



AEROSPACE STANDARD

AS4873**REV. A**

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Stabilized 2014-05

Superseded by AS5857

Gland Design, Elastomeric O-Ring Seals, Static Radial and Face
800 psi Maximum Service

RATIONALE

AS4873 is determined to contain historical and stable technology. A replacement standard (AS5857) is available.

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1. SCOPE:

This document establishes standard gland dimensions for low pressure static radial O-ring seal applications and provides recommendations for modifying these glands in special applications. No provisions are made in this document for anti-extrusion devices.

1.1 Purpose:

The purpose of this document is to provide the aerospace industry with standardized dimensional criteria for static radial elastomeric O-ring seal glands for a service pressure of 800 psi maximum. This document supplements ARP1231.

2. REFERENCES:

2.1 Applicable Documents

The following publications form a part of this specification 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 specification and references cited herein, the text of this specification takes precedence. Nothing in this specification, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

2.1.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

AS568	Aerospace Size Standard for O-rings
ARP1231	Gland Design, Elastomeric O-ring Seals, General Considerations and Military Standard MS33581

2.1.2 ANSI Publications: Available from ANSI, 11 West 42nd Street, New York, NY 10036-8002.

ANSI B46.1 - 1962 Surface Texture

3. GENERAL REQUIREMENTS

3.2 Gland Configurations:

3.2.1 Standard Glands: Figure 1 and Table 1 depicts rod and bore-mounted radial and face seal O-ring seal glands. Standard dimensions for these glands are tabulated in Figure 2. These dimensions are designed for use with seals conforming to AS568 tolerances except for the deviations in this document if any. Dimensions are computed in accordance with the criteria defined in Section 4 of this document and in ARP1231.

3.2.2 Exemption: Standard glands are not provided for the larger diameter bore-mounted applications. In these larger sizes, Diameter D becomes larger than the outside of the O-ring seal. This condition makes the installation of a seal impractical. Bore-mounted seal glands have been provided up to those sizes where diameter D is equal to or greater than the seal ID plus 1/2 (seal OD - seal ID).

3.2.3 Modified Glands: The standard gland dimensions may be modified to achieve an optimum sealing configuration. In selecting or computing gland dimensions, the criteria defined in ARP1231 and in Section 4 of this document should be consulted.

3.3 Surface Texture:

3.3.1 Figure 1 defines the preferred surface texture to be used with the glands described in this document. The 63 and 40 μin textures are satisfactory for most low pressure static applications. A 32 μin texture may be required if there is relative motion between seal and gland sealing surfaces during operation. However, if this relative motion becomes excessive, the applications should be considered dynamic and ARP1233 consulted.

4. DESIGN CRITERIA:

4.1 O-ring Seal Stretch:

4.1.1 Minimum Stretch: Static seals should be stretched a minimum of 2% at installation into the gland. This assures a snug fit in a short time for elastomers such as fluorocarbons which are slow to return to size after stretching.

4.1.2 Maximum Stretch: The as-installed seal stretch should be held to a low value consistent with the need for a 2% minimum stretch and with the gland dimensional tolerances needed for manufacture. Excessive stretches can cause stress cracking during operation particularly with nitrile seals. The maximum stretch resulting from the standard gland dimensions in Figure 2 varies from 2.5 to 10% depending on size. Of the sizes listed, 85% have a maximum stretch of less than 5%. Consideration should be given to reducing the seal stretch when there is a possibility of seal stress cracking.

TABLE 1 - Standard Gland Dimensions in Inches

O-ring Size	W Cross Section Nominal	W Cross Section Actual	L Gland Depth	Squeeze Actual	Squeeze %	E Diametral Clearance (a & c)	G Fuel & Engine Oil Uses	G Vacuum & Gases	R Groove Radius	Eccentricity Max (b)
4 through 50	1/16	0.070 ±.003	0.050 to 0.054	0.013 to 0.023	19 to 32	0.002 to 0.010	0.101 to 0.107	0.082 to 0.088	0.005 to 0.015	0.002
110 through 178	3/32	0.103 ±.003	0.074 to 0.080	0.020 to 0.032	20 to 30	0.002 to 0.010	0.136 to 0.142	0.117 to 0.123	0.005 to 0.015	0.002
210 through 284	1/8	0.139 ±.004	0.101 to 0.107	0.028 to 0.042	20 to 30	0.003 to 0.011	0.177 to 0.187	0.157 to 0.163	0.010 to 0.025	0.003
325 through 395	3/16	0.210 ±.005	0.152 to 0.162	0.043 to 0.063	21 to 30	0.003 to 0.011	0.270 to 0.290	0.247 to 0.253	0.020 to 0.035	0.004
425 through 475	1/4	0.275 ±.006	0.201 to 0.211	0.058 to 0.080	21 to 29	0.004 to 0.012	0.342 to 0.362	0.322 to 0.328	0.020 to 0.035	0.005

- a. Clearance gap must be held to a minimum consistent with design requirements for temperature range variation.
- b. Total indicator reading between groove and adjacent bearing surface.
- c. Reduce maximum diametral clearance 50% when using Silicone O-rings.