30 September 1967

Materiel Test Procedure 8-2-061
Dugway Proving Ground

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

DECONTAMINATING APPARATUS, PORTABLE

1. OBJECTIVE

The objective of this materiel test procedure (MTP) is to present a series of engineering subtests designed to determine the technical performance and safety aspects of the test item relative to the criteria cited in applicable Qualitative Materiel Requirements (QMR's), Small Development Requirements (SDR's), Technical Characteristics (TC's), and other requirements and documentation that pertain to a particular test item.

2. BACKGROUND

Decontamination is the process of making harmless or removing chemical or biological agents or removing radioactive material to insure the safety of personnel, objects, or areas. Decontamination includes the processes of absorbing, destroying, neutralizing, and/or physically removing the contaminant.

The need for a portable decontaminating apparatus has been well established. It is used primarily for the decontamination of vehicles, crew-served weapons, and other key equipment, to allow continued safe utilization.

Engineering testing of such items is necessary to determine: (1) the technical performance of the test item; (2) if further development is required; and (3) if the test item is suitable for further testing (such as service testing).

3. REQUIRED EQUIPMENT

a. Common-type mechanic's tools which accompany vehicle, weapon, or equipment item to be decontaminated
b. Chemical agent detector kit
c. Supply of clean rags
d. Protective equipment - mask, gloves, overgarment, etc.
e. Biological samplers
f. Laboratory facilities
g. Theodolite equipment
h. Photographic equipment (color and black and white)
   1) Still
   2) Motion picture

4. REFERENCES

A. AR 705-35, Criteria for Air Portability and Air Drop of Materiel, 15 June 1964

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B. USATECOM Regulation 705-2, Research and Development of Materiel - Documentating Test Plans and Reports, 28 February 1966
C. AMC Pamphlet 706-134, Engineering Design Handbook, Maintainability Guide for Design, February 1966
D. MIL-STD-810, Military Standard Environmental Test Methods for Aerospace and Ground Equipment, 15 June 1967
E. CRDL Technical Memorandum 5-7, Determination of Residual Hazards on Contaminated Surfaces, U. S. Army Edgewood Arsenal, December 1964
F. DPGR 381, Surveillance Test (Environmental)of Decontaminating Apparatus, Portable 1 1/2 Quart, ABC-M11; Decontaminating Agent, DS2, Dugway Proving Ground, Utah, October 1963. AD 423646
G. DPGR 257, Final Engineering Testing of E17R1 Decontaminating Apparatus and the DS2 Decontaminating Solution, Dugway Proving Ground, Utah, August 1960
H. Engineering Tests of Portable DS2 Decontaminating Apparatus, 1 1/2 Quart, Dugway Proving Ground, 30 April 1965. AD 465374L
I. MTP 8-2-500, Receipt Inspection
J. MTP 8-2-503, Rough Handling and Surface Transport
K. MTP 7-1-002, Air Portability and Air Drop Service Testing
L. MTP 7-2-509, Air Drop Capability of Materiel
M. MTP 8-2-510, Decontamination
N. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers

5. SCOPE

5.1 SUMMARY

This MTP presents testing procedures in general terms. Individual test plans shall be prepared to meet specific testing requirements as dictated by the performance and characteristics criteria for a particular test item.

Only those tests required for a specific item need be used on a selective basis as indicated by the applicable materiel requirements documentation.

a. Receipt Inspection - An inspection of the test item, as received to: (1) determine its physical characteristics and condition; (2) locate any defects it might have; and (3) identify damage received during transport. During this inspection, the test items will also be serialized for subsequent identification purposes.

b. Safety Evaluation - The objectives of this subtest are: (1) to check the Safety Statement issued by the developing agency, and (2) to identify the safety hazards, if any, which must be included in the Safety Release Recommendation required by USATECOM Regulation 385-6.

c. Simulated Environmental Testing - The objectives of this subtest are to: (1) provide a basis for estimating the effects of extreme physical environments on the given system under consideration, and (2) determine the effects of fresh and salt water on the test item.

d. Rough Handling and Surface Transport - A study to determine the effects of rough handling and surface transport on the physical and operational characteristics of the test item.

e. Air Transportability - A study to determine the air transport characteristics of the test item and the effects resulting from subjection to air transport conditions, including reduced pressure and temperature.

f. Air Drop Capability - A study to determine: (1) if the test item is suitable for air drop, and (2) the operational suitability after air drop.

g. Leak Testing - A study to determine if the portable decontaminator leaks when subjected to standard leak tests.

h. Operational Reliability - A study to determine if the test item meets specified reliability criteria.

i. Assembly and Disassembly - A study to determine the ease of assembly and disassembly of the test item, and the adequacy of instructions.

j. Human Factors (Including Ease of Usage) - A study to determine the characteristics of the test item involving human factors in the handling and ease of operation of the item.

k. Maintenance Aspects - A study to determine the design for maintainability characteristics of the test item and perform other evaluations of maintainability aspects as indicated by the test criteria.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Safety Statement

The test officer shall ensure that a Safety Statement (see Glossary) has been received from the developing agency and is understood before the test is started. The Safety Statement includes information pertaining to item operational limitations and specific hazards peculiar to the systems, items, or components to be tested.

6.1.2 Safety

a. Test and subtest plans and procedures shall ensure performance in the safest manner consistent with accomplishing the mission. The cardinal principle is to limit exposure of a minimum of personnel, for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations. Plans shall include safety procedures, precautions, protections, and emergency procedures as necessary. Technical information on the hazards and safety characteristics of the test item as provided by the Safety Statement and other pertinent information shall be included. Such information shall include evaluation of potential hazards, analysis of risks, limitations, and precautions including special test equipment and techniques that should be incorporated in test plans and procedures.

b. A specific individual shall be charged with responsibility for safety. He shall be familiar with the construction and operation of the test item and its critical components, shall have full knowledge of the hazards and safety aspects of the test, and shall review test procedures for evaluation of hazards and recommend control measures.

c. All personnel who participate in or observe the tests shall be briefed on the hazards involved and proper test methods and procedures.

6.1.3 Security

Security considerations shall be adequately determined and provided for as applicable to each test item.

6.1.4 Meteorological Data

Provisions shall be made to obtain meteorological data as required for testing and to record temperature, wind direction and speed, and humidity data periodically as required.

6.2 TEST CONDUCT

6.2.1 Receipt Inspection

The test item shall be subject to the applicable procedures of MTP 8-2-500 following its arrival at the test site with emphasis on the following:

a. Adequacy of packaging - Visually inspect test item package and record the following:

1) Binding deficiencies such as broken straps, seals, etc.
2) Packaging material deficiencies such as cuts, tears, breaks, deterioration, illegible markings, etc.

b. Test item inspection:

1) Visually inspect the test item for damages such as dents, cracks, illegible markings, broken hoses, etc.
2) Determine the test item's leakage as described in paragraph 6.2.7
3) Disassemble the test item and note any deficiencies, etc.

c. Determine and record the following:

1) Length, width, height and weight of the packaged test item
2) Length, height, width, diameter and weight of the test item
3) Missing or damaged instructions or manuals

d. Number and identify each test item to be used.
e. Obtain photographs of damaged items.

6.2.2 Safety Evaluation

a. Verify the safety aspects cited in the Safety Statement prepared by the developing agency.

b. Observe the condition of apparatus as received, and subsequent operation thereof for unsafe aspects.

c. Note jagged edges, rust, dents, loose connections, or any other conditions or features which make utilization of the apparatus hazardous to personnel.

d. Pay particular attention to the results of the rough handling and surface transport tests and the environmental tests.

e. Collect data to be included in the Safety Release Recommendation required by USATECOM Regulation 385-6.

6.2.3 Simulated Environmental Testing

6.2.3.1 Extreme Temperature Tests

Unless otherwise directed, the test items shall be subject to the following temperature tests:

6.2.3.1.1 Low Temperature Tests - Place a minimum of (3) three test items, which have successfully passed the leak test of paragraph 6.2.7 in a temperature chamber and perform the following:

a. Reduce the chamber temperature to -80°F (-62.2°C), maintain it at -80°F for a period of 72 hours, and then visually inspect the test item and record any damages.

b. Raise the chamber temperature to -65°F (-53.9°C) or its minimum operating temperature, and maintain this temperature until stabilization is reached. If stabilization is attained in less than 24 hours, maintain temperature for a complete 24 hour interval. Perform the following:

NOTE: Stabilization, unless otherwise specified, is considered to be reached when the temperature of the test item does not change more than 3.6°F (2.°C) per hour.

1) Visually inspect the test item and record any damages.
2) Remove 1/3 of the test items and verify their operability as described in paragraph 6.2.8.

NOTE: Operability checks should be accomplished within 15 minutes of removing the test items from the chamber.

c. Increase the chamber temperature to the local ambient temperature and perform the following:

1) Visually inspect the test item and record any damages.

2) Subject 1/2 of the test items to the leak test procedures of paragraph 6.2.7.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8

6.2.3.1.2 High Temperature Tests - Place a minimum of 4 test items, which have successfully passed the leak test of paragraph 6.2.7 in a temperature chamber and perform the following:

a. Adjust the chamber to a temperature of 155°F (88.3°C) and an absolute humidity of 13 grains/ft.^{3} and maintain these conditions for a minimum of 4 hours, then visually inspect the test items and record any damages.

b. Adjust the chamber to a temperature of 120°F (48.9°C) and a relative humidity of no greater than 15% and maintain these conditions for a minimum of 24 hours and perform the following:

1) Visually inspect the test items and record any damages.
2) Remove 1/2 the test items and perform the following:

a) Subject 1/2 of the test items to the leak test of paragraph 6.2.7.
b) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

c. Adjust the chamber to local ambient temperature and humidity and perform the following:

1) Visually inspect the test items and record any damages.
2) Subject 1/2 of the test items to the leak test of paragraph 6.2.7.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.2 Fungus Test

a. Subject a minimum of 2 test items to the fungi exposure of reference 4D (MIL-STD-810) Method 508.

b. At the completion of the exposure period, perform the following:

1) Disassemble 1/2 of the test items and record if any fungus was present on the test item components.
2) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.3 Humidity Test

a. Subject a minimum of 2 test items to the humidity cycling of reference 4D (MIL-STD-810) Method 507.

b. At the completion of the cycling period, perform the following:

1) Visually inspect the test items and record any signs of corrosion.
2) Disassemble 1/2 of the test items and inspect the components for corrosion and/or deterioration.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.4 Dust Test

a. Subject a minimum of 2 test items to exposure conditions of reference 4D (MIL-STD-810) Method 510.
b. At the completion of the exposure period, perform the following:

1) Visually inspect the test items and record any surface damages noted
2) Disassemble 1/2 of the test items and inspect the components for damages and/or presence of dust
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.5 Temperature-Altitude Cycling Test

a. Subject a minimum of 10 test items to the temperature-altitude cycling of reference 4D (MIL-STD-810) Method 504.
b. At the completion of the cycling period, perform the following:

1) Subject 1/2 of the test items to the leak test of paragraph 6.2.7.
2) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.8.

6.2.3.6 Sunshine Test

a. Subject a minimum of 2 test items to the sunshine conditions of reference 4D (MIL-STD-810) Method 505.
b. At the completion of the exposure period, perform the following:

1) Visually inspect the test items and record any surface damages noted.

NOTE: Sunshine causes heating of equipment and fading of fabric colors, checking of paints, and deterioration of natural rubber and plastics.

2) Subject 1/2 of the test items to the leak test procedure of paragraph 6.2.7.
3) Verify the operability of the test item by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.3.7 Salt Fog Test

a. Subject a minimum of 3 test items to the conditions of Method 509 of reference 4D (MIL-STD-810).

b. At the completion of the salt fog spray exposure, perform the following:

1) Rinse the test items with clear water.
2) Visually inspect the test items for and record the presence of corrosion.
3) Disassemble 1/3 of the test items and inspect the components for, and record:

a) Evidence of water penetration
b) Presence of corrosion

4) Subject 1/3 of the test items to the leakage test of paragraph 6.2.7.
5) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.8.

6.2.3.8 Rain Test

a. Subject a minimum of 3 test items to the rain conditions of Method 506 of reference 4D (MIL-STD-810).

b. At the completion of the rain exposure, perform the following:

1) Visually inspect the test items for, and record the presence of, corrosion.
2) Disassemble 1/3 of the test items and inspect the components for, and record:

a) Evidence of water penetration
b) Presence of corrosion

3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.7.
4) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.8.

6.2.4 Rough Handling and Surface Transport Tests

6.2.4.1 Handling and Transportation Test

a. Subject a minimum of 2 test items packaged in their original containers, to the applicable procedures of MTP 8-2-503.

b. At the completion of testing, perform the following:

1) Visually examine the test item's package for, and record the presence of, cracks, breaks, undone binding, etc.
2) Visually examine the test items for, and record the presence of, damages and/or deformations.

3) Subject 1/2 of the test items to the leakage test of paragraph 6.2.7.
4) Verify the operability of the test item by subjecting the remaining items to the procedures of paragraph 6.2.8.

6.2.4.2 Vibration Test

a. Subject a minimum of 2 test items packaged in their original containers, to the procedures of Equipment Category G (Shipment by Common Carrier) of Method 514 of reference 4D (MIL-STD-810).

b. At the completion of testing, repeat the procedures of paragraph 6.2.4.1.b.

6.2.4.3 Shock Test

a. Subject a minimum of 2 test items packaged in their original containers, to each applicable transit Test of Method 516 of reference 4D (MIL-STD-810).

b. At the completion of each transit test performed, repeat the procedures of paragraph 6.2.4.1.b.

6.2.5 Air Transportability

Determine the effects of pressure-altitude and vibration similar to that which will be experienced by the test item in flight as follows, and the ease of loading/unloading aircraft as follows:

6.2.5.1 Loading/Unloading

NOTE: Background information on air transportability is contained in MTP 7-1-002.

a. Load the test items, in their shipping containers, aboard aircraft, or simulated aircraft facilities as indicated in the test plan loading schedule using normal loading equipment and record the following:

1) Type of aircraft used/simulated
2) Shipping container length, width, height, weight and material
3) Equipment used for loading
4) Difficulties encountered while loading
5) Method of tie-down
6) Damage incurred to the package while loading

b. Unload the test items from the aircraft/simulated aircraft and record:

1) Equipment used in unloading
2) Difficulties encountered while unloading

6.2.5.2 Simulated Flight Test

a. Subject a minimum of 2 test items in their shipping containers, to the following simulated conditions simultaneously:

1) Ambient pressure of the maximum altitude the test item is expected to be flown
2) Flight vibration conditions as described in the procedures of Equipment Category G (Shipment by Common Carrier) of Method 514 of reference 4D (MIL-STD-810)

b. At the completion of the simulated pressure-altitude/vibration testing, subject the test items to the procedures of paragraph 6.2.4.1.b.

6.2.6 Air Drop Capability

The air drop of the test item, when in its shipping container and when assembled for field use, shall be determined as described in the applicable sections of MTP 7-2-509 and as follows:

6.2.6.1 Shipping Container Test

a. Rig a minimum of 10 test items in the appropriate air drop containers and drop the containers from aircraft flying at the altitude and speed stipulated in the test plan. Record the following:

1) Aircraft used
2) Aircraft altitude
3) Aircraft air speed
4) Meteorological conditions
5) Air delivery system trajectory and impact velocities
6) Acceleration "G" force magnitude at impact

b. Conduct visual coverage of the air drop test procedures with motion and still camera.

c. At the completion of the test, perform the following:

1) Visually examine the test item's package for, and record the presence of cracks, breaks, undone bindings, etc.
2) Visually examine the test items for, and record the presence of damages and/or deformations.
3) Subject 1/2 of the test items to the leakage test of paragraph 6.2.7.
4) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.8.

6.2.6.2 Field Use Test

Repeat steps a, b, and c2 through c4 with a test item dropped in field use condition.

6.2.7 Leak Testing

a. Determine if the test item leaks as described in the applicable sections of MTP 8-2-512 at the completion of the following:

1) Extreme temperature tests (paragraph 6.2.3.1)
2) Temperature-altitude cycling tests (paragraph 6.2.3.5)
3) Salt fog tests (paragraph 6.2.3.7)
4) Rain tests (paragraph 6.2.3.8)
5) Sunshine tests (paragraph 6.2.3.6)
6) Rough handling and surface transportability tests (paragraph 6.2.4)
7) Simulated flight tests (paragraph 6.2.5.2)
8) Airdrop capability tests (paragraph 6.2.6)

b. Photographic evidence of damage, leakage, or any other failings that have a significant bearing on the evaluation of the test item shall be obtained.

6.2.8 Operational Reliability

NOTE: 1. Reliability testing shall be conducted under the conditions presented in the test criteria and under applicable instructions, as based upon requirements contained in the applicable QMR's or SDR's or TC's.

2. The test items undergoing operation reliability testing shall have previously been subjected to the following test procedures:

a) Simulated environmental testing (paragraph 6.2.3)
b) Rough handling and surface transport tests (paragraph 6.2.4)
c) Simulated flight tests (paragraph 6.2.5.2)
d) Air drop capability (paragraph 6.2.6)

a. Select a suitable test site and contaminate a suitable item with a chemical agent.

NOTE: 1. The test site shall meet all safety requirements and be of sufficient area to ensure that contamination is confined to the test site.

2. Types of contaminants to be utilized shall be indicated by governing performance criteria.

b. Operate the test item from the prescribed distance, such as 6 - 8 feet. Record actual operating distances.

c. Photograph the test item, in action using high speed camera at the number of frames per second prescribed or appropriate to the test item. Record camera speed.

d. Conduct and record the following measurements:

1) The range of dispersal at the beginning of the spray and at the end of the spray.
2) The area covered by the decontamination solution.
3) Disassemble the test item and measure the quantity of decontamination solution remaining in the container. (Note the number of gas cylinders required to completely discharge apparatus, if gas pressurized.)

e. Determine the effectiveness of the test item by performing the applicable sections of MTP 8-2-510.

f. Record the following for each performance:

1) Ambient temperature
2) Relative humidity
3) Wind direction and speed
4) Operability of the test item

g. At the completion of operational reliability tests, record the following:

1) Total number of test items tested
2) Number of malfunctions or nonfunctioning test items
3) Reasons for malfunctioning/nonfunctioning, if known
4) Number and types of repairs required
5) Other aspects as deemed applicable to the reliability estimate

6.2.9 Assembly and Disassembly

a. Using applicable instructions, disassemble and assemble the test item and prepare it for decontamination operations.

b. Observations shall be made and recorded regarding ease of performances, etc. Specific areas of observations shall include the following:

1) Unscrewing plunger assembly or head and valve assembly from container
2) Filling the test item with decontaminating solution prescribed for test
3) Reassembling plunger or head and valve assembly to container
4) If gas-pressurized, insert prescribed gas cylinder. Operate mechanism to pierce gas cylinder and pressurize container.
5) Adequacy and simplicity of instructions

c. Photograph areas of difficulties with a still or motion picture camera, as applicable.

6.2.10 Human Factors

Throughout the conduct of this MTP observations shall be made relative to the human factors aspects of the test item, inconveniences recorded regarding ease of handling and ease of reading and understanding operating instructions. Specific areas of observation shall include the following:

a. Strain or fatigue during preparation and operation of the test item.

b. Ease of interpretation of responses:

1) By item operator (level of skill required)
2) Under various light conditions

c. Compatibility with field clothing and equipment, i.e., ease of handling items when wearing protective clothing, gloves, etc.

6.2.11 Maintenance Aspects

NOTE: Background information on design for maintainability is available in AMC Pamphlet 706-134 (reference 4c)

a. Determine what common-type and specialized tools are required to perform maintenance.

b. Inspect the test item for deficiencies which will require replacement of components before the test item can be tested. Photograph the deficiencies.

c. Accomplish necessary maintenance.

d. Note whether special tools or skills are required.

e. Note ease of maintenance.

f. Note adequacy of maintenance manuals, instructions, etc.

g. Evaluate test item from design for maintainability standpoint, as applicable, and note improvements that need to be made.

h. Determine the maintenance category of the test item.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the following for each test item:

1) Test item identification number
2) Receipt inspection data collected as described in the applicable sections of MTP 8-2-500
3) Test item description
4) Total number of test items inspected
5) Leakage data collected as described in paragraph 6.2.7

b. Retain all photographs.

6.3.2 Safety Evaluation

Record the following:

a. Any hazardous characteristics
b. Any actual or possible interference noted
c. Information for inclusion in the Safety Release Recommendation

6.3.3 Simulated Environmental Tests

6.3.3.1 Extreme Temperature Tests -

6.3.3.1.1 Low Temperature Tests

Record the following for each test item, as applicable:

a. Test item identification number
b. For temperature of -80°F:

    1) Damages incurred

c. For temperature of -65°F:

    1) Damages incurred
    2) Operability data collected as described in paragraph 6.2.8

d. For ambient temperature:

    1) Temperature in °F
    2) Test item damage
    3) Leakage data collected as described in paragraph 6.2.7
    4) Operability data collected as described in paragraph 6.2.8

6.3.3.1.2 High Temperature Tests -

Record the following for each test item, as applicable:

a. Test item identification number
b. For temperature of 155°F:

    1) Damages incurred

c. For temperature of 120°F:

    1) Damages incurred
    2) Leakage data collected as described in paragraph 6.2.7
    3) Operability data collected as described in paragraph 6.2.8

d. For ambient temperature:

1) Temperature in °F
2) Damages incurred
3) Leakage data collected as described in paragraph 6.2.7
4) Operability data collected as described in paragraph 6.2.8

6.3.3.2 Fungus Test

Record the following for each test item:

a. Test item identification number
b. Presence of fungus on:

1) Test item
2) Test item components

c. Operability data collected as described in paragraph 6.2.8

6.3.3.3 Humidity Test

Record the following for each test item:

a. Test item identification number
b. Evidence of corrosion on:

1) Test item
2) Test item components

c. Operability data collected as described in paragraph 6.2.8

6.3.3.4 Dust Test

Record the following for each test item:

a. Test item identification number
b. Damage to:

1) External surface
2) Test item components

c. Presence of dust on test item components
d. Operability data collected as described in paragraph 6.2.8

6.3.3.5 Temperature-Altitude Cycling Test

Record the following for each test item:

a. Test item identification number
b. Leakage data collected as described in paragraph 6.2.7
c. Operability data collected as described in paragraph 6.2.8

6.3.3.6 Sunshine Test

Record the following for each test item:

a. Test item identification number
b. Damage to:

   1) External surface
   2) Test item components

c. Leakage data collected as described in paragraph 6.2.7
d. Operability data collected as described in paragraph 6.2.8

6.3.3.7 Salt Fog Test

Record the following for each test item, as applicable:

a. Test item identification number
b. Evidence of corrosion:

   1) Test item
   2) Test item components

c. Evidence of water penetration
d. Leakage data collected as described in paragraph 6.2.7
e. Operability data collected as described in paragraph 6.2.8

6.3.3.8 Rain Test

Record the following for each test item, as applicable:

a. Test item identification number
b. Presence of corrosion:

   1) Test item
   2) Test item components

c. Evidence of water penetration
d. Leakage data collected as described in paragraph 6.2.7
e. Operability data collected as described in paragraph 6.2.8

6.3.4 Rough Handling and Surface Transport Tests

Record the following for each test item, as applicable:

a. Test performance (handling and transportation, shock, vibration)
b. Test item identification number
c. For test item container:

1) Presence of cracks, breaks, etc.
2) Undone binding, if applicable

d. Damage and deformation to the test item's exterior
e. Leakage data collected as described in paragraph 6.2.7
f. Operability data collected as described in paragraph 6.2.8

6.3.5 Air Transportability

6.3.5.1 Loading/Unloading

Record the following:

a. Type of aircraft used or simulated
b. Shipping container:

1) Length, width and height, in inches
2) Weight, in pounds
3) Material

c. Equipment used in loading
d. Difficulties encountered while loading
e. Damage incurred to the package while loading
f. Equipment used in unloading
g. Difficulties incurred in unloading

6.3.5.2 Simulated Flight Test

Record the following for each test item, as applicable:

a. Altitude simulated, in feet
b. Test item identification number
c. For test item shipping container:

1) Presence of cracks, breaks, etc.
2) Undone binding, if applicable

d. For test item individual package:

1) Presence of cracks, breaks, etc.
2) Undone binding, if applicable

e. Damage and deformation to the test item's exterior
f. Leakage data collected as described in paragraph 6.2.7
g. Operability data collected as described in paragraph 6.2.8

6.3.6 Air Drop Capability

a. Record the following for each test item:

1) Condition of test item (packaged, ready for field use)
2) Test item identification
3) Aircraft used
4) Aircraft air speed
5) Air conditions (calm, turbulent)
6) Air delivery system trajectory
7) Test item impact velocity in fps
8) Acceleration force of impact in G's
9) For test item package:

a) Packaging material used
b) Presence of cracks, breaks, etc.
c) Undone binding

10) For air test item:

a) Damage or deformities
b) Leakage data collected as described in paragraph 6.2.7
c) Operability data collected as described in paragraph 6.2.8

b. Retain all motion and still pictures

6.3.7 Leak Testing

Data shall be collected and recorded as described in the applicable sections of MTP 8-2-512.

6.3.8 Operational Reliability

a. Record the following for each individual test item undergoing operability tests:

1) Test items identification number
2) Temperature in °F
3) Relative humidity, in percent
4) Wind direction and speed, in mph
5) Operability of test item
6) Actual prescribed operating distance, in feet
7) The following measurements:

a) Range of dispersal, in yards
b) Area covered by decontamination solution, in sq. yds.
c) Amount of solution, in pints, remaining in container after decontamination operations.

d) If applicable, number of gas cylinders required to completely discharge apparatus.

8) Results of the laboratory analysis determining the effectiveness of decontamination
9) Camera speed, in frames per second

b. Record the following for all operability tests:

1) Total number of test items tested
2) Number of malfunctioning or nonfunctioning items
3) Reasons for malfunctions/nonfunctions, if known
4) Number and types of repairs required
5) Other aspects as deemed applicable to the reliability estimate

6.3.9 Assembly and Disassembly

a. Record the following:

1) Ease of disassembly
2) Time required to fill apparatus
3) Leakage occurrence
4) Difficulties in filling
5) Ease of reassembly and time required
6) Ease of pressurization and significant pressure data
7) Ease of operation to spray decontaminating solution

b. Retain all photographs.

6.3.10 Human Factors

Record the following:

a. Operations causing undue strain or fatigue
b. Ease of interpretation of response
c. Difficulties attributable to wearing protective clothing

6.3.11 Maintenance Aspects

a. Record the following:

1) Special tools required for maintenance
2) Special skills required to perform maintenance
3) Required maintenance
4) Ease of maintenance
5) Adequacy and clarity of maintenance instructions and manuals
6) Maintenance category
7) Recommendations regarding improvements that could be made

b. Retain all photographs.

6.4 DATA REDUCTION AND PRESENTATION

a. Information on which to base a Safety Release Recommendation shall be forwarded as soon as possible, and in any event within 30 days after beginning of testing, to the responsible directorate of U. S. Army Test and Evaluation Command. The Safety Release Recommendation information shall contain but not be limited to the following: Special safety considerations or hazards to personnel and materiel, (including developmental types of equipment as well as standard components used in the assemblage of items being tested).

b. Information collected before, during, and after the test shall be analyzed and reduced to tables, drawings, charts, graphs, documentary photographs (both motion and still), and narrative comments as appropriate. All data shall be reduced or presented with the objective of providing sound support for meaningful conclusions and recommendations pertinent to test objectives and should allow determining whether or not the item is suitable from an engineering test standpoint.

c. The presentation of data shall show clearly if the objectives of the test have been met.

d. Applicable security regulations and procedures shall be determined and observed in the compilation and presentation of data.

6.4.1 Receipt Inspection

a. Present data in tabular and photographic form where possible regarding serialization, physical characteristics, and condition of test item. Make note of any damaged or missing components.

b. Complete necessary forms and certificates.

6.4.2 Safety Evaluation

a. Supply information required by USATECOM Regulation 385-6 pertaining to the Safety Release Recommendation.

b. Present data and comments recorded relative to hazards to personnel during any phase of the testing.

c. Present completed forms, certificates, approvals, etc., as required to comply with applicable safety regulations, provisions, and SOP's.

6.4.3 Simulated Environmental Testing

a. Provide tabular presentation of item identification number, times tested, temperature and humidity measurements, and other information as indicated by applicable test criteria.

b. Present data on physical condition of test item after test. Include photographs and narrative comments as required.

c. Present data in tabular form or such other form as appropriate on operational check of test item after each environmental test that could be expected to affect the operation and performance of the item.

6.4.3.1 Exposure to Fresh and Salt Water

a. Present data as indicated in applicable portions of MIL-STD-810,

and as otherwise may be prescribed.

b. Present significant times, temperatures, and types of water sprays or salt fogs used.

c. Present data on physical condition of each item after test. Include photographs as necessary.

d. Present data on item operation after being subjected to water exposure testing.

6.4.4 Rough Handling and Surface Transport

a. Present data as indicated in applicable portions of MTP 8-2-503, and as otherwise may be prescribed. Include information on vibration and shock tests.

b. Present data in tabular form to indicate test times, distances (dropped), shock levels, vibration frequencies, etc., and significant findings of test. Include photographs of damage.

c. Present data on operation of test item after subjection to rough handling and surface transport conditions.

6.4.5 Air Transportability

a. Present data in summary form as indicted in applicable portions of MTP 7-1-002, and other pertinent testing documentation.

b. Present data on low-pressure, low temperature, and vibration testing and pressure-altitude cycling. Include information to indicate whether test item was in the packaged or unpackaged condition.

c. Present data regarding any significant aspects of the test item observed during conduct of air transport testing.

d. Present data on test item operation after subjection to air transport testing. Indicate any change in performance attributable to the test.

6.4.6 Air Drop Capability

a. Present data in accordance with applicable portions of MTP 7-2-509, and as indicated by other pertinent testing documentation.

b. Present data on the following:

1) Type of aircraft
2) Air speed, altitude, and meteorological conditions
3) Packaging material condition after test
4) Maximum "G" force on opening of parachute and on impact

c. Present narrative comments and data regarding ease or difficulty encountered in accomplishing air drop. Present photographs (as required) to indicate results of air drop.

d. Present data on operation and performance of the test item after air drop capability subtest.

6.4.7 Leak Testing

a. Present data as indicated by applicable portions of MTP-8-2-512.

b. Present results of leak testing, indicating the following representative data:

1) Liquid fill used
2) Pressurization pressures
3) Length of pressurization at each pressure
4) Leaks noted and areas of leakage

c. Present photographs of areas of damage or leakage.
d. Indicate any repairs made during leak testing and results of repair.

6.4.8 Operational Reliability

Data derived from this subtest shall be presented in narrative form, supplemented by drawings, photographs, charts, tables, graphs, or any other suitable means of displaying information. The report shall clearly conclude whether the test item meets the reliability criteria established in applicable specifications. Recommendations relative to further testing and methods to overcome malfunctions shall also be included.

6.4.9 Assembly and Disassembly

a. Data derived from this subtest shall be presented in a convenient form, supplemented by photographs and graphic or art presentations as required to substantiate the conclusions.
b. Present summary of comments regarding shortcomings and recommended improvements.

6.4.10 Human Factors

a. Data shall be presented regarding the following human factors aspects:

1) Size and weight considerations
2) Identification markings
3) Operating instructions and manuals

a) Level of education or skill required
b) Clarity and ease of use

b. Impairment of normal operations or mobility.
c. Physical irritation or inconvenience caused by test item.
d. Present a summary of comments regarding shortcomings and recommended improvements.

6.4.11 Maintenance Aspects

a. Present comments regarding the ease or difficulty involved in performing any required maintenance during the testing as well as adequacy of

the maintenance performed. Present summary of comments regarding maintenance instructions and manuals if applicable.

b. Present data or results of analyzing the design for maintenance provisions. Include comments regarding special tools and skills required. Indicate maintenance category of item.

c. Present summary of comments recorded regarding shortcomings or inadequacies of maintenance provisions.

d. Present recommendations regarding improvements that could be made.

GLOSSARY

1. Safety Statement: A statement issued by the developing agency which includes information pertaining to operational limitations and specific hazards peculiar to the systems or components tested.

2. Safety Release Recommendation: A statement issued by the testing agency containing information pertaining to the safety, or the hazards involved to personnel, of all materiel, including development types and standard components used in the assemblage of items being tested. Within thirty (30) days of the beginning of the test, this Safety Release Recommendation shall be forwarded (ASAP) to U. S. Army Test and Evaluation Command in compliance with TECOM Regulation 385-6.