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MIL-I-20037A
17 APRIL 1956

SUPERSEDING
MIL-F-20037
2 October 1951

MILITARY SPECIFICATION

INDICATORS, SIGHT, LIQUID LEVEL, DIRECT READING, REFLEX TUBULAR GAGE GLASS

This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope.—This specification covers sight liquid level indicators of the direct reading type.

1.2 Classification.—Indicators shall be of the following types and classes as specified (see 6.2):

Type I—Nonautomatic.
Type II—Automatic.
Class a—General.
Class b—Shielded.

2. APPLICABLE DOCUMENTS

2.1 The following specifications, standards, and drawings, of the issue in effect on date of invitation for bids, form a part of this specification:

SPECIFICATIONS

FEDERAL

NN-B-591 —Boxes, Fiberboard, Wood-Cleated (for Domestic Shipment).
NN-B-621 —Boxes, Wood, Nailed and Lock-Corner.
QQ-S-763 —Steel Bars, Shapes, and Forgings—Corrosion Resisting.
LLL-B-631 —Boxes, Fiber Corrugated (for Domestic Shipment).
LLL-B-636 —Boxes, Fiber, Solid (for Domestic Shipment).
PPP-B-601 —Boxes, Wood-Cleated-Plywood.

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JAN-P-103 —Packaging and Packing for Overseas Shipment — Boxes; Wood, Cleated, Solid Fiberboard.
JAN-P-106 —Packaging and Packing for Overseas Shipment — Boxes, Wood, Nailed.
JAN-P-108 —Packaging and Packing for Overseas Shipment — Boxes, Fiberboard (V-Board and W-Board), Exterior and Interior.
MIL-P-116 —Preservation, Methods of.
MIL-G-2695 —Glasses, Gage, Round and Flat, Reflex, Under 125 Pounds Pressure.
MIL-L-10547 —Liners, Case, Waterproof.
MIL-C-15726 —Copper-Nickel-Alloy; Bars, Plates, Rods, Sheets and Strips.
MIL-B-16541 —Bronze, Valve: Castings.
MIL-M-16576—Metal, Gun: Castings.

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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DRAWINGS

BUREAU OF SHIPS

5000-S8700-1385802—Shield.

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

2.2 Other publications.—The following documents form a part of this specification. Unless otherwise indicated the issue in effect on date of invitation for bids shall apply.

NATIONAL BUREAU OF STANDARDS PUBLICATION

Handbook H28—Screw Thread Standards for Federal Services.

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.)

CONSOLIDATED CLASSIFICATION COMMITTEE

Consolidated Freight Classification Rules.

(Application for copies should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Ill.)

3. REQUIREMENTS

3.1 Materials.—

3.1.1 *Castings.*—The composition of castings shall be in accordance with Specification MIL-B-16541 or MIL-M-16576.

3.1.2 *Glass.*—The tubular glass shall be in accordance with Specification MIL-G-2695, except that for type II indicators the glass shall withstand a maximum pressure of 300 p.s.i.

3.2 Construction.—Indicators shall be so constructed as to allow easy replacement of glass while under pressure and to allow the inside of the glass to be cleaned from either end without loosening packing or glass.

3.2.1 *Sizes.*—Unless otherwise specified in the contract or order, the connections shall be of the size specified for the diameter of the glass as shown in table I and as specified (see 6.2).

Table I—*Sizes and diameter.*

Pipe connection	Diameter nominal	
(NPT)	Glass	Gland
Inch	Inch	Inches
3/8-18	1/2	7/8
1/2-14	5/8	1
3/4-14	3/4	1 1/16

3.2.2 *Valves.*—Valves shall be furnished for shutting off vapor and liquid ends and for draining the glass tube. Petcocks will not be permitted except as specified in 3.3.1.

3.2.2.1 *Operation.*—Valves shall be of the quick closing type, closing against working pressure with a rotation of approximately 90 degrees.

3.2.2.2 *Castings.*—All castings shall be free from blowholes, porosity, or any other defects that may affect the strength or appearance. They shall be thoroughly clean of sand inside and outside, and free from all fins. No impregnation will be permitted.

3.2.2.3 *Disks.*—Valves shall have conical disks and be of the regrinding type, that is, designed for regrinding by use of a special tool. Unless otherwise specified, the tool shall not be furnished.

3.2.2.4 *Handwheel.*—The shut-off valves shall be furnished with a suitable handwheel having an outside diameter not less than 3 1/2 inches and with holes drilled in the rim suitably located for adapting to chain operation. When specified (see 6.2) chain shall be provided.

3.2.3 *Glands.*—Glands for gage glasses shall be designed to receive grommets 5/16 inch long and to minimize torsional stress on the glass when the gland is tightened.

3.2.4 *Protection.*—

3.2.4.1 *Class a.*—Unless otherwise specified in the contract or order, the glass tube shall be protected from damage by not less than three 1/4 inch solid brass rods of suffi-

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cient length to allow the valves to be mounted 24 inches between centers.

3.2.4.2 *Class b.*—A shield shall be provided in accordance with Drawing 5030–S8700–1385802.

3.2.5 *Connections.*—Unless otherwise specified in the contract or order, the connections shall be male, threaded in accordance with Handbook H–28.

3.3 Type I, non-automatic.—Indicators shall be suitable for a maximum working pressure of 100 pounds.

3.3.1 A petcock shall be furnished for draining the glass.

3.4 Type II, automatic.—Indicators shall be suitable for a maximum working pressure of 300 pounds.

3.4.1 An automatic valve of the solid ball-check type shall be provided on the liquid end and vapor end so constructed as to allow leakage equivalent to a 1/16 inch diameter hole, when the check valve is closed. An automatic valve will be required on the vapor end when the equipment is used in steam service.

3.4.1.1 The drain valve shall have a connection to which a drain line of at least 3/8 inch may be connected.

3.4.2 Automatic valves of the ball-check type shall be so designed that the ball is lifted vertically through a distance of not less than 3/8 inch before seating. The ball shall be (18-8) corrosion resisting steel conforming to Specification QQ–S–763 for all service except sea water, in which case the material of the ball shall be copper nickel alloy conforming to Specification MIL–C–15726 and shall be not less than 1/2 inch in diameter. The diameter of circle of contact with seat shall not be greater than two-thirds the diameter of check ball. The space around each ball in the ball chamber shall not be less than 1/8 inch. Means shall be provided for removal and inspection of the check valves while the pressure vessel is under pressure.

4. QUALITY ASSURANCE PROVISIONS

4.1 Sampling for lot acceptance.—

4.1.1 *Inspection lot.*—All indicators of the same type, class and size offered for delivery at one time shall be considered a lot for purposes of inspection and tests.

4.1.2 *Sampling for inspection and tests.*—A random sample of indicators shall be selected from each lot offered for Government inspection and tests in accordance with Standard MIL–STD–105 at inspection level II for lot sizes of 110 items and less, and inspection level I for lot sizes over 110. The acceptable quality level shall be 1.5 percent defective. Each sample indicator shall be inspected in accordance with 4.2 and tested as specified in 4.3.2 and 4.3.3.

4.2 Inspection.—The samples selected in accordance with 4.1.2 shall be inspected to determine compliance with the requirements of this specification. Any indicator in the sample containing one or more defects shall be rejected, and if the number of defective indicators in any sample exceeds the acceptance number for the sample, the lot represented by the sample shall be rejected. A rejected lot may be resubmitted for Government inspection after the manufacturer has reinspected each indicator in the lot and has removed or repaired all nonconforming indicators.

4.3 Tests.—

4.3.1 *Hydrostatic test.*—Each indicator shall be subjected for 1 minute, with a test gage glass in place and with all valves except drain valve open, to a hydrostatic pressure 1 1/2 times the specified maximum working pressure for the type.

4.3.2 *Type I.*—Each sample type I indicator selected in accordance with 4.1.2 shall be tested as follows: Type I valve (non-automatic) shall be checked for closing readily against maximum working pressure and shall show no leakage when closed.

4.3.3 *Type II.*—Each sample type II indicator selected in accordance with 4.1.2 shall

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be tested as follows: Type II valves (automatic) for the liquid end shall seat themselves automatically under the action of escaping liquid; shall withstand the pressure specified in 4.3.1 with only minimum possible leakage and shall open automatically upon release of pressure. The test shall then be repeated using the maximum working pressure. Similar tests for the automatic valve of vapor end, if provided, shall be made (see 3.4.1).

4.3.4 *Rejection.*—Any indicator in the sample containing one or more defects shall be rejected, and if the number of defective indicators in any sample exceeds the acceptance number for that sample, the lot represented by the sample shall be rejected. A rejected lot may be resubmitted for Government inspection after manufacturer has tested each indicator in the lot and has removed all nonconforming indicators.

4.3.5 *Additional inspection.*—Where other specifications form a part of this specification, unless otherwise specified in the contract or order sampling, inspection and tests shall be conducted as required in the referenced specification.

5. PREPARATION FOR DELIVERY

5.1 Cleaning, preservation and packaging.

5.1.1 *Level A.*—The indicators shall be cleaned by process C-1 and packaged by method III in accordance with Specification MIL-P-116. Unit and intermediate containers shall conform to Specification JAN-P-108, LLL-B-631 or LLL-B-636. The gross weights shall not exceed the weight limitations specified in the applicable container specification. Closure and sealing of containers shall conform to the applicable container specification and appendix thereto.

5.1.2 *Level C.*—Cleaning, preservation and packaging shall be in accordance with the manufacturer's commercial practice.

5.2 Packing.

5.2.1 *Level A.*—The indicators shall be packed in snug-fitting wood cleated fiberboard, wood cleated plywood, nailed wood or fiberboard boxes conforming to Specification JAN-P-103, PPP-B-601 (overseas type), JAN-P-106, or JAN-P-108, respectively. Containers shall be lined with a waterproof case liner conforming to grade A or B of Specification MIL-L-10547 and sealed in accordance with the appendix thereto. Shipping containers shall be closed and strapped in accordance with the appendix of the applicable container specification. The gross weight of wood boxes shall not exceed 200 pounds, and fiberboard boxes shall not exceed 70 pounds. Case liners will not be required when the equipment is packaged in fiberboard boxes conforming to Specification JAN-P-108 and appendix thereto.

5.2.2 *Level B.*—The indicators shall be packed in snug-fitting wood cleated fiberboard, cleated plywood, nailed wood, corrugated or solid fiberboard boxes conforming to Specification NN-B-591, PPP-B-601 (domestic type), NN-B-621, LLL-B-631, LLL-B-636, respectively. Fiberboard containers shall conform to the special requirements of the applicable container specification and appendix thereto. The gross weight of wood boxes shall not exceed 200 pounds, and fiberboard boxes shall not exceed 90 pounds.

5.2.3 *Level C.*—The indicators shall be packed in a manner which will insure acceptance and safe delivery at destination. Containers shall comply with the Consolidated Freight Classification Rules.

5.3 Marking.—In addition to any special marking required by the contract or order, unit packages, intermediate, and exterior shipping containers shall be marked in accordance with Standard MIL-STD-129.

6. NOTES

6.1 Intended use.

6.1.1 *Type I.*—Liquid level indicators are suitable for gas, oil, or water service and line or exhaust steam when pressure does not exceed 100 p.s.i.

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6.1.2 *Type II.*—Liquid level gages are for oil, water or gas and steam pressure up to 300 p.s.i.

6.1.3 *Class a.*—Rod protection is intended for nonflammable fluids.

6.1.4 *Class b.*—Metal shield protection is intended for use where combustible fluids such as fuel oil might spill out should the glass tube be broken.

6.2 Ordering data.—Procurement documents should specify the following:

(a) Title, number, and date of this specification.
(b) Type and class required (see 1.2).
(c) Diameter of glass tube (see table I).
(d) When chain is required and length (see 3.2.2.4).
(e) Service (gas, oil, or steam, see 3.4.1 and 3.4.2).
(f) The valve regrinding tool, when required, see 3.2.2.3.

Patent notice.—When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied the said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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