INCH-POUND

MIL-S-24771(SH)
8 April 1992

MILITARY SPECIFICATION

SENSOR, LEVEL, FLOAT TYPE, SHIPBOARD SEWAGE SYSTEMS

This specification is approved for use by the Naval Sea Systems Command, Department of the Navy, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1 1 Scope This specification covers float type level sensors used in sewage Marine Sanitation Devices (MSD's) aboard U S Navy ships The sensors are used in conjunction with MSD pump control and alarm circuitry to govern pump operation and to activate installed level alarms The sensors should function in shipboard sewage containing varying amounts of seawater, human wastes, detergents, caustics, acids, oils, solvents, and other chemical agents used on board ship.

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 specification 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

QQ-N-281	- Nickel-Copper Alloy Bar, Rod, Plate, Sheet, Strip, Wire, Forgings, and Structural and Special Shaped Sections
PPP-F-320	- Fiberboard, Corrugated and Solid Sheet Stock (Container Grade) and Cut Shapes
QQ-C-390	- Copper Alloy Casting (Including Cast Bar)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to Commander, Naval Sea Systems Command, SEA 55Z3, Department of the Navy, Washington, DC 20362-5101 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter

MILITARY

MIL-S-901 - Shock Tests, H I (High-Impact), Shipboard Machinery, Equipment and Systems, Requirements for
MIL-G-1149 - Gasket Materials, Synthetic Rubber, 50 and 65 Durometer Hardness
MIL-R-15624 - Rubber Gasket Material, 50 Durometer Hardness (Maximum)
MIL-E-17555 - Electronic and Electrical Equipment, Accessories, and Provisioned Items (Repair Parts), Packaging of
MIL-L-19140 - Lumber and Plywood Fire-Retardant Treated
MIL-F-20042 - Flanges, Pipe and Bulkhead, Bronze (Silver Brazing)
MIL-C-24640/21 - Cable, Electrical, 600 Volts, Lightweight, Four Conductor, Power, Type FXW (Including Variation Type FXWA and FXOW).
MIL-T-31000 - Technical Data Packages, General Specification for.

STANDARDS

FEDERAL

FED-STD-313 - Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities

MILITARY

MIL-STD-167/1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited)
MIL-STD-202 - Test Methods for Electronic and Electrical Component Parts
MIL-STD-785 - Reliability Program for Systems and Equipment Development and Production

HANDBOOK

MILITARY

MIL-HDBK-217 - Reliability Prediction of Electronic Equipment

(Unless otherwise indicated, copies of the federal and military specifications, standards and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, 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

CODE OF FEDERAL REGULATIONS (CFR)

Title 10, Chapter 1, Part 30 - Rules of General Applicability to Licensing of Byproduct Material

(Copies of the CFR are available from the Superintendent of Documents, U S Government Printing Office, Washington, DC 20402.)

2 2 Non-government publications The following document forms 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 NATIONAL STANDARDS INSTITUTE, INC (ANSI)

B16.5 - Steel Pipe Flanges, Flanged Valves, and Fittings.

(Application for copies should be addressed to the American National Standards Institute, Inc., 1430 Broadway, New York, NY 10018)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the 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, 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), a sample of the float type level sensors furnished under this specification shall be subjected to first article inspection (see 6 4) in accordance with 4.3

3 2 Design, workmanship and construction. The float type level sensors shall have a service life of 10 years and 100,000 cycles and shall successfully complete the accelerated life and switch activation tests specified herein. Each sensor assembly shall consist of a float type level sensor, attached cable, mounting flange, stuffing tube assembly, and mounting flange gasket for installation in a MSD sewage tank The parts shall fit together snugly without binding or play The stuffing tube assembly shall be able to tighten against the cable The sensor shall not have flaws (cracks, cuts, holes, nicks) more than 1/32-inch deep. Scratches shall not cross one another and are limited to 1-1/2-inches in length No more than 5 acceptable size flaws shall be visible There shall be no bubbles or soft spots The sensor cable shall not exhibit any cracks, bubbles or physical flaws in the cable jacket The level sensor float shall contain 2 independent tilt type activation switches as described herein The sensor switches shall be open when the sensor is hanging in the down position (normally open) unless

normally closed is specified (see 6 2) The switches shall activate and deactivate within the range specified in 4 5 4

3 2 1 Mechanical features

3.2 1 1 Serviceability Material and serviceability of the level sensor shall be physically unaffected when the float with the cable is immersed in a sewage holding tank containing sewage with constituents described in 1.1, and at a temperature of 32 degrees Fahrenheit (°F) to 140°F Serviceability of the float with the cable shall be physically unaffected when immersed in a sewage holding tank at room temperature at a pressure of 20 pounds per square inch (lb/in^2). The total weight of the level sensor float and attached cable inside an MSD sewage tank shall not exceed 115 percent (%) of the original weight of the float and cable when exposed to the preceding conditions for the design service life of the sensor. The float and attached cable inside an MSD sewage tank shall have a specific gravity of 33 percent or less of that of tap water at room temperature Float and float coating materials shall be such that no abrading shall be evident during the testing of this document and there shall not be any likelihood of significant abrading and a change of shape over the design life

3.2 1 1 1 Switches (2 per sensor) shall be of the tilt type and shall pass the switch activation test of 4 5.4 Rotation about the longitudinal axis of the switches shall not affect the switch operation.

3 2 1 2 Mounting flange. When specified (see 6 2), the mounting flange with the interfacing stuffing tube assembly and mounting flange gasket specified herein shall be provided with the cable and float assembly. The mounting flange shall conform with the critical dimension requirements of 3 4 1 and figure 1. The flange mating surface finish shall be in accordance with MIL-F-20042.

3 2 1.3 Cable The cable shall be type FXW-4, in accordance with MIL-C-24640/21, standard identification code method 3 (black, white, red and green wires) The overall length of cable required and its positioning relative to the float and mounting flange shall be as shown in figures 1 and 2 (see 6.2)

3 2 1 4 Stuffing tube assembly The manufacturers commercial stuffing tube assembly design is acceptable subject to the requirements specified herein The stuffing tube shall be appropriately faired or chamfered where the cable exits the assembly to prevent fraying of the cable Stuffing tube assembly materials shall be in accordance with 3 3 2.2 Stuffing tube assembly shall accommodate the cable specified in 3.2.1.3 and pass the shock, vibration, and accelerated life tests specified in 4 5 5 and 4 5 6.

3 2.1.5 Float assembly. Float design and construction shall conform with the specific critical dimensional requirements of 3.4 1 and figures 1 and 2. Each float assembly shall contain two hermetically sealed mercury switches, or two mechanically activated switches using a rolling metal ball or similar activating mechanism as specified (see 6.2). One switch's contacts shall be connected to the red and green cable wires and the second switch's contacts shall be connected to the black and white cable wires The switches, their exposed leads, and the specified length of jacketed cable shall be fully encapsulated by a single, watertight core composed of epoxy urethane or other suitable non-porous rubber or

plastic material The core shall seal the switches from moisture in the event of a float failure and shall contain mercury in the event of a mercury switch casing failure The switch casings with encapsulating core and the required part of the cable shall be housed in a watertight, non metallic float with a watertight seal at the float/cable interface. The switches shall be properly centered in the float to insure activation and deactivation within the specified range regardless of the rotational alignment of the sensor assembly. The float material shall be suitable for service in liquid sewage containing varying amounts of constituents described in 1.1 The float may be of hollow, molded plastic construction or may be of solid construction consisting of cellular polyurethane or similar water resistant, buoyant material. Floats of solid construction shall have a chemically resistant, water proof outer coating with a dry film thickness of not less than 9 mils The float shape and construction shall provide protection from tank wall abrasion over it's design life due to fluid turbulence and vibration during both submerged and unsubmerged operations.

3.2.2 Electrical requirements Each switch shall be rated to carry continuously 5 amps at 115 volts, 60 Hertz (Hz). After completing the tests specified in 4.5, the resistance between the primary contacts of each switch, when the switch is in the closed position, shall not exceed 0.05 ohm. Contacts shall provide for a minimum of 100,000 make and break cycles under load. The insulation resistance of the sensor shall be not less than 10 megohms at 500 volts direct current (Vdc) at standard ambient conditions, and after completing the tests in 4.5

3.3 Materials Material shall be as specified herein. Where materials are not specified, material selection shall be in accordance with the best commercial practice and be suitable for use in the intended environment

3 3.1 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and may be fabricated using materials produced from recovered materials to the maximum extent practicable 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. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified

3.3.2 Parts and materials.

3.3.2.1 Mounting flange. The mounting flange shall be bronze, alloy number C92200 in accordance with QQ-C-390.

3 3 2 2 Stuffing tube assembly Stuffing tube assembly parts not integral with the mounting flange, except for grommets, gaskets and O-rings, shall be nickel-copper alloy in accordance with QQ-N-281

3.3 2 3 Stuffing tube grommet. Stuffing tube grommets shall be BUNA-N or neoprene class 1, of suitable hardness in accordance with MIL-R-15624

3 3 2 4 Mounting flange gasket The mounting flange gaskets shall be synthetic rubber in accordance with MIL-G-1149.

3 3 2 5 Cable The cable shall be type FXW-4, in accordance with MIL-C-24640/21 standard identification code method 3 (black, white, red and green wires)

3 3.2.6 Switches Switches shall meet all requirements of 3 2 1.1, 3 2 1 5, and 3 2 2 Mercury switches, where used, shall be hermetically sealed, tilt type Contact areas of mercury switches shall be engulfed in an arc suppressing gas

3 4 Dimensions

3.4.1 Critical dimensions In addition to the stuffing tube assembly and the float assembly dimensional requirements specified in 3 2 1 4 and 3.2.1 5, the following dimensions which are shown on figures 1 and 2 are considered critical and shall be met·

a Dimensions of the mounting flange including diameter, thickness, spacing, size and location of the bolt holes
b Maximum allowable diameter of the level sensor (float)
c Length of cable between the level sensor and the mounting flange
d Overall cable length measured from level sensor.
e Minimum length of cable (with jacket) encapsulated by the level sensor
f Minimum length of cable (with jacket) covered by the float core.
g Minimum thickness of covering over all switches and wiring by the float core
h Minimum thickness of the float material over the float core (for floats of solid construction only).
i Maximum length of level sensor (float)

3 4 2 Non-critical dimensions The configuration of the stuffing tube assembly and the shape of the level sensor float shown on figures 1 and 2 is not restrictive and dimensions for which guidelines are not specified herein are at the discretion of the manufacturer provided all of the performance, design, material and testing requirements specified herein are met

3 5 Shock and vibration The level sensor shall meet the requirements of grade A, Class I, Type C shock testing in accordance with MIL-S-901, and the vibration testing requirements of MIL-STD-167/1, Type I

3 6 Marking The name "LEVEL SENSOR, FLOAT TYPE", the manufacturer's name and part or identification number (PIN), the National Stock Number (NSN), and an indication of the switch position, e g , float down (NO) or float down (NC) shall be stamped on each level sensor float and mounting flange Each float shall also be marked or stamped to identify the red and green leads with one switch and the black and white leads with the other The float marking shall be stamped in an area least prone to wear due to impact with the tank walls

3 7 Reliability The contractor shall conduct a reliability program in accordance with MIL-STD-785 Each item shall meet a specified mean-time-between

failure (MTBF) of not less than 8 76x10^{4} hours (failure rate not greater than 1 failure per 8 76x10^{4} hours), which is comparable to a service life of 10 years and 100,000 cycles

3 7 1 Reliability prediction. A reliability prediction shall be in accordance with the stress analysis procedures and failure rates of MIL-HDBK-217 (see 6.3)

3 8 Material safety data sheet (MSDS) The contracting activity shall be provided a material safety data sheet at the time of contract award. The MSDS shall be provided in accordance with the requirements of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification (see 6 6)

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 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 specifications 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 the manufacturing operations, is an acceptable practice to ascertain conformance to the 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 Classification of inspections The inspection requirements specified herein are classified as follows.

a First article inspection (see 4.3).
b Quality conformance inspection (see 4.4).

4 3 First article inspection First article inspection shall consist of the examination and tests specified in table I and conducted in the order listed

4 3 1 Samples for first article inspections Six level sensors shall be subjected to the examinations and tests specified in table I as follows

a All sensors for the examination

b Four sensors for insulation resistance, switch contact resistance switch activation, vibration and shock, and accelerated life tests

TABLE I First Article Inspection

EXAMINATION AND TEST	REQUIREMENT	TEST
General examination	3.4	4 5 1
Insulation resistance	3 2 2	4 5.2
Switch contact resistance	3.2.2	4 5 3
Switch activation	3.2 and 3 2 1 1	4 5 4
Vibration	3 5	4.5 5
Shock	3 5	4 5.5
Accelerated life	3 2.1 1 and 3 2 2	4 5 6

4 4 Quality conformance inspection Quality conformance inspection shall consist of the examinations and tests specified in table II The test listed under group B is not required unless first article inspection was not required as part of a particular contract or purchase order (see 6 3).

TABLE II. Quality Conformance Inspection

EXAMINATION AND TEST	REQUIREMENT	TEST
Group A		
General examination	3 4	4 5 1
Insulation resistance	3 2 2	4.5 2
Switch contact resistance	3 2.2	4 5 3
Switch activation	3 2 and 3 2 1 1	4 5 4
Group B		
Accelerated life	3 2.1.1 and 3 2.2	4.5 6

4 4 1 Lot For purposes of quality conformance inspection, a lot shall consist of level sensors which are of the same material, type, size, fabricated by the same process, and produced as one continuous run or order or part thereof and submitted for acceptance inspection at the same time

4 4.1.1 Quality conformance inspection sampling As a minimum, the contractor shall randomly select a sample quantity of level sensors from each lot in accordance with table III and inspect them in accordance with the group A tests listed in table II When the test listed under group B is required, only two level sensors shall be used (one sensor should be tested at each of the specified temperatures). Detection of any nonconforming characteristic in any sample shall result in rejection of the entire lot The contractor has the option of correcting the discrepancy, retesting, and resubmitting a conforming lot or submitting a new lot which shall be inspected and tested as specified herein

Table III. Sampling for quality conformance inspection.

Lot size	Sample size
8 and under	All
9 to 150	13
151 to 280	20
281 to 500	29
501 to 1,200	34
1,201 to 3,200	42
3,201 to 10,000	50
10,000 to 35,000	60

4 5 Methods of inspection

4 5 1 Examination A visual examination of the level sensor shall be conducted and shall conform to requirements as specified in 3.2 The sensor and its entire assembly and all associated hardware shall be examined for proper dimensional limits as specified in 3 4

4 5 2 Insulation resistance An insulation resistance test of the sensor shall be conducted During the test, the sensor shall be submerged in a tank or hydrostatic cell completely filled with seawater and pressurized to 20 pounds per square inch gauge (psig) for 30 minutes The interior of the test cell shall be electrically grounded The insulation resistance shall then be measured between the following points with the switches in the open position:

a. All wires and test cell ground
b. Red wire to green wire
c Black wire to white wire
d Red wire to black wire
e Green wire to black wire
f Red wire to white wire
g Green wire to white wire

The insulation resistance shall not be less than 10 megohms at 500 Vdc in any of the above tests Where a test voltage of 500 Vdc would be injurious to the switch, the insulation resistance should be measured at the manufacturer's recommended voltage

4 5 3 Switch contact resistance. The switch contact resistance (R) of each switch in the closed position shall be calculated at a rated open circuit voltage level of 115.0 ± 1.0 volts alternating current (Vac) and a closed circuit load current level of 5 0 ± 0 01 amperes with a circuit frequency of 60.0 ± 1 0 Hz using the following formula:

$$R(\text{ohms}) = \frac{\text{Voltage drop across contacts (closed)(volts)}}{\text{Load current (amps)}}$$

The calculated value of R shall not exceed 0 05 ohms.

4 5.4 Switch activation. The float sensor assembly shall be attached by its mounting flange and stuffing tube assembly to a vertical panel type support in a manner similar to its intended installation in an MSD tank and tested in a dry environment The leads from each switch shall be connected to an electrical circuit with the characteristics described in 3 2.2. The float shall be allowed to hang vertically downward by gravity and shall then be raised slowly upward until the switch activates (closes) for a normally open sensor or deactivates (opens) for a normally closed sensor. The sensor shall continue to be raised to a vertically upward position and then slowly lowered back down until the switch deactivates (opens) for a normally open sensor or activates (closes) for a normally closed sensor Finally, return the sensor to the vertically downward position. Repeat the cycle 3 times. The test shall be repeated with the mounting flange and sensor rotated 120 degrees from the original position. The exact angles of activation and deactivation during all phases of the test shall be recorded for both switches Failure to activate or deactivate between the specified operating angle of 15 degrees below the horizontal position to 15 degrees above the horizontal during any cycle for either switch shall constitute failure of the test Additionally, activation angles shall not vary more than 5 degrees during any three test cycles of an individual test in a particular sensor orientation Likewise, deactivation angles shall not vary from each other by more than 5 degrees during any three test cycles in a single sensor orientation. The exact rate at which the sensors are cycled shall be at the manufacturers discretion and may be varied to accommodate any damping features of the switch

4 5 5 Vibration and shock The level sensor shall meet the vibration requirements of MIL-STD-167/1, type I, and the requirements of grade A, class I, type C shock testing per MIL-S-901 During vibration and shock testing, level sensor shall be mounted to simulate shipboard installations in an empty tank and shall not be restricted from normal operation and movement. Level sensor shall not suffer any cracking of a switch casing, broken or detached part, release or leakage of mercury, nor any impairment of its proper operation as determined by switch activation tests of 4 5 4 which shall be repeated after vibration test and after shock test During vibration test, the switch contacts shall be monitored as specified by method 310 of MIL-STD-202 Normally open switch contacts shall not close nor shall normally closed switch contacts open while undergoing vibration testing (see 6.3)

4 5 6 Accelerated life. After completion of the shock and vibration tests of 4 5 5, four sensors with flange, cable, and stuffing tube assembly (all materials listed in Section ? ?) shall be subjected to an accelerated life test which shall be conducted in the two phases described below The weight of the sensors

shall be recorded before the test For the purposes of the test, a suitable synthetic seawater may be used

a Phase 1 The level sensors shall be subjected to 100,000 test cycles in seawater at ambient temperature During the test each switch shall be subjected to the full rated electrical load as described in 3.2.2. A cycle shall start with the sensor completely out of the seawater and freely suspended from its mounting flange The sensor shall then be gradually and totally submerged until the float reaches its maximum upward travel and is covered by at least three inches of seawater. The process shall then be reversed and the sensor returned to its unsubmerged starting position freely suspended from the mounting flange. The exact rate at which the sensors are cycled shall be at the manufacturers discretion and may be varied to accommodate any damping features of the switch. During the cycling, failure of the contacts of any sensor switch to open or close in proper sequence shall constitute failure of the test Switches shall be continuously monitored and recorded to determine whether any contact has failed to open or close its individual circuit in the proper sequence Upon completion of phase 1 testing, the sensors shall undergo the insulation resistance tests of 4.5.2 and the switch contact resistance tests of 4 5 3 at a rated open circuit voltage of 115 ± 1 0 Vac and a closed circuit load current level of 5 0 ± 0.01 amperes Failure of any of these tests shall constitute failure of the accelerated life test Any cracking or failure of the cable jacket caused by abrasion against the stuffing assembly or float body shall constitute failure of the test

b Phase 2 The four sensors subjected to the phase 1 tests shall undergo the following phase 2 tests Two of the sensors shall be tested at a constant temperature of 32°F and the remaining two sensors shall be tested at a constant temperature of 140°F The sensors shall be installed in a hydrostatic cell which is filled with seawater and sealed Where the mounting flange and stuffing tube assembly are being provided under the contract, they shall form part of the pressure boundary of the test cell. A dye similar to Telon KBRL 200, blue, MODAY Chemical Corp or equal, concentration 0.1 milligram (mg) per 0 5 liter, shall be added to the seawater to aid in tracing moisture leaks The test cells shall be pressurized to 20 psig at the required temperatures and maintained for a period of 14 days Where included, the mounting flange and stuffing tube assembly shall be monitored for leakage throughout the test The flange bolting and stuffing tube gland nuts may be tightened once Any visible leakage after tightening shall con-

stitute failure of the test. At the end of the test, the sensors shall pass the insulation resistance tests of 4 5 2 and the switch contact resistance tests of 4 5 3 at a rated open circuit voltage of 115 ± 1 0 Vac and a closed circuit load current level of 5.0 ± 0 01 amperes. Sensors shall be weighed. A weight gain of more than 15 percent in any sensor shall constitute failure of the test. Finally, all sensors shall be opened up and the float core removed from around the switches Any dye penetration beyond the outer boundary of the float or any evidence of rust or corrosion of any switch casing or contacts shall constitute failure of the test.

4.5.7 Inspection of packaging. The inspection of preservation, packaging and marking for shipment, stowage, and storage shall be in accordance with the requirements of section 5 and the documents specified herein

5 PACKAGING

5.1 Packaging requirements. Sensors shall be preserved level A or C method IA-8, or commercial, packaged level A, B, C, or commercial, and marked in accordance with MIL-E-17555, and shall include bar codes and applicable packaging acquisition options therein as specified (see 6 2) In addition, for Navy acquisitions, the following shall apply

a Navy fire-retardant requirements

(1) Treated Lumber and Plywood Unless otherwise specified (see 6 2 1), all lumber and plywood including laminated veneer material used in shipping containers and pallet construction, members, blocking, bracing, and reinforcing shall be fire-retardant treated material conforming to MIL-L-19140 as follows

Levels A and B	-	Type II - weather resistant Category 1 - general use
Level C	-	Type I - non-weather resistant Category 1 - general use

(2) Fiberboard. Unless otherwise specified (see 6 2), fiberboard used in the construction of interior (unit and intermediate) and exterior fiberboard boxes including interior packaging forms, shall conform to the class-domestic/fire-retardant or class-weather resistant/fire-retardant material requirements of PPP-F-320 and amendments thereto

5 2 Special marking In addition to the marking requirements of 5.1 and regardless of the level or type of packaging specified, all unit, supplementary, and exterior containers shall be marked with a warning label as follows in cases where float sensors contain mercury switches

"WARNING

Contains equipment using mercury which may be

injurious to your health if spilled "

In addition, poison labels as required by Department of Transportation regulations shall be applied to the shipping container.

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 level sensors covered by this specification are intended for use in sewage systems within U S. Navy shipboard MSDs. In general, the sensor assemblies described herein are interchangeable with those installed in the fleet at the assembly level. The float sensors with the attached cable defined herein are also functionally interchangeable with those currently in the fleet and may be procured separately for use with existing mounting flanges and stuffing tube assemblies already installed in the fleet Individual sub parts of the stuffing tube assemblies provided under this specification such as gland nuts and grommets may not be interchangeable with those currently installed in the fleet Accordingly, this specification may be used to procure the float sensor with the attached cable without buying the mounting flange, stuffing tube assembly and mounting flange gasket if so stated in the ordering data. In most cases of level sensor failure, replacement of the mounting flange and stuffing tube assembly is not required. The great majority of MSD float level sensors required in Navy service are normally open sensors with a 15 foot minimum cable length Some large ships with exceptionally large MSD tanks may require level sensors with 30 foot minimum cable lengths (e.g aircraft carriers) A relatively small number of normally closed sensors will be required, usually to activate tank low level alarms existing on a limited number of ships.

6 2 Acquisition requirements Acquisition documents should specify the following:

a. Title, number and date of this specification
b. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1. and 2.1.2.).
c Type of switch (see 3 2 1 5)
d Switch contacts NO or NC (see 3.2)
e. When mounting flange, stuffing tube assembly and mounting flange gasket is to be provided with the float assembly and attached cable (see 3 2 1 2 and 6 1)
f Cable length (see 3 2 1 3)
g When first article inspection is required (see 3 1)
h Levels of preservation and packing (see 5 1)
i Packaging options of MIL-E-17555 (see 5 1)
j When drawings are required (see 6 3)
k When inspection plan is required (see 4 1 2)

1 When fire-retardant packaging is not required (see 5 1a(1) and 5 1a(2))

6 3 Consideration of data requirements The following data requirements should be considered when this specification is applied on a contract The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/ provided and that the DID's are tailored to reflect the requirements of the specific acquisition To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 27.475-1 exempts the requirement for a DD Form 1423

Reference Paragraph	DID Number	DID Title	Suggested Tailoring
3.7 1	DI-R-7095	Reliability Prediction	
4 4	DI-T-2072	Reports, Test	
4.5 5	UDI-T-23762	Report, Vibration Testing	
4 5 5	DI-ENVR-80708	Shock Test Report	
6.2	DI-DRPR-81000	Product Drawings and Associated Lists	

The above DID's were those cleared as of the date of this specification The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423

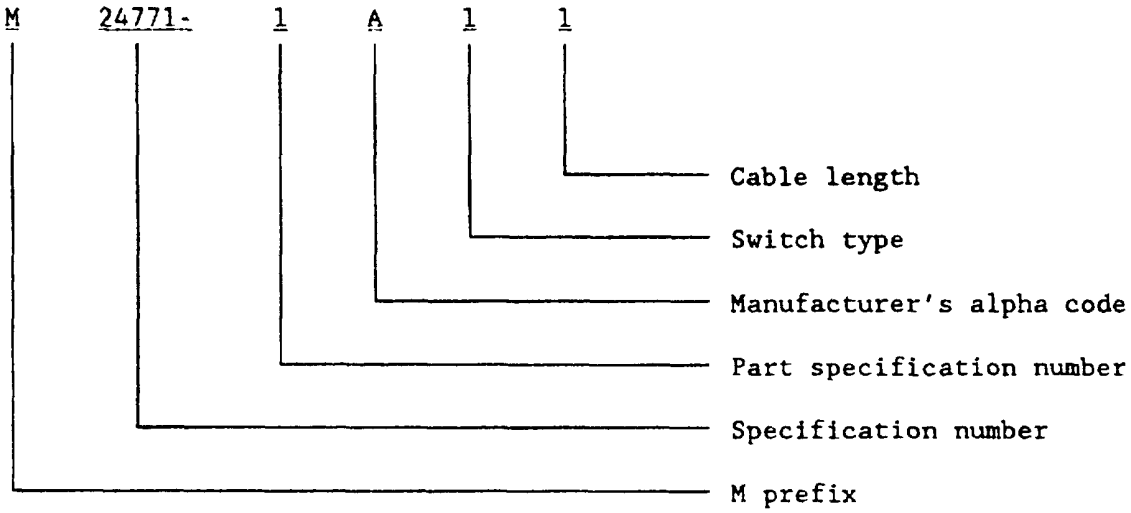
6 4 First article. When first article inspection is required, the contracting officer should provide specific guidance to offerors whether the item(s) should be a first article sample, a first production item, or a standard production item from the contractor's current inventory and the number of items to be tested as specified in 4 3 The contracting officer should include specific instructions in acquisition documents regarding arrangements for examinations, approval of first article test results and disposition of first articles Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection to those bidders offering a product which has been previously acquired or tested by the Government, and that bidders offering such products, who wish to rely on such production or test, must furnish evidence with the bid that prior Government approval is presently appropriate for the pending contract

6.5 Disposability. One or more of the following methods should be used to accomplish disposal of float sensors· reuse, recycling, baling, sanitary landfill, composting, incineration, pyrolysis, or sea disposal Where float sensors contain mercury, disposal shall be in accordance with local regulations governing the disposal of hazardous waste

6 6 Material safety data sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in

accordance with FED-STD-313 The pertinent Government mailing addresses for submission of data are listed in FED-STD-313

6.7 Part or identifying number (PIN) The PIN to be used for parts acquired to this specification shall include prefix "M" to indicate military specification, specification number, part specification number and code numbers as follows



PIN CODE:

Part specification number	Manufacturer alpha code	Switch type
1 - Float assembly with attached cable	A -	For P/N 1, indicate:
2 - Mounting flange	B -	1 - Mercury, NO contacts
3 - Stuffing tube assy	C -	2 - Mercury, NC contacts
4 - Grommet	D -	3 - Mechanical, NO contacts
5 - Gland nut	E -	4 - Mechanical, NC contacts
6 - O-ring	N - non restricted, may be used for P/Ns 4, 6 and 7 only	N/A for P/Ns 2 thru 7 use 0
7 - Mounting flange gasket		
8 -		
9 -		

Cable length

For P/N 1 indicate:

15 - 15 feet min.
30 - 30 feet min
N/A for P/Ns 2 thru 7 use 0

6.8 Provisioning Provisioning Technical Documentation (PTD), spare parts, and repair parts should be furnished as specified in the contract

6.8.1 Spare parts When ordering spare parts or repair parts for the equipment covered by this specification the contract should state that such spare

parts and repair parts should meet the same requirements and quality assurance provisions as the parts used in the manufacture of the equipment Packaging for such parts should also be specified

6 9 Sub-contracted material and parts. The packaging or preparation for delivering requirements of referenced documents listed in section 2 do not apply when material and parts are procured by the contractor for incorporation into the equipment and lose their separate identity when equipment is shipped

6 10 Subject (key word) listing

CHT - collection holding transfer
sanitary
wastewater

Preparing activity
Navy - SH
(Project 5930-N707)

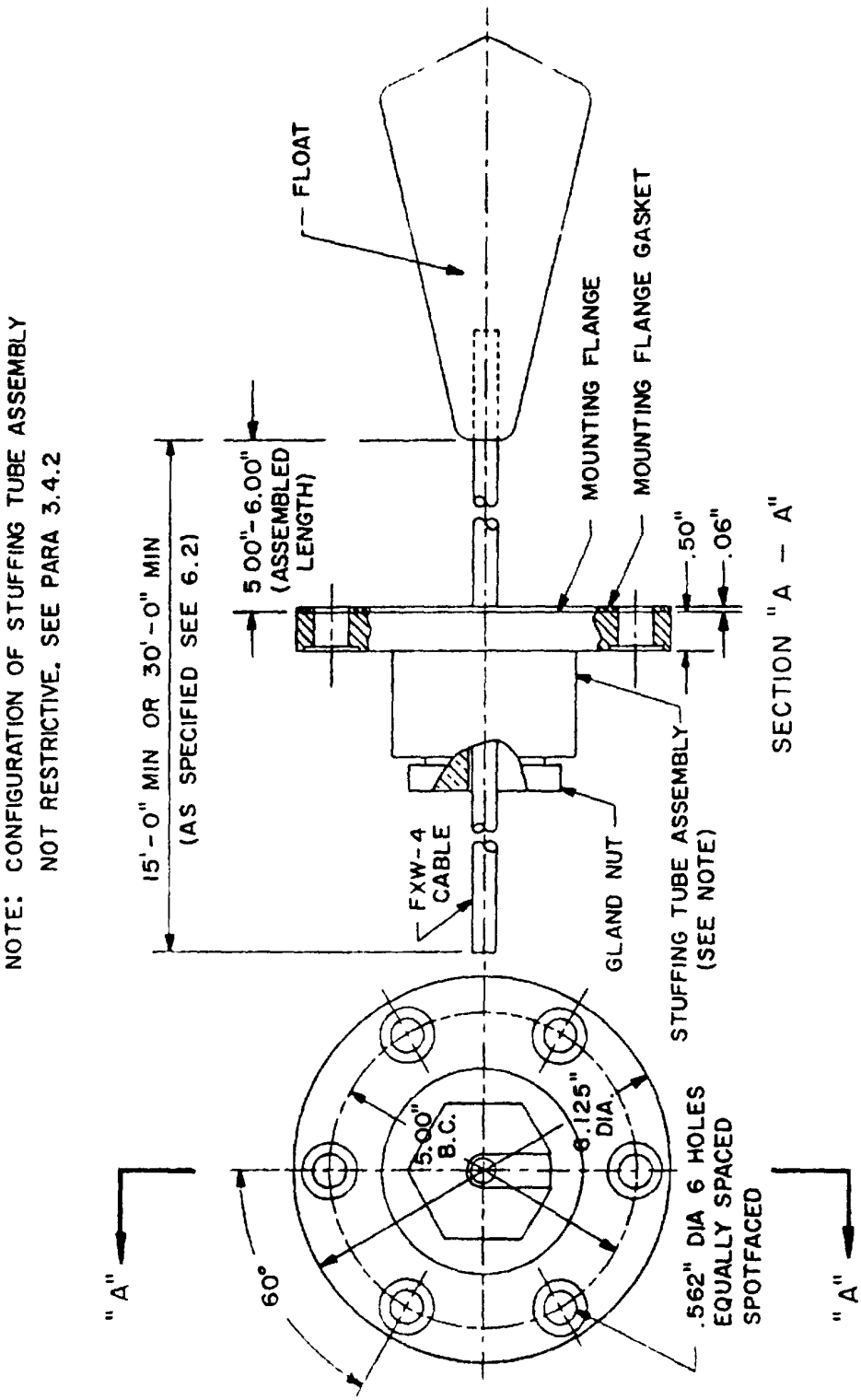


Figure 1. Sensor

NOTES:

1. SHAPE OF FLOAT SENSOR AND RELATIVE LOCATION OF SWITCHES IS NOT RESTRICTIVE EXCEPT FOR MINIMUM AND MAXIMUM DIMENSIONS AS SPECIFIED. SEE PARA 3.4

2. FLOAT SHOWN IS OF SOLID CONSTRUCTION, BUT HOLLOW FLOATS OF MOLDED PLASTIC CONSTRUCTION ARE ALSO PERMITTED. SEE PARA 3.2.1.5

3. FLOAT CORE SHALL COVER SWITCHES AND ASSOCIATED WIRES BY AT LEAST 1/4" IN ALL AREAS.

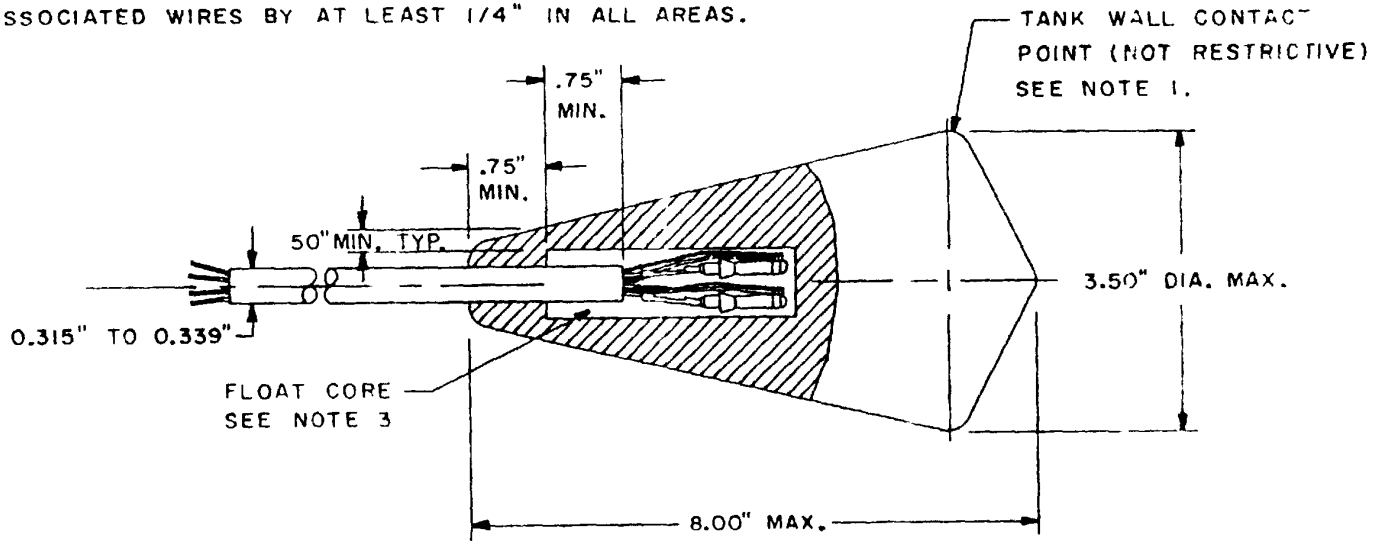


Figure 2 Float assembly

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

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-S-24711(SH)	2. DOCUMENT DATE (YYMMDD): 8 APRIL 1992

3. DOCUMENT TITLE
SENSOR, LEVEL, FLOAT TYPE, SHIPBOARD SEWAGE SYSTEMS

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: Technical Point of Contact (TPOC): Mr. John Julian (SEA 56Y35) PLEASE ADDRESS ALL CORRESPONDENCE AS FOLLOWS:	b. TELEPHONE (Include Area Code) (1) Commercial: TPOC: 703-602-5793 (2) AUTOVON: 8-332-5793
c. ADDRESS (Include Zip Code) COMMANDER, NAVAL SEA SYSTEMS COMMAND SEA 5523, DEPARTMENT OF THE NAVY	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