



AEROSPACE STANDARD

AS4832™**REV. B**

Issued 1994-06
Reaffirmed 2012-06
Revised 2023-06

Superseding AS4832A

Gland Design: Nominal 3/8 Inch Cross Section for
Compression-Type Seals

RATIONALE

Two corrections required on pg. 12; Table 6: The Cylinder Bore ØA or Piston Rod ØB, On Chrome, Uncoated Steel and Hard Anodized Surfaces, Elastomer Cell value is incorrect. Currently is 8-2 (µin), Correct values are: 8-12 (µin). Second correction, the top right cell in Table 6, Gases (Note 7), should read: Gases (Notes 5, 6).

1. SCOPE

This SAE Aerospace Standard (AS) offers gland details for a 0.364 inch (9.246 mm) cross-section gland (nominal 3/8 inch) with proposed gland lengths for compression-type seals with two backup rings over a range of 7 to 21 inches (178 to 533 mm) in diameter.

The dash number system used is similar to AS568A. A 600 series has been chosen as a logical extension of AS568A, and the 625 number has been selected for the initial number, since 300 and 400 series in MIL-G-5514 and AS4716 begin with 325 and 425 sizes.

Seal configurations and design are not a part of this document. This gland is for use with compression-type seals including, but not limited to, O-rings, T-rings, D-rings, cap seals, etc.

1.1 Purpose

The current O-ring gland design standard, AS4716, specifies gland dimensions for 0.070 to 0.275 inch (1.778 to 6.985 mm) cross-section O-rings. For landing gear and other large diameter applications, a larger cross-section seal has advantages in performance, and longer life. To address this need, this aerospace standard specifies gland dimensions and other pertinent criteria based on O-rings for nominal 3/8 inch (9.53 mm) cross-section glands.

2. REFERENCES

2.1 Applicable Documents

The following publications form a part of this document to the extent specified herein. The latest issue of SAE publications shall apply. The applicable issue of other publications shall be the issue in effect on the date of the purchase order. In the event of conflict between the text of this document and references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

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Documents
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2.1.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (inside USA and Canada) or +1 724-776-4970 (outside USA), www.sae.org.

AMS2452	Superfinishing of HVOF Applied Tungsten Carbide Coatings
AIR6079	Selection of Metallic Spring Energized Seals for Aerospace
ARP5555	Recommendations for Installation of Seals in Standard Glands
ARP5935	Use of HVOF Thermal Spray Coatings for Hard Chrome Replacement in Landing Gear Applications
AS568	Aerospace Size Standard for O-Rings
AS4716	Gland Design, O-Ring and Other Seals

2.1.2 ASME Publications

Available from ASME, P.O. Box 2900, 22 Law Drive, Fairfield, NJ 07007-2900, Tel: 800-843-2763 (U.S./Canada), 001-800-843-2763 (Mexico), 973-882-1170 (outside North America), www.asme.org.

ASME B46.1-2009 Surface Texture (Surface Roughness, Waviness, and Lay)

2.1.3 ISO Publications

Available at <https://webstore.ansi.org/>.

ISO 4287-1 Geometrical Product Specifications (GPS) - Surface Texture: Profile Method - Terms, Definitions and Surface Texture Parameters

2.1.4 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-G-5514G Gland Design, Packings, Hydraulic, General Requirements for (Inactive for New Design)

3. TECHNICAL REQUIREMENTS

3.1 General

3.1.1 The recommended seal (O-ring, T-ring, D-ring, cap seal, etc.) cross section is 0.418 inch $\pm$ 0.006 inch (10.617 mm $\pm$ 0.152 mm). This cross section and tolerance provide appropriate levels of squeeze and is the basis for the squeeze calculations and subsequent results provided in Tables 1A and 1B.

NOTE: Other cross-section sizes and squeeze levels may be suitable and/or required in application, depending on the seal type and/or seal assembly; in these instances, consult the seal supplier for more detailed squeeze and gland occupancy calculations.

3.1.2 Rod diameters are expanded from MIL-G-5514 and AS4716. In these size ranges, MIL-G-5514 and AS4716 list 1/2 inch (12.7 mm) increments, while 1/4 inch (6.35 mm) increments are provided in this document.

3.1.3 The hardware dimensions listed in Tables 1A and 1B ensure the seal squeeze will be limited to 5% minimum when using the recommended seal cross section listed in 3.1.1. Any “laydown” or lateral displacement of the rod/piston will typically reduce the seal squeeze on one side of the rod/piston, which may lead to increased rates of leakage, accelerated compression set, or seal wear damage. In the event wear rings are required, the maximum diametral clearance will be increased, however, the effective “laydown” or lateral displacement capable within the system will be reduced due to the wear rings incorporation. A minimum squeeze of 5% (0.020 inch [0.508 mm]) should be maintained on the seal assembly under worst case tolerance and laydown conditions. This minimum squeeze level is applicable for both elastomer-only assemblies, as well as cap-type elastomer energized seal assemblies. For cap-type seal assemblies, the 5% minimum squeeze value should be a combination of the stack-up tolerance associated with the energizer, hardware, and cap component.

NOTE: For seal assemblies which do not use the seal cross section listed in 3.1.1, consult the seal supplier for more detailed squeeze calculations to ensure proper levels of squeeze are maintained after the effects of “laydown.”

NOTE: The cap shall be considered incompressible.

3.1.4 The maximum diametral clearances between cylinder bore and piston, rod and rod gland are listed in Table 7 for convenience of the user (see 3.3). The maximum runouts are listed in Table 8 (see 3.4).

3.2 Gland and Groove Details

3.2.1 Gland Major Dimensions

The gland major dimensions are shown in Figure 1 and Tables 1A and 1B.

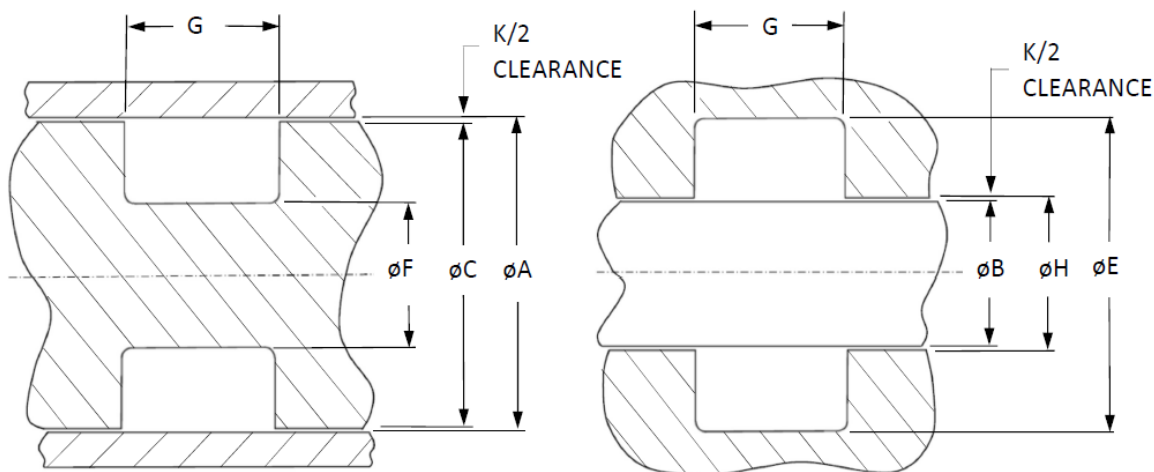


Figure 1 - Gland design

Examples of the gland configurations shown in Figure 1 are provided in Figure 2.

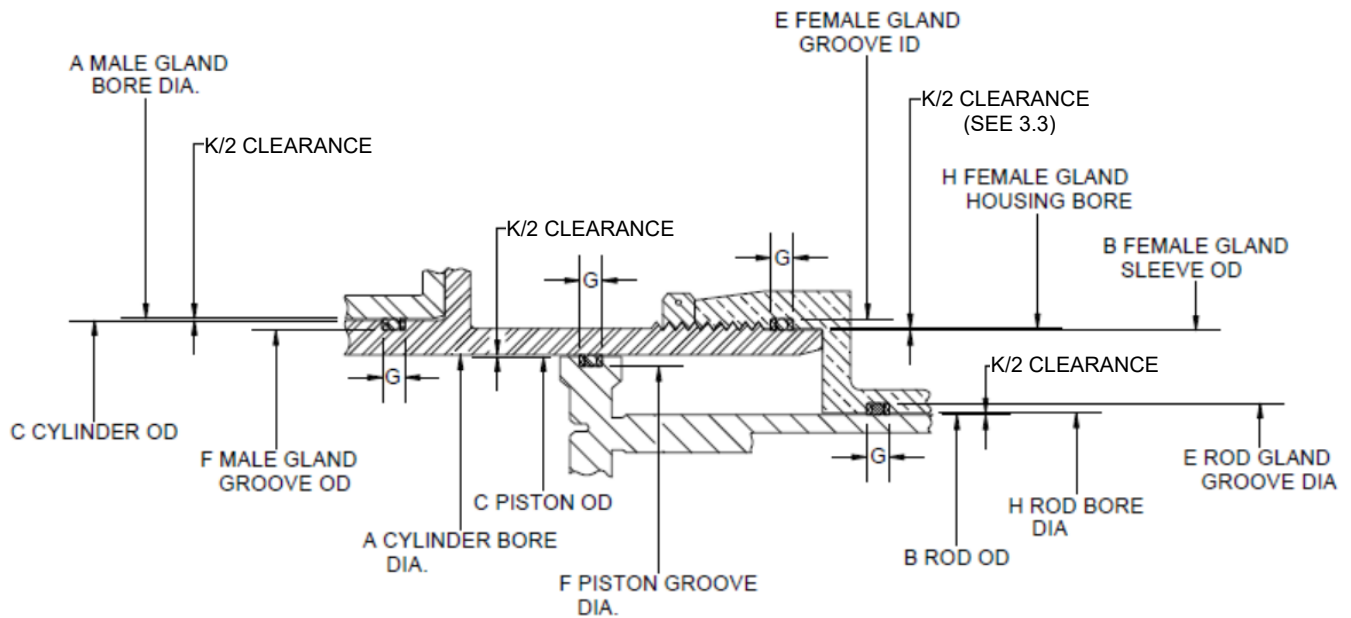


Figure 2 - Gland configuration examples

Table 1A - Gland dimensions and O-ring squeeze, in inches

Gland Dash No.	ØC Piston Diameter	ØA Cylinder Bore	ØF Piston Groove Diameter	ØB Rod Diameter	ØH Rod Gland Bore	ØE Rod Groove Diameter	Actual Minimum Squeeze	Actual Maximum Squeeze
	Max Min	Min Max	Max Min	Max Min	Min Max	Min Max	Piston Rod	Piston Rod
625	7.968	7.974	7.247	7.247	7.253	7.974	0.0313	0.0685
	7.965	7.977	7.244	7.244	7.256	7.977	0.0313	0.0685
626	8.218	8.224	7.497	7.497	7.503	8.224	0.0314	0.0685
	8.215	8.227	7.494	7.494	7.506	8.227	0.0314	0.0685
627	8.468	8.474	7.747	7.747	7.753	8.474	0.0315	0.0685
	8.465	8.477	7.744	7.744	7.756	8.477	0.0315	0.0685
628	8.718	8.724	7.997	7.997	8.003	8.724	0.0317	0.0685
	8.715	8.727	7.994	7.994	8.006	8.727	0.0317	0.0685
629	8.968	8.974	8.247	8.247	8.253	8.974	0.0309	0.0685
	8.965	8.977	8.244	8.244	8.256	8.977	0.0309	0.0685
630	9.218	9.224	8.497	8.497	8.503	9.224	0.0311	0.0685
	9.215	9.227	8.494	8.494	8.506	9.227	0.0311	0.0685
631	9.469	9.474	8.747	8.747	8.753	9.474	0.0302	0.0685
	9.466	9.478	8.744	8.744	8.756	9.478	0.0307	0.0685
632	9.719	9.724	8.997	8.997	9.003	9.724	0.0308	0.0680
	9.716	9.728	8.994	8.994	9.006	9.728	0.0308	0.0685
633	9.969	9.974	9.247	9.247	9.253	9.974	0.0309	0.0680
	9.966	9.978	9.244	9.244	9.256	9.978	0.0309	0.0685
634	10.219	10.224	9.497	9.497	9.503	10.224	0.0307	0.0680
	10.216	10.228	9.494	9.494	9.506	10.228	0.0307	0.0685
635	10.469	10.474	9.747	9.747	9.753	10.474	0.0308	0.0680
	10.466	10.478	9.744	9.744	9.756	10.478	0.0308	0.0685
636	10.719	10.724	9.997	9.997	10.003	10.724	0.0309	0.0680
	10.716	10.728	9.994	9.994	10.006	10.728	0.0309	0.0685

Gland Dash No.	ØC Piston Diameter	ØA Cylinder Bore	ØF Piston Groove Diameter	ØB Rod Diameter	ØH Rod Gland Bore	ØE Rod Groove Diameter	Actual Minimum Squeeze	Actual Maximum Squeeze
	Max Min	Min Max	Max Min	Max Min	Min Max	Min Max	Piston Rod	Piston Rod
637	10.969	10.974	10.247	10.247	10.253	10.974	0.0310	0.0680
	10.966	10.978	10.244	10.244	10.256	10.978	0.0310	0.0685
638	11.219	11.224	10.497	10.497	10.503	11.224	0.0311	0.0680
	11.216	11.228	10.494	10.494	10.506	11.228	0.0311	0.0685
639	11.469	11.474	10.747	10.747	10.753	11.474	0.0312	0.0680
	11.466	11.478	10.744	10.744	10.756	11.478	0.0312	0.0685
640	11.719	11.724	10.997	10.997	11.003	11.724	0.0312	0.0680
	11.716	11.728	10.994	10.994	11.006	11.728	0.0312	0.0685
641	11.969	11.974	11.247	11.247	11.253	11.974	0.0313	0.0680
	11.966	11.978	11.244	11.244	11.256	11.978	0.0313	0.0685
642	12.219	12.224	11.497	11.497	11.503	12.224	0.0314	0.0680
	12.216	12.228	11.494	11.494	11.506	12.228	0.0314	0.0685
643	12.469	12.474	11.747	11.747	11.753	12.474	0.0315	0.0680
	12.466	12.478	11.744	11.744	11.756	12.478	0.0315	0.0685
644	12.719	12.724	11.997	11.997	12.003	12.724	0.0316	0.0680
	12.716	12.728	11.994	11.994	12.006	12.728	0.0316	0.0685
645	12.969	12.974	12.247	12.247	12.253	12.974	0.0316	0.0680
	12.966	12.978	12.244	12.244	12.256	12.978	0.0316	0.0685
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	15.716	15.728	14.994	14.994	15.006	15.728	0.0315	0.0685
657	15.969	15.974	15.247	15.247	15.253	15.974	0.0316	0.0680
	15.966	15.978	15.244	15.244	15.256	15.978	0.0316	0.0685
658	16.219	16.224	15.497	15.497	15.503	16.224	0.0317	0.0680
	16.216	16.228	15.494	15.494	15.506	16.228	0.0317	0.0685
659	16.469	16.474	15.747	15.747	15.753	16.474	0.0317	0.0680
	16.466	16.478	15.744	15.744	15.756	16.478	0.0317	0.0685