

FED. SUPPLY CLASS

4720

1. SCOPE

- 1.1 Scope. This specification covers flexible and semi-rigid laminated rubber impregnated fabric air ducts for cabin heating, ventilating, defrosting, and deicing; provides flexible means of connecting rigid ducts; and allows slight misalignment in the installation of rigid ducts.

2. APPLICABLE DOCUMENTS

- 2.1 The following documents, of the issue in effect on date of invitation for bids, form a part of this specification.

Federal Specifications

PPP-B-576 Boxes, Wood-Cleated Panelboard
PPP-B-1055 Barrier Material, Waterproof, Flexible

Military Specifications

MIL-Y-1140 Yarn, Cord, Sleeving, Cloth and Tape-Glass
MIL-PRF-5606 Hydraulic Fluid, Petroleum Base, Aircraft and Ordnance
A-A-52506 Clamps, Hose

Military Standards

MIL-STD-129 Marking For Shipment and Storage
MIL-STD-130 Identification Marking Of U.S. Military Property
MIL-STD-970 Standards and Specifications, Order of Preference for the Selection of
MIL-STD-810 Environmental Test Methods
AN737 Clamp, Hose

Copies of Federal and Military Standards and Specifications can be obtained from the Department of Defense Single Stock Point (DODSSP) <http://dodssp.daps.dla.mil>.

- 2.2 Publication. The following document forms a part of this specification, unless otherwise indicated, the issue in effect on the date of invitation for bids shall apply.

American Society for Quality (ASQ)

ANSI/ASQ Z1.4 Sampling Procedures and Tables for Inspection by Attributes

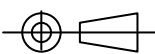
Copies can be obtained from the American Society for Quality, 600 North Plankinton Ave., Milwaukee, WI 53203.
www.asq.org

ASTM International

ASTM D1974/D1974M Standard Practice for Methods of Closing, Sealing, and Reinforcing Fiberboard Boxes
ASTM D5118/D5118M Standard Practice for Fabrication of Fiberboard Shipping Boxes
ASTM D5486/D5486M Standard Specification for Pressure-Sensitive Tape for Packaging, Box Closure, and Sealing

Copies can be obtained from ASTM International, 100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA, 19428-2959. www.astm.org

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THIRD ANGLE PROJECTION 	CUSTODIAN NATIONAL AEROSPACE STANDARDS COMMITTEE	REVISION 3
PROCUREMENT SPECIFICATION NONE	TITLE DUCT, AIR, FLEXIBLE AND SEMI-RIGID	CLASSIFICATION SPECIFICATION NAS1369 SHEET 1 OF 11

Aerospace Industries Association of America (AIA/NAS)

NAS1370 thru NAS1379 Duct, Air, Flexible, Helix Wire Supported
NAS1924 Clamp, Hose

Copies can be obtained from the Aerospace Industries Association, 1000 Wilson Blvd., Suite 1700, Arlington, VA 22209. www.aia-aerospace.org

SAE International

AS8796 Hose, Air Duct, Flexible, Aircraft
AS5131 Tube End, Beaded, Design Standard
AMS-C-9084 Cloth, Glass, Finished, for Resin Laminates

Copies can be obtained from SAE International, Inc, 400 Commonwealth Drive, Warrendale, PA 15096. www.sae.org

ASME

POWER TEST CODE 19.5.4 Supplement on Instruments and Apparatus Part 5, Chapter 4 Flow Measurement By Means Of Standardized Nozzles and Orifice Plates

Copies can be obtained from ASME, Three Park Ave., New York, NY 10016-5990. www.asme.org

3. REQUIREMENTS

- 3.1 Preproduction. The flexible air duct hose furnished under this specification shall be a product which has been inspected and has passed the preproduction tests specified herein.
- 3.2 Selection of specifications and standards. Specifications and standards for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-970.
- 3.3 Materials. All materials shall be of uniformly good quality, free of foreign materials and consistent in properties. All ducts shall be free of foreign materials, cracks, blisters, delaminations, loose seams and other obvious defects.
- 3.4 Design and construction
- 3.4.1 Classifications
- 3.4.1.1 Type A warm air ducts. Type A warm air ducts, with temperature ranging from -65 °F to +275 °F, shall be fabricated from a suitable glass fabric impregnated with a synthetic elastomer of the chloroprene type.
- 3.4.1.2 Type B hot air ducts. Type B hot air ducts, with temperature ranging from -75 °F to +500 °F, shall be fabricated from a suitable glass fabric impregnated with a synthetic elastomer of the silicone type.
- 3.4.2 Forms. Ducts shall be fabricated as specified in the procurement drawing in one of the following forms:
- Form A – Straight sleeves
- Form B – Circumferential convolutions, not reinforced
- Form C – Helical or circumferentially convoluted, reinforced with wire helix or wire rings
- Form D – Special shapes and sections as required

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3.4.3 Construction

- A. Single ply ducts shall be fabricated from Type IV (Style 128) yarn glass fabric per on AMS-C-9084.
- B. Multiple ply ducts shall be fabricated so that the inner ply is Type IV (Style 128) yarn glass fabric per AMS-C-9084. Outer plies may be Type IV above or Type VII (Style 164) yarn per AMS-C-9084.
- C. Impregnation shall be such that each wrap of the fabric is coated and the coating shall cover all interstices.
- D. Ducts may be coated with a resin to provide additional rigidity, except over the attachment area, when specified on the procurement drawing.
- E. Wire-reinforcement shall be inside the duct in single ply construction, and between the first and second layers of fabric from the outside for multiple ply ducts, unless otherwise specified. Reinforcing wires shall be securely bonded to the fabric over its entire length and the wire end shall be treated so as to prevent piercing or otherwise injuring the fabric. Wire reinforced ducts shall be externally reinforced with fiber glass cordage per MIL-Y-1140 impregnated with the same elastomer stock used in the duct. This winding shall follow the external convolution troughs formed by the wire reinforcement and shall be securely bonded over its entire length to the duct.

3.4.4 Tolerances

- A. Inside diameter tolerance shall be $\pm .03$ inches unless otherwise specified, in area of sealing surfaces, any ridges or valleys shall not exceed .005 inches.
- B. Length tolerances shall be as follows: for convoluted ducts plus or minus three percent of the nominal; for wire reinforced ducts $\pm .125$ inches or ± 1 percent of the nominal length, whichever is greater, unless otherwise specified.
- C. Other tolerances shall be as specified on the procurement drawing.

3.4.5 Serviceability. The ducts shall be designed and constructed to resist abrasion, exposure to solvents, and leakage; and shall withstand continuous flexing consistent with the performance requirements specified herein.

3.5 Environmental. The ducts shall be capable of withstanding the environmental conditions stated herein without impairment of the performance specified in 3.6.

3.5.1 Humidity. Relative humidity of 100 percent, with condensation in the form of either water or frost.

3.5.2 Altitude. Air pressure representing an altitude of 10,000 feet operating and 80,000 feet nonoperating.

3.5.3 Fungus. Fungus growth as found in tropical climates.

3.5.4 Salt Spray. Salt sea atmosphere as encountered in coastal areas.

3.5.5 Rain. Rainfall as encountered in any locale.

3.5.6 Sand and dust. Sand and dust particles as encountered in desert areas.

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3.6 Performance

3.6.1 Gage pressure

3.6.1.1 Positive gage pressure. Ducts shall be capable of operating at the following internal gage pressures, and shall be capable of withstanding twice the following positive gage pressures without failure: (gage pressure for Grades D, E, and F ducts Ø6 inches and over shall be limited to a restrained system only.)

Grade A: 4 PSIG	Grade D: 35 PSIG
Grade B: 12 PSIG	Grade E: 50 PSIG
Grade C: 20 PSIG	Grade F: 100 PSIG

3.6.1.2 Negative gage pressure. Helical wire reinforced ducts shall be capable of withstanding, in addition to the internal gage pressure, the following external gage pressure without failure:

Grade A: 4.5 PSIG	Grade D: 10 PSIG
Grade B: 4.5 PSIG	Grade E: 12 PSIG
Grade C: 6 PSIG	Grade F: 12 PSIG

3.6.2 Leakage. Ducts shall be capable of preventing leakage in excess of the following amounts expressed as SCFM (Standard Cubic Feet per Minute) per inch of inside diameter per foot of nominal length:

Class A: .005 SCFM	(Grades A, B, and C only)
Class B: .01 SCFM	(All Grades)
Class C: .05 SCFM	(Grades D, E, and F only)

3.6.3 Flexibility

- A. All fully convoluted and wire reinforced sections, Grades A, B, and C, shall be capable of being bent to an inside bend radius equal to the nominal inside diameter of the duct. Grades D, E, and F shall be capable of being bent to an inside radius equal to three times the nominal inside diameter of the duct. When so bent, the reduction in cross-sectional area of all grades shall not exceed 10 percent of the nominal cross-sectional area of the ducts.
- B. All ducts with soft ends shall be capable of being installed over, and making a snug fit, on tubing with an outside diameter equal to the duct nominal inside diameter, and beaded according to AS5131.

3.6.4 Low temperature. Ducts shall be capable of withstanding pressurization and vibration as described in Paragraph 4.5.4 for 6 hours at the minimum type temperature without deterioration. After completion of this test, ducts shall be capable of passing the proof pressure test of Paragraph 4.5.6, and leakage shall not exceed that of the class specified when tested in accordance with Paragraph 4.5.2.

3.6.5 High temperature. Ducts shall be capable of withstanding pressurization and vibration as described in Paragraph 4.5.5 for 72 hours at the maximum type temperature without deterioration. After completion of this test, ducts shall be capable of passing the proof pressure test of Paragraph 4.5.6, and leakage shall not exceed that of the class specified when tested in accordance with Paragraph 4.5.2.

3.6.6 Flame resistance. No specimen of the finished duct material, when tested as specified in Paragraph 4.5.16, shall burn more than 30 seconds after the source of the flame is removed. The average char length shall not exceed 3 inches.

3.6.7 Plastic crazing. Plasticizer from the material shall not craze sheet plastic material when tested in accordance with Paragraph 4.5.17.

3.6.8 Toxicity and odor. The duct impregnating materials shall not give off any toxic, irritating, or unpleasant odors when exposed to temperature throughout the operating temperature range when tested in accordance with 4.5.7.

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