



AEROSPACE RECOMMENDED PRACTICE

ARP6910™

Issued

2020-07

Rod End Locking Device Selection Criteria

RATIONALE

There are many different locking device standard methodologies imbedded in other standards and handbooks. This Aerospace Recommended Practice (ARP) is being created to help tell a design agent where to find them, while at the same time defining and characterizing their effectiveness. Restrictions on use have been clarified.

1. SCOPE

This ARP discusses common rod end locking devices with recommended applications and some of the advantages and disadvantages of specific configurations. An appendix is included with factors to be considered for selection of positive locking devices and a discussion of safetying devices for rod end assemblies.

1.1 Purpose

This ARP outlines recommended practice for selecting rod end locking devices.

1.2 Classification

Rod ends covered by this recommended practice shall be alloy or corrosion resistant (CRES) steel, internally or externally threaded, with a conical or elliptical head.

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.

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.

AS567 Safety Cable, Safety Wire, Key Washers, and Cotter Pins for Propulsion Systems, General Practices for Use of

AS3510 Cable, Safety, Kit, Corrosion and Heat Resistant Steel, UNS S32100

AS6039 Bearings, Ball, Rod End, Double Row, Self-Aligning

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Full document details: SAE ARP6910

For more information on this standard, visit
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Documents

Document Sharing Hub

AS8952	Bearings, Roller, Rod End, Antifriction Self-Aligning
AS14227	Lock, Rod End, Improved Strength, NAS Lug
AS81935	Bearings, Plain, Rod End, Self-Aligning, Self-Lubricating, General Specification for (-65 to +325 °F)
AS81935/3	Locking Devices (for Rod End Bearings)

2.1.2 AIA/NAS Publications

Available from Aerospace Industries Association, 1000 Wilson Boulevard, Suite 1700, Arlington, VA 22209-3928, Tel: 703-358-1000, www.aia-aerospace.org.

NAS513	Washer, Rod End, Locking
NAS509	Nut, Jam, Drilled and Undrilled
NAS559	Lock, Rod End (Key Type)
NAS1193	Locking Device, Positive Index
NAS1423	Nut, Plain, Hexagon, Drilled Jam, Thin
NASM14198	Lock, Rod End, Extra Strength, High Profile Lug
NASM20995	Wire, Safety or Lock
NASM33540	Safety Wiring, Safety Cabling, Cotter Pinning, General Practices for

2.1.3 U.S. Government Publications

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

MIL-HDBK-1599	Bearings, Control System Components and Associated Hardware Used in the Design and Construction of Aerospace Mechanical Systems and Subsystems.
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2.2 Definitions

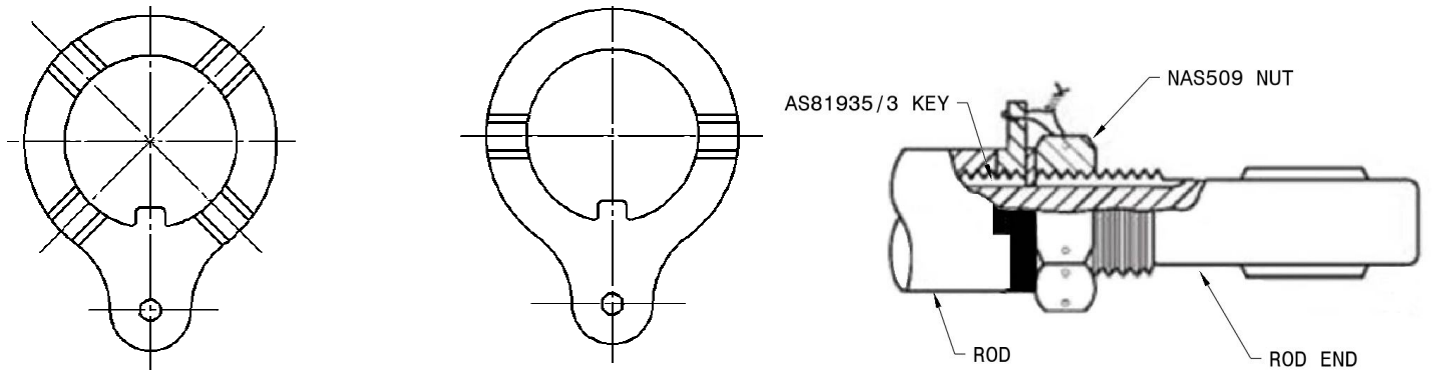
POSITIVE LOCKING OF A FASTENED JOINT: Positive locking of a fastened joint is a means by which the fastened components are prevented from loosening and becoming disengaged by a mechanical device. NASM1515 and NASM33588 allude to "positive locking device that requires shearing or rupture of materials before torsional loads would relieve the initial stresses of the assembly."

ROD END LOCKING DEVICE: A rod end locking device is a part that prevents the nut fastener from backing off the threaded rod.

3. GENERAL REQUIREMENTS

3.1 Standardized Types of Rod End Locking Devices with Description of Strengths and Weaknesses

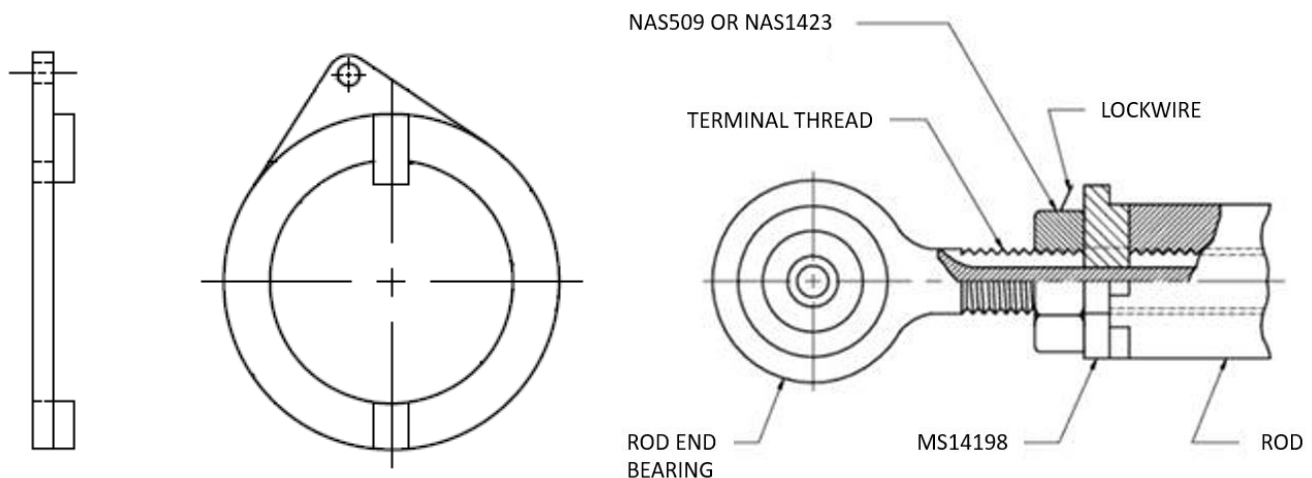
3.1.1 Recommended Rod End Locking Devices for New Design



TYPICAL INSTALLATION OF M81935/3 LOCK WASHER

Figure 1 - Lock washer (round protrusion), M81935/3

The M81935/3 lock washer in Figure 1 is associated with AS81935/3 and designed for use with AS81935/X rod ends. The AS81935/3 document provides rod end terminal definition for special rod ends to be used with M81935/3 locking devices. It resembles NAS513, but provides more locking features and greater strength. It is the preferred rod end locking device for rod ends having thread sizes up to 1/2 inch diameter.



TYPICAL INSTALLATION OF MS14198 LOCK WASHER

Figure 2 - Lock washer (square protrusion - high profile), MS14198

The MS14198 lock washer (Figure 2) is associated with NASM14198 and intended for use in new design. It provides greater key tab strength than existing NAS rod end locks. The high profile lug creates an obvious mismatch if improperly installed making inspection for proper engagement easier. NASM14198 may directly replace NAS513 washers for sizes -20 through -36. It is secured with NAS509 or NAS1423 jam nuts. For thread sizes 1/2 inch diameter and smaller, the tab may interfere with the slot of AS81935 rod ends.