

INCH-POUND

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 SUPERSEDING
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PERFORMANCE SPECIFICATION

COMPASS, MAGNETIC, MOUNTED

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 the requirements for four types of integrally-lighted, flange-mounted, pilot's standby magnetic compasses (see 6.4.7).

1.2 Classification. Compasses are to be of the following types, as specified (see 6.2):

Class I	AQU-3/A	Blue Filtered White light.
Class II	AQU-5/A	Red light.
Class III	TBD	NVIS Green light.
Class IV	AQU-14/A	White light, low voltage.

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are cited 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 these lists, document users are cautioned that they must meet all requirements specified in the documents cited in sections 3 and 4 of this specification, whether or not they are listed.

<p>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/TICLA, 3001 Staff Drive, Suite 1AE1-101A, Tinker AFB, OK 73145-3036 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.</p>

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2.2 Government documents.

2.2.1 Specification and standards. The following specifications and standards form a part of this document to the extent specified herein. Unless otherwise specified, the applicable issues of these documents are those listed in the specific issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATION

DEPARTMENT OF DEFENSE

MIL-C-14806	-	Coating, Reflection Reducing For Instrument Cover Glasses and Lighting Wedges
MIL-L-25467	-	Lighting, Integral, Red, Aircraft Instrument, General Specification For
MIL-L-27160	-	Lighting, Instrument, Integral, White, General Specification For
MIL-L-85762	-	Lighting, Aircraft, Interior, Night Vision Imaging System (NVIS) Compatible

STANDARDS

FEDERAL

FED-STD-595	-	Colors Used In Government Procurement
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DEPARTMENT OF DEFENSE

AN3116	-	Plug Assembly – Instrument Electrical
MS33638	-	Cases, Instrument, Flange Mounted, Aircraft

(Unless otherwise indicated, copies of the above specification and standards are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

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 the documents which are DoD adopted are those listed in the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN NATIONAL STANDARDS INSTITUTE/AMERICAN SOCIETY FOR QUALITY (ANSI/ASQ)

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- ANSI/ASQ Z1.4 - Sampling Procedures and Tables for Inspection by Attributes (DoD-adopted)

(Application for copies should be addressed to American Society for Quality, P.O. Box 3066, Milwaukee, WI 53201-3066, or to the American National Standards Institute, 11 West 42nd Street, 13th Floor, New York, NY 10036.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus (DoD-adopted)

(Application for copies should be addressed to American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.)

- MACAIR 91B0445 - General Requirements for T-45A Crew Station Instrumentation Integral Illumination

(Unless otherwise indicated (see 6.2), copies of the above specification is available from the procuring activity.)

RADIO TECHNICAL COMMISSION FOR AERONAUTICS (RTCA)

- RTCA/DO-160 - Environmental Conditions and Test Procedures for Airborne Equipment

(Application for copies should be addressed to RTCA Inc., 1140 Connecticut Avenue, NW, Suite 1020, Washington, DC 20036-4001.)

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 Qualification. The compasses furnished under this specification shall be products that are manufactured by a manufacturer authorized by the qualifying activity for listing on the applicable Qualified Products List (QPL) before contract award (see 4.2 and 6.3). Qualification for one class of compass shall neither preclude nor include qualification for the other types of compasses.

3.2 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible provided

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that the materials meet or exceed the operational and maintenance requirements, and promote economically advantageous life cycle cost.

3.3 Materials. All materials shall be treated to resist corrosion due to electrolytic decomposition, fungus, salt fog, and any other atmospheric condition that may be encountered during operational use or storage. Non-magnetic materials shall be used to the maximum extent possible. The use of toxic chemicals, hazardous substances, or ozone depleting chemicals shall be avoided, whenever feasible.

3.3.1 Plastic. No part of the compass case or internal assembly shall be made of plastic.

3.4 Interface.

3.4.1 Dimensions. The outline dimensions of the compass shall conform to figure 2 and MS33638.

3.4.2 Mounting flange. The mounting flange shall be an integral part of the compass.

3.4.3 Field of vision. The face of the compass shall be visible from any point within the frustum of a cone, the side of which makes an angle of 30° from a perpendicular to the dial, where the small diameter is the aperture of the compass case and is centered on the lubber line.

3.4.4 Electrical connector. The compass shall use an electrical connector that fits the plug assembly in AN3116-2 and conforms to the external configuration shown in figure 3.

3.4.5 Color.

3.4.5.1 Visible surfaces. Unless otherwise specified (see 6.2), all visible surfaces of the compass shall be lusterless black, color number 37038 of FED-STD-595.

3.4.5.2 Lettering. Unless otherwise specified (see 6.2), all lettering on the compass shall be lusterless white, color number 37875 of FED-STD-595.

3.4.6 Reflecting surfaces. Unless contacting the filling liquid, all reflecting glass surfaces shall be treated with a reflection reducing coating according to MIL-C-14806.

3.4.7 Visibility. The filling liquid shall not obscure the card from the user (see 6.4.2).

3.4.8 Electrical power. The compass shall be powered by 5Vdc.

3.5 Performance.

3.5.1 Reliability. The compass shall have a mean time between failures (MTBF) of at least 3,000 flight hours with a discrimination ratio of 2 and a confidence factor of 0.9.

3.5.2 Operational life. The compass shall have an operational life of at least 5 years.

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3.5.3 Operation. When properly installed in the aircraft, the compass shall continuously indicate the heading of the aircraft with reference to the magnetic field of the earth.

3.5.4 Dielectric strength. The performance of the compass shall be unaffected by a 500Vac, 60Hz signal applied between the electrical connector pins, and the electrical connector pins and the case for 1 minute.

3.5.5 Weight. The compass shall weigh no more than 14 ounces.

3.5.6 Lighting.

3.5.6.1 AQU-3/A (white light). The compass shall incorporate an integral white lighting system as specified in MIL-L-27160.

3.5.6.2 AQU-5/A (red light). The compass shall incorporate an integral red lighting system as specified in MIL-L-25467.

3.5.6.3 NVIS Green. The compass shall incorporate an integral, NVIS-compatible, green lighting system as specified in MIL-L-85762.

3.5.6.4 AQU-14/A (white light, low voltage). The compass shall incorporate an integral lighting system as specified in MACAIR 91B0445.

3.5.7 Compensator (see 6.4.6).

3.5.7.1 Adjustability. The compensators shall be manually adjustable to remove the compass deviations on north-south and east-west headings. Both compensators shall be provided with a zero index mark to show where the compensators exert zero effect during operation. The compensators shall be adjustable from the front using a flat tip screwdriver.

3.5.7.2 Adjustment. The coupling effect between the North-South and East-West Compensators shall be no more than 2°. The change in compensation for equal angular displacements of the adjusting screws shall be the same for both North-South and East-West Compensators. Either adjustment screw may be turned continuously in one direction without meeting a stop, allowing both compensator systems to pass through the entire adjustment range continuously.

3.5.7.3 Compensation range. The compensators shall adjust the deflection of the compass by at least 32° in each direction.

3.5.7.4 Compensator cover. A cover integral to the compass shall be used to cover the compensator systems adjusting devices.

3.5.7.5 Compensator vibration (see 6.4.5). The adjustment of the compensators shall not be affected by vibration.

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3.5.7.6 Compensator shipping. The compass shall be shipped with the compensators nulled.

3.5.8 Mounting lugs. When mounted, the mounting lugs of the compass shall withstand 175 pounds of force to the holes of the mounting lugs for 1 minute.

3.5.9 Connector strength. The electrical connector shall withstand a torque of 25 inch-pounds.

3.5.10 Filling liquid (see 6.4.1).

3.5.10.1 Filler cap. The compass shall incorporate a filler cap.

3.5.10.2 Leakage. The compass shall not leak.

3.5.10.3 Seals. All gaskets and sealing agents shall not affect or contaminate the filling liquid.

3.5.10.4 Internal surfaces. The internal surfaces and the finish on the internal surfaces of the compass shall not interact with the filling liquid of the compass.

3.5.11 Error.

3.5.11.1 Static response. With no compensation applied, the compass shall indicate within 1° of the actual magnetic heading.

3.5.11.2 Time of swing. With no compensation applied, the compass reading shall be within 1° of the original heading within 1.4 to 1.8 seconds, and within 0.5° within 10 seconds after the compass card is deflected (rotated) 30° and released.

3.5.12 Lubber line. When the compass is installed in the proper operating position, the lubber line shall be within 1° of vertical.

3.5.13 Attitude. The compass shall operate when subjected to a bank or pitch up to 18°.

3.5.14 Balance. With the compass housing in a level plane, the base of the compass card shall be within 1° of horizontal. With the vertical component of the magnetic field set to 0 Oersteds, the horizontal component of the magnetic field set to 0.18 Oersteds, and the compass housing in a level plane, the base of the compass card shall be within 3° of horizontal.

3.5.15 Bubbles. No bubbles shall be in the window of the compass when it is subjected to 18° of pitch or roll.

3.5.16 Loops and rolls. The compass shall withstand the acceleration ranges in Table I.

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Table I. Acceleration Ranges.

Direction of acceleration	Magnitude of acceleration (G)
Forward	18
Aft	6
Down	9
Up	27
Lateral	12

3.5.17 Rapid altitude change (see 6.4.3). The compass shall be unaffected by rapid altitude changes.

3.5.18 Turn rate. When the compass is rotated through 360° at a rate of 12° per second in azimuth and abruptly stopped, the heading of the compass shall not overshoot by more than 2°.

3.6 Item identification. The compass shall be permanently and legibly marked with the following information:

- a. Manufacturer's name.
- b. Manufacturer's CAGE code.
- c. Manufacturer's part number.
- d. Manufacturer's lot number.
- e. National Stock Number (NSN).
- f. Date of manufacture.
- g. Contract number.

3.7 Interchangeability. All parts having the same manufacturer's part number shall be functionally and dimensionally interchangeable.

3.8 Environmental conditions.

3.8.1 Operating temperature (see 6.4.4). The compass shall operate in temperatures from -65.2° to 159.8° F (-54° to 71°C).

3.8.2 Storage temperature. The compass shall withstand storage temperatures from -79.6° to 159.8°F (-62° to 71°C) with no degradation of performance.

3.8.3 Altitude (see 6.4.4). The compass shall operate at altitudes from 0 to 80,000 feet.

3.8.4 Vibration. The compass shall operate under all vibration conditions described in RTCA/DO-160, category R for fixed wing and category U for rotary wing aircraft.

3.8.5 Sand and dust. The performance of the compass shall be unaffected by sand and dust.

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3.8.6 Thermal shock. The performance of the compass shall be unaffected by temperature changes from 159.8° to 41° F (71° to 5°C), and from 41° to 159.8° F (5° to 71°C), taking place within 5 minutes.

3.8.7 Shock. The performance of the compass shall be unaffected by 10g shocks lasting 10 milliseconds.

3.8.8 Humidity. The performance of the compass shall be unaffected by humidity.

3.9 Maintenance.

3.9.1 Special tools. All maintenance on the compass shall not require the use of any special tools or fixtures other than non-magnetic screwdrivers for calibration.

4. VERIFICATION

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

- a. Qualification (see 4.2).
- b. Conformance (see 4.3).

4.2 Qualification inspection. When required (see 6.3), qualification shall be performed on six compasses. Three compasses shall be subjected to all tests, excluding the environmental tests. The remaining three compasses shall be subjected to all tests, excluding the life tests.

4.3 Conformance inspection. Compasses, sampled according to ANSI/ASQ Z1.4, shall be subjected to the following tests:

- a. High temperature (see 4.6.5).
- b. Low temperature (see 4.6.6).
- c. Altitude (see 4.6.7).
- d. Shock (see 4.6.11).
- e. Static response (see 4.6.23).
- f. Time of swing (see 4.6.24).
- g. Turn rate (4.6.29).

4.4 Test conditions. Unless otherwise specified (see 6.2), all tests shall be performed in accordance with the test conditions specified in the applicable test method document or applicable paragraph in this specification.

4.4.1 Friction removal. Unless otherwise specified (see 6.2), the compass shall be lightly tapped with a finger before a test reading is taken.

4.4.2 Attitude. Unless otherwise specified (see 6.2), the compass shall be tested in the level position.

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4.4.3 Alignment. The compass shall be tested on an index table aligned to magnetic north using a traceable standard.

4.4.4 Standard field. Unless otherwise specified (see 6.2), all tests shall be performed in a magnetic field with a horizontal component of 0.18 Oersteds and a vertical component of 0.54 Oersteds.

4.5 Requirements cross reference matrix. Table II provides a cross-reference matrix of the section 3 requirements tested or verified in the paragraphs below.

Table II. Requirements cross-reference matrix

Requirement	Verification	Requirement	Verification
3.1	4.2	3.5.8	4.6.16
3.3	4.6.1, 4.6.2, 4.6.3	3.5.9	4.6.17
3.3.1	4.6.1	3.5.10.1	4.6.1
3.4.1	4.6.1	3.5.10.2	4.6.1
3.4.2	4.6.1	3.5.10.3	4.6.19, 4.6.32
3.4.3	4.6.1	3.5.10.4	4.6.32
3.4.4	4.6.1	3.5.11.1	4.6.23
3.4.5.1	4.6.1, 4.6.18	3.5.11.2	4.6.24
3.4.5.2	4.6.1, 4.6.18	3.5.12	4.6.1
3.4.6	4.6.4	3.5.13	4.6.25.1, 4.6.25.2
3.4.7	4.6.1	3.5.14	4.6.31
3.4.8	4.6.12	3.5.15	4.6.21
3.5.1	4.6.13	3.5.16	4.6.30
3.5.2	4.6.14	3.5.17	4.6.22
3.5.3	4.6.23	3.5.18	4.6.29
3.5.4	4.6.15	3.6	4.6.1
3.5.5	4.6.1	3.7	4.6.1
3.5.6.1	4.6.12.1	3.8.1	4.6.5, 4.6.6
3.5.6.2	4.6.12.2	3.8.2	4.6.5, 4.6.6
3.5.6.3	4.6.12.3	3.8.3	4.6.7
3.5.6.4	4.6.12.4	3.8.4	4.6.8
3.5.7.1	4.6.1, 4.6.26, 4.6.27	3.8.5	4.6.9
3.5.7.2	4.6.27	3.8.6	4.6.10
3.5.7.3	4.6.28.1, 4.6.28.2	3.8.7	4.6.11
3.5.7.4	4.6.1	3.8.8	4.6.20
3.5.7.5	4.6.8	3.9.1	4.6.1

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4.6 Tests.

4.6.1 Examination. The compass shall be inspected to determine compliance with the requirements specified herein with respect to materials, plastic, dimensions, mounting flange, field of vision, electrical connector, visible surfaces, lettering, visibility, weight, adjustability, compensator cover, filler cap, leakage, lubber line, item identification, interchangeability, and maintenance.

4.6.2 Fungus. The compass shall be subjected to the fungus test in accordance with RTCA/DO-160.

4.6.3 Salt fog. The compass shall be subjected to the salt fog test in accordance with ASTM B117 for 50 hours.

4.6.4 Reflecting surfaces. The reflecting surfaces not in contact with the filling liquid shall be tested in accordance with MIL-C-14806.

4.6.5 High temperature. The compass shall be stabilized at 159.8° F (71°C) for 24 hours, with a humidity of no more than 15%. The compass shall then be subjected to the static response test and checked for leaks.

4.6.6 Low temperature. The compass shall be stabilized at -79.6°F (-62°C) for 24 hours, with a humidity of no more than 15%. The compass shall then be stabilized at -65.2°F (-54°C) for 4 hours and subjected to the static response test and checked for leaks.

4.6.7 Altitude. The compass shall be subjected to an altitude of 80,000 feet and subjected to the static response test and checked for leaks. The compass shall then be lowered to ambient altitude, subjected to the static response test and checked for leaks.

4.6.8 Vibration. The compass shall be subjected to the vibration test in RTCA/DO-160 using category R for fixed wing and category U for rotary wing aircraft. The compass shall then be subjected to the static response and liquid contamination tests and checked for leaks.

4.6.9 Sand and dust. The compass shall be tested according to the sand and dust test in RTCA/DO-160. The compass shall then be subjected to the static response test and checked for leaks.

4.6.10 Thermal shock. The compass shall be stabilized at 159.8°F (71°C). The temperature of the compass shall then be lowered to 41°F (5°C) in less than 5 minutes. The temperature of the compass shall be raised to 159.8°F (71°C) in less than 5 minutes, and then returned to ambient temperature. The compass shall then be subjected to the static response test and checked for leaks.

4.6.11 Shock. The compass shall be subjected to 10g shocks lasting 10 milliseconds in accordance with the RTCA/DO-160 Operational Shocks And Crash Safety test for Category B units. The compass shall then be subjected to the static response test and checked for leaks.

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4.6.12 Lighting.

4.6.12.1 AQU-3/A (blue filtered white light). The lighting of the AQU-3/A shall be verified as specified in MIL-L-27160.

4.6.12.2 AQU-5/A (red light). The lighting of the AQU-5/A shall be verified as specified in MIL-L-25467.

4.6.12.3 NVIS green. The lighting of the NVIS green compass shall be verified as specified in MIL-L-85762.

4.6.12.4 AQU-14/A (white light, low voltage). The lighting of the AQU-14/A shall be verified as specified in MACAIR 91B0445.

4.6.13 Reliability. The manufacturer shall demonstrate an MTBF of 3,000 flight hours with a discrimination ratio of 2 and a confidence factor of 0.90 (see 6.2).

4.6.14 Operational life. The manufacturer shall demonstrate an operational life of at least 5 years (see 6.2).

4.6.15 Dielectric strength. 500Vac, 60 Hz, shall be applied simultaneously between each of the electrical connector pins, and between the pins and the case for one minute. There shall be no insulation breakdown or permanent damage to the compass. The compass shall then be subjected to the static response test and checked for leaks.

4.6.16 Mounting lugs. The compass case shall be mounted to a test fixture with the face of the compass facing down where the mounting lugs receive no extra support. Then a shaft shall be placed through the hole of the mounting lug. A force of 175 pounds shall be applied to the end of the shaft in the direction of the face of the compass. There shall be no evidence of damage to the mounting lugs. The compass shall then be checked for leaks.

4.6.17 Connector strength. The compass shall be mounted to a test fixture in the operating position. A torque of 25 inch-pounds shall be applied to the connector, which shall not be loosened or damaged. The compass shall be visually inspected for damage and checked for leaks.

4.6.18 Color. The color of the compass shall be verified as specified in FED-STD-595.

4.6.19 Seals. The manufacturer shall provide verification that all gaskets and sealing agents are compatible with the filling liquid (see 6.2).

4.6.20 Humidity. The compass shall be subjected to the Category B humidity test in RTCA/DO-160.

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4.6.21 Bubbles. The compass shall be tilted 18° in pitch and roll. No bubble shall appear in the face.

4.6.22 Rapid altitude change. The compass shall be subjected to the decompression test in RTCA/DO-160. The compass shall then be subjected to the static response test and checked for leaks.

4.6.23 Static response. With the compensator removed, the compass shall be mounted on an index table and aligned to magnetic north. The table shall be rotated in increments of 30°. The compass shall be within 1° of the table reading. This shall be repeated every 30° until the heading returns to magnetic north. The first time this test is conducted, the compass reading at each 30° increment shall be recorded for use with the Attitude tests (see 4.6.25.)

4.6.24 Time of swing. With the compensator removed, the compass shall be mounted on an index table and aligned to magnetic north. The compass card shall be deflected (rotated) 30°. When released, the compass card shall return to within 1° of the original reading in 1.4 to 1.8 seconds and be within 0.5° of the original reading in 10 seconds or less.

4.6.25 Attitude tests.

4.6.25.1 Pitch error. With the compensator removed, the compass shall be mounted on an index table and aligned to magnetic north. The compass shall then be tilted 18° in pitch about a horizontal axis and rotated in azimuth 360°. Every 30°, the heading shall be recorded. The pitched readings shall differ from the level readings recorded in the static response test (see 4.6.23) by no more than 2°.

4.6.25.2 Bank error. With the compensator removed, the compass shall be mounted on an index table and aligned to magnetic north. The compass shall be tilted 18° in bank about a horizontal axis and rotated in azimuth 360°. The heading shall be recorded every 30°. The banked readings shall differ from the level readings recorded in the static response test (see 4.6.23) by no more than 5°.

4.6.26 Compensator. The compensators shall be inspected to verify the presence of a zero index mark, and that the zero index mark corresponds to the position of the compensator that has no effect on the indication of the compass.

4.6.27 Adjustment. The compensators of the compass shall be adjusted from the front of the compass using a flat tip screwdriver. No physical stops shall be present. While facing east or west, one rotation of the East-West Compensator shall cause a change in the east or west indication. While facing north or south, one rotation of the North-South Compensator shall cause an equal change in the north or south indication.

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4.6.28 Compensation range.

4.6.28.1 North-South Compensator. The compass shall be aligned to magnetic north and both compensators shall be zeroed. The North-South Compensator shall be adjusted to verify that a $\pm 32^\circ$ change in indication occurs. With North-South Compensator zeroed, the East-West Compensator shall be adjusted to verify a maximum of $\pm 2^\circ$ of cross-coupling occurs.

4.6.28.2 East-West Compensator. The compass shall be aligned to east and both compensators shall be zeroed. The East-West Compensator shall be adjusted to verify that a $\pm 32^\circ$ change in indication occurs. With the East-West Compensator zeroed, the North-South Compensator shall be adjusted to verify a maximum of $\pm 2^\circ$ of cross-coupling occurs.

4.6.29 Turn rate. The compass shall be mounted to a test fixture in the level position and aligned to magnetic north. The compass shall then be rotated in azimuth at a rate of 12° per second through 360° and stopped abruptly at magnetic north. The compass card shall not overshoot the magnetic north by more than 2° .

4.6.30 Loops and rolls. The compass shall be subjected to the accelerations in Table 1 using the test procedures in RTCA/DO-160. The compass shall then be subjected to the static response test and checked for leaks.

4.6.31 Balance. With the compass in a level plane, the compass card shall not deviate from horizontal by more than 1° . With the magnetic field adjusted to 0 Oersted vertical and 0.18 Oersted horizontal, the base of the compass card shall deviate from horizontal by no more than 3° .

4.6.32 Liquid contamination. The compass shall be held face down and rocked through approximately 40° (20° either side of vertical) at a rate of approximately 1 Hz for 5 seconds. The compass shall then be placed face down for approximately 3 minutes. With the face still down, the compass shall be raised and viewed. No more than five particles, with no particle larger than 0.002 inch, may be visible on the compass glass. Particle size may be estimated by comparison with the lubber line, the width of which was approximately 0.016 inch.

5. PACKAGING

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

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6. NOTES

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

6.1 Intended use. The magnetic compasses are intended to operate as a reference to the magnetic meridian of the earth.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Classification of compass (see 1.2)
- c. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2.1).
- d. If MACAIR 91B0445 should be obtained from other than the procuring activity (see 2.3)
- e. If visible surfaces of the compass should be other than lusterless black (see 3.4.5.1)
- f. If lettering on the compass should be other than lusterless white (see 3.4.5.2)
- g. If the test conditions are different to be different than specified in the applicable test method or test paragraph (see 4.4).
- h. If the compass is not to be tapped before a test reading is taken (see 4.4.1)
- i. If the compass is to be tested in other than the level position (see 4.4.2)
- j. If the compass is to be tested in other than a standard field (see 4.4.4)
- k. The requirement for the vendor to identify the proposed verification methods for:
 - Reliability (see 4.6.13)
 - Operational life (see 4.6.14)
 - Seals (see 4.6.19)
 - Liquid (4.6.20)
 - Loops and rolls (4.6.30)
- l. Data required.
- m. Packaging requirements (see 5.1).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL No. 38214, whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. Information pertaining to qualification of products may be obtained from Oklahoma City Air Logistics Center/TICLA, 3001 Staff Drive, Suite 1AE1-101A, Tinker AFB, OK 73145-3036.

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6.4 Notes.

6.4.1 Filling liquid. Previously, the compass was completely filled with liquid at 68°F (20°C). The compass was then sealed. If a bellows type of compass was used, the compass was filled to allow for expansion of the liquid. With the filler cap removed, the compass was placed in a pressure chamber, the pressure was reduced to the equivalent of 50,000 feet altitude and maintained for 20 minutes. Then the pressure was increased to ambient, the filling liquid was refilled, and the filler cap was installed. All filling liquid was required to comply with MIL-L-5020.

6.4.2 Visibility. Examples of the liquid obscuring the card include, but are not limited to, foaming and clouding.

6.4.3 Rapid altitude change. Previous compasses made in accordance with this specification required thorough annealing of the cover glass, ensuring the cover glass would withstand the rigors of rapid altitude changes.

6.4.4 Operating temperature and altitude. Previous compasses made in accordance with this specification required the use of an expansion unit, allowing the filling liquid to expand and contract with changes in temperature and altitude.

6.4.5 Compensator vibration. Previous compasses made in accordance with this specification prevented changes in the adjustment of the compensator due to vibration by incorporating enough friction in the operation of the compensator to prevent changes during operation.

6.4.6 Compensator. Previous compasses made in accordance with this specification required the use of permanent bar magnets as components of the compensator.

6.4.7 Other compasses. Similar compasses are used in Navy aircraft. This compass is described in SAE-AS5604.

6.5 Subject term (key word) listing.

Backup
Standby
Whiskey

6.6 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.

MIL-PRF-38214C

Custodian:

Navy – AS
Army - AV

Preparing activity:

Air Force - 71

Agent:

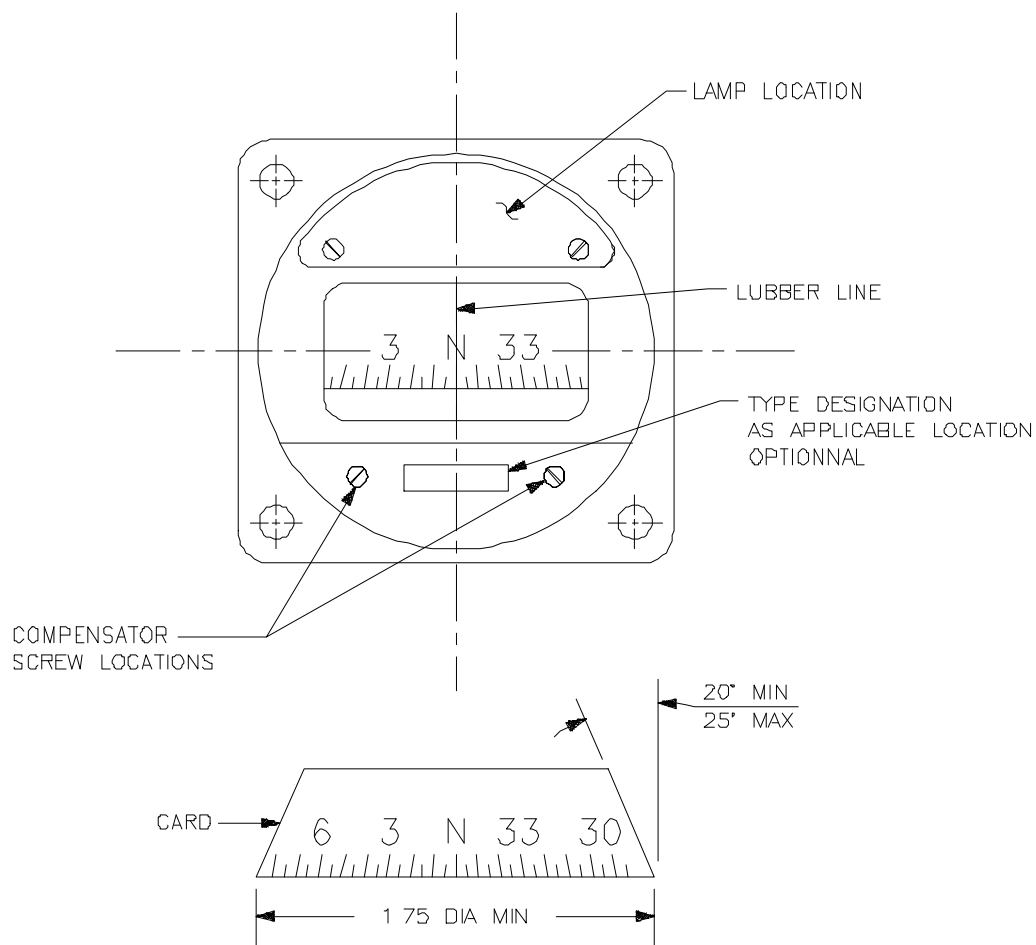
Air Force - 99

Review activity:

Army - MI

(Project Number 6605-0517)

MIL-PRF-38214C

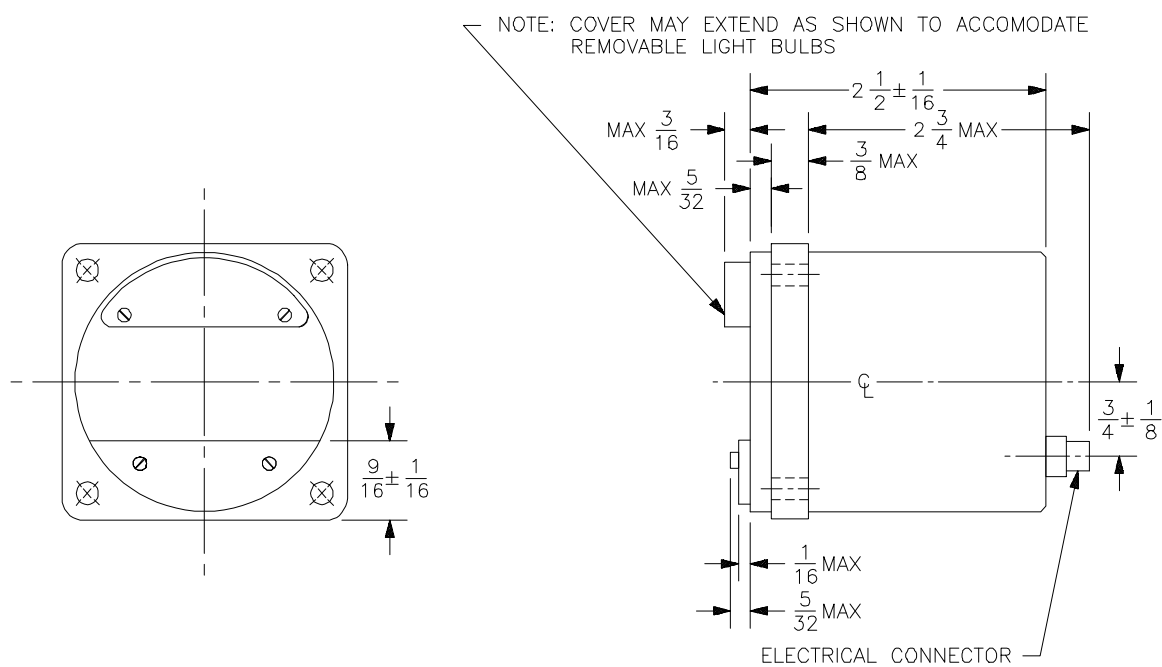


MARKING	HEIGHT OR LENGTH ± 0.010	WIDTH OF LINE ± 0.005	COLOR
Numerals 3, 6, 12, 15, 21, 24, 30 and 33	0.187	-----	White
30° Graduations	0.094	0.031	White
10° Graduations	0.094	0.016	White
Cardinal Pointers N, E, S, W	0.187	-----	White
Lubber Line (Approx) 5° Graduations	0.750 0.062	0.016 0.016	White
Type No. Designation	0.062	-----	Durable Black

NOTE: ALL DIMENSIONS IN INCHES

FIGURE 1. CASE AND CARD DETAIL

MIL-PRF-38214C



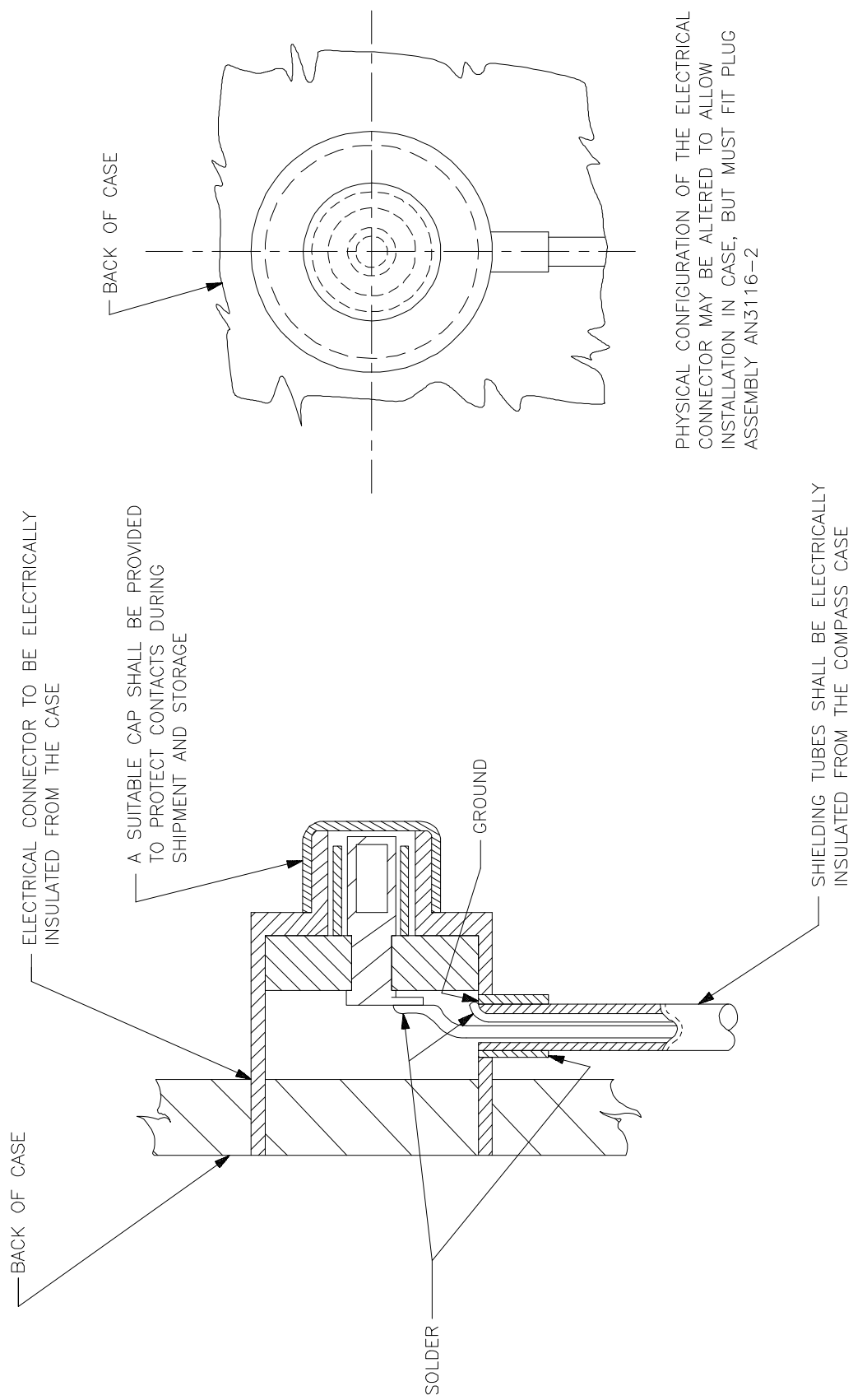
SEE FIGURE 1 FOR FACE AND CARD DETAILS

CASE IN ACCORDANCE WITH MS33638 FOR 2-INCH NOMINAL SIZE EXCEPT AS SHOWN

DIMENSIONS IN INCHES

FIGURE 2. CASE ENVELOPE

MIL-PRF-38214C



PHYSICAL CONFIGURATION OF THE ELECTRICAL CONNECTOR MAY BE ALTERED TO ALLOW INSTALLATION IN CASE, BUT MUST FIT PLUG ASSEMBLY AN3116-2

FIGURE 3. ELECTRICAL CONNECTOR

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
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I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-PRF-38214C

2. DOCUMENT DATE (YYYYMMDD)
20010802

COMPASS, MAGNETIC, MOUNTED

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (*Last, First, Middle Initial*)

b. ORGANIZATION

c. ADDRESS (*Include Zip Code*)

d. TELEPHONE (*Include Area Code*)
(1) Commercial
(2) AUTOVON
(*if applicable*)

7. DATE SUBMITTED
(YYYYMMDD)

8. PREPARING ACTIVITY

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(2) AUTOVON
336-5960

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