



AEROSPACE MATERIAL SPECIFICATION

AMS2444™**REV. B**

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Revised 2025-03

Superseding AMS2444A

Coating, Titanium Nitride
Physical Vapor Deposition

RATIONALE

AMS2444B results from a Five-Year Review and update of this specification with changes to Ordering Information, Authority (see 1.3), Thickness (see 3.2.2.1), Microstructure (see 3.2.4), Coverage (see 3.3.2.1 and 3.3.2.2), Nodules (see 3.3.3), and Note (see 8.4).

NOTICE

ORDERING INFORMATION: The following information shall be provided to the processor by the cognizant engineering organization.

1. Purchase order shall specify not less than the following:

- AMS2444B
 - Basis metal to be coated
 - Quantity of parts to be coated
 - Class of coating thickness
2. Parts should generally be supplied for coating in the finish machined condition, with all thermal processing, forming, surface finishing, and fluorescent penetrant inspection completed prior to coating. Parts supplied for coating should be free of dirt, oil, grease, stains, and other foreign materials requiring additional precleaning operations by the coating processor.
3. The parts manufacturer should ensure that surfaces of metal parts supplied to the processor are free from blemishes, pits, tool marks, and other irregularities that will affect the quality of the finished parts (see 3.3.2.1).

1. SCOPE

1.1 Form

This specification covers the requirements for the application and properties of a titanium nitride coating on metal parts applied by physical vapor deposition (PVD).

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Full document details: SAE AMS2444B

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Documents

Standard, visit Sharing Hub

1.2 Application

This coating has been used typically for enhancing the wear resistance of parts, but usage is not limited to such applications. The process is limited to line-of-sight applications that are not damaged by process temperatures.

1.3 Authority

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

1.4 Classification

1.4.1 Coatings covered by this specification are classified as follows:

Class 1 - 0.00005 to 0.00015 inch (1.27 to 3.81 μm) thick

Class 2 - 0.00010 to 0.00024 inch (2.54 to 6.10 μm) thick

Class 3 - 0.00025 to 0.00050 inch (6.35 to 12.70 μm) thick

1.4.2 Unless a specific class is specified, Class 1 shall be supplied.

2. APPLICABLE DOCUMENTS

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 supplier 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.

AS7766 Terms Used in Aerospace Metals Specifications

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 B487 Measurement of Metal and Oxide Coating Thickness by Microscopical Examination of Cross Section

ASTM B499 Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals

ASTM B568 Measurement of Coating Thicknesses by X-ray Spectrometry

ASTM E92 Vickers Hardness and Knoop Hardness of Metallic Materials

ASTM E376 Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Testing Methods

ASTM E384 Microindentation Hardness of Materials

2.3 NIST Publications

Available from NIST, 100 Bureau Drive, Stop 1070, Gaithersburg, MD 20899-1070, Tel: 301-975-6478, www.nist.gov.

Crystallographic Standards Data

2.4 Definitions

Terms used in AMS are defined in AS7766.

3. TECHNICAL REQUIREMENTS

3.1 Processing Requirements

3.1.1 General

3.1.1.1 Documentation

Processing shall be performed in accordance with written procedures or work instructions covering all control factors (see 4.4.3).

3.1.1.2 Equipment

Coating in accordance with this specification requires physical vapor deposition equipment using cathodic arc, electron beam, magnetron, or other ion generation suitable for TiN coating. Coating chamber cleaning and maintenance shall be performed according to documented procedures and schedules.

3.1.1.3 Consumable Materials

Composition and quality of nitrogen and inert gas(es) as well as titanium source material shall conform to the supplier's specifications, subject to approval in accordance with 4.4.2.

3.1.1.4 Surface Finish

Cleaning and coating processes shall be established and controlled to prevent any unacceptable increase in surface roughness of the parts (see 8.3).

3.1.1.5 Undesignated Coating Areas

Coating may be present on areas that are not designated to require coating. When present, coating on these areas shall meet the same property requirements as the coating on designated areas, except for thickness (see 3.2.2.3).

3.1.2 Procedure

3.1.2.1 Precleaning

Parts to be coated shall be free of dirt, oil, stains, and any other foreign materials. Cleaning methods and parameters are subject to approval as in 4.4.

3.1.2.2 Bond Layer Coating

When approved in accordance with 4.4, a layer of titanium may be applied prior to TiN coating to aid in bonding.

3.1.2.3 Application of Coating

3.1.2.3.1 Parts and material for test sampling shall be positioned in the chamber so that surfaces to be coated are fully exposed to the coating vapor.

3.1.2.3.2 Exposure times and vapor concentration shall be established to meet coating thickness requirements.

3.1.2.3.3 During the coating process, part temperature shall be maintained within a range that does not damage the parts.