AEROSPACE MATERIAL SPECIFICATION

AMS3004	REV. H

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Stabilized 2014-03

Superseding AMS3004G

Alcohol, Methyl

RATIONALE

AMS3004H has been designated Stabilized because the material and this specification are not likely to incur technical changes.

STABILIZED NOTICE

AMS3004H has been declared "STABILIZED" by AMS Committee D. This document will no longer be updated and may no longer represent standard industry practice. The last technical update of this document occurred in March 2001.

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1. SCOPE:

1.1 Form:

This specification covers methyl alcohol in the form of a liquid.

1.2 Application:

This product has been used typically as an additive to prevent freezing of water used in aircraft power plant injection systems, 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 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.

1.3.1 Precautions: THIS MATERIAL IS A DEADLY POISON IF TAKEN INTERNALLY. It cannot be made nonpoisonous. Avoid prolonged breathing of vapor. It is unlawful to use this fluid in any article of food, beverage, or medicinal or toilet preparation for human use.

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 canceled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 ASTM Publications:

Available from ASTM, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

ASTM D 86	Distillation of Petroleum Products
ASTM D 1298	Density, Relative Density (Specific Gravity), or API Gravity of Crude Petroleum and Liquid Petroleum Products by Hydrometer Method
ASTM D 4057	Manual Sampling of Petroleum and Petroleum Products

3. TECHNICAL REQUIREMENTS:

3.1 Composition:

Shall be as shown in Table 1; aldehydes plus ketones shall be determined as acetaldehyde in accordance with 4.5.1 or other method acceptable to purchaser.

TABLE 1 - Composition

	Percent Min	Percent Max
Methyl Alcohol	99.0	--
Aldehydes + Ketones (as acetaldehyde) (4.5.1)	--	0.05
Sulfur and Sulfur Compounds (as S)	--	0.03
Acetone	--	0.015
Acidity (as acetic acid)	--	0.01
Esters (as methyl acetate)	--	1.0

3.1.1 Nonvolatile residue shall not exceed 5.0 mg per 100 milliliters.

3.2 Properties:

Alcohol shall conform to the following requirements:

3.2.1 Specific Gravity: Shall be 0.7958 to 0.7986 at 15/4 °C (59/39 °F), determined in accordance with ASTM D 1298.

3.2.2 Distillation Range: Alcohol shall be completely distilled between 64 and 67 °C (147 and 153 °F), determined in accordance with ASTM D 86.

3.2.3 Corrosion: There shall be no evidence of pitting or black stain on freshly-polished 3.5-inch (89-mm) diameter hemispherical copper dish when 100 mL of the alcohol is evaporated to dryness by heating on a steam bath; a slight amount of brown stain is acceptable.

3.2.4 Miscibility: Alcohol shall be miscible with distilled water in all proportions.

3.2.5 Odor: Shall be characteristic; there shall be no residual odor after evaporation from filter paper saturated with the alcohol.

3.3 Quality:

Alcohol, as received by purchaser, shall be clear and free from suspended matter or other contaminants detrimental to usage of the alcohol. Alcohol shall be colorless unless otherwise required by government rules and regulations.

4. QUALITY ASSURANCE PROVISIONS:

4.1 Responsibility for Inspection:

The vendor of alcohol shall supply all samples for vendor's tests and shall be responsible for the performance of all required tests. Purchaser reserves the right to sample and to perform any confirmatory testing deemed necessary to ensure that the alcohol conforms to the applicable requirements of this specification.

4.2 Classification of Tests:

All technical requirements are acceptance tests and preproduction tests and shall be performed prior to or on the initial shipment of alcohol to a purchaser, on each lot, when a change in ingredients and/or processing requires reapproval as in 4.4.2, and when purchaser deems confirmatory testing to be required.

4.3 Sampling and Testing:

Shall be in accordance with ASTM D 4057. A lot shall be all alcohol from the same batches of raw materials processed in one continuous run and presented for vendor's inspection at one time. A lot shall not exceed 5000 gallons (18,927 L).

4.4 Approval:

4.4.1 Sample alcohol shall be approved by purchaser before alcohol for production use is supplied, unless such approval be waived by purchaser. Results of tests on production alcohol shall be essentially equivalent to those on the approved sample.

4.4.2 Vendor shall use ingredients, manufacturing procedures, processes, and methods of inspection on production alcohol which are essentially the same as those used on the approved sample. If necessary to make any change in ingredients, in type of equipment for processing, or in manufacturing procedures, vendor shall submit for reapproval a statement of the proposed changes in ingredients and/or processing and, when requested, sample alcohol. Production alcohol made by the revised procedure shall not be shipped prior to receipt of reapproval.

4.5 Test Methods:

4.5.1 Aldehydes Plus Ketones: The following reagent, apparatus, and procedure are recommended to determine the percentage of aldehydes plus ketones as acetaldehyde:

4.5.1.1 Reagent: 0.5N hydroxylamine hydrochloride ($NH_20H \cdot HCl$) containing no free hydrochloric acid. Dissolve 35 grams of CP $NH_20H \cdot HCl$ in water, add sufficient 0.5N sodium hydroxide to neutralize any free hydrochloric acid, and dilute to one liter. The amount of sodium hydroxide needed may be calculated from the amount needed to render a sample of the hydroxylamine hydrochloride neutral to bromophenol blue. The pH of the finished solution should be 3.045 to 3.055.

4.5.1.2 Apparatus: An electrical pH meter with standard glass electrode and standard calomel electrode. The meter should be standardized against a standard buffer having a pH in or near the working range.

4.5.1.3 Procedure: Add 1 mL of 0.5N $NH_20H \cdot HCl$ to 10 mL of distilled water in a 50-mL beaker. Adjust the pH meter to the temperature of the resulting solution and determine the pH. It should be within the range 3.65 to 3.80. Add 10 mL of the alcohol to be tested and mix thoroughly. The temperature of the solution will rise to approximately 35 °C (95 °F) and, with continued stirring, drop to approximately 30 °C (86 °F) in the five minute period which should be allowed for reaction. At the end of five minutes, adjust the pH meter to the temperature of the solution and determine the pH. The percentage of aldehydes plus ketones is determined from a curve of change in pH versus concentration. The curve may be plotted from the data shown in Table 2.

TABLE 2 - Data for Aldehyde Plus Ketone Determination

Aldehydes + Ketones (as Acetaldehyde) %	Decrease in pH
0.0000	0.00
0.0125	0.63
0.0250	0.89
0.0375	1.04
0.0500	1.14

4.6 Reports:

The vendor of alcohol shall furnish with each shipment a report showing the composition and the quantitative results of tests on the lot of alcohol from which the order was filled and stating that the alcohol conforms to the other technical requirements. This report shall include the purchase order number, lot number, AMS3004H, formula number, and quantity.