



METRIC AEROSPACE STANDARD

MA2538™

Issued 1992-06
Reaffirmed 2026-01

Gasket, Metal C-Ring Seal
Nickel Alloy, Corrosion and Heat Resistant, Metric
Procurement Specification for

FSC 5330

RATIONALE

MA2538 has been reaffirmed to comply with the SAE Five-Year Review policy.

1. SCOPE:

1.1 Type:

This procurement specification covers aircraft quality metallic gaskets having a "C" shape cross-section to form a seal ring, made from a corrosion and heat resistant age hardenable nickel base alloy of the type identified under the Unified Numbering System as N07750.

1.2 Application:

Primarily for aerospace propulsion system applications for sealing fluids where operating temperatures excludes the use of elastomeric O-ring seals, and where the applications are relatively free from axial cyclic deflection, such as a bolted face type seal joint.

1.3 Safety - Hazardous Materials:

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards which may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

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 documents shall be the issue in effect on the date of the purchase order.

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Full document details: SAE MA2538

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<https://www.sae.org/standards/content/MA2538/>

Documents

Standard Sharing Hub

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

AMS 2645	Fluorescent Penetrant Inspection
AMS 2750	Pyrometry
AMS 5582	Alloy Tubing, Seamless, Corrosion and Heat Resistant, 72Ni-15.5Cr-0.95(Cb + Ta)-2.5Ti-0.70Al-7.0Fe
AMS 5598	Alloy Sheet, Strip, and Plate, Corrosion and Heat Resistant, 72Ni-15.5Cr-0.95(Cb + Ta)-2.5Ti-0.70Al-7.0Fe, Consumable Electrode or Vacuum Induction Melted, Solution Heat Treated
MA2536	Gasket, Metal C-Ring, Internal Pressure, UNS N07750, Silver Plate, Metric
MA2537	Groove Design, Metal C-Ring Gasket, Internal Pressure, Metric

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

ANSI/ASME B46.1 Surface Texture (Surface Roughness, Waviness, and Lay)

2.1.3 U.S. Government Publications: Available from Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

MIL-STD-2073-1 DoD Materiel, Procedures for Development and Application of Packaging Requirements

2.2 Definitions:

PRODUCTION INSPECTION LOT: Shall be all finished parts of the same part number, made from a single heat of alloy, heat treated at the same time to the same specified condition, produced as one continuous run, and submitted for vendor's inspection at the same time.

2.3 Unit Symbols:

°C	- degree Celsius
mm	- millimeter
h	- hour
kPa	- kilopascal
N/mm	- newton per millimeter
sp gr	- specific gravity

3. TECHNICAL REQUIREMENTS:

3.1 Material:

Shall be AMS 5582 seamless tubing or AMS 5598 sheet or strip.

3.2 Design:

Finished (completely manufactured) parts shall conform to the following requirements:

- 3.2.1 Dimensions: The dimensions of internal pressure metal C-rings gaskets procured to this specification shall conform to MA2536 or other applicable part drawing. Dimensions apply before plating.
- 3.2.2 Surface Texture: Surface texture of finished parts, prior to plating, shall conform to the requirements as specified on MA2536 or other applicable part drawing, determined in accordance with ANSI/ASME B46.1.
- 3.2.3 Geometric Tolerances: Part features shall be within the geometric tolerances specified on the part drawing.

3.3 Fabrication:

- 3.3.1 Blanks: Cylindrical blanks to the required diameter and length shall be formed by cross-cutting large diameter tubing, or made from rolled flat strip stock with ends butt welded using an inert gas, automated welding process.
- 3.3.2 Forming: Blanks as in 3.3.1 shall be formed by a process using a die cavity, by rolling, or both to produce the "C" cross-section ring.
- 3.3.3 Heat Treatment: Formed "C" cross-section rings as in 3.3.2 shall be solution and precipitation heat treated as follows:
 - 3.3.3.1 Heating Equipment: Furnaces may be any type ensuring uniform temperature throughout the parts being heated and shall be equipped with, and operated by, automatic temperature controllers and data recorders conforming to AMS 2750. The heating medium or atmosphere shall be controlled and shall cause no surface contamination.
 - 3.3.3.2 Solution Heat Treatment: Formed "C" cross-section rings shall be solution heat treated by heating in a suitable protective atmosphere to $980\text{ }^{\circ}\text{C} \pm 15\text{ }^{\circ}\text{C}$, holding at heat for a time commensurate with product thickness, and cooling at a rate equivalent to air cool or faster.
 - 3.3.3.3 Precipitation Heat Treatment: The solution treated rings as in 3.3.3.2 shall be precipitation heat treated by heating to $730\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$ in a controlled atmosphere, holding at heat for 8 hours ± 0.5 hours, cooling at a rate of $55\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$ per hour to $620\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$, holding at $620\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$ for 8 hours ± 0.5 hours, and cooling in air. Instead of the $55\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$ per hour cooling rate to $620\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$, parts may be furnace cooled at any rate provided the time at $620\text{ }^{\circ}\text{C} \pm 8\text{ }^{\circ}\text{C}$ is adjusted to give a total precipitation heat treatment time of 18 hours.

3.3.4 Cleaning: Parts, after heat treatment as in 3.3.3, shall be degreased and then immersed in one of the following solutions for the time and temperature shown:

- a. One volume of nitric acid (sp gr 1.42) and 9 volumes of water for not less than 20 minutes at room temperature.
- b. One volume of nitric acid (sp gr 1.42) and 4 volumes of water for 30 to 40 minutes at room temperature.
- c. One volume of nitric acid (sp gr 1.42) and 4 volumes of water for 10 to 15 minutes at 60 to 70 °C.

3.4 Identification Marking:

No marking of any kind is permitted on the part. The part number and lot number shall be marked on an adhesive label and applied to the inner package (see 5.1).

3.5 Plating:

Where required, the part shall be plated as specified by the part drawing.

3.6 Face Loading and Springback:

Parts shall be compressed to the minimum groove depth specified in MA2537 for the applicable ring size. The compression load shall not exceed that specified in Table 1. The part shall be held in the compressed state for not less than 5 minutes. On release of compression load, the part shall recover (springback) by an amount, exceeding the minimum groove depth, as specified in Table 1.

TABLE 1 - MA2536 C-Ring Gasket, Springback and Face Load

Free Height øC, mm	Wall Thickness T, mm	Springback Minimum, mm	Face Load, Maximum N/mm of Circumference
1.60	0.18	0.07	70
1.60	0.25	0.05	61
2.50	0.25	0.10	61
2.50	0.38	0.08	70
3.20	0.38	0.13	61