



AEROSPACE MATERIAL SPECIFICATION

AMS2759™/13**REV. A**Issued 2018-06
Revised 2025-04

Superseding AMS2759/13

(R) Gaseous Nitrocarburizing

RATIONALE

AMS2759/13A results from a Five-Year Review and update of this specification resulting in a complete revision.

NOTICE

ORDERING INFORMATION: In addition to that listed in AMS2759, the purchaser shall supply the following information to the heat-treating processor:

- AMS2759/13A
- Complete requirements for the part and processing if the engineering drawing is not provided
- Part material designation
- Heat-treat condition of parts to be processed
- Areas to be nitrocarburized, areas to be masked, and areas that are optional (see 3.2.4)
- Required compound zone thickness (see 3.5.5)
- Surface hardness, if required (see 3.5.1)
- Case hardness (see 3.5.2)
- Core hardness, if required (see 3.5.3)
- Case depth, if required (see 3.5.4)
- If parts are to be used for testing (see 4.2)

1. SCOPE

1.1 Purpose

This specification covers the engineering requirements for producing a continuous compound zone (white layer) on parts by means of a gaseous, low-temperature, carbon-enriched nitriding process.

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For more information on this standard, visit
<https://www.sae.org/standards/content/AMS2759/13A/>

Documents

Standard, visit Sharing Hub

1.1.1 If the compound zone (white layer) is intended to be controlled automatically, AMS2759/12 should be used.

1.2 Application

The nitrocarburizing process described herein is used typically for enhancement of wear resistance and fatigue strength, as well as corrosion resistance in ferrous alloys, but usage is not limited to such applications.

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 that may be involved in such use. It is the 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.

1.4 Authority

The cognizant engineering organization may impose requirements or approve allowances that supersede the requirements in this AMS.

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.

AMS2408	Plating, Tin
AMS2418	Plating, Copper
AMS2429	Plating, Bronze, Nitriding Stop-off, 90Cu - 10Sn
AMS2750	Pyrometry
AMS2759	Heat Treatment of Steel Parts, General Requirements
AMS2759/1	Heat Treatment of Carbon and Low-Alloy Steel Parts, Minimum Tensile Strength Below 220 ksi (1517 MPa)
AMS2759/2	Heat Treatment of Low-Alloy Steel Parts, Minimum Tensile Strength 220 ksi (1517 MPa) and Higher
AMS2759/9	Hydrogen Embrittlement Relief (Baking) of Steel Parts
AMS2759/11	Stress Relief of Steel Parts
AMS2759/12	Automated Gaseous Nitrocarburizing, Controlled by Potentials
ARP1820	Chord Method of Evaluating Surface Microstructural Characteristics
AS7766	Terms Used in Aerospace Metals Specifications
SAE J423	Methods of Measuring Case Depth
SAE J864	Surface Hardness Testing with Files

2.2 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 E18 Rockwell Hardness of Metallic Materials

ASTM E140 Standard Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness

ASTM E384 Microindentation Hardness of Materials

ASTM E407 Microetching Metals and Alloys

2.3 Definitions

Terms used in AMS2759/13 are defined in AMS2759, AS7766, and as follows:

2.3.1 COMPOUND ZONE

External, non-etching portion of nitrided layer, composed of compact epsilon or gamma prime nitrides or a combination thereof.

2.3.2 CORE HARDNESS

The hardness below the nitride case, as determined by a Knoop or a Vickers hardness traverse, where the average measured hardness does not change. A minimum of three hardness readings taken at a minimum distance of two times the case depth usually corresponds to this hardness. Core hardness readings can also be taken in accordance with ASTM E18.

3. TECHNICAL REQUIREMENTS

3.1 Processing Equipment

Parts to be nitrocarburized shall be processed in an integral quench, sealed retort, fluidized bed, or atmosphere-type furnace conforming to AMS2759. Nitrocarburizing furnaces shall be Class 3 or better.

3.1.1 Furnace Controls

Shall be in accordance with AMS2750.

3.1.2 Thermocouples

When load thermocouples are required, they shall be sheath-protected to prevent deterioration due to furnace atmospheres.

3.2 Pre-Nitrocarburizing Operations

3.2.1 Heat Treatment

When heat treatment is specified for parts to be nitrocarburized, it shall be performed as specified prior to nitrocarburization. If a heat-treatment document is not called out, then it shall be performed in accordance with AMS2759 and to AMS2759/1 or AMS2759/2, as applicable.

3.2.2 Surface Condition

Parts shall be dry, clean, and free of scale, oxide, entrapped sand, mold or core sand material, metal particles, oil, or grease prior to the nitrocarburizing process. Cleaning shall be in accordance with AMS2759.