AD723025

1 March 1971

Materiel Test Procedure 4-2-015*
Aberdeen Proving Ground

U. S. ARMY TEST AND EVALUATION COMMAND
COMMODITY ENGINEERING TEST PROCEDURE

CLOSE SUPPORT ROCKETS AND MISSILES

1. OBJECTIVE

This MTP provides guidance for evaluating the performance of close support rockets and missiles to determine conformance with QMR's, SDR's, and technical characteristics. Procedures apply principally to engineering tests but may be used for other tests such as initial production tests. Materiel considered within this pamphlet includes:

a. Artillery rockets up to approximately 6 inches in diameter and shoulder-held, bazooka-type, antitank rockets.

b. Antitank guided missiles or shoulder-fired, surface-to-air guided missiles.

2. BACKGROUND

Close support rockets and missiles are of relatively short range and are used against enemy troops and materiel to provide close support for friendly ground operations. The rocket consists of a motor for propulsion, fins for stability, a warhead, and a fuze. The missile possesses the same components plus a guidance system.

A rocket motor is a jet propulsion device wherein a combination of oxidizer and fuel (or a monopropellant) is burned to create a high-pressure and high-temperature gas in the combustion chamber. A nozzle exit is provided at the rear, through which the gas is exhausted to the air. A forward motion is imparted to the rocket motor by the reaction force (thrust) developed by the expelling gases.

Most close support rockets and missiles have either HE or HEAT warheads. Special warheads are available also: these include white phosphorous, smoke, and illuminating. Their fuzes are classified according to type (mechanical, electrical, chemical, or a combination of these), method of functioning (impact, time, or proximity), and location of the detonator with respect to the main explosive charge (point-detonating or base-detonating). Further identification may be necessary; for example, impact fuzes may be classed according to their action as superquick or delay (time from impact to completion of function). The type of target will dictate the projectile and fuze to be employed.

3. REQUIRED EQUIPMENT

Required equipment consists of firing ranges, environmental test equipment, and instrumentation as stated in paragraphs 6.1 and 6.2 and in the referenced MTP's.

*Supersedes Interim Pamphlet 40-10.

4. REFERENCES

A. AR 70-38, Research, Development, Test and Evaluation of Materiel for Extreme Climatic Conditions.
B. MIL-STD-810B, Environmental Test Methods.
C. USATECOM Regulation 70-23, Equipment Performance Reports (EPR's).
D. USATECOM Regulation 750-15, Maintenance Evaluation During Testing.
E. MTP 2-2-614, Toxic Hazards Test for Vehicles.
F. MTP 2-2-815, Rain and Freezing Rain.
G. MTP 3-1-002, Confidence Intervals and Sample Size.
H. MTP 3-2-056, Rocket Launchers, Ground-to-Ground.
I. MTP 3-2-810, Weapon Pressure Instrumentation.
J. MTP 3-2-811, Noise and Blast Measurements.
K. MTP 3-2-823, Range Firing of Close Support Rockets and Missiles.
L. MTP 3-2-824, Flight Tests of Antitank Missiles.
M. MTP 3-2-825, Location of Impact or Airburst Positions.
N. MTP 4-1-003, Order of Functioning.
O. MTP 4-2-055, Fuzes.
P. MTP 4-2-500, Ammunition Characteristics.
Q. MTP 4-2-503, Safety Evaluation of Close Support Rockets and Missiles.
R. MTP 4-2-509, Air Drop Capability of Explosive Materiel.
S. MTP 4-2-601, Drop Tower Tests for Munitions.
T. MTP 4-2-602, Rough Handling Tests.
U. MTP 4-2-800, Physical Measurement of Projectiles.
V. MTP 4-2-804, Laboratory Vibration Tests.
W. MTP 4-2-806, Impact Sensitivity of Fuzes.
X. MTP 4-2-807, Fuze Functioning Time - Superquick Fuzes.
Y. MTP 4-2-808, Fuze Functioning Time - Airburst Fuzes.
Z. MTP 4-2-813, Arena Tests of High-Explosive Fragmentation Munitions.
AA. MTP 4-2-818, Testing for Fungus Resistance.
AB. MTP 4-2-819, Sand and Dust Testing of Ammunition.
AC. MTP 4-2-820, Humidity Tests.
AD. MTP 4-2-824, Penetration Tests of HEAT Warheads for Close Support Rockets and Missiles.
AE. MTP 4-2-826, Solar Radiation Tests.
AF. MTP 5-2-584, Microbial Resistance Tests.

5. SCOPE

5.1 SUMMARY

This MTP covers the following subtests:

5.2 LIMITATIONS

The procedures in this MTP are limited to the testing of the rockets and missiles. Procedures for testing launchers, guidance systems, and shaped charge warheads are not included. Safety evaluation of rockets and missiles is covered in MTP 4-2-503.

6. PROCEDURES

6.1 PREPARATION FOR TEST

The rocket or missile to be tested is studied and photographed, and all instructional material furnished by the manufacturer, contractor, or commodity command is reviewed as are reports of tests conducted on similar items.

A characteristics data sheet, suitable for the formal report, is prepared. This consists of a general, cross-sectional, or exploded view of the test item, together with a listing of technical and physical characteristics (MTP 4-2-500), assembled on an 8- by 10-inch glossy print.

A standard or suitably designed launcher for conducting range (dynamic) firing tests is selected.

NOTE: 1. When the performance of the fuze and warhead depends upon the spin rate imparted during launch and flight, launchers in states of wear beyond acceptable tolerance limits shall not be used.
2. If tests of fuzes and warheads for inherently inaccurate rockets are required, a long tube launcher or ballistic track may be selected.

The rocket or missile motor selected to propel the fuze and warhead must be one for which the item was designed and must meet the requirements of the test directive. If it is necessary to conduct the test on a ballistic track, the propelling device (motor) must provide the required acceleration and terminal velocity.

To assure that the rocket motor meets all test requirements, static tests are conducted. For these, a test stand similar to that shown in Figure 1 is constructed. Details of these tests as well as other phases are described below.

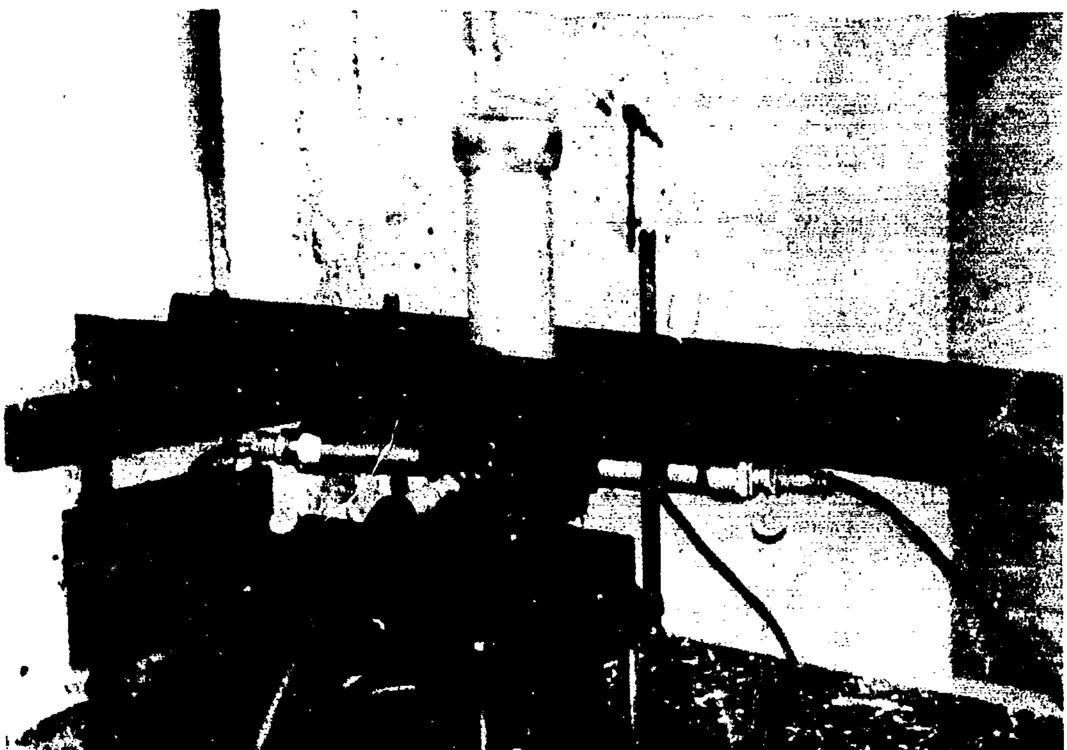

Figure 1. Motor Setup for Static Firing.

6.2 TEST CONDUCT

6.2.1 Physical Examination

a. Upon receipt of the maintenance test package, the contents are compared with the listing, and shortages are reported immediately by message Equipment Performance Report (EPR) in accordance with USATECOM Regulation 70-23.

b. The test item is examined and the nomenclature, serial number(s), and manufacturer's name of the test item(s) are recorded.

c. Each sample item is inspected to assure that the visible parts are properly assembled, that the item is marked in accordance with specifications, and that there has been no damage during shipment.

d. As far as possible within safety limits, one round of the test ammunition is disassembled into its component parts for study, and photographs are made as appropriate.

e. Physical measurements are obtained as outlined in MTP 4-2-800, and the following additional information relative to the motor is recorded:

1) Type, weight, and composition of propellant.
2) Trapping method.
3) Propellant grain geometry.
4) Type and method of ignition.
5) Expected operating pressure as related to motor strength characteristics.
6) Port-to-throat ratio.
7) Type and location of propellant inhibiters.
8) Nozzle cant angle.
9) Type and location of resonance rods.
10) Nozzle area.

6.2.2 Static Motor Test

Static motor tests primarily involve measuring and studying the functions that occur inside the motor during burning. To obtain the necessary performance data, the motor is equipped with thrust and pressure transducers, thermocouples, and strain gages; installed in a specially designed thrust stand (Fig. 1); and fired. Each motor requires special adapters for mounting in the static test stand. The transducers (strain type gages) provide thrust and pressure information with respect to time during the motor burning process.

a. A test sample of motors is selected and divided into three subsample lots. The number of specimens in each lot is determined in accordance with MTP 3-1-002.

b. The first subsample is conditioned at standard temperature (70°F) and, utilizing the special adapters, one of the motors is installed on an appropriate thrust stand.

c. Weapon pressure instrumentation (thrust and pressure transducers, strain gages, etc.) is installed in accordance with the procedures given in MTP 3-2-810.

d. Each motor of the first subsample is ignited and the following information recorded:

1) Thrust (peak and average).
2) Pressure (peak and average).
3) Ignition delay.
4) Burning time (total).
5) Action time (90 percent performance).
6) Temperature of exhaust gases and motor components.
7) Velocity of exhaust gases, if required.
8) Burning characteristics, i.e., smooth, erratic, afterburning.

e. The second and third subsamples are conditioned to the extreme high and extreme low service temperatures, respectively, prescribed for the rocket, unless otherwise directed, and fired as outlined above. The data of step d are recorded for each firing.

f. Thrust, pressure, burning time, exhaust gas velocity, and temperature are compared with missile or rocket specifications contained in appropriate QMR's and TC's. Ignition delay, action time, and burning characteristics are compared with data on previously accepted similar items and with specifications.

6.2.3 Fuze Tests

Prior to testing fuzes with the associated warheads and rocket motors, the fuzes should meet the appropriate requirements. Fuzes may be subjected to any one or all of the following tests depending on the design and intended use:

a. Airburst - Airburst tests are conducted on proximity and time fuzes to evaluate the performance and time-of-flight characteristics.

b. Ground Impact - Ground impact tests are performed to determine the order of functioning of the explosive charge, and functioning characteristics of the fuze on various terrains.

c. Sensitivity Test - Sensitivity tests are performed to determine the fuze impact sensitivity upon various targets.

Depending upon the design and intended use, the fuzes are subjected to the procedures given in MTP's 3-2-825, 4-1-003, 4-2-055, 4-2-806, 4-2-807, and 4-2-808, as applicable, and pertinent data are obtained.

6.2.4 Warhead Tests

Close support rockets and missiles normally are equipped with shaped charge warheads or high explosive (HE) fragmentation type warheads. Special warheads, however, are developed for some systems. These include white phosphorous, colored smoke, flare, etc.

The HE warheads are usually tested as a separate item or component of ammunition or they may be tested in conjunction with fuzes. Some special type of testing also is required to determine the fragmentation capability and effectiveness of the warhead. Procedures for conducting the tests are given in MTP 4-2-813. Procedures for testing shaped charge (HEAT) warheads on antitank rockets and missiles are found in MTP 4-2-824.

6.2.5 Safety Evaluation

The safety evaluation is conducted to assure that items are safe for service testing. The procedures are described in MTP 4-2-503 and cover many environmental and rough handling tests. This evaluation is normally conducted early in the engineering test. The environmental tests described in 6.2.7 below are intended to supplement testing accomplished during the safety evaluation, when necessary.

6.2.6 Range Firing Tests

Range firings of close support rockets and missiles are conducted on new items and on modified items if changes have been made that might affect flight characteristics or safety. If these tests are required, they are performed in accordance with the procedures given in MTP 3-2-823 or MTP 3-2-824, as applicable.

6.2.7 Environmental and Rough Handling Tests

NOTE:
1. These tests will not be repeated if adequately covered in the safety evaluation.
2. As appropriate, selected environmental and rough handling tests are conducted in a sequential manner as described in the appendix.
3. Determination of test item sample sizes for environmental tests is discussed in the appendix.

6.2.7.1 Simulated Transportation Vibration

This test is a part of the safety evaluation covered in MTP 4-2-503.

6.2.7.2 Rough Handling Tests

The rough handling tests, involving 5-foot drop, 7-foot drop, and loose cargo tests, are part of the safety evaluation covered by MTP 4-2-503. The sequence of rough handling tests is described in MTP 4-2-602.

6.2.7.3 Forty-Foot Drop Test

This test, involving a minimum of three packages, will be conducted according to MTP 4-2-601 if not already covered in the safety evaluation.

6.2.7.4 Air Delivery

This test is conducted in accordance with MTP 4-2-509.

6.2.7.5 Temperature Shock

A sample of rockets or missiles is placed in a temperature conditioning chamber and subjected to a minimum of three continuous cycles between temperatures of -65° and 155° F, as outlined in Method 503 of MIL-STD-810B.

Upon completion, all rounds are examined for damage and prepared for firing.

6.2.7.6 Sand and Dust

Five to 10 rounds are subjected to the sand and dust test procedures of MTP 4-2-819.

Upon completion, all rounds are inspected for damage and prepared for firing.

6.2.7.7 Fungus

Five to 10 rounds are subjected to fungus-resistance testing in accordance with the procedures given in MTP 5-2-584 or MTP 4-2-818 as applicable.

Upon completion, all rounds are inspected for damage and prepared for firing.

6.2.7.8 Salt Spray

Five to 10 rounds are subjected to the salt-spray ("salt-fog") test procedures specified in Method 509 of MIL-STD-810B or other test specification as applicable.

Upon completion, all rounds are inspected for damage and prepared for firing.

6.2.7.9 Water Immersion

a. Five to 10 rounds are immersed in accordance with the preferred immersion test described in Procedure I of MIL-STD-810B, Method 512. If this condition is not practicable, the rounds will be placed under 3 feet of water at 60° to 85° F for 72 hours, divided into 24 hours horizontal, 24 hours vertical with nozzle up, and 24 hours vertical with nozzle down.

b. Upon completion, each round is inspected for damage, and any notable observations, including the following, are recorded:

1) The location(s) where water entered the test item.
2) The internal components exposed to the water.
3) The location and approximate volume of any water accumulation.
4) The approximate volume of water entering the test item.
5) The visual effect of water on any component.

c. The rounds are prepared for firing.

d. If the exposure results in any electrical, electronic, or mechanical difficulty or deficiency that could shorten service life or degrade the performance capabilities of the rocket or missile, the item will be considered as having failed the test.

6.2.7.10 Temperature-Humidity

The test rockets or missiles are subjected to the temperature-humidity procedures contained in MTP 4-2-820.

Upon completion, all rounds are inspected for damage and prepared for firing.

6.2.7.11 Extreme-Temperature Storage

Storage at extreme temperatures is ordinarily part of the safety evaluation but may be conducted otherwise. The hot storage test (the 7-day high temperature-low humidity schedule of MTP 4-2-820) will involve the same samples as, and usually precede, the high temperature operating test of 6.2.7.12 below. The low temperature storage test (3 days at -50°F) will likewise involve the same samples as, and precede the test of 6.2.7.14 below.

6.2.7.12 High Temperature Operating Tests

a. For "intermediate hot-dry" climatic conditions each test rocket or missile is exposed to four and a fraction diurnal cycles (with peak solar radiation of 360 Btu/ft^2/hr and peak air temperature of 110°F) as specified in AR 70-38. Upon completion of the fourth cycle the test item is examined and, at 1500 hours of the fifth cycle, fired. If stipulated, the diurnal cycle may be adjusted to conform with MIL-STD-810B.

If facilities do not permit firing from within the solar radiation chamber, the test item is conditioned for at least 18 hours at the equivalent peak temperature. This temperature is obtained by exposing the test item, fitted throughout with thermocouples, in a solar radiation chamber as described in MTP 4-2-826. If not practicable, the item may be conditioned in a temperature cabinet to 145° ± 5° F, which, in lieu of more specific data, may be assumed to be the equivalent temperature.

b. For "hot-dry" conditions the test is conducted as shown in a above, except that the "hot-dry" diurnal cycle of AR 70-38 is used (i.e., the peak air temperature is 125°F). If it becomes necessary to condition the item in a temperature cabinet without solar radiation, 160° ± 5° F will be assumed to be the equivalent peak temperature.

6.2.7.13 Solar Radiation Exposure Test

If a solar radiation test is requested, and no guidance is provided, the "hot-dry" cycle described in 6.2.7.12b above shall constitute an adequate test.

NOTES: 1. If it is possible to fire the rocket from within the solar-radiation chamber, firing will be done at the peak temperature (presumably at 1500 hours) of the fifth cycle. In this manner test requirements for paragraphs 6.2.7.12 and 6.2.7.13 are satisfied. If this is not possible, the fifth cycle is completed and the test item is fired at ambient temperature. Requirements of 6.2.7.12 may be satisfied by temperature-conditioning samples to either 145° or 160° F as appropriate.

2. Each missile or rocket shall be transported from the temperature conditioning chamber to the test site in the specified shipping container or locally provided containers to assure a minimum of temperature loss.

6.2.7.14 Low Temperature Operating Tests

a. Each test missile or rocket is exposed to the "intermediate cold" climatic conditions of AR 70-38 for a minimum of 18 hours at -25°F for items that are expected to be mounted above the ground, and at -35°F for items that may possibly be resting on the ground prior to loading and firing.

b. For the "cold" climatic conditions of AR 70-38 -50°F is used.

6.2.7.15 Freezing Rain Test

a. Each test rocket or missile is assembled into its tactical configuration, and water is sprayed on it in a fine mist in accordance with MTP 2-2-815.

b. The ice coating is removed, using only those tools available to the military user in the field, and the round is fired as indicated in paragraph 6.2.6.

c. Malfunctions of the rocket or missile caused by exposure to freezing rain and/or ice accumulation are recorded as are damage or deterioration and failures of individual parts caused by this exposure.

6.2.7.16 Test Firing

Upon completion of all phases of the environmental treatment, or the sequential treatment (appendix, Fig. A-1), the test rounds are fired following normal procedures (para 6.2.6).

NOTE: 1. If no previous firings have been accomplished, samples of rounds that have not undergone preconditioning shall be fired at the same time as the test rounds for comparison purposes.

2. In all extreme temperature and shock and vibration subtests, firing shall be conducted at the conditioning temperature.

6.2.8 Pendulum Recoil Tests

Pendulum recoil tests are conducted on shoulder-fired weapons in accordance with MTP 3-2-056.

6.2.9 Noise and Blast Measurements

Noise and blast measurements are conducted in accordance with MTP 3-2-811.

6.2.10 Toxic Gases

When the crew may be in a confined area, toxic gas tests are conducted at crew locations in accordance with MTP 2-2-614.

6.2.11 Vulnerability to Bullets

When a vulnerability test (sometimes called a bullet impact test) is required, the test is conducted using 7.62-mm and caliber .50 projectiles fired at close range at service velocity. Several test items, unpackaged and grouped, are fired upon with several types of ammunition. Satisfactory performance requires that the test items not detonate or ignite, and that they be safe to dispose of. The recorded data will include: number and types of projectiles, location of each impact, appropriate photographs, and description of results.

6.2.12 Reliability

When a reliability requirement is stated, MTP 3-1-002 is used to determine sample size and to determine whether the desired reliability was achieved with the desired confidence. A precise definition of satisfactory performance is a prerequisite to a reliability analysis. Two reliability analyses are made: (a) overall reliability which includes a summation of all the satisfactory and unsatisfactory samples of each subtest and (b) selected reliability which includes all sample groups except those in which the test items suffered damage or deterioration during environmental or rough handling tests and groups in which statistically significant failures occurred in a particular subtest.

6.2.13 Maintenance Evaluation

A maintenance evaluation is a separate subtest of an engineering test or initial production test and, although reported separately, is conducted throughout the entire test.

The maintenance evaluation covers the following subjects:

a. Data acquisition, i.e., obtaining data for mean time between maintenance (MTBM), mean time to repair (MTTR), operational availability (A_0), and other factors.
b. Tools and test equipment.
c. Equipment publications.
d. Repair parts.
e. Design for maintainability.
f. Safety aspects of maintenance operations.
g. Human factors aspects of maintenance operations.
h. Maintenance test package. (This includes elements of b, c, and d above. It is first evaluated upon receipt of the test item, but its evaluation continues throughout the entire test program.)

To plan and conduct a maintenance evaluation, USATECOM Regulation 750-15, MTP 7-2-504, and current guidance documents and policies must be consulted. Procedures for data reduction in connection with a above are included in these documents.

6.2.14 Human Factors Evaluation

The compatibility of the crew and weapon system is observed throughout the test. The ease with which the missile is identified (such as by type of warhead, etc.), prepared for firing, and loaded into the launcher are typical areas of concern. Other human factors data obtained in each test phase should also be reported in this section (e.g., recoil tests, noise and blast measurements, toxic gas effects, etc.).

6.3 TEST DATA

In addition to the data obtained for each test covered in 6.2 above, test records should include:

a. Photographs and/or motion pictures, radiographs, sketches, maps, charts, graphs, or other pictorial or graphical presentations that will support test results or conclusions.

b. An engineering logbook containing, in chronological order, pertinent remarks and observations that could aid in a subsequent analysis of the test data. This information may consist of temperature, humidity, and other environmental data; peculiarities, functions, and deficiencies of the test item or components; meteorological data if applicable; theoretical estimations, mathematical calculations, intermittent or catastrophic failures, test parameters, and similar data.

c. Instrumentation or measurement system mean error stated accuracy.

d. Test item sample size (number of measurement repetitions).

6.4 DATA REDUCTION AND PRESENTATION

Before completion of an engineering test, a recommendation for a safety release is made in accordance with USATECOM Regulation 385-6 and MTP 4-2-503.

Processing of raw test data shall, in general, consist of organizing, marking for identification and correlation, and presenting the test data in graphical form when applicable. Individual requirements are included in the references cited in 6.2 above.

A written report shall accompany all test data and shall consist of conclusions and recommendations drawn from test results. The test director's opinion concerning the success or failure of any of the functions evaluated shall be included. In addition, equipment specifications that will serve as the model for a comparison of the actual test results should be included.

Test evaluation will usually be limited to comparing the actual test results to the specifications and the requirements as imposed by the intended usage. The results may also be compared to data gathered from previous tests of similar items under similar conditions.

APPENDIX

ENVIRONMENTAL AND ROUGH HANDLING TESTS

1. INDIVIDUAL AND SEQUENTIAL TREATMENTS

The successful use of rockets or missiles is dependent upon a high level of system performance, safety, and reliability when transported, handled, and fired in the various environments throughout the world. In order to prove the system for world-wide use, each component as well as the whole round or system is subjected to treatments that will simulate as nearly as possible the environments encountered in the desert, tropic, and arctic regions of the world. A general guide for these tests is given in paragraph 6.2.7.

The so-called "sequential treatment" procedure is sometimes used instead of certain individual environmental tests. Possible examples of sequential tests are shown in Figure A-1. The two principal reasons for sequential treatments are: to obtain a maximum amount of exposure data with a limited number of samples, and to simulate a situation wherein ammunition may be exposed to a series of environmental extremes during its life. Individual treatments are preferred when a series of environmental conditions may be incompatible or when it is difficult to isolate the exact environment that causes a failure.

Upon completion of all phases of the environmental treatment, or the sequential treatment, the rounds are fired following normal procedures.

2. TEST SAMPLE SIZES

Many variables must be considered when determining the sample sizes required for testing. The physical size, complexity, and cost (availability) of the test item are significant. Larger sample sizes must be considered when the test item incorporates a new concept (such as a new propulsion system or a new warhead fuzing concept) or when a complete new weapon system is undergoing developmental testing.

Factors that can decrease sample size requirements are previous test history available on the item, use of sophisticated instrumentation to gather data from the firing of each round, increased severity of testing (example: conducting temperature storage tests at +165°F when the required storage limit is +155°F), and sequential environmental testing, as discussed in 1 above. Time available to conduct the test must be considered when sequential tests are planned as they may take longer to complete than concurrent tests.

Extensive use of instrumentation is particularly useful when testing missile systems, where complex guidance controls the missile flight. Instrumentation may be used to record guidance signals, missile position data, and other significant parameters. Analysis of data thus obtained may reveal transient or relatively minor, but significant, system malfunctions that could otherwise have gone unnoticed. Instrumentation data are invaluable when analyzing major malfunctions (abbreviated flights, etc.) of missiles, or for measuring overall system performance.

Typical test sample sizes are indicated in Figure A-1. The total sample size shown (80) is small. The test planning approach shown would be typical of that required for a missile system. Another approach to a sequential environmental treatment is shown in MTP 4-2-503, where a sample size of 320 is more typical of that required for a smaller caliber rocket system (unguided). In practice, sample size requirements could range anywhere between those of the two examples, or even outside these limits. The actual sample size required for a specific test is determined by careful application of engineering judgment in consideration of the factors mentioned previously and the number of samples in a package.

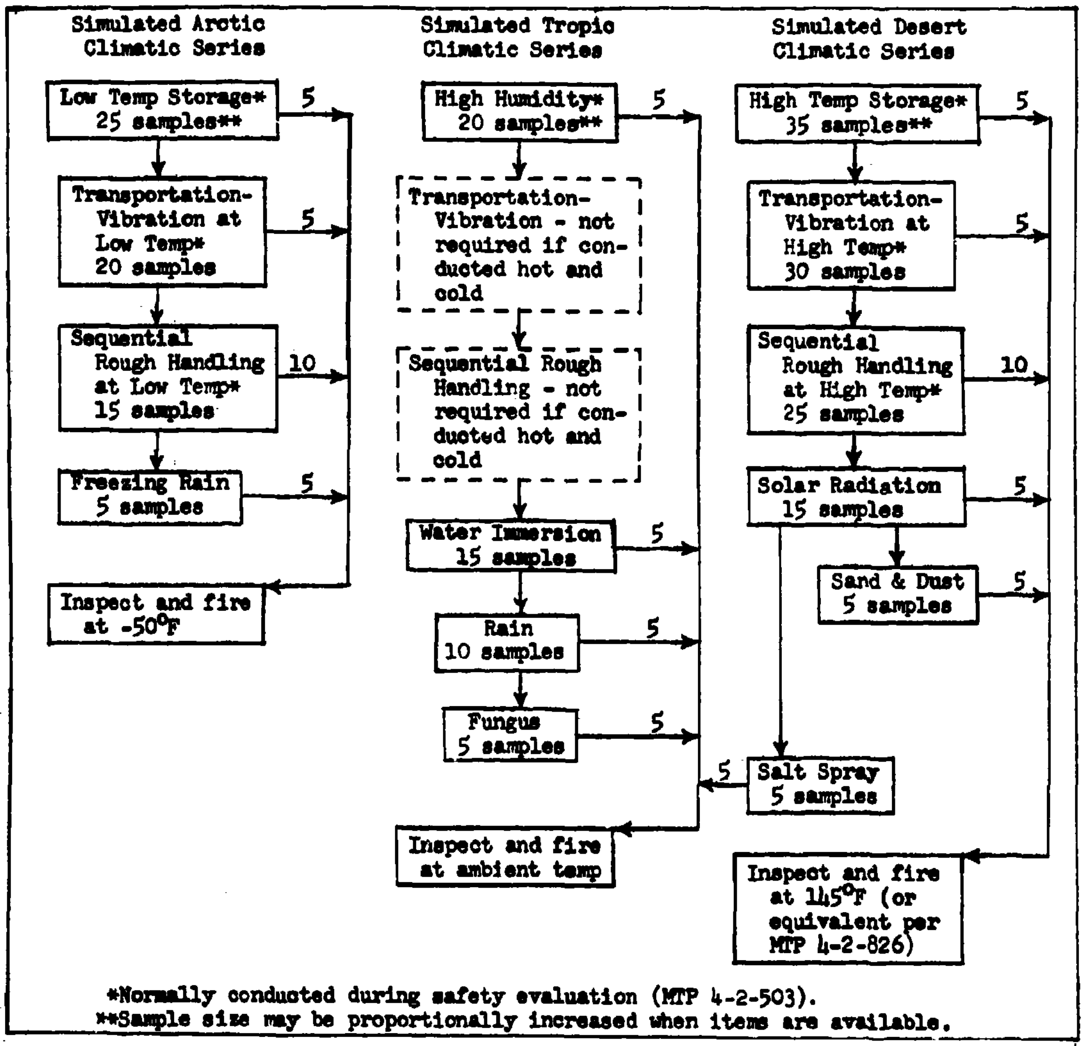

Figure A-1. Example of Complete Sequential Treatments to Cover Three Climatic Areas.

UNCLASSIFIED
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 4-2-015, Commodity Engineering Test Procedure, Close Support Rockets and Missiles

4. DESCRIPTIVE NOTES *(Type of report and inclusive dates)*

5. AUTHOR(S) *(First name, middle initial, last name)*

----

6. REPORT DATE 1 March 1971	7a. TOTAL NO. OF PAGES 19	7b. NO. OF REFS 32
8a. CONTRACT OR GRANT NO. b. PROJECT NO. AMCR 310-6 c. d.	9a. ORIGINATOR'S REPORT NUMBER(S) MTP 4-2-015 9b. OTHER REPORT NO(S) *(Any other numbers that may be assigned this report)* ----------	

10. DISTRIBUTION STATEMENT

Approved for public release; distribution unlimited.

11. SUPPLEMENTARY NOTES -------------	12. SPONSORING MILITARY ACTIVITY Headquarters US Army Test and Evaluation Command Aberdeen Proving Ground, Maryland 21005

13. ABSTRACT

This MTP provides engineering test guidance for close support rockets and missiles, such as: (a) artillery rockets up to approximately 6 inches in diameter and shoulder-held, bazooka-type, antitank rockets; and (b) antitank guided missiles or shoulder-fired, surface-to-air guided missiles. It does not include procedures for testing launchers, guidance systems, and shaped charge warheads.

It describes functi- tests for components (warhead, fuze, and motor) and outlines performance tests fc -mplete round including environmental and rough handling effects tc be deterr ther points covered are noise and blast, toxic gas, vulnerability tc bu liability, maintenance evaluation, and human factors evaluation.

DD FORM 1 NOV 65 1473 REPLACES DD FORM 1473, 1 JAN 64, WHICH IS OBSOLETE FOR ARMY USE.

UNCLASSIFIED
Security Classification

Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
Engineering test, close support rockets and missiles Rockets, artillery (up to 6-inch diameter) Rockets, antitank, shoulder-fired Guided missiles, antitank (see missiles, guided, (close support)) Missiles, guided (close support): Antitank Surface-to-air, shoulder-fired						

UNCLASSIFIED
Security Classification