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MILITARY SPECIFICATION

FLANGES, MOUNTING, ATTACHABLE, AIRCRAFT INSTRUMENT

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

1. SCOPE

1.1 Scope.- This specification covers aircraft instrument attachable mounting flanges.

1.2 Classification.- The flanges shall be furnished in the MS part numbers listed in column 1 of table I, as specified (see 6.2.):

TABLE I

Flange MS part number and nominal size

Flange MS part number	Flange nominal size	Attach to case conforming to	To replace case conforming to
MS28055-10	1 1/2 inches	MS33639	MS28002
MS28055-11	2 inches	MS33639	MS33548
MS28055-12	3 inches	MS33639	MS33550

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:

SPECIFICATIONS

Military

MIL-N-3336	Nut, Self Locking, Instrument Mounting
MIL-E-5272	Environmental Testing, Aeronautical and Associated Equipment, General Specification for
MIL-C-5541	Chemical Films for Aluminum and Aluminum Alloys
MIL-P-7936	Parts and Equipment, Aeronautical, Preparation for Delivery
MIL-A-8625	Anodic Coatings, for Aluminum and Aluminum Alloys

FSC 6620

STANDARDS

Military

MIL-STD-130	Identification Marking of U. S. Military Property
MS28002	Indicator - Position, Control Surfaces, 1-3/8 Inch Dial, 28 Volts DC
MS28055	Flanges, Mounting, Attachable, Aircraft Instrument
MS33548	Case, Instrument, 1-7/8 Dial, Standard Dimensions for
MS33550	Case, Instrument, 2-3/4 Dial, Without Sump, Standard Dimensions for
MS33639	Cases, Instrument, Clamp-Mounted, Aircraft

Air Force-Navy Aeronautical

AN500	Screw - Machine, Fillister Head, Coarse Thread

PUBLICATIONS

Air Force-Navy Aeronautical Bulletin

No. 143	Specifications and Standards; Use of

(Copies of specifications, standards, drawings, and publications 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 Preproduction.- This specification makes provision for preproduction testing.

3.2 Precedence.- Whenever any requirement of any document mentioned in this specification conflicts with any requirement specified in this specification, the requirement specified in this specification shall prevail.

3.3 Materials.- Where materials are not specified, they shall be of the best quality, of the smallest practical density, and entirely suitable for the purpose intended.

3.3.1 Protective treatment.- When materials are used in the construction of the flange which are subject to corrosion in salt air or other atmospheric conditions likely to occur during service use, they shall be protected against such corrosion in a manner which will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating which will crack, chip, or scale with age or extremes of atmospheric conditions shall be avoided.

3.3.2 Selection of materials.- Specifications and standards for all materials and 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.

3.4. Design.- Each flange shall conform to Standard MS28055 and shall be designed to be attached to an instrument case conforming to Standard MS33639 specified in column 3 of table I to adapt it for installation in an instrument panel cutout which was made to accommodate an instrument case conforming to the standard specified in column 4 of table 1. The flange shall be so designed that the rear shell may be put onto the instrument case from the rear and attached to the front shell with four AN500 undrilled 2-56 screws. The screws shall be inserted from the rear, and the screwheads shall not extend beyond the rear mounting surface of the flange. The flange shall be so designed that when it is installed on an instrument case, the instrument case shall have no tendency to rotate under conditions of vibration as encountered on aircraft instrument panels.

3.5 Parts.- Each flange shall consist of a front shell, a rear shell, four AN500 undrilled 2-56 assembly screws, four AN500 undrilled mounting screws, and four clip-in type self-locking NC-2A mounting nuts.

3.6 Construction.-

3.6.1 Each flange shall be constructed of a nonferrous, low-density material, uniform in texture with a smooth surface.

3.6.2 Mounting screws and nuts.- The mounting screws shall be of sufficient length for mounting an instrument with the flange attached to it in an instrument panel 0.125 inch thick with the flange on the front of the panel, and also with the flange on the rear of the panel, using the mounting nuts provided. The mounting screws shall conform to Standard AN500 for undrilled screws. The mounting nuts shall conform to Specification MIL-N-3336 when applicable. The mounting screws and nuts shall be of the following size, as applicabe:

Flange size (inches)	Mounting screws
1-1/2	4-40
2	6-32
3	6-32

3.7 Finish.- The external surface of the flange and the inside surface of the aperture of the front shell shall be finished in durable dull black. The finish on the interior surface is optional, provided the finish used will in no way prevent compliance with the requirements of this specification nor interfere with the use of the flange. The heads of the mounting screws shall be finished in durable dull black.

3.8 Weight.- The weight of each flange shall not exceed the following value as applicable:

Flange size (inches)	Maximum weight (ounces)
1-1/2	2
2	3
3	4

3.9 Finishes and protective coatings.-

3.9.1 Aluminum-alloy parts.- Aluminum-alloy parts shall be covered with an anodic film in accordance with Specification MIL-A-8625, except as provided in the following paragraphs.

3.9.1.1 Small holes and case inserts need not be anodized.

3.9.1.2 Aluminum alloys which do not anodize satisfactorily shall be coated with a chemical film in accordance with Specification MIL-C-5541.

3.9.1.3 Where the primary purpose of the treatment is to afford a suitable paint base, chemical treatments conforming to Specification MIL-C-5541 may be used in lieu of anodizing.

3.9.1.4 Castings containing non-aluminum-alloy integral inserts may be treated with a chemical film in accordance with Specification MIL-C-5541 in lieu of anodizing.

3.9.1.5 When abrasion resistance is a factor, chemical films conforming to Specification MIL-C-5541 shall not be used in lieu of anodizing.

3.10 Markings.- A reference mark approximately 0.094 inch long and 0.010 inch wide shall be located on the front surface of the front shell as shown on Standard MS28055. The reference mark shall be finished in durable dull white.

3.11 Identification of product.- Equipment, assemblies, and parts shall be marked for identification in accordance with Standard MIL-STD-130. The following information shall be stenciled or marked on the outside surface of the rear shell:

FLANGES, MOUNTING, ATTACHABLE, AIRCRAFT INSTRUMENT
MS Part No.
Manufacturer's Part No.
Manufacturer's identification
US

3.12 Workmanship.- The flanges shall be constructed and finished in a thoroughly workmanlike manner. Particular attention shall be given to marking of parts and assemblies, and to freedom of parts from burrs and sharp edges.

4. QUALITY ASSURANCE PROVISIONS

4.1 Inspection responsibility.- Unless otherwise specified herein, the supplier is responsible for the performance of all inspection requirements prior to submission for Government inspection and acceptance. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order.

4.2 Classification of tests.- The inspection and testing of the flanges shall be classified as follows:

(a) Preproduction tests (See 4.4.)
(b) Acceptance tests (See 4.5.)

4.3 Test conditions.-

4.3.1 Test instrument.- The case of the test instrument shall conform to the standard specified in column 3 of table I. The case of the test instrument shall be made of metal. The weight of the test instrument shall be the following applicable value, ±10 percent:

Flange size (inches)	Instrument weight (pounds)
1-1/2	1
2	2
3	4

If it is necessary to add weights to the test instrument to obtain the desired weight, they shall be securely attached to the inside of the case. The center of weight of the test instrument shall be within 0.250 inch of the axis of the case and 3 ±0.5 inches from the extreme front surface of the case.

4.3.2 Test panel.- The test panel shall be fabricated of hard aluminum 0.125 inch thick. It shall contain four cutouts in a square with horizontal and vertical sides, and as close to each other as is practicable. Each cutout shall be designed to accommodate an instrument case conforming to the standard specified in column 4 of table I.

4.3.3 Vibration stand.- The vibration stand shall vibrate at a frequency of 2,600 to 3,000 cpm and shall subject the instrument to such vibration that a point on the instrument will describe in a plane inclined 45° from the horizontal plane, a circle of not less than 0.018 inch nor more than 0.020 inch in diameter.

4.4 Preproduction tests.-

4.4.1 Sampling instructions.- Preproduction test samples shall consist of at least four flanges of a given manufacturer's part number. Samples shall be identified as required and forwarded to the testing laboratory designated in the contract. (See 6.2.)

4.4.2 Tests.- The preproduction tests shall consist of all the tests of this specification as described under acceptance tests and, in addition, the following test.

4.4.3 Salt spray.- The flanges shall be subjected to the Salt spray tests, Procedure I, of Specification MIL-E-5272.

4.5 Acceptance tests.- The acceptance tests shall consist of individual test and sampling plan A and sampling plan B tests.

4.5.1 Individual test.- Each flange shall be subjected to the following test.

4.5.1.1 Examination of product.- Each flange shall be examined to determine compliance with this specification as to workmanship, finish, dimensions, markings, and materials.

4.5.2 Sampling plan A test.- Five out of each 200 flanges or fraction thereof submitted for acceptance under contract, which have passed the individual test specified in 4.5.1.1, shall be selected at random and subjected to the following test.

4.5.2.1 Vibration.- Four flanges shall be attached to test instruments and shall be installed in a test panel with the mounting screws and nuts provided, with the flanges on the rear of the panel. The test panel, with the instruments installed in it, shall then be mounted on a vibration stand and shall be subjected to vibration as specified in 4.3.3 for a period of 6 hours. During this test, the test instrument shall not turn. At the end of this test, the flange assembly screws shall be checked for tightness. The screws shall be tight, and there shall be no evidence of damage to the flange as a result of this test.

4.5.3 Sampling plan B test.- When specified (see 6.2), five flanges representing the manufacturer's contract or order shall be subjected to the following test.

4.5.3.1 Humidity.- The flanges shall be subjected to the Humidity test, Procedure I, of Specification MIL-E-5272. Water introduced to maintain the desired humidity shall be distilled water. At the end of the 15 cycles, the flange shall be thoroughly examined. There shall be no evidence of corrosion.

4.5.4 Packing and marking.- The inspector shall ascertain that the packing and marking of the flanges conform to this specification.

4.5.5 Rejection and retest.- Rejected flanges shall not be resubmitted for inspection without furnishing full particulars concerning previous rejection and measures taken to overcome the defects. When one or more of the flanges fails to meet the requirements of the Vibration test (4.5.2.1) or the Humidity test (4.5.3.1), additional flanges from the lot represented shall be tested immediately to determine the cause of failure. Individual performance tests shall not be interrupted, unless the defect is of such nature that it will seriously affect the performance or safe use of the flanges.

5. PREPARATION FOR DELIVERY

5.1 Packaging and packing and marking.- The flanges shall be packaged, packed, and marked for shipment in accordance with Specification MIL-P-7936.

6. NOTES

6.1 Intended use.- The attachable mounting flanges covered by this specification are intended to be attached to instruments whose cases conform to the standards specified in column 3 of table I to adapt them for installation in instrument panel cutouts which were made to accommodate instruments whose cases conform to the standard specified in column 4 of table I. A point on the dial of the instrument which should be at the top, bottom, left, or right should be alined with the reference mark on the flange. The thickness of the instrument panel should not exceed 0.125 inch. The instrument may be installed in the panel with the flange either on the front or on the rear of the panel.

6.2 Ordering data.- Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) MS Part No. (See 1.2.)
(c) Whether sampling plan B test samples are to be conducted. (See 4.5.3.)
(d) Where the preproduction test samples should be sent, the activity responsible for testing, and instructions concerning the submittal of the test reports. (See 4.4.1.)

6.2.1 Manufacturers' part numbers which were qualified under part number MS28055-1 (AN5809-1) on the date of issuance of this specification should be accepted if they are offered under part number MS28055-11. Such manufacturers' part numbers should be marked with, and conform in all other ways to part number MS28055-1. All other manufacturers' part numbers which are offered under part number MS28055-11 must conform to part number MS28055-11.

Custodians:
Navy - Bureau of Naval Weapons
Air Force