

REV. C

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Superseding AS4052B

(R) Gland Design: Scraper, Landing Gear, Installation

RATIONALE

AEROSPACE

STANDARD

Previously, this SAE Aerospace Standard (AS) was missing metric equivalents. It was updated to include metric equivalents, similar to the updates previously completed on gland documents, such as AS4716, AS5857, and AS4832. In addition, the Type II gland retention details have been adjusted from historical values to effectively increase retention capabilities.

1. SCOPE

This SAE Aerospace Standard (AS) covers an alternate gland design for the installation of scraper/ wiper rings in the lower end of landing gear shock struts for the purpose of contaminant exclusion.

The defined scraper gland covered by this document, as shown in Table 1, is a variant of AS4716, the accepted gland standard for AS568, O-ring packing seals. Piston rod diameters, gland internal diameters, groove sidewall angles and the surface finish are all defined by AS4716, but the gland outer retaining wall diameter is changed. The traditional scraper design installed into the glands detailed in Table 1 typically utilize components made from PTFE, urethane, or nitrile materials. These scraper designs, while still acceptable, must be reviewed in consideration to deicing, cleaners and disinfectant fluids applied to or in contact with the landing gear, as the materials of construction for the installed scrapers may not be compatible to these fluids. Exposure of the scraper to incompatible fluids is likely to reduce the performance of the scraper.

In addition, an alternative scraper gland is also covered by this document and shown in Table 2. It is also a variant of AS4716; however, this gland has a reduced atmospheric gland lip and profiled lead in geometry to allow for a PTFE jacket metal spring energized scraper to be installed. The advantages of the PTFE jacket metal spring energized scraper design are that the materials of construction are chemically inert, greatly reducing the possibility of negative performance due to incompatibility with deicers, cleaners, and disinfectant fluids.

AS4088 is similar to the hardware design in Tables 1A and 1B of this document, which was developed by SAE A-6 for flight control and general-purpose cylinders. It differs from this document primarily by the clearance between the rod (piston) and outer gland wall.

1.1 Purpose

This document is intended to present a groove which will accommodate an improved scraper/wiper ring assembly design and is not intended to obsolete the MS33675 gland standard.

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2. 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.

2.1 SAE Publications

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- AS568 Aerospace Size Standard for O-Rings
- AS4716 Gland Design, O-Ring and Other Seals
- 2.2 U.S. Government Publications

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

MIL-G-5514F Gland Design; Packings, Hydraulic, General Requirements for (Inactive for new designs)

- MS28776 Scraper, Piston Rod (Inactive for new designs)
- MS33675 Scraper, Installation, Packing Gland Ring (Inactive for new designs)
- 3. TECHNICAL REQUIREMENTS

3.1 General

Historically, the most common scraper gland has been an MS33675, which accepted either a MS28776 bronze scraper or a comparable TFE scraper. It has been noted that this arrangement is deficient in two aspects: the metal scraper ring is split, allowing contaminants to pass through and around it; and, being installed in a very abbreviated gland, the scraper frequently dislodges under conditions of shock strut deflection. An improved metal, plastic, or elastomeric endless scraper ring would require additional gland volume with greater retaining surfaces than specified by MS33675 and as detailed in this specification.

The gland length shown in Tables 1A, 1B, 2A, and 2B are AS4716 one backup O-ring groove lengths. This groove provides the desired roll stability with improved scraper assembly designs of plastic and elastomeric materials. A shorter gland (AS4716, zero backup length) was deleted from this document because of stability and increased ingression problems.

Gland surface finishes should be 63 μ in (1.6 μ m) Ra or better, and be free of nicks, scratches, or burrs which could damage the scraper on installation. The rod surface finish should be per the applicable AS4716 recommendation based on the rod material or coating, and respective inboard seal material in contact with the rod.

This AS is a design standard and not to be used as a part number.

Glands meeting the requirements of this document have been classified under FSC-1650.

3.2 Gland and Groove Details

3.2.1 Gland Major Dimensions

The gland major dimensions are separated into Type 1 and Type 2 glands and are shown in Figures 1, and 2, and Tables 1A, 1B, 2A, and 2B.

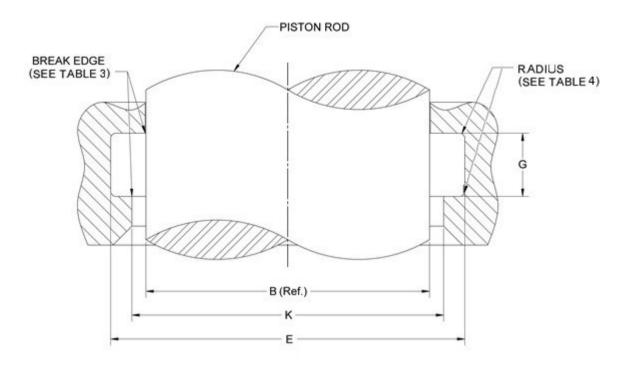


Figure 1 - To accompany Type 1 in Tables 1A and 1B