0,205 | 0,215 | 5,21 | 5,46 | 0,809 0 | 13,257 |
| -367 | 7,445 | 7,505 | 189,10 | 190,63 | 0,205 | 0,215 | 5,21 | 5,46 | 0,836 2 | 13,703 |
| -368 | 7,695 | 7,755 | 195,45 | 196,98 | 0,205 | 0,215 | 5,21 | 5,46 | 0,863 4 | 14,149 |
| -369 | 7,945 | 8,005 | 201,80 | 203,33 | 0,205 | 0,215 | 5,21 | 5,46 | 0,890 6 | 14,594 |
| -370 | 8,195 | 8,255 | 208,15 | 209,68 | 0,205 | 0,215 | 5,21 | 5,46 | 0,917 8 | 15,040 |
| | | | | | | | | | | |
| -371 | 8,445 | 8,505 | 214,50 | 216,03 | 0,205 | 0,215 | 5,21 | 5,46 | 0,945 0 | 15,486 |
| -372 | 8,695 | 8,755 | 220,85 | 222,38 | 0,205 | 0,215 | 5,21 | 5,46 | 0,972 2 | 15,932 |
| -373 | 8,945 | 9,005 | 227,20 | 228,73 | 0,205 | 0,215 | 5,21 | 5,46 | 0,999 4 | 16,377 |
| -374 | 9,195 | 9,255 | 233,55 | 235,08 | 0,205 | 0,215 | 5,21 | 5,46 | 1,026 6 | 16,823 |
| -375 | 9,445 | 9,505 | 239,90 | 241,43 | 0,205 | 0,215 | 5,21 | 5,46 | 1,053 8 | 17,269 |
| | | | | | | | | | | |
| -376 | 9,695 | 9,755 | 246,25 | 247,78 | 0,205 | 0,215 | 5,21 | 5,46 | 1,081 1 | 17,716 |
| -377 | 9,945 | 10,005 | 252,60 | 254,13 | 0,205 | 0,215 | 5,21 | 5,46 | 1,108 3 | 18,162 |
| -378 | 10,445 | 10,505 | 265,30 | 266,83 | 0,205 | 0,215 | 5,21 | 5,46 | 1,162 7 | 19,053 |
| -379 | 10,945 | 11,005 | 278,00 | 279,53 | 0,205 | 0,215 | 5,21 | 5,46 | 1,217 1 | 19,945 |
| -380 | 11,445 | 11,505 | 290,70 | 292,23 | 0,205 | 0,215 | 5,21 | 5,46 | 1,271 5 | 20,836 |
| | | | | | | | | | | |
| -381 | 11,945 | 12,005 | 303,40 | 304,93 | 0,205 | 0,215 | 5,21 | 5,46 | 1,325 9 | 21,728 |
| -382 | 12,945 | 13,005 | 328,80 | 330,33 | 0,205 | 0,215 | 5,21 | 5,46 | 1,434 7 | 23,511 |
| -383 | 13,945 | 14,005 | 354,20 | 355,73 | 0,205 | 0,215 | 5,21 | 5,46 | 1,543 5 | 25,293 |
| -384 | 14,945 | 15,005 | 379,60 | 381,13 | 0,205 | 0,215 | 5,21 | 5,46 | 1,652 3 | 27,076 |
| -385 | 15,910 | 16,000 | 404,11 | 406,40 | 0,205 | 0,215 | 5,21 | 5,46 | 1,759 0 | 28,825 |
| | | | | | | | | | | |
| -386 | 16,910 | 17,000 | 429,51 | 431,80 | 0,205 | 0,215 | 5,21 | 5,46 | 1,867 8 | 30,608 |
| -387 | 17,910 | 18,000 | 454,91 | 457,20 | 0,205 | 0,215 | 5,21 | 5,46 | 1,976 6 | 32,391 |
| -388 | 18,910 | 19,000 | 480,31 | 482,60 | 0,205 | 0,215 | 5,21 | 5,46 | 2,085 4 | 34,174 |
| -389 | 19,910 | 20,000 | 505,71 | 508,00 | 0,205 | 0,215 | 5,21 | 5,46 | 2,194 2 | 35,957 |
| -390 | 20,910 | 21,000 | 531,11 | 533,40 | 0,205 | 0,215 | 5,21 | 5,46 | 2,303 0 | 37,739 |