



AEROSPACE MATERIAL SPECIFICATION

AMS2759™/6**REV. D**

Issued 1987-04
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Superseding AMS2759/6C

Gaseous Nitriding of Steel Parts, Controlled by Ammonia Dissociation

RATIONALE

AMS2759/6D results from a Five-Year Review and update of this specification with changes to Ordering Information, Purpose (see 1.1), Application (see 1.2.2), Definitions (see 2.4), Measurement (see 3.2.2.1), Prior Heat Treatment (see 3.4.1), Stress Relieving (see 3.4.2), Cleaning (see 3.4.3), Masking (see 3.4.4), Visual Inspection (see 3.4.5), Nitriding Temperature Range (see 3.4.7.2), Cooling (see 3.4.8), Hardness at effective case depth (see Table 1), Case Hardness (see 3.6.2), Minimum case hardness requirements (see Table 2), Core Hardness (see 3.6.4), Case Microstructure (see 3.6.5), Acceptance Tests (see 4.2.1), Preproduction Tests (see 4.2.3), Process Control Specimens (see 4.3.1), Specimen Description (see 4.3.2), Inspection of Masking (see 4.3.5), Core Hardness (see 4.3.6), and Resampling and Retesting (see 4.5.1).

NOTICE

ORDERING INFORMATION: In addition to that listed in AMS2759, the purchaser shall supply the following information to the nitriding processor.

- AMS2759/6D
- Engineering drawing or detailed operation information
- Critical dimensions information as applicable (see 3.4.2)
- Class of white layer depth (thickness) (see 1.3)
- Areas to be nitrided, areas to be masked, areas to be optional (see 3.4.3)
- Areas to be ground after nitride, if applicable (see 3.4.3)
- Prior heat treatment information, including actual tempering/aging temperature and hardness
- Any prior stress relieving performed, including specifics and if stress relief is to be performed by the nitride processor (see 3.4.2)
- Total case depth (see 3.6.1.1)
- Effective case depth, if applicable (see 3.6.1.2)

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<https://www.sae.org/standards/content/AMS2759/6D>

Documents

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- Case (surface) hardness, if different than in Table 2 (see 3.6.2)
- White layer removal requirements, if applicable (see 3.5.2)
- Post-nitriding core hardness, if specified (see 3.6.4)
- If parts are to be used for testing (see 4.3.1)
- Grind stock allowances to be removed in subsequent polishing/grinding (see 3.5.2.1)

1. SCOPE

1.1 Purpose

This document specifies the procedure and requirements for gas nitriding steel parts by the use of raw or dissociated ammonia.

1.2 Application

1.2.1 The nitriding process described herein has been used typically for producing a wear-resistant and fatigue-resistant surface on steel parts, but usage is not limited to such applications. This process only applies to gas nitriding. Other processes, such as salt bath nitriding per AMS2753, ion nitriding per AMS2759/8, automated gas nitriding controlled by nitriding potential per AMS2759/10, automated gas nitrocarburizing by potential per AMS2759/12, and gas nitrocarburizing per AMS2757, are not included.

1.2.2 AMS 2759/10 automatic gas nitriding meets the requirements of this specification and is an acceptable alternate.

1.3 Classification

Processes covered by this specification are classified as follows:

Class 1: Two-stage nitriding with maximum applied white layer of 0.0005 inch (12.7 µm).

Class 2: One-stage nitriding with a maximum applied white layer of 0.001 inch (25.4 µm).

If no class is specified, either Class 1 or Class 2 may be provided.

2. APPLICABLE DOCUMENTS

In addition to those listed in AMS2759, the issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The processor may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

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.

AMS2418	Plating, Copper
AMS2429	Plating, Bronze, Nitriding Stop-off, 90Cu - 10Sn
AMS2750	Pyrometry
AMS2753	Liquid Salt Bath Ferritic Nitrocarburizing Non-Cyanide Bath

AMS2757	Gaseous Nitrocarburizing
AMS2759	Heat Treatment of Steel Parts, General Requirements
ARP1820	Chord Method of Evaluating Surface Microstructural Characteristics
AS7766	Terms Used in Aerospace Metals Specifications

2.2 ASM International Publications

Available from ASM International, 9639 Kinsman Road, Materials Park, OH 44073-002, Tel: 440-671-3800, www.asminternational.org.

ASM Metals Handbook

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 E140 Standard Hardness Conversion Tables for Metals

2.4 Definitions

Terms used in AMS2759/6 are defined in AMS2759, AS7766, and as follows:

2.4.1 WHITE LAYER

The white layer, also known as the compound zone, is the external, non-etching portion of nitrided layer composed of compact epsilon or gamma prime nitrides or a combination thereof.

3. TECHNICAL REQUIREMENTS

3.1 Pyrometry

Shall be in accordance with AMS2750.

3.2 Furnace Equipment

Shall be in accordance with AMS2759. Nitriding furnaces shall be Class 3 or better.

3.2.1 Nitriding Environment

Equipment shall be in place for introducing ammonia gas into the furnace at a controlled rate. A separate system for ammonia dissociation is recommended.

3.2.2 Atmosphere Control

Equipment shall be in place to measure and maintain the dissociation of the process atmosphere going through the retort or furnace throughout the nitriding cycle.

3.2.2.1 Measurement

Equipment used for measuring the gas dissociation shall be at the exit of the retort or furnace. Water absorption techniques, such as the use of burettes, are acceptable. Infrared analysis or in-situ probes shall be checked annually in accordance with manufacturers' recommendations.