

MIL-I-5133C(USAF)
5 Aug 1968
Superseding
MIL-I-5133B(USAF)
8 April 1953

MILITARY SPECIFICATION

INDICATOR, ATTITUDE, TYPE J-8

1. SCOPE

*1.1 This specification covers one type of electrically driven attitude gyro indicator, designated Type J-8.

2. APPLICABLE DOCUMENTS

*2.1 The following documents of the issue in effect on the date of invitations for bids or request for proposals, form a part of the specification to the extent specified herein:

SPECIFICATIONS

Federal

QQ-P-416 Plating, Cadmium (Electrodeposited)

Military

MIL-P-116 Preservation, Methods of
MIL-D-1000 Drawings, Engineering and Associated Lists
MIL-E-5272 Environmental Testing, Aeronautical and Associated
Equipment, General Specification for
MIL-C-5541 Chemical Films and Chemical Film Materials for
Aluminum and Aluminum Alloys
MIL-S-7742 Screw Threads, Standard, Optimum Selected Series,
General Specification for
MIL-A-8625 Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-L-25142 Luminescent Material, Fluorescent
MIL-B-27497 Bearing, Jewel, Sapphire, Synthetic

STANDARDS

Military

MIL-STD-105 Sampling Procedures and Tables for Inspection by
Attributes
MIL-STD-129 Marking for Shipment and Storage

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MIL-STD-130	Identification Marking of U.S. Military Property
MIL-STD-143	Specifications and Standards Order of Precedence for the Selection of
MIL-STD-461	Electromagnetic Interference Characteristics Requirements for Equipment
MIL-STD-704	Electric Power, Aircraft, Characteristics and Utilization of
MIL-STD-794	Parts and Equipment, Procedures for Packaging and Packing of
MIL-STD-834	Packaging Data Forms, Instructions for Preparation and Use of
MIL-STD-838	Lubrication of Military Equipment
MS33558	Numerals and Letters, Aircraft Instrument Dial, Standard Form of
MS33678	Connector, Receptacle, Electric, Integral Mounting

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

3. REQUIREMENTS

*3.1 Qualification. The attitude indicators furnished under this specification shall be products which are qualified for listing on the applicable qualified products list at the time set for opening of bids (see 4.2 and 6.4).

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

3.3 Materials.

3.3.1 Metals. Metals shall be of the corrosion-resistant type or shall be suitably protected to resist corrosion during normal service life.

3.3.2 Non-magnetic materials. Non-magnetic materials shall be used for all parts of the indicator, except where magnetic materials are necessary.

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

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3.4 Design and construction.

3.4.1 General. The indicator shall conform to Figure 1 and shall be designed and constructed so that no parts will work loose in service. It shall be built to withstand the strains, jars, vibrations, and other conditions incident to shipping, storage, installation, and service.

3.4.2 Adjustments and repairs. The indicator shall be constructed so that adjustments and repairs can be easily made by the personnel of operating units and overhaul bases.

3.4.3 Mounting. The indicator shall be designed for mounting from the front of the instrument panel of the airplane.

3.4.4 Operational limits. The gyro shall have 360 degrees of freedom in roll and a minimum of plus or minus 80 degrees of freedom in pitch. Pitch limit stops shall be provided to prevent gimbal lock of the gyro when the longitudinal axis of the instrument case is inclined approximately 90 degrees to a horizontal plane. The exact amount of freedom shall be that which produces the minimum error during loops at a rate of 20 degrees per second. The stops shall be designed such that no parts of the instrument will be damaged by a loop at the rate of 30 degrees per second.

3.4.4.1 Sensitive pitch indicator. The sensitive pitch indicator shall consist of a horizon bar and shall be in accordance with Figure 2. It shall be finished in luminescent material. The horizon bar shall go up with respect to the case during a diving maneuver and shall go down with respect to the case during a climbing maneuver. The bar shall move approximately 0.035 inch per degree of gyro pitch movement at the level flight position. At the maximum movement of the bar, it shall be visible at the top (or bottom) of the dial.

3.4.4.2 Trim indication. The trim indicator shall consist of a miniature airplane which shall conform to Figure 2, insofar as outline appearance is concerned, and shall be finished in luminescent material. The miniature airplane shall be adjustable to provide a zero pitch indication for any pitch attitude from five degrees dive to ten degrees climb. A suitable knob shall be provided for this adjustment.

3.4.4.3 Bank index. A bank index shall be incorporated and shall be as shown in Figure 2. It shall be finished in luminescent material. The member, which moves the bank index, shall be attached to the roll gimbal and shall not move with pitch deviations of the gyro.

FIGURE 1. Case dimensions

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

3.4.6 Radio noise interference. The indicator shall be provided with the necessary radio noise suppression features to suppress its radio noise to the limits specified in MIL-STD-461.

3.4.7 Turn error compensation. The indicator shall be compensated to maintain the error in indication due to centrifugal force encountered in turns to a minimum. The method used shall be subject to the approval of the Procuring Agency.

3.4.8 Luminescent Material. Where luminescent material is specified, it shall conform to MIL-L-25142.

3.4.9 Bearings synthetic. When sapphire or ruby jewel bearings are used they shall be in accordance with MIL-B-27497.

3.4.10 Case. The indicator case shall consist of the body and the bezel ring and shall be in accordance with Figure 1.

3.4.10.1 Body. The body shall be made either of non-ferrous low density metal or of synthetic material, uniform in texture with a smooth surface, and entirely covered with a durable black finish. Synthetic material shall be of thermal setting type composed of a suitable filler and phenol condensation product binder.

3.4.10.2 Bezel ring. The bezel ring shall be made of non-ferrous low density metal and shall have a durable dull black finish. The ring shall be held in place by means of properly secured screws. Provision shall be made for replacement of the cover glass by removal of the bezel ring.

3.4.10.3 Reinforcement. The inside of the case around each connection shall be of sufficient strength to prevent damage to the case when the connections are tightened during installation of the indicator.

3.4.10.4 Cover glass. The cover glass shall be properly sealed, provision being made to prevent fogging on the inside of the glass under operating conditions. The distance between the cover glass and the closest point of the sphere shall be the minimum practicable.

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3.4.11 Face. The face of the indicator shall conform to Figure 2, insofar as dial markings are concerned. The style and proportions of the letters placed on the face shall conform to MS-3355B. All markings shall be finished in luminescent material, with the exception of the 5-degree bank marks which shall have a durable dull black finish.

3.4.12 Gyro element. The indicator shall incorporate an electrically driven vertical gyro which has freedom about each of two perpendicular axes. The gyro shall operate from a 115V, 3 phase, 400 cps (nominal value) power supply which has A-B-C phase rotation in accordance with MIL-STD-704. The gyro shall operate properly on any voltage from 90 to 124V and on any frequency from 380 to 420 cps, or any combination thereof.

3.4.12.1 Erection device. The indicator shall incorporate an erection device to maintain the gyro indication in its neutral position.

3.4.12.2 Caging device. A caging device shall be incorporated into the indicator and shall be an integral part thereof. The mechanism shall be constructed so that the gyro may be caged manually at any time from any indication and returned to straight and level flight indication by means of mechanical levers. This mechanism shall be self-retracting.

3.4.12.3 Gyro frame. The gyro parts shall be mounted so that the instrument cover may be removed without disturbing the adjustments of the gyro.

3.4.12.4 Gyro life. The indicator shall be capable of a minimum of 1000 hours of operation without failure.

3.4.13 Flag alarm. A warning device shall be incorporated which will indicate when power failure occurs. This device shall be in accordance with Figure 1. The flag shall have a durable dull black background with the letters "OFF" and a border finished in luminescent material.

3.5 Screw threads. Unless otherwise specified, the threads of all machine screws, 0.060 inch, or larger, in diameter shall conform to MIL-S-7742.

3.6 Lubrication. Where lubrication is required, parts shall be lubricated in accordance with MIL-STD-838.

3.7 Interchangeability. All parts having the same manufacturer's part number shall be directly and completely interchangeable with each other with respect to installation and performance. Changes in manufacturer's part numbers shall be governed by the drawing number requirements of MIL-D-1000..

3.8 Weight. The weight of the indicator completely assembled, less mounting screws, shall not exceed 3-1/4 pounds.

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3.9 Finishes and protective coatings.

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

3.9.1.1 Dials, small holes, case inserts, and special surfaces need not be anodized.

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

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

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

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

3.9.2 Steel Parts. Steel parts shall be cadmium plated, where practicable, in accordance with QQ-P-416, Type II or Type III as applicable, and of a Class that is adequate to achieve the degree of protection required.

3.10 Markings. All markings shall be durable to withstand the usage encountered in service.

3.10.1 The sphere shall be finished in durable dull black with all markings finished in luminescent material and shall conform to Figure 2. The style and proportions of the numerals and letters shall conform to MS-33558.

3.10.2 The bezel markings shall be finished in luminescent material and shall conform to Figure 2.

3.10.3 The style and proportions of the letters on the caging knob shall conform to MS-33558 and shall be finished in durable dull white.

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

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3.12 Installation.

3.12.1 Mounting screws. The contractor shall furnish sufficient mounting screws for installing the indicator. They shall be No. 6-32 NC-2 round head brass machine screws having a durable dull black finish. The length shall be sufficient to permit mounting on a panel 5/16 inch thick.

3.12.2 Envelope. An envelope, containing the mounting screws, shall be furnished with each indicator. The following information shall be printed on the face of the envelope:

IMPORTANT
THIS ENVELOPE CONTAINS
MOUNTING SCREWS

3.13 Workmanship.

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

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

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

4. QUALITY ASSURANCE PROVISIONS

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

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

- a. Qualification inspection See 4.3
- b. Quality conformance inspection See 4.4

***4.3 Qualification inspection.** Qualification inspection shall consist of all the tests specified under quality conformance inspection and, in addition, the following environmental tests and endurance test:

- a. Low temperature exposure See 4.6.16
- b. High temperature exposure See 4.6.17
- c. Altitude See 4.6.18
- d. Rain See 4.6.19
- e. Acceleration See 4.6.20
- f. Vibration failure See 4.6.21
- g. Sand and dust See 4.6.22
- h. Salt spray See 4.6.23
- i. Humidity See 4.6.24
- j. Fungus resistance See 4.6.25
- k. Life See 4.6.28

***4.3.1 Qualification test sample.** The qualification test sample shall consist of five indicators representative of the production equipment. These indicators shall be identified as qualification samples and forwarded to the qualifying activity as designated in the letter of authorization (See 6.4).

***4.4 Quality conformance inspection.** Quality conformance inspection shall consist of individual tests and sampling tests.

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*4.4.1 Individual tests. Each indicator submitted for acceptance under contract shall be subjected to each of the following tests as described under 4.6.

- | | |
|---------------------------|------------|
| a. Examination of product | See 4.6.1 |
| b. Dielectric | See 4.6.2 |
| c. Power consumption | See 4.6.3 |
| d. Low voltage | See 4.6.4 |
| e. Caging | See 4.6.5 |
| f. Starting and alignment | See 4.6.6 |
| g. Loop | See 4.6.7 |
| h. Gyro inclination | See 4.6.8 |
| i. Erection | See 4.6.9 |
| j. Roll, pitch and yaw | See 4.6.10 |
| k. Power failure | See 4.6.11 |

*4.4.2 Sampling tests. Five indicators which have been manufactured under essentially the same conditions shall be selected at random from each lot of 500 (or fraction thereof) and subjected to the following tests.

- | | |
|-----------------------------|------------|
| a. Individual tests | See 4.4.1 |
| b. Low temperature | See 4.6.12 |
| c. High temperature | See 4.6.13 |
| d. Magnetic effect | See 4.6.14 |
| e. Vibration error | See 4.6.15 |
| f. Radio noise interference | See 4.6.26 |
| g. Mounting lugs | See 4.6.27 |
| h. Examination of packaging | See 4.6.29 |

*4.4.3 Rejection and retest. When one or more indicators from a lot fail to pass the sampling tests, acceptance of the lot will be withheld until the extent and cause of failure are determined.

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*4.4.4 Individual tests may continue. For product reasons, individual tests may be continued pending the investigation of the sampling test failure. Final acceptance of the lot will not be made, however, until it is determined that the lot meets all the requirements of the specification.

*4.4.5 Defects in items already accepted. The investigation of a test failure could indicate that defects may exist in items 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 conditions. Unless otherwise specified, all tests required by this specification shall be conducted at atmosphere pressure (approximately 29.92 inches of Hg) and at room temperature (approximately 25 degrees Centigrade). When tests are performed with atmospheric pressure or temperature substantially different from the above values, proper allowance shall be made for the change in instrument reading.

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

4.5.2 Pitch tolerances. Whenever a pitch tolerance or displacement is specified in degrees, the degrees shall be converted to inches displacement of the bar from the known calibration of the design.

4.6 Test methods.

4.6.1 Examination of product. Each indicator submitted for acceptance under contract shall be carefully examined to determine compliance with the requirements specified herein with respect to materials, workmanship, proper operation and performance.

4.6.2 Dielectric. The indicator shall be subjected to a dielectric test with 500V ac, at a commercial frequency, applied between each terminal and the case for a period of .5 seconds. At the end of the specified time, there shall be no arcing or breakdown of insulation.

4.6.3 Power consumption. With an alternating current calibrated voltmeter connected across the terminals, a voltage of $115 \pm 2V$ ac shall be applied, and with the indicator running not less than 3 minutes, the indication read on a calibrated ammeter shall not exceed 0.100 amp in each leg.

4.6.4 Low voltage. A potential of $90 \pm 5V$ ac shall be applied to the receptacle with the gyro not running. After 15 seconds, the gyro shall be caged and released and the indicator shall settle to its zero position within ± 1 degree in roll and pitch in a time not to exceed 3 minutes.

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4.6.5 Caging. The indicator shall be mounted in a horizontal plane and the necessary voltage, 115V, 3 phase, 400 cycles, shall be applied for a period of 1-1/2 minutes. The gyro shall be caged by means of the manual caging knob and then released quickly. When the caging knob is released, the horizon bar and the banking index shall not move more than 1/64 inch from its caged position.

4.6.6 Starting and alignment. A potential of $115 \pm 2V$ ac shall be applied to the receptacle with the gyro not running. After 15 seconds, the gyro shall be caged and released and the indicator shall settle to its zero position within ± 1 degree in roll and pitch in a time not to exceed 3 minutes.

*4.6.7 Loop. The indicator shall be rotated 1 complete revolution (loop) at a rate of 10 ± 1 degree per second and returned to the normal position. The error in pitch and bank shall not exceed 4 degrees.

4.6.8 Gyro inclination. The indicator shall be mounted on an accurately leveled turntable and operated for a sufficient length of time to reach equilibrium conditions. The indicator shall be rotated rapidly 180 degrees in azimuth and the deflection read within .5 second after rotation. For indicators which contain an inclined gyro, the deflection shall be 4 ± 1 degree nose down.

*4.6.9 Erection. The erection rates of dive, climb, and right and left bank from 10 to 5 degrees shall be between 2 and 4 degrees per minute in bank, and between 2 and 5 degrees per minute in pitch. During the pitch erection test, the bank index shall not exceed 3 degrees bank. During the bank erection test, the horizon bar shall not deviate more than 3 degrees from zero. The horizon bar and bank index shall be observed during the erection rate test to determine that the horizon bar and bank index return from 5 degrees to zero position within ± 1 degree in a period not exceeding 6 minutes.

4.6.10 Roll, pitch, and yaw. After being initially erected to within ± 1 degree, the indicator shall be subjected to a 15-degree roll, pitch, and yaw movement for 10 minutes. This 15 degree movement shall be considered 7-1/2 degrees both ways from each reference axis and shall be at a rate of 5 to 7 oscillations per minute. At the end of the 10-minute period, the indicator shall be brought to its level position and the error in indication shall be within ± 1 degree in roll and ± 1 degree in pitch.

4.6.11 Power failure. Voltages of $90 \pm 5V$ ac shall be applied to the receptacle of the indicator and the gyro allowed to run for 1 minute. Each or any phase shall be broken. Then the flag alarm shall indicate "OFF".

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4.6.12 Low temperature operation. While being operated at rated voltage, the indicator shall be subjected to a temperature of -54 ± 2 degrees Centigrade for a period of 4 hours. At the end of this period and while still at the low temperature, the indicator shall be subjected to the Roll, pitch, and yaw test. At the end of 10 minutes, the indicator shall be brought to its level position and the error in indication shall be within ± 3 degrees in roll and pitch. After the indicator has returned to room temperature, it shall be subjected to and shall pass the tests specified in 4.4.1.

4.6.13 High temperature operation. The indicator shall be placed in a chamber and maintained at a temperature of 71 ± 2 degrees Centigrade, for a period of 4 hours. At the end of this period and while still at high temperature, the indicator shall be subjected to the Roll, pitch, and yaw test. At the end of 10 minutes, the indicator shall be brought to its level position and the error in indication shall be within ± 3 degrees in roll and pitch. After the indicator has returned to room temperature, it shall be subjected to and shall pass the tests specified in 4.4.1.

4.6.14 Magnetic effect. The indicator (first - not operating and second - operating on rated voltage) shall be rotated in a vertical plane and about a short bar magnet compass with the nearest part of the indicator 5-1/2 inches from and magnetically east or west of the center of the compass. Starting directly under the compass, the indicator shall be held in positions 0, 45, 90, 135, 180, 225, 270, and 315 degrees from the initial position. At each of these positions, the indicator shall be rotated on its horizontal axis until it is in its normal upright position. The horizontal magnetic field intensity shall be between 0.17 and 0.19 oersted. The deflection of the compass at any one of the specified positions shall not exceed 5 degrees from the settled position.

4.6.15 Vibration error. Vibration error shall be in accordance with Procedure IV of MIL-E-5272. The indicator shall be operated on rated voltage and shall be subjected to vibration with an amplitude between 0.003 and 0.005 inch at frequencies of from 500 to 3000 cycles per minute. The reading shall not differ at any time by more than 1 degree from the reading obtained when the indicator is at rest.

4.6.16 Low temperature exposure. The Low temperature exposure test shall be conducted in accordance with Procedure II of MIL-E-5272. No examination shall be required at the end of the 72-hour period at minus 62 degrees Centigrade. At the conclusion of the 24-hour period at minus 54 degrees Centigrade, and while still at the test temperature, rated voltage shall be applied. After allowing a period of no longer than 5 minutes for warm-up and

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starting, the instrument shall properly indicate all attitudes with no evidence of sticking, binding, or other erratic action of the horizon bar, sphere, caging mechanism, or erection system. After the indicator has returned to room temperature, it shall successfully pass the tests specified in 4.4.1. The indicator shall be examined to determine that no external or internal damage has resulted from the exposure.

4.6.17 High temperature exposure. The High temperature exposure test shall be conducted in accordance with Procedure II of MIL-E-5272, except for a period of 24 hours. The indicator shall be operating during this period. After the indicator has returned to room temperature, it shall be subjected to and shall pass the tests specified in 4.4.1. There shall be no damage which would adversely affect subsequent operation. After completion of these tests, the parts shall be relubricated, if necessary, before acceptance.

4.6.18 Altitude. The Altitude test shall be conducted in accordance with Procedure VI, Condition C, of MIL-E-5272 for a continuous period of 4 hours and at a temperature of minus 54 degrees Centigrade. The indicator shall be operating at rated voltage during this period. After return to normal conditions, the indicator shall be subjected to the starting and alignment and the roll, pitch, and yaw tests. There shall be no failure as a result of this test.

4.6.19 Rain. The Rain test shall be conducted in accordance with Procedure II of MIL-E-5272, except that the indicator shall not be operating and shall be mounted for 1/2 hour with the dial in a vertical plane and 1/2 hour with the dial in a horizontal plane (dial face upward) in a rain test chamber.

4.6.20 Acceleration. The Acceleration test shall be conducted in accordance with Procedure III of MIL-E-5272. The indicator, not operating, shall be subjected to an acceleration of 20g. At the end of the acceleration, the indicator shall be subjected to and shall pass the tests specified under 4.4.1. No damage shall result from this test.

4.6.21 Vibration failure. The Vibration test shall be conducted in accordance with Procedure V of MIL-E-5272. The test shall be conducted while the indicator is being operated on rated voltage. After the vibration, the indicator shall be subjected to the roll, pitch, and yaw test. No looseness in the mechanism nor damage to any part of the indicator shall result from the vibration.

4.6.22 Sand and dust. The Sand and dust test shall be conducted in accordance with Procedure I of MIL-E-5272. At the end of this test, the indicator shall then satisfactorily meet the test requirements specified for starting and alignment and roll, pitch, and yaw.

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4.6.23 Salt spray. The salt spray test shall be conducted in accordance with Procedure I of MIL-E-5272 for a period of 50 hours with the indicator not operating. At the end of the 50-hour period, the indicator shall be subjected to the individual tests specified herein. No damage shall result from this test and the tolerances specified in the individual tests shall apply.

4.6.24 Humidity. The humidity test shall be in accordance with Procedure I of MIL-E-5272 with the indicator not operating. The indicator shall satisfactorily pass the roll, pitch and yaw test immediately following the exposure. There shall be no evidence of corrosion or rusting of the external or internal parts of the indicator, except for the electrical connector.

4.6.25 Fungus resistance. The fungus resistance test shall be conducted in accordance with Procedure I of MIL-E-5272. After the test, the indicator shall meet the requirements of 4.4.1. There shall be no deterioration which would adversely affect subsequent operation.

4.6.26 Radio noise interference. The radio noise test shall be in accordance with MIL-STD-461.

4.6.27 Mounting lugs. The indicator case, with the mechanism and cover glass removed, shall be mounted face downward on the movable head of a suitable testing machine with the diameter of the case in a horizontal plane so that the mounting lugs receive no support. A suitable pin shall be inserted through the hole in the mounting lug and attached to the pull strap in the stationary head of the machine. A load of 175 pounds shall be applied for one minute to each lug along the lug axis and toward the front of the indicator. The lugs shall withstand the applied load without fracture.

4.6.28 Life. The indicator shall be properly connected and operated on a 15 degree total movement low-roll Scorsby, having 5 to 7 oscillations per minute, for a period of 1000 hours of actual running time. The power shall be disconnected for a period of 2 hours after completion of each 22 hours of operation. There shall be no failure during the test. Upon completion of approximately 500, 750, and 1000 hours of operation, the indicator shall pass the tests specified in 4.4.1.

*4.6.29 Examination of packaging. A random sampling of completed packages shall be selected from each lot submitted under contract and examined to assure compliance with Section 5 of this specification. Samples shall be selected in accordance with MIL-STD-105, Inspection Level I, AQL4.0 defective, and subjected to applicable test outlined in the quality assurance requirements of MIL-STD-794.

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5. PREPARATION FOR DELIVERY

5.1 General. The requirements specified herein apply only to direct purchases by, or direct shipments to the Government.

*5.2 Preservation and packaging. Indicators shall be packaged one each per unit package in accordance with Level "A" requirements of MIL-STD-794 unless otherwise specified in the contract or order. Where detailed preservation and packaging instructions are not provided in the contract or order, the applicable preservation method shall be determined in accordance with preservation selection charts contained in MIL-STD-834. The selected method shall be applied in accordance with MIL-P-116.

*5.2.1 Packing for shipment. Packing for shipment shall be in accordance with Level B requirements of MIL-STD-794, unless otherwise specified in the contract or order.

*5.3 Marking of shipments. Interior packages and exterior shipping containers shall be marked in accordance with MIL-STD-129.

6. NOTES

6.1 Intended use. The type J-8 attitude indicator covered by this specification is intended for use in high speed aircraft to indicate the attitude of the aircraft during all maneuvers of the aircraft.

6.2 Definition.

6.2.1 Amplitude. Whenever the word "amplitude" is specified, it shall mean the extent of motion as measured from one extreme to the opposite extreme.

*6.3 Ordering data. Procurement documents should specify the following:

- a. Title, number and date of this specification
- b. Level of packaging and packing required

*6.4 Qualification. With respect to products requiring qualification, awards will be made only for such products as have prior to the time set for opening of bids, qualified for inclusion in the applicable Qualified Products List whether or not such products have actually been so listed by that date. The attention of the suppliers is called to this requirement, 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 orders for the products covered by this specification. The activity responsible for the Qualified Products List is

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Oklahoma City Air Materiel Area (OCNE) Tinker AFB, Oklahoma and information pertaining to qualification of products may be obtained from that activity.

*6.5 Indication of change. The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) 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 previous issue.

*Custodian:
Air Force - 71

Preparing Activity:
Air Force - 71

Reviewer:
Air Force - 71

Project Number 6610-F037

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
<p style="text-align: center;"><u>INSTRUCTIONS</u></p> <p>This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity.</p>		
SPECIFICATION		
ORGANIZATION		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT \$
MATERIAL PROCURED UNDER A		
<input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING.		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO IF "YES", IN WHAT WAY?		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)		
SUBMITTED BY (Printed or typed name and activity)		DATE

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