

MIL-P-7094A

21 MAY 1951

Superseding

MIL-P-7094

20 December 1950

MILITARY SPECIFICATION

**PLASTIC PARTS, AIRCRAFT EXTERIOR, GENERAL REQUIREMENTS
AND TESTS FOR RAIN-EROSION PROTECTION OF**

This specification was approved by the Departments of the Army, the Navy, and the Air Force for use of procurement services of the respective Departments.

1. SCOPE

1.1 This specification covers the general requirements for rain-erosion protection of all aircraft exterior plastic parts, except for transparent plastic glazing applications.

2. APPLICABLE SPECIFICATIONS

2.1 There are no other specifications applicable to this specification.

3. REQUIREMENTS

3.1 Extent of Protection.- Unless the plastic material of the part will itself meet the requirements specified herein, all exterior plastic parts shall be so protected with an erosion-resistant material that the combination shall meet the requirements of this specification. The protection shall be provided on at least the leading edges and all areas which present an angle of impact in flight through rain of 15 degrees or more; head-on impact of a flat surface being considered as 90-degree angle of impact. The protection shall be by means of inserts, overlays, coatings, or other surfacing.

3.2.1 The surface of the part shall be clean and free from all matter extraneous to the laminate, such as residual parting compounds used in molding the part, which might adversely affect adhesion of organic coatings subsequently applied.

3.2.2 Materials and Processes.- Materials used shall be subject to the approval of the Procuring Service. Processes for low-pressure laminating of glass-fabric-base plastic materials used in exterior parts shall be such that air and other gases are removed as completely as possible from the impregnated fabric wet lay-up before curing, and the molding and curing process shall be such as to produce a laminate practically free of porosity and voids, and with a smooth surface.

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3.2.2 Specifications for the materials and processes employed shall be submitted by the contractor, in the form of titled, numbered, and dated specifications, to the Procuring Service for approval. Applicable Government specifications shall be referenced wherever possible therein. After approval, these specifications shall form a part of this specification, and copies shall be made available by the contractor for their use at the contractor's plant by authorized Government Inspectors. These specifications shall contain full identification and description of all materials and processes involved, sampling and inspection requirements, and methods of control of manufacturing variables. The materials and processes in production shall conform to the requirements of these specifications and shall not be changed in production without approval of new superseding specifications.

3.3 Erosion Resistance.

3.3.1 Preliminary Tests. Flat specimens shall show no erosion damage of any kind after 12 hours' testing on the Air Development Force's rotating propeller rain erosion test apparatus at 265 mph through water spray from two Spraco 4B nozzles at 10 psi pressure.

3.3.2 Final Tests. Materials passing the preliminary tests shall be subjected to the final test. Airfoil leading edge specimens shall require at least 100 minutes' testing on the Cornell Aeronautical Laboratory's rotating propeller rain erosion test apparatus at 500 mph through 1 inch per hour rainfall, to erode through the entire surfacing material, which shall be not more than 0.010 inches thick.

3.4 Mechanical Properties. The addition of any surfacing material shall be such that the mechanical properties, including fatigue strength, of the basic plastic material shall not be reduced. The types of tests required shall be as specified by the Procuring Service for the particular combination of materials submitted.

3.5 Electrical Properties. Where the materials are to be used for radio and radar antenna housings, the electrical properties of the materials shall be suitable for such use, as determined by the Procuring Service. No more than 2-percent loss of transmitted power one way due to either absorption or reflection or both shall be acceptable when the surfacing treatment is applied to such antenna housing.

3.6 Durability. Outdoor exposure, accelerated service exposure, and high and low temperature and/or humidity cycling exposures, shall not produce crazing, cracking, peeling, delamination or other significant deterioration of surfacing materials. The mechanical, electrical, and erosion-resistance properties shall also meet specified requirements after such exposures. The exposure conditions and subsequent tests required shall be as specified by the Procuring Service for the particular combination of materials submitted.

3.7 Weight and Thickness. The weight of any surfacing material used shall not exceed 0.100 pound per square foot, and the thickness of the surfacing material shall not exceed 0.010 inches.

3.8 Repairability. The erosion protection surfacing shall be repairable in the field.

3.9 Report. Substantiating data with regard to mechanical, electrical and other properties, durability, and repairability shall be submitted in the form of a report to the Procuring Service for approval.

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4. SAMPLING, INSPECTION, AND TEST PROCEDURES

4.1 Inspection.-- Unless otherwise specified, sampling, inspection, and test procedures shall be in accordance with the approved contractor's materials and process specifications, with the addition of requirements specified herein.

4.2 Erosion Resistance Test Procedures.--

4.2.1 Preliminary Tests.-- At least two specimens shall be tested on the Air Development Force's rotating propeller rain erosion test apparatus at 265 mph through water spray from two Spraco 4B nozzles at 10-psi pressure. The specimens shall be 1.50 inches square by the thickness of the material.

4.2.2 Final Test.-- At least six airfoil, leading edge specimens shall be tested in the Cornell Aeronautical Laboratory's propeller rain erosion test apparatus at 500 mph through 1 inch per hour rainfall. The specimens shall be molded to conform to figure 1. In testing these specimens the metal straps shall overlap the specimen to protect the notched edges.

4.2.3 In order to save time and effort, erosion tests may be completed before the other tests specified.

4.3 Rejection and Retest.-- Rejected material shall not be resubmitted for inspection without furnishing full particulars concerning previous rejection and measures taken to overcome the defects.

4.4 All material or specimens destroyed in making tests required by this specification to determine compliance with the specification shall be in addition to the quantity of parts or other items specified in the contract or purchase order, and shall be furnished without increasing the cost of the contract or order.

5. PREPARATION FOR DELIVERY

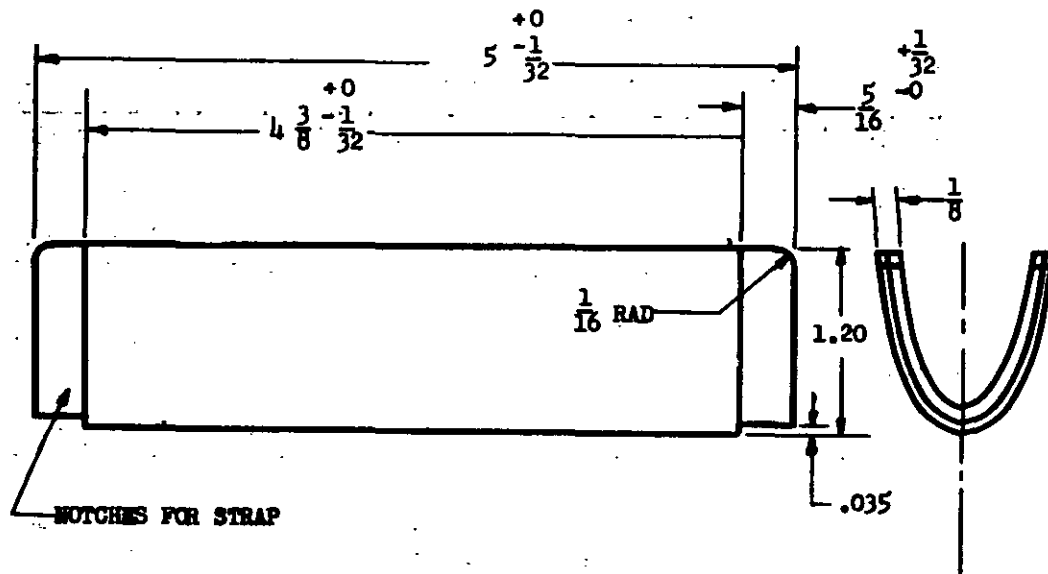
5.1 Application.-- The packing, packaging, and marking requirements shall be as specified in the specifications, drawings, or contracts for the plastic parts or other items.

6. NOTES

6.1 Requests for authorization of erosion resistance tests should be addressed to the Commanding General, Air Development Force, Wright-Patterson Air Force Base, Dayton, Ohio. It is to be understood that the specimens will be furnished at no cost to the Government and that the manufacturer will pay all transportation charges to and from the point where the tests are made. In the case of failure of the sample or samples submitted, consideration will be given to the request of the manufacturer for additional tests only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant additional tests.

6.2 Superseding Data.-- This specification supersedes Specification MIL-P-7094 which was the number assigned by Cover Sheet to USAF Specification No. 12052.

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.0025 AIRFOIL - 1/8 INCH CHORD

% CHORD	ORDINATES DISTANCE FROM L E	ORDINATE
.00	.00	.000
1.25	.05	.158
2.50	.10	.218
5.00	.20	.296
7.50	.30	.350
10.00	.40	.390
15.00	.60	.446
20.00	.80	.478
25.00	1.00	.485
30.00	1.20	.500

OUTER DIMENSIONS
OF 1/8-INCH SPECIMEN

DIMENSIONS IN INCHES.

FIGURE 1. Rain Erosion Test Specimen

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NOTICE: When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever, and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

Custodian:
Air Force

Other interest:
Navy - A