

INCH-POUND

MIL-DTL-25308C

1 November 2010

Superseding

MIL-G-25308B

2 December 1971

## DETAIL SPECIFICATION

GAGE, PRESSURE, DIAL INDICATING, HYDRAULIC, TYPE ME-1

Inactive for new design after 9 March 1999.

### 1. SCOPE

1.1 Scope. This specification covers the requirements for one type of hydraulic, dial indicating, pressure gage, designated type ME-1.

### 2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3, 4, or 5 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents cited in sections 3, 4, or 5 of this specification, whether or not they are listed.

#### 2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks of the exact revision listed below form a part of this document to the extent specified herein.

Comments, suggestions, or questions on this document should be addressed to Defense Logistic Agency Aviation VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5610 or emailed to [STDZNMGT@dla.mil](mailto:STDZNMGT@dla.mil). Since contact information can change, you may want to verify the currency of this address information using the ASSIST Online database at <https://assist.daps.dla.mil>.

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### FEDERAL STANDARD

- FED-STD-595/37038 - Black, Flat or Lusterless
- FED-STD-595/37875 - White, Flat or Lusterless

### DEPARTMENT OF DEFENSE SPECIFICATIONS

- MIL-DTL-5541 - Chemical Conversion Coatings on Aluminum and Aluminum Alloys
- MIL-PRF-6085 - Lubricating Oil: Instrument, Aircraft, Low Volatility
- MIL-S-7742 - Screw Threads, Standard, Optimum Selected Series: General Specification for
- MIL-A-8625 - Anodic Coatings for Aluminum and Aluminum Alloys
- MIL-B-27497 - Bearing, Jewel, Sapphire or Ruby, Synthetic
- MS28105 - Cover Glass, Aircraft Instrument Dial
- MS33639 - Cases, Instrument, Clamp-mounted, Aircraft

### DEPARTMENT OF DEFENSE STANDARDS

- MIL-STD-130 - Identification Marking of U.S. Military Property
- MIL-STD-810 - Environmental Engineering Considerations and Laboratory Tests
- MIL-STD-810B, Notice 1 - Environmental Test Methods, dated 20 October 1969, method 514.1 – Vibration test only
- MIL-STD-810B - Environmental Test Methods, dated 15 June 1967 and including corrections of Notice 4 dated 21 September 1970, method 504 – Temperature-Altitude test only
- MIL-STD-889 - Dissimilar Metals

### DEPARTMENT OF DEFENSE HANDBOOKS

- MIL-HDBK-781 - Reliability Test Methods, Plans, and Environments for Engineering Development, Qualification, and Production
- MIL-HDBK-831 - Preparation of Test Reports

(Copies of the above documents are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094 or online at <https://assist.daps.dla.mil>.)

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2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

## SAE INTERNATIONAL – AEROSPACE

|                    |  |
|--------------------|--|
| SAE AMS-QQ-P-416 - | Plating, Cadmium (Electrodeposited)                            |
| SAE AS5202 -       | Port or Fitting End, Internal Straight Thread, Design Standard |

(Copies of SAE documents are available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001 or on-line at [www.sae.org](http://www.sae.org).)

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein (except for related specification sheets), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

### 3. REQUIREMENTS

#### 3.1 Materials.

3.1.1 Nonmagnetic materials. Nonmagnetic materials shall be used for all parts of the gage except where magnetic materials are essential.

3.1.2 Nonferrous materials. Nonferrous materials shall be used for all parts of the gage except where ferrous materials are essential.

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

3.1.4 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.

3.1.5 Toxic and corrosive fumes. The gage shall be of such material and construction that fumes, when burned, or gases that combine with the atmosphere to form acid or corrosive alkali will not be liberated.

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3.1.6 Protective treatment. When materials are used in the construction of the gage 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 requirements of this specification. The use of any protective coating that will crack, chip, or scale with age or extremes of climatic or environmental conditions shall be avoided.

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

3.2 Design and construction. The gage shall be designed to indicate directly the pressure in aircraft hydraulic and pneumatic systems. The gage shall be so constructed that no parts will work loose in service and shall be built to withstand the strains, jars, vibrations and other conditions incident to shipment, storage, installation and service.

3.2.1 Pivots, bearings and gears. Pivots, bearings and gears shall neither bind nor shake and shall be as frictionless as practicable.

3.2.2 Adjustment mechanism. When the gage is so designed as to permit adjustment, it shall be provided with a means for adjusting or correcting the indications which shall be simple to manipulate and so designed that adjustments can be made without the use of special tools. The means of adjustment need not be outside the case.

3.2.3 Separate mechanism. The gage mechanism shall be comprised of units distinct from the case. The gage shall be sufficiently rugged that small distortions of the case will not affect accuracy of the indication.

3.2.4 Reliability. The gage shall have a minimum acceptable mean-time-between-failures (MTBF) of 2,000 hours based upon a discrimination ratio of 1.5 and a confidence factor of 90 percent.

3.3 Performance. The gage shall operate satisfactorily after subjection to the following conditions:

- a. Temperatures – operating temperatures ranging from  $-54^{\circ}\text{C}$  to  $+100^{\circ}\text{C}$  ( $-65^{\circ}\text{F}$  to  $+212^{\circ}\text{F}$ ) and non-operating temperatures ranging from  $-65^{\circ}\text{C}$  to  $+145^{\circ}\text{C}$  ( $-85^{\circ}\text{F}$  to  $+293^{\circ}\text{F}$ ).
- b. Vibration – vibration of 2g from 5 to 500 Hz.
- c. Temperature-altitude – pressure altitude of 100,000 feet at  $-55^{\circ}\text{C}$  ( $-67^{\circ}\text{F}$ ).
- d. Salt fog – exposure to salt sea atmosphere for 48 hours without evidence of corrosion or deterioration.

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- e. Humidity – relative humidity to 95 percent.
- f. Fungus – fungus growth as encountered in tropical climates.
- g. Dust – exposure to dry dust-laden atmosphere.
- h. Overpressure – overpressure of 5,000 pounds per square inch (psi)

3.3.1 Tolerances. The gage shall operate within the tolerances specified in tables I and II.

TABLE I. Scale error tolerance,  $\pm$ psi.

| Test Pressure (psi) | Dust<br>Room temp.<br>Salt fog<br>Humidity | Low temp. operation<br>Low temp. exposure<br>High temp. operation<br>Altitude<br>Vibration | High temp. exposure |
|---------------------|--|--|---------------------|
| 0                   | 50   | 75   | 100                 |
| 500                 | 50   | 100  | 125                 |
| 1,000               | 50   | 100  | 125                 |
| 1,500               | 50   | 100  | 125                 |
| 2,000               | 50   | 125  | 150                 |
| 2,500               | 50   | 125  | 150                 |
| 3,000               | 50   | 125  | 150                 |
| 3,500               | 75   | 125  | 150                 |
| 4,000               | 75   | 125  | 150                 |

TABLE II. Test Pressures and tolerances.

| Test                       | Test Pressure (psi) | Tolerance ( $\pm$ psi) |
|----------------------------|---------------------|------------------------|
| Friction error – all tests | ----                | 75.0                   |
| Position error             | 2,000               | 30.0                   |
| Overpressure               | 5,000               | 80.0 + room temp tol   |
| Seasoning                  | ----                | 20.0 + room temp tol   |
| Vibration                  | 2,000               |                        |
| Pointer oscillation        |                     | 100                    |
| Pointer variation          |                     | 100                    |

3.4 Part numbering of interchangeable parts. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable.

3.5 Case. The case shall consist of a body and a bezel ring and shall conform to figure 1. The case body shall be made of either nonferrous, low-density metal or of a synthetic material, shall be uniform in texture and shall have a smooth surface. The bezel and that part of the case visible from the cockpit side of the instrument panel shall be finished in lusterless black per FED-STD-595, color 37038. The remainder of the case may be finished in black and shall be adequately

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protected to satisfactorily withstand the environmental conditions specified herein. Synthetic material shall be of a thermal-setting type composed of a suitable filler and phenal condensation product binder.

3.6 Mounting nuts. When attached insert nuts are used, each mounting lug shall be fitted with #6 (0.138 inch)-32 UNC-2B self-locking insert nuts which shall be so attached as to prevent loosening under an axial load of 25 pounds (lbs) and prevent turning under a torque of 10 inch-pounds (in-lbs).

3.7 Boss. The boss on the gage shall conform to SAE AS5202-04. Flats shall be provided on the side of the boss for a minimum distance of 0.375 in. to permit the use of a wrench to tighten the mating fitting.

3.8 Cover glass. The cover glass shall be in accordance with MS28105. The thickness shall be the minimum practicable and entirely suitable for the purpose.

3.9 Dial to cover glass distance. The distance between the inner surface of the cover glass and the dial shall be the minimum practicable and shall not exceed 0.125 in.

3.10 Cover glass to edge of case distance. The distance between the outer surface of the cover glass and the front edge of the case shall be the minimum practicable and shall not exceed 0.031 in.

3.11 Pointer. The pointer shall conform to figure 2.

3.11.1 Pointer finish. The visible portion of the pointer shall be lusterless white per FED-STD-595, color 37875.

3.12 Overpressure stop. An overpressure stop shall be provided to restrain the prime mover and to prevent disengagement of the pinion and sector gears during service use and under the test conditions specified herein. The stop shall allow the pointer to travel beyond full scale and to a point within  $\pm 10^\circ$  from the horizontal centerline of the dial.

3.12.1 Range marks. Two range marks of lusterless black per FED-STD-595, color 37038 shall be located  $10^\circ$  on either side of the horizontal centerline on the right-hand side of the dial.

3.13 Dial. The dial shall conform to figure 1 and shall be constructed of metal. The minimum diameter across the outside ends of the graduation marks shall be 1.75 in. The 2,000 psi graduation shall be located on the horizontal centerline at the left side of the dial. If screws are used to fasten the dial, they shall be located on the horizontal centerline of the dial.

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3.13.1 Markings. The markings shall be as specified in table III. Unless specified, the location of the markings are optional.

TABLE III. Marking details.

|                            | Height or length,<br>in.<br>±0.016 | Width of line or<br>Graduation, in.<br>±0.005 | Color<br>Per FED-STD-595 |
|----------------------------|------------------------------------|---|--------------------------|
| Numerals, 0, 1, 2, 3, 4    | 0.156                              | 0.025   | 37875                    |
| Major graduations          | 0.188                              | 0.031   | 37875                    |
| Minor graduations          | 0.094                              | 0.020   | 37875                    |
| Lettering "HYD PRESS"      | 0.125                              | 0.025   | 37875                    |
| Lettering "PSI X 1000"     | 0.094                              | 0.020   | 37875                    |
| Lettering "USAF TYPE ME-1" | 0.063                              |   | 37038                    |
| Dial face                  |                                    |   | 37038                    |
| All other markings         |                                    |   | 37038                    |

3.14 Screw threads. Unless otherwise specified, screw threads shall be in accordance with MIL-S-7742.

3.15 Lubricants. Lubricants shall conform to MIL-L-6085.

3.16 Weight. The weight of the gage shall not exceed 0.5 lbs.

3.17 Jewel bearing. When synthetic sapphire or ruby bearings are used, they shall conform to MIL-B-27497.

3.18 Finishes and protective coatings.

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

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

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

3.18.1.3 Paint base. 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.

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3.18.1.4 Non-aluminum inserts. Castings containing non-aluminum integral inserts may be treated with a chemical film in accordance with MIL-C-5541 may be used in lieu of anodizing.

3.18.1.5 Abrasion resistance. When abrasion resistance is a factor, parts shall be anodized.

3.18.2 Steel parts. Cadmium plating of steel parts, when used, shall be in accordance with AMS-QQ-P-416, type II or III, as applicable, and of a class that is adequate to achieve the degree of protection required.

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

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

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

3.20.3 Screw assemblies. Assembly screws and bolts shall be tight. The word tight means that the screw or bolt cannot be appreciably tightened further without damage or injury to the screw or bolt or threads.

3.20.4 Cleaning. The gage shall be thoroughly cleaned of loose, spattered or excess solder, metal chips and other foreign materials after final assembly. Burrs and sharp edges, as well as resin flash that may crumble, shall also be removed.

#### 4. VERIFICATION

4.1 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3)
- b. Conformance inspection (see 4.4)



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4.2 Test conditions.

4.2.1 Standard atmospheric conditions. Wherever the pressure and temperature existing at the time of the test are not specified definitely, the test shall be performed at standard atmospheric pressure (approximately 29.92 in Hg) and at room temperature (approximately 25°C (77°F)). When tests are made with conditions appreciably different from the above values, proper allowances shall be made for the difference from the specified condition.

4.2.2 Attitude. Unless otherwise specified, the gage shall be tested with the mounting surface in a vertical position and the gage face in the proper orientation.

4.2.3 Tapping or vibrating. Unless otherwise specified, the gage shall be lightly tapped or vibrated before each reading.

4.3 First article testing.

4.3.1 Test samples. The test samples shall consist of 10 gages representative of the production equipment. The samples shall be identified with the manufacturer's part number and such other information as required by the qualifying activity. The following quantities of samples shall be tested:

- a. Reliability test only – 7 samples
- b. All tests except reliability – 3 samples

4.3.2 Test report. The contractor shall submit a test report covering all testing. MIL-HDBK-831 may be used for guidance.

4.3.3 Qualification tests. The qualification test shall consist of all the tests specified in 4.5.

4.4 Conformance tests. Conformance tests shall consist of:

- a. Individual tests.
- b. Sampling tests.

4.4.1 Individual tests. Each gage shall be subjected to the following tests as described under 4.5:

- a. Examination of product.
- b. Scale and friction error.
- c. Position error.

4.4.2 Sampling tests.

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4.4.2.1 Sampling plan A. One gage shall be selected at random from each 100 or less produced on the contract or order and subjected to the following tests as described under 4.5:

- a. Individual tests.
- b. Vibration.
- c. Low temperature operation.
- d. High temperature operation.

4.4.2.2 Sampling plan B. Unless otherwise specified, three gages shall be selected at random from the first 15 produced on the contract or order and subjected to the following tests as described under 4.X:

- a. Sampling plan A tests.
- b. Seasoning.
- c. Temperature-altitude.
- d. Low temperature exposure.
- e. High temperature exposure.
- f. Humidity.
- g. Salt fog.
- h. Fungus.
- i. Dust.
- j. Overpressure.

4.4.2.3 Rejection and retest. When one gage selected from a production run fails to meet the requirements of this specification, no gages on hand or later produced shall be accepted until the extent and cause of failure have been determined.

4.4.2.3.1 Continuation of individual tests. For operational reasons, individual tests may continue pending the investigation of a sampling test failure. Final acceptance of gages on hand or later produced shall not be made until it is determined that gages meet all the requirements of this specification.

4.4.3 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in gages already accepted. If so, the contractor shall fully advise the procuring activity of all defects likely to be found and methods of correcting them.

#### 4.5 Test methods.

4.5.1 Examination of product. The gage shall be examined to determine compliance with requirements specified herein with respect to materials, markings, dimensions and workmanship.

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4.5.2 Scale and friction error. The gage shall be tested for scale error at ambient temperature at the test points specified in table I. The gage shall be read before and after lightly tapping or vibrating the gage. The reading made after the gage is tapped or vibrated shall be the scale reading. The difference between the readings before and after the gage is tapped or vibrated shall constitute friction error. The scale and friction errors shall not exceed the tolerances specified in tables I and II. This test shall be conducted both up-scale and down-scale at the specified test points.

4.5.3 Position error. During the test, an indication of approximately 2,000 psi shall be maintained on the gage. The maximum change in indication produced by rotating the gage from the normal operating position to a position 90° both clockwise and counterclockwise (longitudinal axis vertical) shall not exceed the position error tolerance specified in table II.

4.5.4 Vibration. The gage shall be subjected to a vibration test in accordance with MIL-STD-810B (dated 15 June 1967), method 514, procedure I, equipment category (a), curve B. An indication of approximately 2,000 psi shall be maintained on the gage during this test. Pointer oscillation and variation shall not exceed the tolerances specified in table II. At the conclusion of this test, the gage shall be subjected to the scale and friction error test. The errors shall not exceed the tolerances specified in table I and II. No damage to the gage shall result from this test.

4.5.5 Low temperature operation. The gage shall be subjected to a low temperature test in accordance with MIL-STD-810, method 502, procedure for operational testing (procedure II), at  $-54^{\circ}\text{C}\pm 2^{\circ}\text{C}$  ( $-65^{\circ}\text{F}\pm 4^{\circ}\text{F}$ ) for a period of 4 hours. During this test, an indication of approximately 2,000 psi shall be maintained on the gage. At the end of this period and while still at the specified temperature, the gage shall be subjected to the scale and friction error test. The errors shall not exceed the tolerances specified in tables I and II. After completion of the low temperature testing, the gage shall be returned to room temperature for a minimum of 4 hours and subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for room temperature.

4.5.6 High temperature operation. The gage shall be subjected to a high temperature test in accordance with MIL-STD-810, method 501, procedure for operational testing at constant temperature exposure (procedure II), at  $100^{\circ}\text{C}\pm 2^{\circ}\text{C}$  ( $212^{\circ}\text{F}\pm 4^{\circ}\text{F}$ ) for a period of 6 hours. During this test, an indication of approximately 2,000 psi shall be maintained on the gage. At the end of this period and while still at the specified temperature, the gage shall be subjected to the scale and friction error test. The errors shall not exceed the tolerances specified in tables I and II. After completion of the high temperature testing, the gage shall be returned to room temperature for a minimum of 4 hours and subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for room temperature.

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4.5.7 Seasoning. The gage shall be operated for 10,000 cycles at a rate of  $30 \pm 10$  cycles per second (cps) from zero indication to  $1600 \pm 100$  psi ( $80 \pm 5\%$  of full scale) and back to zero indication. Within 1 hour after the conclusion of this test, the gage shall be subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table II. The gage shall then be examined to determine that no undue wear has occurred.

4.5.8 Temperature-altitude. The temperature-altitude test shall be conducted in accordance with MIL-STD-810B dated 15 June 1967 (including corrections of notice 4, dated 21 September 1970), method 504, procedure I, except the temperature shall be  $-55^{\circ}\text{C}$  ( $-67^{\circ}\text{F}$ ) and the chamber pressure shall be the equivalent to an altitude of 100,000 feet. The rate of pressure change shall not exceed an average of 3 feet per second (fps) while under these conditions. At the end of a 1 hour period and while still at the temperature and altitude specified, the scale and friction error test shall be conducted. The errors shall not exceed the tolerances specified in tables I and II. This test may be conducted concurrently with the low temperature exposure test.

4.5.9 Low temperature exposure. The gage shall be subjected to a low temperature test in accordance with MIL-STD-810, method 502, procedure for operational testing (procedure II), at  $-65^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $-85^{\circ}\text{F} \pm 4^{\circ}\text{F}$ ) for a minimum of 48 hours after which it shall be operated throughout its entire range to determine that there is no sticky or erratic performance. The temperature shall then be raised to  $-54^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $-65^{\circ}\text{F} \pm 4^{\circ}\text{F}$ ) and the gage subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for low temperature. After completion of the low temperature testing, the gage shall be returned to room temperature for a minimum of 4 hours and subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for room temperature.

4.5.10 High temperature exposure. The gage shall be placed in a temperature chamber and subjected to  $145^{\circ}\text{C} \pm 2^{\circ}\text{C}$  ( $293^{\circ}\text{F} \pm 4^{\circ}\text{F}$ ) for a period of 24 hours. The gage shall then be subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for high temperature exposure. It shall then be returned to room temperature for a minimum of 4 hours after which it subjected to the scale error test at room temperature. The scale errors shall not exceed the tolerances specified in table I for room temperature.

4.5.11 Humidity. The gage shall be subjected to a humidity test in accordance with MIL-STD-810, method 507, procedure II (Aggravated) except that the temperature and humidity shall be as specified in figure 3 herein. A minimum of 10 cycles shall be performed. Intermediate performance testing is not required. External connections to the gage shall be made to simulate installed conditions. Immediately after completion of this test, the gage shall be subjected to the scale and friction error tests. The scale and friction errors shall not exceed the tolerances specified in tables I and II.

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4.5.12 Salt fog. The gage shall be subjected to a salt fog test in accordance with MIL-STD-810, method 509. There should be no evidence of external corrosion or deterioration that might affect subsequent operation. The gage shall be subjected to the scale error test. The scale errors shall not exceed the tolerances specified in table I for room temperature.

4.5.13 Fungus. The gage shall be subjected to a fungus test in accordance with MIL-STD-810, method 508 after completion of qualification testing and after the gage has been subjected to the salt fog test. The gage shall be disassembled so that the internal mechanism will be exposed to the fungus spores. At the end of the test period, the gage shall be examined to determine that no fungus growth has occurred.

4.5.14 Dust. The gage shall be subjected to a dust test in accordance with MIL-STD-810, method 510, procedure I (Blowing Dust). At the completion of this test, the gage shall be removed from the test chamber, allowed to cool to room temperature, and then subjected to the scale and friction error test. The scale and friction errors shall not exceed the tolerances specified in tables I and II for room temperature.

4.5.15 Overpressure. The gage shall be subjected to the pressure specified in table II for a period of 10 minutes. Not less than 1 hour after application of the specified pressure, the gage shall be subjected to the scale error test at room temperature. The scale errors shall not exceed the tolerances specified in table II.

4.5.16 Reliability. Seven gages shall be tested for reliability. MIL-HDBK-781 may be used for guidance in performing the reliability tests. If acceptance criteria is not specified in the procurement document (see 6.2), test plan I-D may be used for guidance. MIL-HDBK-781 may also be used for guidance in recording, data handling and reporting.

4.5.16.1 Test. The test equipment and fixtures shall include provisions for vibration and temperature cycling at periodic intervals specified herein. During this test, input pressure shall be applied at the gage at a rate of 2 to 3 cycles per minute (cpm) from 1000 to 3000 psi (25 to 75% of full scale) and return. Completion of 4 hours of operation shall include at least 480 operational cycles. For at least 10 minutes out of each hour of ON time, the gage shall be vibrated at  $2.2G \pm 10\%$  at any non-resonant frequency between 20 and 60 cps measured at the mounting points of the equipment. The temperature cycles shall be conducted in the following sequence: 4 hours at  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ), 14 minutes for temperature change to  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ) at a minimum rate of  $5^{\circ}\text{C}$  ( $9^{\circ}\text{F}$ ) per minute, 4 hours at  $50^{\circ}\text{C}$  ( $122^{\circ}\text{F}$ ), 14 minutes for temperature change to  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ) at a minimum rate of  $5^{\circ}\text{C}$  ( $9^{\circ}\text{F}$ ) per minute, and 4 hours at  $-20^{\circ}\text{C}$  ( $-4^{\circ}\text{F}$ ). In case of malfunction, the malfunction shall be recorded and the test interrupted while repairs are made. Upon completion of each 250 hours of cycling, the gages shall be subjected to the

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scale error test. The scale error shall not exceed twice the room temperature tolerance in table I. No calibration shall be performed on the units during this test. The test may be interrupted for weekend shutdown. The contractor shall prepare a report which shall contain test procedures, details of any malfunctions and corrective actions taken. MIL-HDBK-781 may be used for guidance in writing the report.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see 6.2). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The type ME-1 gage covered by this specification is intended for use in indicating directly the pressure in hydraulic and pneumatic aircraft systems and for use in locations other than the cabin or cockpit of aircraft where the temperature does not exceed 100°C (212°F) when the gage is operating and 145°C (293°F) when the gage is not operating.

6.2 Acquisition requirements. Acquisition documents should specify the following:

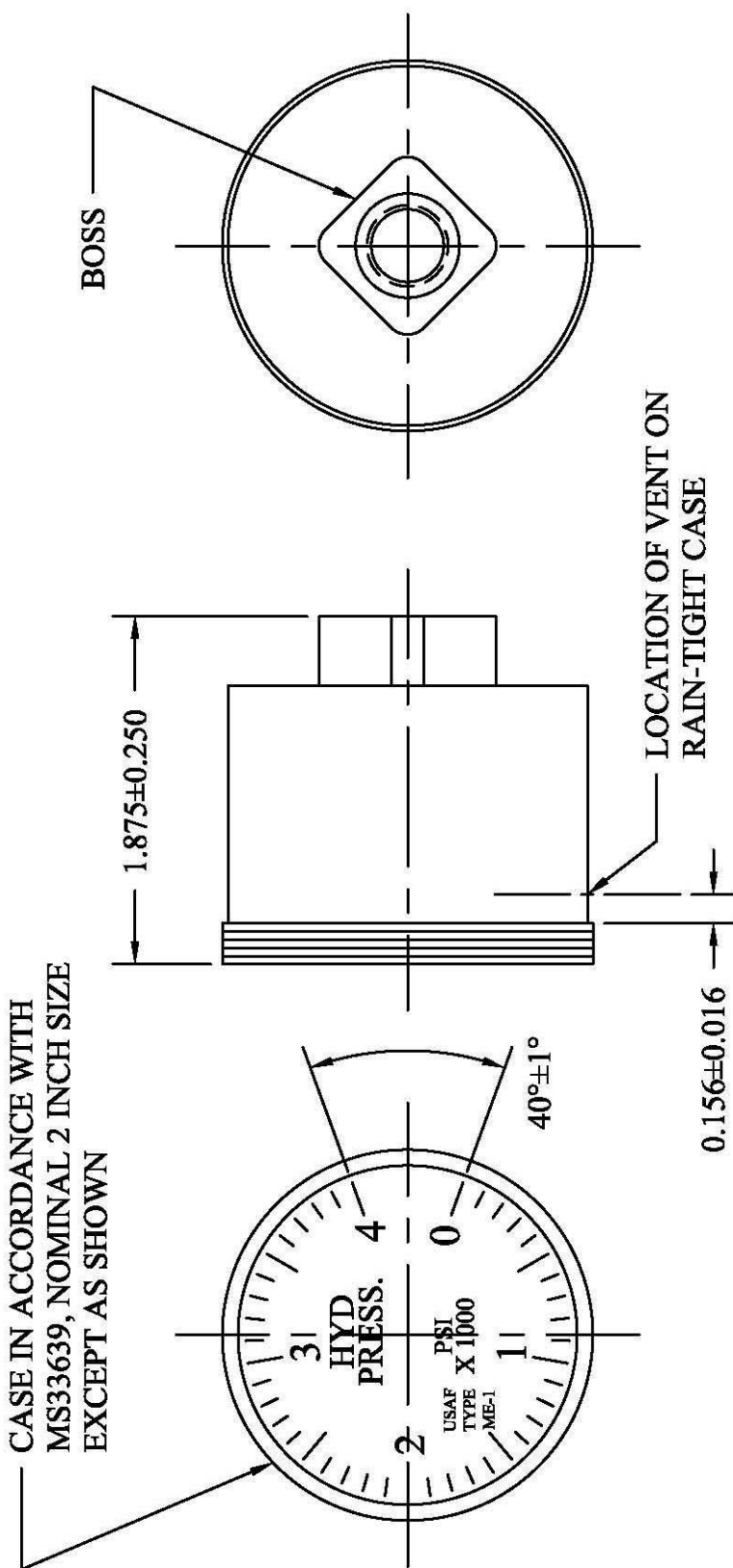
- a. Title, number and date of this specification.
- b. When sampling plan B tests will not be conducted.
- c. Special acceptance criteria if required.
- d. Any special packaging or marking requirements.

6.3 Subject term (key word) listing.

Pneumatic

6.4 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

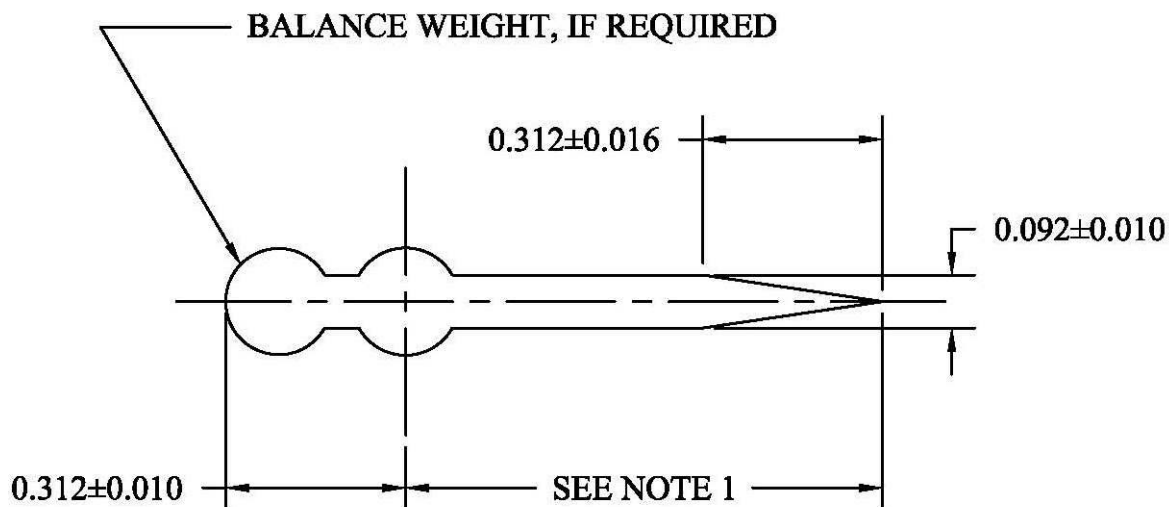
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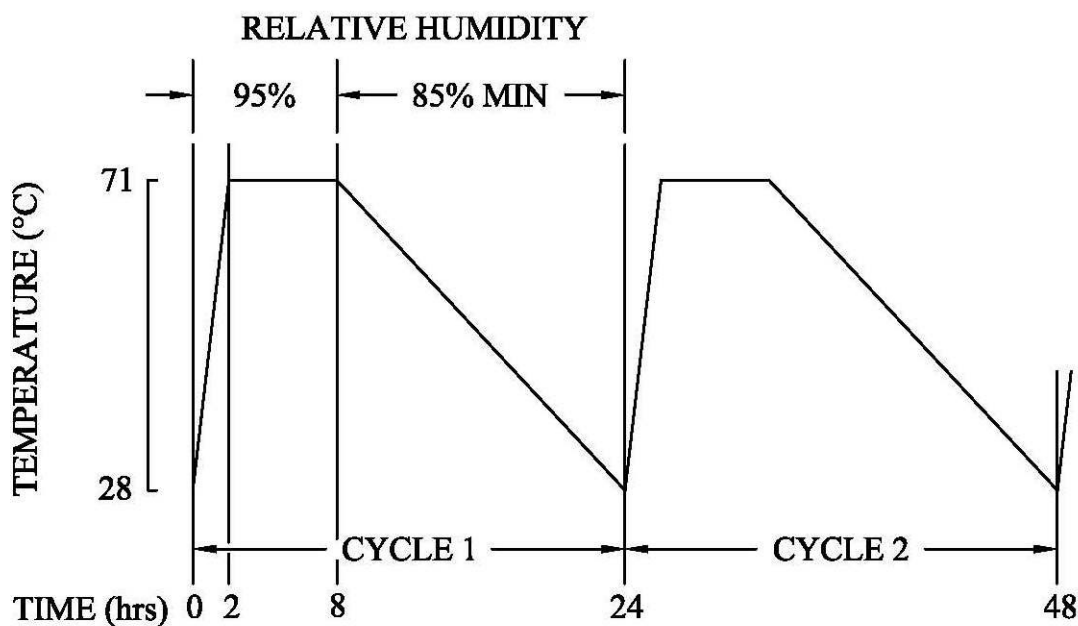
- NOTES:
1. Dimensions in inches.
  2. Break sharp edges approx. 0.010 radius.
  3. Position of text on dial face is optional.

FIGURE 1. Case and dial.

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- NOTES: 1. Length shall be such as to cover 1/3 to 2/3 of the shortest graduation. Length is approximately 0.827.  
 2. Dimensions are in inches.  
 3. Pointer thickness shall not be less than 0.010.

FIGURE 2. Pointer.

RUN FOR 10 CYCLES (240 hrs) TOTAL

FIGURE 3. Humidity cycle.



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Custodians:

Army – AV

Navy – AS

Air Force – 99

DLA – GS

Preparing activity:

DLA – GS1

(Project 6685-2010-001)

Reviewers:

Army – MI

Air Force – 71

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST database at <HTTPS://assist.daps.dla.mil>.