



AEROSPACE MATERIAL SPECIFICATION	AMS2644™	REV. H
	Issued 1996-08 Revised 2020-07	
Superseding AMS2644G		
Inspection Material, Penetrant		

RATIONALE

AMS2644H results from a limited scope ballot to revise water tolerance (3.3.8.5) and fluorescent background measurement (4.4.11.4).

1. SCOPE

1.1 Purpose

This specification establishes the classification, technical requirements, tests, and test procedures for the qualification, approval, and quality verification of all materials used in the liquid penetrant methods of inspection with the exception of those excluded in the application section.

1.1.1 The qualifying agency for direct U.S. Military procurement is the Materials and Manufacturing Directorate of the Air Force Research Laboratory AFRL/RXSA, 2179 12th Street, Room 122, Wright-Patterson Air Force Base, OH, 45433-7718, (937) 656-9151. AFRL/RXSA will maintain the qualified products list for military procurement of penetrant materials, replacing QPL-25135, and will audit and approve other testing facilities to perform all or portions of the tests contained herein.

1.2 Application

This specification is applicable to penetrant materials used in manufacturing and maintenance operations. It is intended to be used by prime contractors in establishing an approved products list (QPL) for use by themselves and their suppliers. It does not cover such special application products as liquid oxygen compatible, high or low temperatures, thixotropic, reverse fluorescent, and dye precipitation penetrant systems.

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.

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<https://www.sae.org/standards/content/AMS2644H/>

1.4 Classification

Penetrant systems covered by this specification are to be classified as follows:

1.4.1 Penetrants shall be of the following types, methods, and sensitivity levels:

Type 1	Fluorescent Dye
Type 2	Visible Dye
Method A	Water washable
Method A(W)	Water washable – water containing (≥20% water by volume)
Method B	Post emulsifiable, lipophilic
Method C	Solvent removable
Method D	Post emulsifiable, hydrophilic
Sensitivity Level 1/2	Ultra low
Sensitivity Level 1	Low
Sensitivity Level 2	Medium
Sensitivity Level 3	High
Sensitivity Level 4	Ultra high

1.4.1.1 Sensitivity level 1/2 applies to Type 1, Method A and Method A(W) penetrants only. There is no sensitivity level classification for Type 2 penetrant systems.

1.4.2 Developers shall be of the following forms:

Form a	Dry powder
Form b	Water soluble
Form c	Water suspendible
Form d	Nonaqueous Type 1 Fluorescent (solvent based)
Form e	Nonaqueous Type 2 Visible Dye (solvent based)
Form f	Special application

1.4.3 Solvent Removers shall be of the following classes:

Class 1	Halogenated
Class 2	Nonhalogenated
Class 3	Special application

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.

AMS4035	Aluminum Alloy, Sheet and Plate, 4.4Cu - 1.5Mg - 0.60Mn (2024-0), Annealed; or when specified, "As Fabricated" (2024-F)
AMS4045	Aluminum Alloy Sheet and Plate, 5.6Zn - 2.5Mg - 1.6Cu - 0.23Cr 7075: (-T6 Sheet, -T65 Plate), Solution and Precipitation Heat Treated
AMS4377	Magnesium Alloy, Sheet and Plate, 3.0Al - 1.0Zn - 0.20Mn (AZ31B-H24), Cold Rolled, Partially Annealed

AMS4916	Titanium Alloy Sheet, Strip, and Plate, 8Al - 1Mo - 1V, Duplex Annealed
AMS5391	Nickel Alloy, Corrosion and Heat-Resistant, Investment Castings, 73Ni - 0.14C - 13Cr - 4.5Mo - 2.3Cb (Nb) - 0.75Ti - 6.0 Al - 0.010B - 0.10Zr, Vacuum Cast, As-Cast
AMS6350	Steel Sheet, Strip, and Plate, 0.95Cr - 0.20Mo (0.28 - 0.33C) (SAE 4130)
ARP1917	Clarification of 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 D93	Flash Point by Pensky-Martens Closed Cup Tester
ASTM D95	Water in Petroleum Products and Bituminous Materials by Distillation
ASTM D445	Kinematic Viscosity of Transparent and Opaque Liquids (the Calculation of Dynamic Viscosity)
ASTM D3828	Flash Point by Small Scale Closed Cup Tester
ASTM D4057	Manual Sampling of Petroleum and Petroleum Products
ASTM D4177	Automatic Sampling of Petroleum and Petroleum Products
ASTM E1135	Comparing the Brightness of Fluorescent Penetrants
ASTM E1316	Terminology for Nondestructive Examinations
ASTM E1417/E1417M	Liquid Penetrant Inspection
ASTM E2275	Evaluating Water-Miscible Metalworking Fluid Bioresistance and Antimicrobial Pesticide Performance
ASTM E3022	Measurement of Emission Characteristics and Requirements for LED UV-A Lamps Used in Fluorescent Penetrant and Magnetic Particle Testing
ASTM G41	Determining Cracking Susceptibility of Metals Exposed Under Stress to a Hot Salt Environment

2.3 OSHA (Occupational Safety and Health Organization) Publications

Available from U.S. Department of Labor/OSHA, 200 Constitution Avenue, Washington, DC 20210, Tel: 800-321-6742, www.osha.gov/pls/publications/pubindex.list.

49 CFR 173	Department of Transportation Hazardous Material Regulations (Orders for the above publication should cite "49CFR 100 to 177")
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2.4 Orders of Precedence

In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.