INCH-POUND
MIL-I-7085C
30 NOVEMBER 1994
SUPERSEDING
MIL-I-7085B
28 JANUARY 1980

MILITARY SPECIFICATION

INDICATOR, PRESSURE, ENGINE, 0-50 PSI

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

1. SCOPE

1.1 Scope. This specification covers one type of hermetically sealed, remote indicating, synchro-style fuel pressure indicator.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

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

SPECIFICATIONS

FEDERAL

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

MILITARY

MIL-P-116	Preservation, Methods Of

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, Tinker AFB, OK 73145-5990, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6620

MIL-T-5882	Transmitter, Pressure, Multipurpose, 0-50 psi, MS28005-1
MIL-I-7057	Indicator, Synchro, Aircraft, General Specification For
MIL-STD-129	Marking For Shipment And Storage
MIL-STD-130	Identification Marking Of U.S. Military Property
MS28005	Transmitter, Pressure, Synchro, Aircraft
MS28010	Indicator, Pressure Synchro, Single, 2-Inch Size
MS33585	Pointer, Dial, Standard Design Of Aircraft Instrument

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Standardization Document Order Desk, 700 Robbins Ave, Building #4, Section D, Philadelphia, PA 19111-5094.)

2.2 Non-Government publications. The following document(s) 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 issue of 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 Society For Testing and Materials (ASTM)

ASTM D3951 Packaging, Commercial

(Application for copies should be addressed to: ASTM, 1916 Race St, Philadelphia, PA 19103.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute documents. These documents also may be available in or through libraries or other informational services.)

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specifications sheets, or MS standards), the test 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. 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 4.3)

3.1.1 General. The requirements specified in specification MIL-I-7057 are applicable as requirements of this specification. Additional requirements shall be as specified herein.

3.1.2 Conflicting requirements. Where the requirements of the general specification and this specification conflict, the requirements of this specification shall govern.

3.2 Design. The indicator shall be designed for use with an MS28005-1 multipurpose pressure transmitter which meets the requirements of Specification MIL-T-5882.

3.3 Construction.

3.3.1 Case. The case shall be hermetically sealed and the case dimensions shall conform to standard MS28010, except that the case length shall be 3 ± 0.12 inches.

3.3.1.1 Cap. A separate nonhermetically sealed cap may be used on the back of the case for the purpose of installing the electrical receptacles. The cap shall be made of nonferrous, low-density metal.

3.3.1.2 Cover glass. The distance between the outer surface of the cover glass and the front edge of the case shall be the minimum practicable and shall not exceed 0.03 inch.

3.3.2 Pointer. The pointer shall be in accordance with MS33585-8, except that the length of the pointer shall be such that the tip will extend into the scale a distance equal to 0.33 to 0.67 the length of the shortest graduation.

3.3.2.1 Pointer finish. The shaded portion of the pointer shall be finished with fluorescent-luminescent material.

3.3.3 Dial. The dial shall be as shown on figure 1. A minimum diameter of 1.75 inches shall be maintained across the outside ends of the graduations. The graduation for 25 psi shall be located on the horizontal center line at the left side of the dial.

3.3.3.1 Dial markings.

3.3.3.1.1 Fluorescent-luminescent markings. The following markings shall be finished in fluorescent-luminescent material. The dimensions of the markings shall be as follows:

	Height or Length Inch ± 0.01	Width of Line or Graduation Inch ±0.005
Numerals 0, 10, 20. 30, 40, and 50	0.16	0.025
Graduation at 25 psi	0.14	0.031
5-Pound Graduations	0.19	0.031
1-Pound Graduations	0.09	0.020
Lettering "FUEL, OIL, WATER, PRESS, PSI, TORQUE"	0.16	0.025

3.3.3.1.2 Durable dull black markings. The markings for the applicable MS part number shall be permanently and legibly marked on the dial in letters 0.06 inch high; location is optional. These markings and all other markings not otherwise specified shall be furnished in durable dull black.

3.3.4 Functional selector plate. A functional selector plate shall be provided with the lettering "WATER" , "FUEL", "OIL" and "TORQUE" and means provided to position the desired lettering in the window opening of the main dial. The method used to accomplish the "application" change shall be simple and shall not require special tools or the disassembly of the indicator case. The means to be used shall be subject to prior approval of the procuring activity.

3.3.5 Weight. The weight of the indicator shall not exceed 0.75 pound.

3.5 Reliability. The indicator shall have a specified mean-time-between-failure (MTBF) of 1000 hours when tested and accepted as specified in 4.

3.6 Recycled and reclaimed materials. The use of recycles and reclaimed materials shall be encouraged to the maximum extent possible without jeopardizing the intended end use of the item.

4. QUALITY ASSURANCE PROVISION

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 Inspection. The indicators shall be subjected to the Qualifications and Quality Conformance Inspections of MIL-I-7057.

4..2.1 Test tolerances. The indicator shall be within the tolerances specified in TABLES I and II of this specification when tested in accordance with specification MIL-I-7057.

TABLE I

Pressure Indicator	
PSI	Tolerance
0	0.25
10	0.25
20	0.25
30	0.25
40	0.25
50	0.25

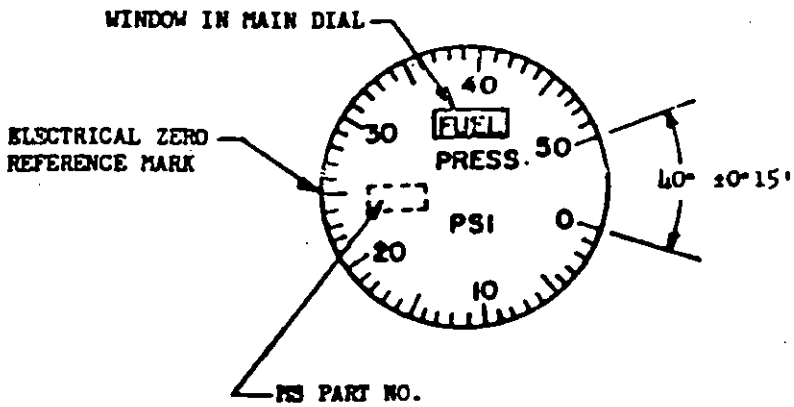

FIGURE 1. Dial.

TABLE II

Pressure Indicator

Test	Tolerance ± psi
Position error at 30 psi	0.25
Friction	
Room temperature	0.25
High temperature	0.25
Low temperature	0.50
High altitude - Low temperature	0.50
Vibration	
Pointer oscillation	0.25
Pointer variation	0.25
Scale error	
Low temperature	0.40
High temperature	0.25

4.3 Qualification inspection. The qualification inspection shall consist of all the qualification tests of MIL-I-7057 and the reliability qualification phase test of 4.4.3.1 herein. A minimum of six indicators shall be required. A minimum of three indicators shall be subjected to the reliability qualification phase test. The remaining three indicators shall be subjected to the qualification of MIL-I-7057.

4.4 Quality conformance inspection. The quality conformance inspection shall be under the supervision of the Government quality assurance representative. Acceptance or approval of material during the curse of manufacture shall in no case be construed as a guarantee of the acceptance of the finished product. The quality conformance inspection shall consist of all the quality conformance tests of MIL-I-7057 and the reliability test herein. (This includes both the qualification an production acceptance phase test.)

4.4.1 Individual inspection. The individual inspection shall consist of the individual tests of MIL-I-7057 and the reliability assurance tests specified in 4.4.3. Each indicator accepted on the contract or order shall have conformed to all of the individual tests and shall be from a lot conforming to the reliability test.

4.4.2 Sampling plans and tests. Indicators selected for the sampling plan tests shall first have passed the individual tests. Indicators which have been subjected to sampling plan A tests shall not be delivered on contract until they have been refurbished (see 6.3.1) and resubmitted, and have passed all of the individual tests. Indicators which have been subjected to the sampling plan B tests shall not be delivered on contract. The sampling plan A and B tests shall be as specified in MIL-I-7057.

4.4.3 Reliability assurance tests. The reliability assurance tests shall consist of the reliability qualification phase test and the reliability production acceptance (sampling) phase test. These tests are

required and shall be conducted in accordance with MIL-STD-781. Indicators selected for the reliability assurance tests shall first have passed the individual tests.

4.4.3.1 Reliability qualification phase test. A minimum of three and maximum of six indicators shall be tested as outlined in MIL-STD-781 under the section entitled "Qualification (Demonstration) Phase of Product Reliability Test." Test Plan IC shall be used and test condition for Transport, Bomber in TABLE I applies.

4.4.3.2 Reliability production acceptance (sampling) phase test. The indicators shall be tested as outlined in MIL-STD-781 under the section entitled "Production Acceptance (Sampling) Phase of Production Reliability Tests. Test Plan IIC shall be used and test conditions for Transport, Bomber in TABLE I applies".

4.4.3.2.1 Procedures for production acceptance (sampling) phase. This test shall be conducted on each lot (see 6.3.3) during the life of the contract. It shall not start until the qualification phase test program has been completed. Testing on each lot shall begin not later than three days after the final indicator of the lot is produced. The number of indicators tested on each lot shall be not less than three nor more than seven. The indicators shall be tested until an accept or reject decision is reached. The test results of each lot shall be summarized for the procuring activity as soon as testing is completed on the lot. The procuring activity reserves the right to stop the acceptance of equipment at any time after one or more reject decisions have been reached, pending a review of the contractor's efforts to improve the equipment, the equipment quality control, etc.

4.4.3.3 Test procedures and test details. Test procedures to be used for each phase of the reliability assurance tests shall be prepared by the contractor. Each procedure shall be submitted to and approved by the qualifying or procuring activity (as applicable) before that phase of the reliability assurance testing contained in the procedure may begin. The test procedures shall contain all pertinent test details such as the length of the duty cycle, length of the heating and cooling portions of the cycle, performance characteristics to be measured, special failure criteria, burn-in period if used, test equipment and wiring diagrams to be used, test data sheets, etc. The following paragraphs shall be considered as minimum requirements and shall apply to both phases.

4.4.3.3.1 Duty cycle: The duty cycle shall be continuous. The duty cycle shall consist of cycling the indicator between 10 and 40 psi and return at a rate of 12 ± 1 cycles per hour. The power shall be "off" 3 to 5 minutes of each hour.

4.4.3.3.2 Performance characteristics. The scale error and friction test shall be conducted at room temperature in accordance with MIL-I-7057 at least once each week. The scale error shall be within the tolerance of TABLE I. The friction error shall be within the room temperature tolerance of TABLE II.

4.4.3.3.3 Failure criteria. Whenever performance characteristics fall below the requirement of 4.2.2.3.3.2 above, at least one failure has occurred. If subsequent analysis reveals that several parts have deteriorated, each shall be counted a failure unless the procuring activity and the supplier agree that one part caused the other parts to fail.

4.4.3.3.4 Preventive maintenance. No preventive maintenance may be accomplished on the indicators while they are on test.

4.4.3.3.5 Operational stability. No adjustment of any instrument controls, in accessible during normal operation, shall be made during reliability tests.

4.4.3.4 Disposition of indicators upon completion of tests. Any indicator used for the reliability assurance tests may delivered on contract provided it meets all of the following requirements:

a. It is representative of production units currently being accepted.

b. It is in "good as new" condition or has been refurbished (see 6.3).

c. It is otherwise satisfactory.

5. PACKAGING

5.1 Preservation-packaging. Preservation-packaging shall be level A, C, or Industrial, as specified (see 6.2).

5.1.1 Level A.

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

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

5.1.1.3 Preservation application. Not applicable.

5.1.1.4 Unit packaging. Unless otherwise specified by the contracting activity, each indicator shall be packaged in quantity unit packs of one each in accordance with Method 1C1 of MIL-P-116. Overbox completed pack in PPP-B-636 container. Apply sufficient cushioning material between bag and unit container. Apply sufficient cushioning material between bag and unit container of a type, density, and thickness to insure shock transmission does not exceed peak values in G's established for the indicator when completed packs are subjected to the rough handling drop tests of MIL-P-116.

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

5.2.1 Level A. Indicators packaged as specified in 5.1.1 shall be packed in shipping containers conforming to PPP-B-601, Styles A or B, Class overseas, unless shipping container shall be of uniform shape, size, minimum tare and cube consistent with the protection required.

5.2.2 Level B. Indicators packaged as specified in 5.1.1 shall be packed in shipping containers.

conforming to PPP-B-636, class weather-resistant, unless otherwise specified by the contracting activity. Other requirements as specified in 5.2.1 apply.

5.2.3 Level C. Packing shall be applied which affords adequate protection during domestic shipment from the supply source to the first receiving activity for immediate use. This level shall conform to applicable carrier rules and regulations.

5.2.4 Industrial. The packaged indicators shall be packed in accordance with ASTM D3951.

5.3 Marking. In addition to any other markings required by the contract or order (see 6.2), interior and exterior containers shall be marked in accordance with MIL-STD-129.

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 multipurpose pressure indicator covered by this specification is intended for use in conjunction with a suitable transmitter in indicating remotely the pressure in the fuel, oil, and water systems of aircraft engines.

6.2 Acquisition requirements. Acquisition documents must specify the following:

a. Title, number, and date of the specification.

b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1).

c. Procurement documents should specify the ordering data listed in Section 6 of MIL-I-7057 and the following:

(1) Lot size (see 6.3.3).

6.3 Definitions. The following definitions shall supplement those in MIL-I-7057.

6.3.1 Refurbished. Refurbished shall mean that the instrument has been completely overhauled with all component parts meeting current parts standards, and the overhauled instrument shall have bee subjected to and met all the requirements of a new instrument.

6.3.2 Good as new. "Good as new" shall mean instruments operated less than 10 percent of the specified MTBF operation.

6.3.3 Lot size. A lot shall be defined as two months production or as defined in the contract.

6.4 Qualification. With respect to products requiring qualification, awards will be made only for such products which are at 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 contractors is called to this requirement, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government test for qualification in order that they may be eligible to be awarded contracts or orders for products covered by this specification. The activity responsible for the Qualified Products List is Oklahoma City Air Logistics Center/TICLA, Tinker AFB, OK 73145-5990 and information pertaining to qualification of products may be obtained from that activity.

6.5 Subject term (key word listing).

Fuel pressure indicator
Multipurpose
Remote indicating
Synchro style

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 extensiveness of the changes.

Custodians:
AIR FORCE - 99
Army -AV
Navy -AS

Preparing activity:
AIR FORCE -71

Project No.
6620-0546