INCH-POUND

MIL-DTL-8348K
21 July 2008
SUPERSEDING
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31 July 2003

DETAIL SPECIFICATION

# GAGE ASSEMBLIES, AIR PRESSURE, DIAL INDICATING CHUCK TYPE, SELF-CONTAINED

Inactive for new design after 24 March 1999.

This specification is approved for use by all departments and agencies of the Department of Defense.

## 1. SCOPE

1.1 Scope. This specification covers self-contained, chuck type, high and low air pressure gage assemblies.

1.2 Classification. The gage assemblies will be of the following classes, sizes, and accuracy grades, as specified (see 6.2).

1.2.1 Class and size. The classes and sizes of gage assemblies are as follows:

Class A - screw-on chuck

Size 1 - 0 to 3,000 pounds per square inch (psi) indication
Size 2 - 0 to 1,500 psi indication
Size 3 - 2,000 to 5,000 psi indication
Size 4 - 0 to 4,000 psi indication
Size 5 - 0 to 400 psi indication

Comments, suggestions, or questions on this document should be addressed to Defense Supply Center Richmond, ATTN: DSCR-VEB, 8000 Jefferson Davis Highway, Richmond, VA 23297-5616 or e-mailed to STDZNMGT@dla.mil. Since contact information can change, you may want to verify the currency of this address information using the ASSIST database at http://assist.daps.dla.mil.

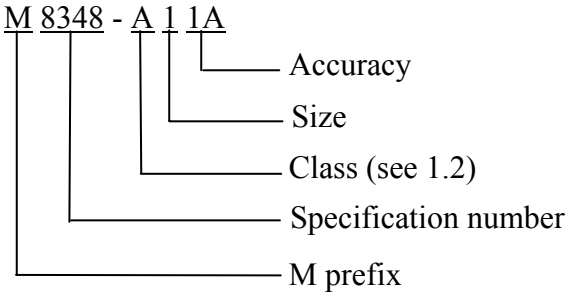
Class B - push-on dual chuck

Size 1 - 0 to 400 psi indication
Size 2 - 0 to 600 psi indication
Size 3 - 0 to 200 psi indication

1.2.2 Scale accuracy grade. The scale accuracy grades in accordance with ASME B40.100 are as follows:

Grade A - ±2 percent accuracy during first and last quarter of the scale and ±1 percent in the middle of the scale.
Grade 1A - ±1 percent accuracy across full scale.

1.3 Part or identifying number (PIN). The PIN to be used for pressure gage assemblies acquired to this specification is created as follows:




2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 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 the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards and handbooks. The following specifications and standards 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 (see 6.2).

FEDERAL STANDARDS

FED-STD-H28/2 - Unified Inch Screw Threads – UN and UNR Thread Forms.

DEPARTMENT OF DEFENSE SPECIFICATIONS

| | |
|---|---|
| MIL-G-18997 | - Gauge, Pressure, Dial Indicating (Naval Shipboard Use). |
| MS20813 | - Cap, High-Pressure Air Valve. |
| MS28889 | - Valve, Air, High Pressure Charging, 5000 PSI. |
| MIL-DTL-31000 | - Technical Data Packages. |
| MIL-A-8625 | - Anodic Coatings for Aluminum and Aluminum Alloys. |

DEPARTMENT OF DEFENSE STANDARDS

| | |
|---|---|
| MIL-STD-130 | - Identification Marking of U.S. Military Property. |
| MIL-STD-1916 | - DoD Preferred Methods for Acceptance of Product. |

DEPARTMENT OF DEFENSE HANDBOOKS

| | |
|---|---|
| MIL-HDBK-808 | - Finish, Protective and Codes for Finishing Schemes for Ground and Ground Support and Equipment. |

(Copies of these documents are available at http://assist.daps.dla.mil or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.2.2 Other government drawings. The following other government drawings form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation or contract (see 6.2).

| | |
|---|---|
| USAF Dwg. 42A3377 | - Washer - High Pressure Air Chuck or Valve. |
| US Army Dwg. 47D1561 | - Housing - Core, High Pressure Air Valve. |

(Copies of drawings required by suppliers in connection with a specific procurement function should be obtained from the procuring activity or as directed by the contracting officer.)

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 (see 6.2).

ASTM INTERNATIONAL

| | |
|---|---|
| ASTM B 633 | - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel. |

(Application for copies should be addressed to ASTM International, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959. Electronic copies of ASTM standards may be obtained from http://www.astm.org/.)

SAE INTERNATIONAL

| | |
|---|---|
| SAE-AMS-QQ-N-290 | - Nickel Plating (Electrodeposited). |
| SAE-AMS-QQ-C-320 | - Chromium Plating (Electrodeposited). |
| SAE-AMS-QQ-P-416 | - Plating Cadmium (Electrodeposited). |

(Application for copies should be addressed to SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001. Electronic copies of SAE standards may be obtained from http://www.sae.org/.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, 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 First article. When specified (see 6.2), a sample shall be subjected to first article testing inspection in accordance with paragraph 4.2.

3.2 Materials.

3.2.1 Protective finish. All parts shall be fabricated from corrosion resistant materials (ferrous or non-ferrous alloys), or plated to resist corrosion. The use of any protective coatings that will crack, chip, or scale with age or extremes of atmospheric conditions is prohibited. Anodizing of aluminum shall be in accordance with MIL-A-8625, type II, class 2 or equivalent. All metal parts fabricated from material that is not corrosion resistant shall be plated or treated to withstand deterioration and corrosion encountered in general service. Plating shall be in accordance with SAE-AMS-QQ-N-290, SAE-AMS-QQ-C-320, SAE-AMS-QQ-P-416, or ASTM B 633.

3.2.2 Metal stock. All metal stock used in the fabrication of gage assemblies shall have a properly refined structure with uniform elemental distribution and be sound and free from nonmetallic inclusions, injurious porosity, excess segregation, hard and soft spots, and other injurious defects.

3.2.3 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3 Design and construction. All gage assemblies shall be designed and constructed so that parts will not work loose or separate in service. They shall be constructed to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, and service.

3.3.1 Maintenance. The pressure gage shall have a minimum number of parts consistent with reliability. All parts subject to disassembly for maintenance purposes shall be readily accessible for adjustments, repairs, and cleaning without the use of special tools.

3.3.2 Heat treatment. When required, heat treatment of parts shall be accomplished in accordance with the best commercial practice and shall be such as to accent the best overall qualities of the material used. Parts requiring special characteristics such as stability, hardness, toughness, or shock resistance shall be heat treated in accordance with recognized industrial recommendations covering that particular material.

3.3.3 Threads. Standards for threads shall conform to FED-STD-H28/2.

3.3.4 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable. The drawing number requirements of MIL-DTL-31000 shall govern changes in the manufacturer's part numbers.

3.4 Performance. Class A and B pressure gages shall be capable of accurately measuring air pressure with the range of the specified gage size when the gage chuck is engaged with the valve stem specified herein (see 4.5).

3.5 Pressure gages. Class A and B pressure gages shall be of the Bourdon tube design that mechanically senses pressure and indicates it via a dial indicator moving over a graduated scale. The diameter of the dial size with scale shall be specified in the contract or acquisition document.

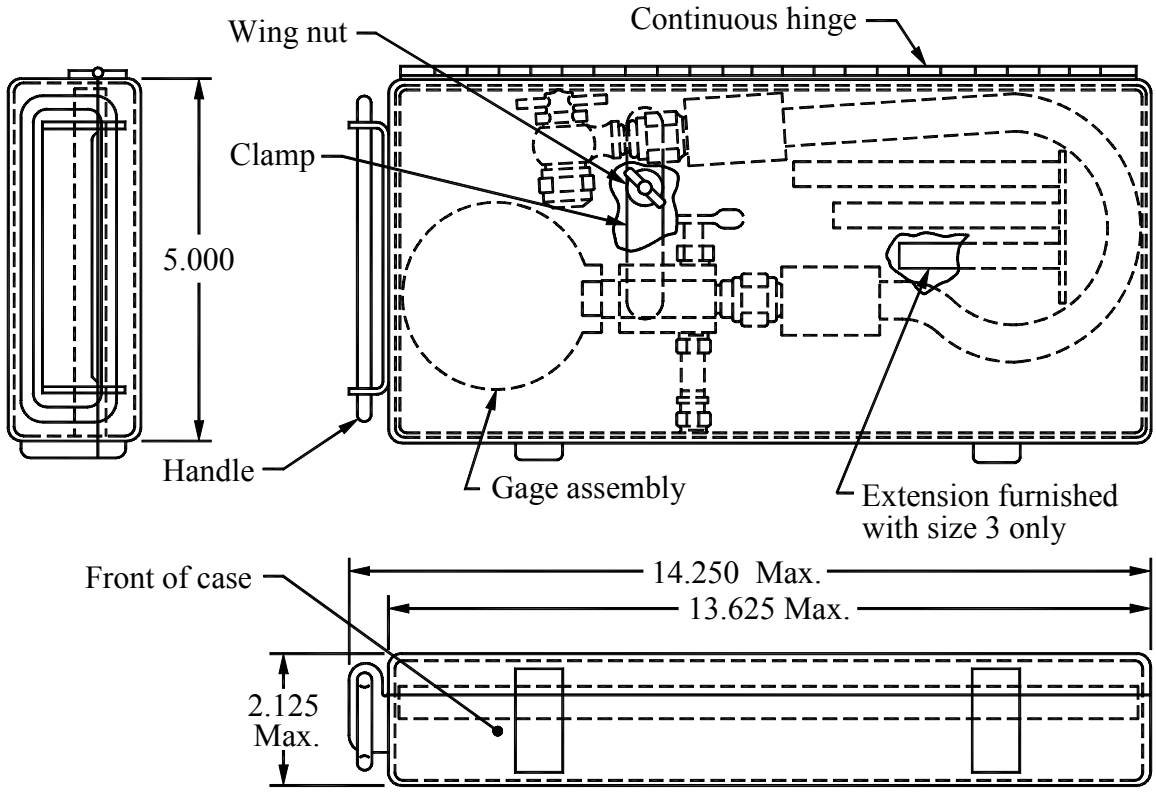
3.5.1 Case. The gage case shall be made from durable corrosion resistant materials, or be plated or treated to resist corrosion, with black or chrome exterior finish and shall provide for removal of the mechanism as a unit for servicing.

3.5.2 Dial. The dial shall be direct reading and shall have a silver or white background with black scale graduations and numerals. The dial shall be marked in black as follows: Pressure LB/SQ. IN. The smallest increments of the scale graduations shall be a minimum of 1/8 inch long. Every fifth graduation shall extend a minimum of 1/16 inch beyond the smallest graduation. Every tenth graduation shall be further extended and marked with the applicable increment figure. The numerals shall be a minimum of 1/8 inch high. The pointer or dial indicator shall be black.

3.5.3 Mechanism. The mechanism shall be corrosion resistant metal and shall be of rugged design to withstand rough usage encountered in service. Provisions shall be incorporated in the design to permit adjustment for correction of indications that may become necessary during the service life of the gage.

3.5.4 Safety. An overload stop shall be provided to prevent injury to the Bourdon tube or disengagement of the movement sector under severe overpressure conditions. The gage shall have an unbreakable crystal. The outlet shall have a 1/4-inch standard external pipe thread. The gage shall be provided with a safety blowout protective device, which in the event of rupture of the Bourdon tube will allow sufficient air escapement to prevent explosion of the gage. The gage shall be furnished with a bronze bushed, heavy duty movement or its equivalent, which shall consist of heavy bronze plates and stainless steel components.

3.6 Class A gage assembly. The class A gage assembly shall consist of a pressure gage conforming to section 3.5, a bleeder valve, stem, hose, chuck assembly, and carrying case, and shall be of the specific sizes in accordance with figures 1 and 2 as applicable.

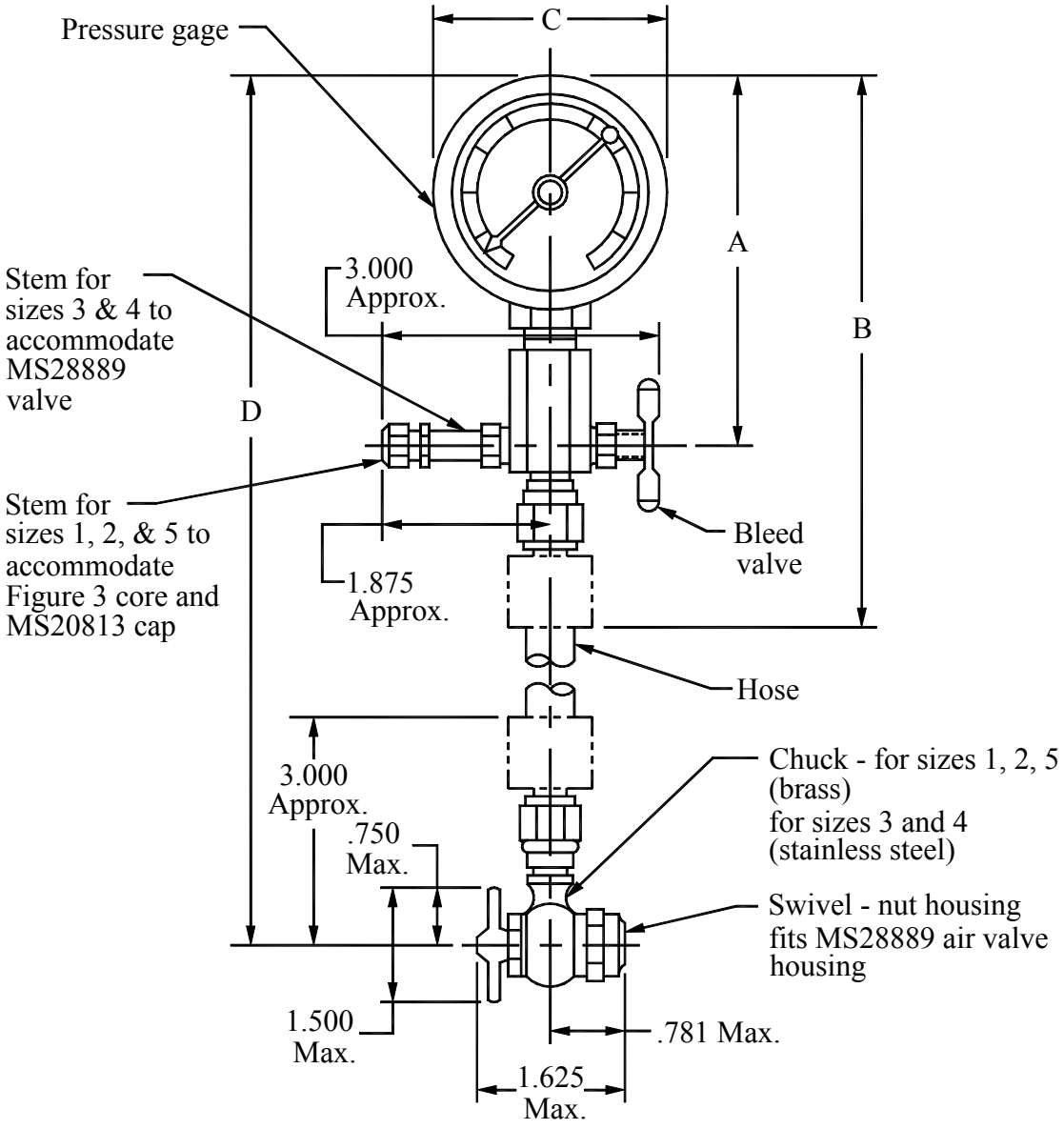



NOTE: Dimensions are in inches.

FIGURE 1. Class A gage assembly and case.

3.6.1 Bleeder valve. The bleeder valve shall be manually operated and shall provide a means for bleeding pressure as applied to the gage through the chuck.

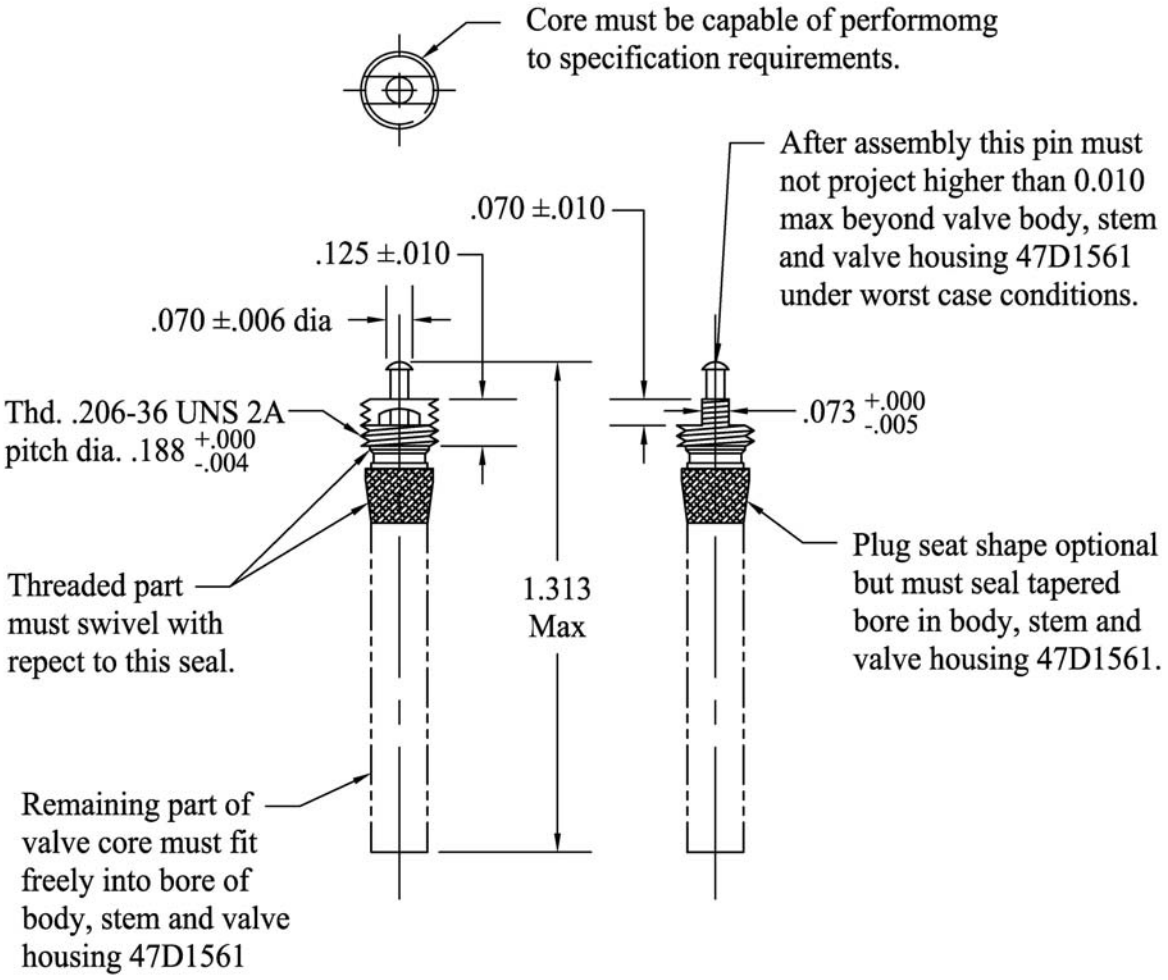
3.6.2 Stem. The stem shall provide a means for applying air pressure to the gage and chuck. The stem shall be made of brass approximately 1-5/16 inches long. One end shall have a 1/8-inch standard external pipe thread; the other end shall be 0.302 inch in diameter and shall have 32 threads per inch. The stem shall have an adequate axial hole and the end with a 0.302-inch diameter shall be properly fitted with a high pressure valve core conforming to figure 3 for sizes 1, 2, and 5. The stem for size 3 and 4 shall accommodate the valve conforming to MS28889.




| Size | Pressure gage | A approx. | B max. | C max. | D max. |
|---|---|---|---|---|---|
| 1 | 0 to 3,000 psi | 5-1/2 | 8 | 3-1/2 | 25-3/4 |
| 2 | 0 to 1,500 psi | 5-1/2 | 8 | 3-1/2 | 25-3/4 |
| 3 | 2,000 to 5,000 psi | 6-1/4 | 9 | 5-2/3 | 26-1/2 |
| 4 | 0 to 4,000 psi | 5-1/2 | 8 | 3-1/2 | 25-3/4 |
| 5 | 0 to 400 psi | 5-1/2 | 8 | 3-1/2 | 25-3/4 |

Note: Dimensions are in inches.

FIGURE 2. Class A gage assemblies.




NOTES:
1. Remove all burrs and sharp edges.
2. Dimensions are in inches.

FIGURE 3. Class A high pressure valvecore.

3.6.3 Chuck assembly. The chuck assembly shall incorporate a swivel nut for attachment to a valve stem conforming to MS28889. The assembly shall be properly sealed against loss of air pressure by replaceable gaskets, washers, or packing. The chuck shall have a valve core depressor that may be turned by hand to depress the valve core after the chuck is attached to the valve by the swivel nut. A suitable stop shall be provided to prevent the depressor from damaging the valve core. The chuck body for sizes 1, 2, and 5 shall be brass and for sizes 3 and 4, stainless steel.

3.6.4 Carrying case. Unless otherwise specified in the acquisition document, each class A gage shall be provided with a case designed and constructed to compactly enclose and protect the gage during handling and service. The case shall conform to figure 1 and shall be fabricated from sheet steel approximately 0.030 inch thick (see 6.2).

3.6.4.1 Latches. The case shall incorporate two spring-type latches to securely hold the lid in a closed position. The latches shall be constructed in such a manner that opening and closing of the case may be easily accomplished without the use of tools.

3.6.4.2 Clamp. The clamp shall be designed and constructed to retain the gage within the case when the open case is placed in any position. Similar provisions shall be incorporated to retain the accessories as specified herein.

3.6.4.3 Handle. The handle shall provide sufficient clearance for an easy and complete grip by a person wearing heavy gloves.

3.6.4.4 Paint finish. The case shall have a yellow paint finish. The finish code number is F-103 for type I exposure and color DG as listed in MIL-HDBK-808.

3.6.5 Accessories. The class A gage shall be furnished with three space valve stem washers to fit in the swivel-nut chuck, manufactured in accordance with U.S. Air Force drawing 42A3377.

3.6.6 Dial marking. Class A gages shall have graduated dial markings as follows:

a. Size 1 - graduated in 30-pound increments.
b. Size 2 - graduated in 25-pound increments.
c. Size 3 - graduated in 50-pound increments (the space allotted for 0 to 2,000 pounds shall be blanked out).
d. Size 4 - graduated in 50-pound increments.
e. Size 5 - graduated in 5-pound increments.

3.6.7 Hose assembly. A reinforced hose assembly with a working pressure as specified in paragraph 1.2 for each size and a minimum burst of four times the working pressure shall be used. The outer cover shall be resistant to abrasion and shall withstand deteriorating effects of gasoline, grease, oil, weather, and water.

3.7 Class B gage assembly. Class B gage assemblies shall consist of a pressure gage, hose, dual chuck foot, chuck foot extension, and carrying case (see figure 4). The graduated dial markings for the different ranges shall be 20-pound increments, with 2 pounds being the smallest graduated increment.

3.7.1 Dual chuck foot. As shown in figure 4, the chucks shall be offset approximately 30 degrees. The chucks shall be designed and constructed to fit a valve stem conforming to MS28889. The dual chucks shall be designed so that engagement of one of the chucks with the valve stem will render the deflator stem of the other chuck inoperative. Deflator pins shall be fabricated from hardened steel. The pins shall be designed with flats so that distortion of sealing

washers will not cause any restriction of the airflow through the chuck to the gage after continued usage.

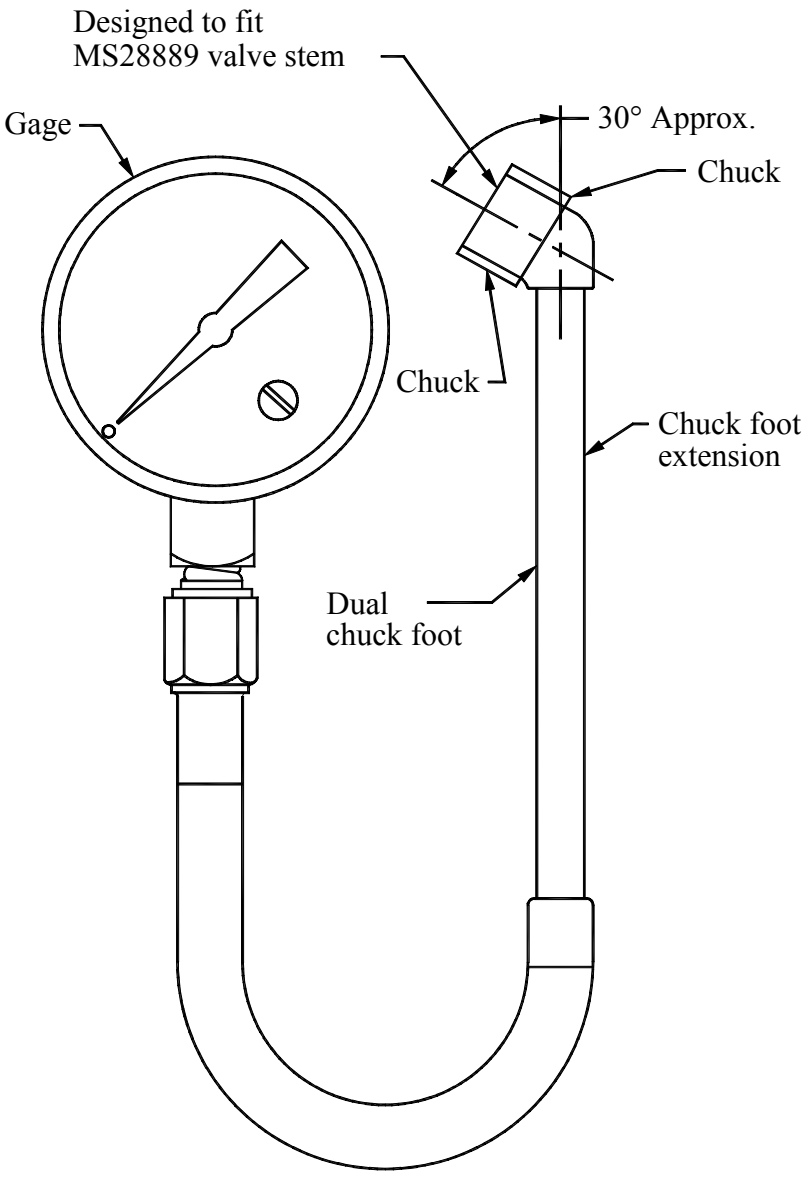



FIGURE 4. Class B gage assemblies.

3.7.2 Chuck foot extension. The chuck foot shall have an extension approximately six inches long. The chuck foot shall either be fabricated integrally with the extension or shall be rigidly attached thereto in such manner that it will not become loose or detached under normal usage.

3.7.3 Hose assembly. A reinforced hose assembly with a working pressure as specified in paragraph 1.2 for each size and a minimum burst of four times the working pressure shall be used. The outer cover shall be resistant to abrasion and shall withstand deteriorating effects of gasoline, grease, oil, weather, and water. The hose shall be approximately eight inches in length.

3.7.4 Carrying case. Unless otherwise specified in the acquisition document, the case for class B gages shall conform to the case requirements for class A gages, except that the length shall not exceed 10-5/8 inches and the width shall not exceed 5 inches (see 6.2).

3.7.5 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 requirement of MIL-DTL-31000 shall govern the manufacturer's part numbers and changes thereto.

3.7.6 Identification marking. Equipment assemblies and parts shall be marked for identification in accordance with MIL-STD-130. The nomenclature and scale range of each gage assembly shall be marked on the outside of the carrying case in black letters 3/8 inch high.

3.7.7 Workmanship. Workmanship shall be of the quality necessary to produce complete units of good appearance, with safe and efficient operating characteristics as are customarily found in high grade commercial quality items of a similar nature.

## 4. VERIFICATION

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

a. First article inspection (see 4.2).
b. Conformance inspection (see 4.3).

4.2 First article inspection. When a first article inspection is required (see 3.1 and 6.2), the number of units to be provided for inspection shall be specified (see 6.2). The gage assemblies, including carrying case, provided for first article inspection shall undergo examinations for defects specified in table I and the tests specified in table II. Any gage assembly displaying any defect shall be rejected.

4.3 Conformance inspection. Conformance inspection shall be performed in accordance with the inspection provisions set forth herein. A sample of gage assemblies, including carrying case, shall be selected from each lot in accordance with MIL-STD-1916 inspection level I and examined for the defects defined in table I and scale accuracy at room temperature test of paragraph 4.5.

4.4 Examination of gage assemblies. Each of the sample gage assemblies, including carrying case, shall be visually and dimensionally examined (see table I) to determine compliance with the requirements specified herein with respect to materials, marking, and workmanship.

Table I. Classification of defects.

| Class | Defect | Requirement paragraph | Critical | Major | Minor |
|---|---|---|---|---|---|
| A & B | Damage to plating or protective finish | 3.2.1 | | | 201 |
| A | Bleeder valve cannot be manually operated | 3.6.1 | 1 | | |
| A | Pipe threads on the stem are damaged | 3.6.2 | | 101 | |
| A | Swivel nut does not turn freely | 3.6.3 | | 102 | |
| A & B | External damage to carrying case | 3.6.4 & 3.7.4 | | | 202 |
| B | Chucks are damaged or broken | 3.7.1 | | 103 | |
| B | Hose assembly is damaged | 3.7.3 | | 104 | |

Table II. Test requirements.

| Test | Test paragraph |
|---|---|
| Overpressure | 4.6.2.1 |
| Endurance | 4.6.2.2 |
| Drop test | 4.6.2.3 |
| Rupture | 4.6.2.4 |

4.5 Scale accuracy (error) at room temperature. The gage assembly shall be tested for scale accuracy or error at pressure readings selected in the lower 1/4 of the scale, middle 1/2 of the scale and upper 1/4 of the scale on the gage.

4.5.1 Pressure during test. These tests shall be made with the pressure increasing, then with the pressures decreasing. With the pressures increasing, the pressure shall be brought up to, but shall not exceed the selected pressure(s) at the three increments on the pressure gage. Also, with the pressure decreasing, the pressure shall be brought down to, but not fall below the selected pressure(s) at the three increments on the pressure gage. The permissible accuracy error chosen for the selected pressures shall be in accordance with table III.

Table III. Accuracy grades.

| Grade | Lower 1/4 of scale | Middle 1/2 of scale | Upper 1/4 of scale |
|---|---|---|---|
| A | ±2.0% | ±1.0% | ±2.0% |
| 1A | ±1.0% | ±1.0% | ±1.0% |

4.6 Tests.

4.6.1 Test conditions.

4.6.1.1 Test equipment. Tests shall be performed using air or gas pressure to simulate actual use. Tests with hydraulic pressures are not acceptable.

4.6.1.2 Atmospheric conditions. Unless otherwise specified, all required tests shall be made at an atmospheric pressure of approximately 30 inches of mercury at room temperature of 70 ºF ± 5degrees. When tests are made with atmospheric pressure and temperature substantially different from the above values, proper allowance shall be made for the difference from specified conditions.

4.6.1.3 Tapping. Unless otherwise specified, the gage assemblies incorporating Bourdon tube-type gages shall be tested in the normal operating position and shall be tapped lightly before a test reading is taken (see 6.3.4).

4.6.2 Test methods for class A and B gage assemblies.

4.6.2.1 Overpressure. The assemblies shall be subjected to a pressure of 15 percent in excess of full-scale pressure for a period of 10 minutes. No less than one hour following the application of the specified pressure, the gage assemblies shall be subjected to the accuracy test in 4.5. If necessary, recalibration adjustments are permissible.

4.6.2.2 Endurance. The assemblies shall be subjected to 10,000 applications of pressure from 0 to 80 ± 5 percent of the full-scale pressure and return to zero at a rate of 20 ± 10 cycles per minute. The applied pressure with respect to time shall approximate a square wave shape. Not less than one hour following this test, the gage assemblies shall be subjected to the accuracy test in 4.5. If necessary, recalibration adjustments are permissible.

4.6.2.3 Drop test. The assemblies shall be dropped at least five times from a height not less than 12 inches on a concrete floor. Not less than one hour following this test, the gage assemblies shall be subjected to the accuracy test in 4.5. If necessary, recalibration adjustments are permissible. Evidence of permanent damage to the gage assembly and any change occurring to the reading mechanism that cannot be recalibrated by the provisions for adjustment for correction of indications (see 3.5.3) shall be cause for rejection.

4.6.2.4 Rupture. Test with gaseous nitrogen utilizing 150 percent of scale range to assure that the pressure integrity of the element is acceptable. The burst shall be accomplished hydrostatically and recorded. The safety of the lens and case shall be tested as specified in MIL-G-18997. The Bourdon tube shall be cut or broken and the nitrogen shall be elapsed by a quick-acting ball valve to simulate explosive failure.

## 5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contact or order (see 6.2). When packaging of materiel is to be performed by DoD personnel or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain requisite 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 command. 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 gage assemblies are intended for use in gaging air pressure and servicing aircraft shock struts, accumulators, and tires.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of this specification.
b. Class, size, and accuracy grade (A or 1A) of gage assembly (see 1.2).
c. The specific issue of individual documents referenced (see 2.2.1, 2.2.2, and 2.3).
d. Whether a first article sample is required (see 3.1).
e. Case, if different (see 3.6.4 and 3.7.4).
f. Number of units required for first article inspection (see 4.2).
g. Packaging requirements (see 5.1).

6.3 Definitions.

6.3.1 Gage accuracy. Gage accuracy is the difference (error) between the true value and the gage indication expressed as a percent of the gage span.

6.3.2 Gage assembly. Gage assembly is defined as the entire operating unit (as described by classes A and B).

6.3.3 Gage element. Gage is defined as meaning the Bourdon or indicator-type gage incorporated as a component part of the complete gaging assembly.

6.3.4 Tapped lightly. The phrase, "tapped lightly," is defined as the application of a light vibration sufficient to overcome that small amount of residual friction normally associated with pressure gages.

6.4 Subject term (key word) listing.

accumulators
aircraft
bleeder valve
Bourdon
shock struts
tires
valve stem

6.5 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue. Technical changes to this document include addition of specific slash sheet to FED-STD-H28 and correction of a typographical error in figure 3. Editorial changes to this document include addition of previously omitted inactivation notice, update of contact information, and revision and reformatting to meet MIL-STD-961/ Change 1 requirements.

Custodians:
Navy - AS
Air Force -99

Preparing Activity:
DLA - GS1

(Project 6685-2008-002)

Review Activity:
Air Force - 71

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