

MIL-S-21919B(OS)
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 SUPERSEDING
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MILITARY SPECIFICATION

SWITCH, HYDROSTATIC, MARK 42 MOD 0

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1 SCOPE

1.1 Scope. This specification establishes the requirements for the procurement of the Switch, Hydrostatic, Mark 42 Mod 0, Naval Sea Systems Command LD 299450. The hydrostatic switch is of one type and one class.

2 APPLICABLE DOCUMENTS

2.1 The following documents, of the issue in effect on the date of invitation for bids or request for proposal, form a part of this specification to the extent specified herein.

STANDARDS

MILITARY

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-331	Fuze and Fuze Components, Environmental and Performance Tests for
MIL-STD-454	Standard General Requirements for Electronic Equipment

DRAWINGS

NAVAL SEA SYSTEMS COMMAND (Code Ident 10001)

LD 299450	Switch, Hydrostatic, Mark 42 Mod 0
DL 2644484	Shipping (packing) Condition Hydrostatic Switch

All drawing numbers referenced herein are listed on LD 299450 unless otherwise designated.

PUBLICATIONS

NAVAL SEA SYSTEMS COMMAND

NAVSEA OD 10511	Basic Methods for Nonmagnetic Testing With the Test Set Mark 115 Type
WR-43	Naval Weapons Requirement, Preparation of Quality Assurance Requirements

2.2 Other publications. The following document forms a part of this specification. Unless otherwise indicated, the issue in effect on the date of invitation for bids or request for proposal shall apply.

NATIONAL BUREAU OF STANDARDS PUBLICATION

HANDBOOK H28	Screw Thread Standards for the Federal Services
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(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402)

3 REQUIREMENTS

3.1 Description. The Switch, Hydrostatic, Mark 42 Mod 0 is a normally open, four-circuit, make and break device, including a multiple terminal connector plug whereby the hydrostatic

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switch is connected with external circuitry. The hydrostatic switch is locked in the safe or open position by means of a pair of locking pawls retained in the locking position by an enclosing cap and safety pin. Upon removal of the safety pin, a spring urges the cap clear of the pawls to free a diaphragm and piston assembly which responds to close the switch as a pre-determined hydrostatic pressure is applied to the sea side of the device. A spring-loaded plunger locks the piston upon movement of the latter to switch closing position. The hydrostatic switch is nonmagnetic.

3.2 First article sample. Unless otherwise specified in the contract or order, a first article sample of the hydrostatic switches shall be manufactured and prepared for delivery using the methods and procedures proposed for the production lot. The sample shall be prepared for delivery in accordance with Section 5 herein and will be tested as specified in Section 4 herein. The sample is for the purpose of determining that, prior to starting production, the contractor's production methods are capable of producing items that comply with this specification and the design. The sample size shall be as specified in the contract or purchase order.

3.3 General requirements.

3.3.1 Fabrication. The switch shall be manufactured in accordance with LD 299450 and as specified herein.

3.3.2 Interchangeability. Component parts of assembled units (unless otherwise specified on the applicable drawings) fabricated in accordance with applicable drawings shall be interchangeable and shall assemble with mating components of the unit without selection or fitting.

3.3.3 Threads. Unless otherwise specified, all threads shall be in accordance with the National Bureau of Standards Handbook H28.

3.3.4 Soldering. Soldering shall be in accordance with Requirement 5 of MIL-STD-454.

3.4 Performance requirements and product characteristics. The switch shall meet the following performance requirements and product characteristics:

3.4.1 Shorting bar. After soldering the Shorting Bar, Drawing 1191214, between the two center terminals (I and J) of the connector, the shorting bar shall withstand a pull of 8.9 newtons (N) (2-pound force) without loosening or affecting the electrical resistance between the connected terminals. After an 8.9-N (2-pound) pull on the shorting bar, the resistance between terminals I and J shall not exceed 0.1 ohm. See 6.4

3.4.2 Pin staking. After staking the Pins, Drawing 1191211, securing the Pawls, Drawing 1191212, within the Cap, Drawing 1517946, the pins shall withstand an 8.9-N (2-pound) force without separating from the cap. The staking operation shall be conducted in such a manner as not to alter either the outer or inner diameters of the cap.

3.4.3 Pin installation. The Pins, Drawing 2414074, securing the Sleeve, Drawing 1246982, to the Cap, Drawing 1517946, shall be installed in such a manner as not to alter the inside diameter of the cap.

3.4.4 Cap assembly. Before and after switch assembly, the cap, including sleeve, shall be capable of 365 degrees manual rotation within the bell of the Cap Assembly, Drawing 1518061, without binding.

3.4.5 Retaining rings. Following assembly, all retaining rings shall be fully seated in their respective grooves. To insure proper seating of the rings, the diaphragm shall, in each instance, be compressed sufficiently to clear the ring groove before the rings are mounted.

3.4.6 Pin depression and release. Before mounting the piston assembly within the body, the Pin, Drawing 1558829, that locks the piston in the closed-circuit position within the body, shall depress into the piston flange to the solid height of the spring and release to the fully extended position without evidence of binding or sticking.

- 3.4.7 Piston release. The piston shall release from its depressed and locked position as a 1.27mm (0.050-inch) diameter pin is inserted into the 1.78mm (0.070-inch) diameter hole in the side of the body sufficiently to disengage the pin from the internal body groove.
- 3.4.8 Safety wire. When the sleeve, with spring, is depressed to shouldering position over the cap, the safety wire holes in the sleeve and cap shall so align with the groove in the piston as to permit easy insertion of the safety wire to locking position with the piston.
- 3.4.9 Torque. Following assembly of the switch, the Nuts, Drawing 2418050, shall withstand without movement a torque of 0.452N-metre (N·m) (4.0 pound-inches) maximum applied in the same direction in which the nuts were tightened.
- 3.4.10 Low pressure pawl release. When the switch is subjected to a pressure of 90 kilopascals (kPa) (13.0 PSIG), the pawls shall release and free the piston, which shall move to the extended position, closing all circuits through the switch to meet the contact resistance requirements of 3.3.14. The switch shall then remain closed.
- 3.4.11 Leakage. The switch shall withstand, without leakage, air pressures of 83 and 407 kilopascals (kPa) (12 and 59 PSIG).
- 3.4.12 Insulation resistance. The insulation resistance between each of the conductive elements and between each of the conductive elements and the remainder of the metallic elements of the switch shall be 50 megohms or greater when measured at 500 ± 50 volts DC.
- 3.4.13 Pressure response. All four switch circuits shall remain open at any pressure below 27.6 kPa (4.0 PSIG).
- 3.4.14 Contact resistance. The contact resistance of each switch circuit, with the switch closed, shall be no greater than 0.2 ohm as measured under a maximum potential of 5.5 volts DC.
- 3.4.15 Operating position. Unless otherwise specified, the switch shall operate in a manner to meet all requirements of this specification in the following positions: (a) sea side up; (b) sea side down; (c) switch axis horizontal.
- 3.4.16 Nonmagnetic requirement. The static magnetic effect of the switch shall not cause a total change in the flux density of the background magnetic field of more than 10 nanoteslas (0.10 milligauss) (peak to trough).
- 3.5 Environmental requirements.
- 3.5.1 Vibration. The switch shall meet all performance requirements and product characteristics of this specification after being vibrated in accordance with 4.8.1.
- 3.5.2 Shock. The switch shall meet all performance requirements and product characteristics of this specification after being shocked in accordance with 4.8.2.
- 3.5.3 Temperature.
- 3.5.3.1 Operating temperature. The switch shall operate in a manner to meet all performance requirements and product characteristics of this specification at any temperature between -3°C and 34°C (26°F and 93°F).
- 3.5.3.2 Storage temperature. The switch shall withstand without damage one 14-day JAN TEMPERATURE AND HUMIDITY CYCLE defined in MIL-STD-331, Test Method 105, except that the relative humidity in the chamber need not exceed room ambient or ambient as controlled.
- 3.5.4 High pressure.
- 3.5.4.1 Ruggedness. The switch shall withstand without damage 4.14 MPa (600 PSIG) hydraulic pressure for three minutes and shall show no evidence of leakage.
- 3.5.4.2 Safety. With the safety pin in place, the switch shall withstand, without becoming unsafe by closing of the contacts, 4.14 MPa (600 PSIG) hydraulic pressure for no less than 3 minutes.

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3.6 Cleanup. Prior to final assembly, all parts, components, and the assembly shall be thoroughly cleaned of loose or excess solder, metal chips, and other foreign matter.

3.7 Workmanship. Workmanship shall be in accordance with Requirement 9 of MIL-STD-454.

4 QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier 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 Classification of inspections. Inspection of hydrostatic switch shall be classified as follows:

- a. First article inspection (see 4.4)
- b. Quality conformance inspection (see 4.5)
- c. Periodic production sample inspection (see 4.6)

4.3 Test equipment. The following items of test equipment are required to perform the tests required in this specification:

- a. Test Set Mark 250 type with Accessory Set Mark 5 Mod 0 and Accessory Set Mark 13 Mod 0 (Government furnished (see 6.2d)).
- b. A torque wrench capable of applying a .565 N·m (5 pound-inch) torque with an accuracy of ± 2 percent.
- c. Test Set Mark 115 type with Adapter Mark 36 Mod 0 and Magnetic Effects Test Stand Mark 9 Mod 0 (Government furnished).
- d. A test chamber capable of withstanding an internal pressure of 4.14 MPa (600 PSIG) hydrostatic pressure and capable of accepting a switch.
- e. A pull tester capable of measuring a pull of 8.9-N to 22.2-N (2 to 5 pounds).
- f. A resistance bridge capable of measuring a resistance of 1 ohm in increments of 0.1 ohm, accuracy 1 percent.

4.4 First article inspection.

4.4.1 First article sample. First articles shall be subjected to the examinations and tests designated in Table I. First article sample approval will be granted when the Government testing activity, through testing and subsequent analysis of the test results, is assured of contractor conformance to the contract technical requirements. Conditional acceptance may be granted at the option of the Government based on analysis of detected defects. A first article sample may be disapproved when either nonconforming characteristics or unauthorized materials are found. (See 6.2b.)

4.5 Quality conformance inspection.

4.5.1 100% inspection. During assembly, each unit shall be subjected to the examinations and tests designated in Table I. Any unit containing one or more defects shall be cause for regarding the unit as defective.

4.5.2 Sampling. Tests designated as sampling tests in Table I shall be conducted on a random sample of switches selected from each production lot (see 6.3.2) in accordance with MIL-STD-105, Inspection Level II, AQL of 1.0 percent defective. Unless otherwise specified (see 6.2f), a production lot shall consist of one month's production. Lot composition shall be in accordance with MIL-STD-105, Section 5. Failure of any unit to pass any quality conformance sampling test shall reject the defective unit and shall result in rejection of the lot it

TABLE I - INSPECTION PROCEDURES (1)

Title of Examination or Test	Requirement Paragraph	Method Paragraph	First Article	INSPECTION CLASSIFICATIONS	
				Quality Conformance	Periodic Production
Preparation for delivery	5	4.7.1	1		1
Visual	3.3.1, 3.3.2 3.6 and 3.7	4.7.2	2 (2)	(3)	2 (2)
Cap assembly	3.4.4	4.7.7	3	(3) (6)	3
Piston release	3.4.7	4.7.10	4	(3)	4
Safety wire	3.4.8	4.7.11	5	(3)	5
Torque (7)	3.4.9	4.7.12	6	(3)	6
Low pressure pawl release	3.4.10	4.7.13	7	(3)	7
Leakage	3.4.11	4.7.14	8	(3)	8
Insulation resistance	3.4.12	4.7.15	9	(3)	9
Pressure response	3.4.13	4.7.16	10	(3)	10
Contact resistance	3.4.14	4.7.17	11	(3)	11
Operating position	3.4.15	4.7.18	12	(3)	12
Nonmagnetic requirements	3.4.16	4.7.19	13	(3)	13
Environmental (3 groups)		4.8			
Group (A)					
Vibration	3.5.1	4.8.1	14 (4)		14 (4)
Shock	3.5.2	4.8.2	15 (4)		15 (4)
Group (B)					
Storage temperature	3.5.3.2	4.8.3.2	16 (4)		16 (4)
Group (C)					
Operating temperature (High and low)	3.5.3.1	4.8.3.1	17		17
Ruggedness	3.5.4.1	4.8.4.1	18 (5)		18 (5)
Safety	3.5.4.2	4.8.4.2	19		19
Threads	3.3.3	4.7.2	20	(3)	20
Soldering	3.3.4	4.7.3	21	(3)	21
Shorting bar	3.4.1	4.7.4	22	(3)	22
Pin staking	3.4.2	4.7.5	23	(3)	23
Pin installation	3.4.3	4.7.6	24	(3)	24
Retaining rings	3.4.5	4.7.8	25	(3)	25
Pin depression and release	3.4.6	4.7.9	26	(3)	26

NOTES

1. Inspections shall be performed in successive numerical order for the first article and periodic production samples.
2. These inspections shall be performed as applicable without disassembly of the switch.
3. Quality conformance inspection shall be an in-process inspection performed during assembly of the switches prior to delivery. The sequence of inspection shall be at the discretion of the manufacturer.
4. Repeat steps 8 through 11 after vibration, shock, and group B tests.
5. Repeat steps 8, 9, and 11 after ruggedness test.
6. This test shall also be performed on the assembled switch.
7. This is a sampling test.

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represents if the number of defective units equals or exceeds the rejection number for the stated AQL.

4.6 Periodic production inspection.

4.6.1 Periodic production samples. Periodic production tests specified in Table I shall be conducted on a random sample of hydrostatic switches selected from each lot (see 6.2f) of hydrostatic switches offered for acceptance. The sample size shall be as specified in the contract or purchase order (6.2h). When a unit fails to pass any periodic production test, such failure shall be cause for rejection of the periodic production sample and the lot it represents.

4.7 Examination and test methods.

4.7.1 Preparation for delivery. The packaging shall be examined to determine conformance to 5 herein.

4.7.2 Visual examination. Each switch shall be visually examined in accordance with Drawing 1475915 to determine compliance with this specification and applicable drawings.

4.7.3 Soldering examination. Examine all soldered connections for excess solder or cold solder joints. Look for loose solder between the terminal pins. Observe for extended discoloration of the contacts as caused from overheating.

4.7.4 Shorting bar test (M101). After soldering the Shorting bar, Drawing 1191214, within the contact assembly, apply an $8.9 \pm 0, -0.9$ -N ($2 \pm 0 - 0.2$ -pound) pull to the shorting bar in a direction along the axis of the connector assembly. After the pull test, verify that the shorting bar is not loose; measure the resistance between terminals I and J to determine that the resistance does not exceed 0.1 ohm.

4.7.5 Pin staking test (M102). After staking the Pins, Drawing 1191211, that retain the pawls within the cap, apply a 8.9 -N (2-pound) axial force alternately to the ends of each pin. Examine each cap assembly to determine that the pin staking operation has not increased the outer or decreased the inner diameter of the cap.

4.7.6 Pin installation test (M103). After installing the pins which secure the sleeve to the cap, verify that the inner diameter of the cap meets the dimensional requirements of the Cap, Drawing 1517946.

4.7.7 Cap assembly test (M104). After the flaring operation securing the cap within the bell, hold the bell and manually rotate the cap 365 degrees within the bell. Also perform the foregoing test upon the completely assembled switch. Verify that there is no binding between the cap and bell.

4.7.8 Retaining ring test (M105). After assembling the diaphragm to the piston, examine the retaining ring to assure that it is properly seated within the piston groove. After final assembly of the switch, inspect the retaining ring securing the cap assembly and diaphragm to the body to assure that it is properly seated within the body groove.

4.7.9 Pin depression and release test (M106). Prior to mounting the piston within the body, insert Spring, Drawing 1558828, and Pin, Drawing 1558829, in the 2.43mm (0.096-inch) hole in the piston flange. Using a suitable probe, press the pin into the piston to the solid height of the spring. Slowly release the pin. Verify that the pin and spring do not bind.

4.7.10 Piston release test (M107). With the piston, Drawing 2424404, of the assembled hydrostatic switch depressed and locked in the circuit closing position, insert a 1.27mm (0.050-inch) diameter pin through the 1.78mm (0.070-inch) diameter hole in the side of the body. Exert pressure on the 1.27mm (0.050-inch) diameter pin. Retraction of the Piston, Drawing 2424404, to its open-circuit position indicates that the Pin, Drawing 1558829, was caused to retract by the pressure exerted on the 1.27mm (0.050-inch) diameter pin.

4.7.11 Safety wire test (M108). With the switch completely assembled except for the safety wire, depress the sleeve over the cap sufficiently to permit the safety wire holes in the sleeve to align with those in the cap. Insert the safety wire through the sleeve, cap, and notch in the piston to secure the piston in open circuit position.

4.7.12 Torque test (Sampling) (M109). Using the Torque Wrench, Item 4.3b., apply a torque of 0.452N·m (4 pound-inches) to each of the nuts securing the contact assembly to the body. Apply the torque in the same direction in which the nuts were tightened. Observe the nuts for turning during the torque application.

4.7.13 Low pressure pawl release test (M110). Install the switch with its sleeve depressed in the pressure chamber of the Test Set Mk 250 as in 4.7.14 (without plastic chamber). Release the sleeve of the switch. Apply a pressure of 90 kPa (13 PSIG) to the test chamber. Movement of the Piston, Drawing 2424404, to its fully extended and locked position indicates that the two pawls have released the piston. The capability of the switch to pass the contact resistance test of 4.7.17, after removal of the 90 kPa (13 PSIG) pressure, indicates that the piston is locked in the switch-closed position.

4.7.14 Leakage test (M111). Remove the warning tag and Pin assembly, Drawing 1672265, from the switch. Place the switch in the Test Set Mark 250 with sea side of the switch down and exposed to the pressure of the pressure pot. Enclose the other side of the switch with the plastic chamber connected to the manometer. Keep the secondary opening in the plastic chamber open when the pressure in the pressure pot is changing and closed only during the testing interval when the pressure in the pressure pot is constant. Increase the pressure in the pressure pot to 83 ± 3.45 kPa (12 ± 0.5 PSIG). Allow 30 seconds for creep of the diaphragm; then close the secondary opening in the plastic chamber. Movement of the oil in the sloping section of the manometer tube at a rate of 25.4mm (1.0 inch) or more in 30 seconds indicates that the switch is defective. With the switch so mounted, increase the pressure in the pressure chamber to at least 407 kPa (59 PSIG). Movement of the oil in the sloping section of the manometer at a rate of 25.4mm (1.0 inch) or more in 30 seconds indicates that the switch is defective. During the foregoing test, maintain the switch and the plastic cover at a constant temperature to prevent erroneous results in the manometer reading.

4.7.15 Insulation resistance test (M112). Place each assembled switch within a conditioning chamber for a period of 24 hours while maintaining the chamber at a temperature of $22^{\circ}\text{C} \pm 1^{\circ}\text{C}$ ($77^{\circ}\text{F} \pm 2^{\circ}\text{F}$) and a relative humidity of 75 ± 5 percent. Remove the switch from the chamber and place the switch in the pressure pot of the Test Set Mark 250 in the same manner as in 4.7.14. Maintain the pressure in the pot at atmospheric during the first part of this test. Plug the Cable Assembly CA-963 into the receptacle of the switch and rotate the TEST SELECTOR to the INSULATION RES position. Set the STATION SELECTOR on Position 1 and depress the METER switch. Repeat this operation with the STATION SELECTOR at Positions 2, 3, and 4. Movement of the meter needle into the red area of the meter dial in any instance indicates insulation resistance less than 50 megohms. Apply a pressure of 90 kPa (13.0 PSIG) to the pressure pot and set the STATION SELECTOR on Position 5. Depress the METER switch. Movement of the meter needle into the red area indicates insulation resistance less than 50 megohms. Repeat this with the STATION SELECTOR on Position 7 through 20.

4.7.16 Pressure response test (M113). With the switch mounted in the Test Set Mark 250 as called for in 4.7.14, turn the PRESSURE CONTROL to SLOW INTAKE and increase the pressure in the pressure pot. Ascertain that none of the four pairs of switches close at less than 27.6 kPa (4 PSIG) pressure.

4.7.17 Contact resistance test (M114). With the switch mounted in the Test Set Mark 250 in the same manner as in 4.7.14, rotate the TEST SELECTOR to the CONTACT RES position. Increase the pressure in the pressure pot to 90 kPa (13.0 PSIG). At this pressure make the following test: Rotate the STATION SELECTOR to Position 1 and depress the METER switch. Movement of the meter needle into the red area of the meter dial indicates contact resistance in excess of 0.2 ohm. Repeat the test with the STATION SELECTOR at Positions 2, 3, and 4. Movement of the meter needle into the red area of the meter dial in any instance indicates contact resistance in excess of 0.2 ohm. Upon completion of the foregoing test, reduce the pressure in the pressure pot to atmospheric and remove the hydrostatic switch from the pressure pot.

4.7.18 Operating position test (M115). Divide the lot or sample into three equal groups and subject them to the test procedures at 4.7.13, and 4.7.15 thru 4.7.17 as follows: one group in sea side down position; one group in sea side up position; and one group in the switch axis horizontal position.

4.7.19 Nonmagnetic test (M116). Perform the nonmagnetic test of the hydrostatic switch with safety pins removed in accordance with Test Method II of OD 10511 under the general test

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conditions and definitions described therein. Adapter Mark 36 Mod 0 shall be used to mount the switch upon the Magnetic Effects Test Stand Mark 9 Mod 0. The test face of the switch shall be the electrical plug connector end of the switch. The test distance shall be 127mm (5 inches). To achieve this test distance, the mounting plate of the test stand shall be adjusted as required to place the test face of the switch to the required 127mm (5 inches) from the center of the magnetometer.

4.8 Environmental tests. Divide the sample into three equal groups. See Table I for test sequence.

4.8.1 Vibration. Rigidly fasten the switch directly to the vibration table by either simulating the actual method of mounting used in service, or by its external case, whichever is appropriate. Apply simple harmonic excitation parallel to each of the three principal axes of the switch for equal periods of time. The frequency range from 10 to 60 Hz shall be covered either by slowly cycling at a logarithmic rate between the limits, or by at least 24 discrete frequency steps which have a logarithmic distribution. Maintain the vibration amplitude at $2 \pm .2g$ or $2.5 \pm 0.3mm$ ($0.10 \pm .01$ inch) (peak-to-peak), whichever is the lesser. Vibrate the switch in each direction for four hours. The total test duration shall be twelve hours.

4.8.2 Shock. Subject the hydrostatic switch to a continuous two-phase shock applied in any direction with respect to the hydrostatic switch as follows:

a. The first (impact) phase shall consist of a change of velocity of 1.7 to 2.1 m/s (5.5 to 7.0 feet per second) taking place in from 0.2 to 0.4 millisecond.

b. The second (drag) phase shall consist of an acceleration for a minimum time of 15 milliseconds in such a manner that during this time the minimum average acceleration is 90 gravity units. The peak acceleration shall be between 125 and 150 gravity units.

4.8.3 Temperature.

4.8.3.1 Operating. Subject the hydrostatic switch to the tests of 4.7.14, 4.7.15, 4.7.16, and 4.7.17 at temperatures of $-2^\circ \pm 1^\circ C$ ($28^\circ \pm 2^\circ F$) and $32^\circ \pm 2^\circ C$ ($90^\circ \pm 3^\circ F$).

4.8.3.2 Storage. Subject the switch, packaged and packed as designated in Section 5, to one 14-day JAN TEMPERATURE AND HUMIDITY CYCLE defined in MIL-STD-331, Test Method 105, except that the relative humidity in the chamber need not be raised above room ambient or ambient as controlled.

4.8.4 High pressure tests.

4.8.4.1 Ruggedness test (M117). With safety pin removed mount the switch within the Test Chamber, Item 4.3d., and apply to the sea side of the switch a 4.14 MPa (600 PSIG) hydraulic pressure for no less than 3 minutes. Observe the switch for evidence of leakage. See Table I.

4.8.4.2 Safety test (M118). With the safety pin in place, mount the switch within the Test Chamber, Item 4.3d., and apply to the sea side of the switch a 4.14 MPa (600 PSIG) hydraulic pressure for no less than 3 minutes. Verify that the contacts of the switch do not close during the test.

4.9 Classification of characteristics. The characteristics verified by the tests and examinations herein are classified as major or Minor in accordance with WR-43. Tests and examinations that verify major characteristics are identified by the symbol (M). The number following the classification symbol indicates the serial number of the test or examination. Tests and examinations which are not annotated with a classification code are classified Minor, AQL 2.5 percent.

5 PREPARATION FOR DELIVERY

5.1 Preservation and packaging.

5.1.1 Level A.

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5.1.1.1 Unit packaging. Each switch shall be individually packaged in accordance with DL 2644479 unless otherwise specified in the contract or order.

5.2 Packing.

5.2.1 Level A.

5.2.1.1 Exterior container. Twenty-four hydrostatic switches individually packaged as specified under 5.1.1.1 shall be packed in accordance with DL 2644484.

5.3 Marking.

5.3.1 Normal markings. In addition to any special marking required by the contract or order, all marking shall be in accordance with MIL-STD-129.

6 NOTES

6.1 Intended use. The hydrostatic switch is intended for use in underwater mines.

6.2 Ordering data. Procurement documents should specify the following:

- a. Title, number, and date of this specification.
- b. Number of first articles required. (3.2, 4.4.1)
- c. That the standards of workmanship exhibited by the previously approved production sample shall be used to determine the minimum requirements of the current contract relative to workmanship, when first article sample requirements are waived because of having been submitted on a recent contract.
- d. Test equipment to be loaned by the Government, and the terms under which it is loaned. (4.3a)
- e. Activity to perform first article testing, if other than contractor. (4.4)
- f. Lot size for sampling purposes, if one month's scheduled production is not acceptable. (4.5.2)
- g. That preparation for delivery shall be adequate to protect the switch prior to its installation, when switches are purchased for a prime contractor for installation into Assembly Condition "D" mines.
- h. Number of units in the periodic production sample.

6.3 Definitions. The following terms are used throughout this specification and are here defined for clarity.

6.3.1 Hydrostatic switch. Reference herein to the switch or hydrostatic switch shall be understood to mean the Switch, Hydrostatic, Mark 42 Mod 0.

6.3.2 Lot. Unless otherwise specified in the contract or purchase order, lot size shall mean one month's scheduled production. See Section 5 of MIL-STD-105 for lot composition.

6.4 Metrication. This specification utilizes metric units in accordance with ASTM E 380-72 as approved by the Department of Defense. Quantities expressed in conventional units are noted parenthetically. Of particular interest are the metric units of force and pressure, the newton (N) and pascal (Pa), respectively. One pound (force) equals 4.45 newtons and one psi equals 6,895 pascals.

6.5 The design and technical cognizance for the switches specified herein are located at the Naval Mine Engineering Facility, Yorktown, Virginia 23691.

Custodian:
NAVY - OS

Preparing Activity:
NAVY - OS
Project Number
1350-N030

Review Activities
NAVY - OS

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 22-R255
INSTRUCTIONS: This sheet is to be filled out by personnel, either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.		
SPECIFICATION MIL-S-21919B(OS) Switch, Hydrostatic, Mark 42 Mod 0		
ORGANIZATION		
CITY AND STATE	CONTRACT NUMBER	
MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> SUBCONTRACT		
1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE? A. GIVE PARAGRAPH NUMBER AND WORDING. <div style="text-align: center; padding: 20px;"> NO PROBLEMS FOUND </div>		
B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES <div style="text-align: center; padding: 20px;"> NO RECOMMENDATIONS </div>		
2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID 		
3. IS THE SPECIFICATION RESTRICTIVE? <input type="checkbox"/> YES <input type="checkbox"/> NO (If "yes", in what way?)		
4. REMARKS (Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity) 		
SUBMITTED BY (Printed or typed name and activity - Optional)		DATE

DD FORM 1426
1 JAN 66

REPLACES EDITION OF 1 OCT 64 WHICH MAY BE USED.

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