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MILITARY SPECIFICATION

INDICATOR, AIRSPEED, MACH NUMBER AND MAXIMUM ALLOWABLE SPEED

This specification is approved for use by the Department of the Air Force, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers intergrally lighted combination indicated airspeed and mach number indicators.

1.2 Classification. Indicators shall be of the following types as specified (see 6.2):

AVU-8/A	Covers Glass Coated with Anti-reflection Coating conforming to MIL-C-675
AVU-8A/A	Cover Glass Coated with Multi-layer Anti-reflection Coating of High Efficiency
AVU-88/A	Improved Dial, and Cover Glass Coated with Multilayer Anti-reflection Coating of High Efficiency
AVU-8C/A	Cover Glass Coated with Multilayer Anti-reflection Coating of High Efficiency and with 3/8 Inch Static and 1.4 Inch Pitot Tubing Connectors

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specification and standards of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DODISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

PPP-B-601	-	Boxes, Wood, Cleated Plywood
PPP-B-636	-	Box, Shipping, Fiberboard

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Oklahoma City Air Logistics Center/MMEDO, Tinker AFB OK 73145 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FSC 6610

Military

MIL-P-116	-	Preservation, Methods of
MIL-C-675	-	Coating of Glass Optical Elements (Anti-reflection)
MIL-C-5541	-	Chemical Conversion Coatings on Aluminum and Aluminum Alloys
MIL-S-7742	-	Screw Threads, Standard, Optimum Selected Series, General Specification for
MIL-A-8625	-	Anodic Coatings, for Aluminum and Aluminum Alloys
MIL-C-14806	-	Coating, Reflection Reducing, for Instrument Cover Glasses and Lighting Wedges
MIL-L-27160	-	Lighting, Instrument, Integral, White, General Specification for
MIL-C-83488	-	Coating, Aluminum, Ion Vapor Deposited

STANDARDS

Federal

FED-STD-595	-	Colors

Military

DOD-STD-100	-	Engineering Drawing Practices
MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	-	Marking for Shipment and Storage
MIL-STD-130	-	Identification Marking of U.S. Military Property
MIL-STD-143	-	Standards and Specifications, Order of Precedence for the Selection of
MIL-STD-454	-	Standard General Requirements for Electronic Equipment
MIL-STD-781	-	Reliability Tests Exponential Distribution
MIL-STD-794	-	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-810	-	Environmental Test Methods
MIL-STD-831	-	Test Reports, Preparation of
MIL-STD-859	-	Standard Calibration Table for Aeronautical Pressure Measuring Equipment
MIL-STD-882	-	System Safety Program Requirements
MIL-STD-1186	-	Cushioning, Anchoring, Bracing, Blocking, and Waterproofing, with Appropriate Test Methods
MS 28105	-	Cover Glass, Aircraft Instrument Dial
MS 33556	-	Case, Aircraft Instrument, 3-1/4 Inch Size, Standard Dimension for
MS 33558	-	Numerals and Letters, Aircraft Instrument Dial, Standard Form of
MS 33585	-	Pointer, Dial, Standard Design of Aircraft Instrument
MS 33649	-	Boss, Fluid Connection - Internal Straight Thread

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

2.2 Other publication. The following document forms a part of this specification to the extent specified herein.

NASA Technical Note

D822	Tables of Airspeed, Altitude, and Mach Number Based on Latest International Values for Atmospheric Properties and Physical Constants

(Copies of the NASA document may be obtained from the National Aeronautics and Space Administration, Washington DC 20546.)

3. REQUIREMENTS

3.1 Qualification. The indicators furnished under this specification shall be products which are qualified for listing on the applicable Qualified Products List at the time set for opening of bids (see 4.4 and 6.4).

3.2 Selection of standards and specifications. Standards and specifications for necessary commodities and services not specified herein shall be selected in accordance with MIL-STD-143.

3.3 Airspeed and mach number equations. Airspeed and mach number equations shall be in accordance with NASA Technical Note D822. Relationship between pressure and altitude shall be in accordance with MIL-STD-859.

3.4 Materials. Materials shall conform to applicable specification and shall be as specified herein. When materials are used that are not specifically designated, they shall be of the best quality, of the lightest practicable weight, and suitable for the purpose intended.

3.4.1 Fungusproof materials. Materials that are nutrients for fungi shall not be used where it is practicable to avoid them. Where used and not hermetically sealed, they shall be treated with a fungicidal agent acceptable to the procuring activity.

3.4.2 Metals. Metals shall be of the corrosion-resistant type and suitably treated to resist corrosion due to fuels, salt fog, or atmospheric conditions likely to be met in storage or normal service.

3.4.2.1 Dissimilar metals. Unless suitably protected against electrolytic corrosion, dissimilar metals shall not be used in intimate contact with each other. Dissimilar metals are defined in MIL-STD-889.

3.4.3 Nonmagnetic materials. Nonmagnetic materials shall be used for all parts of the indicator, except where magnetic materials are essential.

3.4.4 Protective treatment. When materials are used in the construction of the indicator that are subject to deterioration when exposed to climatic and environmental conditions likely to occur during service usage, they shall be protected against such deterioration in a manner that will in no way prevent compliance with the performance requirements of this specification. The use of any protective coating that will crack, chip, or scale with age or extremes of climatic and environmental conditions shall be avoided.

3.5 Design.

3.5.1 The indicator and case shall conform to figures 1 through 7.

3.5.2 The indicator shall incorporate a pitot-static operated indicated airspeed mechanism that will drive a pointer to indicate airspeed on a fixed dial as shown on figures 3, 4, and 5, as applicable; a static-pressure operated altitude mechanism that will drive a moving scale to indicate mach number as shown on figures 3 and 6, and a maximum allowable pointer as shown on figure 7, adjustable for a limiting equivalent airspeed of 600 to 800 knots. The gearing between the moving scale and the altitude mechanism shall be such that mach number will be indicated by the pointer on the moving scale at any combination of airspeed and altitude within the range of the indicator.

3.5.2.1 Maximum speed pointer. A maximum speed pointer as shown on figure 7 shall be provided. The pointer shall be positioned as a function of equivalent airspeed and shall indicate, in terms of indicated airspeed, the specific value of equivalent airspeed which has been set into the instrument by means of the adjustment provided within the altitude range of the instrument. The adjusting mechanism shall be settable through a range of from 600 to 800 knots equivalent airspeed.

3.5.2.2 Adjustment index. An adjustment index conforming to figures 1 and 2 shall be provided to show the equivalent airspeed to which the instrument is adjusted. The equivalent airspeed shall be placed on the scale provided as shown on figures 1 and 2. The mechanism shall be so arranged that the values of equivalent airspeed between the numerals may be set by linear interpolation between the numbers. An alternate means of adjustment may be provided, subject to the approval of the procuring activity. The location of the equivalent airspeed adjustment shall be subject to the approval of the procuring acitivty.

3.5.2.3 Maximum speed pointer adjustment. The method of adjustment of the maximum speed pointer shall be such that adjustment may be made by removing a plug from the rear of the case with the use of standard tools. The design of the adjustment shall be subject to the approval of the procuring activity. Setting sensitivity of the adjustment shall be within 10 knots.

3.5.2.4 Concentricity of pointers. The two pointers shall be concentric. The maximum allowable pointer shall be nearest the dial and the indicated airspeed pointer shall be nearest the cover glass.

3.5.3 Airspeed setting index. An airspeed setting index shall be provided as shown on figures 3 and 7. The setting of the index shall be controlled by a knob in the lower right corner. The index shall be settable over the range

of 100 to 700 knots (minimum) indicated airspeed with a minimum setting sensitivity of 1 knot. The tip of the index shall extend toward the center of the dial at least 1/16 inch further than the tip of the longest 50 knot graduations.

3.5.4 Range. The indicator shall be designed to operate over an indicated airspeed range of 80 to 850 knots at altitudes from -1,000 to +80,000 feet. The mach-number range shall be from .50 to 2.2.

3.5.5 Safety. The indicator shall present no danger, injury or hazard to operating and service personnel.

3.5.5.1 Hazard analysis. A safety hazard analysis shall be performed to determine, from a safety consideration, the functional relationships of components and equipments interfacing with the indicator. The safety analysis shall identify all components, equipments, and materials whose performance degradation or functional failure could result in category III and IV hazards as defined in MIL-STD-882, paragraph entitled Hazard Level. This analysis shall include a determination of the failure modes and the effects on safety should failures occur. Areas to be considered are the appropriate sections of MIL-STD-882, as listed under paragraph entitled System Hazard Analyses, and the effects of storage, shelf life, transportation, and packaging. Where practicable, design changes shall be made to eliminate or minimize the hazards. If the hazards cannot be eliminated, alternative controls such as recommended changes to interfacing equipment shall be presented to the procuring activity for resolution. The analysis shall be presented at the final design review.

3.6 Construction. The indicator shall be so constructed that no parts will work loose in service. It shall be built to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation and service.

3.6.1 Case. The indicator case shall conform to MS33556 for the 3-inch nominal size, exept as shown on figures 1 and 2.

3.6.2 Body. The body shall be made of aluminum alloy, shall be uniform in texture with a smooth surface, and shall be entirely covered with a durable lusterless black finish conforming to Color No. 37038 of FED-STD-595.

3.6.3 Bezel ring. The bezel ring shall be made of aluminum alloy and shall have a durable lusterless black finish. The ring shall be held in place by means of screws properly secured by lockwashers.

3.7 Pointers. The pointers shall conform to figure 7.

3.7.1 Limitation of indicated airspeed pointer movement. The pointer movement shall be limited by means of suitable stops in the mechanism in such a way that the pointer will not rotate more than 355° of arc cw from the zero graduation when the indicator is subjected to overpressure. The design of the stops shall be subject to the approval of the procuring activity.

3.8 Cover glass. The cover glass shall conform to MS28105. It shall be sealed and shall be replaceable by removing the bezel. If the cover glass is used as part of the lighting system, its size and shape may deviate from the dimensions specified on MS28105 to the extent required for proper lighting design.

3.8.1 Reflection-reducing coating (AVU-8A/A, AVU-8B/A, and AVU 8C/A). All reflecting glass surfaces shall be provided with a reflection-reducing coating that meet the requirements of MIL-C-14806.

3.9 Integral lighting. The indicator shall incorporate integral white lighting in accordance with MIL-L-27160. In the event of conflict between this specification and MIL-L-27160, this specification shall govern. Lighting shall operate on 5V ac or dc. Lighting acceptability of production indicators shall be based on visual comparison with a prime standard. The method of lighting shall be approved by the procuring activity prior to fabrication.

3.9.1 Prime standard. The prime standard lighting reference instrument shall be prepared as follows: A minimum of 20 areas covering the entire face of the indicator shall be measured in foot-lambers for brightness level. A minimum of 10 areas covering the entire face of the indicator shall be measured for color. The prime standard instrument and its recorded overall brightness and color measurements shall be approved by the procuring activity. The standard shall be checked at least every 50 hours of operation or 120 days, whichever occurs first, to determine any change in brightness or color. Variations greater than ±20 percent in two or more areas shall require return of the standard for corrective action. The data and, if required by the procuring activity, the prime standard shall be submitted for evaluation and reapproval or corrective action, or both.

3.10 Performance. The indicator shall be capable of meeting the requirements specified herein when subject to the following conditions or any natural combination thereof:

a. Temperatures: Operating temperatures ranging from -54° to +71°C, and nonoperating temperatures ranging from -65° to +71°C.

b. Vibration:

(1) Vibration failure: Vibration at a double amplitude of 0.1 each from 5 to 20 Hz; 2g from 20 to 500 Hz.

(2) Vibration error: Vibration with a double amplitude of between 0.003 and 0.005 inch at frequencies from 5 Hz to 50 Hz.

c. Salt-fog: Exposure to simulated salt sea atmosphere for a period of 50 hours.

d. Humidity: Relative humidity up to 95 percent.

e. Fungus resistance: Exposure to fungus growth as encountered in tropical climates.

f. Acceleration: Applied acceleration forces up to 20g.

g. Dust: Exposure to sand and dust particles.

3.10.1 Magnetic effect. The indicator shall not cause a free compass to deflect more than 1° when revolved about a short-bar magnetic compass with a field intensity of 0.17 to 0.19 oersted.

3.10.2 Case leakage. Case leakage shall not exceed 0.01 inch Hg for a 1-minute period when mounted in an instrument panel or mock-up panel. The mounting requirement may be waived by the procuring activity if it can be demonstrated that mounting does not affect case leakage.

3.11 Markings.

3.11.1 Dial. The indicator shall conform to figures 3, 4, and 5. The style and proportions of the numerals and letters shall conform to MS33558. Each numeral shall distinctly indicate the graduation to which it applies. The graduation shall be located on the dial as shown on figures 3, 4, 5, and 6.

3.11.1.1 White markings. The following markings shall be finished in lusterless white, color no. 37875, or semi-gloss grey, color no. 36595, of FED-STD-595. Alternate may be used on the IAS and MACH NO. POINTER - MASK (see Figure 7) with prior approval of the contracting activity. The color and brightness tolerances, as specified in MIL-L-27160 for white markings and pointers, shall apply regardless of the alternate color selected and approved. Alternate colors submitted must be selected from either the 36000 or 37000 series of FED-STD-595 with a reflectance value greater than 50 percent. The dimensions of the markings shall be as specified.

	Height or Length Inch ±1/64	Width of Line or Graduation Inch ±0.005
Numerals on indicated airspeed	1/4	-----
Numerals on mach scale		
0.5 thru 1.6	5/32	-----
1.8 thru 2.2	1/8	
Graduations corresponding to 100 knot increments	as shown on figure 4	
Graduations corresponding to 50 knot increments:		
below 400 knots (except 150)	7/32	0.030
above 400 knots	5/32	0.030
Graduation corresponding to 150 knot increments	1/8	0.030
Graduations corresponding to 10 knot increments	5/32	0.020
Graduations corresponding to 0.10 mach increments	1/8	0.030
Graduations corresponding to 0.05 mach increments	3/32	0.020
Lettering MACH NO.	3/32	0.020
Lettering KNOTS X 100	3/32	0.020
Zero graduation	1/8	0.020
Lettering SET INDEX	5/64	0.020
Shaded portion of indicated airspeed pointer	as shown on figure 7	
Settable index pointer	as shown on figure 7	

Note: Any variation from the nominal height dimensions of the indicated airspeed numerals must be submitted to the procuring activity for approval.

3.11.1.2 Black markings. The markings USAF, MACH NO., and IAS shall be durably and legibly marked on the dial. These markings, the dial background, and all other markings not otherwise specified shall be finished in lusterless black, Color No. 37038 of FED-STD-595.

3.11.1.3 Dial visibility. The pointer, numerals, at least 1/16 inch of the shortest graduations, and other specified markings on the dial shall be visible from any point within the frustum of a cone the side of which makes an angle of 30° with a perpendicular to the dial and of which the small diameter is the aperture of the indicator case.

3.12 Pressure fittings. Pitot and static pressure fittings shall be as shown on figures 1 and 2.

3.13 Plug. During shipment, each static and pitot pressure connection shall be provided with a vented plug of a material and design acceptable to the procuring activity. The vent hole shall be 1/16 ±1/64 inch in diameter.

3.14 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The item identification and part number requirments of DOD-STD-100 shall govern the manufacturer's part numbers and changes thereto.

3.15 Screw threads. Unless otherwise specified, the threads of all machine screws shall conform to MIL-S-7742.

3.16 Finishes and protective coatings

3.16.1 Aluminum alloy parts. Aluminum alloy parts shall be covered with an anodic film conforming to MIL-A-8625, except as follows:

3.16.1.1 Dials, small holes, and case inserts need not be anodized.

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

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

3.16.1.4 Castings containing nonaluminum alloy integral inserts may be treated with a chemical film in accordance with MIL-C-5541 in lieu of anodizing.

3.16.1.5 When abrasion resistance is a factor, chemical films in accordance with MIL-C-5541 shall not be used in lieu of anodizing.

3.16.2 Steel parts. Steel parts shall be coated with ion vapor deposited aluminum, where practicable, in accordance with MIL-C-83488, type I or II as applicable and of a class that is adequate to achieve the degree of protection required. Other protective coating may be used if demonstrated to be satisfactory and approved by the cognizant engineering activity. Cadmium plating must be avoided when satisfactory alternative processes can be used.

3.17 Soldering. Soldering will be accomplished in accordance with MIL-STD-454.

3.18 Weight. The weight of the indicator shall not exceed 2.5 pounds.

3.19 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-STD-130.

3.20 Workmanship. The indicator, including all parts and accessories shall be constructed and finished in a thoroughly workmanlike manner. Particular attention shall be given to neatness and thoroughness of marking of parts and assemblies, and freedom of parts from burrs and sharp edges.

3.20.1 Dimensions and tolerances. Dimensions and tolerances not specified shall be as close as is consistent with the best shop practices. Where dimensions and tolerances may affect the interchangeability, operation, or performance of the indicator, they shall be held or limited accordingly.

3.20.2 Gears. Gear assemblies shall be properly aligned and meshed, and shall be operable without interference, tight spots, loose spots, or other irregularities. Where required for accurate adjustments, gear assemblies shall be free from backlash.

3.20.3 Cleaning. The indicator shall be brushed thorughly clean of loose, spattered, or excess solder, metal chips, and other foreign material after final assembly. Burrs and sharp edges, as well as resin flash that may crumble, shall be removed.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed reqirements.

4.2 Classification of inspections. The inspection and testing of the indicator shall be classified as follows:

a. Qualification inspection (see 4.4)

b. Quality conformance inspection (see 4.5)

4.3 Inspection conditions.

4.3.1 Standard atmospheric conditions. Whenever the pressure and temperature existing at the time of test are not specified definitely, it shall be understood that the test is to be made at atmospheric pressure (approximately 29.92 inches Hg) and at room temperature (approximately +25°C). When tests are made with atmospheric pressure or room temperature differing

materially from the above values, proper allowance (as approved by the procuring activity) shall be made for the difference from the specified condition.

4.3.2 Tapping. Unless otherwise specified, the indicator shall be vibrated before a test reading is taken. Vibration shall be applied by electromechanical vibrators and shall be in the order of 0.2g. Frequencies of less than 50 Hz shall not be used.

4.3.3 Attitude. Unless otherwise specified, the indicator shall be tested in its normal operating position.

4.4 Qualification inspection.

4.4.1 Test samples. The qualification test samples shall consist of five indicators representative of the production equipment. Three indicators shall be subjected to all tests except shelf life. The remaining two indicators shall be subjected to individual and shelf life tests.

4.4.2 Test report. The contractor shall prepare a test report in accordance with MIL-STD-831.

4.4.3 Qualifiction inspection. The qualification inspection shall consist of all the tests specified in 4.6.

4.5 Quality conformance inspection. Quality conformance inspection shall consist of:

a. Individual tests

b. Sampling tests

4.5.1 Individual tests. Each indicator shall be subjected to the following tests as described in 4.6:

a. Examination of product

b. Case leakage

c. Case leakage at -35°C

d. Diaphragm capsule leakage

e. Airspeed scale error (room temperature)

f. Mach number scale error (room temperature)

g. Maximum equivalent scale error (room temperature)

h. Friction error-airspeed pointer

i. Friction error-maximum equivalent airspeed pointer

j. Friction error-mach scale

k. Position error

l. Pointer zero position error

m. High temperature operation

n. Low temperature operation

o. Individual lighting tests of MIL-L-27160

4.5.2 Sampling tests.

4.5.2.1 Sampling Plan A. When specified (see 6.2.f), five indicators shall be selected at random from each twenty-five or less produced on the contract or order and subjected to the following tests as described under 4.6:

a. Individual tests

b. Dial visibility

c. Damping

d. Vibration error

e. Sampling Plan A tests of MIL-L-27160

4.5.3 Sampling Plan B. Unless otherwise specified (see 6.2,c.), three indicators shall be selected at random from the first fifteen and two out of each succeeding 300 indicators or less on the contract or order and subjected to the following tests as described under 4.6:

a. Sampling Plan A tests

b. Low temperature exposure

c. High temperature exposure

d. Vibration failure

e. Magnetic effect

f. Acceleration

g. Humidity

h. Salt fog

i. Fungus

j. Overpressure

k. Seasoning (as applicable)

l. Sampling Plan B tests of MIL-L-27160

4.5.4 Sampling Plan C. One indicator shall be selected at random from each 100 or less produced on contract or order and subjected to the following tests as specified in 4.6:

a. Individual tests

b. Shelf-life test

4.5.5 Sampling Plan D. When specified (see 6.2,f), sampling and inspection procedures of MIL-STD-105 shall be applied for Government acceptance of all lots of production indicators on contract. General Inspection Level II of table I, MIL-STD-105, shall be used throughout the acceptance program. Samples drawn for inspection shall be randomly selected by the Government representative after the whole lot has been submitted for acceptance. The acceptable quality level (AQL) to be maintained is 2.5. The sampling plan specified in table IIA of MIL-STD-105 shall be used initially. The reduced sampling plan of table IIC may be used when the criteria for reduced sampling has been attained and with approval of the procuring activity. A tightened inspection shall not apply without approval of the procuring activity. Each sample selected shall be subjected to, and shall meet, all tests listed under 4.5.2.1 prior to acceptance of the lot by the Government.

4.5.5.1 Defective units. A defective unit is an indicator which has failed any test listed under sampling plan A test requirements of this specification. The unit shall be considered defective as soon as it has failed a test requirement. A unit which has failed any test at only one test point shall be reinspected by the Government at least one time prior to being classified as defective.

4.5.5.2 Defective lots. Defective lots will be rejected and returned to the contractor. The lot shall not be resubmitted to the Government for acceptance until, as a minimum, it has been completely reinspected by the contractor. Repairs shall be made as appropriate prior to complete retesting by the contractor. Samples that are subjected to and pass all sampling plan A tests shall not be returned to the contractor with the remainder of the defective lot but shall be accepted as a production item. When resubmitted to the Government for acceptance, the defective lot shall again be subjected to the same acceptance criteria as specified in 4.5.5.

4.5.6 Rejection and retest. When one indicator selected from a production run fails to meet the specification, items still on hand or later produced shall not be accepted until the extent and cause of failure are determined. After corrections have been made, all necessary tests shall be repeated.

4.5.7 Individual tests may continue. For operational reasons, individual tests may be continued pending the investigation of a sampling test failure. But final acceptance of the indicators on hand or items produced later shall not be made until it is determined that all items meet the requirements of the specification.

4.6 Test methods

4.6.1 Examination of product. Prior to sealing, the indicator shall be inspected to determine if compliance with the requirements of paragraphs 3.4, 3.4.2, 3.15, 3.17 and 3.21. If these inspections are performed as part of the assembly inspections, they shall be documented during the equipment assembly and this documentation shall be checked as part of the Examination of Product. After sealing, filling and painting, the indicator shall be examined to determine compliance with the requirements specified herein with respect to materials, workmanship, markings, weight, dimensions and visibility of the display components. The case shall be inspected for proper painting and general good workmanship and the connector shall be inspected to make sure that no pins are bent or damaged.

4.6.2 Case leakage. The pitot and static pressure connections of the indicator shall be jointed with Y connection and connected to the same mercury manometer and a source of vacuum. A vacuum of 25 inches Hg (equivalent to a pressure altitude of approximately 40,000 feet altitude) shall be applied to the pitot and static connections of the indicators. With the connecting tubing pinched off or otherwise completely sealed for a period of one minute, the changes in mercury level shall not change by more than 0.01 inch when mounted in an instrument panel or mock-up panel with four screws, three of which shall be finger tight and the fourth shall be tightened to 10 inch pounds.

4.6.2.1 Case leakage at -35°C. The indicator shall be placed in a temperature chamber and maintained at a temperature of -35°C for a period of 3 hours. While at this temperature, a case leakage test in accordance with 4.6.2 shall be conducted. With the connecting tubing pinched off, or otherwise completely sealed, for a period of 1 minute, the difference in the mercury level shall not change by more than 0.025 inch.

4.6.3 Diaghragm capsule leakage. With the static pressure connection open to the atmosphere, the pitot connection shall be connected to a mercury manometer and a source of pressure. A pitot pressure sufficient to produce a reading of 800 knots shall be applied to the indicator. The connecting tubing shall be pinched off or otherwise completely sealed. During a period of 1 minute, the pressure shall not change by more than 0.15 inches Hg.

4.6.4 Airspeed scale error (room temperature). The indicator shall be tested for scale error at all test points indicated in table II. The test shall be made by subjecting the indicator to the pressures specified to produce these readings, first with increasing pressures, then with decreasing pressures. For increasing pressures, the pressure shall be brought up to but shall not exceed the pressures specified to give the desired reading. The errors at the test points shall not exceed those specified in table II.

4.6.4.1 Mach number scale error (room temperature). The mach scale shall be tested at each of the mach settings in table III. The specified altitude shall be established and the indicated airspeed pointer set on the mach number graduation at each of the specified test points. The error shall be determined by reading the airspeed value indicated by the airspeed pointer.

4.6.4.2 Maximum equivalent scale error (room temperature). The maximum equivalent pointer shall be tested at each test point in table IV. The errors shall not exceed those specified.

4.6.5 Friction error airspeed pointer. The airspeed pointer shall be tested for friction at every other asterisk test point beginning with the first asterisk test point in table II. The pressure shall be increased to bring the pointer to the approximate desired reading and held constant while two readings are taken, the first before the indicator is tapped, the second after the indicator is tapped. The difference between any two such readings shall not exceed the values specified in table I. The pointer shall move smoothly while the pressure is varied uniformly without vibrating the indicator. This test may be combined with the scale error at room temperature test.

4.6.5.1 Friction error maximum equivalent airspeed pointer. The maximum equivalent airspeed pointer shall be tested for friction at every other asterisk test point beginning with the first asterisk test point in table IV. The pressure shall be held constant while the two readings are taken, the first before the indicator is tapped and the second after the indicator is tapped. The difference between any two readings shall not exceed the tolerance specified in table I. The pointer shall move smoothly while the pressure is varied uniformly without the vibration of the indicator. This test may be combined with the scale error test.

4.6.5.2 Friction error mach scale. The mach scale shall be tested for friction at every other asterisk test point beginning with the first asterisk test point in table III. Pressure shall be decreased to bring the mach position to the desired test point and the position held constant while two readings are taken, the first before the indicator is tapped and the second after the indicator is tapped. The difference between any two readings shall not exceed the tolerances specified in table I. The mach scale shall move smoothly while the pressure is varied uniformly without vibration to the indicator. This test may be combined with the scale error test.

4.6.6 Position error

4.6.6.1 Position error-airspeed scale. The airspeed scale reading taken while the indicator is held in any position and is being tapped shall not differ from the reading when the indicator is in the normal position by more than the tolerances specified in table I. This test shall be conducted at three points in table I.

4.6.6.2 Mach scale. The mach scale reading taken while the indicator is held in any position and is being tapped shall not differ from the reading when the indicator is in the normal position by more than the tolerances specified in table I. Beginning with the first test point, this test shall be conducted at any four points specified in table III.

Table I. Test Tolerances

Tests and Test Points	Tolerance ±
Friction error and Position error	
Indicated airspeed pointer	
80 to 200 knots	3.0 knots
200 to 850 knots	5.0 knots
Maximum allowable pointer	10.0 knots
Mach scale	5.0 knots
Pointer zero position	+1/16 inch
Pointer error	
Maximum allowable pointer	10.0 knots
Vibration error	
Test altitude - 35,000 feet	
Indicated airspeed - 350 knots	
Maximum vibration - pointer and mach scale	10.0 knots
Maximum bariation - pointer and mach scale	10.0 knots
Overpressure	
Mach scale	3.0 knots
Pointer	3.0 knots
Static connection - 6 inches water	
Pitot connection - 55 inches Hg	
Low and High temperature operation	
Maximum allowable pointer	5.0 knots
Damping	
Time required for airspeed pointer to travel from full-scale deflection to the 90-knot graduation	+1.0 1.0 -0.2 second
Aging	
Pointer	2.0 knots
Mach scale	2.0 knots
Maximum allowable pointer	10.0 knots

Table II. Scale Error Tolerances

Speed - Knots	Differential Pressure Inches Hg	Tolerance Knots
80*	0.308	4.0
90	0.390	4.0
100*	0.481	3.0
110	0.583	3.0
120*	0.695	3.0
130	0.817	3.0
140*	0.949	3.0
150*	1.091	3.0
160*	1.244	3.0
170	1.406	5.0
180*	1.580	5.0
190	1.764	5.0
200*	1.959	5.0
220*	2.382	5.0
250*	3.104	5.0
280	3.924	5.0
300*	4.534	5.0
320	5.195	5.0
350*	6.286	5.0
380	7.502	5.0
400*	8.385	8.0
420	9.330	8.0
450	10.867	8.0
480	12.558	8.0
500*	13.776	8.0
520	15.069	8.0
550*	17.159	8.0
580	19.441	8.0
600*	21.075	10.0
650	25.589	10.0
700*	30.764	10.0
750	36.566	10.0
800*	42.938	10.0
850*	49.842	10.0

Note: Sampling and qualification tests except friction error shall be conducted at all test points. Individual tests except friction error shall be conducted at the test points marked with an asterisk. Friction error tests shall be conducted at every other asterisk test point beginning with the first.

Table III. Mach No. Scale Error Tolerances

Pressure Alt Ft X 1000	Inches Hg	Mach Settings	Indicated Airspeed	Tolerances Knots ±
0	29.9213	.5	331	5
0	29.9213	.6*	397	5
0	29.9213	.9*	595	5
0	29.9213	1.0	661	5
10	20.5770	.5*	277	5
10	20.5770	.7*	391	5
10	20.5770	1.1*	625	5
20	13.7500	.7*	324	5
20	13.7500	1.2	579	5
20	13.7500	1.4*	675	5
30	8.8854	.6*	223	5
30	8.8854	1.0	390	5
30	8.8854	1.6*	643	5
40	5.5380	.7	209	5
40	5.5380	1.0*	313	3
40	5.5380	1.5*	493	5
50	3.4246	.9*	219	5
50	3.4346	1.6*	425	5
60	2.1178	1.2	245	3
60	2.1178	1.7*	363	3
80	0.8099	1.8*	245	5
80	0.8099	2.0	274	5

Note: Sampling and qualification tests except friction error shall be conducted at all test points. Individual tests except friction error shall be conducted at the test points marked with an asterisk. Friction error tests shall be conducted at every other asterisk test point beginning with the first.

Table IV. Maximum Equivalent Scale Error Tolerances

Pressure Altitude Ft X 1000	Ve=600 Knots		Ve=700 Knots		Ve=800 Knots		Tolerance
	IAS	Mach	IAS	Mach	IAS	Mach	+ Knots
0	600*	0.9077	700	1.0590	800*	1.2102	10
5	610	0.9951	713	1.1609	813	1.3268	10
10	622*	1.0945	726*	1.2770	826	1.4594	10
15	635*	1.2083	738*	1.4096	837*	1.6100	10
20	647	1.3390	749	1.5621	847	1.7853	10
25	658*	1.4900	758*	1.7384	---	------	10
30	667	1.6656	767*	1.9432	---	------	10
35	675*	1.8712	774*	2.1830	---	------	10
40	682*	2.1098	---	------	---	------	10

Note: Sampling and qualification tests except friction error shall be conducted at all test points. Individual tests except friction error shall be conducted at the test points marked with an asterisk. Mach No's are for reference only. Friction error tests shall be conducted at every other asterisk test point beginning with the first.

4.6.6.3 Maximum allowable pointer. The maximum allowable pointer shall be set at the 700-knot increment and the indicator at any position while being lightly tapped. The maximum allowable pointer reading shall not differ from the reading when the indicator is held in the normal position by more than the tolerances specified in table I.

4.6.7 Pointer zero poisition error. The zero position of the pointer with no differential pressure applied to the indicator shall be within the values specified in table I.

4.6.8 Low temperature operation. The indicator shall be subjected to the room temperature scale error test except that during and for 3 hours prior to the test, the temperature shall be -35 C. The test shall be conducted at the test points specified in tables II and III and at the 700 maximum allowable pointer setting in table IV. Allowable scale errors shall not exceed those specified in tables II and III by more than two knots and in table IV by more than 5 knots. The indicator shall not be damaged by this test. During this test, the adjustment index shall retain its original setting within 10 knots and shall operate satisfactorily throughout its range at all points.

4.6.9 High temperature operation. This test shall be in accordance with 4.6.8 except the temperature shall be +45°C.

4.6.10 Lighting. The indicator shall be subjected to the individual lighting tests of MIL-L-27160.

4.6.10.1 Visual comparison. This test shall be conducted by qualified personnel only after they have been tested for normal color vision and have spent at least 20 minutes in the dark to become dark adapted. The prime standard and the indicator under test shall be placed side-by-side at eye level in completely dark surroundings and compared as described in the following paragraphs.

4.6.10.1.1 Brightness. With 2.50 +0.01V applied to the indicator under test and 2.40 and 2.60V applied consecutively to the lighting terminals of the prime standard, like areas of the pointers, numerals, indicia, markings, et cetera, of the indicator under test and the prime standard shall be compared for brightness. The two instruments shall also be compared for lighting uniformity. The brightness of the production unit at 2.50V shall fall within the brightness settings of the prime standard when set at 2.40 and 2.60V. If the brightness is dissimilar in any individual area or the lighting of the indicator and prime standard is not uniform, the questionable areas of the production units shall be measured with a photometer in accordance with MIL-L-27160. If the production units fail this test, they shall be rejected and returned for rework. Qualification units shall not be tested by use of the prime standard.

4.6.10.1.2 Color. The color comparison test shall be conducted as specified in 4.6.10.1.1, except 4.50V shall be applied to both the production indicator and the prime standard. The two indicators shall be identical in color.

4.6.11 Dial visibility. The indicator shall be viewed from a point on and within a circle formed by the intersection of a plane parallel to and 24 inches from the front surface of the instrument coverglass and frustum of a cone the side of which makes an angle of 30 degrees with a perpendicular to the dial and of which the small diameter is the aperture of the indicator case. The pointer numerals, and at least 1/16 inch of the shortest graduation shall be visible from any point on and within the above defined circle.

4.6.12 Damping. Sufficient pressure shall be applied to the pitot connection to produce full-scale deflection of the airspeed pointer. The pressure shall suddenly be released. The time required for the airspeed pointer to reach the value specified in table I shall be equal to the time and within the tolerance specified therein.

4.6.13 Overpressure. The pitot and static pressures as specified in table I shall be applied to the indicator for a period of 10 minutes. Not less than 5 minutes following the applications of this overpressure, the indicator shall be tested for scale error as specified in the scale error at room temperature test. The errors at the test points shall not exceed those specified in tables II, III and IV by more than the values specified in table I. During this test the adjustment index shall retain its original setting within 10 knots and shall operate satisfactorily throughout its range at all test points.

4.6.13.1 Prior to the test specified in 4.6.13 a pressure of 32.0 inches Hg shall be applied to the static port and a pressure of 29.92 inches Hg shall be applied to the pitot port for a period of 10 minutes. Within 5 minutes following the application of these pressures, the indicator shall be tested for scale error as specified in the scale error at room temperature tests. The errors at the test points shall not exceed those specified in tables II, III, and IV.

4.6.14 Vibration error. The indicator shall be mounted on the vibration stand in its normal operating position and secured by flange screws positioned as on an aircraft panel. While being operated at the condition specified in table I the indicator shall be vibrated with circular motion in a plane inclined 45 degrees to the horizontal plane with a diameter of circular motion between 0.003 and 0.005 inches. The frequency of applied vibration shall be varied slowly from 5 to 50 cycles per second. The natural frequency of the indicator shall not occur in this range. While being vibrated, the indicator shall be tested at test points specified in table I. The maximum total spread of pointer vibration and the pointer variation from its original position shall not exceed the values specified in table II.

4.6.15 Lighting. The indicator shall be subjected to and shall meet the sampling plan A lighting tests of MIL-L-27160.

4.6.16 Low temperature exposure. The indicator shall be subjected to a low temperature test in accordance with MIL-STD-810, Method 502.1 for a period of 48 hours at -62° ±2°C. At the end of the 48-hour period, the temperature shall be raised to -54° ±2°C and shall be maintained at this temperature for 4 hours. While still at this temperature, the indicator shall be tested for scale errors at the asterisk test points specified in tables II, III, and at the 700 knot test point in table IV. The scale errors at the test points

shall not exceed those specified in tables II and III by more than 2 knots and shall not exceed those specified in table IV by more than 5 knots. After the indicator has returned to room temperature, it shall meet the individual tests.

4.6.17 High temperature exposure. The test specified in 4.6.16 shall be repeated except that the indicator shall be subjected to a high temperature test in accordance with MIL-STD-810, Method 501.1, procedure I. After the indicator has returned to room temperature, it shall meet the individual tests.

4.6.18 Vibration failure. The vibration failure tests shall be conducted in accordance with MIL-STD-810, Method 514.2, procdure 1, figure 514.2-2, curve B at frequencies from 5 to 500 Hz. The indicator shall then be subjected to and shall meet the individual tests.

4.6.19 Magnetic effect. The indicator shall be held in various positions with its nearest part 5 inches from the center of a short-bar magnetic compass with compensator magnets removed and which is set up in a uniform magnetic field having a horizontal intensity between 0.17 and 0.19 oersted. The various positions shall be so chosen as to include that position which causes the maximum deflection of the compass. The maximum deflection shall not exceed 1°.

4.6.20 Acceleration. The acceleration test shall be performed in accordance with MIL-STD-810, Method 513.2, procedure I. After testing, the indicator shall be subjected to and shall meet the individual tests.

4.6.21 Humidity. The indicator shall be subjected to a humidity test in accordance with MIL-STD-810, Method 507.1, procedure I. The indicator shall then be subjected to and shall meet the individual tests.

4.6.22 Salt-fog. The indicator shall be subjected to a salt-fog test in accordance with MIL-STD-810, Method 509.1, procedure I, for a period of 48 hours. At the end of the 48-hour period, there shall be no damage or deterioration to any part of the indicator. The indicator shall then be subjected to and shall meet the individual tests.

4.6.23 Fungus. The indicator, including applicable external connectors, shall be subjected to a fungus test in accordance with MIL-STD-810, Method 508.1, procedure I. At the end of the test period, the indicator shall be examined to ascertain that no fungus growth has occurred. The indicator shall then be subjected to and shall meet the individual tests.

4.6.24 Lighting. The indicator shall be subjected to and shall meet the sampling plan B lighting tests of MIL-L-27160.

4.6.25 Seasoning (AVU-8/A, AVU-8A/A, AVU-8B/A). The indicator shall be subjected to a minimum of 250 hours of pressure cycling at a rate of 4 cycles per hour. Each cycle shall consist of an application of a differential pressure sufficient to produce approximately full scale deflection of the indicator and then removal of the differential pressure so that the indicator returns to a zero airspeed indication. During this testing the indicator shall be subjected to temperature and vibration cycling in accordance with

MIL-STD-781, test level F, and at the completion of cycling the indicator shall be subjected to and shall meet the individual tests. The tolerances shall be increased by 100 percent of the basic specification tolerance or ±5 knots, whichever is less, for scale error, friction error, and position error tests. Failure to meet any test shall be considered a malfunction. In case of malfunction of any kind, the malfunction shall be recorded, the procuring activity shall be notified, and the seasoning test interrupted while analysis is conducted and repairs are made. The tests shall then be continued from the point of interruption. If recalibration is required to pass any scale error test, an additional malfunction shall be charged against the test. No more than three failures shall be allowed with no two failures on the same indicator of the same mode.

4.6.26 Seasoning (AVU-8C/A). The test as specified in 4.6.25 shall be conducted except that the test shall consist of a minimum of 1,000 hours of pressure cycling. After each 250 hours of cycling and at the completion of 100 percent of the basic specification tolerance, or 5 knots, whichever is less, shall be allowed for scale error, friction error and position error after the first 250-hour period. An additional 100 percent of the basic tolerance or 5 knots, whichever is less, shall be allowed over the remaining 750 hours of testing. No more than five failures shall be allowed with no more than two failures of the same mode on one indicator.

4.6.27 Shelf-like (aging). Indicators shall be placed in storage for a period of not less than 30 days. During the 30-day period; the indicators shall remain as dormant as practicable. The mechanism shall not be exercised other than that caused by normal ambient pressure vibrations. The temperature shall remain essentially constant; however, normal room temperature variations will be permissible. After the 30-day period, the indicators shall again be subjected to and shall meet the individual tests. In addition to meeting the tolerances specified for scale error, the readings shall not vary from the original scale error readings by more than the values specified in table I. Once the original scale error characteristics have been determined, re-calibration is not allowed during shelf life tests.

4.7 Inspection and tests. Tests of methods of preservation shall be accomplished in accordance with Section 4 of MIL-P-116 to insure compliance with Section 5 of this specification.

5. PACKAGING

5.1 Preservation-packaging. Preservation-packaging shall be level A or C as specified.

5.1.1 Level A.

5.1.1.1 Cleaning. Units shall be cleaned in accordance with process C-1 of MIL-P-116.

5.1.1.2 Drying. Units shall be dried in accordance with process D-4 of MIL-P-116.

5.1.1.3 Preservation-application. Not applicable

5.1.1.4 Unit packaging. Unless otherwise specified by the procuring activity, each indicator, torque pressure, magnesyn style, single clamp mounted, shall be packaged in quantity unit packs of one each in accordance with method III of MIL-P-116. Each indicator shall be overboxed in PPP-B-636 carton. Carton shall be large enough to allow for application of sufficient cushioning material between container and bag, of a type, density, and thickness to insure shock transmission does not exceed peak values in G's established for the indicator when completed packs are subjected to rough handling drop tests of MIL-P-116.

5.1.2 Level C. Units shall be clean, dry, and individually packaged in a manner that will afford adequate protection against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity.

5.2 Packing. Packing shall be level A, B, or C as specified.

5.2.1 Level A. Indicators packaged as specified in 5.1.1 shall be packed in shipping containers conforming to PPP-B-601, styles A and B, Class overseas, unless otherwise specified by the procuring activity. Insofar as practical, exterior shipping container shall be of uniform shape, size, and of minimum tare and cube, consistent with the protection required.

5.2.2 Level B. Indicators packaged as specified in 5.1.1 shall be packed in weather-resistant class exterior shipping containers conforming to PPP-B-636. Other requirements as specified in 5.2.1 above are applicable.

5.2.3 Level C. Packing shall be applied which affords adequate protection during domestic shipment from the supply source to the first domestic receiving activity for immediate use. This level shall conform to applicable carrier rules and regulations and may be the contractor's commercial practice provided the latter meets the requirements of this level.

5.3 Marking. In addition to the requirements of the contract or order (see 6.2), unit containers and shipping containers shall be marked for shipment in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The indicator covered by this specification is intended for use on high speed aircraft to indicate airspeed and mach number on a single dial, with maximum allowable equivalent airspeed pointer. The indicated airspeed range is from 80 to 850 knots at altitudes from -1,000 to +80,000 feet.

6.2 Ordering data. Procurement documents should specify the following:

a. Title, number and date of this specification

b. Indicators which have been subjected to the sampling tests may be delivered on contract provided:

(1) The sample has been refurbished

(2) The item meets the individual tests, and

(3) The sample is representative of production indicators currently being accepted.

c. When Sampling Plan B tests are not to be conducted

d. Levels of preservation, packaging and packing required (see 5.1 and 5.2)

e. Special shipment marking (see 5.3)

f. When Sampling Plans A or D tests shall be conducted

6.3 Definition.

6.3.1 Refurbished. Refurbished means that the indicator has been completely overhauled, that all component parts meet current parts standards, and that the indicator meets all requirements of a new indicator.

6.4 Certain provisions of this specification are the subject of international standardization agreement ABC AIR STD's 10/41C and 10/46. When amendment, revision or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Offices so that appropriate action may be taken respecting the international agreement concerned.

6.5 Changes from previous issue. Asterisks were not used to indicate changes from the previous issue due to the extensiveness of the changes.

Custodian:
Air Force - 99

Review activity:
Air Force - 11

Preparing activity:
Air Force - 71

Project number:
6610-F025

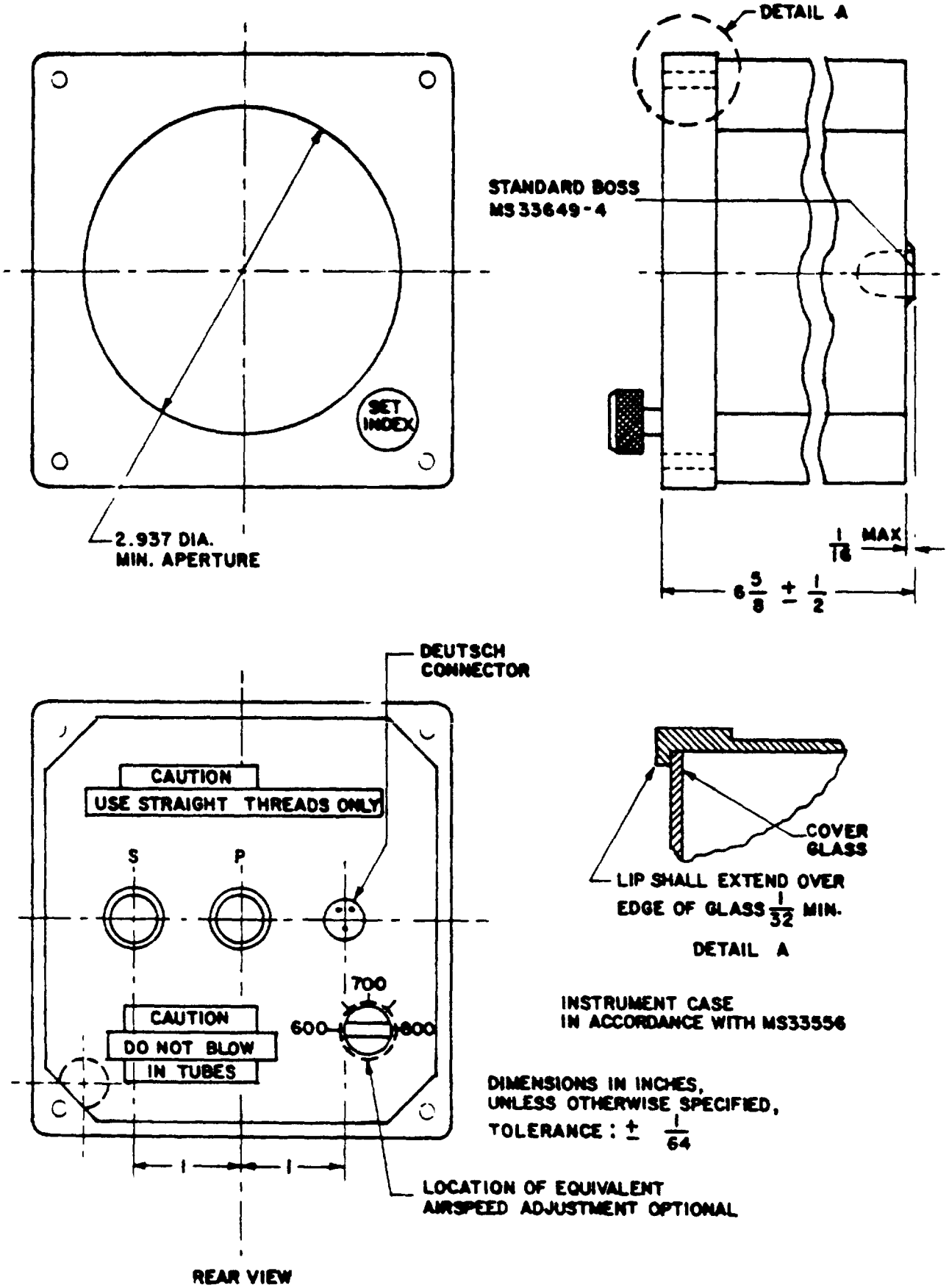


FIGURE 1. Case (AVU-8/A, AVU-8A/A, AVU-8B/A)

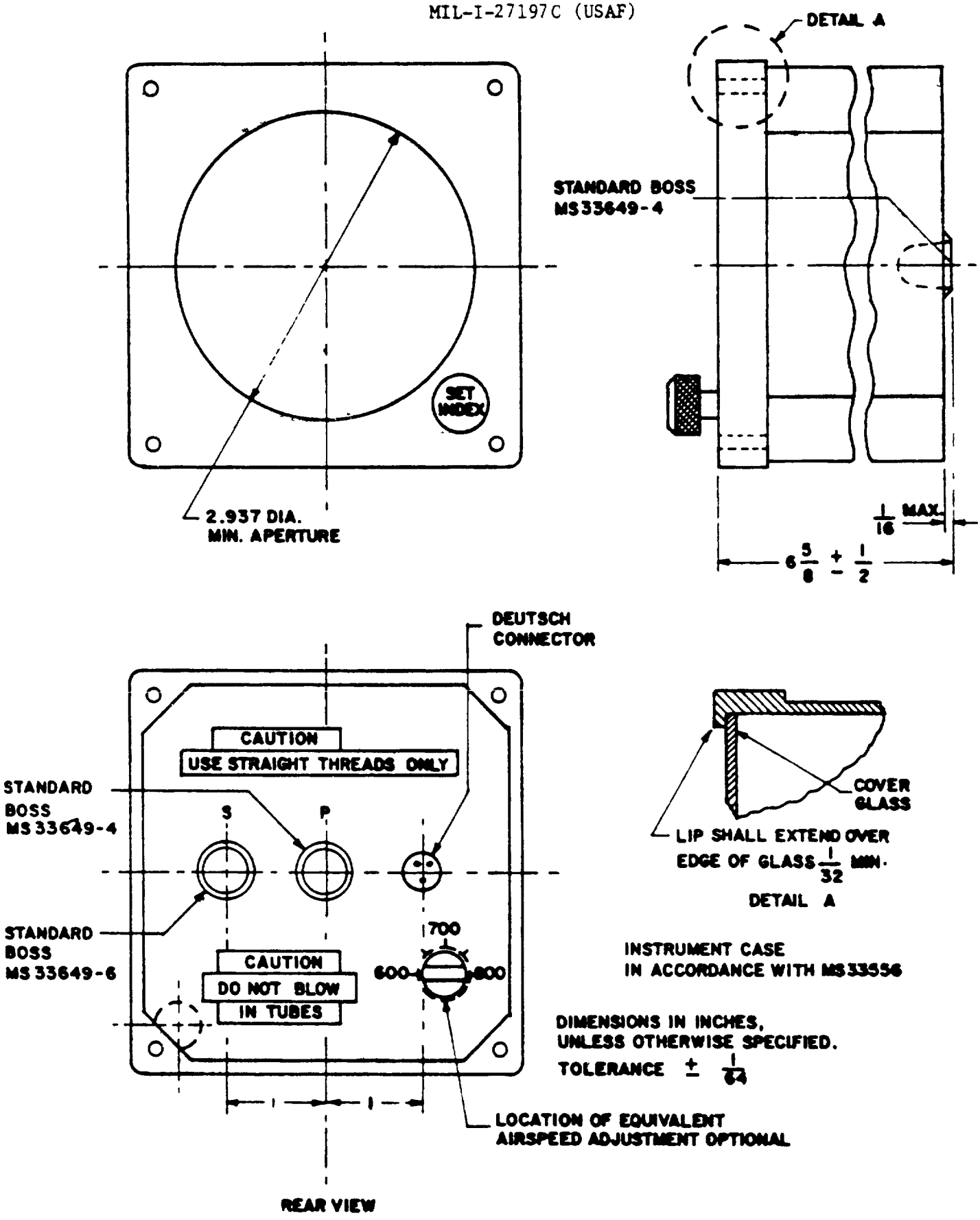
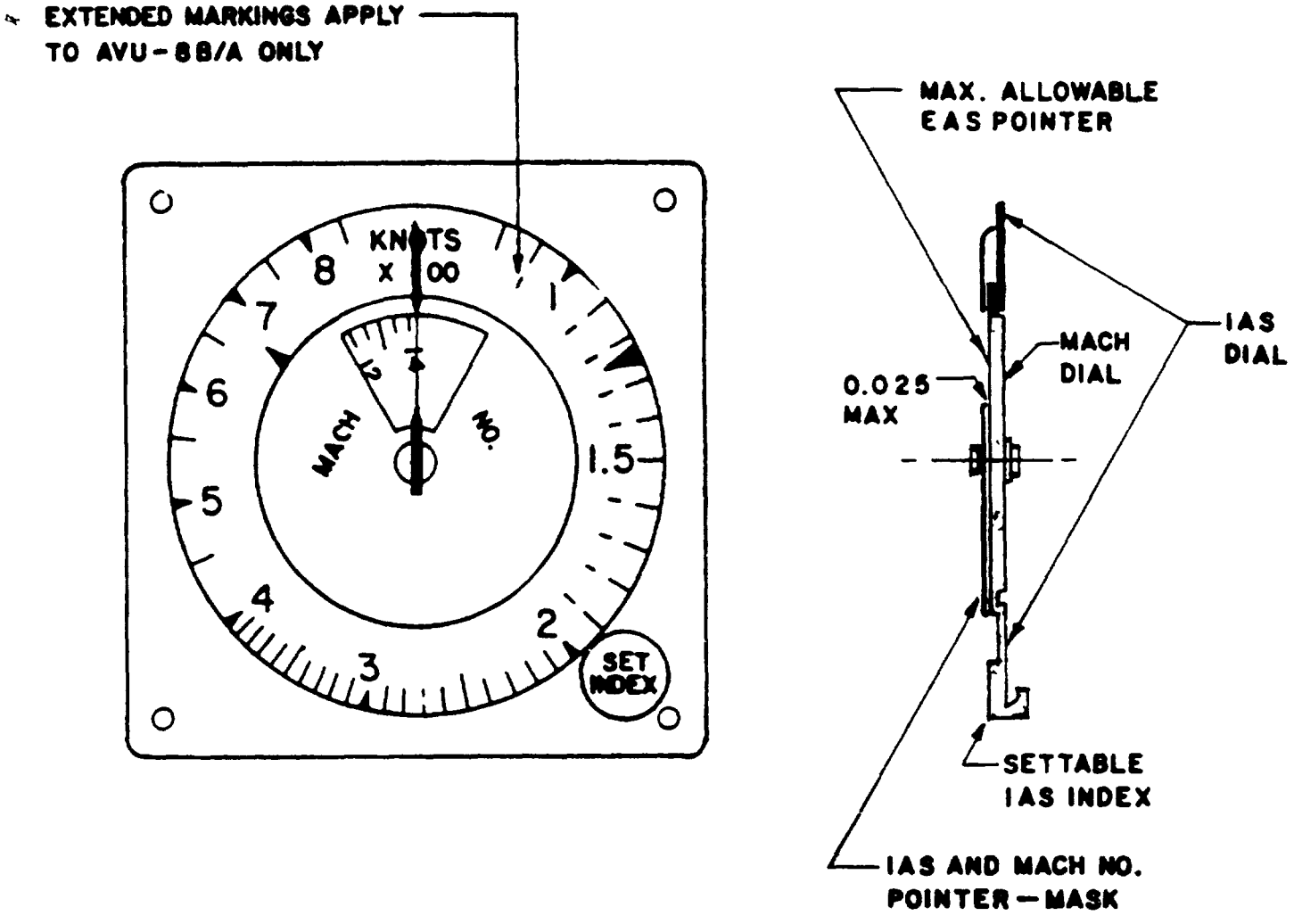
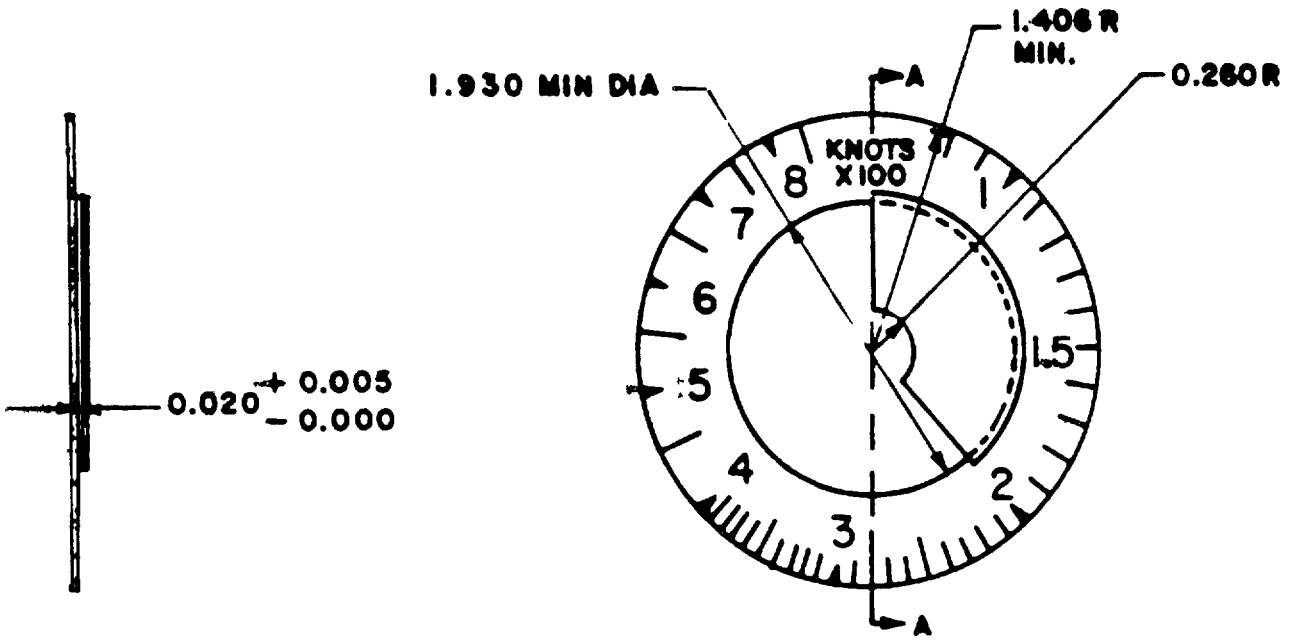


FIGURE 2. Case (AVU-8C/A)



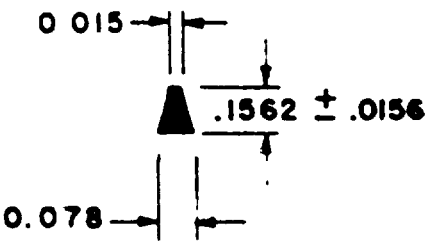
DIMENSIONS IN INCHES.
UNLESS OTHERWISE SPECIFIED.
TOLERANCE: DECIMALS ± 0.010

FIGURE 3. Dial arrangement * (AVU-8/A, AVU-8A/A, AVU-88/A, AVU-8C/A)



SECTION A – A

LINEARITY OF SCALE DISTRIBUTION BELOW 190 KNOTS TO BE MAINTAINED WITHIN 1 1/4 ANGULAR DEGREES BETWEEN 10 – KNOT INCREMENTS

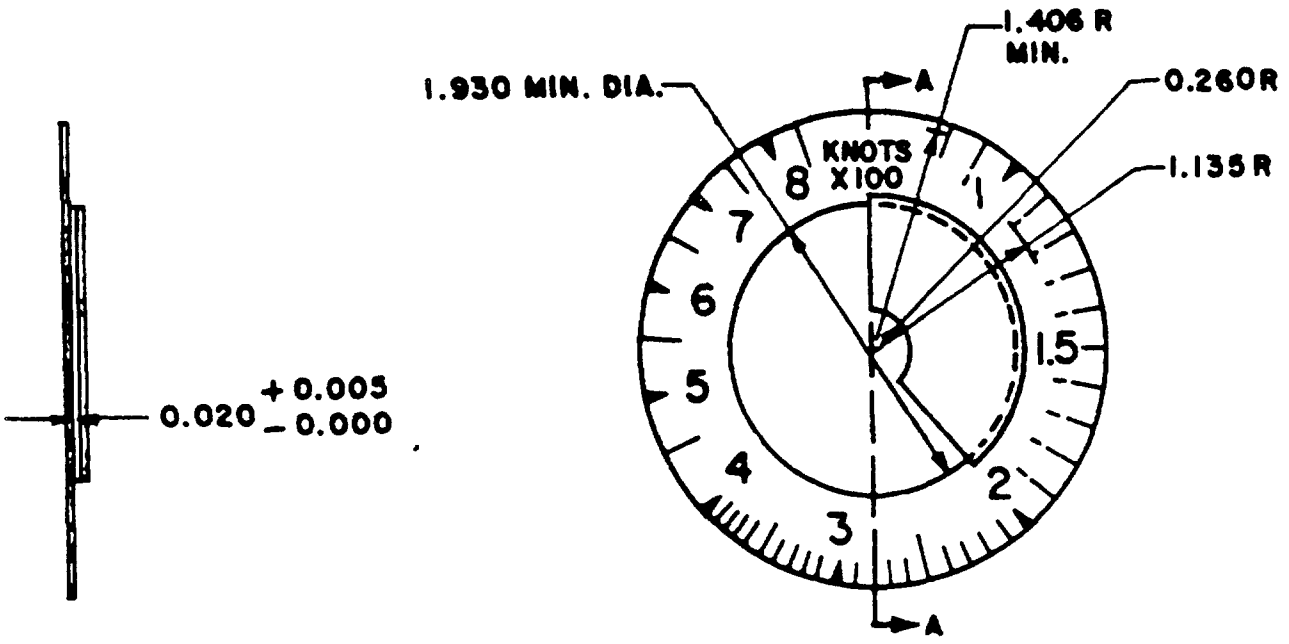


100 – KNOT GRADUATIONS

DIMENSIONS IN INCHES.
UNLESS OTHERWISE SPECIFIED, TOLERANCE:
DECIMALS ± 0.010

FIGURE 4. Airspeed Dial (AVU-8/A, AVU-8A/A, AVU-8C/A).

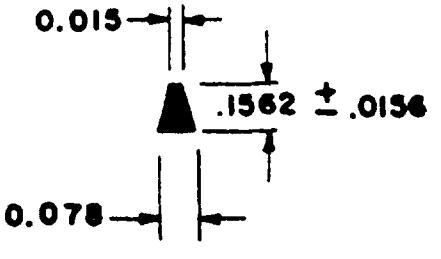
NOTE: The 80 knot graduation shall be located as shown in this figure 20° ± 5° clockwise from the vertical centerline of the dial.



SECTION A–A

LINEARITY OF SCALE DISTRIBUTION BELOW 190 KNOTS TO BE MAINTAINED WITHIN $1\frac{1}{4}$ ANGULAR DEGREES BETWEEN 10 – KNOT INCREMENTS

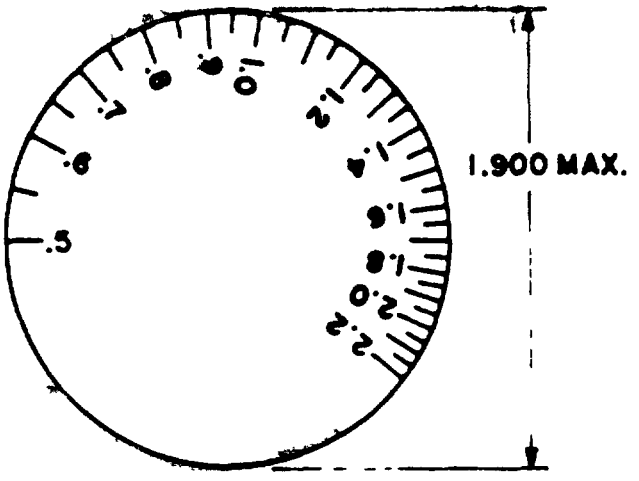
DIMENSIONS IN INCHES.
UNLESS OTHERWISE SPECIFIED, TOLERANCE :
DECIMALS ± 0.010



100–KNOT GRADUATIONS

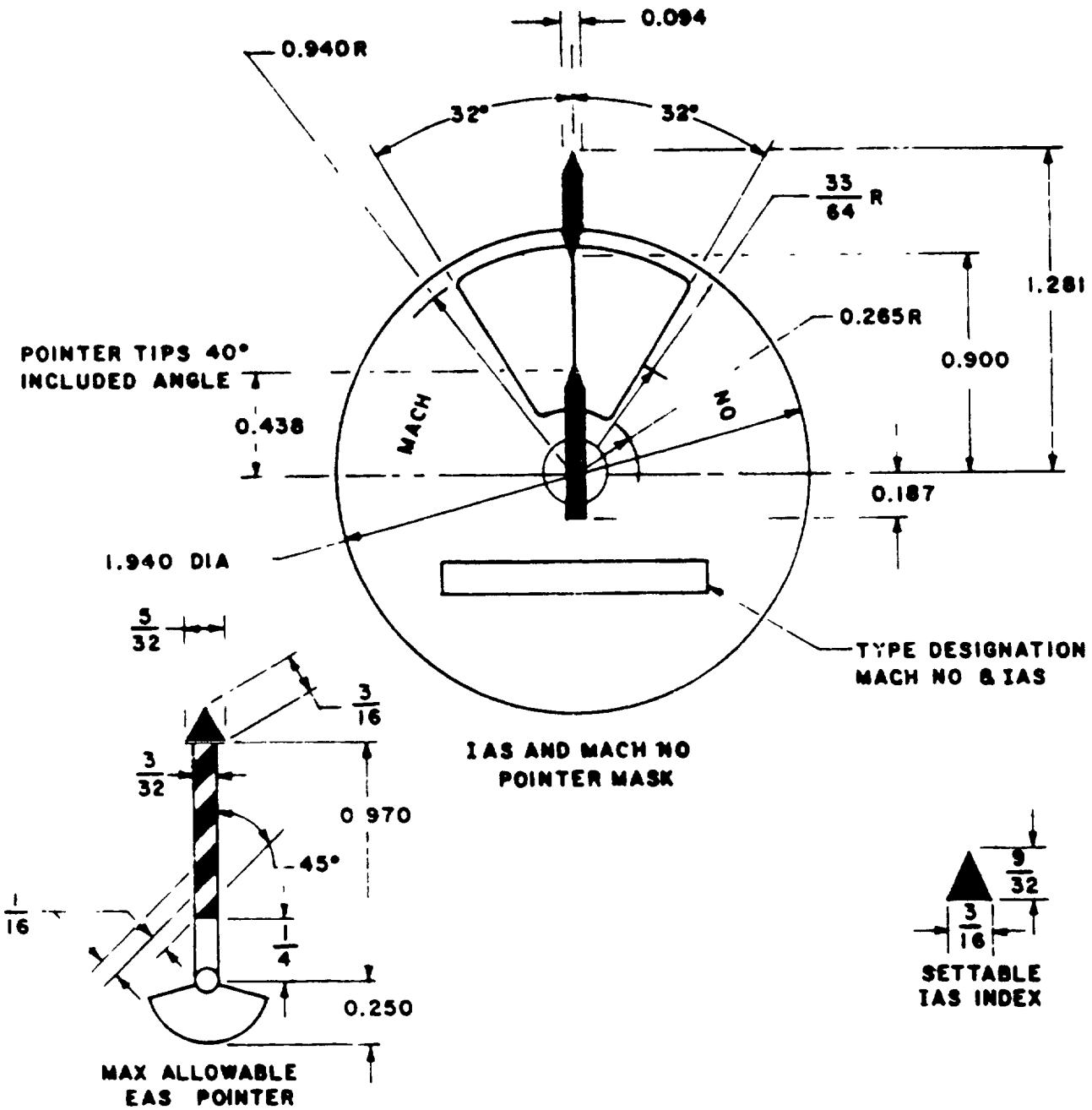
FIGURE 5. Airspeed Dial (AVU–88 /A).

NOTE: The 80 knot graduation shall be located as shown in this figure 20° ± 5° clockwise from the vertical centerline of the dial.



DIMENSIONS IN INCHES.
UNLESS OTHERWISE SPECIFIED, TOLERANCE: DECIMALS ± 0.010

FIGURE 6. Mech Dial.



SHADED PORTIONS OF MAX. ALLOWABLE EAS POINTER SHALL BE COLOR NO. 31136, FED-STD-595

DIMENSIONS IN INCHES. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DECIMALS ± 0.010, FRACTIONS ± 1/64, ANGLES ± 0.5°

FIGURE 7. Mask and maximum allowable pointer.

NOTE: The settable IAS index shall be lusterless white, Color No. 37875 of FED-STD-595 for the AVU-8/A, AVU-8A/A, and AVU-8B/A.
For the AVU-8C/A, the settable IAS index shall be of a lusterless fluorescent green, Color No. 36001 of FED-STD-595.

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(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-I-27197C	

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)* _____

5. PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

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