AEROSPACE MATERIAL SPECIFICATION

AMS2550	REV. E

Issued 1960-06
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Revised 1994-03
Reaffirmed 2014-07

Superseding AMS2550D

Treatment of Sheet Metal Parts Corrosion-Resistant Steel

RATIONALE

AMS2550E has been reaffirmed to comply with the SAE five year review policy.

This specification has been declared "NONCURRENT" by the Aerospace Materials Division, SAE, as of June 18, 1993. It is recommended, therefore, that this specification not be specified for new designs.

This cover sheet should be attached to the **"D"** revision of the subject specification.

"NONCURRENT" refers to those materials which have previously been widely used and which may be required on some existing designs in the future. The Aerospace Materials Division, however, does not recommend these as standard materials for future use in new designs. Each of these "NONCURRENT" specifications is available from SAE upon request.

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1. SCOPE: This specification covers the engineering requirements for a treatment to provide enhanced corrosion resistance to sheet metal parts, such as brackets, spacers, and washers, fabricated from martensitic corrosion-resistant steels, usually AMS 5504 or AMS 5508 and having hardness not higher than 40 HRC, or ferritic corrosion-resistant steels, usually AMS 5506. The treatment is not recommended for use on parts subject to impact in service.

2. APPLICABLE DOCUMENTS: The following publications form a part of this specification to the extent specified herein. The latest issue of Aerospace Material Specifications shall apply. The applicable issue of other documents shall be as specified in AMS 2350.

2.1 SAE Publications: Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096.

2.1.1 Aerospace Material Specifications:

AMS 2350 - Standards and Test Methods
AMS 2759/5 - Heat Treatment of Martensitic Corrosion Resistant Steel Parts

2.2 U.S. Government Publications: Available from Commanding Officer, Naval Publications and torms Center, 5801 Tabor Avenue, Philadelphia, PA 19120.

2.2.1 Military Standards:

MIL-STD-794 - Parts and Equipment, Procedures for Packaging and Packing of

3. TECHNICAL REQUIREMENTS:

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. The heating medium or atmosphere shall cause no surface hardening or softening.

3.2 Atmosphere: Shall be one of the following; specified dew points apply to the gas being exhausted from the furnace or retort work zone:

3.2.1 Hydrogen of not less than 99.94% purity and dew point not higher than -25°F (-32°C).

3.2.2 Argon of not less than 99.99% purity and dew point not higher than -35°F (-37°C).

3.2.3 Mixtures of argon and hydrogen in any proportions, the hydrogen purity being as specified in 3.2.1, the argon purity being as specified in 3.2.2, and the dew point of the mixture being not higher than -35°F (-37°C).

3.2.4 Vacuum of 5 - 20 microns of Hg; the specified partial pressure may be maintained by back-filling with an inert atmosphere as in 3.2.2 or 3.2.3 before the furnace temperature exceeds 1600°F (870°C).

3.2.5 Atmospheres other than those listed above and quenching media other than that listed in 3.4.1.1 may be used when authorized in writing by purchaser; such authorization will be granted only after demonstration, to the satisfaction of purchaser, that use of such atmospheres will produce parts which consistently meet all technical requirements of this specification.

3.3 Preparation: Forming operations, welding, and brazing at temperatures above the austenitizing temperature of the steel shall be completed prior to heat treatment of the parts when heat treatment is specified and prior to cleaning of all parts.

3.4 Procedure:

3.4.1 Heat Treatment: Parts requiring heat treatment *to* specified hardness or strength shall be heat treated in accordance with AMS 2759/5.

3.4.2 Cleaning: After hardening and tempering, parts shall be cleaned as follows:

3.4.2.1 Abrasive Blasting: All brazed parts, and all other parts containing recesses, pockets, overlaps, etc, in which acids could be trapped, shall be blasted with a substantially iron-free abrasive, preferably alumina or silica sand, applied either dry or as a slurry. Blasting shall be performed in such a manner as to avoid undesirable roughening of surfaces. Such parts shall receive no further treatment. Parts which have been wet blasted shall be thoroughly washed and dried. Abrasive blasting may be used on other parts as an aid to removal of heat treatment scale; the above restrictions on types of abrasive do not apply to such parts.

3.4.2.2 Descaling: All parts exposed to tempering temperatures higher than 800°F (425°C) during processing, except those on which only abrasive blasting is permitted by 3.4.2.1, shall be cleaned of embedded foreign contaminants, scale, and oxide by immersion in one or more aqueous acid solutions, usually inhibited hydrochloric, hydrofluoric, and nitric, singly or in combination, together with alkali cleaners and adequate rinses. No specific procedure will be required but the process used shall produce results equivalent to those produced by the following: Immerse in alkali cleaner at 180° - 200°F (80" - 95°C) for 1 - 2 min., rinse, immerse in inhibited hydrochloric acid at 150" - 170°F (65° - 75°C) for 8 - 12 min., rinse, immerse in a solution consisting of 20% by volume nitric acid and 1.5% by volume hydrofluoric acid at room temperature for 3 - 10 min., rinse, spray wash, immerse in trisodium phosphate solution containing wetting agent at room temperature for 2 - 3 min., rinse, hot rinse, and imnerse in water-displacing, corrosion-preventive oil.

3.4.2.3 Acid Cleaning: Parts which have not been heated to tempering temperatures over 800°F (425°C) during processing, including those heated to not over 800°F (425°C) during any processing following descaling, except parts on which only abrasive blasting is permitted, shall be immersed in an aqueous solution of 15 - 25% by volume nitric acid for 30 - 40 min. at 70" - 90°F (20° - 30°C) or for 10 - 15 min. at 140" - 160°F (60° - 70°C), unless other conditions of immersion are agreed upon by purchaser and vendor. Parts shall be rinsed thoroughly, dried, and coated with corrosion-preventive oil or immersed in water-displacing, corrosion-preventive oil.

3.4.3 Polishing: When specified, parts shall be mechanically polished using a suitable compound; the compound used for final polishing shall be free of iron and compounds of iron. After polishing, parts shall be cleaned of residual compound by suitable solvent or cleaning solution.

3.5 Prooerties:

3.5.1 Surfaces of finished parts shall be free of decarburization, carburization and nftriding.

3.5.2 Parts shall have microstructure of tempered martensite, free from massive areas of free ferrite. Standards for acceptance shall be as agreed upon by purchaser and vendor.

3.5.3 Hardness of parts shall be uniform and within the range specified on the drawing.

3.6 Quality: Parts shall have clean, bright or matte surfaces free from scale, pitting, and other surface imperfections detrimental to performance of the parts. Temper color characteristic of heating at temperatures lower than 800°F (425°C) is acceptable.