

MIL-I-7085B
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SUPERSEDING
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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 Issues of documents. The following documents, of the issue in effect on date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

SPECIFICATIONS

FEDERAL

PPP-B-636 - Box, Shipping, Fiberboard

MILITARY

MIL-P-116 - Preservation-Packaging, Methods of
MIL-T-5882 Transmitter, Pressure, Multipurpose,
0-50 psi, MS 28005-1
MIL-I-7057 - Indicator, Synchro, Aircraft, General
Specification for

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Hq AFLC CASO/LODS, Federal Center, Battle Creek, MI 49016, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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STANDARDS

MILITARY

MIL-STD-129	- Marking for Shipment and Storage
MIL-STD-130	- Identification Marking of U.S. Military Property
MIL-STD-794	- Parts and Equipment, Procedures for Packaging and Packing of
MS28005	- Transmitter, Pressure, Synchro, Aircraft
MS28010	- Indicator, Pressure Synchro, Single, 2-Inch Size
MS33585	- Pointer, Dial, Standard Design of Aircraft Instrument

(Copies of specifications, standards, drawings, and publications required by contractors 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. 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 $3 \pm 1/8$ 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.

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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 1/32 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 1/3 to 2/3 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 1-3/4 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 $\pm 1/64$	Width of Line or Graduation Inch ± 0.005
Numerals 0, 10, 20, 30, 40, and 50	5/32	0.025
Graduation at 25 psi	9/64	0.031
5-Pound Graduatiions	3/16	0.031
1-Pound Graduatiions	3/32	0.020
Lettering "FUEL, OIL, WATER, PRESS, PSI, TORQUE"	5/32	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 1/16 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.

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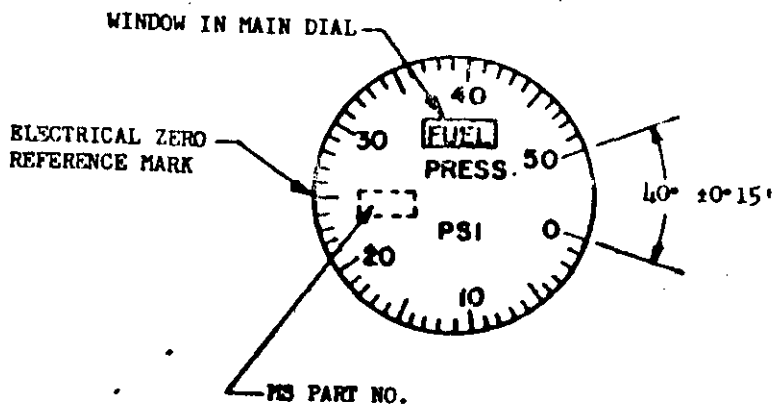


FIGURE 1. Dial

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

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

* 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.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract. 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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

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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. A detailed test report of the qualification test results of MIL-I-7057 and the reliability qualification phase test results shall be prepared by the contractor and submitted to the qualifying activity.

*4.4 Quality conformance inspection. The quality conformance inspection shall be under the supervision of the Government quality assurance representative. The contractor shall furnish all samples and shall furnish test reports showing the detailed quantitative results of all tests required of the contractor, signed by an authorized representative of the contractor. Acceptance or approval of material during the course 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 and 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.

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*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 Tests." 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

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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 be 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 or C as specified.

* 5.1.1 Level A.

* 5.1.1.1 Cleaning. Indicator shall be cleaned in accordance with process C-1 of MIL-P-116.

* 5.1.1.2 Drying. Indicator 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 procuring activity, each indicator shall be packaged in quantity unit packs of one each in accordance with method IC-1 of MIL-P-116. Overbox in PPP-B-636 carton large enough to allow for application of sufficient cushioning material between container and bag, of a type, density, and thickness to insure shock transmission does not exceed peak values in Gs established for the item, when completed packs are subjected to the rough handling drop tests of MIL-P-116.

* 5.1.2 Level C. Same as Level A except Method III of MIL-P-116 applies in lieu of specified method.

* 5.2 Packing. Packing shall be level A, B, or C as specified

* 5.2.1 Level A. Indicators packaged as specified in 5.1.1 shall be packed in shipping containers conforming to PPP-B-636, weather-resistant class, unless otherwise specified by the procuring activity. Insofar as practical, exterior shipping container shall be of uniform shape, size, of minimum tare and cube consistent with the protection required. Table II of MIL-STD-794 applies for Army use.

* 5.2.2 Level B. Indicators packaged as specified in 5.1.1 shall be packed in domestic class exterior shipping containers conforming to PPP-B-636. Other requirements as specified in 5.2.1 above shall apply.

* 5.2.3 Level C. Packing shall be applied which affords adequate protection during domestic shipment from the supply source to the first domestic receiving activity for immediate use. This level shall conform to applicable carrier rules and regulations and may be the contractor's commercial practice provided the latter meets the requirements of this level.

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6. NOTES

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

a. 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 been 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 tested 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 Hq AFLC CASO/LODS, Federal Center, Battle Creek, MI 49016, and information pertaining to qualification of products may be obtained from that activity.

6.5 Reclaimed material. The use of reclaimed materials shall be encouraged to the maximum extent possible.

* 6.6 Marginal notations. 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.

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in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document base on the entire content irrespective of the marginal notations and relationship to the last previous issue.

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