

INCH-POUND

MIL-I-25906D (USAF)
 30 JUNE 1993
 SUPERSEDING
 MIL-I-25906C (USAF)
 31 OCTOBER 1986

MILITARY SPECIFICATION

INDICATOR, RATE OF FLOW EFU-3A,
 FUEL. 0-15, 000 PPH

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 a single remote indicating fuel flow rate indicator, designated EFU-3/A.

2. APPLICABLE DOCUMENTS2.1 Government documents.

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 73145-3037 by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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).

SPECIFICATIONSFederal

PPP-B-1672 Boxes, Shipping, Reusable With Cushioning

Military

MIL-P-116 Preservation, Methods Of

AMSC N/A

FSC 6620

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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MIL-B-121	Barrier Material, Greaseproofed Waterproofed Flexible
MIL-I-7566	Indicator System, Fuel Flowmeter, General Specification For
MIL-T-25906	Transmitter, Rate of Flow Tru-7/A, Fuel, 0-15,000 PPH

STANDARDSFederal

FED-STD-101	Preservation, Packaging and Packing Materials: Test Procedures
MIL-STD-129	Marking For Shipment And Storage
MIL-STD-2073-1	DOD Materiel Procedures For Development And Application Of Packaging Requirements
MS33585	Pointer, Dial, Standard Design Of Aircraft Instrument
MS33639	Case, Instrument, Clamp-Mounted, Aircraft
MS33678	Connector, Receptacle, Electric, Integral Mounting

(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.)

2.1.2 Other Government documents, drawings, and publications. The following other Government documents, drawings, and publications form a part of this document to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

Air Force Drawing 898894

Luminescent Material, Fluorescent.

2.2 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, specification sheets, or MS standards), the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

3.1 First article. When specified (see 6.2.d), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.5.4.

3.2 General specification. The requirements of MIL-I-7566 apply as

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requirements of this specification with the exceptions and additions called out herein. When the two specifications conflict, this specification shall govern.

3.3 Excitation. The indicator shall operate on the second harmonic system in which the moving element consists of nonenergized permanent 2-pole magnet(s) and the toroidally wound stator is energized with 115V 400 cycle single phase alternating current. In addition to the excitation voltages even harmonics may appear across the winding dependent upon the position of the moving element.

3.4 Calibration. Each indicator dial shall be graduated in accordance with figure 1. The calibration of fuel flow versus angular degrees shall be linear with $\pm 0^\circ .15$ if arc, except at the changeover point.

3.4.1 Remote indication. Unless otherwise specified, the indicator shall be designed to indicate, at a remote station, the rate of flow in pounds per hour of aviation fuel when used in conjunction with a fuel flow transmitter in accordance with MIL-T-25905.

3.5 Pointer. The pointer shall conform to MS33585-8, except that the length of the pointer shall be such that the tip will overlap from 1/3 to 2/3 of the length of the shortest graduation.

3.6 Fluorescent-luminescent markings. The following markings shall be finished in fluorescent-luminescent material which meets the requirement of AF Drawing 898894. The dimensions of the markings shall be as follows:

	Height or length Inch + 0.016	Width of Line or Graduation Inch + 0.005
Scale Numerals		
1 through 3	0.0161	0.031
Scale Numerals		
6 through 15 and .5	0.094	0.020
Numbered 1000-Pound		
Graduations through 3	0.016	0.031
Numbered 1000-Pound		
Graduations 1 through 15	0.125	0.020
Intermediate 1000-Pound		
Graduations	0.125	0.020
500-Pound Graduations		
1 through 3 and .5	0.094	0.031
100-Pound Graduations	0.094	0.020
Lettering "PPH X 1000"	0.094	0.016
"FUEL FLOW"	0.125	0.020
Shaded Portion of Pointer	-----	-----

3.6.1 Durable dull black. The markings "USAF" and "EFU-3/A" shall be

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permanently and legibly marked on the dial in 0.047 inch letters. These markings and all other markings not otherwise specified shall be finished in durable dull black.

3.7 Weight. The weight of the complete indicator shall not exceed 0.6 pound.

3.8 Case. The case shall be hermetically sealed and shall conform to MS33639. The dimension "L" shall be 2.750 +/- 0.250.

3.9 Dial distance. The dial shall have a minimum diameter of 1.950 inches as measured at the outside ends of the outer scale graduations.

3.9.1 Dial to cover glass distance. The distance between the indicator and the inside of the cover glass shall be held to a minimum and shall not exceed 0.150 inch.

3.10 Electrical receptacle. The indicator electrical receptacle shall be in accordance with MS33678-14S-2P, except it shall be designed for hermetic sealing.

3.11 Zero reference mark. The dial shall be provided with zero reference mark 16° before the first graduation of the dial. The zero reference mark shall be fluorescent-luminescent and shall be approximately 0.047 inch long, 0.016 inch wide, and shall be located on the outer edge of the dial as shown on figure 1., so that it is visible through the cover glass.

3.12 Identification of product. Equipment, assemblies, and parts shall be marked for identification in accordance with MIL-I-7566.

3.13 Recovered materials. Recovered materials shall be used to the maximum extent possible without jeopardizing the end use of the item.

4. QUALITY ASSURANCE PROVISIONS

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

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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 know defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.2 General. The sampling, inspection, and test procedures shall be in accordance with MIL-I-7566.

4.3 Quality conformance inspection. The quality conformance inspection shall be in accordance with MIL-I-7566.

4.4 Performance. The performance of the indicator shall be checked against tables I and II of this specification.

TABLE I

Fuel, Flow Rate Indicator

Flow Rate PPH	Room Temp	Tolerance PPH±	
		Low Temp	High Temp
500	10	15	10
1000	10	15	10
1500	10	15	10
2000	10	15	10
2500	10	15	10
3000	-10+100	-15+150	-10+100
4000	100	150	100
6000	100	150	100
9000	100	150	100
12000	100	150	100
15000	100	150	100

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TABLE II

Fuel, Flow Rate Indicator

Test	Tolerance PPH+	
	500 - 3000 Scale	3000 - 15000 Scale
Frequency and Voltage Variation	10	100
Position error at 2500 PPH	10	---
Friction		
Room temperature	10	100
High temperature	10	100
Low temperature	20	200
Vibration		
Pointer oscillation	20	200
Pointer variation	20	200
Endurance	15	150
Response time 3 seconds max. power input 2.3 watts max.		

4.5 First article inspection.

4.5.1 Sample size. The contractor shall subject three indicators to the first article inspection specified in 4.5.2

4.5.2 First article test. The first article shall consist of all the tests specified in MIL-I-7566 and herein.

4.6 Inspection of packaging. Tests of methods of preservation and packaging shall be accomplished in accordance with Section 4 of MIL-P-116 to insure compliance with Section 5 of this specification.

5. PACKAGING

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

5.1.1 Preservation-packaging. Unless otherwise specified by the contracting activity, item shall be packaged in Quantity Unit Pack (QUP) of one each. Each item will be provided a preservation method IC-1 In Accordance With (IAW) MIL-P-116.

5.1.2 Cleaning. Item shall be cleaned IAW MIL-P-116 C-1 process.

5.1.3 Drying. Immediately after cleaning, the item shall be dried following any one or combination of the drying procedures listed in MIL-P-116. The drying procedures employed shall not be injurious to the item.

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5.1.4 Level A. Item shall be preserved IAW MIL-P-116 and MIL-STD-2073-1 to provide a method IC-1.

5.1.5 Level C. Item shall be individually preserved in a manner that will afford adequate protection against corrosion, deterioration, and physical damage during shipment from the supply source to the first receiving activity as specified in MIL-P-116 and MIL-STD-2073-1.

5.2 Packing. Packing shall be level "A", "B", or "C", as specified (see 6.2)

5.2.1 Container-cushioning. Unit container requirements shall conform to MIL-B-121, barrier material, unless otherwise specified by the contacting activity. Unit containers shall be large enough to allow for application of sufficient cushioning/wrap material, between the item and unit container to protect the unit container from punctures. Exterior/shipping container requirements shall conform to PPP-B-1672 weather-resistant unless otherwise specified by the contacting activity. Cushioning material shall be of sufficient density and thickness to insure shock transmission does not exceed peak values in G's established for the item.

5.2. Level A. Fiberboard containers do not meet Level "A" container criteria.

5.2.3 Level B. Item will be preserved as specified in 5.1 and shall be packed in exterior containers conforming to PPP-B-1672, weather-resistant, unless otherwise specified by the contracting activity. Exterior container shall be uniform shape, size and minimum tare and cube, consistent with the protection required. Closure shall be in accordance with appropriate PPP-B-1672 procedure, as specified by contractor, Special Packaging Instructions (SPI) or contracting activity.

5.2.4 Level C. Item will be packed in such a manner that will afford adequate protection against physical damage during direct domestic shipment from the supply source to the first receiving activity. These packs shall conform to MIL-STD-2073-1.

5.3 Marking. Unit and exterior containers shall be marked IAW special markings required by the contractor, SPI and MIL-STD-129.

5.4 Inspection and Test. Test of methods of preservation shall be accomplished IAW section 4 of MIL-P-116 to insure compliance with section 5 of this specification. Packaging tests shall be conducted IAW rough handling as specified in FED-STD-101.

6. NOTES

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

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6.1 Intended use. The EFU-3/A indicator covered by this specification is intended for use to indicate the rate of flow of fuel in pounds per hour consumed by an aircraft turbojet engine.

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. Selection of applicable levels of packaging and packing (see Section 5).
- d. Whether Sampling Plan B is to be omitted.
- e. A minimum of three indicators as first article samples subjected to first article inspection tests by the contractor to determine compliance with this specification and submitted to the contracting activity.

6.3 First article. A first is required for inspection and approval (see 3.1 and 4.5).

6.4 Subject term (key word) listing.

Aircraft jet engine
 Fluorescent-luminescent markings
 Fuel
 Fuel totalizing
 Gravimetric
 Hermetically sealed
 Length 3 inches maximum
 Second harmonic
 Single pointer
 2-inch size
 115V, 400Hz
 500 to 15,000 pounds per hour

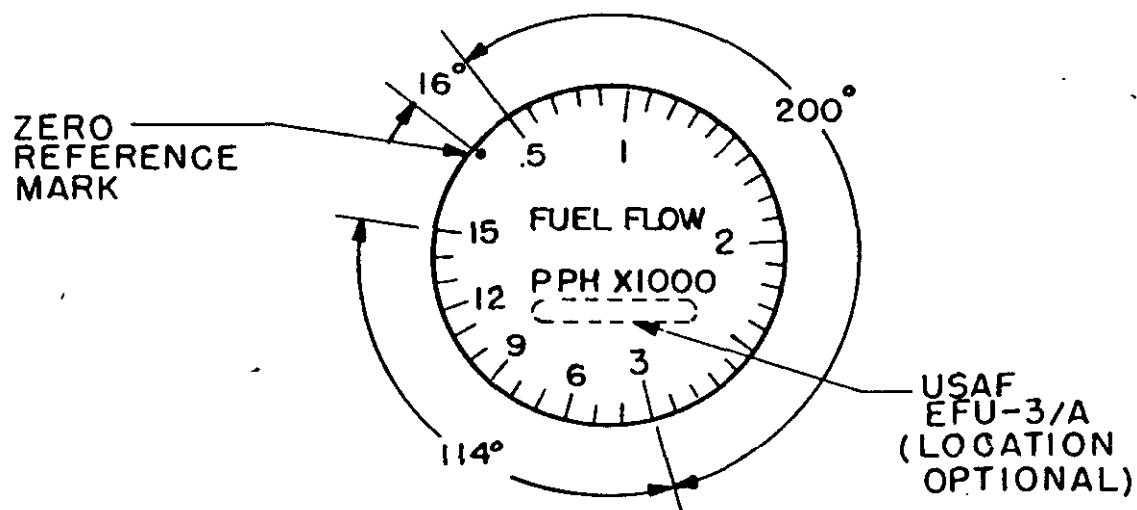
6.5 Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodian:
 Air Force -99

Preparing Activity:
 Air Force -71

Project Number:
 6620-F512

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NOTE: 14,000 PPH GRADUATION TO BE MAINTAINED AT HORIZONTAL CENTERLINE

TOLERANCE: $\pm 15'$

FIGURE I.

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.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-I-25906D	2. DOCUMENT DATE (YYMMDD) 93/08/30
3. DOCUMENT TITLE INDICATOR, RATE OF FLOW EFU-3/A, 0-15,00OPPH		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)		
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 (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME OC-ALC/TICLA	b. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON 338-5490	
c. ADDRESS (Include Zip Code) Tinker AFB OK 73145-3037	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	