

NATIONAL AIRCRAFT STANDARDS COMMITTEE

AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC., 610 SHOREHAM BUILDING, WASHINGTON 5, D. C.

SPECIFICATION FOR TUBE FITTINGS MOLDED

FROM THERMOSETTING PLASTIC MATERIALS

This specification covers the material for and fabrication of plastic tube fittings. All parts of this specification shall apply unless otherwise specified.

CONTENTS

- A. Applicable Specifications.
- B. Types and Classes.
- C. Material and Workmanship.
- D. General Requirements.
- E. Detail Requirements on Materials.
- F. Sampling, Inspection and Tests on Materials.
- G. Detail Requirements on Molded Fittings.
- H. Inspection and Tests on Fittings.
- I. Packaging, Packing and Marking for Shipment.
- J. Notes.

A. APPLICABLE SPECIFICATIONS

A-1. Specifications: The specifications listed below form a part of this specifications. Unless modified in the order, or contract, the issues shown shall apply.

A-1a. American Society for Testing Materials:

- D 256-43T Method of Test for Impact Resistance of Plastics and Electrical Insulating Materials. (Tentative)
- D 494-41 Method of Test for Acetone Extraction of Phenolic Molded or Laminated Products.
- D 543-43 Method of Test for Resistance of Plastics to Chemical Reagents.
- D 570-42 Method of Test for Water Absorption of Plastics.
- D 618-41T Method of Conditioning of Plastics and Electrical Insulating Materials for Testing. (Tentative)
- D 647-42T Specifications for Molds for Test Specimens of Molding Materials Used for Electrical Insulation. (Tentative)
- D 648-41T Method of Test for Distortion under Heat of Molder Electrical Insulating Materials. (Tentative)
- D 650-42T Method of Test for Flexural Strength of Electrical Insulating Materials. (Tentative)
- D 651-42T Method of Test for Tensile Strength of Molded Electrical Insulating materials. (Tentative)

TITLE

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THERMOSETTING PLASTIC MATERIALS

CLASSIFICATION SPECIFICATION

NAS 278

SHEET 1 of 1

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

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D 675-43T Descriptive Nomenclature of Objects made from
Plastics. (Tentative)

D 695-44T Method of Test for Compressive Strength
of Plastics. (Tentative)

A-1B. Federal Specifications:

L-P-406 Plastics, Organic; General Specifications
(Methods of Tests)

B. TYPES AND CLASSES

B-1. Material shall be furnished in the following types
and classes:

B-1a. Type MTS-M: Mechanical properties dominant.

Class MTS-M-1 Cotton Flock filler. Impact over 0.65
foot pounds per inch of notch.

Class MTS-M-2 Rag filler. Impact over 2.40 foot pounds
per inch of notch.

Class MTS-M-3 Cord filler. Impact over 6.40 foot pounds
per inch of notch.

B-1b. Type MTS-H: Heat Resisting properties dominant.

Class MTS-H-1 Mineral filler.

B-2. The materials shall be in the form of molded shapes as
specified in the order or contract.

B-3. The materials shall be furnished in the colors speci-
fied or permitted in the order or contract.

C. MATERIAL AND WORKMANSHIP

C-1. Material: The material shall consist of a suitable
organic or inorganic filler impregnated with a thermosetting
condensation product or resin as a binding agent, and processed
to a stage to meet the requirements of this specification.

C-1a. Substitution: If the manufacturer changes his material
or process in any manner, after class approval has been granted,
the ultimate purchaser and/or approving agency shall immediately
be informed, and new test specimens shall be submitted if required
by the ultimate purchaser and/or approving agency.

① C-2. Workmanship: The workmanship shall be first class in
every respect and shall meet every requirement of this specifi-
cation.

D. GENERAL REQUIREMENTS.

D-1. Class Approval: To supply materials under this specifi-
cation, an approval of materials as to class must have been obtained.
The procuring agency reserves the right to reject any bids for
materials which have not been prequalified and found satisfactory.
Application for such approval shall be made in duplicate to the ap-
proving agency. Specimens for test shall be submitted in accordance
with the provisions of F-1a and in accordance with instructions from
the approving agency.

TITLE	CLASSIFICATION SPECIFICATION
SPECIFICATION FOR TUBE FITTINGS MOLDED FROM THERMOSETTING PLASTIC MATERIALS	NAS 278 SHEET 2 of 16

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APPROVAL DATE 2-16-44 REVISION 1 10-1-47

NATIONAL AIRCRAFT STANDARDS COMMITTEE

AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC., 610 SHOREHAM BUILDING, WASHINGTON 3, D. C.

D-1a. Withdrawal of Approval: The procuring agency and/or approving agency reserves the right to require subsequent qualification tests at any time. Any approval granted under this specification shall be withdrawn upon failure under such retest.

D-1b. Notice of Prior Approval: An intermediate purchaser buying for resale shall notify the manufacturer to that effect so that the manufacturer shall have the opportunity to submit to such purchaser, in lieu of specimens, evidence showing previous approval of the material directly by the ultimate purchaser concerned in such resale.

D-2. Material Properties: These shall be as specified in Section E herein; in terms of standard test specimens and conditioning for each of the several classes of material involved, and as determined by the complete class approval tests outlined in F-4.

D-3. Uniformity: All specimens of corresponding thickness of a given class of any one manufacturer shall be uniform in texture, finish, and in the specified properties.

D-3a. Class Identification: The value obtained in the class identification of tests (F-4K) shall be reproduced at any time within the following limits:

D-3a(1). Inorganic Residue. (Ash Content). As listed below:

<u>Inorganic Residue</u> (per cent of initial weight)	<u>Tolerance</u> ($\pm$ per cent of initial weight)
Less than 3	1
3 to less than 25	3
more than 25	5

D-3a(2). Hardness (Rockwell M. Scale): ± 5 points

D-3a(3). Specific Gravity: ± 5 Per cent.

D-3a(4). Water Absorption: ± 1 per cent.

D-3a(5). Acetone Extraction: ± 1 per cent of the original weight of the material, except that the maximum values permitted shall not exceed the following:

- ① 6 per cent for classes in which mechanical properties are predominant
5 per cent for all other classes.

D-4. Freedom from Defects: The molded parts shall be reasonably free from small defects such as scratches, dents, heat marks, etc.

D-4a. Warpage, etc.: The molded parts shall be free from warpage, cracks, chipped edges or surfaces, blisters, and uneven surfaces.

D-4b. Fins, etc.: The molded parts shall be free from fins, burrs or projecting ridges at the dividing line of the mold, and from an unsightly finish at these points caused by chipping, filing, or grinding of the ridges without subsequent buffing or polishing.

D-4c. Porosity: The molded parts shall be uniformly dense throughout their structure, and free from porosity.

TITLE

SPECIFICATION FOR TUBE FITTINGS MOLDED
FROM THERMOSETTING PLASTIC MATERIALS

CLASSIFICATION
SPECIFICATION

NAS 278

SHEET 3 of 3

Documents

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AIRCRAFT INDUSTRIES ASSOCIATION OF AMERICA, INC., 610 SHOREHAM BUILDING, WASHINGTON 5, D. C.

D-5. Chemical Resistance: The molded parts shall be resistant to such chemicals as are specified in the contract or order when tested as specified in the contract or order.

D-6. Dimensions and Tolerances: Sizes and weights shall be within the limits specified in the order or contract. If no limits are specified, common commercial tolerances shall apply.

D-7. Machineability: The molded parts shall be suitable for fabrication by standard machining operations, except threading, and shall not crack, split, craze or distort as a result of such machining operations.

D-8. Accuracy of Molding:

D-8a. Dimensions: All molded articles or parts, after proper curing in the molds, shall be within the dimensional tolerances on the applicable drawings. The accuracy of molding shall be such, in all cases, as to assure a high degree of interchangeability for all parts furnished under one contract, or made to the same drawing.

D-8b. Inserts, etc.: All inserts, holes, lugs, etc., shall be correctly spaced as shown on the approved drawings. The inserts shall not be battered or damaged in any way, nor be coated with material in such manner that would result in a poor mechanical fit.

D-8c. Threads: All threaded sections, whether threaded metal inserts or threads molded into the molding material itself, shall have smooth, clean threads, free from nicks, tears, or other damage.

D-9. Cure:

D-9a. Mold Cured: All molded materials shall be finish cured in the molds under normal molding pressures and temperatures.

D-9b. Degree of Cure: The degree of cure of molded materials shall be substantially equivalent to that attained to the "approved sample" subjected to the complete type and class approval tests; the degree of cure shall be as determined by acetone extraction and the hot mineral oil tests. (F-4j(1) and F-4j(2)).

D-9b(1). Acetone Extraction: The values obtained in the acetone extraction test on molded materials shall not differ from the values recorded for the approved specimens by more than one per cent. (F-4j(2)).

① D-9b(2). Hot Oil Bath: Molded materials subjected to the hot oil bath shall show no greater changes in color and surface finish, nor instances of greater warping, shrinking, splitting, softening or blistering, nor greater changes from the original dimensions than were recorded for the approved samples. (F-4J(2)).

E. DETAIL REQUIREMENTS ON TEST SPECIMENS

E-1. The average value obtained from measurements of a set of test specimens for any specific property required in Table I, when tested as required in F-4, after being conditioned as required in Table I and F-3, shall be not less than the minimum, nor more than the maximum (whichever is applicable) specified in Table I. If the value obtained for any single specimen deviates from the average of the values obtained from all the other specimens for any specific property, by more than 5 times the average deviation of the values

TITLE	CLASSIFICATION SPECIFICATION
SPECIFICATION FOR TUBE FITTINGS MOLDED FROM THERMOSETTING PLASTIC MATERIALS	 NAS 278 Documents SHEET 4 of 16

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NATIONAL AIRCRAFT STANDARDS COMMITTEE

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obtained for each of the other specimens, this value shall be disregarded in determining the average value obtained. If more than one specimen is eliminated in determining the average value for any specific property, new specimens for that property shall be furnished by the manufacturer.

F. SAMPLING, INSPECTION AND TESTS ON MOLDED MATERIALS

F-1. Test Specimens:

F-1a. Number of Specimens: The minimum quantity of test specimens required for each class of material shall be as indicated in Table II. The form of test specimens shall be as specified in the table and in Figures 1 to 6 inclusive. The test requirement limits of Table II indicate the applicable tests and test procedure.

F-2. Preparation of Specimens:

F-2a. Test specimens shall be formed from batches of production material by methods which are used in production molding.

F-2a(1). Tolerances on dimensions shall be ± 5 per cent.

F-2b. Each test specimen shall be suitably identified with the manufacturer's name or trade mark, the manufacturer's grade, and the claimed class under this specification.

F-2c. Approval granted on a basis of tests made on one color shall apply to all materials furnished in the normal colors for the class, except where the pigment, or combination of pigments, used to obtain the color exceeds 1 per cent by weight, in which case a separate approval must be obtained for each color in the class.

F-3. Standard Conditioning of Test Specimens:

F-3a. As Received: The specimens shall be tested dry, as received from the manufacturer, at the temperature and humidity prevailing in the testing room at the time the tests are made. No special preparation is necessary other than to ascertain that the test specimens are approximately at the temperature of the testing room.

F-3b. Desiccation: Specimens shall be conditioned for a period of 48 hours in a circulating air oven at a temperature of $50 \pm 3^\circ \text{C}$ ($122^\circ \pm 5.4^\circ \text{F}$). The specimens shall then be removed from the oven and cooled in a desiccator over anhydrous calcium chloride to room temperature.

F-3c. Standard Laboratory Atmosphere: Specimens shall be conditioned for a period of not less than 48 hours at a temperature of $25^\circ \pm 2^\circ \text{C}$ ($77^\circ \pm 3.6^\circ \text{F}$) and a relative humidity of 50 ± 2 per cent.

F-3d. Water Immersion:

F-3d(1). Room Temperature: Specimens shall be wholly immersed in distilled water at a temperature of $25^\circ \pm 2^\circ \text{C}$ ($77^\circ \pm 3.6^\circ \text{F}$) for a period of 24 hours. They shall then be withdrawn from the water and all surface water shall be removed by wiping with a dry cloth.

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CLASSIFICATION
SPECIFICATION

NAS 278
SHEET 16

Documents

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