

NOTICE OF
CANCELLATION

INCH-POUND

A-A-50568
NOTICE 1
30 January 2004

COMMERCIAL ITEM DESCRIPTION

GAGES, LIQUID LEVEL MEASURING, TANK

A-A-50568, dated 17 January 1997, is hereby canceled without replacement.

MILITARY INTERESTS:

Custodian:
Navy - YD

CIVIL AGENCY
COORDINATING ACTIVITY:

GSA - 7FLE

Preparing Activity:
DLA - GS1

(Project 6680-0284)

[INCH-POUND]
A-A-50568
January 17, 1997
SUPERSEDING
MIL-G-17713D(YD)
26 July 1988

COMMERCIAL ITEM DESCRIPTION

GAGES, LIQUID LEVEL MEASURING, TANK

The General Services Administration has authorized the use of this commercial item description for all Federal agencies.

1. **SCOPE.** This commercial item description covers gages for measuring, transmitting, and indicating liquid levels of tanks. The gages specified herein are used primarily to indicate levels in de-aerating tanks, condensate storage and return tanks, hot water expansion tanks, lubricating oil and fuel oil tanks, acid storage tanks, caustic storage tanks, seawater tanks, fresh water tanks, wastewater tanks, ballast tanks, and service tanks.

2. **CLASSIFICATION.** Gages shall be of the following types as specified (see 7.2):

- Type I - Buoyant force.
- Type II - Diaphragm.
- Type III - Purge.
- Type IV - Differential pressure.
- Type V - Magnetic float type indicating system.
- Type VI - Direct reading magnetic flag level indicator.
- Type VII - Magnetostrictive level transducer and gauge.
- Type VIII - Gauge and differential pressure, electronic.

3. **SALIENT CHARACTERISTICS.**

3.1 **Description.** The gages shall consist of a liquid level measuring element, a means of transmitting the measurement, and an indicator. The measuring element shall be composed of

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any data which may improve this document should be sent to: Commanding Officer (Code 1581), Naval Construction Battalion Center, 1000 23rd Avenue, Port Hueneme, CA 93043-4301, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6680

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A-A-50568

materials that will not chemically react with the operating fluid. When the liquid is corrosive, or contaminated by solids that may obstruct or interfere with the normal operation of the indicator, provisions shall be made to seal the indicator from the system. The indicating element shall receive and indicate the signal from the measuring element either indirectly or directly, (see 7.2). The gages shall allow for the tank's liquid level to be easily read. The use of compressed air or a hand pump as specified (see 7.2), may be used with type III gages.

3.2 Standard commercial product. The gages shall, as a minimum, be in accordance with the requirements of this commercial item description and shall be the manufacturer's standard commercial product. Additional or better features which are not specifically prohibited by this commercial item description but which are a part of the manufacturer's standard commercial product, shall be included in the gages being furnished. A standard commercial product is a product which has been sold or is being currently offered for sale on the commercial market through advertisements or manufacturer's catalogs, or brochures, and represents the latest product model.

3.3 Design. The gages shall be capable of indicating levels of still or turbulent liquids over the entire indicating range. The gage design shall prevent conditions hazardous to personnel or deleterious to equipment and shall facilitate installation and service in the field. The gages shall be designed for the fluid properties and system conditions specified (see 7.2). When specified (see 7.2) gages shall be frost and fungus protected. The gages shall be capable of maintaining accuracy of indication and resist wear and corrosion. Moving parts shall be properly aligned and adequately lubricated, as applicable. Interior parts, seals, and packing shall be accessible for service. Mounting shall be either at the source or at a remote location (panel or wall type) as specified (see 7.2). When specified (see 7.2), protection from gage overrange shall be furnished. A single measuring device shall be capable of covering the entire operating range. Means shall be provided to permit filling and drainage of fluid-containing components without disassembly of the gage unit. At the option of the manufacturer, unless definitely specified (see 7.2), type III gages shall be equipped with means of constant bleed (with or without rapid blow-down) for continuous indication, or intermittent purge to check reading. Accuracy of the measurements beyond the first major graduation on the indicator shall be within the limits specified in table I. When specified (see 7.2), the accuracy shall be within plus or minus one percent.

3.4 Operating conditions. Typical condensate tank operating conditions are 2 pounds per square inch (psi) (14 kilopascal (kPa)) at 220 degrees Fahrenheit (°F) (104 degrees Celsius (°C)). Operating capability shall be at a range that extends to 30 psi (207 kPa) at 275 °F (135 °C).

3.5 Performance. The gage characteristics for each type shall be as specified in table I.

3.6 Components.

3.6.1 Measuring element. The measuring element shall be inherently resistant to corrosion and of the type specified in table I. This element shall accurately and instantaneously measure the liquid level by means of the static pressure, buoyant force, magnetically actuated reed switch, or

A-A-50568

displacement principle and shall include, when applicable, compensation for variations in pressure and temperature. The element shall be furnished for indoor or outdoor service (see 7.2) and shall not result in failure due to normal system variations. The cable for the type I gage shall be taut, nontwisting, and nonstretching. Capillary tubes for type II gages shall have an inside diameter of not greater than 0.8 inches (20 millimetre (mm)). The bubble pipe for the type III gage shall be positioned so that the maximum liquid rise in the pipe will be not less than 1-inch (25 mm) below the air connection to the pipe. Depending on tank conditions, the type IV and type VIII gage may be designed to indicate the liquid level by means of a suitable datum pressure and either the total tank pressure, the vapor pressure above the liquid, or the liquid pressure. When the vapor pressure above the liquid is selected to provide a differential pressure with a datum pressure, an equalizing tube shall be provided. Condensing, seal, or surge chambers shall be furnished when necessary to meet the specified requirements. Type V shall be flanged or bracket mounted rigid pipe mounted in such a way as to provide free movement of the float within the tank or vessel. Type VI shall be rigidly mounted pipe external from the tank and mounted in such a way as to provide visual access to the indicating element. Type VII, shall be capable of monitoring the liquid level, volume, and temperature of a single liquid or of two different immiscible liquids contained in one tank.

TABLE I. Gage types and characteristics.

| Characteristics | Type I | Type II | Type III | Type IV |
|---------------------------|--|--|--|--|
| Operating fluid | Corrosive, viscous and solids bearing | Corrosive, viscous and solids bearing | Corrosive, viscous and solids bearing | Nonviscous liquids |
| Static pressure range | 0-3,000 psi (0-20 604 kPa) | 0-150 psi (0-1 034 kPa) | 0-75 psi (0-517 kPa) | 0-3,000 psi (0-20 604 kPa) |
| Maximum temperature | 180 °F (82 °C) | 275 °F (135 °C) | 180 °F (82 °C) | 150 °F (66 °C) |
| Measuring element | Float and float arm, cable | Diaphragm | Bubble pipe | Manometric device |
| Direct transmission | Mechanical linkage | Fluid pressure | Inert gas, compressed air | Magnetic, mechanical |
| Tank condition | Vented or under pressure | Vented or under pressure | Vented or under pressure | Vented or under pressure |
| Level change limits* | 0-100 ft (0-30 480 mm) H ₂ O | 0-200 ft (0-60 960 mm) H ₂ O | 0-100 ft (0-30 480 mm) H ₂ O | 10-inch to 40 ft (12 192 mm) H ₂ O |
| Temperature compensation | Above 120 °F (49 °C) or as required | Above 120 °F (49 °C) | Above 160 °F (71 °C) | Above 700 psi (4 826 kPa) |
| Pressure compensation | N/A | N/A | N/A | Above 1,500 psi (10 342 kPa) |
| Accuracy | ± 3 percent | ± 3 percent | ± 3 percent | ± 3 percent |
| Remote transmission limit | 250 ft (76 200 mm) (10,000 ft (3 048 000 mm) for electric) | 1,000 ft (304 800 mm) | 1,000 ft (304 800 mm) | 5,000 ft (1 524 000 mm) for electric |

A-A-50568

TABLE I. Gage types and characteristics. - Continued

| Characteristics | Type V | Type VI | Type VII | Type VIII |
|---------------------------|--|---|--|---|
| Operating fluid | Corrosive, viscous | Corrosive, nonviscous | Corrosive, nonviscous liquids | Viscous liquids and nonviscous fluids |
| Static pressure range | 0-3,000 psi (0-20 604 kPa) | 0-750 psi (0-5 171 kPa) | 0-50 psi (0-344 kPa) | 0-50 psi (0-344 kPa) |
| Maximum temperature | 225 °F (107 °C) | 750 °F (399 °C) | 150 °F (66 °C) | 212 °F (100 °C) |
| Measuring element | Magnetic float | Float/rigid pipe | Magnetostrictive/magnetic float | Diaphragm |
| Direct transmission | Electro-mechanical/reed switch | Magnetic visual | Magnetostrictive, electronic | Electronic |
| Tank condition | Vented or under pressure | Vented or under pressure | Vented or under pressure | Vented or under pressure |
| Level change limits* | 0-500 ft (0-152 400 mm) H ₂ O | 0-100 ft (0-30 480 mm) H ₂ O | 0-65 ft (0-19 812 mm) H ₂ O | 1.65-2,000 ft (42-50 800 mm) H ₂ O |
| Temperature compensation | N/A | N/A | N/A | - 5 °F to +175 °F (- 20 °C to + 80 °C) |
| Pressure compensation | N/A | N/A | N/A | N/A |
| Accuracy | ± 1 percent | ± 0.375-inch (10 mm) | ± 0.25 percent | ± 0.5 percent |
| Remote transmission limit | 10,000 ft (3 048 000 mm) | 10,000 ft (3 048 000 mm) | 2,500 ft (762 000 mm) | 5,000 ft (1 524 000 mm) |

*Gage types are operable under conditions within the limits indicated. Operation for purpose of this commercial item description is not necessarily intended to extend over the entire range indicated. Typical requirements for level measuring applications within the above limits are noted in section 7. Actual range of operating conditions shall be as specified (see 7.2)

3.6.2 Measuring transmitter. The measured level shall be transmitted from the measuring element to the indicator either directly or indirectly by mechanical, electrical, hydraulic, or pneumatic means. When transmission is electrical, the transmission shall conform to the applicable portions of NFPA 70. Transmission shall be accomplished with minimum resistance, pressure drop, or lost motion. The transmitter shall operate over the entire range of measurements indicated, and shall not be adversely affected by normal system variations.

3.6.3 Indicator. The indicator shall clearly indicate the liquid level measured, be adjustable, balanced and aligned, enclosed in a dust-proof housing, with minimum friction, lost motion, and moisture contamination. Length and graduation shall be as specified (see 7.2). Unless otherwise specified (see 7.2), calibration shall be made at midscale. When the indicator is of the liquid-containing type, it shall be leak-tight, equipped with a drain, and constructed of materials that avoid deterioration due to corrosion. The indicator shall be enabled to retain the liquid when the indicator range has been exceeded. Operation of the indicator shall be by the same means that are employed in operation of the transmitter. Indicator performance shall not be affected by system variations or slight distortion of the housing.

3.6.4 Bearings. Bearings provided in any of the gage components shall be the sealed-for-life anti-friction type, designed for long life and resistance to wear.

A-A-50568

3.7 Fastening devices. All screws, pins, bolts, and similar parts shall be installed with means for preventing loss of tightness. When subject to removal or adjustment, such parts shall not be swaged, peened, staked, or otherwise permanently deformed.

3.8 Treatment and painting. Unless otherwise specified (see 7.2), the gages shall be treated and painted in accordance with the manufacturer's standard practice.

3.9 Electrical equipment. When electrical operation is required, input characteristics and connections shall be as specified (see 7.2).

3.10 Pneumatic and hydraulic equipment. Unless otherwise specified (see 7.2), each instrument located at measuring source, shall be furnished with integral piping for installation into an existing system. Unless otherwise specified (see 7.2), continuous length tubing shall be provided. When specified (see 7.2), tubing shall be encased in a sheath. Fluid characteristics and connections shall be as specified (see 7.2). Piping connections shall be as specified (see 7.2).

3.11 Gearing. Spur gears and pinions used in any of the meter components shall be machined in the "inch" system and shall conform to the dimensions and tolerances of AGMA 201.02. Where helical, herringbone, bevel, or worm gearing is used, the dimensions and tolerances shall conform to AGMA 390.03. Operation of gears shall be smooth and free of vibration.

4. REGULATORY REQUIREMENTS.

4.1 Materials. The offeror/contractor is encouraged to use recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR). Unless otherwise specified herein, all equipment, material, and articles incorporated in the work covered by this commercial item description are to be new and fabricated using materials produced from recovered materials to the maximum extent possible without jeopardizing the intended use. The term "recovered materials" means materials which have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. Unless otherwise specified, none of the above shall be interpreted to mean that the use of used or rebuilt products are allowed under this commercial item description.

4.2 Metric products. Products manufactured to metric dimensions will be considered on an equal basis with those manufactured using inch-pound units, provided they fall within specified tolerances using conversion tables contained in the latest version of FED-STD-376B, and all other requirements of this commercial item description including form, fit and function are met. If a product is manufactured to metric dimensions in the inch-pound units, a request should be made to the contracting officer to determine if the product is acceptable. The contracting officer has the option of accepting or rejecting the product.

5. QUALITY ASSURANCE PROVISIONS.

5.1 Product conformance. The products provided shall meet the salient characteristics of this commercial item description, conform to the producer's own drawings, specifications, standards,

A-A-50568

and quality assurance practices, and be the same product offered for sale in the commercial market. The government reserves the right to require proof of such conformance.

6. PACKAGING. The preservation, packing, and marking shall be as specified in the contract or order.

7. NOTES.

7.1 Source of documents.

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

7.1.2 The Federal Acquisition Regulation (FAR) may be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

7.1.3 NFPA Standards are available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

7.1.4 AGMA Standards are available from the American Gear Manufacturer's Association, 1500 King Street, Suite 201, Alexandria, VA 22314.

7.2 Ordering data. Acquisition documents should specify the following:

- a. Type gage required (see 2. and table I).
- b. Whether measurement is direct or indirect, and whether compressed air or a hand pump is available for type III gages (see 3.1).
- c. Fluid density, pressure, and temperature; static pressure, tank height, range of level measurement, and tank pressure specified (see 3.3 and table I).
- d. Whether gage is to be remotely mounted or mounted at the measurement source; whether wall or panel mounting is required; whether protection from gage overrange is to be furnished, and whether continuous indication (with or without rapid blow-down) or intermittent purge is required (see 3.3).
- e. When gage accuracy is plus or minus one percent is required (see 3.3 and table I).
- f. Frost and fungus protection, if required (see 3.3).
- g. Whether measuring element shall be for indoor or outdoor service (see 3.6.1).
- h. Length and graduation required and indicator calibration if other than specified (see 3.6.3).
- i. Treatment and painting, if different than specified (see 3.8).
- j. If electrical operation is required; electrical input characteristics and connections required (see 3.9).
- k. When integral piping is not required, and whether continuous length tubing need not be furnished; whether tubing shall be encased in sheath; fluid characteristics and connections required; and piping connections required (see 3.10).

A-A-50568

7.3 Part Identification Number (PIN). The following part identification numbering procedure is for government purposes and does not constitute a requirement for the contractor. The PINs used for items acquired to this description are created as follows:

AA50568-XX

CID number _____
 Type code (see table 1) _____

7.3.1 Type code of the gage is identified by a type number identifier.

7.4 Options. Since overall accuracy of the gages specified are governed by the type measurement, method of transmission, and indicator location, a complete gage unit arranged as recommended by the manufacturer should be provided for the intended system application. Type I gages are essentially unaffected by changes in the fluid specific gravity, and may be used on tanks where there is sufficient installation clearance. Type II gages are suitable for use when purge air, gas, or liquid is not available, or where its use is undesirable. For type III gages, a hand pump is recommended for open or vented tanks or nonvented tanks when the over the liquid pressure does not exceed 5 psi (34 kPa), or when the head of the fluid does not exceed 20 psi (138 kPa), or when the indicator is not more than 250 feet (76 200 mm) from the tank. Type IV gages are normally furnished when it is convenient to make use of the liquid static pressure acting on various type indicating elements such as spiral, diaphragm, or bellows. Type V gages are unaffected by depth, density, operating temperatures and pressures and may be used on tanks where there is sufficient installation clearance. Type VI gages are used when direct tank penetration is not possible and when a remote electrical output is not required. Type VII gages require no recalibration after initial set-up. Repair or replacement of the complete transducer or sensing element is accomplished through the top of the tank. Type VIII gages are appropriate for use in seawater, fresh water, wastewater, ballast and fuel oil tanks.

7.5 Subject term (key word) listing.

Buoyant force
 Diaphragm
 Differential pressure
 Electronic
 Magnetic float
 Purge

A-A-50568

MILITARY INTEREST:

CIVIL AGENCY COORDINATING ACTIVITY:

Custodian:

GSA - FSS

Navy - YD1

PREPARING ACTIVITY:

Navy - YD1

(Project 6680-0245)

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.
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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
A-A-50568

2. DOCUMENT DATE (YYMMDD)

3. DOCUMENT TITLE

GAGES, LIQUID LEVEL MEASURING, TANK

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)

7. DATE SUBMITTED
(YYMMDD)

(1) Commercial

(2) AUTOVON
(if applicable)

8. PREPARING ACTIVITY

a. NAME

ROBERT J. BRICKEY

b. TELEPHONE (Include Area Code)

(1) Commercial

805-982-5593

(2) AUTOVON

551-5593

c. ADDRESS (Include Zip Code)

COMMANDING OFFICER, NCBC CODE 1581B
1000 23RD AVENUE
PORT HUENEME, CA 93043-4301

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DEFENSE QUALITY AND STANDARDIZATION OFFICE
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