MIL-STD-322B
20 March 1984
SUPERSEDING
MIL-STD-322A
31 December 1975

MILITARY STANDARD

EXPLOSIVE COMPONENTS, ELECTRICALLY INITIATED, BASIC EVALUATION TESTS FOR

FSC 1390

DEPARTMENT OF DEFENSE
WASHINGTON, D.C. 20301

Explosive Components, Electrically Initiated, Basic Evaluation Tests for MIL-STD-322B

1. This Military Standard is approved for use by all Departments and Agencies of the Department of Defense.

2. Beneficial Comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document shall be addressed to Commander, Armament Research and Development Center, US Army AMCCOM, ATTN: DRSMC-TST-S(D), Dover, NJ 07801 by using the self-addressed Standardization Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

FOREWORD

1. This Standard is revised to include provisions to allow the use of an alternative, statistical, interpretation method, the One Shot Transformed Response, or the OSTR. Though the option is at the discretion of the user, the OSTR method generally requires lesser amounts of samplings for a given confidence level than for the Bruceton Method.

2. The format has been revised but tests and passing criteria as previously specified in MIL-STD-322A have not been changed and the added information is that pertaining to the OSTR interpretation method.

3. It is not the purpose of this Standard to establish design specifications for Electric Initiators; for such a case, MIL-I-23659 applies.

CONTENTS

FIGURES

TABLES

APPENDICES

1. SCOPE

1.1 General. This standard has a two-fold purpose, establishing tests and procedures which electrically initiated explosive components must pass as well as characterizing electroexplosive device (EED) designs.

1.2 Application. This standard applies to electrically initiated explosive components prior to completion of development.

1.3 Computer Program. A Fortran IV computer program, which fits a Weibull response function to data from either a Bruceton or OSTR conducted test, is available at ARDC, AMCCOM, DRSMC-LCS-E(D), Dover, NJ. Point and confidence interval estimates of percentage points and reliabilities (or response probabilities) are also provided by the program.

2. REFERENCED DOCUMENTS

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

SPECIFICATIONS

MILITARY

MIL-I-23659 - Initiators, Electric, General Design Specifications for

STANDARDS

MILITARY

MIL-STD-331 - Fuze and Fuze Components Environmental and Performance Tests for

PUBLICATIONS

Navy - NAVORD Report No. 2101 - Statistical Methods Appropriate for Evaluation of Fuze Explosive - Train Safety and Reliability

Army - Safety Manual AMC-R-385-100

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

2.2 Other publications. The following documents form a part of this standard to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

a. Applied Mathematical Panel, National Defense Research Committee AMP Report No. 101.1R SRG-P No. 40, Statistical Analysis for a Procedure in Sensitivity Experiments.

b. Office of the Chief of Research Development and Acquisition under Army Research Office Report ARO-D-63-2, pgs. 146-165, dated 1963, for a new procedure in sensitivity experiments.

c. Office of the Chief of Research Development and Acquisition under Army Research Office Report 74-1, pgs. 369-386, dated 1974 as revised in May 1978, for a new procedure in sensitivity experiments.

d. Electric Initiator Handbook, 3rd Edition, Picatinny Arsenal, Dover, NJ.

(Application for copies of these publications shall be addressed to: Armed Services Technical Information Agency, Arlington Hall Station, Arlington, VA.)

3. DEFINITIONS - Not applicable

4. GENERAL REQUIREMENTS

4.1 Tests. The tests shall be performed with the sample sizes indicated.

LIST OF TESTS AND SAMPLE SIZES

Test	Quantity	Paragraph
Sensitivity to Initiation	1260(Bruceton); 1200(OSTR)	4.1.1
Reliability of Functioning	230-385	4.1.2
Reliability of Non-Functioning	230-385	4.1.3
High Temperature Storage	300(Bruceton); 60(OSTR)	4.1.4
Functioning Tests at Extreme Temperatures	150	4.1.5
Sensitivity to Static Electricity	48 min.	4.1.6
Jolt	24	4.1.7
Twelve Meter Drop	25	4.1.8
Transportation Vibration	24	4.1.9
Thermal Shock	50	4.1.10
Temperature and Humidity	50	4.1.11
High Frequency Vibration	24	4.1.12
Waterproofness	50	4.1.13

4.1.1 Sensitivity to initiation. Sensitivity tests shall be conducted at ambient condition to determine explosive sensitivity to initiation at constant current, constant voltage, and capacitor discharge. There is no criterion for passing the tests. Information obtained shall be used to determine the 50 percent firing point, the standard deviation about the point, and the "all-fire" and "no-fire" levels of the various input stimuli.

4.1.2 Reliability of functioning. The reliability of functioning for the samples shall be at least 0.99 with an 85 percent confidence level when tested at a predetermined "all-fire" input. Depending on the intended application of the samples, the "all-fire" input stimulus shall either be the level at constant current, constant voltage, or capacitor discharge, as determined by the sensitivity tests of 4.1.1. The criterion for passing the test is that no more than one failure occurs or no more than one sample fails to meet the output requirement when testing 385 samples, or that 230 consecutive samples function without a failure. In accordance with statistical tables based on the Poisson distribution, this will meet the given reliability and confidence level (see Table I).

4.1.3 Reliability of non-functioning. The reliability of non-functioning for the samples shall be at least 0.99 with an 85 percent confidence level when tested at a predetermined "no-fire" input. Depending on the intended application of the samples, the "no-fire" input stimulus shall either be the level at constant current, constant voltage, or capacitor discharge, as determined by the sensitivity tests of 4.1.1. The criterion for passing the tests is that no more than one sample functions when 385 samples are tested, or that 230 consecutive samples do not function. In accordance with statistical tables based on the Poisson distribution, this will meet the given reliability and confidence level.

4.1.4 High temperature storage. Samples shall be stored at an elevated temperature for various intervals and, after removal from storage, tested at ambient to determine if any shift has occurred in the selected 50 percent firing level as determined by the sensitivity tests conducted in accordance with 5.1.1 by using either the Bruceton or the OSTR method. There is no passing criterion for this storage test; the test result only indicates the effect of high temperature storage on explosive sensitivity.

4.1.5 Functioning tests at extreme temperatures. Seventy-five samples are conditioned at -65°F (-54°C) and seventy-five at 160°F (72°C), then tested for functioning and output by application of a predetermined "all-fire" electrical input from the results of the Bruceton or the OSTR tests conducted in accordance with 4.1.1, Sensitivity to Initiation. The criterion for passing the test is that all samples shall function and meet the output when tested as outlined in 4.1.2 and 5.1.2, using the same "all-fire" input stimulus as for the reliability tests.

4.1.6 Sensitivity to static electricity. This test is designed to simulate the maximum static discharge that can be transferred from a human body to the sample at ambient condition. Equipment equivalent to that shown in Figures 6 and 7 shall be used to provide a 25,000 ± 2 percent volt input from a 500 ± 5 percent

picofarad capacitor which is in series with a 5,000 ± 5 percent ohm resistor and the sample under test. Reference is made to MIL-I-23659 (see 2.1). The criteria for passing the test is that no sample shall fire.

4.1.7 Jolt. Twenty-four samples shall be tested in accordance with Jolt Test 101, MIL-STD-331. The criteria for passing are that no sample shall function during the jolt cycle and no sample shall be unsafe for subsequent handling or disposition as determined by inspection and engineering judgment.

4.1.8 Twelve meter drop. Twenty-five samples shall be tested in accordance with Test 103, MIL-STD-331, except that the samples shall be dropped in a fixture, in lieu of packing container. The criteria by which the samples are judged to have passed the test are that no sample shall function by the test and no sample shall be unsafe for subsequent handling or disposition as determined by inspection and engineering judgment.

4.1.9 Transportation vibration. Twenty-four samples shall be tested at room temperature in accordance with Test 119 of MIL-STD-331. Passing criteria for the samples shall be all are safe and operable after test. The decision on safety shall be based on inspection and engineering judgment; operability shall be confirmed by further tests.

4.1.10 Thermal shock. Fifty samples shall be subjected to the Thermal Shock Test as prescribed in MIL-STD-331, Test 113. The criteria for passing shall be safe and operable for all samples after thermal shocks.

4.1.11 Temperature and humidity. Fifty samples shall be tested in accordance with Test 105, MIL-STD-331. The criteria by which the samples are judged to have passed this test are that the samples shall be safe and operable.

4.1.12 High frequency vibration. Twenty-four samples shall be tested using a vibrator producing essentially rectilinear simple harmonic motion and having the necessary capacity for force output (weight of load, including fixtures and samples) and frequency range. The samples shall be mounted in a suitable fixture having a natural frequency at least three times the maximum frequency encountered in the test schedule. The criteria for passing shall be safe and operable for all samples after vibration schedule. The decision on safety shall be based on inspection and engineering judgment. If satisfactory from the safety viewpoint, all samples must function when tested for reliability and output in accordance with 4.1.2.

4.1.13 Waterproofness. After immersion in water for a period of time, fifty samples shall be tested for functioning and output by the application of an appropriate "all-fire" input determined from results of the sensitivity tests conducted in accordance with 5.1.1, by either the Bruceton or the OSTR method. The criterion for passing the test is that no sample shall fail to fire or to meet the output requirement as determined by the appropriate test in MIL-STD-331: Test 301, steel dent; Test 302, lead disc; or Test 303, aluminum dent.

5. DETAILED REQUIREMENTS

5.1 Test equipment, procedures, and safety precautions. Details in this section amplify or modify the specified test equipment and procedures in MIL-STD-331. Details of the Bruceton and the OSTR methods are given by the referenced documents. Additional information is given in Chapter III of the Electric Initiator Handbook (see 2.2d) as the method applies to the input energy supplied by the capacitor discharge. Dry ice refrigeration may be used for low temperature conditioning provided that the carbon dioxide gas has no significant effect upon the test samples. Since test samples are explosives, adequate safety precautions shall be provided during all handling and testing operations to prevent injury to personnel. The person in charge of this test shall know the design and operation of the test samples thoroughly. Removal of the samples from a test fixture shall be accomplished by an experienced person(s) following written approved procedures. All electrical and heating fixtures required for any of these tests shall meet safety requirements specified by the testing activity.

5.1.1 Sensitivity to initiation. Equipment shall include standard firing fixtures and a suitable electrical input source. Electrical input source and equipment already developed and identified in Electric Initiator Handbook (2.2d) shall be acceptable. Output measurements shall be made by using Test 301 (steel dent), 302 (lead disc), or 303 (aluminum dent) in MIL-STD-331. Input energy variations shall be as follows:

a. Constant current for pulse times of 1 u sec (micro-second), 10 u sec, 100 u sec, and 1000 u sec.

b. Constant voltage for pulse times of 1 m sec (milli-second), 10 m sec, and 100 m sec.

c. Capacitor discharge using capacitors of 0.0022 uF (microfarad), 0.01 uF, 0.04 uF, 1 uF, and 16 uF.

In all tests, the increments shall be in log units (i.e., volts, amps, etc.) and no sample shall be tested at more than one firing level. All misfires shall be destroyed. The method of analysis shall either be the Bruceton or the OSTR technique.

5.1.1.1 Bruceton technique. Twelve hundred sixty samples shall be used to conduct the sensitivity tests: with 100 samples for each group and 20 extra available for use in estimating the proper step variation of the input energy to obtain valid data for the required calculations. Details of the method with sample calculations are given in AMP Report No. 101.1R SRG-P No. 40 (see 2.2a) and NAVORD Report No. 2101 (see 2.1). The 50% firing point (level) with its standard deviation along with the "all-fire" and "no-fire" levels so calculated shall be recorded in Figure 8.

5.1.1.2 OSTR technique. Twelve hundred samples shall be used in this alternate technique to conduct the sensitivity tests using 100 samples in each group to obtain the 10%, 50% and 90% functioning levels. Details of the method

are contained in ARO-D-63-2 Report, pgs. 146-165 (see 2.2b) and in ARO-74-1 Report, pgs. 369-386, as revised in May 1978 (see 2.2c). Other levels (0%, "no-fire"; and 100%, "all-fire") may be extrapolated from the test data after subjected to statistical computer analysis. The 50% firing level (the mean) and the standard deviation about the mean along with the "all-fire" and "no-fire" levels so extrapolated shall be recorded in Figure 8 (see also Appendices A & B).

5.1.2 Reliability of functioning. Standard firing fixtures which will permit efficient transfer of input energy and allow for means of measuring output shall be used. Output measurements shall be made by using Test 301 (steel dent), 302 (lead disc), or 303 (aluminum dent) in MIL-STD-331. An electrical input source as specified in Electric Initiator Handbook (see 2.2d) shall be used to furnish the appropriate pulse at the ambient condition. Test results shall be recorded as indicated in Figure 8.

5.1.3 Reliability of non-functioning. Standard firing fixtures which will permit efficient transfer of input energy and an electrical input source as specified in Electric Initiator Handbook (see 2.2d) shall be used to furnish the appropriate "no-fire" pulse at the ambient condition. Test results shall be recorded as indicated in Figure 8.

5.1.4 High temperature storage. Conditioning equipment shall include a cabinet capable of maintaining a constant temperature of 160°F ± 3°F (71°C ± 2°C) for intervals up to 12 weeks. Testing equipment (including firing fixture, input source, output measuring devices, etc.) shall be as those used for the sensitivity test of 4.1.1. Selection of the input stimulus to be used shall be dependent upon the specific application of the item (sample) under development, i.e., either constant current, constant voltage, or capacitor discharge. The method of determination shall either be a Bruceton or an OSTR with its corresponding sampling size.

5.1.4.1 Bruceton method, storage. Three hundred samples shall be stored in the conditioning cabinet maintained at the specified temperature. After intervals of 4 weeks (28 days), 8 weeks, and 12 weeks, 100 samples each shall be withdrawn and tested, using this method (see 5.1.1.1). Based on results obtained, calculations of the mean (50%) firing level of the selected stimulus and the standard deviation about the mean shall be made and recorded as Figure 8.

5.1.4.2 OSTR method, storage. Sixty samples shall be stored in the conditioning cabinet maintained at the specified temperature. After intervals of 4 weeks (28 days), 8 weeks, and 12 weeks, 20 samples each shall be withdrawn and tested, using this method (see 5.1.1.2). Based on results obtained, calculations of the mean (50%) firing level of the selected stimulus and the standard deviation about the mean shall be made and recorded as in Figure 8.

5.1.5 Functioning tests at extreme temperatures. Cabinets used to condition the samples shall maintain the prescribed temperature within ± 3°F (± 2°C).

Conditioning time shall be a minimum of four hours up to a maximum of seventy-two hours for both temperatures. Functioning of the samples should be conducted without removal from the conditioning cabinet whenever possible. When it is impossible to function the samples in the conditioning cabinet, precautions shall be taken to assure the temperature is maintained until the samples are tested. The number of samples which fail to function or to meet the output requirements, if any, shall be recorded in Figure 8 for each of the extreme temperatures.

5.1.6 Sensitivity to static electricity. Twenty-four samples per each discharge path shall be tested between pairs of lead wires or pins of the sample in all combinations and between all the shorted lead wires or pins and the metallic case of the sample (lead wires or pins shorted to each other external to the sample). For a 2-lead wire item, 48 samples are required; 3 leads, 96 samples. Testing shall be performed in a polarity mode for worst case on the sample with each discharge maintained for a 60 second period. The number of fires (if any) and no fires shall be recorded as indicated in Figure 8.

5.1.7 Jolt. Additional equipment required shall consist of adapters into which the samples can be mounted. Using the adapters, the 24 samples shall be tested in each of the three positions of the jolt arm in accordance with the Jolt Test procedures. After cycling, samples shall be examined for compliance with criteria for passing (4.1.7).

5.1.8 Twelve meter drop. The 25 samples shall be tested, five each in five different positions to simulate nose up, nose down, horizontal, 45° impact with nose up, and 45° impact with nose down. A fixture suitable for testing various detonators as shown in Figures 1 through 5 or a similar fixture shall be required for the test. Samples shall be examined, after test, for compliance with criteria for passing (4.1.8).

5.1.9 Transportation vibration. The 24 samples shall be tested, first in a vertical plane with the initiating end up, and then in a horizontal plane. The frequency shall be swept logarithmically from 5 to 500 and back to 5 Hz in 60 minutes. Accuracies and amplitudes at the various frequencies shall be in accordance with 5.1.1 of Test 119. The total test duration shall be 4 hours (2 hours per orientation). Upon completion of vibration, examine the samples for conformance with the safety criterion for passing. If satisfactory from the safety viewpoint, all samples shall function when tested for reliability of functioning and output in accordance with 4.1.2.

5.1.10 Thermal shock. Using equipment as described in Test 113, the 50 samples are alternately conditioned for four hours each between -65°F and 160°F (-54°C and 72°C). After three temperature reversals (24 hours), samples are removed and then examined and tested for functioning. The decision on safety shall be based on inspection and engineering judgment. If satisfactory from safety viewpoint, all samples must function when tested for reliability and output as outlined in 4.1.2. The input used for the test shall be the design "all-fire" stimulus (volt, current, or capacitor discharge).

5.1.11 Temperature and humidity. Using equipment as described in Test 105, the samples are exposed to two complete 14-day extreme temperature cycles at 95% relative humidity. After 28 days, samples are examined and tested at ambient conditions for functioning. The decision on safety shall be based on inspection and engineering judgment. If satisfactory from the safety viewpoint, all samples shall function to meet specification output requirement when initiated by the specification "all-fire" electrical input (see 4.1.2).

5.1.12 High frequency vibration. Simple harmonic vibration shall be applied along each of the three mutually perpendicular axes of the samples for three hours. The frequency range of 5 to 2,000 Hz shall be covered by cycling at a logarithmic rate allowing twenty minutes for each 5 - 2000 - 5 Hz sweep. The vibration amplitude shall be maintained at 0.100 inch ± 0.010 inch (peak-to-peak) from 5 to 14 Hz; at 1.0g ± 0.1g from 14 to 23 Hz; 0.036 inch ± 0.004 inch (peak-to-peak) from 23 to 74 Hz; and at 10.0g ± 1.0g (peak) from 74 to 2000 Hz. The total testing duration shall be nine hours. The twenty-four samples shall then be examined and tested for compliance with the criteria for passing (4.1.12).

5.1.13 Waterproofness. The fifty samples shall be immersed in a container of water to a depth of 2 to 3 inches (5 to 8 cms) for a minimum of 48 hours. The water temperature shall be maintained between 65°F to 75°F (18°C to 24°C). A standard firing fixture which will permit efficient transfer of input energy and allow for means of measuring output shall be used. An acceptable electrical input source as identified in Electric Initiator Handbook 3rd Edition shall be used to furnish the appropriate "all-fire" pulse, the stimulus of which will be dependent upon intended application, the same as used in the reliability test of 4.1.2. Output measurements pertinent to the item under test will be made and recorded for each test.

6. NOTES

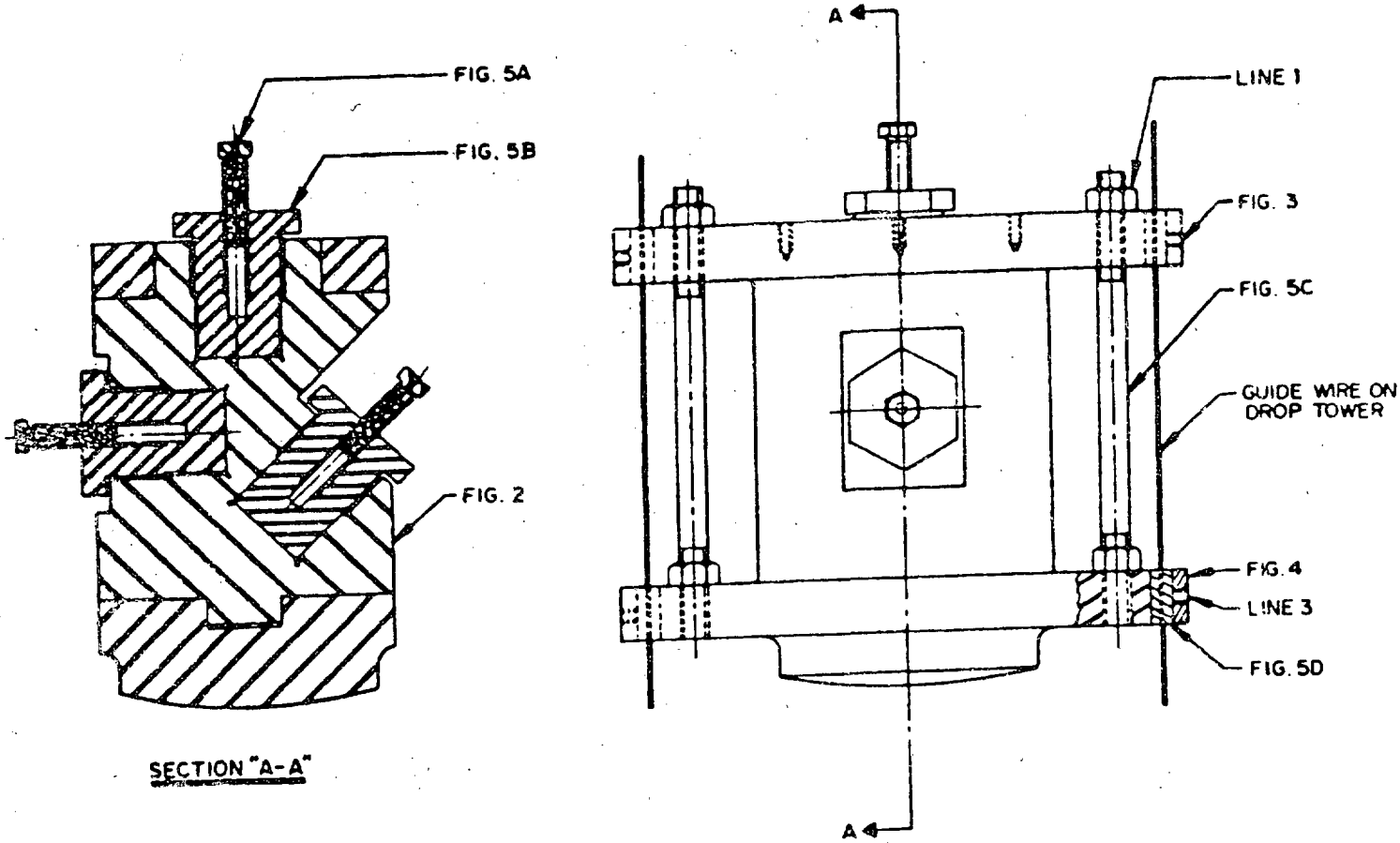
6.1 Intended use. The purpose of this standard is to standardize the design and conduct of tests for assessing the ability of explosive components to withstand environmental stresses they will encounter during their life cycle, and to insure that plans and test results are adequately documented.

Custodians:
Army - AR
Navy - OS
Air Force - 99

User: MC

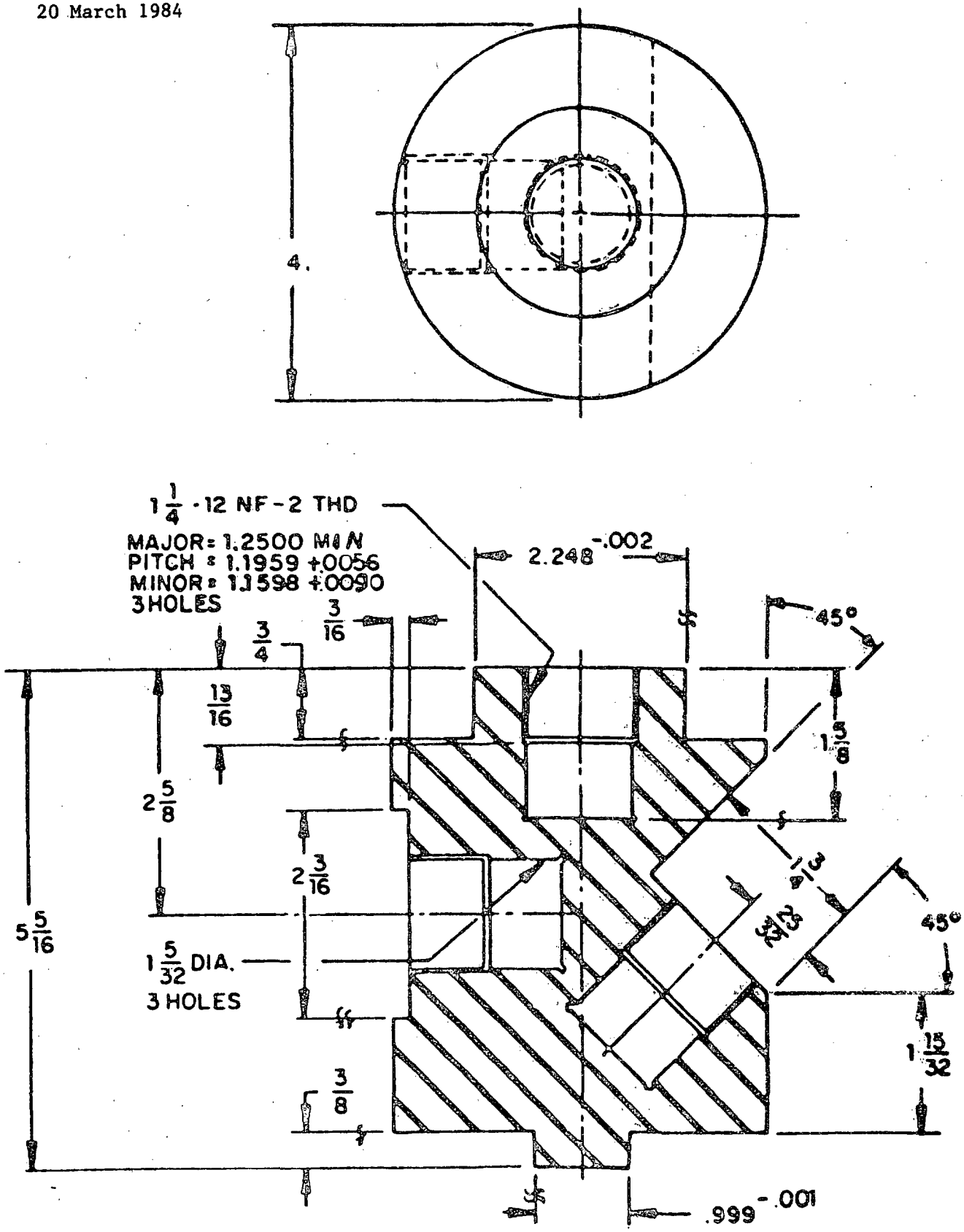
Preparing activity:
Army - AR

Project No. 1390-0219



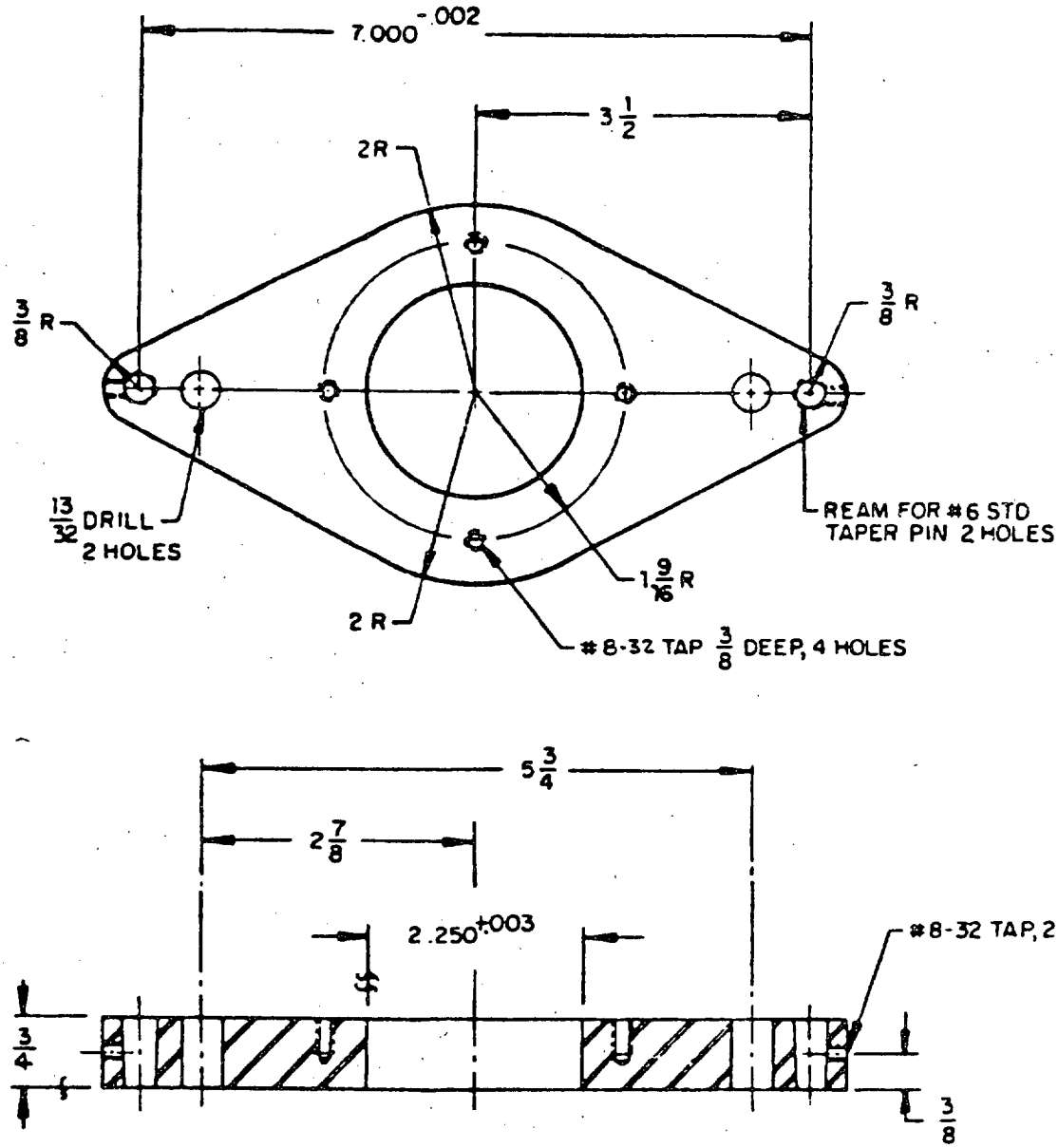
BILL OF MATERIAL			
LINE NO.	QTY. PER ASSEM.	NOMENCLATURE COMMERCIAL ITEMS	MATERIAL
1	4	NUT, HEX 3/8-16	STEEL
3	4	SCREW, SKT SET, ¼ 8-32 x 1/4 Lg	STEEL

FIGURE 1. Twelve meter drop test fixture.



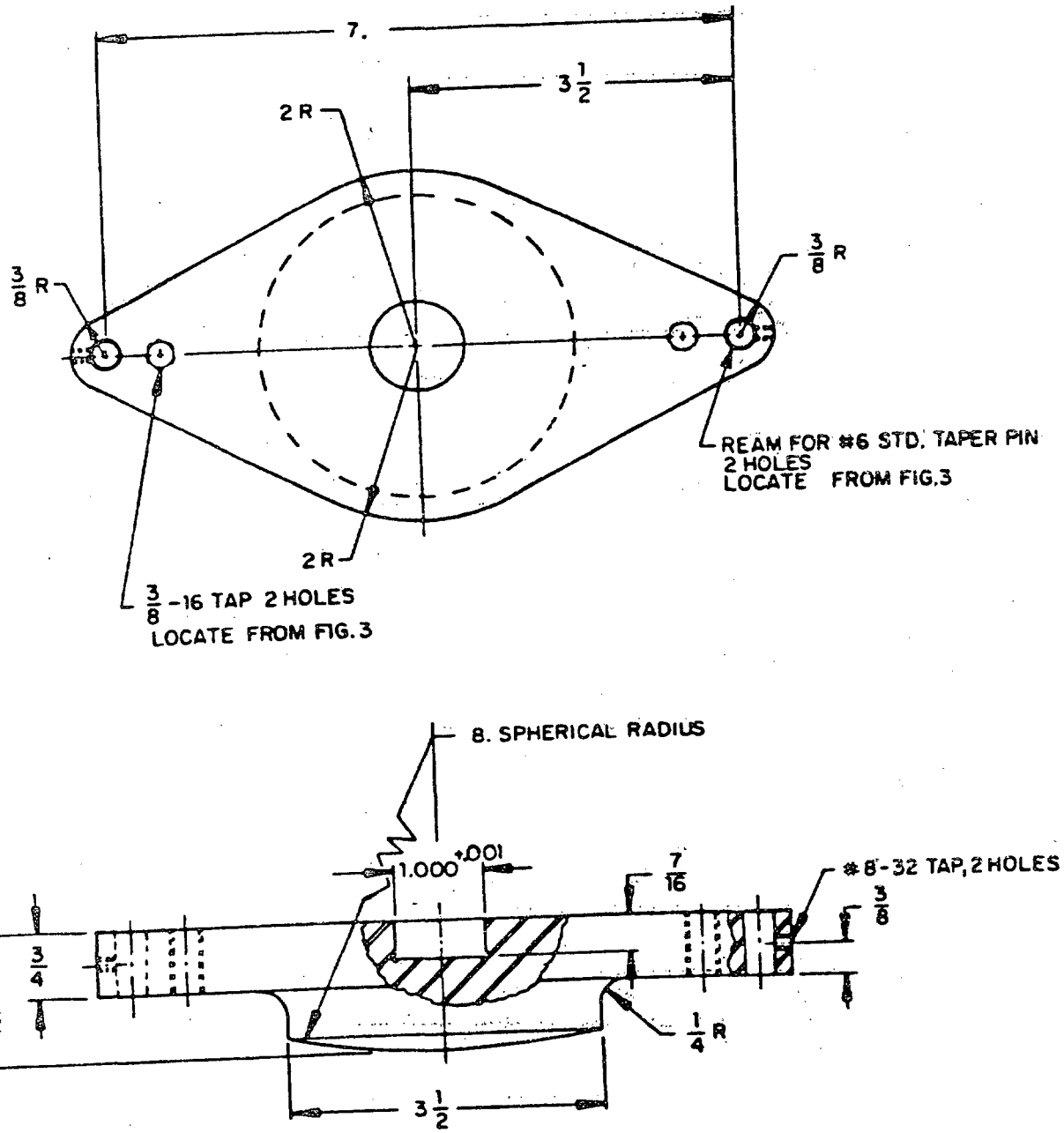
STEEL, COMPOSITION 4150 (UNS G41500) OR EQUAL
HARDNESS, 30-35 HRC, 1-REQ'D

FIGURE 2. Block.



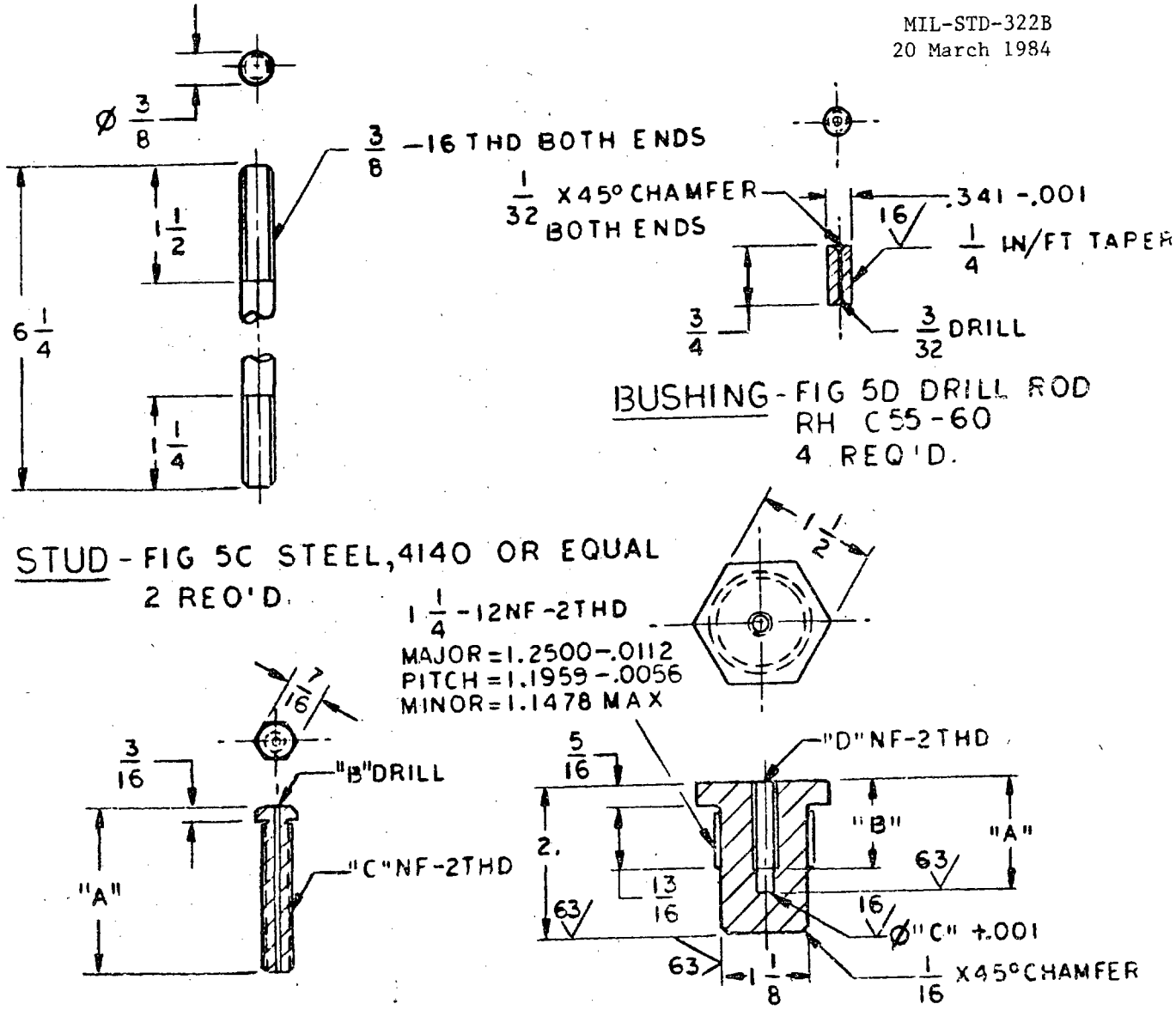
STEEL, COMPOSITION 4150 (UNS G41500) OR EQUAL, 1-REQ'D.

FIGURE 3. Clamp.



STEEL, COMPOSITION 4150 (UNS G41500) OR EQUAL;
HARDNESS, 50-55 HRC, 1-REQ'D

FIGURE 4. Nest.



PIECE MARK	"A"	"B"	"C"
Screw Clamping	13/16	5/64	#10-32
Screw Clamping A-1	1-1/4	5/64	1/4-28
Screw Clamping B-1	1-7/16	3/32	5/16-24
Screw Clamping C-1	15/16	--	#10-32
Screw Clamping D-1	1-1/4	--	1/4-28

PIECE MARK	"A"	"B"	"C"	"D"
Holder	15/16	11/16	.149	#10-32
Holder A-1	1-5/16	1.	.196	1/4-28
Holder B-1	1-1/2	1-3/16	.245	5/16-24
Holder C-1	None	3/8	None	1/4-28

FIGURE 5. Stud, Bushing, screw clamping, holder.

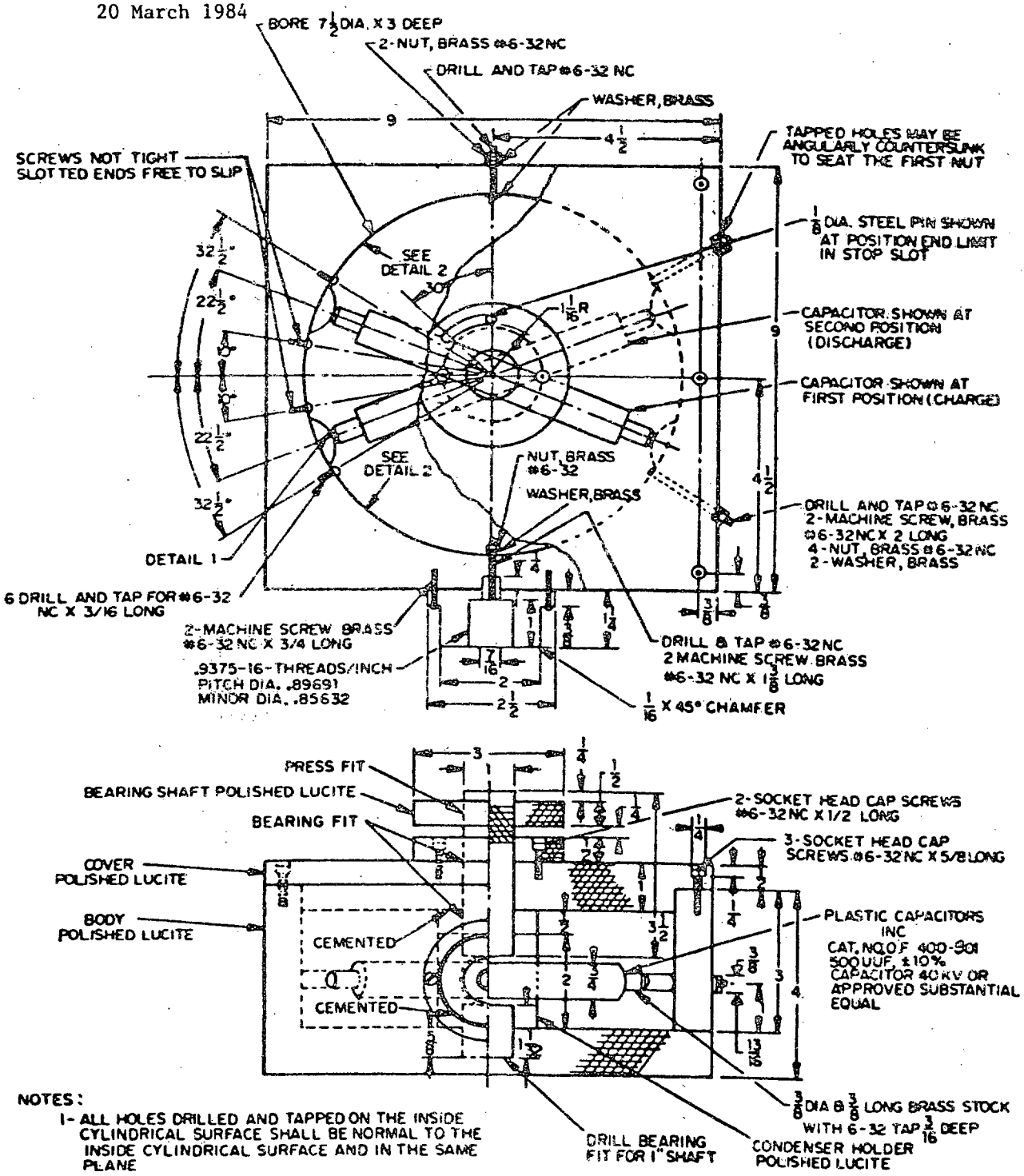


FIGURE 6. Static electricity test fixture.

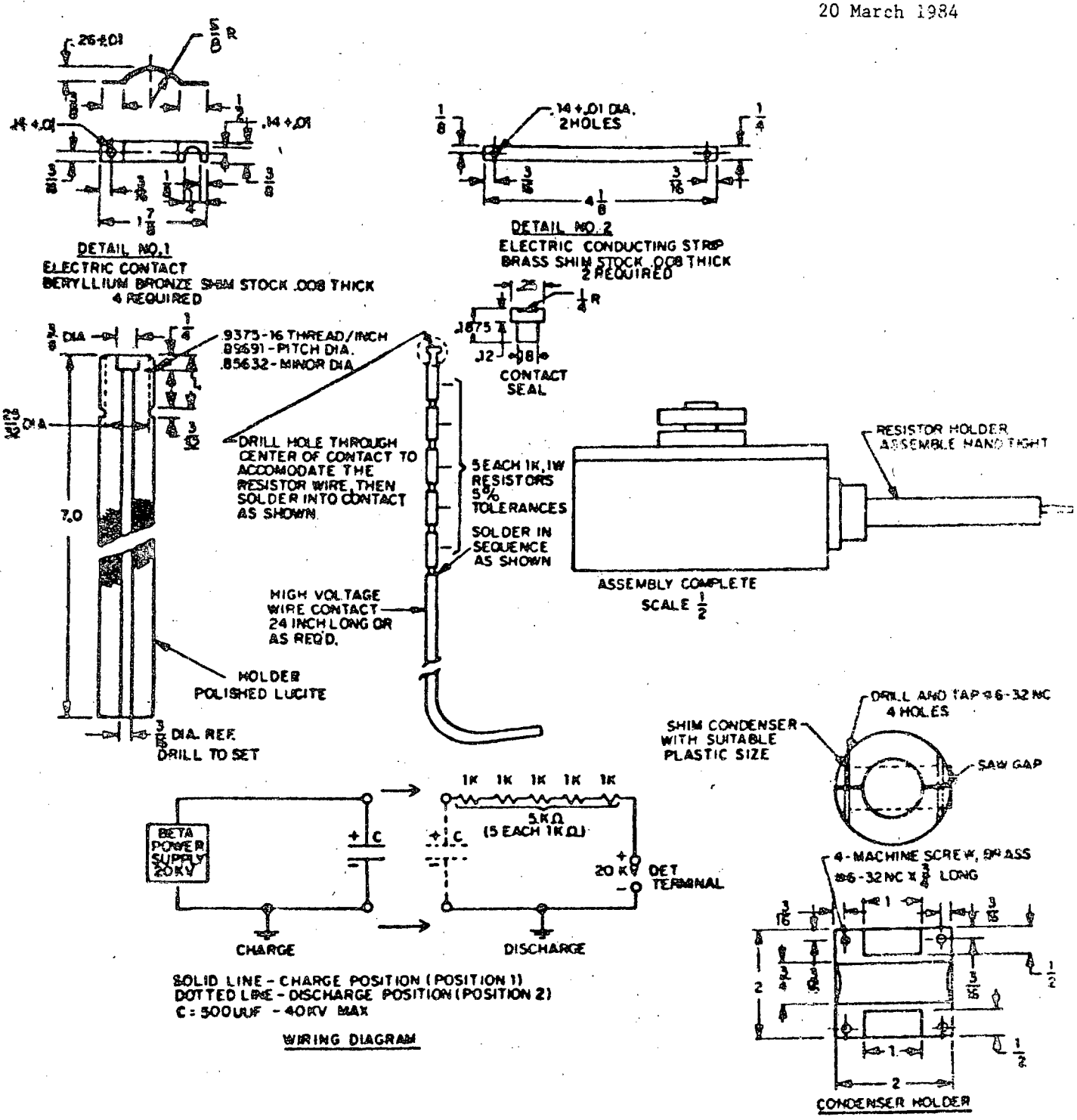


FIGURE 7. Wiring diagram and condenser holder.

FIGURE 8

TEST RECORD

Electrically Initiated Explosive Components Tested in Accordance with MIL-STD-322.

COMPONENT IDENTIFICATION

Name_____ Mfr. _____
Dwg. No. _____ Cognizant Activity:
Spec. No. _____ _____

1. Sensitivity to Initiation

a. Constant current at pulse times below.

	50% level	Std. Dev.	"All-fire"	"No-fire"
Amps at: 1 u sec				
10 u sec				
100 u sec				
1000 u sec				

b. Constant voltage at pulse times below.

	50% level	Std. Dev.	"All-fire"	"No-fire"
Volts at: 1 m sec				
10 m sec				
100 m sec				

c. Capacitor discharge at capacitances below.

	50% level	Std. Dev.	"All-fire"	"No-fire"
Charging volts at:				
0.0022 uF				
0.01 uF				
0.04 uF				
1.0 uF				
16.0 uF				

2. Reliability of Functioning

No. tested _____ No. passed _____ No. failed _____
"All-fire" electrical input stimulus used _____
Remarks _____

3. Reliability of Non-Functioning

No. tested _____ No. passed _____ No. failed _____
"No-fire" electrical input stimulus used _____
Remarks _____

FIGURE 8. TEST RECORD (Cont'd)

4. High Temperature Storage

Type of stimulus selected to determine if any shift has occurred in the 50 percent firing level _____.

Check method of determination: _____Bruceton _____OSTR

After 4 weeks: 50% firing level _____ at Std. Dev. _____
8 weeks: 50% firing level _____ at Std. Dev. _____
12 weeks: 50% firing level _____ at Std. Dev. _____

Remarks: _____

5. Functioning Tests at Extreme Temperatures

-65°F(-54°C): No. Tested _____ No. Passed _____ No. Failed _____
160°F(72°C): No. Tested _____ No. Passed _____ No. Failed _____
"All-fire" stimulus for both temperatures _____
Remarks _____

6. Sensitivity to Static Electricity

No. of lead wires or pins on sample _____
No. of combination of discharge paths _____
No. Tested _____ No. "fires" _____ No. "no-fires" _____
Remarks _____

		No. tested	No. passed	No. failed	*Remarks
7.	Jolt				
8.	Twelve Meter Drop				
9.	Transportation Vibration				
10.	Thermal Shock				
11.	Temperature and Humidity				
12.	High Frequency Vibration				
13.	Waterproofness				

* Remarks to include the "all-fire" stimulus if used, or the description of damage as appropriate.

CERTIFICATION:

Date Test Begun _____ Ended _____

Performed at _____

All requirements of above tests 1 through 13 were met. _____Yes
_____No

TABLE I. SAMPLE SIZE REQUIRED FOR RELIABILITY ESTIMATES AT GIVEN CONFIDENCE LEVELS

Sample Size	Number of Failures	Point Reliability Estimate	Lower Reliability Confidence Level			
			.99	.95	.90	.85
100	0	1.00	.952	.970	.977	.982
	1	.99	.935	.957	.962	.968
	2	.98	.915	.938	.948	.954
150	0	1.00	.969	.980	.985	.988
	1	.993	.956	.969	.974	.978
	2	.987	.944	.958	.965	.968
200	0	1.00	.976	.985	.989	.991
	1	.995	.968	.977	.981	.983
	2	.99	.958	.968	.973	.977
230	0	1.00	.979	.987	.991	.992
	1	.996	.972	.980	.983	.985
	2	.992	.964	.973	.977	.980
250	0	1.00	.981	.988	.991	.993
	1	.996	.974	.981	.985	.987
	2	.992	.966	.975	.979	.981
275	0	1.00	.983	.989	.992	.993
	1	.996	.977	.983	.986	.988
	2	.993	.970	.978	.982	.983
300	0	1.00	.984	.990	.992	.994
	1	.997	.978	.985	.987	.989
	2	.993	.972	.979	.982	.985
350	0	1.00	.987	.991	.993	.995
	1	.997	.981	.987	.989	.990
	2	.994	.976	.982	.985	.987
385	0	1.00	.988	.992	.994	.995
	1	.997	.983	.988	.990	.991
	2	.995	.978	.984	.986	.988

APPENDIX A

ILLUSTRATIVE EXAMPLE OF THE APPLICATION OF THE OSTR PROCEDURE

10. GENERAL

10.1 Objective. To determine the 1% firing level with 99% confidence of an electric detonator, capacitor discharge using a capacitor of 4.7μ F.

10.2 Test plan. An OSTR, No = 7, TMP = .0944 was conducted. The stimulating voltage was varied seventy-nine units under test and nine changes of response were obtained as indicated in test data.

10.3 Analysis of test data. Test data were subjected to analysis assuming a Weibull distribution which is robust (insensitive to the form of the distribution).

10.4 Summary of test results.

Percentage Points	Point Estimate Volts	99% Confidence Level LL	Levels UL
.0944	2.56	2.40	2.73
.01	2.32	1.78	2.86

The values above were subsequently converted to energy in ergs in accordance with the formula $E = 5CV^2$ where E = energy in ergs
C = 4.7μ F
V = Volts

Percentage Points	Point Estimate Ergs	99% Confidence Level LL	Limits UL
.0944	154.01	135.36	175.14
.01	126.49	74.46	192.22

APPENDIX B

TEST DATA FROM
ONE SHOT SENSITIVITY TEST, (OSTR)
PA500 ELECTRIC DETONATOR

No = 7, TMP = .0944 Unit = Volts

(NOTE: Capacitor Discharge No Fire Level Test, C = 4.7 μf)

Trial (I)	Stress X(I)	Response Y(I)	Response Type	Change Number
1	10	1	D	
2	5	1	D	
3	2.5	0		
4	2.5	0		
5	2.5	0		
6	2.5	0		
7	2.5	0		
8	2.5	0		
9	2.5	0	U	1
10	3.75	1	D	2
11	3.60	1	D	
12	1.8	0		
13	1.8	0		
14	1.8	0		
15	1.8	0		
16	1.8	0		
17	1.8	0		
18	1.8	0	U	3
19	2.7	0		
20	2.7	0		
21	2.7	0		
22	2.7	1	D	4
23	2.25	0		
24	2.25	0		
25	2.25	0		
26	2.25	0		
27	2.25	0		
28	2.25	0		
29	2.25	0	U	5
30	2.47	0		
31	2.47	0		
32	2.47	0		
33	2.47	0		
34	2.47	0		
35	2.47	0		
36	2.47	0	U	
37	3.73	1	D	6
38	3.1	1	D	
39	2.67	1	D	
40	1.33	0		

APPENDIX B (con't)

Trial (I)	Stress X(I)	Response Y(I)	Response Type	Change Number
41	1.33	0		
42	1.33	0		
43	1.33	0		
44	1.33	0		
45	1.33	0		
46	1.33	0	U	7
47	2.0	0		
48	2.0	0		
49	2.0	0		
50	2.0	0		
51	2.0	0		
52	2.0	0		
53	2.0	0	U	
54	2.55	0		
55	2.55	0		
56	2.55	0		
57	2.55	0		
58	2.55	0		
59	2.55	0		
60	2.55	0	U	
61	3.19	1	D	8
62	2.87	1	D	
63	2.43	0		
64	2.43	0		
65	2.43	0		
66	2.43	0		
67	2.43	0		
68	2.43	1	D	
69	1.88	0		
70	1.88	0		
71	1.88	0		
72	1.88	0		
73	1.88	0		
74	1.88	0		
75	1.88	0	U	9
76	2.15	0		
77	2.15	0		
78	2.15	0		
79	2.15	0		

U = 0000000
D = 0000001, 000001, 00001, 0001, 001, 01, 1

Where 0 = No Fire
1 = Fire

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-STD-322B	Explosive Components, Electrically Initiated, Basic Evaluation Tests For

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*

(TO DETACH THIS FORM, CUT ALONG THIS LINE.)

DD FORM 82 MAR 1426 PREVIOUS EDITION IS OBSOLETE.