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MILITARY SPECIFICATION

SPRAY EQUIPMENT, AIRCRAFT WINDSHIELD, ANTI-ICING

This specification has been approved by the Department of the Air Force and by the Navy Bureau of Aeronautics.

1. SCOPE

1.1 This specification covers one type of spray equipment for the elimination of ice formation on aircraft windows.

2. APPLICABLE SPECIFICATIONS, STANDARDS, DRAWINGS, AND PUBLICATIONS

2.1 The following specifications, standard, drawing, and publication, of the issue in effect on date of invitation for bids, form a part of this specification to the extent specified herein:

SPECIFICATIONS

Military

MIL-A-140	Adhesive, Water-Resistant, Waterproof Barrier-Materia
MIL-A-6091	Alcohol; Ethyl, Specially Denatured, Aircraft
MIL-D-5028	Drawings and Data Lists; Preparation of (For Engines, Accessories, and Other Auxiliary Equipment)
MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification for
MIL-F-5566	Fluid; Anti-Icing (Isopropyl Alcohol)
MIL-M-7911	Marking, Identification of Aeronautical Equipment, Assemblies, and Parts
MIL-P-116	Preservation, methods of
MIL-P-7105	Pipe Threads, Taper, Aeronautical National Form, Symbol ANPT
JAN-P-105	Packaging and Packing for Overseas Shipment - Boxes, Wood, Cleated, Plywood
JAN-P-106	Packaging and Packing for Overseas Shipment - Boxes; Wood, Nailed
JAN-P-108	Packaging and Packing for Overseas Shipment - Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior
JAN-P-125	Packaging and Packing for Overseas Shipment - Barrier-Materials, Waterproof, Flexible

STANDARDS

MIL-STD-129 Marking of Shipments

DRAWINGS

U. S. Air Force

42B3581 Cap and Adapter Assembly - Tank Filler

PUBLICATIONS

Air Force-Navy Aeronautical Bulletin

No. 143 Specifications and Standards; Use of

(Copies of specifications, standards, and drawings required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

3. REQUIREMENTS

3.1 Components.- The spray equipment shall consist of a spray tube, fluid pump, fluid tank, and a control valve.

3.2 Materials.-

3.2.1 Protective treatment.- When materials are used in the construction of the spray equipment that are subject to deterioration when exposed to climatic and environmental conditions likely to occur during service usage, they shall be protected against such deterioration in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating that will crack, chip, or scale with age or extremes of climatic and environmental conditions shall be avoided.

3.2.2 Selection of materials.- Specifications and standards for all materials, parts, and Government certification and approval of processes and equipment, which are not specifically designated herein and which are necessary for the execution of this specification, shall be selected in accordance with ANA Bulletin No. 143, except as provided in the following paragraph.

3.2.2.1 Standard parts.- Standard parts (MS, AN, or JAN) shall be used wherever they are suitable for the purpose, and shall be identified on the drawing by their part numbers. Commercial utility parts such as screws, bolts, nuts, cotter pins, etc, may be used, provided they possess suitable properties and are replaceable by the standard parts (MS, AN, or JAN) without alteration, and provided the corresponding standard part numbers are referenced in the parts list and, if practicable, on the contractor's drawings. In the event there is no suitable corresponding standard part in effect on date of invitation for bids, commercial parts may be used provided they conform to all requirements of this specification.

3.2.3 The materials entering into the construction of the spray tube shall be of a nonmagnetic character due to the proximity to the compass.

3.3 Design and construction.- The spray equipment shall be so designed and constructed that no parts will work loose in service. It shall be built to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service.

3.3.1 The spray equipment shall be so constructed that adjustments and repairs can be easily made by the personnel of operating units and overhaul bases.

3.3.2 The spray tube shall be made of 1/4-inch aluminum alloy or copper tubing with 0.0280-drill holes spaced approximately 1 inch apart or as may be required to evenly distribute the fluid over the window and as specified in paragraph 3.3.3.2.

3.3.3 The fluid pump shall be an electrically driven, pressure-automatic, cut-out pump.

3.3.3.1 The pump shall be capable of delivering the required amount of fluid to the windshield from a suitable position in the airplane.

3.3.3.2 The pump shall be capable of supplying approximately 2 quarts of fluid per square foot of 2/3 of the window area per hour.

3.3.4 The fluid tank, when used only for windshield anti-icing fluid, shall be made of aluminum alloy and shall be provided with a filler cap in accordance with Drawing 42B3581, and a vent through the skin of the airplane.

3.3.4.1 The capacity of the fluid tank shall be determined by the following formula:

$$\text{Capacity of tank, gal} = \frac{0.70AX}{12}$$

Where,
A = Total area of windshield, square feet
X = Airplane range in hours with full military load

3.3.4.2 The fluid tank shall be capable of withstanding a pressure of 4 psi.

3.3.4.3 A stand pipe shall be installed to insure the proper reserve capacity for the windshield spray, when the tank is to provide fluid for the three systems as specified in paragraph 3.3.7.

3.3.4.4 The note, "Fill with . . . . . Alcohol, Specification No. . . . . ", and the capacity of the tank shall be durably and legibly marked on the tank near the filler neck in letters 1/2 inch high.

3.3.5 Control valve.- The control valve shall control the rate of flow of the fluid and pump from 10 percent through 100 percent of fluid required as specified in paragraph 3.3.3.2.

3.3.6 Pipe threads.- Pipe threads shall be in accordance with Specification MIL-P-7105.

3.3.7 It is permissible to use fluid conforming to Specification MIL-A-6091 for windshield anti-icing when the propeller and carburetor anti-icing fluid also conforms to Specification MIL-A-6091. In such a case, it is permissible to use one tank for all three systems.

3.3.8 Isoprophyl alcohol, conforming to Specification MIL-F-5566, may be used when the propeller and carburetor anti-icing system does not specify alcohol conforming to Specification MIL-A-6091.

3.3.9 The system shall function satisfactorily at all temperatures from +49° to -54°C and at all altitudes from sea level to 25,000 feet, but shall not be damaged when exposed to a temperature of +71°C for 48 hours.

3.4 Interchangeability.- All parts having the same manufacturer's part number shall be directly and completely interchangeable with each other with respect to installation and performance. Changes in manufacturer's part numbers shall be governed by the drawing number requirements of Specification MIL-D-5028.

3.5 Identification of product.-

3.5.1 Nameplate.- A nameplate, permanently and legibly filled in with the following information, shall be securely attached to the pump and tank. The information marked in the spaces provided shall be in accordance with Specification MIL-M-7911.

PUMP, SPRAY EQUIPMENT, AIRCRAFT WINDSHIELD, ANTI-ICING, or
TANK, SPRAY EQUIPMENT, AIRCRAFT WINDSHIELD, ANTI-ICING, whichever applies
Specification MIL-S-6625A(ASG)
Stock No. (USAF or Navy, as applicable)
Manufacturer's Part No.
Manufacturer's Serial No.
Contract or Order No.
Manufacturer's name or trade-mark
US Property

3.6 Workmanship. -

3.6.1 General.- The spray equipment, including all parts and accessories, shall be fabricated and finished in a thoroughly workmanlike manner. Particular attention shall be given to freedom from blemishes, defects, burrs, and sharp edges; thoroughness of welding, painting, and riveting; marking of parts and assemblies; alinement of parts and tightness of assembly screws and bolts; etc.

3.6.2 Cleaning.- The spray equipment shall be thoroughly cleaned and metal chips and other foreign material removed during and after final assembly.

4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 General.- All the tests required herein for the testing of spray equipment are classified as Inspection tests, for which necessary sampling techniques and methods of testing are specified in this section.

4.2 Individual tests.- Each unit of the spray equipment shall be subjected to the following tests.

4.2.1 Examination of product.- Each unit shall be inspected to determine compliance with the requirements specified herein with respect to material, workmanship, and marking.

4.2.1.1 Flow pattern of the anti-icing fluid on the window as specified in paragraph 3.3.2.

4.2.1.2 Capacity of the anti-icing fluid pump.

4.2.1.3 Functioning of the control valve as specified in paragraph 3.3.5.

4.3 Sampling tests.- One complete spray equipment shall be selected at random from each lot of 100 or fraction thereof on the order and subjected to the following tests. A lot shall consist of spray equipment manufactured under essentially the same conditions and submitted for inspection at substantially the same time.

4.3.1 Low temperature test in accordance with procedure I of Specification MIL-E-5272, except a temperature of -54°C shall be used for this test. During this test the equipment shall perform as specified in paragraph 3.3.3.2.

4.3.2 High temperature test in accordance with procedure I of Specification MIL-E-5272, except that the spray equipment shall be subjected to this test for 48 hours. During this test the equipment shall perform as specified in paragraph 3.3.3.2.

4.3.3 Altitude test in accordance with procedure I of Specification MIL-E-5272, except the spray equipment shall be subjected to an altitude of 25,000 feet. During this test the spray equipment shall perform as specified in paragraph 3.3.3.2.

4.4 Rejection and retest.- When tests are specified on a quantity of spray equipment that are selected as representative of a certain lot, and one or more of this number fails to meet the specified tests, additional spray equipment of the lot represented shall be tested immediately to determine the extent of failure. Individual performance tests shall not be interrupted, unless the defect is of such a nature that it will seriously affect the performance or safe use of the spray equipment.

5. PREPARATION FOR DELIVERY

5.1 Application.- The requirements specified in Section 5 apply only to direct purchases by or direct shipments to the Government.

5.2 Preservation.- The windshield spray pump and control valve shall be preserved in accordance with method II of Specification MIL-P-116.

5.3 Packaging.- The windshield spray equipment units shall be securely packed in a fiberboard container conforming to Specification JAN-P-108 and shall be sealed as specified in the Appendix to Specification JAN-P-108.

5.4 Packing.-

5.4.1 Domestic packing.- Unless otherwise specified, the containers shall be overpacked in substantial commercial exterior containers constructed to insure acceptance by common or other carrier, for safe transportation, at the lowest rate, to the point of delivery. Except as specified herein, the exterior container shall conform to the requirements of the Consolidated Freight Classification Rules in effect at the time of shipment, except that fiberboard, when used, shall have a minimum Mullen test of 275 pounds. Exterior containers shall be able to withstand storage, rehandling, and reshipping without the necessity of repacking.

5.4.2 Overseas packing.- Unless otherwise specified, the containers shall be packed in nailed wood or cleated plywood boxes conforming to Specification JAN-P-105 or JAN-P-106. Plywood, if used, shall be type B, condition I. Nailed wood or cleated plywood boxes shall be furnished with a sealed case liner conforming to Specification JAN-P-125. The seams of the case liner shall be sealed with adhesive conforming to Specification MIL-A-140.

5.5 Marking of shipments.- Interior packages and exterior shipping containers shall be marked in accordance with Standard MIL-STD-129. The nomenclature shall be as follows: Spray Equipment, Aircraft Windshield, Anti-Icing, Specification MIL-S-6625A(ASG), *Manufacturer's Part No.

*Applicable data to be entered by the contractor.

6. NOTES

6.1 Intended use.- The windshield anti-icing spray equipment covered by this specification is intended for use on aircraft either as an independent unit or with a windshield wiper.

6.1.1 Spray systems using MIL-F-5566 and MIL-S-6091 de-icing fluids should be used only on aircraft having windshields and transparent areas of materials that are not attacked by these de-icing fluids. The preceding de-icing fluids should not be used on windshields composed of methyl methacrylate.

Custodians:
Navy - Bureau of Aeronautics
Air Force