



O-RING & BACK-UP RING CATALOG

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O-RING AND BACK-UP RING INTRODUCTION

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O-RING & BACK-UP RING CATALOG

The most common type of elastomer seal is the o-ring. The “O” in o-ring refers to the shape of the seal’s cross-section. An o-ring’s size is typically defined by its inside diameter and cross section dimensions shown in the figure below.

FIGURE 1: O-Ring Detail**FEATURES AND BENEFITS**

- Relative low cost
- Ease of installation
- Simplicity of shape and ability to seal effectively

HOW O-RINGS AND BACK-UP RINGS WORK

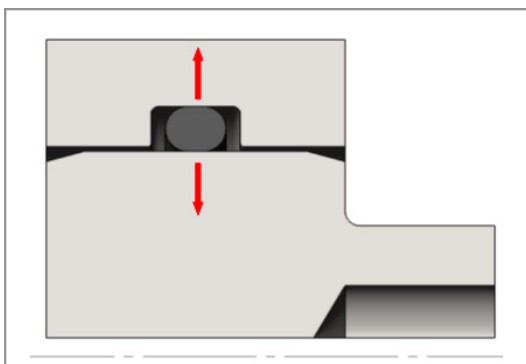
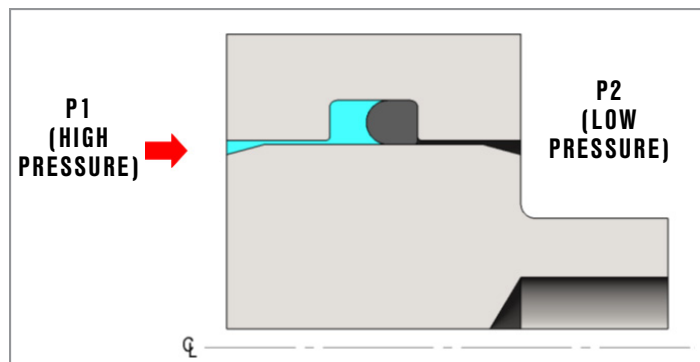
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O-RING & BACK-UP RING CATALOG

O-RINGS

A seal is created, compressing the o-ring cross-section between two mating hardware components. As the two mating surfaces come together, the compression exerted on the seal deforms the o-ring, creating the initial squeeze pressure.

FIGURE 2: Initial Squeeze

FIGURE 3: Sealed Pressure ($\Delta P = P1 - P2$)

When the sealed fluid exerts higher pressure, the o-ring is forced to the low-pressure gland wall and away from the system pressure. As the system pressure is transmitted through the o-ring, the original sealing force is increased and equal to the original squeeze pressure plus the system pressure. This combination of squeeze and system pressure creates the total sealed pressure, which creates a seal. Sealed pressure is defined as ΔP , which equals $P1 - P2$.

BACK-UP RINGS (BURs)

BURs are installed on the low-pressure side of an o-ring to prevent the elastomer from extruding into the clearance gap between the mating hardware. Greene Tweed offers Arlon® (polyetheretherketone [PEEK] based) and Avalon® (polytetrafluoroethylene [PTFE] based) materials for use as BURs.

Arlon® and Avalon® are durable, high-temperature, thermoplastic materials, offering an excellent combination of mechanical, thermal, and chemical resistance properties. Both materials have the unique ability to elongate and close the extrusion gap when system pressure is applied to the seal.

BURs are used when high pressure can cause extrusion of the elastomeric seal. A BUR should also be used when the hardware extrusion gap cannot be controlled to a suitable level and the elastomer hardness is not high enough to resist extrusion damage. The maximum allowable clearance gap for a given o-ring is defined by industry AS4716 or AS5857 gland standard.

GLAND (GROOVE) CONFIGURATIONS

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O-RING & BACK-UP RING CATALOG

CONFIGURATIONS

Greene Tweed's 9000 Series (AS568A Standard) is recommended for use in AS5857 gland sizes for static applications and AS4716 gland sizes for dynamic applications.

Greene Tweed's o-rings can be used in rod or piston hardware configurations with open or closed glands and anti-extrusion BURs.

Note: Split BURs are required for use in closed gland configurations while solid BURs are recommended for use in open gland configurations.

CLOSED CONFIGURATION

FIGURE 4: Closed Piston Type Gland

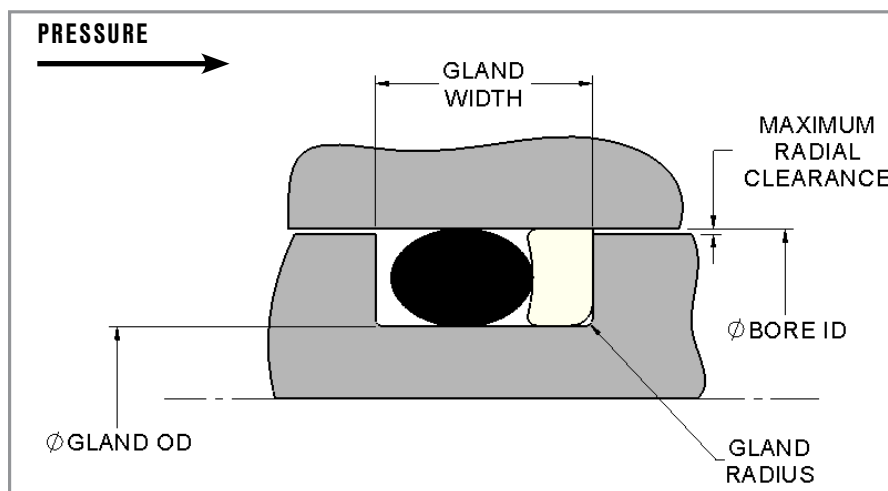
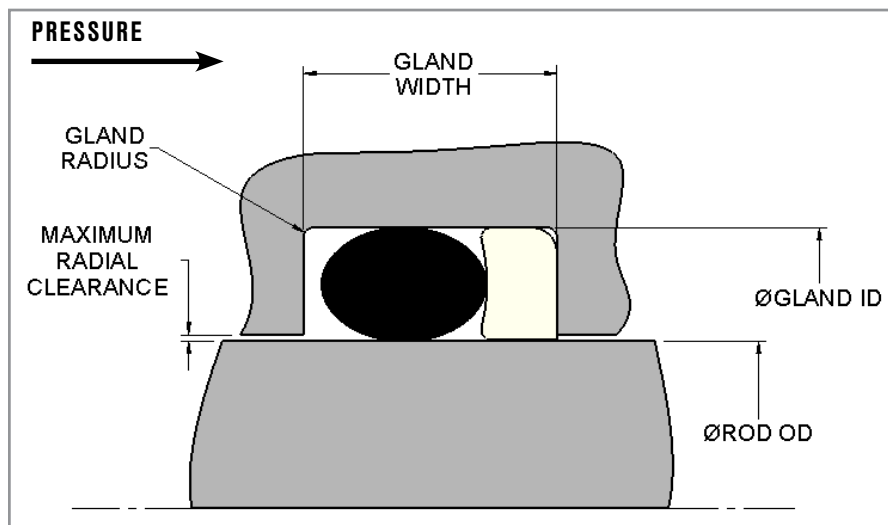


FIGURE 5: Closed Rod Type Gland



OPEN CONFIGURATION

FIGURE 6: Open Piston Type Gland

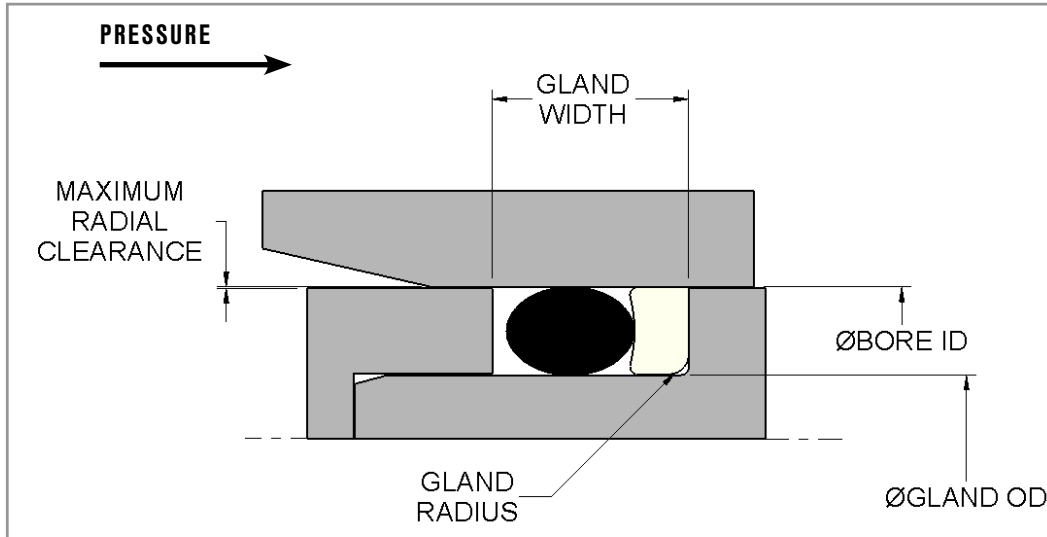
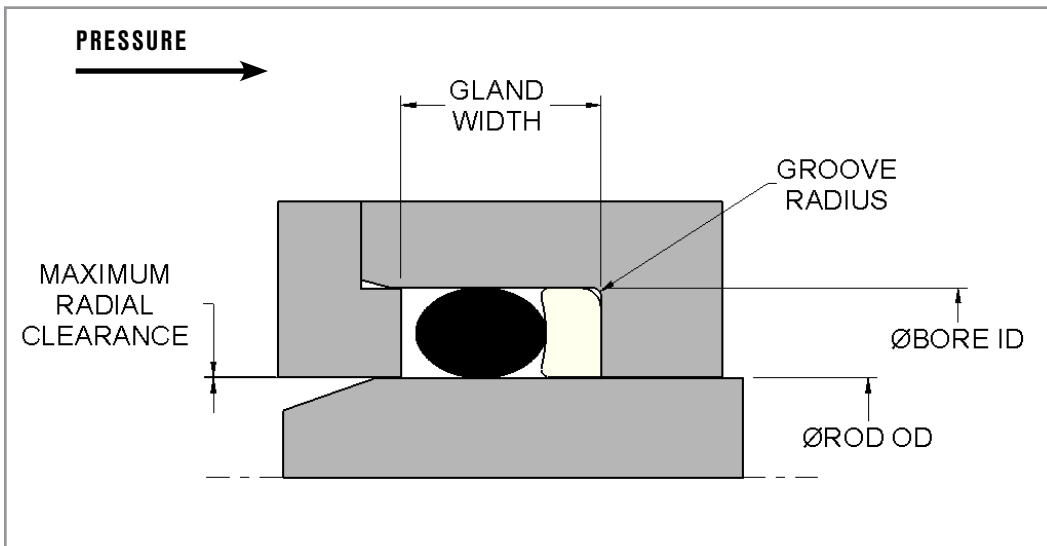


FIGURE 7: Open Rod Type Gland



DESIGN INFORMATION

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O-RING & BACK-UP RING CATALOG

CONFIGURATIONS

TABLE 1: O-Ring and Back-Up Ring Configurations

Cross-Sectional View	Description
	O-Ring
	O-Ring with 1 Back-Up Ring
	O-Ring with 2 Back-Up Rings

PART NUMBERING SYSTEM

STANDARD O-RING PART NUMBER SERIES

9	XXX	XXX
1	2	3

1	Designator for AS568A and ISO 3601-1, Class A o-rings
2	Three-digit dash size per AS568A and ISO 3601-1, Class A
3	Three-digit compound code

* For more information regarding our non-standard capabilities, please contact your local Greene Tweed sales representative.

Example: 9214-938
 9: Series designator for AS568A and ISO 3601-1, Class A o-rings
 214: Dash 214
 938: Fusion™ 938 compound

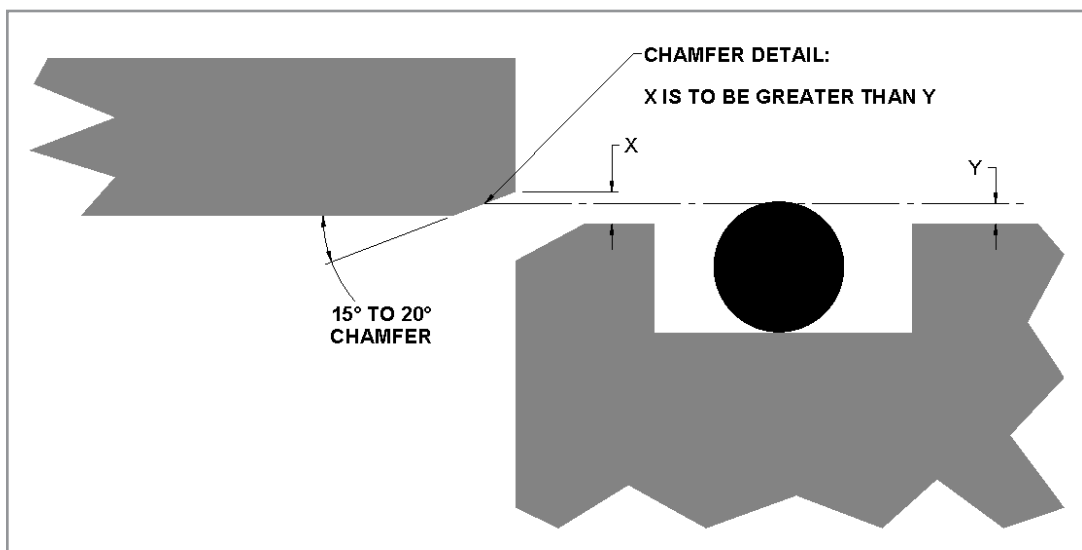
STANDARD INSPECTION REQUIREMENTS

ISO 3601-3 Grade “N” shall be applied to all standard 9000 series o-rings. Non-standard o-rings are available upon request with other nominal dimensions, tolerances, inspection criteria, or special processing requirements.

CHAMFERS

Sharp edges can be damaging to elastomers during installation. To help prevent installation damage due to skiving of the elastomer, a lead-in chamfer for all mating hardware is strongly recommended. The hardware should also be de-burred to eliminate no sharp objects that can tear or cut the o-ring during installation.

FIGURE 8: Recommended Chamfer Detail



LUBRICATION

When installing o-rings in a radial-type gland, it is advisable to ensure that the seal and hardware are properly lubricated with a suitable lubricant. Lubricants will aid in installation and help prevent elastomer damage during installation. Care should be taken into account when using lubricants such that they do not interfere with the operation or compatibility of the system or seal. For example, an FDA-approved lubricant should be used in FDA applications.

STRETCH

Typically, installation will require the o-ring to be stretched over existing hardware to seat in the seal gland. The installation stretch may be greater than the maximum allowable installed stretch of 3 percent. When stretching an o-ring during installation it is important to consider the typical properties values for elongation at break. The elongation will give the designer an idea on how much stretch an o-ring can withstand during installation before being damaged. Small inner-diameter o-rings should be given special considerations as they are more prone to snapping when stretched.

Note: Elongation properties can be found in the elastomer compounds typical properties sheet at www.gtwweed.com.

O-RING

FIGURE 9: Standard O-Ring Dimensional Detail

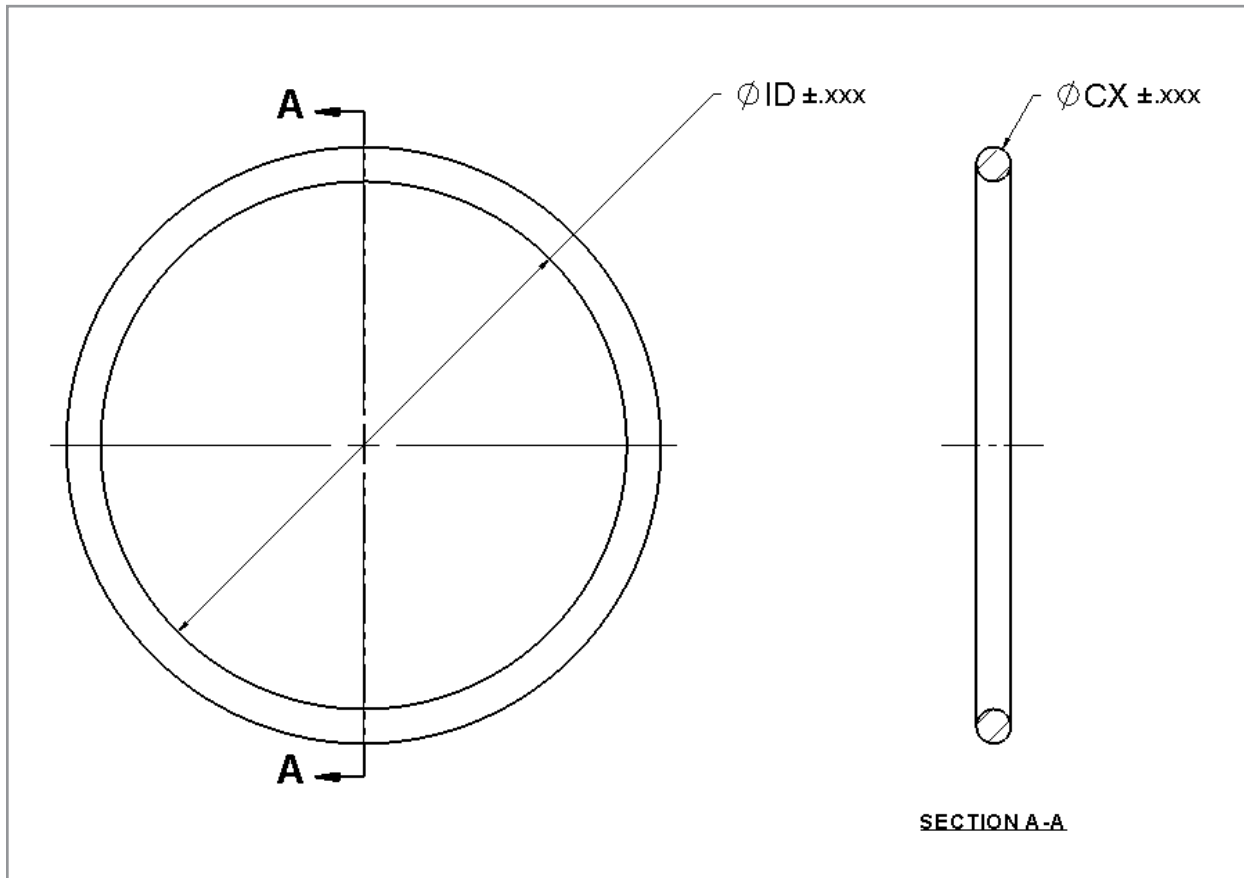


Table 2 summarizes AS568A o-ring dimensions.

For detailed gland dimensions and tolerances, reference the attached AS5857 or AS4716 tables in the Appendix. Note that not all sizes are listed; although Greene Tweed manufactures AS568A o-rings in all standard dash sizes, some sizes require different gland considerations.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-001*	0.040	±0.003	±0.003	0.029	±0.004	±0.004
-002*	0.050	±0.003	±0.003	0.042	±0.004	±0.004
-003*	0.060	±0.003	±0.003	0.056	±0.004	±0.004
-004*	0.070	±0.003	±0.003	0.070	±0.005	±0.005
-005*	0.070	±0.003	±0.003	0.101	±0.005	±0.005
-006	0.070	±0.003	±0.003	0.114	±0.005	±0.005
-007	0.070	±0.003	±0.003	0.145	±0.005	±0.005
-008	0.070	±0.003	±0.003	0.176	±0.005	±0.005
-009	0.070	±0.003	±0.003	0.208	±0.005	±0.005
-010	0.070	±0.003	±0.003	0.239	±0.005	±0.005
-011	0.070	±0.003	±0.003	0.301	±0.005	±0.005
-012	0.070	±0.003	±0.003	0.364	±0.005	±0.005
-013	0.070	±0.003	±0.003	0.426	±0.005	±0.005
-014	0.070	±0.003	±0.003	0.489	±0.005	±0.005
-015	0.070	±0.003	±0.003	0.551	±0.007	±0.007
-016	0.070	±0.003	±0.003	0.614	±0.009	±0.009
-017	0.070	±0.003	±0.003	0.676	±0.009	±0.009
-018	0.070	±0.003	±0.003	0.739	±0.009	±0.009
-019	0.070	±0.003	±0.003	0.801	±0.009	±0.009
-020	0.070	±0.003	±0.003	0.864	±0.009	±0.009
-021	0.070	±0.003	±0.003	0.926	±0.009	±0.009
-022	0.070	±0.003	±0.003	0.989	±0.010	±0.010
-023	0.070	±0.003	±0.003	1.051	±0.010	±0.010
-024	0.070	±0.003	±0.003	1.114	±0.010	±0.010
-025	0.070	±0.003	±0.003	1.176	±0.011	±0.011
-026	0.070	±0.003	±0.003	1.239	±0.011	±0.011
-027	0.070	±0.003	±0.003	1.301	±0.011	±0.011
-028	0.070	±0.003	±0.003	1.364	±0.013	±0.013
-029*	0.070	±0.003	±0.003	1.489	±0.013	±0.013
-030*	0.070	±0.003	±0.003	1.614	±0.013	±0.013
-031*	0.070	±0.003	±0.003	1.739	±0.015	±0.015
-032*	0.070	±0.003	±0.003	1.864	±0.015	±0.015
-033*	0.070	±0.003	±0.003	1.989	±0.018	±0.018
-034*	0.070	±0.003	±0.003	2.114	±0.018	±0.018
-035*	0.070	±0.003	±0.003	2.239	±0.018	±0.018
-036*	0.070	±0.003	±0.003	2.364	±0.018	±0.018
-037*	0.070	±0.003	±0.003	2.489	±0.018	±0.018
-038*	0.070	±0.003	±0.003	2.614	±0.020	±0.020
-039*	0.070	±0.003	±0.003	2.739	±0.020	±0.020
-040*	0.070	±0.003	±0.003	2.864	±0.020	±0.020

* Contact Greene Tweed for gland details.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-041*	0.070	±0.003	±0.003	2.989	±0.024	±0.024
-042*	0.070	±0.003	±0.003	3.239	±0.024	±0.024
-043*	0.070	±0.003	±0.003	3.489	±0.024	±0.024
-044*	0.070	±0.003	±0.003	3.739	±0.027	±0.027
-045*	0.070	±0.003	±0.003	3.989	±0.027	±0.027
-046*	0.070	±0.003	±0.003	4.239	±0.030	±0.030
-047*	0.070	±0.003	±0.003	4.489	±0.030	±0.030
-048*	0.070	±0.003	±0.003	4.739	±0.030	±0.030
-049*	0.070	±0.003	±0.003	4.989	±0.037	±0.037
-050*	0.070	±0.003	±0.003	5.239	±0.037	±0.037
-102*	0.103	±0.003	±0.003	0.049	±0.005	±0.005
-103*	0.103	±0.003	±0.003	0.081	±0.005	±0.005
-104*	0.103	±0.003	±0.003	0.112	±0.005	±0.005
-105*	0.103	±0.003	±0.003	0.143	±0.005	±0.005
-106*	0.103	±0.003	±0.003	0.174	±0.005	±0.005
-107*	0.103	±0.003	±0.003	0.206	±0.005	±0.005
-108*	0.103	±0.003	±0.003	0.237	±0.005	±0.005
-109*	0.103	±0.003	±0.003	0.299	±0.005	±0.005
-110	0.103	±0.003	±0.003	0.362	±0.005	±0.005
-111	0.103	±0.003	±0.003	0.424	±0.005	±0.005
-112	0.103	±0.003	±0.003	0.487	±0.005	±0.005
-113	0.103	±0.003	±0.003	0.549	±0.007	±0.007
-114	0.103	±0.003	±0.003	0.612	±0.009	±0.009
-115	0.103	±0.003	±0.003	0.674	±0.009	±0.009
-116	0.103	±0.003	±0.003	0.737	±0.009	±0.009
-117	0.103	±0.003	±0.003	0.799	±0.010	±0.010
-118	0.103	±0.003	±0.003	0.862	±0.010	±0.010
-119	0.103	±0.003	±0.003	0.924	±0.010	±0.010
-120	0.103	±0.003	±0.003	0.987	±0.010	±0.010
-121	0.103	±0.003	±0.003	1.049	±0.010	±0.010
-122	0.103	±0.003	±0.003	1.112	±0.010	±0.010
-123	0.103	±0.003	±0.003	1.174	±0.012	±0.012
-124	0.103	±0.003	±0.003	1.237	±0.012	±0.012
-125	0.103	±0.003	±0.003	1.299	±0.012	±0.012
-126	0.103	±0.003	±0.003	1.362	±0.012	±0.012
-127	0.103	±0.003	±0.003	1.424	±0.012	±0.012
-128	0.103	±0.003	±0.003	1.487	±0.012	±0.012
-129	0.103	±0.003	±0.003	1.549	±0.015	±0.015
-130	0.103	±0.003	±0.003	1.612	±0.015	±0.015
-131	0.103	±0.003	±0.003	1.674	±0.015	±0.015
-132	0.103	±0.003	±0.003	1.737	±0.015	±0.015

* Contact Greene Tweed for gland details.



TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-133	0.103	±0.003	±0.003	1.799	±0.015	±0.015
-134	0.103	±0.003	±0.003	1.862	±0.015	±0.015
-135	0.103	±0.003	±0.003	1.925	±0.017	±0.017
-136	0.103	±0.003	±0.003	1.987	±0.017	±0.017
-137	0.103	±0.003	±0.003	2.050	±0.017	±0.017
-138	0.103	±0.003	±0.003	2.112	±0.017	±0.017
-139	0.103	±0.003	±0.003	2.175	±0.017	±0.017
-140	0.103	±0.003	±0.003	2.237	±0.017	±0.017
-141	0.103	±0.003	±0.003	2.300	±0.020	±0.020
-142	0.103	±0.003	±0.003	2.362	±0.020	±0.020
-143	0.103	±0.003	±0.003	2.725	±0.020	±0.020
-144	0.103	±0.003	±0.003	2.487	±0.020	±0.020
-145	0.103	±0.003	±0.003	2.550	±0.020	±0.020
-146	0.103	±0.003	±0.003	2.612	±0.020	±0.020
-147	0.103	±0.003	±0.003	2.675	±0.022	±0.022
-148	0.103	±0.003	±0.003	2.737	±0.022	±0.022
-149	0.103	±0.003	±0.003	2.800	±0.022	±0.022
-150	0.103	±0.003	±0.003	2.862	±0.022	±0.022
-151	0.103	±0.003	±0.003	2.987	±0.024	±0.024
-152	0.103	±0.003	±0.003	3.237	±0.024	±0.024
-153	0.103	±0.003	±0.003	3.487	±0.024	±0.024
-154	0.103	±0.003	±0.003	3.737	±0.028	±0.028
-155	0.103	±0.003	±0.003	3.987	±0.028	±0.028
-156	0.103	±0.003	±0.003	4.237	±0.030	±0.030
-157	0.103	±0.003	±0.003	4.487	±0.030	±0.030
-158	0.103	±0.003	±0.003	4.737	±0.030	±0.030
-159	0.103	±0.003	±0.003	4.987	±0.035	±0.035
-160	0.103	±0.003	±0.003	5.237	±0.035	±0.035
-161	0.103	±0.003	±0.003	5.487	±0.035	±0.035
-162	0.103	±0.003	±0.003	5.737	±0.035	±0.035
-163	0.103	±0.003	±0.003	5.987	±0.035	±0.035
-164	0.103	±0.003	±0.003	6.237	±0.040	±0.040
-165	0.103	±0.003	±0.003	6.487	±0.040	±0.040
-166	0.103	±0.003	±0.003	6.737	±0.040	±0.040
-167	0.103	±0.003	±0.003	6.987	±0.040	±0.040
-168	0.103	±0.003	±0.003	7.237	±0.045	±0.045
-169	0.103	±0.003	±0.003	7.487	±0.045	±0.045
-170	0.103	±0.003	±0.003	7.737	±0.045	±0.045
-171	0.103	±0.003	±0.003	7.987	±0.045	±0.045
-172	0.103	±0.003	±0.003	8.237	±0.050	±0.050
-173	0.103	±0.003	±0.003	8.487	±0.050	±0.050

* Contact Greene Tweed for gland details.



TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-174	0.103	±0.003	±0.003	8.737	±0.050	±0.050
-175	0.103	±0.003	±0.003	8.987	±0.050	±0.050
-176	0.103	±0.003	±0.003	9.237	±0.055	±0.055
-177	0.103	±0.003	±0.003	9.487	±0.055	±0.055
-178	0.103	±0.003	±0.003	9.737	±0.055	±0.055
-201	0.139	±0.004	±0.004	0.171	±0.005	±0.005
-202	0.139	±0.004	±0.004	0.234	±0.005	±0.005
-203	0.139	±0.004	±0.004	0.296	±0.005	±0.005
-204	0.139	±0.004	±0.004	0.359	±0.005	±0.005
-205	0.139	±0.004	±0.004	0.421	±0.005	±0.005
-206	0.139	±0.004	±0.004	0.484	±0.005	±0.005
-207	0.139	±0.004	±0.004	0.546	±0.007	±0.007
-208	0.139	±0.004	±0.004	0.609	±0.009	±0.009
-209	0.139	±0.004	±0.004	0.671	±0.009	±0.009
-210	0.139	±0.004	±0.004	0.734	±0.010	±0.010
-211	0.139	±0.004	±0.004	0.796	±0.010	±0.010
-212	0.139	±0.004	±0.004	0.859	±0.010	±0.010
-213	0.139	±0.004	±0.004	0.921	±0.010	±0.010
-214	0.139	±0.004	±0.004	0.984	±0.010	±0.010
-215	0.139	±0.004	±0.004	1.046	±0.010	±0.010
-216	0.139	±0.004	±0.004	1.109	±0.012	±0.012
-217	0.139	±0.004	±0.004	1.171	±0.012	±0.012
-218	0.139	±0.004	±0.004	1.234	±0.012	±0.012
-219	0.139	±0.004	±0.004	1.296	±0.012	±0.012
-220	0.139	±0.004	±0.004	1.359	±0.012	±0.012
-221	0.139	±0.004	±0.004	1.421	±0.012	±0.012
-222	0.139	±0.004	±0.004	1.484	±0.015	±0.015
-223	0.139	±0.004	±0.004	1.609	±0.015	±0.015
-224	0.139	±0.004	±0.004	1.734	±0.015	±0.015
-225	0.139	±0.004	±0.004	1.859	±0.018	±0.018
-226	0.139	±0.004	±0.004	1.984	±0.018	±0.018
-227	0.139	±0.004	±0.004	2.109	±0.018	±0.018
-228	0.139	±0.004	±0.004	2.234	±0.020	±0.020
-229	0.139	±0.004	±0.004	2.359	±0.020	±0.020
-230	0.139	±0.004	±0.004	2.484	±0.020	±0.020
-231	0.139	±0.004	±0.004	2.609	±0.020	±0.020
-232	0.139	±0.004	±0.004	2.734	±0.024	±0.024
-233	0.139	±0.004	±0.004	2.859	±0.024	±0.024
-234	0.139	±0.004	±0.004	2.984	±0.024	±0.024
-235	0.139	±0.004	±0.004	3.109	±0.024	±0.024
-236	0.139	±0.004	±0.004	3.234	±0.024	±0.024

* Contact Greene Tweed for gland details.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-237	0.139	±0.004	±0.004	3.359	±0.024	±0.024
-238	0.139	±0.004	±0.004	3.484	±0.024	±0.024
-239	0.139	±0.004	±0.004	3.609	±0.028	±0.028
-240	0.139	±0.004	±0.004	3.734	±0.028	±0.028
-241	0.139	±0.004	±0.004	3.859	±0.028	±0.028
-242	0.139	±0.004	±0.004	3.984	±0.028	±0.028
-243	0.139	±0.004	±0.004	4.109	±0.028	±0.028
-244	0.139	±0.004	±0.004	4.234	±0.030	±0.030
-245	0.139	±0.004	±0.004	4.359	±0.030	±0.030
-246	0.139	±0.004	±0.004	4.484	±0.030	±0.030
-247	0.139	±0.004	±0.004	4.609	±0.030	±0.030
-248	0.139	±0.004	±0.004	4.734	±0.030	±0.030
-249	0.139	±0.004	±0.004	4.859	±0.035	±0.035
-250	0.139	±0.004	±0.004	4.984	±0.035	±0.035
-251	0.139	±0.004	±0.004	5.109	±0.035	±0.035
-252	0.139	±0.004	±0.004	5.234	±0.035	±0.035
-253	0.139	±0.004	±0.004	5.359	±0.035	±0.035
-254	0.139	±0.004	±0.004	5.484	±0.035	±0.035
-255	0.139	±0.004	±0.004	5.609	±0.035	±0.035
-256	0.139	±0.004	±0.004	5.734	±0.035	±0.035
-257	0.139	±0.004	±0.004	5.859	±0.035	±0.035
-258	0.139	±0.004	±0.004	5.984	±0.035	±0.035
-259	0.139	±0.004	±0.004	6.234	±0.040	±0.040
-260	0.139	±0.004	±0.004	6.484	±0.040	±0.040
-261	0.139	±0.004	±0.004	6.734	±0.040	±0.040
-262	0.139	±0.004	±0.004	6.984	±0.040	±0.040
-263	0.139	±0.004	±0.004	7.234	±0.045	±0.045
-264	0.139	±0.004	±0.004	7.484	±0.045	±0.045
-265	0.139	±0.004	±0.004	7.734	±0.045	±0.045
-266	0.139	±0.004	±0.004	7.984	±0.045	±0.045
-267	0.139	±0.004	±0.004	8.234	±0.050	±0.050
-268	0.139	±0.004	±0.004	8.484	±0.050	±0.050
-269	0.139	±0.004	±0.004	8.734	±0.050	±0.050
-270	0.139	±0.004	±0.004	8.984	±0.050	±0.050
-271	0.139	±0.004	±0.004	9.234	±0.055	±0.055
-272	0.139	±0.004	±0.004	9.484	±0.055	±0.055
-273	0.139	±0.004	±0.004	9.734	±0.055	±0.055
-274	0.139	±0.004	±0.004	9.984	±0.055	±0.055
-275	0.139	±0.004	±0.004	10.484	±0.055	±0.055
-276	0.139	±0.004	±0.004	10.984	±0.065	±0.065
-277	0.139	±0.004	±0.004	11.484	±0.065	±0.065

* Contact Greene Tweed for gland details.



TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-278	0.139	±0.004	±0.004	11.984	±0.065	±0.065
-279	0.139	±0.004	±0.004	12.984	±0.065	±0.065
-280	0.139	±0.004	±0.004	13.984	±0.065	±0.065
-281	0.139	±0.004	±0.004	14.984	±0.065	±0.065
-282	0.139	±0.004	±0.004	15.955	±0.075	±0.075
-283	0.139	±0.004	±0.004	16.955	±0.080	±0.080
-284	0.139	±0.004	±0.004	17.955	±0.085	±0.085
-309	0.210	±0.005	±0.005	0.412	±0.005	±0.005
-310	0.210	±0.005	±0.005	0.475	±0.005	±0.005
-311	0.210	±0.005	±0.005	0.537	±0.007	±0.007
-312	0.210	±0.005	±0.005	0.600	±0.009	±0.009
-313	0.210	±0.005	±0.005	0.662	±0.009	±0.009
-314	0.210	±0.005	±0.005	0.725	±0.010	±0.010
-315	0.210	±0.005	±0.005	0.787	±0.010	±0.010
-316	0.210	±0.005	±0.005	0.850	±0.010	±0.010
-317	0.210	±0.005	±0.005	0.912	±0.010	±0.010
-318	0.210	±0.005	±0.005	0.975	±0.010	±0.010
-319	0.210	±0.005	±0.005	1.037	±0.010	±0.010
-320	0.210	±0.005	±0.005	1.100	±0.012	±0.012
-321	0.210	±0.005	±0.005	1.162	±0.012	±0.012
-322	0.210	±0.005	±0.005	1.225	±0.012	±0.012
-323	0.210	±0.005	±0.005	1.287	±0.012	±0.012
-324	0.210	±0.005	±0.005	1.350	±0.012	±0.012
-325	0.210	±0.005	±0.005	1.475	±0.015	±0.015
-326	0.210	±0.005	±0.005	1.600	±0.015	±0.015
-327	0.210	±0.005	±0.005	1.725	±0.015	±0.015
-328	0.210	±0.005	±0.005	1.850	±0.015	±0.015
-329	0.210	±0.005	±0.005	1.975	±0.018	±0.018
-330	0.210	±0.005	±0.005	2.100	±0.018	±0.018
-331	0.210	±0.005	±0.005	2.225	±0.018	±0.018
-332	0.210	±0.005	±0.005	2.350	±0.018	±0.018
-333	0.210	±0.005	±0.005	2.475	±0.020	±0.020
-334	0.210	±0.005	±0.005	2.600	±0.020	±0.020
-335	0.210	±0.005	±0.005	2.725	±0.020	±0.020
-336	0.210	±0.005	±0.005	2.850	±0.020	±0.020
-337	0.210	±0.005	±0.005	2.975	±0.024	±0.024
-338	0.210	±0.005	±0.005	3.100	±0.024	±0.024
-339	0.210	±0.005	±0.005	3.225	±0.024	±0.024
-340	0.210	±0.005	±0.005	3.350	±0.024	±0.024
-341	0.210	±0.005	±0.005	3.475	±0.024	±0.024
-342	0.210	±0.005	±0.005	3.600	±0.028	±0.028

* Contact Greene Tweed for gland details.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-343	0.210	±0.005	±0.005	3.725	±0.028	±0.028
-344	0.210	±0.005	±0.005	3.850	±0.028	±0.028
-345	0.210	±0.005	±0.005	3.975	±0.028	±0.028
-346	0.210	±0.005	±0.005	4.100	±0.028	±0.028
-347	0.210	±0.005	±0.005	4.225	±0.030	±0.030
-348	0.210	±0.005	±0.005	4.350	±0.030	±0.030
-349	0.210	±0.005	±0.005	4.475	±0.030	±0.030
-350	0.210	±0.005	±0.005	4.600	±0.030	±0.030
-351	0.210	±0.005	±0.005	4.725	±0.030	±0.030
-352	0.210	±0.005	±0.005	4.850	±0.030	±0.030
-353	0.210	±0.005	±0.005	4.975	±0.037	±0.037
-354	0.210	±0.005	±0.005	5.100	±0.037	±0.037
-355	0.210	±0.005	±0.005	5.225	±0.037	±0.037
-356	0.210	±0.005	±0.005	5.350	±0.037	±0.037
-357	0.210	±0.005	±0.005	5.475	±0.037	±0.037
-358	0.210	±0.005	±0.005	5.600	±0.037	±0.037
-359	0.210	±0.005	±0.005	5.725	±0.037	±0.037
-360	0.210	±0.005	±0.005	5.850	±0.037	±0.037
-361	0.210	±0.005	±0.005	5.975	±0.037	±0.037
-362	0.210	±0.005	±0.005	6.225	±0.040	±0.040
-363	0.210	±0.005	±0.005	6.475	±0.040	±0.040
-364	0.210	±0.005	±0.005	6.725	±0.040	±0.040
-365	0.210	±0.005	±0.005	6.975	±0.040	±0.040
-366	0.210	±0.005	±0.005	7.225	±0.045	±0.045
-367	0.210	±0.005	±0.005	7.475	±0.045	±0.045
-368	0.210	±0.005	±0.005	7.725	±0.045	±0.045
-369	0.210	±0.005	±0.005	7.975	±0.045	±0.045
-370	0.210	±0.005	±0.005	8.225	±0.050	±0.050
-371	0.210	±0.005	±0.005	8.475	±0.050	±0.050
-372	0.210	±0.005	±0.005	8.725	±0.050	±0.050
-373	0.210	±0.005	±0.005	8.975	±0.050	±0.050
-374	0.210	±0.005	±0.005	9.225	±0.055	±0.055
-375	0.210	±0.005	±0.005	9.475	±0.055	±0.055
-376	0.210	±0.005	±0.005	9.725	±0.055	±0.055
-377	0.210	±0.005	±0.005	9.975	±0.055	±0.055
-378	0.210	±0.005	±0.005	10.475	±0.060	±0.060
-379	0.210	±0.005	±0.005	10.975	±0.060	±0.060
-380	0.210	±0.005	±0.005	11.475	±0.065	±0.065
-381	0.210	±0.005	±0.005	11.975	±0.065	±0.065
-382	0.210	±0.005	±0.005	12.975	±0.065	±0.065
-383	0.210	±0.005	±0.005	13.975	±0.070	±0.070

* Contact Greene Tweed for gland details.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-384	0.210	±0.005	±0.005	14.975	±0.070	±0.070
-385	0.210	±0.005	±0.005	15.955	±0.075	±0.075
-386	0.210	±0.005	±0.005	16.955	±0.080	±0.080
-387	0.210	±0.005	±0.005	17.955	±0.085	±0.085
-388	0.210	±0.005	±0.005	18.955	±0.090	±0.090
-389	0.210	±0.005	±0.005	19.955	±0.095	±0.095
-390	0.210	±0.005	±0.005	20.955	±0.095	±0.095
-391	0.210	±0.005	±0.005	21.955	±0.100	±0.100
-392	0.210	±0.005	±0.005	22.940	±0.105	±0.105
-393	0.210	±0.005	±0.005	23.940	±0.110	±0.110
-394	0.210	±0.005	±0.005	24.940	±0.115	±0.115
-395	0.210	±0.005	±0.005	25.940	±0.120	±0.120
-425	0.275	±0.006	±0.006	4.475	±0.033	±0.033
-426	0.275	±0.006	±0.006	4.600	±0.033	±0.033
-427	0.275	±0.006	±0.006	4.725	±0.033	±0.033
-428	0.275	±0.006	±0.006	4.850	±0.033	±0.033
-429	0.275	±0.006	±0.006	4.975	±0.037	±0.037
-430	0.275	±0.006	±0.006	5.100	±0.037	±0.037
-431	0.275	±0.006	±0.006	5.225	±0.037	±0.037
-432	0.275	±0.006	±0.006	5.350	±0.037	±0.037
-433	0.275	±0.006	±0.006	5.475	±0.037	±0.037
-434	0.275	±0.006	±0.006	5.600	±0.037	±0.037
-435	0.275	±0.006	±0.006	5.725	±0.037	±0.037
-436	0.275	±0.006	±0.006	5.850	±0.037	±0.037
-437	0.275	±0.006	±0.006	5.975	±0.037	±0.037
-438	0.275	±0.006	±0.006	6.225	±0.040	±0.040
-439	0.275	±0.006	±0.006	6.475	±0.040	±0.040
-440	0.275	±0.006	±0.006	6.725	±0.040	±0.040
-441	0.275	±0.006	±0.006	6.975	±0.040	±0.040
-442	0.275	±0.006	±0.006	7.225	±0.045	±0.045
-443	0.275	±0.006	±0.006	7.475	±0.045	±0.045
-444	0.275	±0.006	±0.006	7.725	±0.045	±0.045
-445	0.275	±0.006	±0.006	7.975	±0.045	±0.045
-446	0.275	±0.006	±0.006	8.475	±0.055	±0.055
-447	0.275	±0.006	±0.006	8.975	±0.055	±0.055
-448	0.275	±0.006	±0.006	9.475	±0.055	±0.055
-449	0.275	±0.006	±0.006	9.975	±0.055	±0.055
-450	0.275	±0.006	±0.006	10.475	±0.060	±0.060
-451	0.275	±0.006	±0.006	10.975	±0.060	±0.060
-452	0.275	±0.006	±0.006	11.475	±0.060	±0.060
-453	0.275	±0.006	±0.006	11.975	±0.060	±0.060

* Contact Greene Tweed for gland details.

TABLE 2: Standard O-Ring Dimensions

Dash #	CX	AS568A	ISO-3601-1 CLASS A	ID	AS568A	ISO-3601-1 CLASS A
-454	0.275	±0.006	±0.006	12.475	±0.060	±0.060
-455	0.275	±0.006	±0.006	12.975	±0.060	±0.060
-456	0.275	±0.006	±0.006	13.475	±0.070	±0.070
-457	0.275	±0.006	±0.006	13.975	±0.070	±0.070
-458	0.275	±0.006	±0.006	14.475	±0.070	±0.070
-459	0.275	±0.006	±0.006	14.975	±0.070	±0.070
-460	0.275	±0.006	±0.006	15.475	±0.070	±0.070
-461	0.275	±0.006	±0.006	15.955	±0.075	±0.075
-462	0.275	±0.006	±0.006	16.455	±0.075	±0.075
-463	0.275	±0.006	±0.006	16.955	±0.080	±0.080
-464	0.275	±0.006	±0.006	17.455	±0.085	±0.085
-465	0.275	±0.006	±0.006	17.955	±0.085	±0.085
-466	0.275	±0.006	±0.006	18.455	±0.085	±0.085
-467	0.275	±0.006	±0.006	18.955	±0.090	±0.090
-468	0.275	±0.006	±0.006	19.455	±0.090	±0.090
-469	0.275	±0.006	±0.006	19.955	±0.095	±0.095
-470	0.275	±0.006	±0.006	20.955	±0.095	±0.095
-471	0.275	±0.006	±0.006	21.955	±0.100	±0.100
-472	0.275	±0.006	±0.006	22.940	±0.105	±0.105
-473	0.275	±0.006	±0.006	23.940	±0.110	±0.110
-474	0.275	±0.006	±0.006	24.940	±0.115	±0.115
-475	0.275	±0.006	±0.006	25.940	±0.120	±0.120

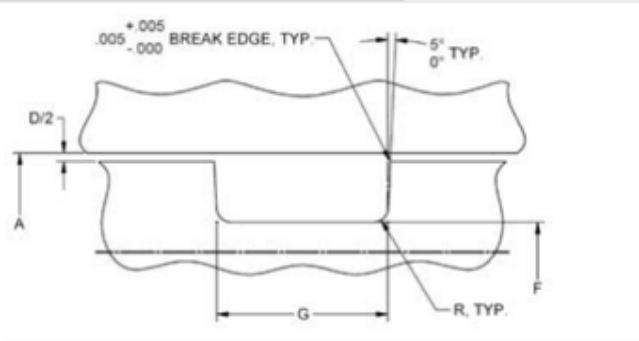
* Contact Greene Tweed for gland details.

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

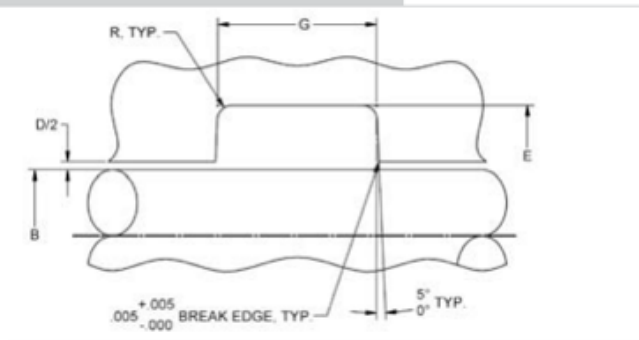
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O-RING & BACK-UP RING CATALOG

Piston



Rod



Unless otherwise stated gland corner radii, surfaces finishes, concentricity, and gland wall angle are as per AS5857 OR AS4716.

GLAND TABLES

TABLE 3: Typical Closed & Open Static Gland Dimensions for AS5857 (Static)

Dash Size	Gland Cross-Section Min.		Diametrical Clearance		Gland Radius	Gland Width No Back-Up	Gland Width One Back-Up +.010/-.000	Gland Width Two Back-Ups +.010/-.000
	Piston	Rod	Piston	Rod				
-0xx	.0535	.0545	.004	.004	.005/.015	.115 +.005/-.000	.174	.230
-1xx	.0825	.0825	.005	.005	.005/.015	.150 +.010/-.000	.210	.275
-2xx	.1125	.1135	.005	.007	.010/.025	.185 +.010/-.000	.250	.320
-3xx	.1725	.1745	.006	.008	.020/.035	.270 +.010/-.000	.360	.455
-4xx	.2275	.2295	.009	.011	.020/.035	.345 +.010/-.000	.475	.610

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

TABLE 4: Typical Closed & Open Dynamic Gland Dimensions for AS4716 (Dynamic)

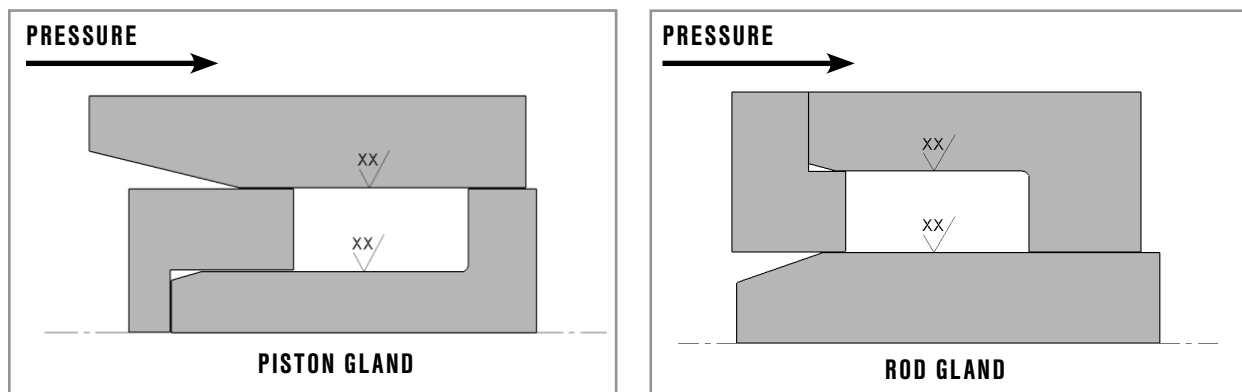
Dash Size	Gland Cross-Section Min.		Diametrical Clearance		Gland Radius	Gland Width No Back-Up	Gland Width One Back-Up +.010/-.000	Gland Width Two Back-Ups +.010/-.000
	Piston	Rod	Piston	Rod				
-006, -007	.0535	.0565	.004	.004	.005/.015	.098 +.005/-.000	.154	.210
-008, -009	.0545	.0565	.004	.004	.005/.015	.098 +.005/-.000	.154	.210
-010 to -028	.0555	.0565	.004	.004	.005/.015	.098 +.005/-.000	.154	.210
-104 to -106	.0855	.0865	.005	.005	.005/.015	.141 +.010/-.000	.183	.245
-110 to -149	.0875	.0875	.005	.005	.005/.015	.141 +.010/-.000	.183	.245
-2xx	.1205	.1215	.005	.007	.010/.025	.188 +.010/-.000	.235	.304
-3xx	.1865	.1865	.006	.008	.020/.035	.281 +.010/-.000	.334	.424
-4xx	.2385	.2385	.009	.011	.020/.035	.375 +.010/-.000	.475	.579

RECOMMENDED SURFACE FINISH

Dynamic –The surface finish is 8 - 16 µin Rms

Static – The surface finish is 16 - 32 µin Rms

FIGURE 10: Surface Finish Locations



APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

TABLE 5: AS5857 Gland Tables – Static Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)		
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND					
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.				
006	0.230	+0.001 -0.000	0.123	+0.000 -0.001	0.123	+0.000 -0.001	0.231	+0.001 -0.000	0.004	0.004	0.115		0.174		0.230					
007	0.261		0.154		0.154		0.262													
008	0.293		0.186		0.185		0.293													
009	0.326		0.219		0.217		0.325													
010	0.357		0.250		0.248		0.356													
011	0.420		0.313		0.310		0.418													
012	0.485		0.378		0.373		0.481													
013	0.550		0.443		0.435		0.543				0.105	+0.005 -0.000	0.164		0.220		0.070 ±0.003			
014	0.613		0.506		0.498		0.606													
015	0.675		0.568		0.560		0.668													
016	0.738		0.631		0.623		0.731													
017	0.800		0.693		0.685		0.793													
018	0.863		0.756		0.748		0.856													
019	0.925		0.818		0.810		0.918													
020	0.991		0.884		0.873		0.981													
021	1.053		0.946		0.935		1.043													
022	1.116		1.009		0.998		1.106													
023	1.178		1.071		1.060		1.168													
024	1.241		1.134		1.123		1.231													
025	1.303		1.196		1.185		1.293													
026	1.366		1.259		1.248		1.356													
027	1.428		1.321		1.310		1.418													
028	1.491		1.384		1.373		1.481													
110	0.541	0.377	0.373	0.538	0.005															
111	0.604	+0.002	0.440	+0.000													0.435	+0.000	0.600	+0.002
112	0.668	-0.000	0.504	-0.002													0.498	-0.002	0.663	-0.000
113	0.730		0.570														0.560		0.725	
114	0.800		0.636														0.623		0.788	
115	0.863		0.699														0.685		0.850	
116	0.925		0.761														0.748		0.913	
117	0.991		0.827														0.810		0.975	
118	1.053		0.889														0.873		1.038	
119	1.116		0.952														0.935		1.100	
120	1.178		1.014														0.998		1.163	
121	1.241		1.077														1.060		1.225	
122	1.303		1.139														1.123		1.288	
123	1.366		1.202														1.185		1.350	
124	1.428		1.264														1.248		1.413	
125	1.491		1.327														1.310		1.475	
126	1.553		1.389		1.373		1.538													
127	1.616		1.452		1.435		1.600													
128	1.678		1.514		1.498		1.663													
129	1.741		1.577		1.560		1.725													

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

TABLE 5: AS5857 Gland Tables – Static Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.		
130	1.805	+0.002 -0.000	1.641	+0.000 -0.002	1.623	+0.000 -0.002	1.788	+0.002 -0.000	0.006	0.006	0.140	+0.010 -0.000	0.200	+0.010 -0.000	0.265	+0.010 -0.000	0.103 ±0.003	0.005 0.015
131	1.867		1.703		1.685		1.850											
132	1.930		1.766		1.748		1.913											
133	1.992		1.828		1.810		1.975											
134	2.055		1.891		1.873		2.038		0.006									
135	2.118		1.954		1.936		2.101											
136	2.180		2.016		1.998		2.163											
137	2.243		2.079		2.061		2.226											
138	2.305		2.141		2.123		2.288		0.007									
139	2.368		2.204		2.186		2.351											
140	2.430		2.266		2.248		2.413											
141	2.493		2.329		2.311		2.476											
142	2.555		2.391		2.373		2.538		0.007									
143	2.618		2.454		2.436		2.601											
144	2.680		2.516		2.498		2.663											
145	2.743		2.579		2.561		2.726											
146	2.805		2.641		2.623		2.788		0.005									
147	2.868		2.704		2.686		2.851											
148	2.930	2.766	2.748	2.913														
149	2.993	2.829	2.811	2.976	0.005													
210	0.991	0.767	0.748	0.974														
211	1.053	0.829	0.810	1.036														
212	1.116	0.892	0.873	1.099														
213	1.178	0.954	0.935	1.161	0.006													
214	1.241	1.017	0.998	1.224														
215	1.303	1.079	1.060	1.286														
216	1.366	1.142	1.123	1.349														
217	1.428	1.204	1.185	1.411	0.007													
218	1.491	1.267	1.248	1.474														
219	1.553	1.329	1.310	1.536														
220	1.616	1.392	1.373	1.599														
221	1.678	1.454	1.435	1.661	0.006													
222	1.741	1.517	1.498	1.724														
223	1.867	1.643	1.623	1.849														
224	1.992	1.768	1.748	1.974														
225	2.118	1.894	1.873	2.099	0.007													
226	2.243	2.019	1.998	2.224														
227	2.368	2.144	2.123	2.349														
228	2.493	2.269	2.248	2.474														
229	2.618	2.394	2.373	2.599														

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

TABLE 5: AS5857 Gland Tables – Static Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.		
230	2.743	+0.002 0.000	2.519	+0.000 -0.002	2.498	+0.000 -0.002	2.724	+0.002 0.000	0.007	0.007	0.185		0.250		0.320		0.139 ±0.004	0.010 0.025
231	2.868		2.644		2.623		2.849											
232	2.993		2.769		2.748		2.974											
233	3.118		2.894		2.873		3.099											
234	3.243		3.019		2.997		3.223											
235	3.368		3.144		3.122		3.348											
236	3.493		3.269		3.247		3.473											
237	3.618		3.394		3.372		3.598											
238	3.743		3.519		3.497		3.723											
239	3.868		3.644		3.622		3.848											
240	3.993		3.769		3.747		3.973											
241	4.118		3.894		3.872		4.098											
242	4.243		4.019		3.997		4.223											
243	4.368		4.144		4.122		4.348											
244	4.493	4.269	4.247	4.473														
245	4.618	4.394	4.372	4.598														
246	4.743	4.519	4.497	4.723														
247	4.868	4.644	4.622	4.848														
325	1.867	1.523	1.498	1.846														
326	1.992	1.648	1.623	1.971														
327	2.118	1.774	1.748	2.096														
328	2.243	1.899	1.873	2.221														
329	2.368	2.024	1.998	2.346														
330	2.493	2.149	2.123	2.471														
331	2.618	2.274	2.248	2.596														
332	2.743	2.399	2.373	2.721														
333	2.868	2.524	2.498	2.846														
334	2.993	2.649	2.623	2.971														
335	3.118	2.774	2.748	3.096														
336	3.243	2.899	2.873	3.221														
337	3.368	3.024	2.997	3.345														
338	3.493	3.149	3.122	3.470														
339	3.618	3.274	3.247	3.595														
340	3.743	3.399	3.372	3.720														
341	3.868	3.524	3.497	3.845														
342	3.993	3.649	3.622	3.970														
343	4.118	3.774	3.747	4.095														
344	4.243	3.899	3.872	4.220														
345	4.368	4.024	3.997	4.345														
346	4.493	4.149	4.122	4.470														
347	4.618	4.274	4.247	4.595														
348	4.743	4.399	4.372	4.720														
349	4.868	4.524	4.497	4.845														

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

TABLE 5: AS5857 Gland Tables – Static Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)										
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND													
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.												
425	4.974		4.519		4.497		4.956																					
426	5.099		4.644		4.622		5.081																					
427	5.224		4.769		4.747		5.206																					
428	5.349		4.894		4.872		5.331																					
429	5.474		5.019		4.997		5.456																					
430	5.599		5.144		5.122		5.581																					
431	5.724		5.269		5.247		5.706																					
432	5.849		5.394		5.372		5.831																					
433	5.974		5.519		5.497		5.956																					
434	6.099		5.644		5.622		6.081																					
435	6.224	+0.003	5.769	5.747	6.206	+0.003	0.009																					
436	6.349	-0.000	5.894	5.872	6.331	-0.000																						
437	6.474	6.019	5.997	6.456																								
438	6.724	6.269	6.247	6.706																								
439	6.974	6.519	6.497	6.956																								
440	7.224	6.769	6.747	7.206																								
441	7.474	7.019	6.997	7.456																								
442	7.724	7.269	+0.000	7.247	+0.000	7.706																						
443	7.974	7.519	-0.003	7.497	-0.003	7.956																						
444	8.224	7.769	7.747	8.206																								
445	8.474	8.019	7.997	8.456																								
446	8.974	8.519	8.497	8.956	0.010																							
447	9.474	9.020	8.997	9.456																								
448	9.974	9.520	9.497	9.956																								
449	10.474	10.020	9.997	10.456																								
450	10.974	10.520	10.497	10.956																								
451	11.474	11.020	10.997	11.456																								
452	11.974	11.520	11.497	11.956																								
453	12.474	+0.004	12.020	11.997			12.456											+0.004										
454	12.974	-0.000	12.520	12.497			12.956											-0.000										
455	13.474	13.020	12.997	13.456																								
456	13.974	13.520	13.497	13.956																								
457	14.474	14.020	13.997	14.456																								
458	14.974	14.520	14.497	14.956																								
459	15.474	15.020	14.997	15.456																								
460	15.974	15.520	15.497	15.956																								

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

Table 6: AS4716 Gland Tables - Dynamic Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.		
006	0.235	+0.001	0.123	+0.000	0.123	+0.000	0.235	+0.001	0.004	0.004	0.098		0.154		0.210			
007	0.266		0.154		0.266													
008	0.297		0.189		0.294													
009	0.329		0.220		0.327													
010	0.360	-0.000	0.250	-0.001	0.248	-0.001	0.359	-0.000										
011	0.422		0.312		0.421													
012	0.485		0.375		0.484													
013	0.550		0.441		0.545													
014	0.613		0.504		0.498		0.608				0.094	+0.005 -0.000	0.150		0.207	0.070 ±0.003		
015	0.675		0.566		0.560		0.670											
016	0.738		0.629		0.623		0.733											
017	0.800		0.691		0.685		0.795											
018	0.863		0.753		0.748		0.858											
019	0.925		0.815		0.810		0.920											
020	0.991		0.881		0.873		0.983											
021	1.053		0.943		0.935		1.045											
022	1.116		1.006		0.998		1.108											
023	1.178		1.068		1.060		1.170											
024	1.241		1.131		1.123		1.233											
025	1.303		1.193		1.185		1.295											
026	1.366		1.256		1.248		1.358											
027	1.428		1.318		1.310		1.420											
028	1.491		1.381		1.373		1.483											
110	0.550		0.379		0.373		0.546											
111	0.613	+0.002 -0.000	0.441	+0.000	0.435	+0.000	0.609	+0.002 -0.000	0.005									
112	0.675		0.502		0.498		0.672											
113	0.738		0.565		0.560		0.734											
114	0.800		0.627		0.623		0.797											
115	0.863		0.689		0.685		0.859											
116	0.925		0.751		0.748		0.923											
117	0.991		0.817		0.810		0.985											
118	1.053		0.879		0.873		1.048											
119	1.116		0.942		0.935		1.110											
120	1.178		1.003		0.998		1.173											
121	1.241		1.066		1.060		1.235											
122	1.303		1.128		1.123		1.298											
123	1.366		1.191		1.185		1.360											
124	1.428		1.253		1.248		1.423											
125	1.491		1.316		1.310		1.485											
126	1.553		1.378		1.373		1.548											
127	1.616	1.441	1.435	1.610														
128	1.678	1.503	1.498	1.673														
129	1.741	1.566	1.560	1.735														

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

Table 6: AS4716 Gland Tables - Dynamic Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.		
130	1.805	+0.002 -0.000	1.631	+0.000 -0.002	1.623	+0.000 -0.002	1.798	+0.002 -0.000	0.006 <									

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

Table 6: AS4716 Gland Tables - Dynamic Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.				
230	2.743	+0.002 -0.000	2.501	+0.000 -0.002	2.498	+0.000 -0.002	2.740	+0.002 -0.000	0.007	0.007	0.188		0.235		0.304		0.139 ±0.004	0.010 0.025
231	2.868		2.626		2.623		2.865											
232	2.993		2.751		2.748		2.990											
233	3.118		2.876		2.873		3.115											
234	3.243		3.001		2.997		3.239											
235	3.368		3.126		3.122		3.364											
236	3.493		3.251		3.247		3.489											
237	3.618		3.376		3.372		3.614											
238	3.743		3.501		3.497		3.739											
239	3.868		3.626		3.622		3.864											
240	3.993		3.751		3.747		3.989											
241	4.118		3.876		3.872		4.114											
242	4.243		4.001		3.997		4.239											
243	4.368		4.126		4.122		4.364											
244	4.493	4.251	4.247	4.489														
245	4.618	4.376	4.372	4.614														
246	4.743	4.501	4.497	4.739														
247	4.868	4.626	4.622	4.864														
325	1.867	+0.002 -0.000	1.495	+0.000 -0.002	1.498	+0.000 -0.002	1.870	+0.002 -0.000	0.006	0.006		+0.010 -0.000		+0.010 -0.000		+0.010 -0.000		
326	1.992		1.620		1.623		1.995											
327	2.118		1.746		1.748		2.120											
328	2.243		1.871		1.873		2.245											
329	2.368		1.996		1.998		2.370											
330	2.493		2.121		2.123		2.495											
331	2.618		2.246		2.248		2.620											
332	2.743		2.371		2.373		2.745											
333	2.868		2.496		2.498		2.870											
334	2.993		2.621		2.623		2.995											
335	3.118		2.746		2.748		3.120											
336	3.243		2.871		2.873		3.245											
337	3.368		2.996		2.997		3.369											
338	3.493		3.121		3.122		3.494											
339	3.618	3.246	3.247	3.619														
340	3.743	3.371	3.372	3.744														
341	3.868	3.496	3.497	3.869														
342	3.993	3.621	3.622	3.994														
343	4.118	3.746	3.747	4.119														
344	4.243	3.871	3.872	4.244														
345	4.368	3.996	3.997	4.369														
346	4.493	4.121	4.122	4.494														
347	4.618	4.246	4.247	4.619														
348	4.743	4.371	4.372	4.744														
349	4.868	4.496	4.497	4.869														

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

APPENDIX A – STANDARD INDUSTRY GLAND TABLES

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O-RING & BACK-UP RING CATALOG

Table 6: AS4716 Gland Tables - Dynamic Applications

DASH SIZE	PISTON TYPE				ROD TYPE				MAXIMUM DIAMETRICAL CLEARANCE (D)		GLAND WIDTH (G)						NOMINAL SEAL CROSS SECTION	GLAND CORNER RADII (R) (MIN/MAX)
	CYLINDER BORE (A)		GLAND OD (F)		ROD OD (B)		GLAND ID (E)				ZERO BACK-UP RING GLAND		ONE BACK-UP RING GLAND		TWO BACK-UP RING GLAND			
	MIN.	TOL.	MAX.	TOL.	MAX.	TOL.	MIN.	TOL.	PISTON	ROD	MIN.	TOL.	MIN.	TOL.	MIN.	TOL.		
425	4.974		4.497		4.497		4.974											
426	5.099		4.622		4.622		5.099											
427	5.224		4.747		4.747		5.224											
428	5.349		4.872		4.872		5.349											
429	5.474		4.997		4.997		5.474											
430	5.599		5.122		5.122		5.599											
431	5.724		5.247		5.247		5.724											
432	5.849		5.372		5.372		5.849											
433	5.974		5.497		5.497		5.974											
434	6.099		5.622		5.622		6.099											
435	6.224	+0.003	5.747		5.747		6.224	+0.003	0.009									
436	6.349	-0.000	5.872		5.872		6.349	-0.000										
437	6.474		5.997		5.997		6.474			0.009								
438	6.724		6.247		6.247		6.724											
439	6.974		6.497		6.497		6.974											
440	7.224		6.747		6.747		7.224											
441	7.474		6.997		6.997		7.474											
442	7.724		7.247	+0.000	7.247	+0.000	7.724				0.375	+0.010	0.475	+0.010	0.579	+0.010	0.275	0.020
443	7.974		7.497	-0.003	7.497	-0.003	7.974					-0.000		-0.000		-0.000	±0.006	0.035
444	8.224		7.747		7.747		8.224											
445	8.474		7.997		7.997		8.474											
446	8.974		8.497		8.497		8.974		0.010									
447	9.474		8.997		8.997		9.474											
448	9.974		9.497		9.497		9.974											
449	10.474		9.997		9.997		10.474											
450	10.974		10.497		10.497		10.974											
451	11.474		10.997		10.997		11.474											
452	11.974		11.497		11.497		11.974											
453	12.474	+0.004	11.997		11.997		12.474	+0.004	0.011									
454	12.974	-0.000	12.497		12.497		12.974	-0.000										
455	13.474		12.997		12.997		13.474			0.010								
456	13.974		13.497		13.497		13.974											
457	14.474		13.997		13.997		14.474											
458	14.974		14.497		14.497		14.974											
459	15.474		14.997		14.997		15.474											
460	15.974		15.497		15.497		15.974											

KEY: MIN. = Minimum | MAX. = Maximum | TOL. = Tolerance

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