

NATIONAL AEROSPACE STANDARD

AEROSPACE INDUSTRIES ASSOCIATION OF AMERICA, INC.. 1725 DE SALES STREET, N. W., WASHINGTON, D. C. 20036

VALVE, SHUTOFF, ELECTRIC MOTOR OPERATED,
FUEL AND OIL SYSTEM, GENERAL SPECIFICATION FOR

1. SCOPE

1.1 This specification establishes the requirements for electric-motor-operated shutoff valves for use in aircraft fuel and oil systems, and is intended to be used in conjunction with a detail specification.

1.2 CLASSIFICATION

1.2.1 Fuel Valves Motor-operated fuel-shutoff valves shall be of one of the following types:

Type A-1	28 V.D.C., motor powered, no thermal relief
Type A-2	28 V.D.C., motor powered, internal thermal relief
Type A-3	28 V.D.C., motor powered, external thermal relief
Type A-4	115 V.A.C., 400-cycle, single-phase-motor powered, no thermal relief
Type A-5	115 V.A.C., 400-cycle, single-phase-motor powered, internal thermal relief
Type A-6	115 V.A.C., 400-cycle, single-phase-motor powered, external thermal relief

1.2.2 Oil Valves Motor-operated oil-shutoff valves shall be one of the following types:

Type B-1	28 V.D.C., motor powered (Petroleum Oil Service Reciprocating Engine)
Type B-2	115 V.A.C., 400-cycle, single-phase-motor powered (Petroleum Oil Service Reciprocating Engine)
Type C-1	28 V.D.C., motor powered (Synthetic Oil Service Turbine Engine)
Type C-2	115 V.A.C., 400-cycle, single-phase-motor powered (Synthetic Oil Service Turbine Engine)

1.2.3 Fireproof Valves To designate a fireproof valve of any of the above types, an "F" suffix shall be added to the type number, i.e., Type A-1-F.

2. APPLICABLE DOCUMENTS

2.1 The following documents, of the latest issue form a part of this specification to the extent specified herein.

SpecificationsMilitary

-USE IT-S-735	Standard Test Fluids, Hydrocarbon and Iso-Octane
MIL-F-5572	Gasoline, Aviation, Grades 80/87, 91/96, 100/130, 115/145
MIL-J-5624	Jet Fuel, Grades JP-3, JP-4, and JP-5
MIL-L-6082	Lubricating Oil, Aircraft Reciprocating (Piston) Engine
MIL-R-7362	Rubber Sheet, Solid, Molded, and Extruded Shapes, Synthetic Oil Resistant
-USE MIL-V-26025	Valve, Shutoff, Oil, Electric Motor Operated, Reciprocating Engine
MIL-L-7808	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base
MIL-V-8608	Valves, Fuel Shutoff, Electric Motor Operated, 28-Volt DC
MIL-A-8625	Anodic Coating, for Aluminum and Aluminum Alloys
MIL-F-18240	Fastener, Externally Threaded, 250°F, Self Locking, Element for
MIL-V-25025	Valve, Shutoff, Turbine Engine, Synthetic Oil, Electric Motor Operated
MIL-N-25027	Nut, Self-Locking, 250°F, 550°F and 800°F

Federal

QQ-C-320	- Chromium Plating, Electro Deposited
QQ-P-416	- Plating, Cadmium, Electro Deposited

StandardsMilitary

MIL-STD-1523	AGE CONTROL FOR SYNTHETIC RUBBER PARTS
MIL-STD-129	Marking for Shipment and Storage
MS15981	Fasteners, Externally Threaded, Self Locking, Design and Usage, Limitations for
MS20995	Wire, Lock
MS29513	Packing, O-Ring, Hydrocarbon Fuel Resistant
-USE MIL-STD-889	Metals, Definition of Dissimilar
MS33588	Nuts and Plate Nuts, Self Locking, Functional Limitations of

2.2 Other Publications The following documents form a part of this specification. Unless otherwise indicated, the latest issue shall apply:Air Force-Navy Aeronautical BulletinAmerican Society for Testing MaterialsASTM D 1655-59T ASTM Designation, Aviation Turbine Fuels
(Copies of ASTM publications may be obtained by application to the American Society for Testing Materials, 1916 Race St., Philadelphia 3, Pennsylvania.)

3. REQUIREMENTS

3.1 MATERIALS All metals used in the construction of the valves shall be of a corrosion-resistant type or suitably protected to resist corrosion. The use of dissimilar metals shall be avoided whenever practicable, or they shall be used in accordance with MIL-STD-889.3.2 O-RINGS When used, O-Rings shall conform to the following standards or specifications for the service indicated:

- (a) Fuel, hydrocarbon: Standard MS29513;
 (b) Lubricating oil, petroleum base, reciprocating engine: seals compatible with Specification MIL-L-6082 oil;
 (c) Lubricating oil, synthetic, turbine engine: seals made from rubber per Specification MIL-R-7362

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PROCUREMENT
SPECIFICATION

TITLE

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SPECIFICATION

NAS 1543

SHEET 1 OF 3

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THIS DRAWING SUPERSEDES ALL ANTECEDENT STANDARD DRAWINGS FOR THE SAME PRODUCT AND SHALL BECOME EFFECTIVE FOR VENDOR COMPLIANCE ON THE DATE OF APPROVAL SHOWN NOT LATER THAN 6 MONTHS AFTER THE LATEST DATE OF APPROVAL SHOWN.

3.3 NONMETALLIC MATERIALS All nonmetallic materials used in the valve shall be sufficiently resistant to aromatic and iso-octane fluids, lubricating oils, and preservative compounds to assure satisfactory operation as herein defined.

3.4 PROTECTIVE FINISH

3.4.1 Anodizing All aluminum-alloy parts shall be anodized in accordance with Specification MIL-A-8625, or adequately treated in some other acceptable manner for corrosion prevention.

3.4.2 Protective Treatment Steel parts, other than corrosion-resisting steel, not in moving contact shall be cadmium plated in accordance with Specification QQ-P-416, type II. Where galling of cadmium plating would cause malfunctioning, wearing surfaces shall be chromium plated in accordance with Specification QQ-C-320, or adequately treated in some other acceptable manner for corrosion prevention. Brass, bronze, and copper-alloy parts shall be cadmium plated or adequately treated in some other acceptable manner for corrosion prevention. Stainless-steel parts shall be passivated.

3.5 PERFORMANCE When subjected to the applicable tests, the valves shall satisfy the performance requirements specified in Section 4.

3.6 VOLTS The voltage specified shall be either 28 or 115 volts, as applicable.

3.6.1 Operating Voltage and Frequency Valves intended for use in 115-volt, 400-cycle, single-phase electrical systems shall operate satisfactorily at any applied frequency between 360 and 440 cycles per second and at any applied line-to-line terminal voltage between 105 and 125 volts. Valves for use in 28-volt direct current systems shall operate satisfactorily over a range of voltage from 18 to 30 volts.

3.6.2 Operating Current Full-load operating current shall not exceed 5 amperes at 28 volts, or 1.5 amperes at 115 volts, as applicable.

3.6.3 Interrupted Operation When electrical power is applied to the motor, the valve shall move directly to the position indicated on the control switch, regardless of the original position of the valve. In the event of a power failure, the valve shall remain in the last energized position.

3.6.4 Bonding A low-resistance electrical path between motor frame, inlet port, outlet port, and mounting bosses is vital in order to reduce radio-frequency interference and the possibility of explosion due to fault currents. A bonding lug for external grounding shall be provided. Electrical conductivity of joints shall be as required by the detail specification.

3.7 DRAINS Drain openings, 1/8 inch minimum diameter, or equivalent, shall be provided to prevent any leakage past the shaft seal from entering the actuator case for any valve mounting position.

3.8 LOCKING OF PARTS All threaded parts shall be securely locked by cotter pins or some other approved method. Self-locking nuts shall conform to Specification MIL-N-25027 and shall be used in accordance with Standard MS33588. Self-locking inserts shall be a replaceable type which do not require enlargement of the original mounting hole. The internal self-locking feature shall comply with the self-locking torque requirements of Specification MIL-N-25027. Self-locking screws shall conform to Specification MIL-F-18240 and shall be used in accordance with Standard MS15981. Safety wire shall conform to Standard MS20995 and shall have a minimum diameter of 0.032 inch. The use of staking or lock washers shall be prohibited.

3.9 MARKINGS The valve shall be marked to provide visual indication of the physical position of the valve (i.e., open or closed). In addition, the valve shall be permanently and legibly marked with the voltage, frequency, valve size and NAS1543 Type X. All type-A valves shall be rubber stamped with the assembly date (quarter and year) per MIL-STD-1523. When required by the detail specification, markings shall also be resistant to all fluids with which the valve may come in contact, as outlined in the detail specification.

3.10 POSITION INDICATION Valves shall be provided with an external position indicator. When a manual override is required, it may be used as the position indicator provided there are suitable markings to indicate the open and closed positions. Position indicators and manual override levers shall be designed so that external icing cannot prevent actuation of the valve.

3.11 REQUIREMENTS APPLICABLE TO TYPE A VALVES ONLY

3.11.1 Design The valves shall permit the shutoff of fuel in either direction. They shall withstand the pressures that may be encountered in fueling services as specified herein. The valves shall be suitable for use with fuels per Specifications TT-S-735 MIL-F-5572, MIL-J-5624 and ASTM-D1655-59T with aromatics of 0 to 30 percent.

3.11.1.1 Thermal Relief For valves which require provision for internal thermal relief of fuel pressure, the unit shall relieve in either direction to the low-pressure side of the valve at a differential pressure required by the detail specification. Valves which require provision for external thermal relief of fuel pressure shall relieve at an internal pressure as required by the detail specification. Means shall be provided for thermal relief of air or trapped fluid in all other sections of the valve not protected by the above.

3.11.1.2 Operating Pressure The actuator shall have sufficient torque to operate against a shutoff pressure as required by the detail specification and open against pressure as determined by the thermal-relief setting.

3.11.1.3 Lubrication The valve and actuator shall operate satisfactorily without the use of lubricants, for any moving part, other than fuel in the valve. Valves and actuators requiring lubrication of any moving part shall be designed and constructed to provide adequate protection to ensure that the lubricant will be retained at all times during normal operation and during all of the tests specified herein, and care shall be taken to prevent the use of an excess of lubricant which could adversely affect low-temperature operation.

3.11.1.4 Indicator Circuit Provision shall be made for operation of electrical-indicator circuits as required by the detail specification. The circuit connections shall be specified on the manufacturer's drawings.

3.12 REQUIREMENTS APPLICABLE TO TYPE B VALVES ONLY

3.12.1 Design and Construction The oil-shutoff valve shall be designed for use in engine oil systems which use oil conforming to Specification MIL-L-6082. The oil-shutoff valve shall be constructed to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service use. The valve shall satisfactorily perform with flow in either direction. The valve shall operate from the "closed" to the "open" position or vice versa, and it shall remain in that position without application of electric power.

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