31 January 1969

Materiel Test Procedure 8-2-083
Deseret Test Center

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

DISPERSERS, RIOT CONTROL AGENT, VEHICULAR OR HELICOPTER MOUNTED

1. OBJECTIVE

The objective of this commodity engineering Materiel Test Procedure (MTP) is to establish uniform procedures for determining and evaluating the technical performance of vehicular or helicopter mounted riot control agent dispersers in terms of the criteria established by applicable Qualitative Materiel Requirements (QMRs), Small Development Requirements (SDRs), Technical Characteristics (TCs), and other design requirements or specifications. These procedures will also permit evaluation of the relative safety of tested items in the hands of Army troops and the safety of those items for service testing.

2. BACKGROUND

Riot control agent dispersers are used for controlling uprisings and disturbances. They generally contain in separate compartments a chemical irritant and a gas propellant which are forced through a nozzle during operation to generate aerosols. Any leakage of chemicals may thus pose a danger to the operating personnel and contaminate the surroundings. Furthermore, mission efficiency requires that the generated aerosols have the proper density and dispersion characteristics.

As new types of dispersers are developed, engineering tests are required to determine if the established technical and safety requirements are satisfied.

3. REQUIRED EQUIPMENT

a. Facilities:

1) Suitable gridded test range.
2) Suitable area or chamber for dissemination of riot control agent.
3) Environmental test chambers offering controlled:

a) Temperature and humidity (-65°F, +155°F, 95%RH)
b) Salt fog
c) Dust
d) Pressure-altitude
e) Sunshine
f) Fungus

b. Meteorological Equipment:

1) Temperature recording equipment

2) Anemometers
3) Humidity recording equipment

c. Gas Protective Clothing and Gas Masks (fume, aerosol, particle)
d. First Aid and Medical Supplies
e. Applicable Riot Control Agent
f. Photographic Equipment (color and black-and-white):

1) Still cameras and film
2) Motion-picture cameras and film

g. Laboratory Facilities for analyzing air samples
h. Trucks and Helicopters
i. Radiographic Equipment
j. Materiels Handling Equipment, as required
k. Equipment as needed to pressurize the dispersers

4. REFERENCES

A. USATECOM Regulation 385-6, Safety Release.
B. USATECOM Regulation 705-4, Equipment Performance Report.
C. USAMC Pamphlet 706-134, Engineering Design Handbook, Maintainability Guide for Design.
D. MIL-STD-810B, Environmental Test Methods.
E. MTP 7-1-002, Air Portability and Airdrop Service Testing.
F. MTP 7-2-509, Airdrop Capability of Materiel.
G. MTP 7-2-515, Air Transport, Internal.
H. MTP 7-2-516, Air Transport, External.
I. MTP 8-2-500, Receipt Inspection.
J. MTP 8-2-503, Rough Handling and Surface Transport.
K. MTP 8-2-510, Decontamination.
L. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers.
M. MTP 8-2-513, Dissemination Characteristics, CM Munitions/ Dissemination Devices.

5. SCOPE

5.1 SUMMARY

These tests determine the operating and safety characteristics of the test items before and after they have been subjected to adverse environments, and rough handling. 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

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defects it may have, and (3) identify damage received during transport. During this inspection, the test items will be serially numbered for subsequent identification purposes.

b. Safety Evaluation - The objective of this procedure is 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 provide a basis for estimating the effects on the test item of extreme temperatures, water immersion, humidity, sunshine, salt fog, fungus, and dust.

d. Rough Handling and Surface Transport Tests - 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 Test - A study to determine the effects of subjecting the test item to air transport conditions.

f. Airdrop Capability Tests - A study to determine the effects on the test item resulting from its being subjected to airdrop conditions (delivery by parachute).

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

h. Installation and Maintenance Aspects - A study to determine the adequacy of installation and maintenance aspects of the test item relative to pertinent standards, requirements, and criteria.

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

j. Leak Testing - A study to determine if it is possible for the test item's contents to leak when the item is subjected to standard conditions.

k. Human Factors Aspects - A study to determine whether or to what extent the demands of human engineering have been met in the design of the test item.

l. Dissemination Characteristics - A study to determine if the test item meets the established criteria for dissemination of its agent fill.

m. Agent-Hardware Compatibility Tests - A study to determine if the riot control agent and disperser have an adverse effect on each other.

5.2 LIMITATIONS

This MTP deals only with riot control agent dispersers which are vehicle or helicopter mounted. Portable dispersers are the subject of MTP 8-2-082.

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 that 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 16 km/hr unless specifically indicated by applicable materiel requirements criteria or requested by the ultimate user agency.

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

6.1.3 Safety

a. Test and subtest plans and procedures will ensure performance in the safest manner consistent with accomplishing 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 (paragraph 6.1.1) 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.

b. A specific 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.

d. Protective masks will be worn by all aircraft crew members during tests involving aerial dispencing or dropping of incapacitating agents. New equipment training (NET) for emergency procedures and proper protective equipment (including masks) will be provided for surface vehicle operators and test crew members.

6.1.4 Security

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

6.1.5 Logistical Requirements

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

6.1.6 Test Sequence and Sample Size

The desirable test sequence is shown in Table I. The order of the first three tests is mandatory, but the order of the remaining tests may be varied at the option of the test officer. Availability and economic considerations will govern the number of items to be tested. It is suggested, however, that the test sample contain at least four items. Two will be charged with the applicable riot control agent and will be used to establish the operational reliability of the item. The remaining items will not contain agent and will be subjected to the leak tests of paragraph 6.2.10.

Table I. Recommended Test Sequence

Paragraph	Subtest Title
6.2.1	Receipt inspection
6.2.10	Leak testing
6.2.9	Operational reliability test
6.2.12	Dissemination characteristics
6.2.3.1.1	High temperature tests
6.2.3.1.2	Low temperature tests
6.2.3.2	Sunshine test
6.2.3.3	Water immersion test
6.2.3.4	Humidity test
6.2.3.5	Fungus test
6.2.3.6	Salt fog test
6.2.3.7	Dust test
6.2.4.1	Handling and transportation test
6.2.4.2	Vibration test
6.2.4.3	Shock test
6.2.4.4	Crash safety test
6.2.6.1	Shipping container test
6.2.6.2	Field use test

6.1.7 Repairs and Corrections

All repairs, corrections, and maintenance performed on the test items during the test sequence will be recorded, as well as the most probable cause of the damage that necessitated the corrections. If required, an equipment performance report will be prepared and distributed in accordance with reference 4B (USATECOM Regulation 705-4).

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) Indications 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 serialize it 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 etc.
c) Contamination with foreign materiel (solid and/or liquid)

2) Determine the presence of internal damage to test item as described in the radiography procedures if required.
3) Determine the test item's leakage as described in the leakage procedures of paragraph 6.2.10.

e. Determine and record the following:

1) Width, length, height, and weight of the test item
2) Radial and longitudinal center of gravity of the test item.
3) Operability of the test item's pressure gages.
4) Tightness of all connections.

f. Obtain photographs of damaged items.

6.2.2 Safety Evaluation

a. Observe the condition of the test item as received, and subsequent operation thereof, 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. Ascertain the presence of adequate handholds for safe manipulation of the test item during installation on vehicle and/or helicopter.

d. Evaluate the adequacy of the test item's tiedown arrangements.

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

f. Collect data to be included in the Safety Release Recommendation required by reference 4A (USATECOM Regulation 385-6).

g. When the test item is fully charged and in operating condition, check the high-pressure component couplings for rigidity and security.

6.2.3 Simulated Environmental Testing

6.2.3.1 Extreme Temperature Tests:

6.2.3.1.1 High Temperature Tests - Place a minimum of 4 fully charged test

items which have successfully passed the leak test of paragraph 6.2.10 in a temperature chamber, and perform the following:

a. Adjust the chamber to a temperature of 68.3°C (155°F) and a relative humidity of 15 percent, maintain these conditions for a minimum of 4 hours, then visually inspect the test items and record any damage.

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

1) Visually inspect the test items and record any damage.
2) Remove one-half the test items and perform the following:

a) Subject one-half of the test items to the leak test of paragraph 6.2.10.
b) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

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

1) Visually inspect the test items and record any damage.
2) Subject one-half of the test items to the leak test of paragraph 6.2.10.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

6.2.3.1.2 Low Temperature Tests - Place a minimum of 4 fully charged items 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 -40°C (-40°F), 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 2.0°C (3.6°F) per hour.

1) Visually inspect the test items and record any damage.
2) Remove one-half test items and perform the following:

a) Subject a minimum number of these items to the leak test of paragraph 6.2.10.
b) Verify the operability of the test items by subjecting

the remaining items to the procedures of paragraph 6.2.9.

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

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

1) Visually inspect the test items and record any damage.
2) Subject a minimum number of the test items to the leak test procedures of paragraph 6.2.10.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

6.2.3.2 Sunshine Test

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

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

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

2) Subject a minimum number of test items to the leak test procedure of paragraph 6.2.10.
3) Verify the operability of the test items by subjecting the remaining test items to the procedures of paragraph 6.2.9.

6.2.3.3 Water Immersion Test

a. Subject a minimum of two fully charged test items to the water immersion conditions of reference 4D (MIL-STD-810B) Procedure I, Method 512, and record the following if required:

1) Presence of bubbling
2) Immersion time to bubbling

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

1) Disassemble a minimum number of test items and inspect the components for evidence of water penetration.
2) Verify the operability of the test items by subjecting the

remaining items to the procedures of paragraph 6.2.9.

6.2.3.4 Humidity Test

a. Subject a minimum of one fully charged test item to the humidity cycling of reference 4D (MIL-STD-810B) Procedure I, Method 507.
b. At the completion of the cycling period, perform the following:

1) Visually inspect the test item and record any signs of corrosion.
2) Verify the operability of the test item by subjecting it to the procedures of paragraph 6.2.9.
3) Disassemble the test item and inspect the components for corrosion and/or deterioration.

6.2.3.5 Fungus Test

a. Subject a minimum of one fully charged test item to the fungus exposure of reference 4D (MIL-STD-810B) Procedure I, Method 508.
b. At the completion of the exposure period, perform the following:

1) Verify the operability of the test item by subjecting it to the procedures of paragraph 6.2.9.
2) Disassemble the test item and record if fungus was present on the components.

6.2.3.6 Salt Fog Test

a. Subject a minimum of one fully charged test item to the conditions of reference 4D (MIL-STD-180B) Procedure I, Method 509.
b. At the completion of the salt fog spray exposure, perform the following:

1) Rinse the test item with clear water.
2) Visually inspect the test item for and record the presence of corrosion.
3) Verify the operability of the test item by subjecting it to the procedures of paragraph 6.2.9.
4) Disassemble the test item and inspect the components for and record:

a) Evidence of water penetration
b) Presence of corrosion

6.2.3.7 Dust Test

a. Subject a minimum of one fully charged test item to exposure conditions of reference 4D (MIL-STD-810B) Procedure I, Method 510.
b. At the completion of the exposure period, perform the following:

1) Visually inspect the test item, and record any surface

damage noted.
2) Verify the operability of the test item by subjecting it to the procedures of paragraph 6.2.9.
3) Disassemble the test item and inspect the components for damage and presence of dust.

6.2.4 Rough Handling and Surface Transport Tests

6.2.4.1 Handling and Transportation Test

a. Subject a minimum of two test items, crated or packaged for shipment, to the following procedures of reference 4J (MTP 8-2-503):

1) Vibration test of paragraph 6.2.2.2.1, using curve Y (parts 1, 2, and 3), Procedure I.
2) Shock test of paragraph 6.2.2.1.2.

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

1) Visually examine the test item's package or crate for, and record the presence of, cracks, breaks, undone bindings, etc.
2) Visually examine the test items for, and record the presence of, damage and deformation.
3) Subject one of the test items to the leakage test of paragraph 6.2.10.
4) Verify the operability of the test item by subjecting the remaining items to the procedures of paragraph 6.2.9.

6.2.4.2 Vibration Test

a. Mount a minimum of two test items, in a ready-to-operate condition, on a vibrating fixture. Subject the test items to Curve Y (parts 1, 2, and 3), reference 4D (MIL-STD-810B) Procedure I, Method 514.

NOTE: Simulate the normal method of installing these items on hilicopters and trucks.

b. At the completion of the test, visually examine the test items and describe any external damage noted.

6.2.4.3 Shock Test

a. Mount a minimum of two test items, in a ready-to-operate condition, on a shock test machine. Subject the test items to reference 4D (MIL-STD-810b) Procedure II, Method 516.

NOTE: Simulate the normal method of installing these items on helicopters and trucks.

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

1) Visually examine the test items for, and record the presence of damage and deformation.
2) Subject one of the test items to the leakage test of paragraph 6.2.10.
3) Verify the operability of the test item be subjecting the remaining items to the procedures of paragraph 6.2.9.

6.2.4.4 Crash Safety Test

a. Subject a minimim of two test items, mounted as in paragraph 6.2.4.3, to the conditions of reference 4D (MIL-STD-180B) Procedure III, Method 516.

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

1) Visually examine the test items for and record the presence of damage and deformation.
2) Subject one item to the leak test of paragraph 6.2.10.
3) Verify the operability of the remaining test items by subjecting it to the procedures of paragraph 6.2.9.

6.2.5 Air Transportability Test

Determine the ease of loading and unloading aircraft as described in the applicable section of reference 4G (MTP 7-2-515) and/or reference 4H (MTP 7-2-516) or as follows:

NOTE: Background information on air transportability is contained in reference 4E (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 materiel.
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.

6.2.6 Airdrop Capability Tests

The airdrop capability of the test item, when in its shipping

container (crate or package) and when prepared for field use, will be determined as described in the applicable sections of reference 4F (MTP 7-2-509) and as follows:

6.2.6.1 Shipping Container Test

a. Rig a minimum of two test items in the appropriate airdrop containers, and drop the containers from aircraft flying at the altitude and velocity selected in accordance with reference 4F (MTP 7-2-509). Record the following:

1) Aircraft used
2) Aircraft altitude
3) Aircraft velocity
4) Meteorological conditions
5) Air delivery systems trajectory and impact velocities
6) "G" force magnitude at impact.

b. Conduct visual coverage of the airdrop test procedures with motion and still cameras.

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, damage and deformation.
3) Subject one of the test items to the leakage test of paragraph 6.2.10.
4) Verify the operability of the test items by subjecting the remaining test item to the procedures of paragraph 6.2.9.

6.2.6.2 Field Use Test

Repeat steps a, b, and c2 through c4 of paragraph 6.2.6.1 with a test item dropped in field use condition.

6.2.7 Decontamination Aspects

a. Decontaminate test items as described by the applicable portions of reference 4K (MTP 8-2-510).

b. After the decontamination, verify the operability of the test items using the procedures of paragraph 6.2.9.

6.2.8 Installation and Maintenance Aspects

6.2.8.1 Installation Aspects

a. Install and remove the test items from appropriate trucks and helicopters in accordance with applicable instructions, manuals, etc., and record the following for each performance and type of transport:

1) Type of transport
2) Special tools or skills required
3) Ease of installation
4) Ease of removal
5) Adequacy of instructions
6) Mission readiness time (installation)
7) Turnaround time
8) Any difficulties encountered

b. Photograph the following with a still camera:

1) The test items installed on each appropriate transport.
2) Difficulties and poor fits which can be best described through photographs.

6.2.8.2 Maintenance Aspects

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

NOTE: The features of design which permit or enhance the accomplishment of maintenance by personnel of average skill, under environmental conditions similar to those in which maintenance is to be performed, shall be recorded.

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) Adequacy of spare parts supply
5) Maintenance category of the test item if previously established.
6) Mean time-to-repair
7) Special tools required
8) Recommendations pertaining to improvements that could be made.

c. Photographs, where applicable, should clarify comments.

6.2.9 Operational Reliability Test

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 QMRs, SDRs or TCs. Unless otherwise specified, it is not required to install the test item on a truck or helicopter before performing this test.
2. The operability of the test items will be ascertained upon receipt and after each of the following test procedures unless otherwise specified by the test

plan:

a. Simulated environmental testing (paragraph 6.2.3)
b. Rough Handling and surface transport tests (paragraph 6.2.4)
c. Airdrop capability tests (paragraph 6.2.6).

a. Select a suitable test site for evaluation of the riot control agent.

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

b. Fire the test item as indicated in applicable SDRs, QMRs, or TCs, using the short-burst method.

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

d. Make and record the following measurements:

1) The trigger pull for complete opening of the valve.
2) The range of dispersal at the beginning of the spray and at the end of the spray.
3) The area covered by the riot control agent.
4) The quantity of agent remaining in the container.

e. Record the following for each performance:

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

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

1) Malfunctions.
2) Reasons for malfunctioning or nonfunctioning if known.
3) Number and types of repairs required.
4) Other aspects as deemed applicable to the reliability estimate.

6.2.10 Leak Testing

a. Determine if the fully charged test item leaks as described in paragraph 6.2.4 of reference 4L (MTP 8-2-512) upon receipt of the item and at the completeion of the following:

NOTE: Because helium diffuses rapidly through the walls of rubber tubing, it is preferable to use a halogen for these tests.

1) Extreme temperature tests (paragraph 6.2.3.1)
2) Sunshine tests (paragraph 6.2.3.2).
3) Rough handling and surface transport tests (paragraph 6.2.4)
4) 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 will be obtained.

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

1) Repairs made
2) Effectiveness of repairs

6.2.11 Human Factors Aspects

Throughout the conduct of this MTP, observations will be made relative to the human factors engineering characteristics of the test item. Specific areas of observation will include the following:

a. Adequacy of handholds and lifting surfaces.
b. Ease of mounting, dismounting, and operating the equipment.
c. Compatibility with field clothing and equipment, i.e., ease of installation and operation by personnel wearing protective clothing, gloves, etc.
d. Adequacy of instructions.
e. Triggering mechanism's ease of pull and shutoff.
f. Factors which caused frequent complaints from operators.

NOTE: Background information on human factors engineering testing is available in reference 4C (USAMC Pamphlet 706-134).

6.2.12 Dissemination Characteristics

a. Determine the dissemination characteristics of the test item as described in the applicable portions of reference 4M (MTP 8-2-513).

NOTE: The test item shall be operated in accordance with the applicable test criteria and operating instructions.

b. In addition to the data collected during the conduct of MTP 8-2-513, determine and record the following:

1) Dispersion characteristics.
2) Cloud persistency.
3) Cloud characteristics.

4) The minimum amount of agent that can be discharged in a single burst as an effective cloud.
5) Time of an effective burst.
6) Weight of agent dispersed, per burst.

NOTE: Such weight measurement shall be made by any convenient method.

7) Meteorological conditions.

c. Photograph all operations with a motion-picture camera, using colored film.

6.2.13 Agent-Hardware Compatibility Tests

a. Remove agent from disperser and cross-section disperser and valves.

b. Clean any remaining agent from the inner wall of the disperser.

c. Inspect inner surface of disperser for, and record the presence of corrosion, pitting, rust, peeling paint, or any deleterious effect agent fill may have had on disperser wall and valves.

d. Use photomicrography to compare surface of casing of unfilled disperser with one which previously contained agent fill. Record fill effects.

e. Determine purity of agent fill removed from the disperser. Note any deleterious effects of the disperser components on agent fill and compare with initial purity of agent.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the data collected as described in applicable sections of MTP 8-2-500 and the following:

1) For the test item package:

a) Indications of damage, deterioration, or illegible markings.
b) Missing components, instructions, or manuals.
c) Length, width, height in feet and inches.
d) Weight, in pounds.

2) For the test item:

a) Evidence of damage or deterioration:

(1) Corrosion of hardware.
(2) Broken connections and deteriorated or cracked hoses, seals, etc.
(3) Evidence of contamination from foreign materiel.

b) Radiography data, if collected, as described in MTP 8-2-500.
c) Leakage data collected as described in paragraph 6.2.10.
d) Height, width, and length in feet and inches.
e) Weight in pounds.
f) Location of radial and longitudinal centers of gravity.
g) Operability of pressure gages.
h) Tightness of connections.

b. Retain all photographs for the test file.

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 Testing

6.3.3.1 Extreme Temperature Tests

6.3.3.1.1 High Temperature Tests

Record the following for each test item, as applicable:

a. Test item identification number
b. For temperature of 68.3°C (155°F) damage incurred.
c. For temperature of 48.9°C (160°F):

1) Damage incurred
2) Leakage data collected as described in paragraph 6.2.10
3) Operability data collected as described in paragraph 6.2.9

d. For ambient temperature:

1) Temperature in °C and °F
2) Damage incurred
3) Leakage data collected as described in paragraph 6.2.10
4) Operability data collected as described in paragraph 6.2.9

6.3.3.1.2 Low Temperature Tests

Record the following for each test item, as applicable:

a. Test item identification number
b. For temperature of -53.9°C (-65°F); damage incurred
c. For temperature of -40°C (-40°F):

1) Damage incurred

2) Operability data collected as described in paragraph 6.2.9

d. For ambient temperature:

1) Temperature in °C and °F
2) Test item damage
3) Leakage data collected as described in paragraph 6.2.10
4) Operability data collected as described in paragraph 6.2.9

6.3.3.2 Sunshine Test

Record the following for each test item:

a. Test item identification number
b. Damage to:

1) External surfaces
2) Test item components

c. Leakage data collected as described in paragraph 6.2.10
d. Operability data collected as described in paragraph 6.2.9

6.3.3.3 Water Immersion Test

Record the following for each test item as applicable:

a. Test item identification number
b. During immersion:

1) Presence of bubbling, if any
2) Immersion time to bubbling, if any, in minutes
3) Presence of water penetration
4) Operability data collected as described in paragraph 6.2.9

6.3.3.4 Humidity Test

Record the following for each test item:

a. Test item identification number
b. Operability data collected as described in paragraph 6.2.9
c. Evidence of corrosion on test item and components

6.3.3.5 Fungus Test

Record the following for each test item:

a. Test item identification number
b. Operability data collected as described in paragraph 6.2.9
c. Presence of fungus on test item and components

6.3.3.6 Salt Fog Test

Record the following for each test item as applicable:

a. Test item identification number
b. Operability data collected as described in paragraph 6.2.9
c. Evidence of corrosion on test item and components
d. Evidence of water penetration

6.3.3.7 Dust Test

Record the following for each test item:

a. Test item identification number
b. Operability data collected as described in paragraph 6.2.9
c. Damage to:

    1) External surfaces
    2) Test item components

d. Presence of dust on test item components

6.3.4 Rough Handling and Surface Transport Tests

6.3.4.1 Handling and Transportation Tests

Record the following for each test item, as applicable:

a. Test item identification number.
b. Data collected as described in the applicable sections of MTP 8-2-503.
c. Evidence of wear and damage to test item and components.
d. Leakage data collected as described in paragraph 6.2.10.
e. Operability data collected as described in paragraph 6.2.9.

6.3.4.2 Vibration Test

a. Record the test item identification number.
b. Describe visible external damage that resulted from the test.

6.3.4.3 Shock Test

Record the following for each test item, as applicable:

a. Test item identification number
b. Evidence of wear and damage to test item and components
c. Data as collected under the applicable sections of MIL-STD-810B
d. Leakage data collected as described in paragraph 6.2.10
e. Operability data collected, as described in paragraph 6.2.9

6.3.4.4 Crash Safety Test

Record the following for each test item:

a. Test item identification number
b. Evidence of damage to test item and components
c. Leakage data collected as described in paragraph 6.2.10
d. Operability data collected as described in paragraph 6.2.9

6.3.5 Air Transportability Test

Record the following:

a. Data collected as described in the applicable sections of MTP 7-2-515 and/or MTP 7-2-516.
b. Type of aircraft used or simulated.
c. Shipping container:

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

d. Equipment used in loading.
e. Difficulties encountered while loading.
f. Method of tiedown.
g. Damage incurred by the package while loading.
h. Equipment used in unloading.
i. Difficulties incurred in unloading.

6.3.6 Airdrop Capability Tests

a. Record the following for each test item:

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

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

10) For air test items:

a) Damage or deformities.
b) Leakage data collected as described in paragraph 6.2.10.
c) Operability data collected as described in paragraph 6.2.9.

b. Retain all motion and still pictures for the test file.

6.3.7 Decontamination Aspects

Record the following for each test item undergoing decontamination:

a. Data collected as described in the applicable sections of MTP 8-2-510.

b. Operability data collected as described in the applicable procedures of paragraph 6.2.9.

6.3.8 Installation and Maintenance Aspects

6.3.8.1 Installation Aspects

a. Record the following for each type of aircraft and performance:

1) Type of aircraft
2) Special tools or skills required
3) Ease of installation
4) Ease of removal
5) Adequacy of instructions
6) Mission readiness time, in minutes
7) Turnaround time, in minutes
8) Difficulties encountered

b. Retain photographs showing:

1) Test item installed on each appropriate aircraft
2) Difficulties encountered

6.3.8.2 Maintenance Aspects

a. Record the following:

1) Special tools required for maintenance
2) Mean time to repair
3) Component interchangeability
4) Ease of maintenance
5) Adequacy and clarity of maintenance instructions and manuals
6) Adequacy of spare parts supply
7) Maintenance category
8) Recommendations regarding improvements that could be made

b. Retain all photographs for the test file

6.3.9 Operational Reliability Test

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

1) Test item's identification number
2) Temperature in °C

3) Relative humidity in percent
4) Wind direction and speed, in mph
5) Operability of test item
6) Actual and prescribed operating distance in feet
7) The following measurements:

a) Range of dispersal, in yards.
b) Area covered by riot control agent, in square yards.
c) Amount of agent remaining in container after operations.
d) Amount of trigger pull for complete opening of the valve in pounds.

8) Camera speed in frames/second

b. Record the following for all operability tests:

1) Malfunctions.
2) Reasons for malfunctions or nonfunctions if known.
3) Number and types of repairs required.
4) Other aspects as deemed applicable to the reliability estimate.

c. Retain all photographs for the test file.

6.3.10 Leak Testing

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

6.3.11 Human Factors Aspects

Record the following for the test item, as applicable:

a. Adequacy of handholds and lifting surfaces
b. Ease of mounting, dismounting, and operating test item
c. Compatibility with other clothing and equipment
d. Adequacy of instructions
e. Ease of pull and shutoff of trigger mechanism
f. Factors which caused frequent complaints from operators

6.3.12 Dissemination Characteristics

a. Record the following for the test item:

1) Dispersion characteristics.
2) Cloud characteristics.
3) Cloud persistency.
4) Minimum amount of agent which can be dispersed in a single burst as an effective cloud.
5) Time in minutes of an effective burst.

6) Weight in pounds of agent dispersed per burst.
7) Temperature in °C.
8) Relative humidity in percent.
9) Wind direction and speed, in mph.

b. Retain all photographs for the test file

6.3.13 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) Deleterious effect on agent fill

3) Effects of fill on casing surface
4) Effects of test item components on agent fill

b. Retain all photographs for the test file
c. Retain all laboratory analyses for the test file

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 and X-ray pictures 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 ovserved 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, MTP 7-2-516 and other pertinent testing instructions.

6.4.6 Airdrop Capability Tests

a. The results of the subtest will be presented as prescribed in MTP 7-2-509 and shall include the following:

1) Type of aircraft.
2) Airspeed, altitude, and meteorological conditions.
3) Packaging material condition after test.
4) Maximum force, in g's, on opening of parachute and on impact.

b. Present narrative comments and data regarding ease or difficulty encountered in accomplishing airdrop. Present photographs as required to indicate results of airdrop.

c. Present data on operation and performance of the test item after airdrop capability subtest.

6.4.7 Decontamination Aspects

The results of this subtest will be presented as indicated in the applicable portions of MTP 8-2-510.

6.4.8 Installation and 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.

6.4.9 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.

6.4.10 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.

6.4.11 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. Dissemination Characteristics

a. The results of this subtest will be presented as prescribed in MTP 8-2-513.

b. Drawings, tables, charts, photographs, or other means of presentation will be included to report sampling techniques, sampling results, etc.

c. Narrative comments will be included, as required.

6.4.13 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.