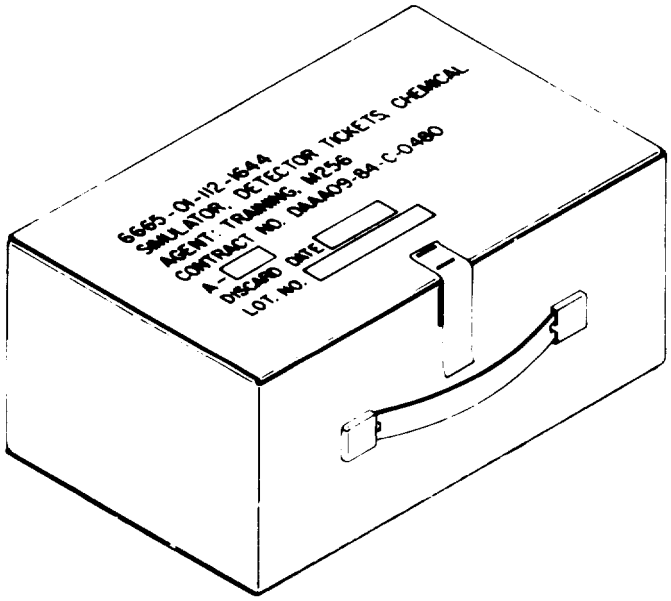
TECHNICAL MANUAL

OPERATOR'S MANUAL

M256 TRAINING CHEMICAL AGENT DETECTOR TICKETS SIMULATOR NSN 6665-01-112-1644



HEADQUARTERS, DEPARTMENT OF THE ARMY

20 SEPTEMBER 1985

WARNINGS

Do not use an outdated kit because it will give unreliable test indications. A false negative indication would give a false sense of security. Always wear protective mask and gloves when using the sampler-detector.

Do not touch the sampler-detector agent test spots because incorrect test results may be produced.

Hold sampler-detector on the upwind side to avoid picking up vapors from your protective equipment.

Do not use an outdated sampler-detector because it will give unreliable test indications.

The heater produces hot vapors and is hot to the touch. Keep away from face and bare skin after the ampoules are broken.

Do not heat sampler-detector over flame or high heat source, such as engine exhaust, to thaw the contents. It may explode or ignite.

Avoid all bodily contact with chemicals. Never drink, eat, smoke, chew, or put anything in your mouth when training. Use first-aid at once for removal and treatment of accidental contamination.

Be careful when breaking the glass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

Before breaking glass ampoules, except heater ampoules, place one heater pad on each side of the sampler-detector covering the ampoule to be broken. These pads will prevent pieces of glass from cutting your gloves or hands.

TECHNICAL MANUAL
No. 3-6665-320-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC,. 20 September 1985

Operator's Manual
M256 TRAINING CHEMICAL AGENT DETECTOR TICKETS SIMULATOR

LIST OF ILLUSTRATIONS

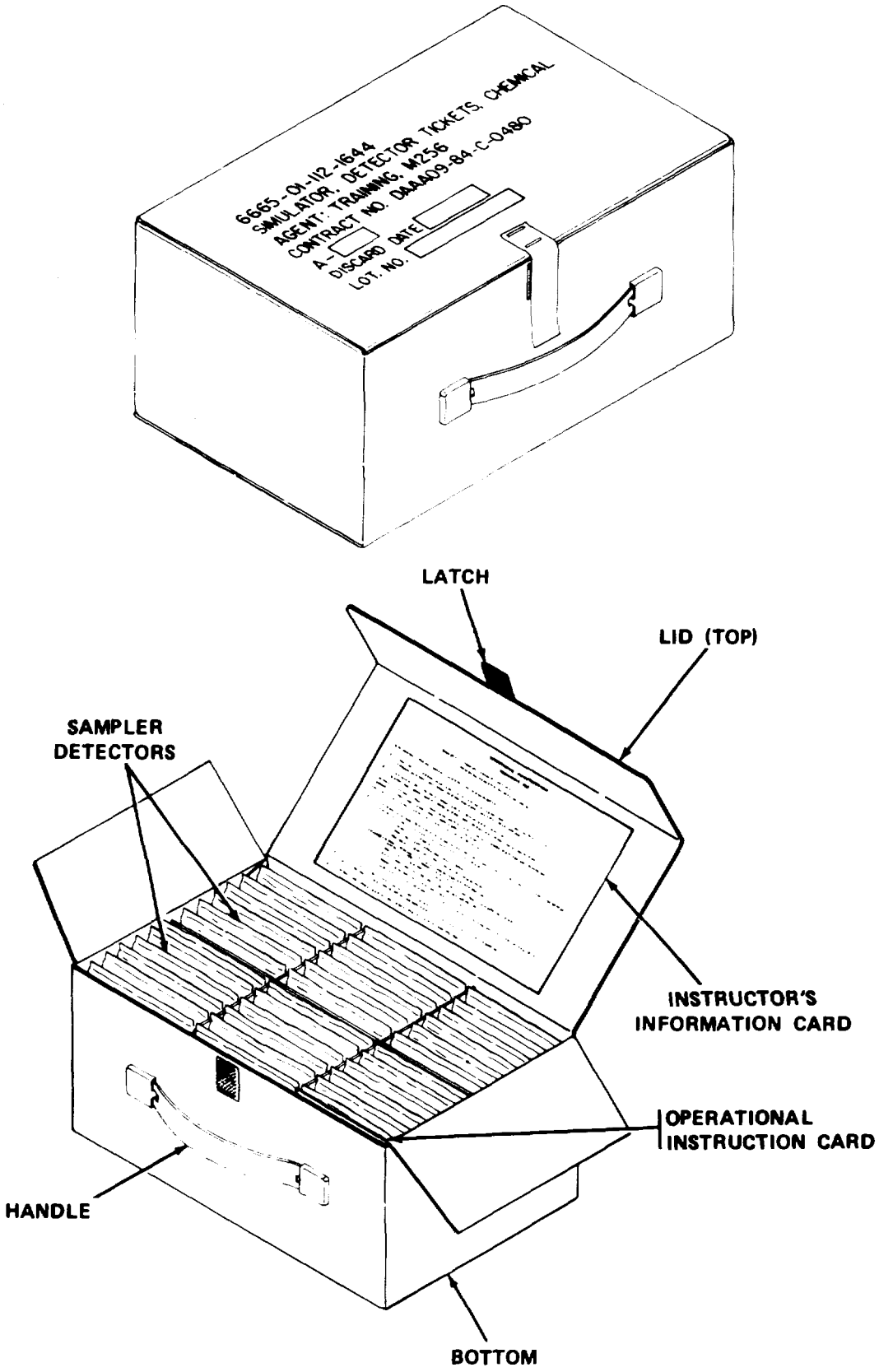


Figure 1-1. M256 Training Chemical Agent Detector Tickets Simulator.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. SCOPE. This manual is for use in operating the M256 Training Chemical Agent Detector Simulator (fig. 1-1). This equipment will be referred to as M256 Training Simulator and can be used to simulate M256 or M256A1 Detector Kit responses.

1-2. FORMS AND RECORDS. Maintenance forms, records, and reports which are to be used by training personnel are listed in and prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS) as contained in the Maintenance Management Update.

1-3. REPORTING OF ERRORS. Reports of errors, omissions, and recommendations for improving this publication by the individual user is encouraged. Reports should be submitted on DA Form 2028, "Recommended Changes to DA Publications," and forwarded direct to Commander, US Army Armament, Munitions, and Chemical Command, ATTN: AMSMC-MAR-T (A), Aberdeen Proving Ground, MD 21010-5423. A reply will be furnished to you.

Section II. DESCRIPTION AND DATA

1-4. DESCRIPTION.

a. *Purpose*. The purpose of the M256 Training Simulator (fig. 1-1) is to simulate a chemical agent response in the absence of agent or simulant in a training environment.

b. *Capabilities*. The M256 Training Simulator is capable of providing positive simulated agent responses when activated without the presence of agent simulants.

c. *Features*. The M256 Training Simulator is a portable expendable item that consists of a carrying box with handle and 36 sampler-detectors.

(1) Carrying box. The carrying box is blue in color to indicate a training aid.

(2) Sampler-detector. There are 36 individually wrapped sampler-detectors (fig. 2-1):

- 12 simulate "all clear"
- 6 simulate nerve agent (G or V)
- 6 simulate blister agent (6) mustard
- 6 simulate blister agent (CX) phosgene oxime
- 3 simulate blood agents (AC) hydrogen cyanide or (CK) cyanogen chloride - STRONG, blue
- 3 simulate blood agents (AC) hydrogen cyanide or (CK) cyanogen chloride - WEAK, pink.

NOTE

In all cases the sampler-detectors are similar to the standard M256 sampler detectors except the specific test which is pre-energineered. The operator will obtain negative tests on spots except those which have been pre-engineered as positive tests.

(3) Identification and informational data. The sampler-detector (fig. 2-2) is stamped "FOR TRAINING ONLY" in blue and has an associated code number (fig. 2-1) to identify the specific response the sampler-detector should simulate. The M256 Training Simulator contains a card (Instructor's Information Card) which would be available only to the instructor/trainer. This card describes the number code and contains suggestions for use of the M256 Training Simulator.

(4) Operational instruction cards. Use to operate the M256 Training Simulator.

1-5. TABULATED DATA (APPROXIMATE).

M256 Training Simulator.

Length	29.845 cm (D1 1-3/4 in.)
Width	19.050 cm (7-1/2 in.)
Height	13.652 cm (5-3/4 in.)
Operational Instruction Cards	3 each
Instructor's Information Card	1 each
Sampler-detectors	36 each
Weight Complete	1.135 kg (2-1/2 lb)

CHAPTER 2
OPERATING INSTRUCTIONS

Section I. PREPARATION FOR OPERATION

CAUTION

Do not open sampler-detector protective bags for inspection. Protective bags should be opened only when training is conducted.

2-1. PRELIMINARY INSPECTION. Inspect Sampler-Detector externally.

a. *Discard Date*. Check discard date. If discard date has expired, obtain additional sampler-detectors for simulated training.

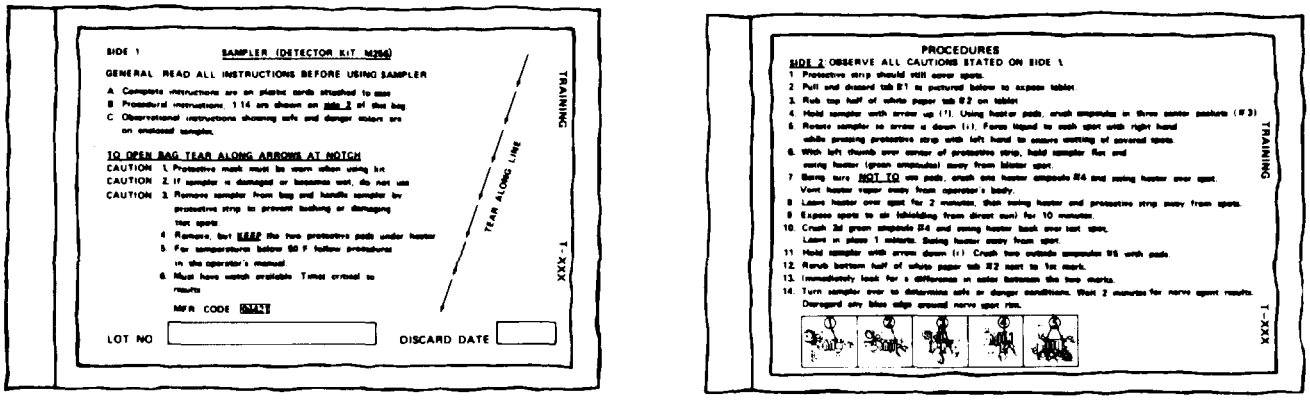


Figure 2-1. M256 Training Protective Bag.

b. *Sampler-Detector*. Check for punctures, rips, or tears. If damage is found, discard and request a new sampler-detector.

NOTE

Do not use an outdated sampler-detector because it will give unreliable test indications.

Section II. OPERATION OF THE M256 TRAINING SIMULATOR

This section is divided into several paragraphs as follows:

Preoperational Procedures
- General
- Preparation for Operation

Operational Procedures
- Operation Under Usual Conditions
- Operation Under Unusual Conditions

Post-Operational Procedures

2-2. PREOPERATIONAL PROCEDURES.

a. *General*. Since color combinations and comparisons are used during training operations, the user should have normal color perception. Remove red lenses from flashlight to avoid false-negative interpretations if training is conducted at night.

WARNING

Be careful when breaking the glass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

NOTE

The decision to unmask during training exercise is always made by the person in command (FM 21-40).

b. *Preparation for Operation*. Read the instructions on both sides of the protective bag before proceeding.

c. *The Sampler*. Study (fig. 2-2) carefully and become familiar with the location of all parts of the sampler.

NOTE

Talk the trainees through the following procedures, when TM 3-6665-307-10 is not available.

2-3. OPERATIONAL PROCEDURES.

NOTE

All operational procedures, including sampling times, must be followed for the sampler-detector to function correctly.

a. *Operation Under Usual Conditions*.

(1) Open sampler-detector protective bag by tearing the bag along the tear line marked with arrows.

WARNING

Hold sampler-detector on the upwind side to avoid picking up vapors from your protective equipment.

CAUTION

Protect sampler-detector during exposure from excessive moisture, such as rain and dew.

(2) Carefully remove the sampler-detector from the protective bag. Retain the protective bag for reference to the instructions written on it.

(3) Handle sampler-detector carefully. Hold the sampler-detector by the hinged protective strip (fig. 2-2), in closed position covering the spots.

(4) Swing the hinged heater assembly away from the test spot; remove and save the two heater pads under the hinged heater assembly.

(5) Pull off and discard the pull tab (marked 1) to expose the lewisite detecting tablet.

(6) Rub the top half of white paper side of the lewisite tablet rubbing tab (marked 2) on the lewisite detecting table. Repeat rubbing until a mark is visible.

(7) Hold the sampler-detector in the vertical position so that the arrow points up.

WARNING

Be careful when breaking the blass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

(8) Using the two heater pads, finger-crush the four reagent ampoules in the three center pockets (marked 3). The ampoules to crush are indicated by asterisks on figure 2-2.

NOTE

Nerve spot may become difficult to wet with solutions as the sampler-detectors age. Work solutions to spot carefully.

(9) Rotate the sampler-detector so arrow points downward. The protective strip should still cover spots and the pads should still cover the broken glass ampoules. Then force liquid to each spot with right hand while pressing protective strip with left hand to ensure wetting of covered spots.

(10) Make sure the hinged heater assembly is away from the test spot.

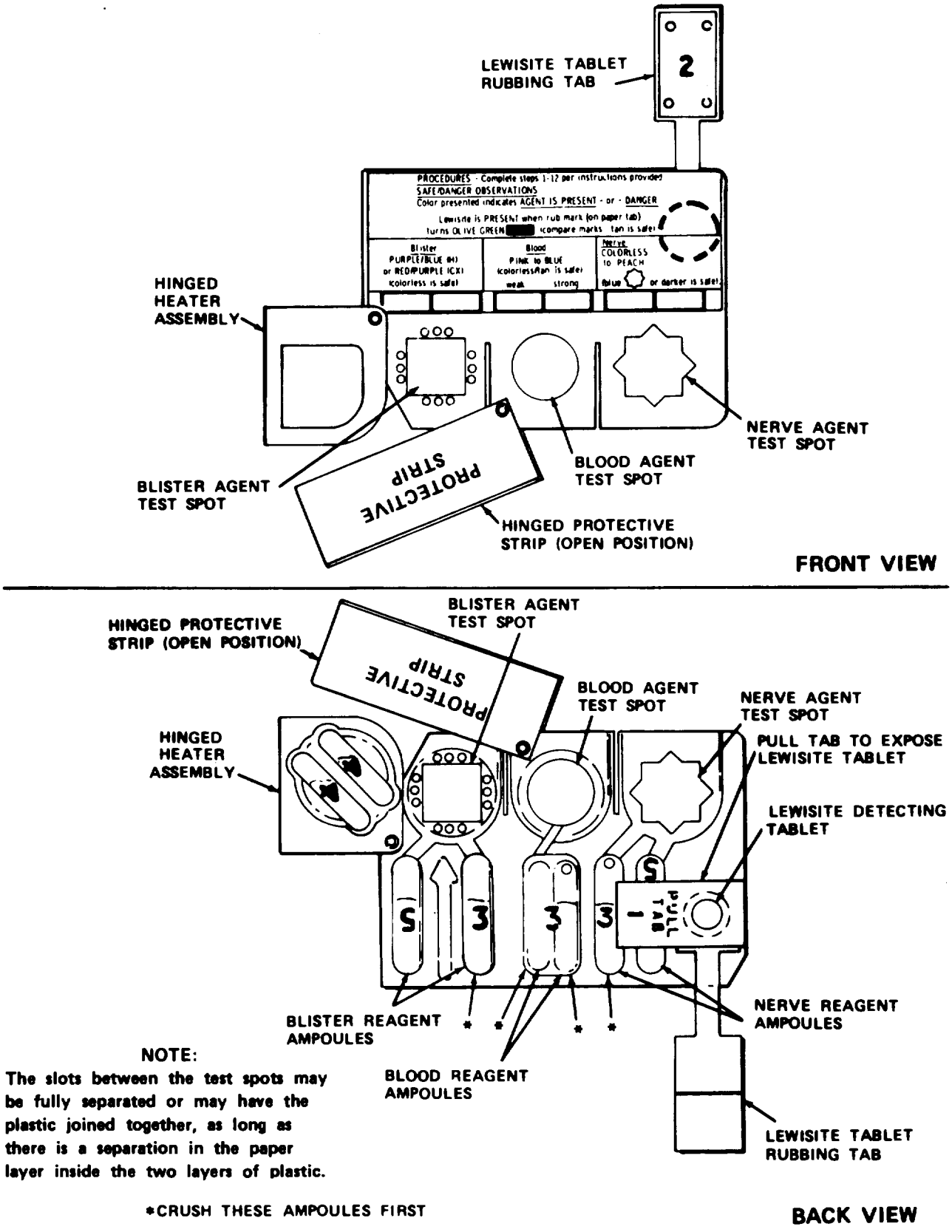


Figure 2-2. M256 Training Sampler-Detector.

WARNING

The heater produces hot vapors and is hot to the touch. Keep away from face and bare skin after the ampoules are broken.

(11) Being sure NOT TO use pads, finger-crush one of the two green ampoules (marked 4). Immediately swing the hinged heater assembly over the test spot. Vent vapor away from operator's body. Leave the hinged heater assembly in place for 2 minutes.

(12) Swing the hinged heater assembly (after two minutes have passed) and hinged protective strip away from test spots.

(13) Hold the sampler-detector by the hinged protective strip.

(14) Expose test spots to air (while shielding from direct sunlight) for 10 minutes.

(15) Finger-crush the second green ampoule (marked 4). Swing the hinged heater assembly over the test spot. Vent vapor away from operator's body. Leave hinged heater assembly in place for approximately 1 minute.

(16) Swing hinged heater assembly (after approximately 1 minute has passed) away from the test spot.

(17) Hold sampler-detector with arrow pointing down.

WARNING

Be careful when breaking the glass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

(18) Finger-crush the two remaining ampoules (marked 5) with pads. Force the liquid from the two ampoules through the formed channels to the test spots to ensure wetting.

(19) Rerub the lewisite detecting tablet on the bottom half of the rubbing tab next to the first rub mark.

(20) Immediately turn the sampler-detector over to determine safe or danger conditions. Observe for a difference in color between the two rub marks on the lewisite tablet rubbing tab. Color comparisons can also be made by the operator using those shown on the operational instruction cards.

NOTE

The student can compare the BLOOD AGENT and LEWISITE tests immediately after the prescribed time. The BLISTER AGENTS (H and CX) develop color immediately after all the ampoules are broken. The NERVE AGENT test requires a waiting period of approximately two minutes.

Disregard small blue areas under the plastic rim of the nerve agent spot.

Nerve spot may become difficult to wet with solutions as the sampler-detectors age. Work solutions to spot carefully.

At low concentrations, a change in the lewisite tablet rub mark may be very slight. Compare with a second mark before making judgment.

Yellow and orange sometimes occur on blood spot when no agent is present. Pink or blue color must be present for a positive test.

Any combination of colors, or "rainbow effect," which includes pink or blue should be considered as a positive blood agent test.

b. *Operation Under Unusual Conditions (Climate Extremes).*

(1) Temperatures between + 50F (10°C) and + 32°F (0°C). Wait 5 minutes before making color comparison when temperature is between + 50°F (10°C) and + 32°F (0°C).

WARNING

Do not heat sampler-detector over flame or high heat source, such as engine exhaust, to thaw the contents. It may explode or ignite.

(2) Temperatures between - 25°F (- 32°C) and + 32° F (0°C). Perform the following when temperature is between - 25°F (- 32°C) and + 32°F (0°C):

(a) Place the unopened protective bag in a warm area (within a heated shelter or vehicle) for 5 minutes or more to thaw the reagents.

(b) Open the protective bag by tearing along the tear line marked with arrows.

(c) Carefully remove sampler-detector (fig. 2-2) from the protective bag.

(d) If any of the reagents are still frozen, wait until they are completely thawed.

(e) Handle sampler-detector carefully. Hold the sampler-detector by the hinged protective strip in closed position.

(f) Swing the hinged heater assembly away from test spot. Save the two heater pads under the hinged heater assembly.

(g) Pull off and discard the pull tab (marked 1) to expose the lewisite detecting tablet.

(h) Rub the top half of white paper side of the lewisite tablet rubbing tabl (marked 2) on the lewisite detecting tablet. Repeat rubbing until a mark is visible.

(i) Hold the sampler-detector in the vertical position so that the arrow points up.

WARNING

Be careful when breaking the glass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

(j) Using the two heater pads, finger-crush the four reagent ampoules in the three center pockets (marked 3). The ampoules to crush are indicated by asterisks on figure 2-2.

(k) Rotate the sampler-detector so arrow points downward. The protective strip should still cover spots and the pads should still cover the broken glass ampoules. Then force liquid to each spot with right hand while pressing protective strip with left hand to ensure wetting of covered spots.

(l) Make sure the hinged heater assembly is away from the test spot.

(m) Being sure NOT TO use pads, finger-crush one of the two green ampoules (marked 4). Immediately swing the hinged heater assembly over the test spot. Vent vapor away from operator's body. Leave the hinged heater assembly in place for approximately 2 minutes.

(n) Swing the hinged heater assembly (after 2 minutes have passed) and the hinged protective strip away from test spots.

(o) Hold the sampler-detector by the hinged protective strip.

(p) Place the sampler-detector outdoors and expose the test spots to air (while shielding from direct sun) for 10 minutes.

(q) Bring the sampler-detector into the warmed area.

(r) Wait for any frozen reagents to thaw.

(s) Finger-crush the second green ampoule (marked 4). Swing the hinged heater assembly over the test spot. Vent vapor away from operator's body. Leave the hinged heater assembly in place for approximately 1 minute.

(t) Swing hinged heater assembly (after approximately 1 minute has passed) away from test spot.

(u) Hold sampler-detector with arrow pointing downward.

WARNING

Be careful when breaking the glass ampoules. Small pieces of glass may cut through the plastic and could cut gloves or hands.

(v) Finger-crush the two remaining ampoules (marked 5) with pads.

(w) Rerub the lewisite detecting tablet on the bottom half of the rubbing tab next to the first rub mark. Immediately observe for a difference in color between the two rub marks.

(x) Immediately turn the sampler-detector over to determine safe or danger conditions.

NOTE

Compare the BLOOD AGENT and LEWISITE test immediately after the prescribed exposure time. The BLISTER AGENTS (H and CX) develop color immediately after all the ampoules are broken. The NERVE AGENT test requires a waiting period of approximately two minutes.

NOTE

Disregard small blue areas under the plastic rim of the nerve agent spot.

Nerve spot may become difficult to wet with solutions as the kit ages. Work solutions to spot carefully.

At low concentrations, a change in lewisite tablet rub mark may be very slight. Compare with a second rub mark before making judgment.

Yellow and orange sometimes occur on blood spot when no agent is present. Pink or blue color must be present for a positive test.

Any combination of colors, or "rainbow effect," which includes pink or blue should be considered as a positive blood agent test.

(3) High temperatures and low humidity (desert conditions). Under desert conditions, the sampler-detector is operated the same as under normal conditions with one exception, approximately 5 minutes after exposure of test spots has started, the nerve agent test spot must be rewet. Do this by squeezing remaining liquid in ampoule 3 onto the nerve agent test spot.

NOTE

A faint blue color may appear in the ABSENCE of blister agents (H and HD).

(4) High temperatures and high humidity (tropic conditions). The color change for lewisite rub marks may be very slight. Compare with a second rub mark before making judgment. A faint blue color may appear in the ABSENCE of blister agents (H and HD).

(5) Direct sunlight. Keep the sampler-detector away from heat and direct sunlight as much as possible.

(6) Snow and rain. Protect from rain and snow as much as possible by use of your body or any available shelter.

2-4. POST-OPERATIONAL PROCEDURES.

a. All used sampler-detectors may be discarded in normal trash.

b. Further demilitarization/disposal procedures can be found in DOD 4160.21 -M and 4160.21 -M-1.

c. The M256 training simulator should be stored in a cool dry place if possible.

APPENDIX A
REFERENCES

Defense Disposal Manual ..... DOD 4160.21 -M

Defense Demilitarization Manual ..... DOD 4160.21 -M-1

Nuclear, Biological and Chemical (NBC) Defense ..... FM 21-40

Operator's Manual, Detector Kit, Chemical Agent: M256 ..... TM 3-6665-307-10

The Army Maintenance Management System (TAMMS) as contained in the Maintenance Management Update ..... DA PAM 738-750

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

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