

6 October 1969

Matériel Test Procedure 8-2-013
Deseret Test Center

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

SHIPPING CONTAINERS, TOXIC CHEMICAL AGENT

AD 721609

1. OBJECTIVE

The objective of this matériel test procedure (MTP) is to establish uniform procedures for determining and evaluating the technical performance and safety aspects of toxic chemical agent shipping containers, in terms of the criteria established by the applicable Qualitative Matériel Requirements (QMR's), Small Development Requirements (SDR's), Technical Characteristics (TC's) and other design requirements or specifications.

2. BACKGROUND

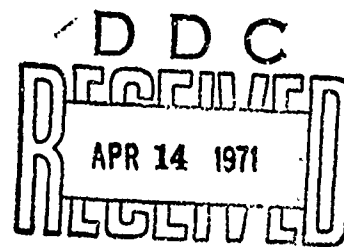
Toxic chemical agents are extremely hazardous, and every protection should be taken for their safe transportation and storage. Shipping containers must remain sealed until they reach their destinations, and must not permit their contents to leak under any condition encountered in service. The containers must satisfy stringent military and civilian regulations.

Of particular importance is the ability of the containers to withstand leakage of their contents when subjected to crash-induced shocks. In one design, the main container has nested in it one or more smaller sealed containers.

Engineering tests and procedures are required to determine if established technical and safety requirements are met by existing and future containers.

3. REQUIRED EQUIPMENT

- a. Materials Handling Equipment
- b. Photographic Equipment for:
 - 1) Still
 - 2) Motion
- c. Environment Test Chambers for:
 - 1) Temperature-Humidity testing
 - 2) Temperature-Pressure testing
 - 3) Sunshine testing
 - 4) Salt fog testing
 - 5) Fungus testing
- d. Water immersion tank
- e. Meteorological Equipment to Measure and Record:
 - 1) Temperature
 - 2) Wind speed and direction
 - 3) Relative humidity



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4) Barometric Pressure

- f. Aircraft or Simulated Aircraft
- g. Air Crash Testing Facilities
- h. Airdrop Testing Facilities

4. REFERENCES

- A. USATECOM Regulation 385-6, Verification of Safety of Materiel During Testing.
- B. MIL-STD-810B, Environmental Test Methods.
- C. MTP 7-1-002, Air Portability and Airdrop Service Testing.
- D. MTP 7-2-509, Airdrop Capability.
- E. MTP 7-2-515, Air Transport (Suitability of Equipment for).
- F. MTP 8-2-500, Receipt Inspection.
- G. MTP 8-2-503, Rough Handling and Surface Transport.
- H. MTP 8-2-509, Radiography.
- I. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers.

5. SCOPE

5.1 SUMMARY

This MTP provides general procedures 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 shall 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 it might have; and (3) identify damage received during transportation. During this inspection, the test item will also be numbered serially 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 determine to what extent the container, filled with the agent it is designed to transport, will be affected by extreme environments it may encounter in service. During the study, the test item is subjected to high and low temperatures, thermal shock, reduced ambient pressure, sunshine, water (immersion), humidity, fungus, and salt fog.

d. Rough Handling and Surface Transport - A study to determine whether the container can successfully withstand the shocks and vibrations that may result from rough handling and surface transport.

e. Air Transportability - A study to determine: (1) the ease of loading and unloading the container on and from aircraft; (2) the ability of the container to withstand the simultaneous vibrations and low ambient pressure it may encounter during air transportation; (3) the effect on the container of large drops,

simulating air crash conditions.

f. Airdrop Capability - A study to determine how the test item is affected by airdrop conditions (delivery by parachute).

g. Leak Testing - A study to determine whether the chemical agent in the container leaks out when the container is subjected to specified conditions.

h. Agent-Container Compatibility - A study to determine if the test item and the chemical agent it contains have a harmful effect on each other.

i. Radiography - A test to determine the structural condition of the test item.

j. Design Evaluation - A study to evaluate the ease with which the test item can be used and reused if so intended.

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 by all test personnel before the test is started. The safety statement includes information pertaining to operation limitations and specific hazards peculiar to the test item.

6.1.2 Personnel Safety

a. Test and subtest plans and procedures will ensure performance in the safest manner that is consistent with their 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 consist of 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 knowledgeable of the construction and operation of the test item and its critical components, will have first-hand knowledge of the hazards and safety aspects of the tests, and will review test plans for evaluation of hazards and to recommend control measures.

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

d. Whenever possible, the shipping containers will be tested while filled with simulated agents rather than with active toxic chemicals. Whenever toxic chemical agents are used, all personnel involved in the test will wear appropriate protective clothing. An adequate supply of proper decontaminant, with appropriate equipment and trained decontamination personnel, will be available when testing with toxic agents.

6.1.3 Security

Security considerations will be determined and provided for as applicable, before tests are begun.

6.1.4 Logistical Requirements

Before tests begin, the test officer will ensure that all logistical requirements are satisfied.

6.1.5 Test Sequence and Sample Size

The order of the tests and the size of the sample will vary according to availability of equipment and test personnel, economic considerations, expected number of containers to be used, toxicity of contents, and other factors, including the initial test results themselves. Table I presents a possible test sequence for accomplishing the desired result.

6.2 TEST CONDUCT

6.2.1 Receipt Inspection

Subject each test item to the applicable procedures of MTP 8-2-500, with particular emphasis on the following:

a. Inspect the container packing, if applicable, with emphasis on the following:

- 1) Method of packing
- 2) Adequacy of unpacking instructions
- 3) Damage to packing

b. Unpack container, if applicable, and number it serially for future reference.

c. Inspect the container and record the following information regarding the opening, filling, closing, sealing, and unsealing of the container:

- 1) Presence and adequacy of instructions.
- 2) Legibility of markings.
- 3) Requirement and presence of special packing, parts, tools, or equipment.

d. Examine the container and inner containers if any, and record (using photographs if required) the following:

- 1) External and internal dimensions of container, weight, and material.
- 2) Evidence of damage during shipment, including nicks, chipped paint, corrosion.
- 3) Type of interior and exterior surfaces (i.e., plated, galvanized, painted, etc.).

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Table I. Recommended Combination and Sequence of Tests

Para. No. & Test	Filled With							
	Helium	Toxic	Non-toxic	Toxic	Non-toxic	Non-toxic	Non-toxic	Non-toxic
6.2.1 Receipt Inspection	L	L	L	L	L,R	L,R	L,R	L,R
6.2.3.1 Extreme Temperature	L	L		X	X	X	X	X
6.2.3.2 Thermal Shock	L	L	X	X	X	X	X	X
6.2.3.3 Temperature-Altitude	L	L						
6.2.3.4 Sunshine	L							
6.2.3.5 Water Immersion	I							
6.2.3.6 Humidity		I						
6.2.3.7 Fungus			I					
6.2.3.8 Salt Fog				I				
6.2.4 Rough Handling					L,R			
6.2.5.1 Loading and Unloading						X		

Table I. Recommended Combination and Sequence of Tests (Continued)

Para. No. & Test	Filled With							
	Helium	Toxic	Non-toxic	Toxic	Non-toxic	Non-toxic	Non-toxic	Non-toxic
6.2.5.2 Flight vibration								
6.2.5.3 Air Crash								
6.2.6 Airdrop								
6.2.8 Agent-Container Compatibility		X		X				
6.2.10 Design Evaluation						X		
X - Perform test. L - Perform test, followed by leak testing (6.2.7). R - Perform test, followed by radiography (6.2.9). I - Perform test; and inspect.								
							L,R	L,R

- 4) Presence of corrosion or other damage to interior surfaces of container.
- 5) Presence of oil or grease films, dirt, or other foreign matter on the inside walls of the container.

e. Ascertain the presence of the proper amount and type of insulation or packing, as applicable.

f. Determine and record the legibility of signs identifying the toxic nature of the container's eventual contents.

g. Subject the container specified in paragraph 6.2.8 to the radiography procedures of paragraph 6.2.9 to ascertain the presence of internal damage.

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 components, sharp or loose handles, and other condition or features which would make use of the test item hazardous to personnel.

c. Evaluate adequacy of handholds for safe manipulation of the test item.

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).

6.2.3 Simulated Environmental Testing

6.2.3.1 Extreme-Temperature Tests

a. Place a suitably determined number of test items in a high-temperature test chamber and perform the following:

- 1) Adjust the temperature of the chamber to 68.3°C (155°F) and a relative humidity of 15 percent, and maintain these conditions for a minimum of 72 hours.
- 2) Inspect containers and record damage.
- 3) Subject the test item to the leak test procedures of paragraph 6.2.7.

b. Remove the containers from the chamber and expose them to ambient temperature and humidity for 24 hours. Then perform the following:

- 1) Inspect containers and record damage.
- 2) Subject the containers to the leak test procedures of paragraph 6.2.7.

c. Place the test items in a low-temperature test chamber, and perform the following:

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- 1) Reduce the chamber temperature to -62.2°C (-80°F), and maintain it for a minimum of 72 hours.
- 2) Inspect the test items and record damage.
- 3) Subject the test items to the leak test procedure of paragraph 6.2.7.

d. Repeat the procedures of step b.

6.2.3.2 Temperature Shock Test

- a. Subject a minimum number of containers to steps 1 through 8 inclusive of Method 503, of reference 4B (MIL-STD-810B).
- b. Perform the following:

- 1) Inspect the containers and record damage.
- 2) Subject the containers to the leak test procedures of paragraph 6.2.7.

6.2.3.3 Temperature - Simulated Altitude Test

- a. Place the minimum number of containers in a low-pressure - high-temperature test chamber, and perform the following:

- 1) Reduce the air pressure in the chamber to correspond to an altitude of 70,000 feet.
- 2) Adjust the temperature of the chamber to 68.3°C and a relative humidity of 15 percent, and maintain these conditions for 24 hours.
- 3) Inspect the containers and record damage.
- 4) Subject the containers to the leak test procedures of paragraph 6.2.7.

- b. Place the containers in a low-pressure - low-temperature test chamber, and perform the following:

- 1) Reduce the air pressure in the chamber to correspond to an altitude of 20,000 feet.
- 2) Adjust the temperature of the chamber to -62.2°C (-80°F), and maintain this condition for 24 hours.
- 3) Inspect the containers and record damage.
- 4) Subject the containers to the leak test procedure of paragraph 6.2.7.

- c. Allow the containers to stabilize at room temperature and ambient pressure. Then perform the following:

- 1) Inspect the test items and record damage.
- 2) Subject the test items to the leak test procedures of paragraph 6.2.7.

6.2.3.4 Sunshine Test

- a. Subject a suitably determined number of test items to the sunshine conditions of Procedure I, Method 505 of reference 4B (MIL-STD-810B).
- b. At the completion of the exposure period, perform the following:
 - 1) Visually inspect the container and record any surface damage, such as deterioration of rubber or plastic parts.
 - 2) Subject the test item to the leak test procedures of paragraph 6.2.7.

6.2.3.5 Water Immersion Test

- a. Immerse a suitably determined number of containers in water to such a depth that the top of the container lies 3 feet below the water surface.
- b. Record the following with the test item immersed:
 - 1) Depth of water over container
 - 2) Temperature of water
 - 3) Presence of bubbling to indicate container leakage
 - 4) Immersion time until bubbling occurs
 - 5) Total immersion time
- c. At the completion of the immersion test, perform the following:
 - 1) Subject the test item to the leak test procedures of paragraph 6.2.7.
 - 2) Inspect the container, and inner containers if any, for evidence of water penetration.

6.2.3.6 Humidity Test

- a. Subject a suitably determined number of test items to the humidity cycling of Procedure I, Method 507, reference 4B (MIL-STD-810B).
- b. At the completion of the cycling period, perform the following:
 - 1) Visually inspect the items, and record any signs of corrosion.
 - 2) Open the container, and inner containers if any, and examine for presence of corrosion or water penetration.

6.2.3.7 Fungus Test

- a. Subject a suitably determined number of test items to the fungus test of Procedure I, Method 508, reference 4B (MIL-STD-810B).
- b. At the completion of the test, perform the following:
 - 1) Visually inspect the items and record any signs of corrosion.
 - 2) Open the container, and inner containers if any, and look for the presence of fungus.
 - 3) Subject the chemical agent to laboratory analysis to determine the absence of deterioration.

6.2.3.8 Salt Fog Test

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a. Subject a suitably determined number of test items to the conditions of Procedure I, Method 509, reference 4B (MIL-STD-810B).

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) Subject the test item to the leakage test of paragraph 6.2.7.
- 4) Open and inspect the container, and inner containers if any, and record the following:
 - a) Evidence of water penetration
 - b) Presence of corrosion

6.2.4 Rough Handling and Surface Transport

a. Determine the capability of the containers to withstand the stresses that may be encountered during surface transport and rough handling by subjecting a suitably determined number of test items to the following procedures of MTP 8-2-503:

- 1) Transit drop test of paragraph 6.2.2.1.a.2
- 2) Rail impact test of paragraph 6.2.2.1.a.5
- 3) Vibration tests of paragraph 6.2.2.1.a.3

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

- 1) Examine the container, and record and photograph changes, if any.
- 2) Subject the container to the radiography procedures of paragraph 6.2.9.
- 3) Perform the leak test of paragraph 6.2.7.

6.2.5 Air Transportability

6.2.5.1 Loading and Unloading Test

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

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

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

- 1) Type of aircraft used or simulated
- 2) Equipment used for loading
- 3) Difficulties encountered while loading

- 4) Method of tiedown
- 5) Damage sustained by the package during the loading operation

b. Unload the test item from the aircraft or simulated aircraft and record:

- 1) Equipment used in unloading
- 2) Difficulties encountered while unloading
- 3) Damage sustained by the package during the unloading operation

6.2.5.2 Simulated Flight Test

a. Subject a minimum number of containers to the following conditions simultaneously:

- 1) Ambient pressure of the maximum altitude at which the test item is expected to be flown.
- 2) Flight vibration conditions of Procedure X, Method 514, of reference 4B (MIL-STD-810B).

b. At the completion of the testing, subject the test items to the procedures of paragraph 6.2.4.b.

6.2.5.3 Air Crash Test

a. Subject a suitably determined number of containers to a 350-foot free drop (equivalent to a final velocity of 150 feet per second), causing it to impact on a heavy concrete pad.

b. Examine and photograph the damage to each container.

c. Determine for each container, if there is any gross spillage of agent.

d. Subject each outer container, and each inner container, if applicable, to the leak test procedure of paragraph 6.2.7, and the radiography procedures of paragraph 6.2.9.

6.2.6 Airdrop Capability

Subject the minimum number of test items to the applicable sections of MTP 7-2-509 and to the following:

a. Fasten the test item, with accelerometers attached, to the appropriate parachute/deceleration device and release it from aircraft flying at the altitude and speed specified in the design criteria. Record the following:

- 1) Deceleration device used
- 2) Aircraft altitude
- 3) Aircraft airspeed
- 4) Meteorological conditions:
 - a) Temperature
 - b) Wind speed and direction

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- c) Relative humidity
- d) Barometric pressure
- 5) Deceleration magnitude at impact in g's
- 6) Impact velocity
- b. Take still and motion pictures of the airdrop test procedure.
- c. At the completion of the test perform the following:
 - 1) Examine each container and record and photograph damage, if any.
 - 2) Subject each container to the leak test procedures of paragraph 6.2.7 and the radiography procedures of paragraph 6.2.9.

6.2.7 Leak Testing

NOTE: There are two methods for leak testing the containers: (1) fill the containers with the appropriate chemical agent, and detect any leakage of this agent by the most suitable technique; (2) pressurize the container with helium or a halogen gas and use a helium or halogen gas detector to detect leaks. The second method is more convenient, but may be unnecessarily sensitive; or gas may leak out of the container under conditions which will not permit a solid or liquid agent to escape. Similarly, tests may be performed with the proper agent in the container, or with a nontoxic substitute having similar characteristics (viscosity, surface tension, vapor pressure, etc.). The latter case will allow some flexibility in leak testing methods.

a. Determine if the fully charged test item leaks as described in paragraph 6.2.3.1 and 6.2.4.b of MTP 8-2-512 upon receipt of the item and at the completion of the following:

NOTE: If the sealed container has rubber components, halogen leak detector agents should be used instead of helium.

- 1) Receipt inspection (6.2.1)
- 2) Environmental tests (6.2.3)
- 3) Rough handling and surface transport tests (6.2.4)
- 4) Air transportability tests (6.2.5)
- 5) Airdrop capability tests (6.2.6)
- b. Photographic evidence of damage, leakage, or any other findings 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

6.2.8 Agent-Container Compatibility Test

a. Remove the contents from a suitably determined number of test items which have been previously subjected to the test procedures of paragraph 6.2.3.1.

b. Clean the inside wall surfaces of the containers, and inspect them for and record the presence of corrosion, pitting, rust, peeling paint or any other damage caused by the chemical agent.

c. Use photomicrography to compare the inside wall surfaces of the used containers with the corresponding surfaces of an unused container.

d. Determine the purity of the chemical agent removed from the container, and compare with the original purity to determine effect of the container on the agent.

6.2.9 Radiography

Determine the internal and structural condition of the test item, using radiography, as described in the applicable sections of MTP 8-2-509 at the following times:

a. Upon receipt of the item.

NOTE: Only the items to be subjected to the following tests will be inspected by radiography upon their receipt.

b. At the conclusion of the rough handling tests of paragraph 6.2.4.

c. At the conclusion of the air transportability tests of paragraphs 6.2.5.2 and 6.2.5.3.

d. At the conclusion of the airdrop capability tests of paragraph 6.2.6.

6.2.10 Design Evaluation

a. Fill a minimum number of containers with the appropriate chemical agent, seal and pack them, adhering rigidly to the instructions on (or accompanying) the test item. Record the following:

- 1) Difficulties encountered during filling operation
- 2) Difficulties encountered during sealing and packing container
- 3) Need for special tools or equipment
- 4) Need for special packing material
- 5) Any special skills needed
- 6) Adequacy of instructions

b. Unpack, unseal, and empty container, adhering rigidly to the instructions on (or accompanying) the test item. Record the following:

- 1) Difficulties encountered during unsealing and unpacking operation.
- 2) Difficulties encountered during emptying operation.
- 3) Need for special tools and equipment.
- 4) Any special skills required

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5) Adequacy of instructions.

c. Refill, reseal, and repack the container, unless the container is the throwaway type. Record any difficulties encountered.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the following:

1) For the container packing, if applicable:

- a) Method of packing
- b) Adequacy of unpacking instructions
- c) Damage to packing

2) For opening, filling, closing, sealing and unsealing the container:

- a) Presence and adequacy of instructions.
- b) Legibility of markings.
- c) Requirement and presence of special packing, parts, tools, or equipment.

3) For container and inner container, if any:

- a) External and internal dimensions of container, weight, and material.
- b) Evidence of damage during shipment, including nicks, chipped paint, corrosion.
- c) Type of interior and exterior surfaces.
- d) Presence of corrosion or other damage to interior surfaces of container.
- e) Presence of oil or grease films, dirt, or other foreign matter on the inside walls of the container.
- f) Discrepancies in the amount and type of insulation or packing, as applicable.
- g) Illegibility of signs identifying the toxic nature of the container's eventual contents.

4) For test item undergoing radiography:

- a) Test item identification number
- b) Radiography data collected as described in paragraph 6.2.9

b. Retain all photographs

6.3.2 Safety Evaluation

Record the following:

- a. Any unsafe aspect of test item observed at the time of receipt or subsequently.
- b. Hazardous conditions (jagged edges, sharp or loose handles, etc.).
- c. Adequacy of handholds for safe manipulation of the test item.
- d. Adequacy of test item's tiedown arrangements.
- e. Validity of safety aspects as reflected in the safety statement prepared by the developing agency.

6.3.3 Simulated Environmental Testing

6.3.3.1 Extreme Temperature Tests

Record the following for each item tested:

- a. Test item identification number
- b. For each temperature condition:
 - 1) Temperature in °C
 - 2) Damage incurred
 - 3) Leakage data collected as described in paragraph 6.2.7

6.3.3.2 Temperature Shock Test

Record the following for each item tested:

- a. Test item identification number
- b. Damage incurred
- c. Leakage data collected as described in paragraph 6.2.7

6.3.3.3 Temperature in Simulated Altitude Test

Record the following for each item tested:

- a. Test item identification number
- b. For each temperature-altitude condition:
 - 1) Temperature-altitude condition in °C and feet
 - 2) Damages incurred
 - 3) Leakage data collected as described in paragraph 6.2.7

6.3.3.4 Sunshine Test

Record the following for each item tested:

- a. Test item identification number
- b. Surface damage incurred
- c. Leakage data collected as described in paragraph 6.2.7

6.3.3.5 Water Immersion Test

Record the following for each item tested:

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- a. Test item identification number
- b. Depth of water over container in feet
- c. Temperature of water in °C
- d. Presence of bubbling, if applicable
- e. Immersion time until bubbling in minutes
- f. Total immersion time in minutes
- g. Leakage data collected as described in paragraph 6.2.7
- h. Evidence of water penetration in:
 - 1) Container
 - 2) Inner container if applicable

6.3.3.6 Humidity Test

Record the following for each item tested:

- a. Test item identification number
- b. Evidence of exterior corrosion
- c. Evidence of water penetration or interior corrosion

6.3.3.7 Fungus Test

Record the following for each item tested:

- a. Test item identification number
- b. Evidence of external corrosion
- c. Presence of fungus
- d. Results of laboratory analysis of chemical agent

6.3.3.8 Salt Fog Test

Record the following for each item tested:

- a. Test item identification number
- b. Evidence of external corrosion
- c. Leakage data collected as described in paragraph 6.2.7
- d. Evidence of water penetration
- e. Presence of internal corrosion

6.3.4 Rough Handling and Surface Transport

a. Record the following for each item tested:

- 1) Test item identification number
- 2) Test performed (transit drop, radiation, etc.)
- 3) Damages incurred
- 4) Leakage data collected as described in paragraph 6.2.7
- 5) Radiography data collected as described in paragraph 6.2.8

b. Retain all photographs

6.3.5 Air Transportability

6.3.5.1 Loading and Unloading Test

Record data collected as described in MTP 7-2-515, or the following, for each item tested, as applicable:

- a. Type of aircraft used or simulated
- b. Equipment used for loading
- c. Difficulties encountered while loading
- d. Method of tiedown
- e. Damage sustained by the test item during loading
- f. Equipment used in unloading
- g. Difficulties encountered while unloading
- h. Damage sustained by the test item during unloading

6.3.5.2 Simulated Flight Test

- a. Record the following for each item tested:
 - 1) Test item identification number
 - 2) Altitude simulated in feet
 - 3) Damage incurred
 - 4) Leakage data collected as described in paragraph 6.2.7
 - 5) Radiography data collected as described in paragraph 6.2.9
- b. Retain all photographs

6.3.5.3 Air Crash Test

- a. Record the following for each item tested:
 - 1) Test item identification number
 - 2) Damage to the test item
 - 3) Gross spillage of agent
 - 4) Leakage data collected as described in paragraph 6.2.7
 - 5) Radiography data collected as described in paragraph 6.2.9
- b. Retain all photographs

6.3.6 Airdrop Capability

- a. Record the following for each item tested:
 - 1) Test item identification number
 - 2) Deceleration device used
 - 3) Aircraft altitude in feet
 - 4) Aircraft airspeed in mph
 - 5) For meteorological conditions:
 - a) Temperature in °C

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- b) Wind speed in mph
- c) Wind direction
- d) Relative humidity in percent
- e) Barometric pressure
- 6) Deceleration magnitude at impact in g's
- 7) Impact velocity in fps
- 8) Damage incurred
- 9) Leakage data collected as described in paragraph 6.2.7
- 10) Radiography data collected as described in paragraph 6.2.9

b. Retain all still and motion pictures

6.3.7 Leak Testing

a. Record data collected as described in the applicable sections of MTP 8-2-512 and the following as applicable:

- 1) Time of test (prior to or after repairs)
- 2) Repairs made
- 3) Effectiveness of repairs

b. Retain all photographs

6.3.8 Agent-Container Compatibility Test

a. Record the following for each item tested:

- 1) Test item identification number
- 2) Presence of the following on the test item inside wall surfaces:
 - a) Corrosion
 - b) Pitting
 - c) Rust
 - d) Peeling paint
 - e) Other damage caused by chemical agent
- 3) Effects of agent on test item surface
- 4) Effects of test item surface on agent

b. Retain all photographs

c. Retain all laboratory analysis

6.3.9 Radiography

a. Record data collected as desirable in applicable sections of MTP 8-2-509.

b. Retain all radiography.

6.3.10 Design Evaluation

Record the following for each item tested:

- a. Test item identification number
- b. Difficulties encountered during filling operation
- c. Difficulties encountered during sealing and packing of container
- d. Need for special tools and equipment
- e. Need for special packing material
- f. Any special skills needed
- g. Adequacy of instructions
- h. Difficulties encountered during unsealing and unpacking operation
- i. Difficulties encountered during emptying operation
- j. Difficulties encountered in the following if applicable:
 - 1) Refill
 - 2) Reseal
 - 3) Repack

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Receipt Inspection

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

6.4.2 Safety Evaluation

- a. Forward a Safety Release Recommendation (USATECOM Regulation 385-6) to U. S. Army Test and Evaluation Command as soon as possible within 30 days after the beginning of testing. The safety release recommendation shall 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. Include data regarding hazards observed during any phase of testing.
- c. Include suggestions to improve the safety of the testing or test item in any convenient form.

6.4.3 Simulated Environmental Testing

- a. The results of the tests conducted shall be presented in tabular or other suitable form.
- b. The results of the postexposure leakage test shall be presented in tabular or other convenient form supplemented by narrative comments, if required.

6.4.4 Rough Handling and Surface Transport Tests

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a. Results of this test shall be presented as indicated in applicable sections of MTP 8-2-503.

b. Tables, photographs, narrative comments, or other suitable means of presentation shall be used to report the results.

6.4.5 Air Transportability

a. Results of this test shall be presented as indicated in applicable portions of MTP 7-1-002 and MTP 7-2-515, and shall include the pressure-altitude cycling and vibration conditions to which the test item was subjected.

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

6.4.6 Airdrop Capability

The results of the test shall be presented as prescribed in MTP 7-2-509 and shall include the following:

- a. Type of aircraft
- b. Airspeed, altitude, and meteorological conditions
- c. Packaging material condition after test
- d. Maximum force on opening of parachute and on impact

Present narrative comments and data regarding problems encountered in accomplishing airdrop. Include photographs as required to show results of airdrop.

6.4.7 Leak Testing

a. The results of leak testing shall be presented as described in MTP 8-2-512.

b. Narrative comments, photos, etc. shall be included as required.

6.4.8 Agent-Container Compatibility Test

Data from this test shall be presented in narrative form and shall clearly indicate whether a particular agent has an effect on the test item or vice versa. The report shall be supplemented by photomicrographs, laboratory analysis and other data required to support the conclusions.

6.4.9 Radiography

a. The results of this test shall be presented as prescribed in MTP 8-2-509.

b. X-ray photographs, supplemented by narrative explanation, comparing the post rough handling, air transport, and air drop results with the receipt inspection results, shall be included as required.

6.4.10 Design Evaluation

Data shall be presented in a narrative form clearly indicating the ease of operation, skills required and special tools required.