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AD NUMBER
AD874030
NEW LIMITATION CHANGE
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AUTHORITY
USATEC ltr, 14 Dec 1970.

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8 July 1970

Materiel Test Procedure 3-3-524
U. S. Army Infantry Board

U. S. ARMY TEST AND EVALUATION COMMAND
COMMON SERVICE TEST PROCEDURE

ADVERSE CONDITIONS

1. OBJECTIVE

The objective of the procedures outlined in this MTP is to provide a means of determining the performance of a test item under adverse environmental conditions encountered (or simulated) during service testing.

2. BACKGROUND

Infantry weapons, ammunition, and ancillary equipments intended for field use are designed to function under the most rigorous environmental conditions likely to be encountered in combat. During engineering testing developmental items are subjected to precisely controlled and instrumented environmental chamber tests under extremes of temperature, humidity, and other atmospheric conditions. However, actual use of an item under severe climatic conditions in the hands of troops in simulated combat may reveal deficiencies which did not become apparent during controlled laboratory testing.

The service test will determine efficiency of the test item when used under natural adverse environmental conditions by troops representative of those who will use it in the field.

3. REQUIRED EQUIPMENT

a. Evaluation of the effects of adverse environmental conditions on the test item generally will not require special tools or equipments other than those normally accompanying the test item, and those required for the commodity test.

b. Basic meteorological data, such as is normally maintained throughout the period of the service test, is particularly important. The test officer will determine additional requirements for meteorological instrumentation.

4. REFERENCES

- A. AR 70-38, Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions.
- B. Applicable Qualitative Materiel Requirements (QMR) or Small Development Requirements (SDR).
- C. USATECOM Reg 750-15, Maintenance Portion of the Service Test.
- D. Report of Engineering Test applicable to the test item.
- E. MTP 3-3-501, Personnel Training.
- F. MTP 3-3-502, Battlefield Mobility.
- G. MTP 3-3-514, Reliability.
- H. MTP 3-3-515, Position Disclosing Effects.
- I. MTP 3-3-517, Infantry Weapons and Ammunition Safety.
- J. MTP 3-3-521, Human Factors Engineering.

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K. MTP 3-3-522, Ease of Assembly and Disassembly.

5. SCOPE

5.1 SUMMARY

The procedures described in this MTP will permit determination of operational performance characteristics of a test item under the adverse environmental conditions encountered (or simulated) during service testing, and within the range of conditions specified for intermediate climatic conditions by AR 70-38.

Special test procedures will not be required unless so directed, or dictated by criteria. Judicious application of the appropriate commodity MTP operational test procedures under the adverse conditions occurring naturally (or readily simulated) during the course of the service test will yield the necessary data. These data will be analyzed and evaluated along with data derived from controlled environmental tests made during engineer testing. Evaluation of the data will be guided by criteria contained in the cited Army Regulation, the applicable QMR or SDR, and the test directive.

5.2 LIMITATIONS

The scope of adverse conditions covered by this MTP is limited to:

- a. Intermediate climatic conditions as defined in AR 70-38.
- b. Adverse environmental conditions which occur naturally at the test sight during the period of the service test, or which can be readily simulated with simple field expedients.

6. PROCEDURES

6.1 PREPARATION FOR TEST

- a. The test directive and the applicable QMR or SDR will be studied to determine criteria and any special test requirements which should be included in the plan of test.
- b. Reference will be made to pertinent environmental test data from the engineering test report in order to avoid any unnecessary duplication of test effort.

6.2 TEST CONDUCT

6.2.1 General

This MTP does not prescribe special tests to be made under adverse conditions. Rather, it is intended to emphasize the necessity of conducting a substantial portion of the planned service testing during the range of adverse environmental conditions which occur naturally throughout the course of the service test. Schedules should be sufficiently flexible to permit taking timely

advantage of periods of precipitation, high and low temperatures, high humidity, and high winds. Specific plans will be made to include designating state of test equipment readiness and test personnel to be on call in order to take advantage of adverse weather occurring during the test period. When naturally occurring adverse conditions are insufficient to satisfy requirements, field expedients may be used to simulate some of the desired conditions. Service test personnel will be alert to detect those adverse-condition phases of engineering tests in which soldiers representing the user should participate. This participation will be designed to obtain human factors data regarding such things as manipulation, assembly, etc. of the test weapon under extreme conditions.

6.2.2 Adverse Test Conditions

a. During the course of the service test, every effort will be made by the service test agency to subject the test item to the adverse conditions listed below:

- 1) High temperature with average humidity.
- 2) High temperature with high humidity.
- 3) High temperature plus solar radiation.
- 4) Low temperature with average humidity.
- 5) Low temperature with high humidity.
- 6) Rain -- light, moderate, and heavy.
- 7) Snow.
- 8) Fog.
- 9) Dew.
- 10) Sleet.
- 11) High winds and gusty winds.
- 12) Blowing snow, sand, and dust.
- 13) Brief immersion in muddy water, as would occur when slipping and falling while traversing swampy areas and while crossing water obstacles.
- 14) Dragging through mud, sand, and dirt, as would occur while creeping and crawling, and while digging in the prone position.

b. When appropriate, the test item will be operated in realistic tests during and/or immediately following exposure.

c. Items which might be unsafe to operate or damaged by operation following exposure (e.g., obstruction of barrel or mechanical parts) will be cleared before making operational tests.

d. Operational failures, malfunctions, and other occurrences affecting operation of the test item will be noted.

6.2.3 Related Common Tests

a. In addition to determining the capability of the test item to operate satisfactorily under adverse conditions, it is necessary to observe other effects of the environment which may have no direct bearing or functioning, but which may affect the overall suitability of the test item, e.g.,

evidence of rust or corrosion; slippery gripping surfaces.

b. The test officer will give consideration to the common tests referenced in the commodity MTP for the type item under test, and ensure that appropriate subtests or observations are made under applicable adverse conditions. The common tests having adverse conditions applicability to most test items are listed in references 4C and 4E through 4K.

c. Particular attention will be given to the safety and human factors characteristics of the test item when exposed to and operated under adverse conditions.

6.3 TEST DATA

The following information will be recorded:

a. Meteorological data in sufficient detail to permit close matching with test events.

b. Description of tests conducted keyed to the meteorological data.

c. Operational difficulties, failures, and malfunctions.

d. Observations pertinent to safety, human factors, and other applicable common tests listed in references, paragraph 4.

6.4 DATA REDUCTION AND PRESENTATION

a. All data having a bearing on the operation and overall suitability of the test item when employed under adverse environmental conditions will be extracted, collated, analyzed, and evaluated. The reduced data will be compared with applicable criteria to determine whether all requirements are met.

b. Results will be presented as indicated in the applicable commodity MTP. Where opinions are presented, they will be identified as such, and separated from factual data.

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Security Classification

DOCUMENT CONTROL DATA - R & D

(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

1. ORIGINATING ACTIVITY (Corporate author) US Army Test and Evaluation Command (USATECOM) Aberdeen Proving Ground, Maryland 21005		2a. REPORT SECURITY CLASSIFICATION Unclassified	
		2b. GROUP -----	
3. REPORT TITLE U. S. Army Test and Evaluation Command Materiel Test Procedure 3-3-524, Common Service Test Procedure, - "Adverse Conditions."			
4. DESCRIPTIVE NOTES (Type of report and, inclusive dates) Final			
5. AUTHOR(S) (First name, middle initial, last name) -----			
6. REPORT DATE 8 July 1970		7a. TOTAL NO. OF PAGES 6	7b. NO. OF REFS 11
8a. CONTRACT OR GRANT NO. DA-18-001-AMC-1045(R)		9a. ORIGINATOR'S REPORT NUMBER(S) MTP 3-3-524	
b. PROJECT NO. AMCR 310-6		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) -----	
c.			
d.			
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11. SUPPLEMENTARY NOTES -----		12. SPONSORING MILITARY ACTIVITY Headquarters US Army Test and Evaluation Command Aberdeen Proving Ground, Maryland 21005	
13. ABSTRACT This Army Service Test Procedure is intended to assist the test director in the conduct of testing to insure that the effects of adverse environmental conditions are taken into account. Evaluation of test data is related to criteria expressed in Qualitative Materiel Requirements (QMR), Small Development Requirements (SDR), Technical Characteristics (TC), or other appropriate design requirements and specifications, applying to the specific item under test.			

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Army Service Test						
Adverse Environmental Conditions						
Test Procedures						

DD FORM 1473 (BACK)
1 NOV 65
S/N 0101-807-6821

UNCLASSIFIED
Security Classification

A-31409