

6 October 1969

Materiel Test Procedure 8-2-062
Deseret Test Center

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

DECONTAMINATING APPARATUSES, POWER DRIVEN,
VEHICULAR OR SKID MOUNTED

AD 720978

1. OBJECTIVE

The objective of this materiel test procedure (MTP) is to determine 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 reducing the hazard caused by chemical, biological, or radiological contamination in order to accomplish a mission. Means of decontaminating personnel, objects, or areas include the absorption, destruction, neutralization, weathering, covering, sealing, and physical removal of the contaminant.

Power driven decontaminating machinery is used primarily to decontaminate equipment, buildings, road surfaces, and terrain. Auxiliary uses can include fire fighting, field showers, pumping and carrying water, spraying water-soluble paint, de-icing aircraft, and dispensing herbicides or defoliants.

Some decontaminating agents are harmful to personnel and equipment. Engineering testing of power driven decontaminating apparatus is essential to evaluate: (1) the technical performance of the test item; (2) the need for further development; (3) the suitability for further testing; and (4) the safety aspects of the test item.

3. REQUIRED EQUIPMENT

a. Meteorological Equipment to measure and record:

- 1) Temperature
- 2) Wind direction and speed
- 3) Relative humidity

b. Appropriate Test Site

c. Suitable CBR Agent for Contamination

d. Protective Equipment - mask, gloves, overgarment, etc.

e. Laboratory Facilities

f. Photographic Equipment (color and black and white)

- 1) Still
- 2) Motion Picture

g. Type Cargo Aircraft or Simulated Equivalent

h. Environmental Chambers for:

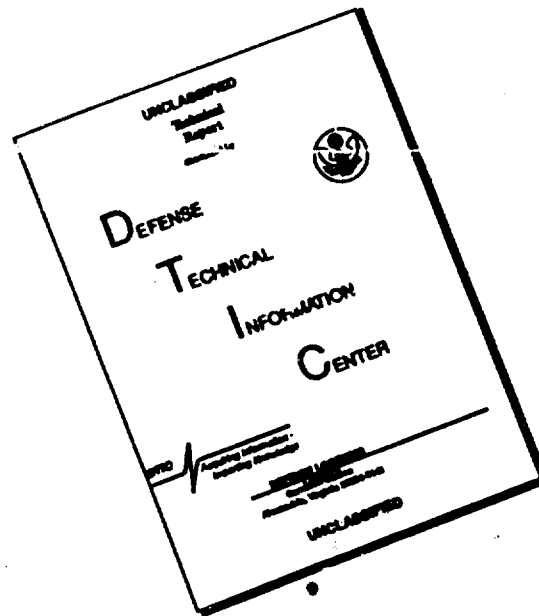
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- 1) Temperature - humidity testing (160°F; 95% RH; -65°F)
- 2) Fungus Testing
- 3) Dust Testing
- 4) Sunshine Testing
- 5) Salt fog Testing
- 6) Rain Testing

4. REFERENCES

- A. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
- B. USATECOM Regulation 705-4, Equipment Performance Report.
- C. MIL-STD-810B, Environmental Test Methods.
- D. USAMC Pamphlet 706-134, Engineering Design Handbook. Maintainability Guide for Design.
- E. Woodson, W. E., and D. W. Conover, Human Engineering Guide for Equipment Designers. 2nd Edition. Berkeley: University of California Press, 1966.
- F. MTP 8-2-500, Receipt Inspection.
- G. MTP 8-2-503, Rough Handling and Surface Transport.
- H. MTP 7-1-002, Air Portability and Airdrop Service Testing.
- I. MTP 7-2-515, Air Transport (Suitability of Equipment For).
- J. MTP 8-2-510, Decontamination.
- K. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers.

5. SCOPE

5.1 SUMMARY

The procedures outlined in this MTP provide general methods for determining the technical characteristics and performance of the test items. Specific testing requirements and procedures will be dictated by the performance and characteristics criteria for a particular test item.

The following procedures will be performed on a selective basis as required to determine if the test item meets the criteria established.

- a. Receipt Inspection - An inspection of the test item, as received, to: (1) determine its physical characteristics and condition; (2) locate any defects; and (3) identify damage received during transport. During this inspection, the test items will also be serially numbered for subsequent identification purposes.
- b. Safety Evaluation - To check the Safety Statement issued by the developing agency, and to identify the safety hazards, if any, which must be included in the Safety Release Recommendation required by reference 4A (USATECOM Regulation 385-6).
- c. Simulated Environmental Testing - A study to: (1) provide a basis for estimating the effects of extreme environments on the test item 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 effect of subjecting the test item to air transport conditions.

f. Decontamination Aspects - A study to determine the relative ease or difficulty involved in decontamination of the test item and the effects of decontamination.

g. Maintenance Aspects - A study to determine the technical characteristics of the test item relative to design-for-maintainability provisions, and the evaluation of maintainability aspects, maintenance manuals, and instructions.

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

i. Leak Testing - A study to determine if the test item leaks when subjected to standard leak tests and conditions.

j. Human Factors - A study to determine the characteristics of the test item that involve human factors considerations in handling and operating the test item.

k. Agent-Hardware Compatibility - A study to determine if the chemical agent fill and test item are compatible.

l. Auxiliary Capability - A study to measure the adaptability of the test item to auxiliary uses requiring spraying of liquids.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Safety Statement

The test officer will ensure that a Safety Statement has been received from the developing agency and is understood before the test is started. The Safety Statement includes information pertaining to operational limitations and specific hazards peculiar to the test item.

6.1.2 Meteorological Requirements

The test officer will ensure the following meteorological considerations are observed during field testing.

a. Functional field tests will not be initiated during precipitation or conducted in winds greater than 16km/hour unless specifically indicated by applicable materiel requirements criteria or requested by the ultimate user agency. Areas once contaminated will be decontaminated regardless of wind speed if decontamination is required.

b. Functional field tests are not executed when the wind speed or direction exceeds the limitations cited in the applicable safety SOP for the particular test range.

6.1.3 Equipment Performance Report

An Equipment Performance Report, if required, will be prepared and distributed in accordance with reference 4B (USATECOM Regulation 705-4).

6.1.4 Safety

a. Test plans and procedures will ensure performance in the safest manner consistent with fulfillment of the mission. Plans will 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 will be included. Such information will 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. Special attention should be paid to hazards to operators from exhaust gases.

b. One individual will be charged with responsibility for safety. He will be familiar with the construction and operation of the test item and its critical components, will have full knowledge of the hazards, and will recommend control measures.

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

6.1.5 Security

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

6.1.6 Logistical Requirements

Prior to the conduct of the test, the test officer will ensure that all logistical requirements are satisfied.

6.2 TEST CONDUCT

6.2.1 Receipt Inspection

Subject the test item to the applicable procedures of MTP 8-2-500, following its arrival at the test site, with emphasis on the following:

a. Visually inspect the test item package and record the following:

- 1) Evidence of damage, deterioration, or illegible markings
- 2) Missing components, instructions, or manuals

b. Measure and record the length, width, height, and weight of the test item package.

c. Unpack the test item and number it serially for future identification.

d. Test item inspection:

- 1) Visually inspect the test item and record all evidence of damage and deterioration, including:
 - a) Corrosion of hardware.
 - b) Broken connections and deteriorated or cracked hoses, seals, and valve packings.
 - c) Contamination with foreign material (solid and/or liquid).
 - 2) Determine the presence of internal damage to test item.
 - 3) Determine whether decontaminating agents leak from the test item as described in the leakage procedures of paragraph 6.2.9.
- e. Determine and record the width, length, height, and weight of the test item.
- f. Determine and record the test item power requirements.
- g. Obtain photographs of damaged items.

6.2.2 Safety Evaluation

- a. Observe the condition of the test item as received, and its subsequent operation for unsafe aspects.
- b. Note jagged edges, rust, dents, loose connections, or any other condition or features which make use of the test item hazardous to personnel.
- c. Pay particular attention to the results of the rough handling and surface transport tests and the environmental tests.
- d. Verify the safety aspects as cited in the Safety Statement prepared by the developing agency.
- e. Collect data to be included in the Safety Release Recommendation required by reference 4A (USATECOM Regulation 385-6).

6.2.3 Simulated Environmental Testing

6.2.3.1 Cyclic Storage

- a. Subject the test item in its packing container to cycles of climatic extremes. A cycle shall consist of three weeks duration as follows: Successive one week tests at humid, low temperature, and high temperature. Chamber conditions for each climatic condition are as follows:
 - 1) Humid Storage. The chamber shall be maintained at $113^{\circ}\text{F} \pm 2^{\circ}\text{F}$ and 85% R.H. for the duration of the test.
 - 2) Low Temperature Storage. The chamber shall be maintained at $-65^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for the duration of the test.
 - 3) High Temperature Storage. The chamber shall be maintained at $160^{\circ}\text{F} \pm 2^{\circ}\text{F}$ for the duration of the test.
- b. The test item shall be subjected to a minimum of three such cycles, or more if specified. Upon completion of each cycle, the container and contents shall be examined for damage.

6.2.3.2 Extreme-Temperature Tests

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

6.2.3.2.1 Low-temperature Tests - Place a minimum of 3 test items which have successfully passed the leak test of paragraph 6.2.9 in a temperature chamber and perform the following:

a. Reduce the chamber temperature to -53.9°C (-65°F); maintain it at -53.9°C for a period of 72 hours, and then visually inspect the test item and record any damage.

b. Raise the chamber temperature to the test item's 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 2°C (3.6°F) per hour.

- 1) Visually inspect the test item and record any damage.
- 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. Remove the remaining test items from the chamber, expose them to the local ambient temperature for 24 hours and perform the following:

- 1) Visually inspect the test items and record any damage.
- 2) Subject 1/2 of the test items to the leak test procedures of paragraph 6.2.9.
- 3) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

6.2.3.2.2 High-Temperature Tests - Place a minimum of 4 test items which have successfully passed the leak test of paragraph 6.2.9 in a temperature chamber and perform the following:

a. Adjust the chamber to a temperature of 71°C (160°F) and a relative humidity not in excess of 15 percent, maintain these conditions for a minimum of 48 hours and then visually inspect the test items and record any damage.

b. Adjust the chamber to a temperature of 49°C (120°F) and a relative humidity of no greater than 15 percent; maintain these conditions for a minimum of 24 hours and perform the following:

- 1) Visually inspect the test items and record any damage.
- 2) Remove 1/2 of the test items and perform the following:
 - a) Subject 1/2 of the test items to the leak test of paragraph 6.2.9.

- b) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.
- c. Remove remaining test items from the chamber, expose them to local ambient temperature and humidity for 24 hours, and perform the following:
 - 1) Visually inspect the test items and record any damage.
 - 2) Subject 1/2 of the test items to the leak test of paragraph 6.2.9.
 - 3) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

6.2.3.3 Fungus Test

- a. Subject a minimum of 2 test items to the fungi exposure of Procedure I, Method 508, reference 4C (MIL-STD-810B).
- b. At the completion of the exposure period, perform the following:
 - 1) Disassemble 1/2 of the test items and record if any fungus growth is visible on the test item components.
 - 2) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

6.2.3.4 Humidity Test

- a. Subject a minimum of 2 test items to the humidity cycling of Procedure I, Method 507, reference 4C (MIL-STD-810B).
- 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 item(s) to the procedures of paragraph 6.2.8.

6.2.3.5 Dust Test

- a. Subject a minimum of 2 test items to exposure conditions of Procedure I, Method 510, reference 4C (MIL-STD-810B).
- b. At the completion of the exposure period, perform the following:
 - 1) Visually inspect the test items and record any surface damage noted.
 - 2) Disassemble 1/2 of the test items and inspect the components for damage and presence of dust.
 - 3) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

6.2.3.6 Sunshine Test

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- a. Subject a minimum of 2 test items to the sunshine conditions of Procedure I, Method 505, reference 4C (MIL-STD-810B).
- b. At the completion of the exposure period, perform the following:
 - 1) Visually inspect the test items and record any surface damage such as deterioration of rubber or plastic components.
 - 2) Subject 1/2 of the test items to the leak test procedures of paragraph 6.2.9.
 - 3) Verify the operability of the test items by subjecting the remaining test item(s) 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 Procedure I, Method 509, reference 4C (MIL-STD-810B).
- 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 evidence of water penetration and corrosion.
 - 4) Subject 1/3 of the test items to the leakage test of paragraph 6.2.9.
 - 5) Verify the operability of the test items by subjecting the remaining test item(s) 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 Procedure I, Method 506, reference 4C (MIL-STD-810B).
- 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 evidence of water penetration and corrosion.
 - 3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.9.
 - 4) Verify the operability of the test items by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

6.2.4 Rough Handling and Surface Transport Tests

- a. Subject a minimum of 2 test items, packaged in their original containers, to the applicable procedures of MTP 8-2-503 including the following:
 - 1) Shock test of paragraph 6.2.2.1a.2
 - 2) Vibration test of paragraph 6.2.2.2a.3

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

- 1) Visually examine the test items package and crate for, and record the presence of cracks, breaks, undone binding, etc.
- 2) Visually examine the test items for, and record the presence of damage and deformation.
- 3) Subject 1/2 of the test items to the leakage test of paragraph 6.2.9.
- 4) Verify the operability of the test item by subjecting the remaining test item(s) to the procedures of paragraph 6.2.8.

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 and Unloading

Determine the ease of loading and unloading aircraft as described in the applicable section of MTP 7-2-515 or as follows:

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

a. Load the test item, in its shipping container (crate or package), 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 tiedown.
- 6) Damage incurred by the shipping container while loading.

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

- 1) Equipment used in unloading
- 2) Difficulties encountered while unloading
- 3) Damage incurred by the shipping container 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.

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- 2) Flight vibration conditions as described in the procedures of Equipment Class g (Shipment by Common Carrier) of Method 514 of reference 4C (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.b.

6.2.6 Decontamination Aspects

a. Decontaminate the test item as described by the applicable sections of MTP 8-2-510.

NOTE: The test item will be decontaminated in accordance with applicable criteria. Various candidate test items, decontamination agents, and other methods will be used.

b. After the decontamination, verify the operability of the test items using the procedures of paragraph 6.2.8.

6.2.7 Maintenance Aspects

a. Determine the test item maintenance aspects in accordance with reference 4D (USAMC Pamphlet 706-134).

b. Determine and record the following, as required:

- 1) Ease of maintenance performed.
- 2) Component interchangeability.
- 3) Adequacy and accuracy of the maintenance documentation.
- 4) Maintenance category of the test item.
- 5) Mean time-to-repair.
- 6) Special tools required.
- 7) The features of design which permit or enhance maintenance by personnel of average skill under environmental conditions similar to those under which maintenance is to be performed will be recorded.
- 8) Recommendations of possible improvements.

c. Photographs, where applicable, should clarify comments.

6.2.8 Operational Reliability

NOTE: 1. Reliability testing will 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 will have been previously 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) Air transportability tests (paragraph 6.2.5)
- d) Airdrop capability (paragraph 6.2.6)

a. Select a suitable test site and contaminate a suitable item or area with a CBR agent.

- NOTE: 1. The test site will meet all safety requirements and be of sufficient area to ensure that contamination is confined to the test site.
2. Types of agents to be used will be prescribed by governing performance criteria.

b. Operate the test item as indicated in applicable SDR's, QMR's, or TC's. Record actual operating times.

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. Measure and record the following:

- 1) The range of dispersal at the beginning of the spray and at the end of the spray.
- 2) The area covered by the decontaminating solution.
- 3) The quantity of solution remaining in the container.
- 4) Flow rate of solution.

e. Determine the effectiveness of the test item by following the applicable procedures of MTP 8-2-510.

f. Record the following for each performance:

- 1) Ambient temperature
- 2) Relative humidity
- 3) Wind direction and speed

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

- 1) Total number of test items used
- 2) Malfunctions
- 3) Reasons for malfunctioning or nonfunctioning, if known
- 4) Number and types of repairs required
- 5) Other aspects deemed applicable to the reliability estimate
- 6) Total operating hours for each item tested

6.2.9 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 6.2.3.2)
- 2) Salt fog tests (paragraph 6.2.3.7)
- 3) Rain tests (paragraph 6.2.3.8)

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- 4) Rough handling and surface transport tests (paragraph 6.2.4)
- 6) Simulated Flight test (paragraph 6.2.5.2)

b. Photograph any evidence of damage, leakage, or other failings that have a bearing on the evaluation of the test item.

c. When leakage is noted, make local repairs if possible, and re-test the item. Record the following:

- 1) Location of leakage
- 2) Repairs made
- 3) Effectiveness of repairs

6.2.10 Human Factors

Throughout the conduct of this MTP, observations will be made regarding the human factors engineering characteristics of the test item.

NOTE: Background information on human factors engineering testing is available in reference 4E (Woodson and Conover).

Specific areas of observations will include the following:

- a. Operations causing undue strain or fatigue
- b. Ease of handling and operating
- c. Ease of operation when wearing protective clothing, gloves, etc.
- d. Compatibility with field clothing and equipment
- e. Adequacy of instructions
- f. Factors which cause frequent complaints from operators

6.2.11 Agent-Hardware Compatibility Test

a. Remove the chemical agent from the test item and cross-section the test item.

b. Rinse with a suitable solvent until no agent is detectable.

c. Inspect inner surface of test item, and record the presence of corrosion, pitting, rust, peeling paint, or any adverse effect the agent fill may have had on the item.

d. Use photomicrographs to compare the surface of an unfilled test item with the surface of an item which had previously contained agent fill.

e. Determine the purity of the agent fill removed from the tank.

Note any adverse effects of the tank components on the agent fill and compare with the initial purity of the agent.

6.2.12 Auxiliary Capability

Evaluate the adaptability of the test item to auxiliary uses, such as fire fighting, supplying field showers, pumping and carrying water, paint spraying, de-icing aircraft, and dispensing herbicides or defoliants.

NOTE: This evaluation may usually be made in terms of limitations (or absence of limitations) deducible from measurements of

the item's technical performance in its primary function, decontamination.

a. Using the criteria of the test item's decontamination technical performance determine the following test item auxiliary capability:

- 1) For fire fighting - Record any test item features which prohibit or limit its use for fighting small fires (i.e. grass or brush fires).
- 2) For water pumping and dispensing - Record any reasons why the test item cannot be used for pumping, transporting and dispensing water for:
 - a) Potable water (i.e. decantaminating agent cannot be flushed completely).
 - b) Water for field showers.
 - c) Water for laundries.
- 3) For dispensing water - Soluble paints, de-icer fluids, herbicides, defoliants, etc. - Record any characteristics which would limit compatibility of the test item with the chemical and physical properties of the fluids used (i.e. corrosion effects, viscosity of fluid).

b. For those auxiliary capabilities the test item is considered suitable for, as in step a above, determine and record the following, for each fluid used, as applicable:

- 1) Flow rates.
- 2) Range of dispersal at the beginning of the spray and end of the spray.
- 3) Area covered by fluid used.
- 4) Effect of fluid on test item durability.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the following:

- 1) Data collected as described in applicable sections of MTP 8-2-500.
- 2) Missing components, instructions or manuals.
- 3) Power requirements.

b. Retain all photographs

6.3.2 Safety Evaluation

Record the following:

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a. Hazardous features:

- 1) Physical
- 2) Operational
- 3) Action taken to reduce or eliminate

b. Data collected for inclusion in Safety Release Recommendation

6.3.3 Simulated Environmental Tests

6.3.3.1 Cyclic Storage

Record the following for each cycle for each test item:

- a. Test item identification number
- b. Cycle number
- c. Damage to:

- 1) Container
- 2) Test item

6.3.3.2 Extreme Temperature Tests

6.3.3.2.1 Low Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of -53.9°C
 - 1) Damages incurred
- c. For equipment minimum operating temperature:
 - 1) Temperature in $^{\circ}\text{C}$
 - 2) Damages incurred
 - 3) Operability data collected as described in paragraph 6.2.8
- d. For ambient temperature:
 - 1) Temperature in $^{\circ}\text{C}$
 - 2) Test item damage
 - 3) Leakage data collected as described in paragraph 6.2.9
 - 4) Operability data collected as described in paragraph 6.2.8

6.3.3.2.2 High Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of 71°C :

1) Damages incurred

c. For temperature of 49°C:

1) Damages incurred

2) Leakage data collected as described in paragraph 6.2.9

3) Operability data collected as described in paragraph 6.2.8

d. For ambient temperature:

1) Temperature in °C

2) Damages incurred

3) Leakage data collected as described in paragraph 6.2.9

4) Operability data collected as described in paragraph 6.2.8

6.3.3.7 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

6.3.3.4 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

6.3.3.5 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

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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 6.2.9
- 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
 - b) Test item components
- c. Evidence of water penetration
- d. Leakage data collected as described in paragraph 6.2.9
- 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 6.2.9
- 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

- a. Test item identification number
- b. Data collected as described in applicable sections of MTP 8-2-503
- c. Damage and deformation to test item exterior
- d. Leakage data collected as described in paragraph 6.2.9
- e. Operability data as described in paragraph 6.2.8

6.3.5 Air Transportability

6.3.5.1 Loading and Unloading

Record the data collected as described in applicable sections of MTP 7-2-515 or 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. Method of tie down
- g. Equipment used in unloading
- h. Difficulties incurred in unloading
- i. Damage incurred to the package while unloading

6.3.5.2 Simulated Flight Test

- a. Record the following for each test item:
 - 1) Test item identification number
 - 2) Altitude simulated in feet
 - 3) For test shipping container:
 - a) Presence of cracks, breaks, etc.
 - b) Undone binding, if applicable
 - 4) Damage and deformation to the test item's exterior
 - 5) Leakage data collected as described in paragraph 6.2.9
 - 6) Operability data collected as described in paragraph 6.2.8

6.3.6 Decontamination Aspects

Record the following:

- a. Data collected as described in applicable sections of MTP 8-2-510
- b. Operability data collected as described in paragraph 6.2.8

6.3.7 Maintenance Aspects

a. Record the following:

- 1) Ease of maintenance.
- 2) Component interchangeability.
- 3) Adequacy and accuracy of maintenance documentations.

- 4) Maintenance category of test item.
- 5) Mean time-to-repair.
- 6) Special tools required.
- 7) Features of design enhancing maintenance by personnel of average skill.
- 8) Recommendations for improvement.

b. Retain all photographs

6.3.8 Operational Reliability

a. Record the following:

- 1) For each test item performance:
 - a) Test item identification number.
 - b) Actual operating time in minutes.
 - c) Camera speed in frames per second.
 - d) Data collected as described in applicable sections of MTP 8-2-510.
 - e) Range of dispersal at the beginning of the spray and at the end of the spray.
 - f) Area covered by the decontaminating solution.
 - g) The quantity of solution remaining in the container.
 - h) Flow rate of solution.
 - i) Ambient temperature.
 - j) Relative humidity.
 - k) Wind direction and speed.
- 2) For the cumulative test phase:
 - a) Total number of test items used
 - b) Malfunctions
 - c) Reasons for malfunctioning or nonfunctioning, if known
 - d) Number of types of repairs required
 - e) Other aspects applicable to the reliability estimate
 - f) Total operating hours for each item tested

b. Retain all motion picture film

6.3.9 Leak Testing

a. Record the following:

- 1) Location of leakage
- 2) Repairs made
- 3) Effectiveness of repairs

b. Retain all photographs

6.3.10 Human Factors

Record the following:

- a. Operations causing undue strain or fatigue
- b. Ease of handling and operating
- c. Ease of operation when wearing protective clothing
- d. Compatibility with field clothing and equipment
- e. Adequacy of instructions
- f. Factors which cause frequent complaints from operators

6.3.11 Agent-Hardware Compatibility

a. Record the following for each test item:

- 1) Test item identification number
- 2) Presence of the following on the test item inner surface:
 - a) Corrosion
 - b) Pitting
 - c) Rust
 - d) Peeling paint
 - e) Other
- 3) Effects of fill on casing surface
- 4) Effects of test item components on agent fill

- b. Retain all photographs
- c. Retain all laboratory analysis

6.3.12 Auxiliary Capability Evaluation

Record the following:

- a. Features which preclude or limit utility in fighting small fires.
- b. Features which preclude or limit utility of test item for pumping and dispensing the following:
 - 1) Potable water
 - 2) Water for field showers
 - 3) Water for laundries
- c. Characteristics which limit dispensing compatibility of test item with the chemical and physical properties of fluids of the following types:
 - 1) Water-soluble paint
 - 2) De-icer fluid
 - 3) Herbicides
 - 4) Defoliants
 - 5) Other fluids
- d. For each fluid identified with the auxiliary capability, as applicable.

- 1) Flow rates.
- 2) Range of disposal at the beginning of the spray and at the end of the spray.
- 3) Area covered by fluid.
- 4) Effect of fluid on test item availability.

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Receipt Inspection

- a. Data collected as a result of this procedure will be presented as indicated in the applicable portions of MTP 8-2-500.
- b. The description of the test item, number of items tested, and conditions upon receipt will be presented in tabular form.
- c. Results of the leak subtest shall be presented in narrative or other convenient form.
- d. Photographs shall be used to substantiate results.

6.4.2 Safety Evaluation

- a. A Safety Release Recommendation as required by USATECOM Regulation 385-6 will be forwarded to the U. S. Army Test and Evaluation Command within 30 days of the beginning of the test. The Safety Release Recommendation will describe special safety considerations or hazards to personnel and materiel, including developmental types of equipment as well as standard components used in assemblage of items being tested.
- b. Report data and comments relative to the safety hazards observed during any phase of testing.
- c. Report comments relative to suggested safety improvements.

6.4.3 Simulated Environmental Testing

- a. The results of the subtests conducted will be presented in tabular or other suitable form.
- b. The results of the operational check tests performed at the conclusion of the various environmental tests will be presented in narrative or other suitable form.

6.4.4 Rough Handling and Surface Transport Tests

- a. Rough handling and surface transport data will be presented as prescribed in MTP 8-2-503.
- b. Vibration and shock data will be presented in tabular form to indicate test times, distances dropped, shock levels, vibration frequencies, etc., and significant findings of the test. Include photographs of damage.
- c. Present data on operation of test item after subjection to rough handling and surface transport conditions, vibration, and shock.

6.4.5 Air Transportability Test

Data will be presented in summary form as indicated in the applicable

portions of MTP 7-1-002, MTP 7-2-515 and other pertinent testing instructions.

6.4.6 Decontamination Aspects

Data will be presented in summary form as indicated in the applicable portions of MTP 8-2-510.

6.4.7 Maintenance Aspects

Data from this subtest will be presented in narrative form. The report will be supplemented by photos, drawings, or other devices to substantiate the conclusions and recommendations.

6.4.8 Operational Reliability Test

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

6.4.9 Leak Testing

- a. The results of leak testing will be presented as prescribed in MTP 8-2-512.
- b. Narrative comments, photos, etc., shall be included as required.

6.4.10 Human Factors Aspects

- a. Data from this subtest will be presented in tabular, narrative, or other suitable form supplemented by photographs and graphic or art presentations as required.
- b. A summary of comments regarding shortcomings and recommended improvements will be presented.

6.4.11 Agent-Hardware Compatibility

Data from this subtest will be presented in narrative form and will clearly indicate whether a riot agent has an effect on the test item, its components, or vice versa. The report will be supplemented by photographs, drawings, or other devices required to support the conclusions.

6.4.12 Auxiliary Capability

Data from this subtest will be presented in narrative form and will clearly indicate the suitability and limitations in the adaptability and utility of the test item for auxiliary purposes.