



AEROSPACE STANDARD

AS6944™

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Dynamic Seal Test Fixture

RATIONALE

There is a need for a document that provides standardized tools for evaluating seals in dynamic applications. This is because there are continuing problems with existing poorly defined dynamic seal test fixtures in elastomer material standards that cause problems with inconsistent test results. This document meets this need.

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Documents

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1. SCOPE

This SAE Aerospace Standard (AS) provides dimensions for a standardized test fixture that can be used to evaluate the dynamic performance requirements defined in some elastomer material standards of O-rings in rod glands per AS4716.

1.1 Purpose

The purpose of this document is to provide a well-defined and easy to produce seal test block and rod to comparatively evaluate the sealing capability of, primarily, O-rings that may be used as dynamic hydraulic seals. This fixture could be retrofitted to existing reciprocating fixtures like that described in AMS-P-83461.

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

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.

AMS-P-83461	Packing, Preformed, Petroleum Hydraulic Fluid Resistant, Improved Performance at 275 °F (135 °C)
AMS2430	Shot Peening
AMS2460	Plating, Chromium
AMS4640	Aluminum Bronze, Bars, Rods, Shapes, Tubes, and Forgings, 81.5Cu - 10.0Al - 4.8Ni - 3.0Fe, Drawn and Stress Relieved (HR50) or Temper Annealed (TQ50)
AMS5659	Steel, Corrosion-Resistant, Bars, Wire, Forgings, Rings, and Extrusions, 15Cr - 4.5Ni - 0.30Cb (Nb) - 3.5Cu, Consumable Remelted, Solution Heat Treated, Precipitation Hardenable
AS4716	Gland Design, O-Ring and Other Seals
AS4088	Aerospace Rod Scraper Gland Design Standard
AS5781	Retainers (Backup Rings), Hydraulic and Pneumatic, Polytetrafluoroethylene Resin, Single Turn, Scarf-Cut, for Use in AS4716 Glands
SAE J1926-1	Connections for General Use and Fluid Power - Ports and Stud Ends with ASME B1.1 Threads and O-Ring Sealing - Part 1: Threaded Port with O-Ring Seal in Truncated Housing

2.2 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	Surface Texture (Surface Roughness, Waviness, and Lay)
ASME Y14.5M	Dimensioning and Tolerancing

2.3 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM A108 Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished

3. DESIGN PHILOSOPHY

The design philosophy for the dynamic seal test fixture is as follows:

- Materials chosen are typical for hydraulic actuators
- Chrome is chosen since HVOF applied finishes are not compatible with bare O-rings in dynamic applications
- Side loading of the piston rod against the gland by the drive mechanism is eliminated
- AS4716 glands are used for the seals since this is the most common gland for dynamic usage
- A separate bleed port is provided for the purging of air
- Split backup rings are used to allow any leakage to get out of the gland
- Scrapers are reversed in the assembly to act as wipers for improved leakage collection
- Two backup width grooves are used to allow the possibility of testing other seal types
- AS4088 glands are used since this is the most common gland for rod scrapers

4. TEST FIXTURE DEFINITION

NOTE: All the dimensions are in inches. Surface texture callouts shall be interpreted per ASME B46.1. Finishes are in R_a (microinches). Dimensioning and tolerancing per ASME Y14.5M-2009.

4.1 Test Block

See Figure 1.

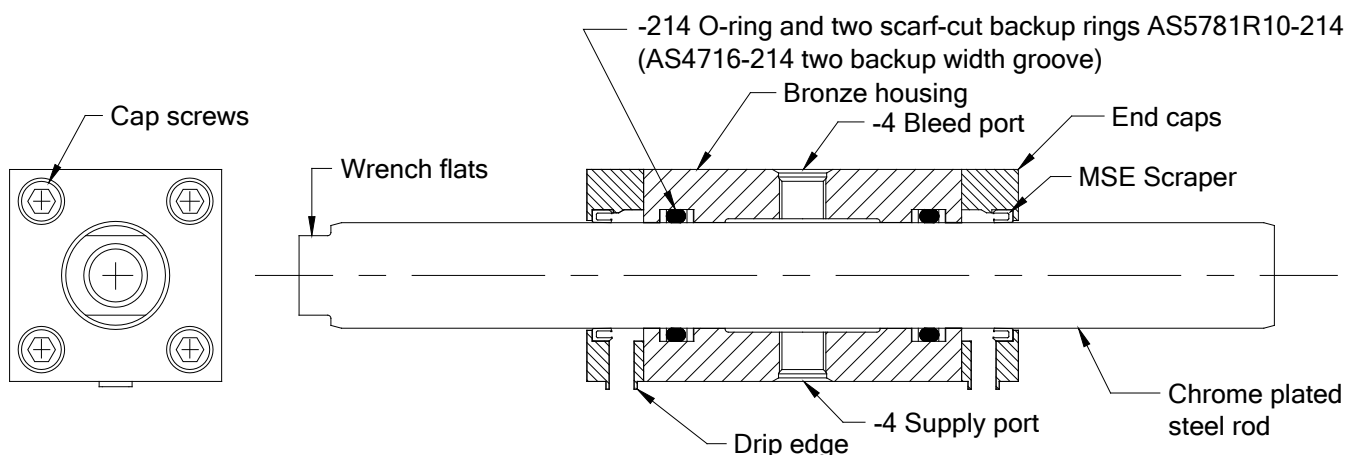


Figure 1 - Test block assembly and rod