MILITARY SPECIFICATION

INDICATORS, TEMPERATURE, DIRECT-READING, BIMETALLIC,
(3-INCH AND 5-INCH DIAL)

PAGE 1

Preamble: Delete and substitute:

* "This amendment forms a part of Military Specification MIL-I-17244E(SHIPS) dated 20 April 1971, and 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."

* 1.2.1, column 2, line 2: Delete "index and reset" and substitute "max- and -min".

1.2.3, line 7, columns 1 and 2: Delete "12" and "200 to 1200".

Add Beneficial comments to bottom of page 1:

* "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."

PAGE 2

2.1, under "SPECIFICATIONS, FEDERAL" add: "L-P-516 - Plastic Sheet and Plastic Rod, Thermosetting, Cast".

2.1, under "STANDARDS, MILITARY" add: "MIL-STD-167-1 - Mechanical Vibrations of Shipboard Equipment (Type I - Environmental and Type II - Internally Excited)".

2.2, under "AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)" delete and substitute: "B18.6.3 - Slotted and Recessed Head Machine Screws and Machine Screw Nuts.

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

PAGE 3

* 3.1: Delete and substitute:

"3.1 First article. When specified, a sample shall be subjected to first article inspection (see 4.3 and 6.5)."

PAGES 3 and 4

* Table I: Delete and substitute:

"TABLE I. Materials.

Indicator part	Material	Material specification	Additional requirements
Case	Corrosion-resisting steel	ASTM A 276, 300 series	Case shall have satin or brushed finish.
Dial	Corrosion-resisting steel	ASTM A 276	Dials shall have a white or silvered background with black graduation and markings.
	Aluminum	ASTM B 209	
Windows for all ranges	Plastic	L-P-516, G3	---
Gaskets	Fluorocarbon rubber (250°F max) Nitrile (Buna N) rubber (180°F max)	MIL-G-23652 MIL-P-5516	Shapes as required. Gaskets shall be suitable for not less than 210°F on ranges above 240°F.
Indicating pointer	---	---	Pointer shall be nonreflective black and be of a plain and unembellished design.
Index pointers	As approved by NAVSEA	---	(Maximum and minimum indicator only.) Pointers shall be painted red and shall be of a plain and unembellished design.
Reset knob	Corrosion-resisting steel or brass (nickel plated)	ASTM A 276	(Maximum and minimum indicator only.) Reset knob shall be accessible to the operator.
Protective tube	Corrosion-resisting steel	ASTM A 276	All joints in the protective tube shall be welded and leak tight.
Jam nut	Corrosion-resisting steel	ASTM A 276 300 series	---

"

Add new paragraph 3.3.1:

"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 shall 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."

3.4.1: Delete and substitute:

* "3.4.1 ITM indicators. ITM indicators shall be identical to the ITD design except that it shall include 2 index pointers and a reset knob. The indicating pointer shall be designed so it actuates the index pointers to indicate the maximum and minimum temperature experienced by the sensing element. The reset knob shall be designed to reset the index pointers without damage to the indicating pointer or mechanism and shall be sealed to maintain a gas-tight enclosure."

Table II: Delete and substitute:

"TABLE II. Scale graduations and accuracies.

Range of scale °F	Accuracy 1/ ± °F	Number of degrees between graduations	Number of degrees between numbers	Maximum dial indicator
40 to 180	2.2	2	20	160
20 to 240	2.2	2	20	240
50 to 550	5.0	5	50	550
50 to 750	7.0	10	100	750

1/ ITM indicators. Additional error of plus or minus 1 percent of the range span permitted when index pointers are in contact with the indicating pointer."

3.4.2.1.1: Delete.

PAGES 5 and 6

Table IV: Delete and substitute:

"TABLE IV. Performance requirements.

Test	Requirement	Test paragraph
Accuracy	See table II	4.6.1
Accuracy repeatability	Repeatability shall be within plus or minus 1/2 percent of range span	4.6.1.2
Inclination	Plus or minus 1/2 percent of range span (maximum)	4.6.2
Thermal response (lag)	Not to exceed 15 seconds lag	4.6.3
Load	150 pounds. No calibration shift permitted	4.6.4
Ambient pressure	Indicators shall operate without evidence of failure and show no damage after being subjected to an ambient gauge pressure of 22 $\pm$ 1 lb/in^2 for not less than 15 minutes	4.6.10
Enclosure leakage	Shall show no signs of leakage	4.6.5
Fog	Shall show no signs of condensed moisture (fog) inside enclosure	4.6.6
Vibration	Accuracy shall be within limits of table II before and after the vibration test. Pointer oscillation shall not exceed 3 percent of the range span. Center of oscillation shall be within plus or minus 1 subdivision of the reading obtained under static condition. Indices of maximum and minimum indicators shall not shift during vibration test. A calibration shift placing data outside the data band established by the repeatability test (see 4.6.1.2), or significant wear on any vital part constitutes failure. Failure also results from any instrument behavior not covered above which could be a serious vibration performance defect. Significant wear is defined as wear which causes dimensional changes to gear teeth visible to the naked eye or which causes increased gearing backlash. Wear to other vital parts is significant if it affects indicator performance.	4.6.7

TABLE IV. Performance requirements. - Continued

Test	Requirement	Test paragraph
Shock - 9 blows	Calibration shift as a result of the shock test, calibration adjustment shall bring performance within the requirements for accuracy and repeatability specified in this table, shall not exceed plus or minus 3 percent of range span.	4.6.8
Thermal stability 1/	Drift shall not exceed 1/4 percent of the range span after 96 hours. However, if the drift is greater than 1/4 percent but less than 1 percent of the range span the test shall be extended an additional 288 hours to a total of 384 hours and then terminated. If the indicator shows a drift of less than 1 percent of the range span it will be acceptable.	4.6.9

1/ Applicable only to 50°F to 750°F."

Table IV, "1/": Delete "and 200 to 1200°F."

3.7, 3.7.1, and 3.7.2: Delete.

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4.2 and 4.3: Delete and substitute:

"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 be conducted at a laboratory satisfactory to the Naval Sea Systems Command and shall consist of the examination and tests of table VII. First article inspection of either 18 or 24 temperature range will constitute acceptance of both ranges."

4.3.1 and table V: Delete.

Footnote 1/ at end of page: Delete.

Table VII: Delete and substitute:

"TABLE VII. Tests.

Tests	Test schedule		Requirement paragraph	Test paragraph
	First article inspection	Quality conformance inspection		
Examination	X	X	-----	4.5
Accuracy	X	X	3.5	4.6.1
Accuracy repeatability	X	X	3.5	4.6.1.2
Inclination	X	-----	3.5	4.6.2
Thermal response	X	-----	3.5	4.6.3
Load	X	-----	3.5	4.6.4
Ambient pressure	X	-----	3.5	4.6.10
Enclosure leakage	X	X	3.5	4.6.5
Fog	X	X	3.5	4.6.6
Vibration	X	-----	3.5	4.6.7
Shock	X	-----	3.5	4.6.8
Thermal stability 1/	X	-----	3.5	4.6.9

1/ Applicable only to 50°F to 750°F."

polyalkene, crosslinked alkane-imide ... clusters insulated with crosslinked po...

TABLE VIII: Delete and substitute:

"TABLE VIII. Classification of defects.

Category	Defects
Critical	None
Major:	
101	Dimensions of stem or protective tube nonconforming.
102	Fails the load test.
103	Jam nut dimensions and threads nonconforming.
104	Materials nonconforming.
105	Indicators do not meet the fog or enclosure leakage test.
106	Joints in stem or protective tube not welded.
107	Does not meet the ambient pressure test.
Minor:	
201	Calibration adjustment not furnished or not identified.
202	Scale arc is not 300 degrees.
203	Range not a standard range.
204	Instruction sheet not furnished.
205	Preparation for delivery, packing, packaging, and marking of containers nonconforming.

"

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4.6.1, line 2: Delete "(except for range 200° to 1200°F in which case accuracy test to 1100°F only):"

Table IX: Delete last item range symbol "12" in its entirety.

PAGE 10

4.6.7.1, line 1: After "The" add: "ITD design"; to end of paragraph add: "The ITM design indicator shall be tested in accordance with MIL-STD-167-1, type I."

4.6.7.1.1: Delete and substitute:

"4.6.7.1.1 Subsequent to the rapid exploratory scan, the ITD design indicator shall be subjected to a detailed resonance search from 500 to 5 Hz in 5 Hz increments. Displacement shall be as specified in table X. Each 5 Hz incremental frequency shall be maintained for a minimum of 2 minutes. ITM design indicators shall be tested in accordance with the variable frequency test of MIL-STD-167-1, type I. Additionally, any frequency where resonance of any part of the indicator was detected during the initial rapid exploratory test shall be subjected to the 2 minute detail resonance search for ITD design or 5 minutes for ITM design."

"4.6.7.2.1, third and fourth sentences: Delete and substitute: "Displacement shall be in accordance with table X for the ITD design, or in accordance with the vibratory displacement requirements of the endurance test of MIL-STD-167-1, type I for the ITM design. The test shall run for 1 hour for the ITD design or 2 hours for the ITM design or until the indicator fails to meet the performance requirements of table IV, whichever occurs first."

"4.6.7.2.2, third sentence: Delete and substitute: "Displacement shall be in accordance with table X for the ITD design, or in accordance with the vibratory displacement requirements of the endurance test of MIL-STD-167-1, type I for ITM design"; line 7: delete "shall be run at 400 Hz" and substitute "shall be run at 400 Hz for ITD design or 50 Hz for ITM design."

4.6.9: Delete and substitute:

"4.6.9 Thermal stability test (50 to 750°F range only). Thermal stability test shall be conducted on range 50 to 750°F up to maximum scale reading as specified in MIL-STD-735 and shall include the following:

(a) Drift - The indicator shall be tested for drift in accordance with MIL-STD-735 and shall meet the requirements of table IV of this specification."

Add new paragraph 4.6.10:

"4.6.10 Ambient pressure test. Test is to be performed prior to the enclosure leakage test. The indicator shall be installed in a pressure chamber and exposed to a gauge pressure of 22 ± 1 lb/in^2 for a period of not less than 15 minutes. After release of the pressure, there shall be no evidence of damage or failure."

PAGE 12

6.2.1: Delete and substitute:

"6.2.1 ITM design is intended to be installed in ammunition pyrotechnic magazines and lockers in mounting brackets (see figure 6), NSN 1H5340-LL-HDEK700. ITM design shall be furnished with 3 inch dial size, back angle form, 4-inch stem length, -40 to 180°F range."

6.2.2, line 2: Delete "200 to 1200°F."

6.3, item (e): Delete.

PAGE 13

6.5 and 6.5.1: Delete and substitute:

"6.5 First article inspection. Invitations for bids should provide that the Government reserves the right to waive the requirement for samples for first article inspection as 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."

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Table XI - Navy Stock list (Cont'd), items 5 and 6: Delete and substitute:

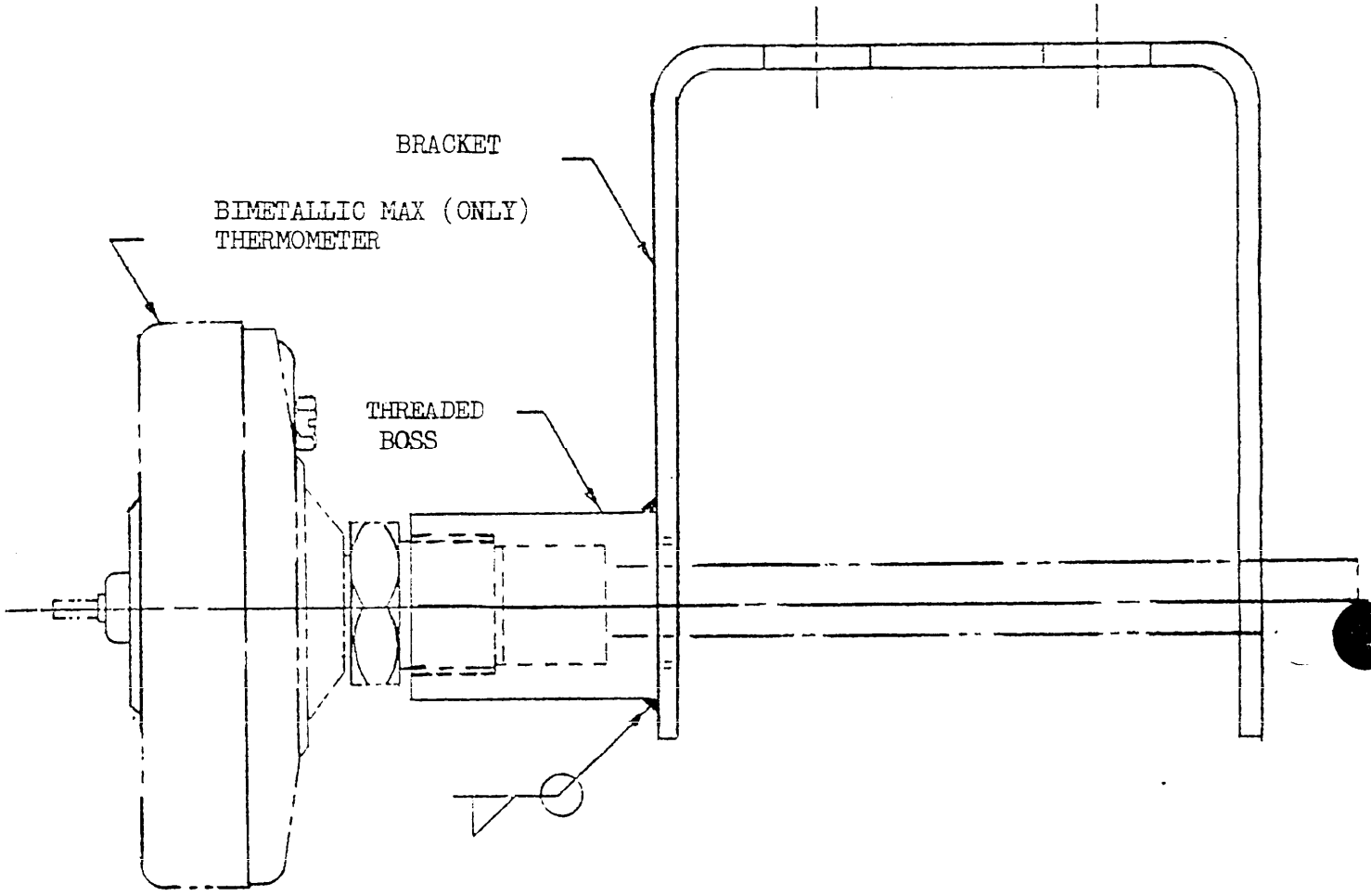
"ITM	3	18	A	4	3/428UNS	1H6685-00-042-3218"

Add the attached figure 6.

LAST PAGE

* DD Form 1426, Standardization Document Improvement Proposal: Delete address and substitute:

"COMMANDER
NAVAL SEA SYSTEMS COMMAND (SEA 55Z3)
DEPARTMENT OF THE NAVY
WASHINGTON, DC 20362-5101"



SH 11378

NOTES:
1. Mounting brackets are available from stock, NSN 1H5340-LL-HDEK700.
2. Thermometer stock No. NSN 1H6685-00-042-3218.

FIGURE 6. Thermometer mounting bracket (for ITM indicator).

NOTE: The margin of this amendment is marked with an asterisk to indicate where a change from the previous amendment was made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in this notation. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notation and relationship to the last previous amendment.

Preparing activity:
Navy - SH
(Project 6685-N763)