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# AS-568 Standard 0-Rings Quick Reference Chart 

## General Applications

Munaco's 0 -Rings are available in a variety of materials. The below are the most common basic materials, each in a range of optional Durometer (Shore A) Hardnesses. Other materials are available upon request.

Buna-N/Nitrile: Buna N/Nitrile rubber is a copolymer of butadiene and acrylonitrile. You will find compounds that are ideally suited for oil and fuel resistant applications of all types

Ethylene-Propylene: In the Ethylene-Propylene family, you will find compounds that are used extensively for outdoor, weather resistant uses, water appliances. The first choice for low torque drive belts.

Silicone: In the Silicone family, you will find compounds that are excellent as static seals in extreme temperature conditions.

Neoprene: ${ }^{\circledR}$ In the Neoprene family, you will find compounds which are the superior sealing materials for the refrigeration industry featuring resistance to ammonia and Freon. ${ }^{\circledR}$

## Fluorocarbon: In the

Fluorocarbon family, you will find compounds that make up the preferred seals for aircraft engines, automotive fuel handling systems, and hard vacuum service.

Fluorosilicone: In the Fluorosilicone family, there are compounds that are unparalleled for aerospace fuel systems and auto fuel emission control systems.

Our materials are compounded under stringent quality control for uniformity of physical properties. We can provide materials to meet or exceed Government, Military, Space Program, Automotive, F.D.A., Industrial and Commercial specifications as well.

| Materials | Durometer (Shore A) | Temperature Range <br> Dry Heat Only | Description |
| :---: | :---: | :---: | :---: |
| Buna-N/Nitrile (NBR) | 40 thru 90 | $\begin{aligned} & -40 \text { to }+257^{\circ} \mathrm{F} \\ & -40 \text { to }+125^{\circ} \mathrm{C} \end{aligned}$ | Nitrile combines excellent resistance to petroleum-based oils and fuels, silicone greases, hydraulic fluids, water and alcohols, with a good balance of such desirable working properties as low compression set, high tensile strength, and high abrasion resistance. |
| Ethylene-Propylene (EPM/EPDM) | 40 thru 90 | $\begin{aligned} & -40 \text { to }+275^{\circ} \mathrm{F} \\ & -40 \text { to }+135^{\circ} \mathrm{C} \end{aligned}$ | EPM/EPDM is also highly recommended for effective resistance to steam (to $400^{\circ}$ ), hot water, silicone oils and greases, dilute acids and alkalies, alcohols and automotive brake fluids. Properly compounded, Ethylene Propylene can provide extended temperature range of $-76^{\circ} \mathrm{F}$ to $+350^{\circ} \mathrm{F}$. |
| Silicone (Mq; PMq; VMq; PVMq) | 25 thru 80 | $\begin{aligned} & -85 \text { to }+400^{\circ} \mathrm{F} \\ & -65 \text { to }+230^{\circ} \mathrm{C} \end{aligned}$ | Especially resistant to high, dry heat, in primarily static applications. Silicones are fungus resistant, odorless, tasteless, non-toxic elastomers, possessing high resistance to the aging effects of both sunlight and ozone attack. |
| Neoprene ${ }^{\circledR}$ (Chloroprene) (CR) | 40 thru 90 | $\begin{aligned} & -40 \text { to }+250^{\circ} \mathrm{F} \\ & -40 \text { to }+121^{\circ} \mathrm{C} \end{aligned}$ | An oil-resistant substitute for Natural Rubber, Neoprene features moderate resistance to petroleum oils; good resistance to ozone, sunlight and oxygen aging; relatively low compression set; good resilience; reasonable cost; and high resistance to attack by Freon ${ }^{\circledR}$ and Ammonia. |
| Fluorocarbon (Viton ${ }^{\text {® }}$ ) (FKM) | 55 thru 95 | $\begin{aligned} & -13 \text { to }+446^{\circ} \mathrm{F} \\ & -25 \text { to }+230^{\circ} \mathrm{C} \end{aligned}$ | Combining high temperature toughness with wide chemical agent compatibility, Fluorocarbon compounds feature excellent resistance to petroleum products and solvents, with good high temperature compression set characteristics. |

Simplified Reference, Easy to Order: The information you need for standard 0Ring sized is listed by ascending inside diameter (I.D.) in fractional and decimal sizes along with the Standard AS-568* Uniform Numbering System .

Choice of Materials: There are a wide variety of compounds and options of Durometer hardness to satisfy practically any service condition. Check with our sales staff for compatibility and other material needs to best suit the application.

A standard 0-Ring size is defined by inside diameter and width (crosssection) and is listed in both fractional and decimal dimensions with tolerances.

We highly recommend that in all cases, samples of a specific size and compound should be tested in a controlled, simulated test environment prior to use in production.

How to Determine an O-Ring Size:


Top View
Cross Section

Shrinkage Size Adjustment: Various O-Ring compounds exhibit different shrinkage rates during molding. The normal 0 -ring sizes herein shown are based upon a 70 Durometer Nitrile standard. For other 0 -ring materials, be sure to consult your Munaco Sales representative.

## Gland Design Guidelines

## O-Ring Gland Guidelines For Dynamic Seals

| O-Ring Cross Section | Gland Depth | Squeeze |  | Diametrical Clearance Max. | Groove Width. $\pm .005$ |  |  | Groove Radius | Eccetricity Max |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  | Inches | \% |  | No Backup Rings | One Backup Ring | Two Backup Rings |  |  |
| . 040 | .031/.033 | .004/.012 | 11-28 | . 004 | . 063 | - | - | .005-.008 | . 002 |
| . 050 | .039/.041 | .006/.014 | 13-26 | . 004 | . 073 | - | - | .005-.008 | . 002 |
| . 060 | . 0471.049 | .008/.016 | 14-25 | . 004 | . 084 | - | - | .005-.008 | . 002 |
| . 070 | .055/.057 | .010/.018 | 15-25 | . 004 | . 095 | . 150 | . 208 | .005-.015 | . 002 |
| . 103 | .0871.090 | .010/.019 | 10-18 | . 005 | . 145 | . 187 | . 249 | .005-.020 | . 003 |
| . 139 | .119/.123 | . 0121.024 | 9-17 | . 006 | . 185 | . 222 | . 301 | .005-.030 | . 004 |
| . 210 | .183/.188 | . 0171.032 | 8.5-15 | . 006 | . 285 | . 338 | . 428 | .005-.050 | . 006 |
| . 275 | .234/.240 | .029/.047 | 10.5-17 | . 007 | . 375 | . 440 | . 579 | .005-.060 | . 008 |

## O-Ring Gland Guidelines For Static Seals

| O-Ring Cross Section | Gland Depth |  | Squeeze |  |  |  | Diametrical Clearance Max. | Groove Width. $\pm .005$ |  |  | Groove Radius | Eccentricity Max |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  |  |  | Radial $>$ O< |  | Axial $\begin{gathered}\text { ¢ } \\ \text { ¢ } \\ \uparrow\end{gathered}$ |  |  | No | One | Two |  |  |
|  | Radial | Axial | Inches | \% | Inches | \% |  | Ring | Ring | Rings |  |  |
| . 040 | .027-. 030 | .027-. 030 | .007-. 016 | 19-37 | .007-. 016 | 19-37 | . 003 | 060 | - | - | 005-.008 | 002 |
| . 050 | .035-. 039 | .034-.038 | .008-.018 | 17-34 | .009-. 019 | 19-36 | . 004 | . 075 | - |  | 005-.008 | . 002 |
| . 060 | .042-.047 | .042-.046 | .010-. 021 | 18-33 | .011-.021 | 19-33 | . 004 | . 090 | - | - | .005-.008 | . 002 |
| . 070 | . $050-.055$ | .049-. 054 | .012-. 023 | 18-32 | . 013 -. 024 | 19-33 | . 004 | 105 | 150 | 208 | 005-.015 | . 002 |
| . 103 | . $080-.086$ | .075-. 081 | .014-. 026 | 14-25 | .019-.031 | 19-29 | . 005 | 146 | 182 | 244 | 005-.020 | . 003 |
| . 139 | . $110-.116$ | .100-. 108 | .019-. 033 | 14-23 | . $027-.043$ | 20-30 | . 006 | 195 | 217 | 296 | 005-.030 | . 004 |
| . 210 | .170-. 176 | .155-. 165 | .029-.045 | 14-21 | .040-.060 | 20-28 | . 006 | . 280 | . 333 | . 423 | .005-.050 | . 006 |
| . 275 | .225-. 235 | .205-. 215 | .034-. 056 | 13-20 | . $054-.076$ | 20-27 | . 007 | . 350 | . 435 | . 574 | .005-.060 | . 008 |


|  | Nominal Reference |  |  | Actual Dimensions |  |  | Nominal Reference |  |  | Actual Dimensions |  |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: | :---: |
|  | I.D. | O.D. | Width | I.D. Tol. | W. Tol. |  | I.D. | O.D. | Width | I.D. Tol. | W. Tol. |
| $\begin{aligned} & -001 \\ & -0011 / 2 \\ & -002 \\ & -003 \\ & -004 \end{aligned}$ | $\begin{aligned} & 1 / 32 \\ & 1 / 16 \\ & 3 / 64 \\ & 1 / 16 \\ & 5 / 64 \end{aligned}$ | $\begin{gathered} 3 / 32 \\ 1 / 8 \\ 9 / 64 \\ 3 / 16 \\ 13 / 64 \end{gathered}$ | $\begin{aligned} & 1 / 32 \\ & 1 / 32 \\ & 3 / 64 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & .029 \pm .004 \\ & .070 \pm .004 \\ & .042 \pm .004 \\ & .056 \pm .004 \\ & .070 \pm .005 \end{aligned}$ | $\begin{aligned} & .040 \pm .003 \\ & .040 \pm .003 \\ & .050 \pm .003 \\ & .060 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -146 \\ & -147 \\ & -148 \\ & -149 \\ & -150 \end{aligned}$ | $\begin{gathered} 25 / 8 \\ 211 / 16 \\ 23 / 4 \\ 213 / 16 \\ 27 / 8 \end{gathered}$ | $\begin{gathered} 213 / 16 \\ 27 / 8 \\ 215 / 16 \\ 3 \\ 31 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 2.612 \pm .020 \\ & 2.675 \pm .022 \\ & 2.737 \pm .022 \\ & 2.800 \pm .022 \\ & 2.862 \pm .022 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -005 \\ & -006 \\ & -007 \\ & -008 \\ & -009 \end{aligned}$ | $\begin{aligned} & 3 / 32 \\ & 1 / 8 \\ & 5 / 32 \\ & 3 / 16 \\ & 7 / 32 \end{aligned}$ | $\begin{aligned} & 7 / 32 \\ & 1 / 4 \\ & 9 / 32 \\ & 5 / 16 \\ & 11 / 32 \end{aligned}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & .101 \pm .005 \\ & .114 \pm .005 \\ & .145 \pm .005 \\ & .176 \pm .005 \\ & .208 \pm .005 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -151 \\ & -152 \\ & -153 \\ & -154 \\ & -155 \end{aligned}$ | $\begin{gathered} 3 \\ 31 / 4 \\ 31 / 2 \\ 33 / 4 \\ 4 \end{gathered}$ | $\begin{gathered} 33 / 16 \\ 37 / 16 \\ 311 / 16 \\ 315 / 16 \\ 43 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 2.987 \pm .024 \\ & 3.237 \pm .024 \\ & 3.487 \pm .024 \\ & 3.737 \pm .028 \\ & 3.987 \pm .028 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -010 \\ & -011 \\ & -012 \\ & -013 \\ & -014 \end{aligned}$ | $\begin{gathered} 1 / 4 \\ 5 / 16 \\ 3 / 8 \\ 7 / 16 \\ 1 / 2 \end{gathered}$ | $\begin{gathered} 3 / 8 \\ 7 / 16 \\ 1 / 2 \\ 9 / 16 \\ 5 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & .239 \pm .005 \\ & .301 \pm .005 \\ & .364 \pm .005 \\ & .426 \pm .005 \\ & .489 \pm .005 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -156 \\ & -157 \\ & -158 \\ & -159 \\ & -160 \end{aligned}$ | $\begin{gathered} 41 / 4 \\ 41 / 2 \\ 43 / 4 \\ 5 \\ 51 / 4 \end{gathered}$ | $\begin{gathered} 47 / 16 \\ 411 / 16 \\ 415 / 16 \\ 53 / 16 \\ 57 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 4.237 \pm .030 \\ & 4.487 \pm .030 \\ & 4.737 \pm .030 \\ & 4.987 \pm .035 \\ & 5.237 \pm .035 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -015 \\ & -016 \\ & -017 \\ & -018 \\ & -019 \end{aligned}$ | $\begin{gathered} 9 / 16 \\ 5 / 8 \\ 11 / 16 \\ 3 / 4 \\ 13 / 16 \end{gathered}$ | $\begin{gathered} 11 / 16 \\ 3 / 4 \\ 13 / 16 \\ 7 / 8 \\ 15 / 16 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & .551 \pm .007 \\ & .614 \pm .009 \\ & .676 \pm .009 \\ & .739 \pm .009 \\ & .801 \pm .009 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -161 \\ & -162 \\ & -163 \\ & -164 \\ & -165 \end{aligned}$ | $\begin{gathered} 51 / 2 \\ 53 / 4 \\ 6 \\ 61 / 4 \\ 61 / 2 \end{gathered}$ | $\begin{gathered} 511 / 16 \\ 515 / 16 \\ 63 / 16 \\ 67 / 16 \\ 611 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 5.487 \pm .035 \\ & 5.737 \pm .035 \\ & 5.987 \pm .035 \\ & 6.237 \pm .040 \\ & 6.487 \pm .040 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -020 \\ & -021 \\ & -022 \\ & -023 \\ & -024 \end{aligned}$ | $\begin{gathered} 7 / 8 \\ 15 / 16 \\ 1 \\ 11 / 16 \\ 11 / 8 \end{gathered}$ | $\begin{gathered} 1 \\ 11 / 16 \\ 11 / 8 \\ 13 / 16 \\ 11 / 4 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{array}{r} .864 \pm .009 \\ .926 \pm .009 \\ .989 \pm .010 \\ 1.051 \pm .010 \\ 1.114 \pm .010 \end{array}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -166 \\ & -167 \\ & -168 \\ & -169 \\ & -170 \end{aligned}$ | $\begin{gathered} 63 / 4 \\ 7 \\ 71 / 4 \\ 71 / 2 \\ 73 / 4 \end{gathered}$ | $\begin{aligned} & 615 / 16 \\ & 73 / 16 \\ & 77 / 16 \\ & 711 / 16 \\ & 715 / 16 \end{aligned}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 6.737 \pm .040 \\ & 6.987 \pm .040 \\ & 7.237 \pm .045 \\ & 7.487 \pm .045 \\ & 7.737 \pm .045 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -025 \\ & -026 \\ & -027 \\ & -028 \\ & -029 \end{aligned}$ | $\begin{gathered} 13 / 16 \\ 11 / 4 \\ 15 / 16 \\ 13 / 8 \\ 11 / 2 \end{gathered}$ | $\begin{gathered} 15 / 16 \\ 13 / 8 \\ 17 / 16 \\ 11 / 2 \\ 15 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & 1.176 \pm .011 \\ & 1.239 \pm .011 \\ & 1.301 \pm .011 \\ & 1.364 \pm .013 \\ & 1.489 \pm .013 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -171 \\ & -172 \\ & -173 \\ & -174 \\ & -175 \end{aligned}$ | $\begin{gathered} 8 \\ 81 / 4 \\ 81 / 2 \\ 83 / 4 \\ 9 \end{gathered}$ | $\begin{gathered} 83 / 16 \\ 87 / 16 \\ 811 / 16 \\ 815 / 16 \\ 93 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 7.987 \pm .045 \\ & 8.237 \pm .050 \\ & 8.487 \pm .050 \\ & 8.737 \pm .050 \\ & 8.987 \pm .050 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -030 \\ & -031 \\ & -032 \\ & -033 \\ & -034 \end{aligned}$ | $\begin{gathered} 15 / 8 \\ 13 / 4 \\ 17 / 8 \\ 2 \\ 21 / 8 \end{gathered}$ | $\begin{gathered} 13 / 4 \\ 17 / 8 \\ 2 \\ 21 / 8 \\ 21 / 4 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & 1.614 \pm .013 \\ & 1.739 \pm .015 \\ & 1.864 \pm .015 \\ & 1.989 \pm .018 \\ & 2.114 \pm .018 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -176 \\ & -177 \\ & -178 \\ & -201 \\ & -202 \end{aligned}$ | $\begin{aligned} & 91 / 4 \\ & 91 / 2 \\ & 93 / 4 \\ & 3 / 16 \\ & 1 / 4 \end{aligned}$ | $\begin{gathered} 97 / 16 \\ 911 / 16 \\ 915 / 16 \\ 7 / 16 \\ 1 / 2 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{array}{r} 9.237 \pm .055 \\ 9.487 \pm .055 \\ 9.737 \pm .055 \\ .171 \pm .005 \\ .234 \pm .005 \end{array}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -035 \\ & -036 \\ & -037 \\ & -038 \\ & -039 \end{aligned}$ | $\begin{aligned} & 21 / 4 \\ & 23 / 8 \\ & 21 / 2 \\ & 25 / 8 \\ & 23 / 4 \end{aligned}$ | $\begin{aligned} & 23 / 8 \\ & 21 / 2 \\ & 25 / 8 \\ & 23 / 4 \\ & 27 / 8 \end{aligned}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & 2.239 \pm .018 \\ & 2.364 \pm .018 \\ & 2.489 \pm .018 \\ & 2.614 \pm .020 \\ & 2.739 \pm .020 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -203 \\ & -204 \\ & -205 \\ & -206 \\ & -207 \end{aligned}$ | $\begin{gathered} 5 / 16 \\ 3 / 8 \\ 7 / 16 \\ 1 / 2 \\ 9 / 16 \end{gathered}$ | $\begin{gathered} 9 / 16 \\ 5 / 8 \\ 11 / 16 \\ 3 / 4 \\ 13 / 16 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & .296 \pm .005 \\ & .359 \pm .005 \\ & .421 \pm .005 \\ & .484 \pm .005 \\ & .546 \pm .007 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -040 \\ & -041 \\ & -042 \\ & -043 \\ & -044 \end{aligned}$ | $\begin{gathered} 27 / 8 \\ 3 \\ 31 / 4 \\ 31 / 2 \\ 33 / 4 \end{gathered}$ | $\begin{gathered} 3 \\ 31 / 8 \\ 33 / 8 \\ 35 / 8 \\ 37 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & 2.864 \pm .020 \\ & 2.989 \pm .024 \\ & 3.239 \pm .024 \\ & 3.489 \pm .024 \\ & 3.739 \pm .027 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -208 \\ & -209 \\ & -210 \\ & -211 \\ & -212 \end{aligned}$ | $\begin{gathered} 5 / 8 \\ 11 / 16 \\ 3 / 4 \\ 13 / 16 \\ 7 / 8 \end{gathered}$ | $\begin{gathered} 7 / 8 \\ 15 / 16 \\ 1 \\ 11 / 16 \\ 11 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & .609 \pm .009 \\ & .671 \pm .009 \\ & .734 \pm .010 \\ & .796 \pm .010 \\ & .859 \pm .010 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -045 \\ & -046 \\ & -047 \\ & -048 \\ & -049 \end{aligned}$ | $\begin{gathered} 4 \\ 41 / 4 \\ 41 / 2 \\ 43 / 4 \\ 5 \end{gathered}$ | $\begin{aligned} & 41 / 8 \\ & 43 / 8 \\ & 45 / 8 \\ & 47 / 8 \\ & 51 / 8 \end{aligned}$ | $\begin{aligned} & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \\ & 1 / 16 \end{aligned}$ | $\begin{aligned} & 3.989 \pm .027 \\ & 4.239 \pm .030 \\ & 4.489 \pm .030 \\ & 4.739 \pm .030 \\ & 4.989 \pm .037 \end{aligned}$ | $\begin{aligned} & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \\ & .070 \pm .003 \end{aligned}$ | $\begin{aligned} & -213 \\ & -214 \\ & -215 \\ & -216 \\ & -217 \end{aligned}$ | $\begin{gathered} 15 / 16 \\ 1 \\ 11 / 16 \\ 11 / 8 \\ 13 / 16 \end{gathered}$ | $\begin{gathered} 13 / 16 \\ 11 / 4 \\ 15 / 16 \\ 13 / 8 \\ 17 / 16 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{array}{r} .921 \pm .010 \\ .984 \pm .010 \\ 1.046 \pm .010 \\ 1.109 \pm .012 \\ 1.171 \pm .012 \end{array}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -050 \\ & -102 \\ & -103 \\ & -104 \\ & -105 \end{aligned}$ | $\begin{aligned} & 51 / 4 \\ & 1 / 16 \\ & 3 / 32 \\ & 1 / 8 \\ & 5 / 32 \end{aligned}$ | $\begin{gathered} 53 / 8 \\ 1 / 4 \\ 9 / 32 \\ 5 / 16 \\ 11 / 32 \end{gathered}$ | $\begin{aligned} & 1 / 16 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{array}{r} 5.239 \pm .037 \\ .049 \pm .005 \\ .081 \pm .005 \\ .112 \pm .005 \\ .143 \pm .005 \end{array}$ | $\begin{aligned} & .070 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -218 \\ & -219 \\ & -220 \\ & -221 \\ & -222 \end{aligned}$ | $\begin{gathered} 11 / 4 \\ 15 / 16 \\ 13 / 8 \\ 17 / 16 \\ 11 / 2 \end{gathered}$ | $\begin{gathered} 11 / 2 \\ 19 / 16 \\ 15 / 8 \\ 111 / 16 \\ 13 / 4 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 1.234 \pm .012 \\ & 1.296 \pm .012 \\ & 1.359 \pm .012 \\ & 1.421 \pm .012 \\ & 1.484 \pm .015 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -106 \\ & -107 \\ & -108 \\ & -109 \\ & -110 \end{aligned}$ | $\begin{gathered} 3 / 16 \\ 7 / 32 \\ 1 / 4 \\ 5 / 16 \\ 3 / 8 \end{gathered}$ | $\begin{gathered} 3 / 8 \\ 13 / 32 \\ 7 / 16 \\ 1 / 2 \\ 9 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & .174 \pm .005 \\ & .206 \pm .005 \\ & .237 \pm .005 \\ & .299 \pm .005 \\ & .362 \pm .005 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -223 \\ & -224 \\ & -225 \\ & -226 \\ & -227 \end{aligned}$ | $\begin{gathered} 15 / 8 \\ 13 / 4 \\ 17 / 8 \\ 2 \\ 21 / 8 \end{gathered}$ | $\begin{gathered} 17 / 8 \\ 2 \\ 21 / 8 \\ 21 / 4 \\ 23 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 1.609 \pm .015 \\ & 1.734 \pm .015 \\ & 1.859 \pm .018 \\ & 1.984 \pm .018 \\ & 2.109 \pm .018 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -111 \\ & -112 \\ & -113 \\ & -114 \\ & -115 \end{aligned}$ | $\begin{gathered} 7 / 16 \\ 1 / 2 \\ 9 / 16 \\ 5 / 8 \\ 11 / 16 \end{gathered}$ | $\begin{gathered} 5 / 8 \\ 11 / 16 \\ 3 / 4 \\ 13 / 16 \\ 7 / 8 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & .424 \pm .005 \\ & .487 \pm .005 \\ & .549 \pm .007 \\ & .612 \pm .009 \\ & .674 \pm .009 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -228 \\ & -229 \\ & -230 \\ & -231 \\ & -232 \end{aligned}$ | $\begin{aligned} & 21 / 4 \\ & 23 / 8 \\ & 21 / 2 \\ & 25 / 8 \\ & 23 / 4 \end{aligned}$ | $\begin{gathered} 21 / 2 \\ 25 / 8 \\ 23 / 4 \\ 27 / 8 \\ 3 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 2.234 \pm .020 \\ & 2.359 \pm .020 \\ & 2.484 \pm .020 \\ & 2.609 \pm .020 \\ & 2.734 \pm .024 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -116 \\ & -117 \\ & -118 \\ & -119 \\ & -120 \end{aligned}$ | $\begin{gathered} 3 / 4 \\ 13 / 16 \\ 7 / 8 \\ 15 / 16 \\ 1 \end{gathered}$ | $\begin{gathered} 15 / 16 \\ 1 \\ 11 / 16 \\ 11 / 8 \\ 13 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & .737 \pm .009 \\ & .799 \pm .010 \\ & .86 \pm .010 \\ & .924 \pm .010 \\ & .987 \pm .010 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -233 \\ & -234 \\ & -235 \\ & -236 \\ & -237 \end{aligned}$ | $\begin{gathered} 27 / 8 \\ 3 \\ 31 / 8 \\ 31 / 4 \\ 33 / 8 \end{gathered}$ | $\begin{aligned} & 31 / 8 \\ & 31 / 4 \\ & 33 / 8 \\ & 31 / 2 \\ & 35 / 8 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 2.859 \pm .024 \\ & 2.984 \pm .024 \\ & 3.109 \pm .024 \\ & 3.234 \pm .024 \\ & 3.359 \pm .024 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -121 \\ & -122 \\ & -123 \\ & -124 \\ & -125 \end{aligned}$ | $\begin{gathered} 11 / 16 \\ 11 / 8 \\ 13 / 16 \\ 11 / 4 \\ 15 / 16 \end{gathered}$ | $\begin{gathered} 11 / 4 \\ 15 / 16 \\ 13 / 8 \\ 17 / 16 \\ 11 / 2 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 1.049 \pm .010 \\ & 1.112 \pm .010 \\ & 1.174 \pm .012 \\ & 1.237 \pm .012 \\ & 1.299 \pm .012 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -238 \\ & -239 \\ & -240 \\ & -241 \\ & -242 \end{aligned}$ | $\begin{gathered} 31 / 2 \\ 35 / 8 \\ 33 / 4 \\ 37 / 8 \\ 4 \end{gathered}$ | $\begin{gathered} 33 / 4 \\ 37 / 8 \\ 4 \\ 41 / 8 \\ 41 / 4 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 3.484 \pm .024 \\ & 3.609 \pm .028 \\ & 3.734 \pm .028 \\ & 3.859 \pm .028 \\ & 3.984 \pm .028 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -126 \\ & -127 \\ & -128 \\ & -129 \\ & -130 \end{aligned}$ | $\begin{gathered} 13 / 8 \\ 17 / 16 \\ 11 / 2 \\ 19 / 16 \\ 15 / 8 \end{gathered}$ | $\begin{gathered} 19 / 16 \\ 15 / 8 \\ 111 / 16 \\ 13 / 4 \\ 113 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 1.362 \pm .012 \\ & 1.424 \pm .012 \\ & 1.487 \pm .012 \\ & 1.549 \pm .015 \\ & 1.612 \pm .015 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -243 \\ & -244 \\ & -245 \\ & -246 \\ & -247 \end{aligned}$ | $\begin{aligned} & 41 / 8 \\ & 41 / 4 \\ & 43 / 8 \\ & 41 / 2 \\ & 45 / 8 \end{aligned}$ | $\begin{aligned} & 43 / 8 \\ & 41 / 2 \\ & 45 / 8 \\ & 43 / 4 \\ & 4378 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 4.109 \pm .028 \\ & 4.234 \pm .030 \\ & 4.359 \pm .030 \\ & 4.484 \pm .030 \\ & 4.609 \pm .030 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -131 \\ & -132 \\ & -133 \\ & -134 \\ & -135 \end{aligned}$ | $\begin{gathered} 111 / 16 \\ 13 / 4 \\ 113 / 16 \\ 17 / 8 \\ 115 / 16 \end{gathered}$ | $\begin{gathered} 17 / 8 \\ 115 / 16 \\ 2 \\ 21 / 16 \\ 21 / 8 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 1.674 \pm .015 \\ & 1.737 \pm .015 \\ & 1.799 \pm .015 \\ & 1.862 \pm .015 \\ & 1.925 \pm .017 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -248 \\ & -249 \\ & -250 \\ & -251 \\ & -252 \end{aligned}$ | $\begin{gathered} 43 / 4 \\ 47 / 8 \\ 5 \\ 51 / 8 \\ 51 / 4 \end{gathered}$ | $\begin{gathered} 5 \\ 51 / 8 \\ 51 / 4 \\ 53 / 8 \\ 51 / 2 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 4.734 \pm .030 \\ & 4.859 \pm .035 \\ & 4.984 \pm .035 \\ & 5.109 \pm .035 \\ & 5.234 \pm .035 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -136 \\ & -137 \\ & -138 \\ & -139 \\ & -140 \end{aligned}$ | $\begin{gathered} 2 \\ 21 / 16 \\ 21 / 8 \\ 23 / 16 \\ 21 / 4 \end{gathered}$ | $\begin{gathered} 23 / 16 \\ 21 / 4 \\ 25 / 16 \\ 23 / 8 \\ 27 / 16 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 1.987 \pm .017 \\ & 2.050 \pm .017 \\ & 2.112 \pm .017 \\ & 2.175 \pm .017 \\ & 2.237 \pm .017 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \end{aligned}$ | $\begin{aligned} & -253 \\ & -254 \\ & -255 \\ & -256 \\ & -257 \end{aligned}$ | $53 / 8$ <br> $51 / 2$ <br> 55/8 <br> $53 / 4$ <br> $57 / 8$ | $\begin{gathered} 55 / 8 \\ 53 / 4 \\ 57 / 8 \\ 6 \\ 61 / 8 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 5.359 \pm .035 \\ & 5.484 \pm .035 \\ & 5.609 \pm .035 \\ & 5.734 \pm .035 \\ & 5.859 \pm .035 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -141 \\ & -142 \\ & -143 \\ & -144 \\ & -145 \end{aligned}$ | $\begin{gathered} 25 / 16 \\ 23 / 8 \\ 27 / 16 \\ 21 / 2 \\ 29 / 16 \\ \hline \end{gathered}$ | $\begin{gathered} 21 / 2 \\ 29 / 16 \\ 25 / 8 \\ 211 / 16 \\ 23 / 4 \end{gathered}$ | $\begin{aligned} & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \\ & 3 / 32 \end{aligned}$ | $\begin{aligned} & 2.300 \pm .020 \\ & 2.362 \pm .020 \\ & 2.425 \pm .020 \\ & 2.487 \pm .020 \\ & 2.550 \pm .020 \end{aligned}$ | $\begin{aligned} & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & .103 \pm .003 \\ & \hline \end{aligned}$ | $\begin{aligned} & -258 \\ & -259 \\ & -260 \\ & -261 \\ & -262 \end{aligned}$ | $\begin{gathered} 6 \\ 61 / 4 \\ 61 / 2 \\ 63 / 4 \\ 7 \end{gathered}$ | $\begin{gathered} 61 / 4 \\ 61 / 2 \\ 63 / 4 \\ 7 \\ 71 / 4 \end{gathered}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $\begin{aligned} & 5.984 \pm .035 \\ & 6.234 \pm .040 \\ & 6.484 \pm .040 \\ & 6.734 \pm .040 \\ & 6.984 \pm .040 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |

*Note: The current revision of the Standard is "C" but it changes periodically.

| \% | Nominal Reference |  |  | Actual Dimensions |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | I.D. | O.D. | Width | I.D. Tol. | W. Tol. |
| $\begin{aligned} & -263 \\ & -264 \\ & -265 \\ & -266 \\ & -266 \end{aligned}$ | $\begin{gathered} 71 / 4 \\ 71 / 2 \\ 73 / 4 \\ 8 \\ 81 / 4 \end{gathered}$ | $\begin{aligned} & 71 / 2 \\ & 73 / 4 \\ & 81 / 4 \\ & 81 / 2 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ |  | $\begin{aligned} & .139 \pm .004 \\ & .139 . \pm 04 \\ & .139 . \pm 04 \\ & .139 . \pm 04 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -268 \\ & -269 \\ & -270 \\ & -271 \\ & -272 \end{aligned}$ | $\begin{aligned} & 81 / 2 \\ & 83 / 4 \\ & 91 / 4 \\ & 91 / 4 \\ & 91 / 2 \end{aligned}$ | $\begin{aligned} & 8314 \\ & 91 / 4 \\ & 91 / 4 \\ & 91 / 2 \\ & 93 / 4 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $8.484 \pm .050$ $8.984 \pm .050$ $9.484 \pm .055$ | $\begin{aligned} & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 .004 \\ & .139 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -273 \\ & -274 \\ & -275 \\ & -276 \\ & -276 \\ & -277 \end{aligned}$ | $\begin{gathered} 93 / 4 \\ 101 / 2 \\ 1012 \\ 1111 / 2 \end{gathered}$ | $\begin{aligned} & 10 \\ & 101 / 4 \\ & 10314 \\ & 11114 \\ & 113 / 4 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \\ & 1 / 8 \end{aligned}$ | $9.734 \pm .055$ $9.984 \pm .055$ <br> $10.484 \pm .055$ <br> $11.484 \pm .065$ | $\begin{aligned} & .139 \pm .004 \\ & 139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| -278 -279 -280 -281 -282 -281 | $\begin{aligned} & 12 \\ & 13 \\ & 14 \\ & 15 \\ & 16 \end{aligned}$ | $\begin{aligned} & 121 / 4 \\ & 131 / 4 \\ & 141 / 4 \\ & 151 / 4 \\ & 161 / 4 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 18 \\ & 1 / 8 \\ & 118 \\ & 118 \end{aligned}$ | $11.984 \pm .065$ $12.984 \pm .065$ <br> $13.984 \pm .065$ <br> $15.955 \pm .075$ | $\begin{aligned} & .139 \pm .000 \\ & 1399 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \\ & .139 \pm .004 \end{aligned}$ |
| -283 -284 -309 -310 -311 -311 | $\begin{aligned} & 17 \\ & 18 \\ & 7116 \\ & 1 / 2 \\ & 9 / 16 \end{aligned}$ | $\begin{aligned} & 1711 / 4 \\ & 1814 \\ & 13116 \\ & 778 \\ & 15116 \end{aligned}$ | $\begin{aligned} & 1 / 8 \\ & 1 / 8 \\ & 3 / 166 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $\begin{aligned} & 16.955 \pm .080 \\ & 17.95 \pm .085 \\ & .412 \pm .005 \\ & .45 \pm .005 \\ & .537 \pm .007 \end{aligned}$ | $\begin{aligned} & .139 \pm .004 \\ & .139 . .004 \\ & .210 \pm .005 \\ & .210 . .005 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -312 \\ & -313 \\ & -314 \\ & -314 \\ & -315 \\ & -316 \end{aligned}$ | $\begin{gathered} 5 / 8 \\ 11116 \\ 131 \\ 13116 \\ 178 \end{gathered}$ | $\begin{gathered} 1 \\ 11116 \\ 11 / 8 \\ 13 / 16 \\ 11 / 4 \end{gathered}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 166 \\ & 3 / 16 \\ & 3 / 166 \\ & 3 / 16 \end{aligned}$ | $\begin{aligned} & .600 \pm .009 \\ & .662 \pm .009 \\ & .725 \pm .010 \\ & .787+.010 \\ & .850 \pm .010 \end{aligned}$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -317 \\ & -318 \\ & -319 \\ & -320 \\ & -321 \end{aligned}$ | $\begin{aligned} & 15111 \\ & 11 / 116 \\ & 11 / 8 \\ & 1316 \end{aligned}$ | $\begin{aligned} & 15 / 16 \\ & 136 \\ & 17716 \\ & 1112 \\ & 19116 \end{aligned}$ | $\begin{aligned} & 3116 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $.912 \pm .010$ $1.037 \pm .010$ $1.162 \pm .012$ | $\begin{aligned} & .210 \pm .005 \\ & .210 . .05 \\ & .2100 . .005 \\ & .210 . .005 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -322 \\ & -323 \\ & -324 \\ & -325 \\ & -326 \\ & -326 \end{aligned}$ | $\begin{aligned} & 11 / 4 \\ & 15 / 16 \\ & 13 / 8 \\ & 111 / 2 \\ & 15 / 8 \end{aligned}$ | $\begin{gathered} 15 / 8 \\ 111 / 16 \\ 13 / 4 \\ 17 / 8 \\ 2 \end{gathered}$ | $\begin{aligned} & 316 \\ & 316 \\ & 316 \\ & 316 \\ & 3 / 16 \end{aligned}$ |  | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .005 \\ & .210 \pm .005 \\ & .210 \pm .050 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -327 \\ & -328 \\ & -329 \\ & -330 \\ & -331 \\ & \hline 331 \end{aligned}$ | $\begin{aligned} & 13 / 4 \\ & 17 / 8 \\ & 2 \\ & 21 / 8 \\ & 21 / 4 \end{aligned}$ | $\begin{aligned} & \begin{array}{l} 1 / 8 \\ 21 / 4 \\ 23 / 8 \\ 21 / 2 \\ 25 / 8 \end{array} \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $\begin{aligned} & 1.725 \pm .015 \\ & 1.85 \pm \pm .015 \\ & 1.975 \pm .018 \\ & 2.1 .00 \pm .018 \\ & 2.225 \pm .018 \end{aligned}$ | $\begin{aligned} & .210 \pm .005 \\ & .210 . \pm 05 \\ & .210 . \pm 05 \\ & .120 . \pm 05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -332 \\ & -333 \\ & -34 \\ & -354 \\ & -336 \\ & -356 \end{aligned}$ | $\begin{aligned} & 23 / 8 \\ & 21 / 2 \\ & 25 / 8 \\ & 23 / 4 \\ & 27 / 4 \end{aligned}$ | $\begin{gathered} 2314 \\ 2718 \\ 31 / 8 \\ 31 / 8 \\ 31 / 4 \end{gathered}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 166 \\ & 3 / 16 \\ & 3 / 166 \\ & 3 / 16 \end{aligned}$ | $2.350 \pm .018$ <br> $2.600 \pm .020$ <br> $2.850 \pm .02$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -337 \\ & -338 \\ & -339 \\ & -340 \\ & -341 \end{aligned}$ | $\begin{gathered} 3 \\ 31 / 8 \\ 31 / 4 \\ 33 / 8 \\ 31 / 2 \end{gathered}$ | $\begin{aligned} & \begin{array}{l} 3 \\ 31 / 2 \\ 31 / 2 \\ 35 / 8 \\ 33 / 4 \\ 37 / 8 \end{array} \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ |  | $\begin{aligned} & .210 \pm .005 \\ & .210 . .05 \\ & .2100 . .005 \\ & .210 . .005 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -342 \\ & -343 \\ & -344 \\ & -345 \\ & -346 \\ & -346 \end{aligned}$ | $\begin{aligned} & 35 / 8 \\ & 33 / 4 \\ & 37 / 8 \\ & 4 \\ & 41 / 8 \end{aligned}$ | $\begin{gathered} 4 \\ 41 / 8 \\ 41 / 4 \\ 43 / 8 \\ 41 / 2 \end{gathered}$ | $\begin{aligned} & 3116 \\ & 316 \\ & 3116 \\ & 316 \\ & 3 / 16 \end{aligned}$ | $3.600 \pm .028$ $3.850 \pm .028$ $4.100 \pm .028$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .005 \\ & .210 \pm .005 \\ & .210 \pm .050 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{array}{r} -347 \\ -348 \\ -349 \\ -350 \\ -351 \end{array}$ | $\begin{aligned} & 41 / 4 \\ & 43 / 8 \\ & 41 / 2 \\ & 45 / 8 \\ & 43 / 4 \end{aligned}$ | $\begin{gathered} 45 / 8 \\ 43 / 4 \\ 47 / 8 \\ 5 \\ 51 / 8 \end{gathered}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $4.225 \pm .030$ $4.475 \pm .030$ $4.600 \pm .030$ $4.725 \pm .030$ | $\begin{aligned} & .210 \pm .005 \\ & .210 .005 \\ & .210 . \pm 05 \\ & .210 . \pm 05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -352 \\ & -354 \\ & -354 \\ & -355 \\ & -356 \end{aligned}$ | $\begin{gathered} 47 / 8 \\ 5 \\ 51 / 8 \\ 51 / 4 \\ 53 / 8 \end{gathered}$ | $\begin{aligned} & 51 / 4 \\ & 5318 \\ & 51 / 2 \\ & 55 / 8 \\ & 53 / 4 \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ |  | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -357 \\ & -358 \\ & -359 \\ & -360 \\ & -360 \\ & -361 \end{aligned}$ | $\begin{gathered} 51 / 2 \\ 55 / 8 \\ 53 / 4 \\ 57 / 8 \\ 6 \end{gathered}$ | $\begin{gathered} 57 / 8 \\ 61 / 8 \\ 61 / 8 \\ 61 / 4 \\ 63 / 8 \end{gathered}$ | $\begin{aligned} & 3116 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $5.475 \pm .037$ 5 <br> $5.725 \pm .037$ <br> $5.850 \pm .037$ $5.975 \pm .03$ | $\begin{aligned} & .210 \pm .005 \\ & .210 . .05 \\ & .2100 . .005 \\ & .210 . .005 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -362 \\ & -363 \\ & -364 \\ & -364 \\ & -365 \\ & -364 \end{aligned}$ | $\begin{aligned} & 61 / 4 \\ & 661 / 2 \\ & 63 / 4 \\ & 7 \\ & 71 / 4 \end{aligned}$ | $\begin{aligned} & 65 / 8 \\ & 67188 \\ & 71 / 8 \\ & 73 / 8 \\ & 75 / 8 \end{aligned}$ | $\begin{aligned} & 3116 \\ & 316 \\ & 3116 \\ & 316 \\ & 3 / 16 \end{aligned}$ | $6.225 \pm .040$ $6.475 \pm .040$ $6.725 \pm .040$ $6.975 \pm .040$ $7.225 \pm .045$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |
| -367 -368 -369 -370 -371 | $\begin{gathered} 71 / 2 \\ 73 / 4 \\ 8 \\ 81 / 4 \\ 81 / 2 \end{gathered}$ | $\begin{aligned} & 7718 \\ & 81 / 8 \\ & 8338 \\ & 85818 \\ & 878 \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $7.475 \pm .045$ $7.975 \pm .045$ <br> $8.475 \pm .050$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .005 \\ & .210 . \pm 05 \\ & .210 . \pm 05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & -372 \\ & -373 \\ & -374 \\ & -375 \\ & -376 \\ & -376 \end{aligned}$ | $\begin{aligned} & 83 / 4 \\ & 9 \\ & 91 / 4 \\ & 91 / 2 \\ & 93 / 4 \end{aligned}$ | $\begin{aligned} & 91 / 8 \\ & 9388 \\ & 95 / 88 \\ & 97 / 8 \\ & 101 / 8 \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $\begin{aligned} & 8.725 \pm .050 \\ & 8.975 \pm .050 \\ & 9.225 \pm .055 \\ & 9.475 \pm .055 \\ & 9.725 \pm .055 \end{aligned}$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .21 \pm \pm .005 \end{aligned}$ |
| $\begin{array}{r} -377 \\ -378 \\ -379 \\ -380 \\ -381 \end{array}$ | $\begin{gathered} 10 \\ 101 / 2 \\ 11 \\ 11 / 12 \\ 12 \end{gathered}$ |  | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3116 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $9.975 \pm .055$ $10.475+060$ <br> $10.975 \pm .060$ <br> $11.1 .975 \pm \pm .065$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |


|  | Nominal Reference |  |  | Actual Dimensions |  |
| :---: | :---: | :---: | :---: | :---: | :---: |
|  | I.D. | O.D. | Width | I.D. Tol. | W. Tol. |
| $\begin{aligned} & -382 \\ & -383 \\ & -384 \\ & -385 \\ & -386 \\ & -384 \end{aligned}$ | $\begin{aligned} & 13 \\ & 14 \\ & 15 \\ & 16 \\ & 17 \end{aligned}$ | $\begin{aligned} & 133 / 8 \\ & 143 / 8 \\ & 153 / 8 \\ & 163 / 8 \\ & 173 / 8 \end{aligned}$ | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \end{aligned}$ | $12.975 \pm .065$ $13.975 \pm .070$ $14.975 \pm .070$ $159.95 \pm .075$ $16.955 \pm .080$ | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm .05 \\ & .210 \pm .05 \\ & .210 \pm .05 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} & \text {-387 } \\ & -388 \\ & -389 \\ & -390 \\ & -391 \end{aligned}$ | $\begin{aligned} & 18 \\ & 19 \\ & 20 \\ & 21 \\ & 22 \end{aligned}$ | $183 / 18$ 19338 2033 $213 / 8$ $223 / 8$ 23 | $\begin{aligned} & 3 / 16 \\ & 3 / 16 \\ & 3 / 16 \\ & 3 / 166 \\ & 3 / 16 \end{aligned}$ |  | $\begin{aligned} & .210 \pm .005 \\ & .120 \pm \pm 05 \\ & .210 \pm 005 \\ & .120 \pm 005 \\ & .210 \pm .005 \end{aligned}$ |
| $\begin{aligned} -392 \\ -393 \\ -394 \\ -395 \\ -495 \\ -45 \end{aligned}$ | $\begin{aligned} & 23 \\ & 24 \\ & 25 \\ & 26 \\ & 41 / 2 \end{aligned}$ | $\begin{gathered} 233 / 18 \\ 24338 \\ 253 / 8 \\ 2633 \\ 5 \end{gathered}$ | $\begin{aligned} & 3116 \\ & 316 \\ & 3 / 16 \\ & 316 \\ & 1 / 4 \end{aligned}$ |  | $\begin{aligned} & .210 \pm .005 \\ & .210 \pm \pm 05 \\ & .210 \pm .005 \\ & .120 \pm .05 \\ & .275 \pm .006 \end{aligned}$ |
| -426 -427 -428 -429 -430 | $\begin{gathered} 45 / 8 \\ 43 / 4 \\ 47 / 8 \\ 5 \\ 51 / 8 \end{gathered}$ | $\begin{aligned} & 51 / 8 \\ & 51 / 4 \\ & 53 / 8 \\ & 551 / 2 \\ & 55 / 8 \end{aligned}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \end{aligned}$ |  | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm .006 \\ & .275 \pm .006 \\ & .275 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| -431 -432 -433 -434 -435 | $\begin{aligned} & 51 / 4 \\ & 53 / 8 \\ & 51 / 2 \\ & 55 / 8 \\ & 53 / 4 \end{aligned}$ | $\begin{aligned} & 5314 \\ & 57 / 8 \\ & 6 \\ & 61 / 8 \\ & 61 / 4 \end{aligned}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \end{aligned}$ |  | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm .006 \\ & .275 \pm \pm 06 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| -436 -437 -438 -439 -440 | $\begin{aligned} & 57818 \\ & 61 / 4 \\ & 61 / 4 \\ & 66121 \end{aligned}$ | $\begin{aligned} & 6318 \\ & 61212 \\ & 63 / 4 \\ & 7 \\ & 71 / 4 \end{aligned}$ | $\begin{aligned} & 114 \\ & 114 \\ & 114 \\ & 114 \\ & 114 \end{aligned}$ | $\begin{aligned} & 5.850 \pm .037 \\ & 5.975 \pm .037 \\ & 6.225 \pm .040 \\ & 6.475 \pm .040 \\ & 6.725 \pm .040 \end{aligned}$ | $\begin{aligned} & .275 \pm .006 \\ & .275 .+06 \\ & .275 . .006 \\ & .275 . .006 \\ & .275 \pm .006 \end{aligned}$ |
| $\begin{aligned} & -441 \\ & -442 \\ & -443 \\ & -444 \\ & -445 \end{aligned}$ | $\begin{gathered} 7 \\ 71 / 4 \\ 71 / 212 \\ 73 / 4 \\ 8 \end{gathered}$ | $\begin{gathered} 71 / 2 \\ 73 / 4 \\ 8 \\ 81 / 4 \\ 81 / 2 \end{gathered}$ | $\begin{aligned} & 114 \\ & 114 \\ & 1 / 4 \\ & 114 \\ & 114 \end{aligned}$ | $6.975 \pm .040$ $7.475 \pm .045$ $7.975 \pm .045$ | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm \pm 06 \\ & .275 \pm .006 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| -446 <br> -447 <br> -448 <br> -449 <br> -450 | $\begin{gathered} 81 / 2 \\ 9 \\ 91 / 2 \\ 10 \\ 1012 \end{gathered}$ | $\begin{gathered} 9 \\ 912 \\ 10 \\ 1012 \\ 11 \end{gathered}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \end{aligned}$ | $\begin{aligned} & 8.475 \pm .055 \\ & 8.975 \pm \pm .055 \\ & 9.475 \pm .055 \\ & 9.975 \pm .055 \\ & 10.475 \pm .060 \end{aligned}$ | $\begin{aligned} & .275 \pm .006 \\ & .75 \pm \pm .060 \\ & .275 \pm \pm 006 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| $\begin{aligned} & -451 \\ & -452 \\ & -453 \\ & -454 \\ & -455 \end{aligned}$ | $\begin{gathered} 11 \\ 11 / 2 \\ 12 \\ 12 / 12 \\ 13 \end{gathered}$ | $\begin{aligned} & 111 / 2 \\ & 12 \\ & 121 / 2 \\ & 13 \\ & 131 / 2 \end{aligned}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \end{aligned}$ |  | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm .006 \\ & .275 \pm \pm 06 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| -456 -457 -458 -459 -460 | $\begin{aligned} & 131 / 2 \\ & 14 \\ & 141 / 4 \\ & 15 \\ & 1512 \end{aligned}$ | $\begin{gathered} 14 \\ 141 / 2 \\ 15 \\ 151 / 2 \\ 16 \end{gathered}$ | $\begin{aligned} & 114 \\ & 1 / 4 \\ & 114 \\ & 114 \\ & 114 \end{aligned}$ | $13.475 \pm .070$ $13.955 \pm .070$ $14.475 \pm .070$ $14.957 \pm .070$ $15.475 \pm .070$ | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm \pm 06 \\ & .275 \pm .006 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| -461 <br> -462 <br> -463 <br> -464 <br> -465 | $\begin{gathered} 16 \\ 1617 \\ 17 \\ 17 / 12 \\ 18 \end{gathered}$ | $\begin{aligned} & 161 / 2 \\ & 17 \\ & 171 / 2 \\ & 18 \\ & 181 / 2 \end{aligned}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 114 \\ & 114 \end{aligned}$ |  | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm \pm 06 \\ & .725 \pm .006 \\ & .725 \pm .06 \\ & .275 \pm .006 \end{aligned}$ |
| -466 -467 -468 -469 -470 | $\begin{aligned} & 181 / 2 \\ & 19 \\ & 191 / 2 \\ & 20 \\ & 21 \end{aligned}$ | $\begin{gathered} 19 \\ 191 / 2 \\ 20 \\ 20112 \\ 211 / 2 \end{gathered}$ | $\begin{aligned} & 1 / 4 \\ & 1 / 4 \\ & 1 / 4 \\ & 114 \\ & 1 / 4 \end{aligned}$ | $18.455 \pm .085$ <br> $19.455 \pm .090$ <br> $20.955 \pm .090$ | $\begin{aligned} & .275 \pm .006 \\ & .275 \pm .06 \\ & .275 \pm \pm 06 \\ & .725 \pm .006 \\ & .275 \pm .006 \end{aligned}$ |
| $\begin{aligned} & -471 \\ & -472 \\ & -473 \\ & -474 \\ & -475 \end{aligned}$ | $\begin{aligned} & 22 \\ & 23 \\ & 24 \\ & 25 \\ & 26 \end{aligned}$ | $\begin{aligned} & 221 / 12 \\ & 231 / 2 \\ & 241 / 2 \\ & 251 / 2 \\ & 261 / 2 \end{aligned}$ | $\begin{aligned} & 114 \\ & 1 / 4 \\ & 1 / 4 \\ & 114 \\ & 1 / 4 \end{aligned}$ |  | $\begin{aligned} & .275 \pm .006 \\ & .275+.006 \\ & \hline 275+.006 \\ & .2755 . .006 \\ & .275 \pm .006 \end{aligned}$ |

Standard O-Ring Boss Gaskets For Straight
Thread Tube Fittings

|  | Tube Size (O.D.) Fractional | Actual Dimensions |  |
| :---: | :---: | :---: | :---: |
|  |  | I.D. Tol. | W. Tol. |
| $\begin{aligned} & -901 \\ & -902 \\ & -903 \\ & -904 \\ & -905 \end{aligned}$ | $\begin{gathered} 3 / 32 \\ 1 / 8 \\ 3 / 16 \\ 1 / 4 \\ 5 / 16 \end{gathered}$ | $\begin{aligned} & .185 \pm .005 \\ & .239 \pm .005 \\ & .301 \pm .005 \\ & .351 \pm .005 \\ & .414 \pm .005 \end{aligned}$ | $\begin{aligned} & .056 \pm .003 \\ & .064 \pm .003 \\ & .064 \pm .003 \\ & .072 \pm .003 \\ & .072 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -906 \\ & -907 \\ & -908 \\ & -909 \\ & -910 \end{aligned}$ | $\begin{aligned} & 3 / 8 \\ & 7 / 16 \\ & 1 / 2 \\ & 9 / 16 \\ & 5 / 8 \end{aligned}$ | $\begin{aligned} & .468 \pm .005 \\ & .530 \pm .007 \\ & .644 \pm .009 \\ & .706 \pm .009 \\ & .755 \pm .009 \end{aligned}$ | $\begin{aligned} & .078 \pm .003 \\ & .082 \pm .003 \\ & .087 \pm .003 \\ & .097 \pm .003 \\ & .097 \pm .003 \end{aligned}$ |
| $\begin{aligned} & -911 \\ & -911 \\ & -913 \\ & -914 \\ & -916 \end{aligned}$ | $\begin{gathered} 11 / 16 \\ 3 / 4 \\ 13 / 16 \\ 7 / 8 \\ 1 \end{gathered}$ | $\begin{array}{r} .863 \pm .009 \\ .924 \pm .009 \\ .986 \pm .010 \\ 1.047 \pm .010 \\ 1.171 \pm .010 \end{array}$ | $\begin{aligned} & .116 \pm .004 \\ & .116 \pm .004 \\ & .116 \pm .004 \\ & .116 \pm .004 \\ & .116 \pm .004 \end{aligned}$ |
| $\begin{aligned} & -918 \\ & -920 \\ & -924 \\ & -928 \\ & -922 \end{aligned}$ | $\begin{gathered} 11 / 8 \\ 11 / 4 \\ 11 / 2 \\ 13 / 4 \\ 2 \end{gathered}$ | $\begin{aligned} & 1.355 \pm .012 \\ & 1.475 \pm .014 \\ & 1.720 \pm .014 \\ & 2.090 \pm .018 \\ & 2.337 \pm .018 \\ & \hline \end{aligned}$ | $\begin{aligned} & .116 \pm .004 \\ & .118 \pm .004 \\ & .118 \pm .004 \\ & .118 \pm .004 \\ & .118 \pm .004 \\ & \hline \end{aligned}$ |

*Note: The current revision of the Standard is "C" but it changes periodically.

More from Munaco.

## Cut Gaskets

- Die and Precision CNC Cut
- Standard Flanges
- Boiler, Chiller, \& Manhole
- Custom Configurations
-Long and Short Runs
- Prototyping
- Fast Dellivery

Metal Gaskets<br>- Complete Line of Flexitallic Gaskets Including Semi-Metallic Spiral Wounds, MRG, Flexpro, HOT, CGU-MRG, \& Baker<br>- Low-Stress<br>- Cnange Gasket<br>- Ring Joints-Oval, Octagonal, \& BX<br>- Jacketed \& Corrugated

Metal Seals

- E, C, O, V, \& U Seals
- Spring-Energized Seals
- Materials Include Aluminum, Copper, Inconel, Mild Steel, Nickel,
Silver, Stainless, \& Titanium
- Helicoflex ${ }^{\text {na }}$ Seals
- Piston Rings, Seal Rings
- Bellows


## Roll and Sheet Materials

- Beater-Add
- Fiberglass
- Flexible Graphite
- GORE*
- Gylor ${ }^{\text {* }}$
- IFG $^{\oplus} 5500$
- Multi-Swelliw 3760
- Mil Specifications
- Neoprene
- PTFE-Virgin \& Filled
- Pure Gum
- Red Rubber
- Rubber Sponge-Open
\& Closed Cell
- Sigma ${ }^{\text {a }}$
- Slilicone Rubber \& Sponge
-Soft-Chem ${ }^{\text { }}$
- Supranite
- Thermiculite ${ }^{\text {e }}$
- Vegetable Fiber
- Viton ${ }^{\text {® }}$ Rubber \& Sponge


## Extrusions

- Materials Include Buna-N, EPDM, Gum Rubber, Neoprene, Silicone, Urethane, \& Viton ${ }^{*}$
- Various Profiles Including Triangle, Channel, Rectangle, Round, \& Tube
- Custom Profiles

Filters

- Medium, High, \& Super High Efficiency
- Turbine Cartridges

Expansion Joints

- Elastomeric, Flue Duct, \& Flexible Pipe
- Bellows

High Temperature Woven Products

- Blankets, Cloth, Gaskets, Rope-Knitted \&

Twisted, Tadpole, Tape, \& Tubing

- Ceramic, Fiberglass, inconel", Keviare, Stainless*
- PTFE, Silicone, Vermiculite Coatings


## Safety Products

- Anti-Fatigue, Anti-Slip, \& Switchboard Matting
- Lockout/Tagout, Safoty Identification, \& Signage


## Hose, Tubing and Fittings

- Hose for Air, Chemical, Discharge, Duct, Food, Material Handling, Petroleum, Plastic, Steam, Suction, Washdown, \& Water Applications
- Tubing Materials Include Nylon, PE, PVC, Rubber, \& Silicone
- Complete Line of Brass \& Stainless Tube Fittings, Gauges, RFL Units, Valves, \& Accessories
- Sanitary - Fittings, Gaskets, Valves


## Molded Parts

- Bellows - Boots
- Bumpers - Bushings
- Klozurg* \& Snaft Seals - Gaskets
- V-Packing (Chevron) - V-Rings
- Grommets - Rod \& Way Covers


## Accessories and Hardware

| " Adhesives | - Belting |
| :--- | :--- |
| - Bearing Pads | - Bushings |
| - Fuel Nozzle Parts | - Isolators |
| - Lubricants | - Nameplates |
| - Shims | - Snap Rings |
| - Springs | - Tubing Kits |

Pump and Valve Packing

- Aramid $\quad$ GFO*
- Keviar $\quad$ Carbon
- Graphite - Inconel
-Synthetic -Teflon*
- Packing Sets $\quad$ Thermiculite ${ }^{\circ}$

O, Quad, Encapsulated, Back-up Rings, Cord and Kits

| - Butyl | - EPDM | - Gum | - Kalrez ${ }^{\text {e }}$ | - Neoprene | - Nitrile | - FDA, Mil-Spec, NSF 51/61 |
| :---: | :---: | :---: | :---: | :---: | :---: | :---: |
| - Sillicone | - Sponge | - Teflon ${ }^{\text {® }}$ | - Viton ${ }^{\text {® }}$ | - AFLAS ${ }^{\text {e }}$ | - Chemraz* | - Custom Sizes |

