FM 3-8

DEPARTMENT OF THE ARMY [redacted] MANUAL

Field

CHEMICAL CORPS

REFERENCE HANDBOOK

DEPARTMENT OF THE ARMY • FEBRUARY 1955

FOREWORD

This manual is a compilation of logistical and technical information pertaining to Chemical Corps materiel and to functions of Chemical Corps units. It is designed for use as a reference handbook.

As the logistical tables are based on data given in the latest publications available at time of preparation of this manual, computations should be adjusted in accordance with subsequent changes to tables of organization and equipment, tables of allowances, supply manuals, and other publications.

FIELD MANUAL

CHEMICAL CORPS REFERERENCE HANDBOOK

FM 3-8
CHANGES NO. 9

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *5 October, 1959*

FM 3-8, 14 February 1955, is changed as follows:

Remove pages 19 and 20 and substitute revised pages 19 and 20.

Remove pages 28.5 through 34 and substitute revised pages 29 through 32.

Remove pages 62.16 and 62.17 and substitute revised pages 62.16 through 62.19.

[AG 322 (22 Jun 59)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

L. L. LEMNITZER,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNGB (1)
Tech Stf, DA (1) except
CCmlO (25)
Tech Stf Bd (1) except
CmlC Bd (10)
USCONARC (5)
US ARADCOM (2)
US ARADCOM, Rgn (2)
OS Maj Comd (10)
MDW (1)
Armies (20) except
First US Army (22)
Corps (2)
CmlC Gp (10)
CmlC Bn (10)
USMA (20)
USACMLCSCH (100)
CmlC Tng Com (100)
CmlC Mat Com (2)
Units org under fol TOE:
3-7 (1)
3-32 (10)
3-36 (10)
3-47 (1)
3-67 (1)
3-77 (1)
3-97 (1)
3-117 (1)
3-266 (2)
3-267 (1)
3-500 (AA-AC) (1)

NG: State AG (3); units same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

AGO 1878B—October

Posted by RB.
18 Feb 64

FM 3-8
CHANGES NO. 8

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *4 March 1959*

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3-8, 14 February 1955, is changed as follows:

Remove pages 3 through 28 and substitute revised pages 3 through 28.5.

Delete period after "protective" on page 75 in C 7 so that this part of paragraph 26 will read in with the remainder of paragraph 26 on page 77 of FM 3-8.

[AG 322 (18 Dec 58)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

R. V. LEE,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNGB (1)
Tech Stf, DA (1) except CCmlO (25)
Tech Stf Bd (1) except CmlC Bd (10)
USCONARC (5)
US ARADCOM (2)
US ARADCOM Rgn (2)
OS Maj Comd (10)
MDW (1)
Armies (20)
Corps (2)
CmlC Gp (10)
CmlC Bn (10)
USMA (20)
USACMLCSCH (100)
CmlC Tng Com (100)
CmlC Mat Com (25)
Units org under fol TOE:
3-7 (1)
3-32 (10)
3-36 (10)
3-47 (1)
3-67 (1)
3-77 (1)
3-97 (1)
3-117 (1)
3-266 (2)
3-267 (1)
3-500 (AA-AC) (1)

NG: State AG (3); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

Posted by C.B. 18 Feb 64

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3-8
CHANGES No. 7

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *8 October 1958*

FM 3-8, 14 February 1955, is changed as follows:

Remove pages 15 and 16 and substitute revised pages 15 and 16.

Remove pages 31 through 34 and substitute revised pages 31 through 34.

Remove pages 63 through 76 and substitute revised pages 63 through 75.

Add pages 80.1 and 80.2.

Remove pages 231 through 238 and substitute revised pages 231 through 237.

Page 62.3, Table XX. In "Radius of burst (yd)" column and opposite "Grenade, hand, smoke, WP, M15," change from "20" to **35.**

[AG 322 (6 May 58)]

By Order of *Wilber M. Brucker*, Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNBG (1)
Technical Stf, DA (1) except CCmlO (25)
Technical Stf Bd (1) except CmlC Bd (10)
USCONARC (5)
US ARADCOM (2)
OS Maj Comd (10)
MDW (1)
Armies (20)
Corps (2)
CmlC Gp (10)
CmlC Bn (10)
USMA (20)
USACMLCSCH (100)
CmlCTngCom (100)
CmlCMatCom (25)
Units organized under following TOE's:
3-32 (10)
3-36 (10)
3-47 (1)
3-67 (1)
3-77 (1)
3-97 (1)
3-117 (1)
3-266 (2)
3-267 (1)
3-500 (AA-AC) (1)

NG: State AG (6); units—same as Active Army except allowance is one copy to each unit.

USAR: None.

For explanation of abbreviations used, see AR 320-50.

Posted by G.P. 18 Feb 64

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3–8
CHANGES NO. 6

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *15 November 1957*

FM 3–8, 14 February 1955, is changed as follows:

Remove pages 55 through 62 and substitute reprinted page 55 and revised pages 56 through 62.

Add new pages 62.1 through 62.17.

Page 174, table LIV. In "Method" column and opposite "Water," change from "Boiling for 10 minutes" to **Boiling for 15 minutes;** in "Method" column and opposite "Food," change from "Boiling in water for 10 minutes" to **Boiling in water for 15 minutes.**

Remove pages 197 through 200 and substitute revised pages 197 through 200.

Page 217. In definition of "Flagella," delete "also known as cilia."

Page 218. Change definition of "molds" to read: **multicellular fungi which form a filamentous branching growth known as mycelium.**

Page 220. In definition of "Thermophilic," delete "not able to grow without heat."

[AG 322 (25 Oct 57)]

By Order of *Wilber M. Brucker,* Secretary of the Army:

MAXWELL D. TAYLOR,
General, United States Army,
Chief of Staff.

Official:

HERBERT M. JONES,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

CNGB	CmlCTngCom
Technical Stf, DA	CmlCMatCom
Technical Stf Bd	Units org under fol TOE:
USCONARC	3–32
US ARADCOM	3–36
OS Maj Comd	3–47
MDW	3–67
Armies	3–77
Corps	3–97
CmlC Gp	3–117
CmlC Bn	3–266
USMA	3–267
USACMLCSCH	3–500 (AA–AC)

NG: State AG; units—same as Active Army.

USAR: None.

For explanation of abbreviations used, see AR 320–50.

Posted by R.B. 18 Feb 64

Thermate. TH2 One purple band. TH2 INCEND.	None.	Incendiary.		Can cause severe burns when ignited.	None.	Grenade.	Stable but flammable.		Grenade: AN–M14.
Thermate. TH3. One purple band. TH3 INCEND.	None	Incendiary.		Can cause severe burns when ignited.	None.	Bomb, grenade.	Stable but flammable.	G	Bomb: AN–M50 series. Bomb, instructional: M1 series, M2 series. Grenade: AN–M14.

[1] Requires protective clothing and mask.
[2] Requires protective mask.
[3] Mask required in dense concentrations.
[4] Decomposes below boiling point at normal atmospheric pressure.
[5] Used when air temperature is above 40° F.
[6] Used when air temperature is between 0° F. and 40° F.
[7] Secondary tactical classification is as an antipersonnel agent; agent also has some incendiary effect.
[8] PT1 is composed of petroleum oil, magnesium waste, and isobutyl-methacrylate polymer as thickener.
[9] Incendiary oil, IM, is composed largely of isobutyl methacrylate and gasoline.
[10] NP is composed of petroleum oil and napalm (M1 thickener).
[11] OT is composed of petroleum oil and octal (M3 thickener).
[12] NP2 is composed of petroleum oil and antiagglomerated napalm (M2 thickener).
[13] NP3 is composed of kerosene and napalm.

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CHEMICAL CORPS REFERENCE HANDBOOK

FM 3–8
CHANGES No. 5

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *11 July 1956*

FM 3–8, 14 February 1955, is changed as follows:

Remove pages 3 through 38 and substitute revised pages 3 through 15; blank page 16; and revised pages 17 through 38.

Remove pages 43 through 46 and substitute revised pages 43 through 46.

Remove pages 153 through 160 and substitute revised pages 153 through 160.

Remove pages 205 and 206 and substitute reprinted page 205 and revised page 206.

AGO 7667B—June

Posted by R. B
18 Dec 64

25

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3-8
CHANGES No. 4

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *28 December 1955*

FM 3-8, 14 February 1955, is changed as follows:

Remove pages 105 and 106 and substitute revised pages 105 and 106.

Add new page 106.1.

Remove pages 115 through 126 and substitute reprinted page 115; blank pages 116 and 117; revised pages 118 through 120; blank page 121; and revised pages 122 through 126.

AGO 3796B. Jan

Posted by ACB
18 Feb 64

FM 3–8
C 3

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3–8
CHANGES No. 3

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *6 October 1955*

FM 3–8, 14 February 1955, is changed as follows:

Remove pages 65 through 76 and substitute revised pages 65 through 76.

AGO 1982B—Oct

Posted by R.C. 18 Feb 64

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3-8
CHANGES No. 2

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *7 July 1955*

FM 3-8, 14 February 1955, is changed as follows:

Remove pages 87 and 88 and substitute revised page 87 and page 88.

Remove pages 101 through 104 and substitute pages 101 and revised pages 102 through 104 and new page 104.1.

Posted by PC
18 Feb 64

FIELD MANUAL

CHEMICAL CORPS REFERENCE HANDBOOK

FM 3-8
CHANGES No. 1

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *16 June 1955*

FM 3-8, 14 February 1955, is changed as follows:

Change heading on cover to read DEPARTMENT OF THE ARMY **FIELD** MANUAL.

Remove pages 91 through 98 and substitute revised pages 91 through 98.1.

Page 198, table LXVIII. Change first item in second column from Psittocosis to **Psittacosis.**

Page 199. Change first item in last column from Melidosis to **Melioidosis.**

TAGO 5973B—June 310488°—55

Posted by R.C.
18 Feb 64

FIELD MANUAL
No. 3-8

DEPARTMENT OF THE ARMY
WASHINGTON 25, D. C., *14 February 1955*

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CHAPTER 1

INTRODUCTION

1. Purpose and Scope

This manual provides statistical information and data for use in planning and performing chemical operations. It contains reference data on organization, operations, and logistics pertinent to the functions of the Chemical Corps.

2. Appendix

The appendix lists publications used as source material for the reference data presented in this manual.

CHAPTER 2

CHARACTERISTICS AND ORGANIZATION OF CHEMICAL TOE UNITS

Section I. GENERAL

3. Types of Units

a. Regular TOE Unit. A regular TOE unit is one that is regularly constituted and activated in accordance with an approved table of organization and equipment. The characteristics and organization of regular TOE chemical units are given in paragraphs 5 through 9.

b. Cellular TOE Unit. A cellular TOE unit is one composed of one or more teams (TOE cells), each of which includes personnel and equipment required for performance of a specific function. Cellular TOE chemical units are discussed in paragraphs 9.1 through 9.6.

4. Categories of Units

There are three categories of chemical units: I, II, and III. These categories are defined in AR 320-5.

Section II. REGULAR TOE CHEMICAL UNITS

5. List of Units

TOE No.	*Title*
3-32D	Headquarters and headquarters detachment, chemical group.
3-36D	Headquarters and headquarters detachment, chemical battalion, service, army or communications zone.
3-7D	Chemical company, combat support.
3-47D	Chemical maintenance company.
3-67D	Chemical depot company.
3-77D	Chemical processing company.
3-97D	Chemical laboratory.
3-117D	Chemical depot company, communications zone.
3-217D	Chemical decontamination company.
3-266D	Headquarters and headquarters detachment, chemical smoke generator battalion.
3-267D	Chemical smoke generator company.

6. Characteristics of Units

Characteristics of regular TOE chemical units are given in table I. Individuals of chemical units, except chaplains, can fight as infantrymen when required. Each unit has the capability of defending itself

and its installations against hostile ground attack except the chemical laboratory and the chemical depot company, communications zone, which depend on other organizations for local security of their installations. The chemical laboratory and the headquarters and headquarters detachments, chemical group, are dependent on other organizations for mess facilities and supplemental motor maintenance. The headquarters and headquarters detachments of chemical service battalion and chemical smoke generator battalion are dependent on other organizations for mess facilities. Several units are adaptable to a type B organization. The capabilities of a type B unit are the same as those of a full strength unit. The number of non-United States personnel required for a type B unit is determined by the major commander to which the unit is assigned and depends upon the capacity of available personnel to produce, the number of work shifts, and other local conditions. Interpreters and translators for a type B unit are provided from teams available to the theater commander. All regular TOE chemical units are equipped with chemical agent detector kits and radiac equipment.

Table I. Characteristics of Regular TOE Chemic[illegible]nits

Designation (TOE No.)	Strength				Mission	Assignment and allocation basis*	Capabilities and remarks
	O	WO	EM	Agg			
Hq & hq det, cml gp (3–32D).	10	2	41	53	Provides tactical, technical, and admin comd of CmlC units.	Asg to fld army or comz; may be atch to Log. Comd B or C; aloc 1 per fld army or comz.	Provides comd, control, stf planning supv of operations, and admin of 3 to 7 CmlC bns or CmlC units; not adaptable to type B orgn; cat. II unit; 50 percent mobile.
Hq & hq det, cml bn, svc, army or comz (3–36D).	5	2	25	32	Provides comd, technical, and operational supv for CmlC units.	Asg to army, ind corps, or comz; may be atch to Log. Comd B or C; aloc 1 per 3 to 7 companies.	Provides comd, control, stf planning, and admin for 3 to 7 atch companies; not adaptable to type B orgn; cat. II unit; 60 percent mobile.
Cml co, cmbt spt (3–7D)	9	----	237	246	Provides CBR spt for cmbt units of a corps.	Asg to army and atch to corps; aloc 1 per corps.	Provides 6 plats for corps spt. (1) Each plat, when issued approp eqp on a special basis, can provide the following svcs for a cmbt div or for corps troops on a priority estb by supported unit commander: operation and fuel spt of 8 smoke generators; pdn of smoke by smoke pots; svc of portable and/or mechanized flame throwers and preparation of flame field expedients; and preparation of flame and toxic cml mine fields and supv of other troops in preparing toxic mine fields. (2) Each plat with organic eqp can provide the following svc for a cmbt div or for

* Basis for allocation are subject to revision as new type units are integrated into the Army structure.

Table I. Characteristics of Regular TOE Chemical Units—Continued

Designation (TOE No.)	Strength				Mission	Assignment and allocation basis*	Capabilities and remarks
	O	WO	EM	Agg			
Cml co, cmbt spt (3–7D) —Continued							corps troops on priority estb by supported unit commander: CBR monitoring, survey and reconnaissance to include radiological fallout surveys; limited decon of critical areas and materiel and supv of unit decon; operation of one personnel decon station; advise on and supv fld imprg of clothing; and assist in tng of div personnel and units in CBR warfare. (3) Each plat can provide the following svc for a cmbt div or for corps troops on a continuing basis: cml technical intel; third echelon maint of div organic CmlC eqp; and operation of a div cml supply point. When operating separately, plats are dependent upon other units for mess; not adaptable to type B orgn; cat. II unit; 100 percent mobile. Eqp includes 18 air compressors; 12 trailer-mounted, 200-gal decon apparatuses; 18 flame thrower fuel filling kits; and 6 incendiary oil mixing and transfer units.

Cml maint co (3–47D)*	4	0	95		Provides fld and depot maint of CmlC materiel.	Asg to army, ind corps, or comz; may be atch to cml svc bn; aloc 1 per army and 1 per corps, or 1 per 100,000 troops.	Performs fld and depot maint on all CmlC eqp utilized by 100,000 troops; not adaptable to type B orgn; cat. II unit; 90 percent mobile; eqp includes one CmlC eqp maint and repair set.
Cml depot co (3–67D)*	4	1	139	144	Receives, classifies, stores, issues, and ships CmlC mun and eqp; fills mun not normally filled in ZI.	Asg to army or ind corps; may be atch to cml svc bn; aloc 1 per army and 1 per corps or 1 per 100,000 troops.	Supplies CmlC mun and eqp for 100,000 troops; each plat capable of operating ind; adaptable to type B orgn; cat. II unit; 80 percent mobile; TOE authorizes eqp for filling and/or hdlg land mines, airplane smoke tanks, one-ton containers, and 55-gal drums.
Cml prcs co (3–77D)*	4	----	89	93	Prim mis to provide cml imprg and/or reimprg of clothing used for prot against CBR agents; secd mis to operate as fixed fld laundry.	Asg to sec of comz; aloc 1 company per 100,000 troops.	Processes apprx 60,000 uniforms per month when operating continuously from fixed instl in comz; plats capable of separate operations; not adaptable to type B orgn; cat. III unit; 10 percent mobile; eqp includes 2 clothing imprg plants.
Cml laboratory (3–97D)*	9	1	42	52	Provides for thtr lab examination, evaluation, and identification of materiel with prim emphasis on cml, biological (except identification), and radiological warfare aspects; analyzes cml and other items procured in thtr to assure satisfaction of contract spec.	Asg to theater of operations; aloc 1 or more per theater of operations.	Performs cml and physical operations; conducts studies, exper or research proj pertinent to other than CBR warfare materiel; not adaptable to type B orgn; cat. III unit; 30 percent mobile; eqp includes one Cml base lab.

* Basis for allocation are subject to revision as new type units are integrated into the Army structure.

Table I. Characteristics of Regular TOE Chemical Units—Continued

Designation (TOE No.)	Strength				Mission	Assignment and allocation basis*	Capabilities and remarks
	O	WO	EM	Agg			
Cml depot co, comz (3-117D).	2	2	70	74	Provides admin and technical pers for depot operations pertinent to receipt, classification, surveillance, storage, and issue of CmlC supplies, ammo, and eqp in the comz.	Asg to comz, atch as required; aloc 1 per 200,000 troops or major fraction thereof in the thtr.	When labor pers are furnished by QM svc troops or other labor sources, depending upon workloads imposed by varying stock levels, company is capable of receipt, storage, surveillance, and issue of CmlC class II, IV, and V supplies in comz; adaptable to type B orgn; cat. III unit; 95 percent mobile; TOE authorizes eqp for filling and/or hdng airplane smoke tanks, one-ton containers, and 55-gal drums.
Cml decon co (3-217D)	4	----	111	115	Prim mis to decon vital areas, instl, and large quantities of materials; secd mis to screen svc and army rear areas by use of smoke.	Asg to comz; may be atch to cml svc bn; aloc 2 per army supported or 1 per 200,000 troops in comz.	Provides CBR warfare decon svc for apprx 100,000 troops; adaptable for firefighting and mobile shower svc; adaptable to type B orgn; cat. II unit; 100 percent mobile; eqp includes 12 truck-mounted, 400-gal decon apparatuses and one chemical agent sampling kit.
Hq & hq det, cml smoke genr bn (3-266D).	4	1	17	22	Provides technical and operational supv and admin comd for cml smoke genr companies.	Asg to an army or comz; aloc 2 per army.	Provides technical and operational supv and admin comd for 3 to 8 cml smoke genr companies; not adaptable to type B orgn; cat. I unit; 100 percent mobile.

Cml smoke [redacted] co (3-267D).	7	----	135	[redacted]	Prim mis to provide concealment of troops or instl under all operating conditions by use of smoke; secd mis to mix flame fuel when not engaged in prim mis.	Asg to army and co [redacted] may be atch to hq & hq det, cml smoke genr bn; aloc 8 per army and to comz as required.	Provides blanketing of an area from 1 to 2½ miles in width and several miles in length, depending upon wea conditions; capable of rapid emplacement and displacement; adaptable to type B orgn; cat. I unit; 100 percent mobile; eqp includes 48 smoke generators.

* Basis for allocation are subject to revision as new type units are integrated into the Army structure.

7. Organizational Charts

Organizational charts for regular TOE chemical units are shown in figures 1 through 11.

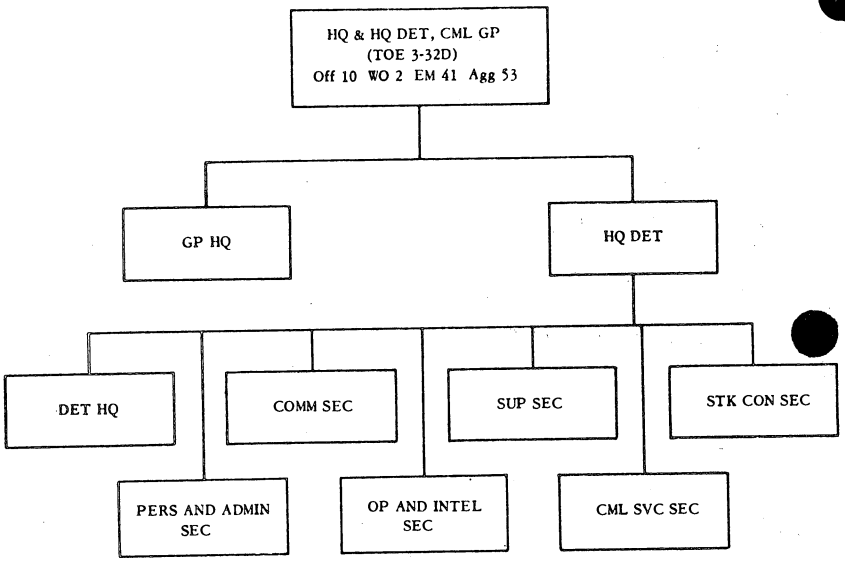

Figure 1. Organization of headquarters and headquarters detachment, chemical group.

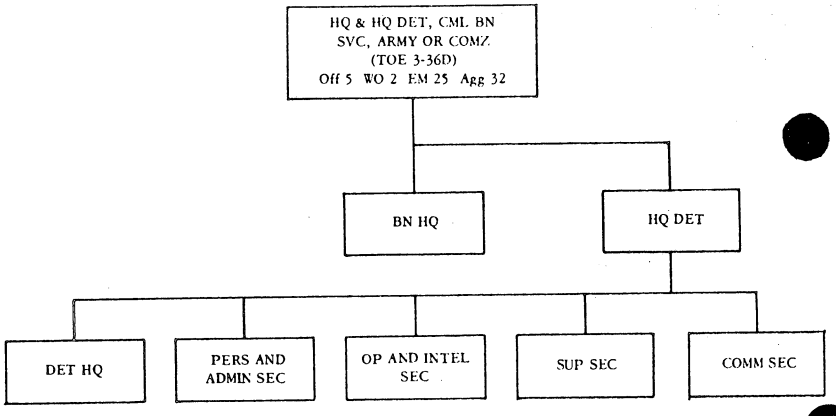

Figure 2. Organization of headquarters and headquarters detachment, chem battalion, service, army or communications zone.

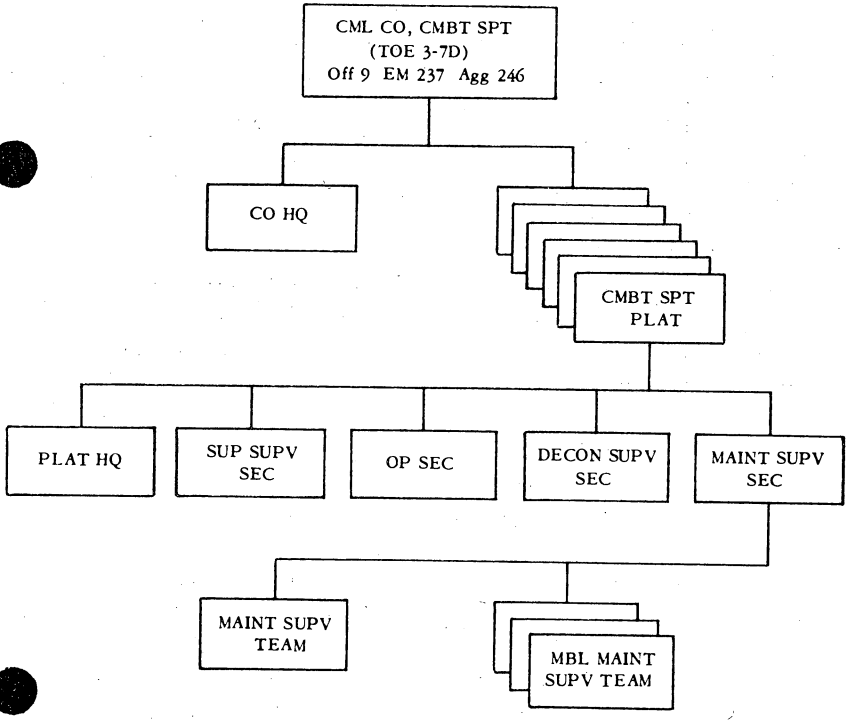

Figure 3. Organization of chemical company, combat support.

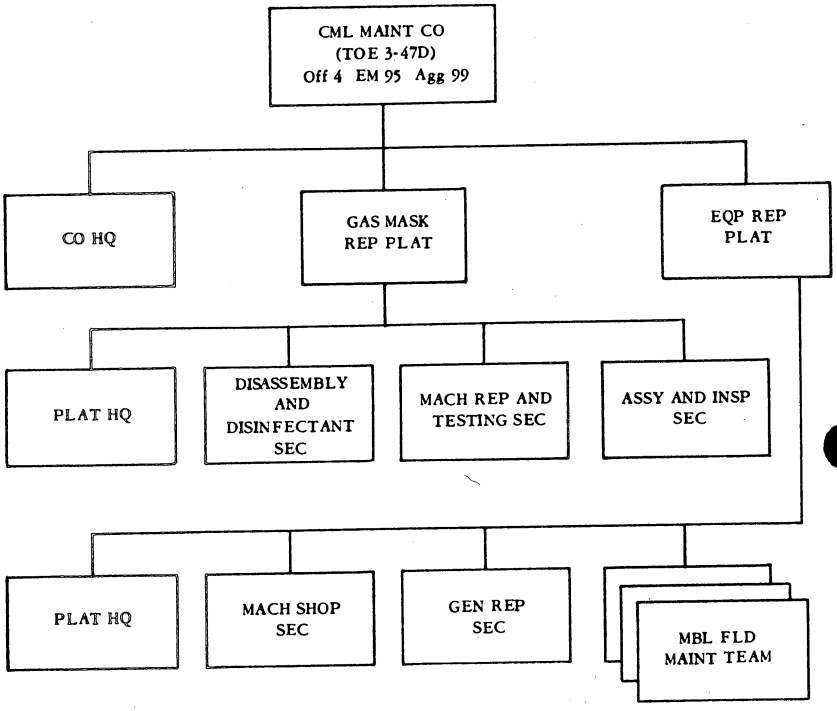

Figure 4. Organization of chemical maintenance company.

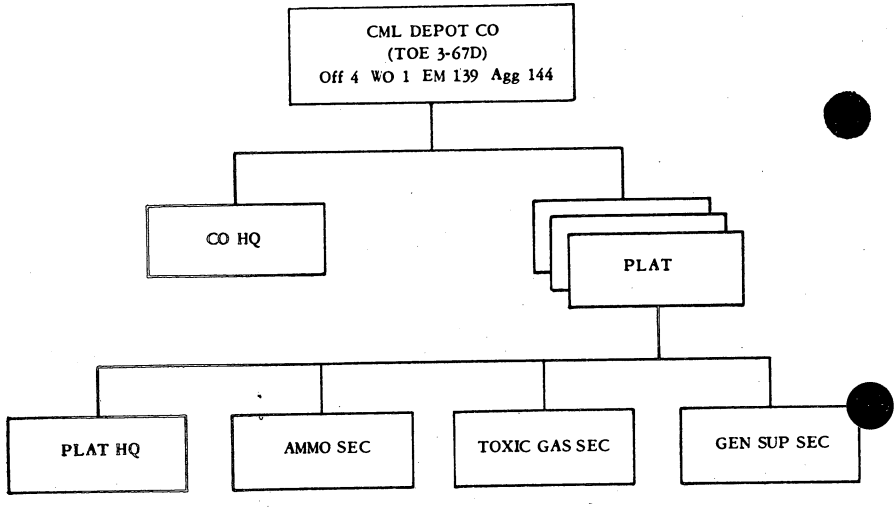

Figure 5. Organization of chemical depot company.

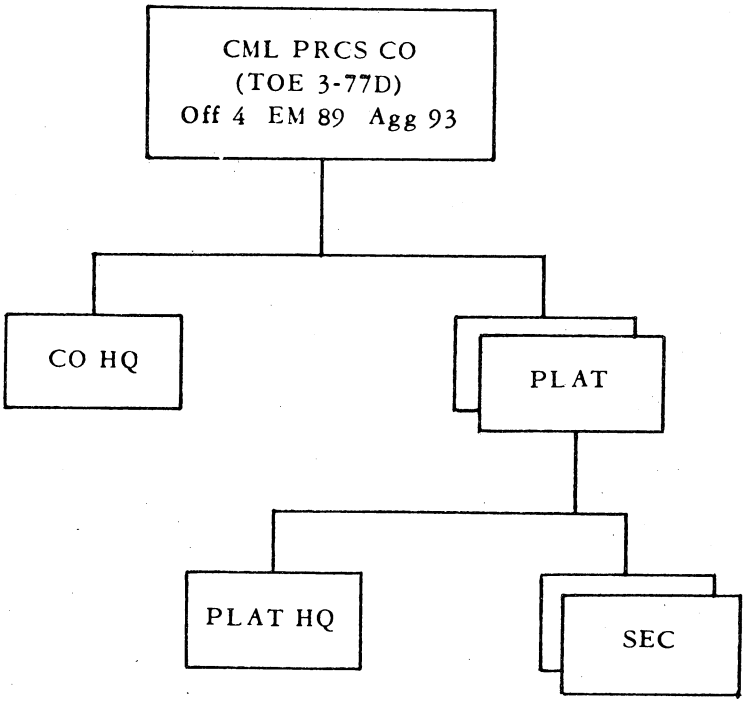

Figure 6. Organization of chemical processing company.

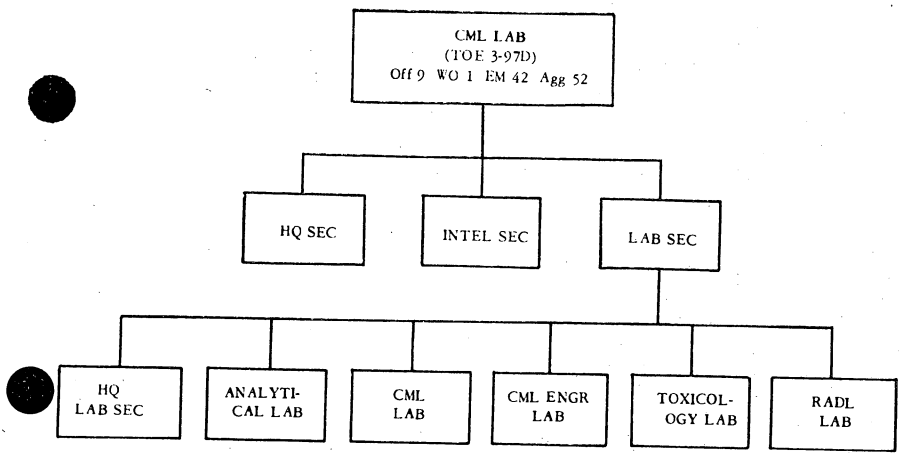

Figure 7. Organization of chemical laboratory.

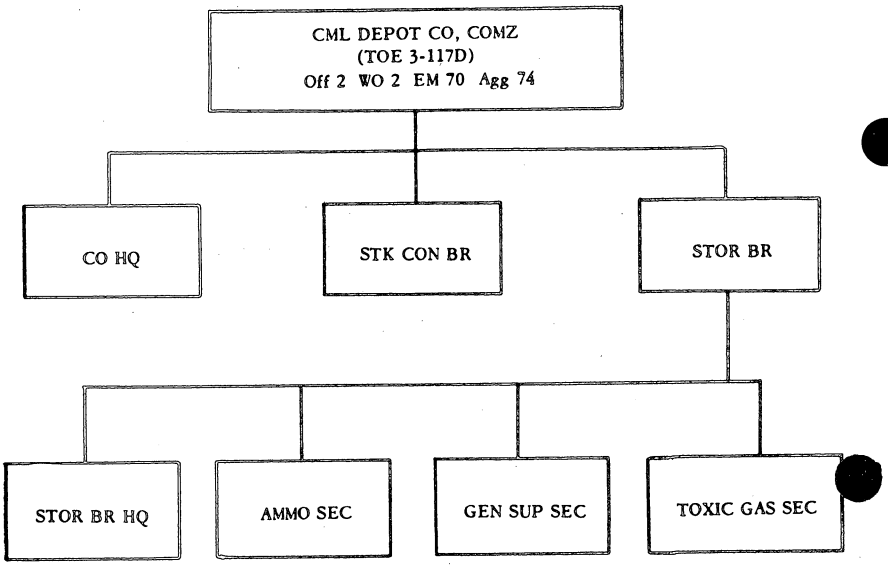

Figure 8. Organization of chemical depot company, communications zone.

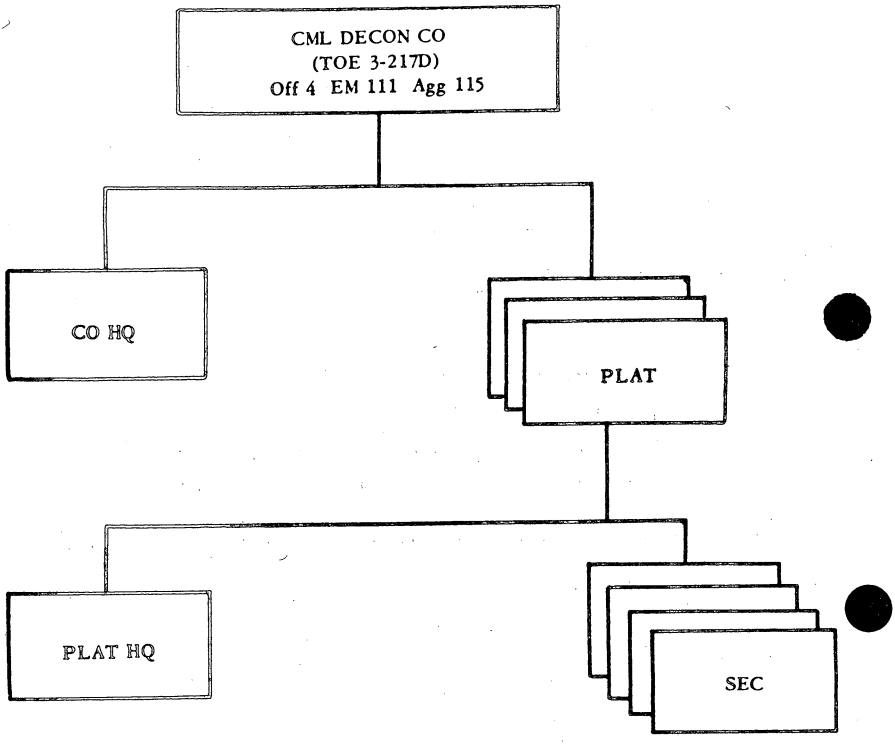

Figure 9. Organization of chemical decontamination company.

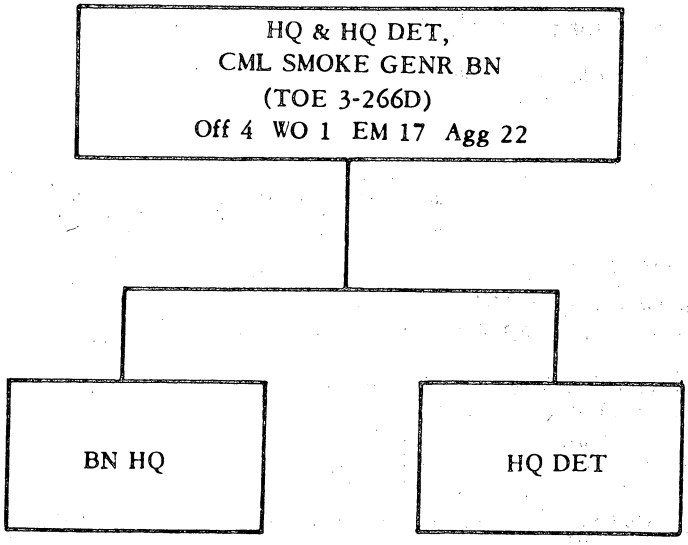

Figure 10. Organization of headquarters and headquarters detachment, chemical smoke generator battalion.

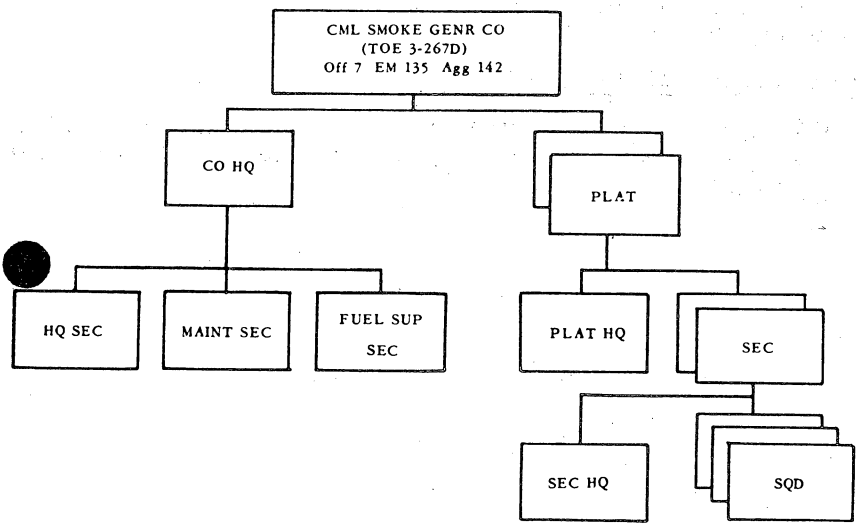

Figure 11. Organization of chemical smoke generator company.

Figures 12 through 16 are rescinded.

8. Armament

Armament for regular TOE chemical units is listed in table II.

Table II. Armament, Regular TOE Chemical Units

Unit	Weapon									
	Carbine cal .30[a]	Gun mach 7.62-mm	Gun mach cal .30[b]	Gun mach cal .50	Gun Sub-mach cal .45[a]	Lchr gre-nade	Lchr rkt 3.5-inch	Pistol cal .45	Rifle 7.62-mm	Rifle cal .30[a]
Hq & hq det, cml gp (3-32D)	----	----	----	1	8	----	1	6	38	----
Hq & hq det, cml bn, svc (3-36D).	17	----	1	----	4	----	1	3	----	----
Cml co, cmbt spt (3-7D)	181	6	----	----	7	----	5	----	----	58
Cml maint co (3-47D)	59	----	----	----	3	12	----	----	----	37
Cml depot co (3-67D)	112	2	----	----	5	----	2	----	----	[illegible]
Cml prcs co (3-77D)	73	----	----	----	----	----	----	----	----	
Cml lab (3-97D)	----	----	----	----	----	----	----	3	49	----
Cml depot co, comz (3-117D)	----	----	----	----	----	----	----	----	74	----
Cml decon co (3-217D)	----	1	----	----	3	----	1	----	112	----
Hq & hq det, cml smoke genr bn (3-266D).	----	----	----	----	2	----	----	2	19	----
Cml smoke genr co (3-267D)	----	4	----	2	15	----	4	----	123[c]	----

[a] To be replaced by rifle, 7.62-mm, light barrel.
[b] To be replaced by gun, machine, 7.62-mm.
[c] Includes 5 heavy barrel-type rifles.

9. Vehicular Equipment

Vehicular equipment, including trucks, truck-mounted equipment, trailers, and trailer-mounted equipment, for regular TOE chemical units is listed in table III.

Table III. Vehicular Equipment, Regular TOE Chemical Units

Vehicle	Unit										
	Hq & hq det, cml gp	Hq & hq det, cml bn, svc	Cml co, cmbt spt	Cml maint co	Cml depot co	Cml prcs co	Cml lab	Cml depot co, comz	Cml decon co	Hq & hq det, cml smoke genr bn	Cml smoke genr co
Truck											
Cargo, ¾-ton, 4 x 4			24	3				3		2	4
Cargo, ¾-ton, 4 x 4, W/WN				1						1	8
Cargo, 2½-ton, 6 x 6, LWB	1	1	19	4	7	3		6	4		7
Cargo, 2½-ton, 6 x 6, LWB, W/WN			7	1	1		1	1	1		
Utility, ¼-ton, 4 x 4	8	4	14	1	4	2	1		4	2	29
Van, shop, 2½-ton, 6 x 6				2							
Truck-Mounted Equipment											
Crane shovel, ⅜ cu yd, gas driven (6 x 6, 2 engine drive).					3						
Crane shovel, ½ cu yd, gas driven (6 x 6, 2 engine drive).								1			
Decon apparatus, power-driven, 400-gal (2½-ton, 6 x 6, LWB).									12		
Trailer											
Cargo, amphibious, ¼-ton, 2-wheel	8	4	14	1	3				4	2	29
Cargo, ¾-ton, 2-wheel			24								
Cargo, 1½-ton, 2-wheel	1	1	12	5	3				16	1	11
Tank, water, 1½-ton, 2-wheel			1	1	1			1	1		3
Trailer-Mounted Equipment											
Decon apparatus, power-driven, 200 gal.			12								
Welding shop, 1½-ton, 2-wheel				1							

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Table III. Vehicular Equipment, Regular TOE Chemical Units—Continued

Vehicle	Unit										
	Hq & hq det, cml gp	Hq & hq det, cml bn, svc	Cml co, cmbt spt	Cml maint co	Cml depot co	Cml prcs co	Cml lab	Cml depot co, comz	Cml decon co	Hq & hq det, cml smoke genr bn	Cml smoke genr co
Tractor-Mounted Equipment											
Crane, w/telescopic boom 12–18 ft long, 5000-lb cap. at 7 ft radius.	-------	-------	-------	-------	-------	-------	-------	2	-------	-------	-------
Automobile											
Sedan, 5-pass, light	-------	-------	-------	-------	-------	-------	1	-------	-------	-------	-------

Section III. CELLULAR TOE CHEMICAL UNITS

9.1. General

a. A cellular TOE chemical unit is an organization (detachment, platoon, or company) composed of separate teams (or cells) provided by the chemical service organization, TOE 3–500D, with or without teams provided by the composite service organization, TOE 29–500D. Each cellular unit is formed to meet a special requirement. Each team of the unit includes personnel and equipment required for the performance of a specific function. In addition to being used in the organization of a cellular unit, teams may be utilized in augmenting regular TOE units.

b. Two general types of teams are provided by the chemical service organization (TOE 3–500D). One type includes administrative and headquarters teams and the other consists of operational teams. Each general type consists of several specific types. The general and specific types of teams are listed below.

(1) *Administrative and headquarters teams:*
- (*a*) Platoon headquarters-component, team AA.
- (*b*) Platoon headquarters-separate, team AB.
- (*c*) Company headquarters, team AC.

(2) *Operational teams:*
- (*a*) Supply teams: EA, EB, and ED,
- (*b*) Maintenance teams: FA, FB, FC, and FD.
- (*c*) Decontamination teams: HA, HB, and HC.
- (*d*) Technical intelligence teams: IA and IB.
- (*e*) Mobile laboratory team: JA.
- (*f*) Chemical munitions safety control teams: KA, demolition and destruction; KB, escort crew; and KC, safety.
- (*g*) Fallout prediction team: LA, radiological center.

c. Teams are identified as to function and size by a two letter code. The first letter indicates the function, such as the letter A for administration and headquarters, E for supply, and H for decontamination. The second letter indicates the relative size of a team, such as the letter A for the smallest, B and C for intermediate sizes, and D for the largest.

9.2. Chemical Service Organization (TOE 3–500D)

The mission of the chemical service organization (TOE 3–500D) is to examine, evaluate, and identify CBR materiel including fallout from nuclear weapons; to provide chemical and radiological decontamination, CBR intelligence, and supply and maintenance of Chemical Corps equipment; to perform prediction of fallout from enemy delivered nuclear weapons and maintain plots of decontamination; to escort, demilitarize, destroy, or deactivate chemical filled munitions. The chemical service organization is not adaptable to a type B organization.

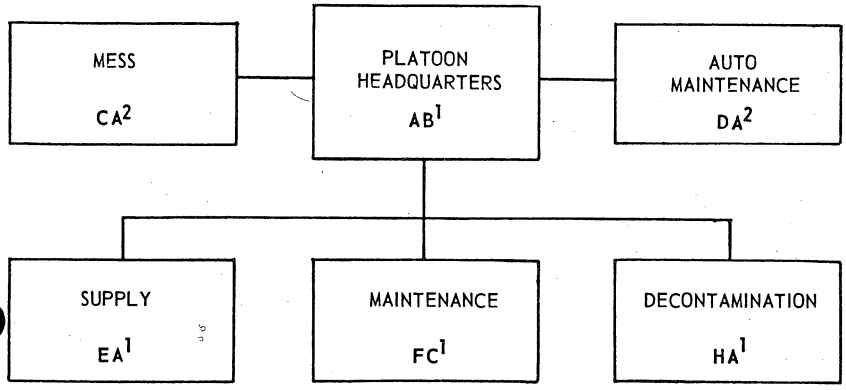
9.3. Organization of Chemical Cellular Units

Each team of a chemical cellular unit (detachment, platoon, or company) is equipped, trained, and organized to perform an operational function or an administrative and headquarters function. When a cellular unit is organized with one or more operational teams but with no administrative and headquarters team, it is designated as a detachment. A chemical service platoon or company may be organized with an administrative and headquarters team and with either operational teams of only one chemical service function, such as maintenance, or operational teams having several chemical service functions, such as supply, maintenance, and decontamination. A platoon composed, for example, of decontamination teams would be designated a chemical decontamination platoon. A platoon composed of a supply team, a decontamination team, and a maintenance team that is predominant by virtue of its relative size would be designated according to the designation of the predominating team, that is, chemical maintenance platoon. A platoon or company composed of teams of different chemical service functions, none of which are predominant, would be designated a chemical service platoon or a chemical service company. Mess, automotive maintenance, and machine record stock accounting teams are provided by the composite service organization (TOE 29-500D). The total number of personnel to be messed, the total number of motor vehicles requiring organizational maintenance computed in terms of vehicle equivalents, and the number of stock record transaction lines per month are determining factors in the selection of appropriate size mess, automotive maintenance, and machine record stock accounting teams. Chemical cellular units are not adaptable to a type B organization. The degree of mobility of cellular units must be computed for each specific combination of teams. Prior to requesting activation for any cellular unit to be organized from TOE 3-500D, the commander should carefully check the personnel, composition, equipment, and capability of each team against the requirements of the unit. The organization of a typical chemical maintenance platoon having a predominant maintenance team is shown in figure 17. The organization of a typical chemical service platoon having no predominant team is shown in figure 18. The organization of a typical service company having no predominant teams in shown in figure 19.

9.4. Characteristics of Teams

The characteristics of TOE 3-500D teams are given in table IV. Armament consists of a rifle for each individual except for the members of escort crew team KB, safety team KC, and the chemical intelligence officer of technical intelligence team IB, all of whom are armed with

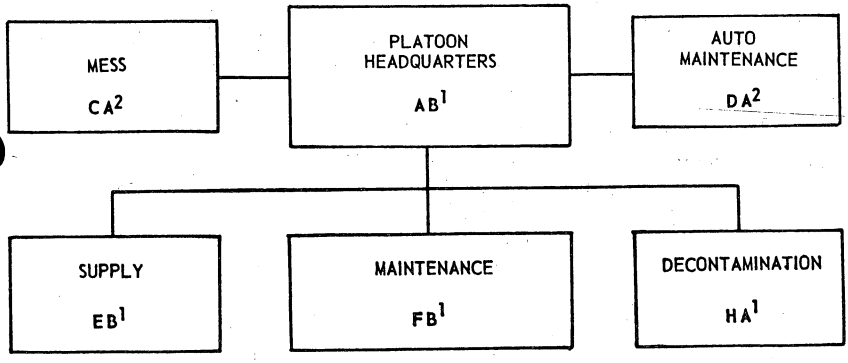
a pistol. All teams are equipped with chemical agent detector kits except platoon headquarters component, team AA and radiological center, team LA.



1FROM TOE 3-500D

2FROM TOE 29-500D

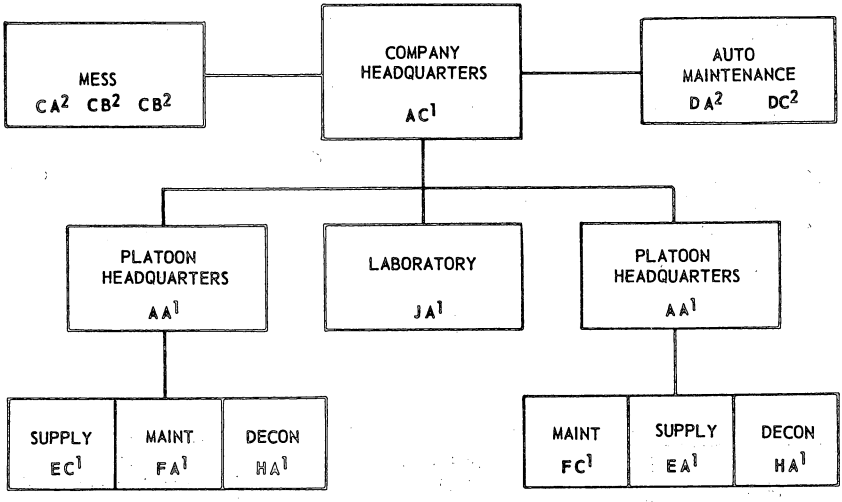
Figure 17. Organization of a typical chemical maintenance platoon.



1FROM 3-500D

2FROM 29-500D

Figure 18. Organization of a typical chemical service platoon.



[1]FROM 3-500D

[2]FROM 29-500D

Figure 19. Organization of a typical chemical service company.

Table IV. Characteristics of Chemical Service Organization (TOE [illegible]0D) Teams

Type	Strength				Capability	Allocation basis	Remarks
	O	WO	EM	Agg			
Administrative and Headquarters Teams							
Team AA, Platoon HQ Component.	1	----	1	2	Comd and admin control of one or more teams.	One per one or more teams of a str of not less than 40 indiv which op as a comp of a larger admin organization.	
Team AB, Platoon Hq Separate.	1	----	3	4	Comd and admin control of one or more teams which operate separately.	One per one or more teams which op separately; units normally are composed of more than one team and/or have a str of not less than 40 indiv.	
Team AC, Company Hq	2	----	5	7	Comd and admin control of two or more plat.	One per two or more plat except that the company str shall not be less than 100 indiv.	
Operational teams, supply							
Team EA, Supply	----	----	12	12	Receives, classifies, stores, and issues class II, IV, and V cml supplies and eqp for approx 5,000 troops.	Asg as required	TOE authorizes eqp for filling and/or hdlg airplane smoke tanks, one-ton containers, and 55-gal drums.

Table IV. Characteristics of Chemical Service Organization (TOE 3-500D) Teams—Continued

Type	Strength				Capability	Allocation basis	Remarks
	O	WO	EM	Agg			
Team EB, Supply	----	1	17	18	Receives, classifies, stores, and issues class II, IV, and V cml supplies and eqp for 5,000 to 10,000 troops.	Asg as required	TOE authorizes eqp for filling and/or hdlg airplane smoke tanks, one-ton containers and 55-gal drums.
Team EC, Supply	1	----	26	27	Receives, classifies, stores, and issues class II, IV, and V cml supplies and eqp for 10,000 to 25,000 troops.	Asg as required	TOE authorizes eqp for filling and/or hdlg airplane smoke tanks, one-ton containers, and 55-gal drums.
Team ED, Supply	1	----	36	37	Receives, classifies, stores, and issues class II, IV, and V cml supplies and eqp for 25,000 to 50,000 troops.	Asg as required	TOE authorizes eqp for filling and/or hdlg airplane smoke tanks, one-ton containers, and 55-gal drums.
Operational Teams, Maintenance							
Team FA, Maintenance	----	----	17	17	Provides cml fld maint spt for approx 5,000 troops.	Asg as required	Eqp includes one CmlC eqp maint and repair set.
Team FB, Maintenance	----	----	20	20	Provides cml fld maint spt for 5,000 to 10,000 troops.	Asg as required	Eqp includes one CmlC eqp maint and repair set.
Team FC, Maintenance	1	----	31	32	Provides cml fld maint spt for 10,000 to 25,000 troops.	Asg as required	Eqp includes one CmlC eqp maint and repair set.
Team FD, Maintenance	1	----	48	49	Provides cml fld maint spt for 25,000 to 50,000 troops.	Asg as required	Eqp includes one CmlC eqp maint and repair set.

Operational Teams, Decontamination							
Team HA, Decontamination.	----	----	8	8	Decon of critical areas and materiel for approx 5,000 troops.	Asg as required----------	Eqp includes one truck-mounted, 400-gal decon apparatus and radiac eqp.
Team HB, Decontamination.	1	----	21	22	Decon of critical areas and materiel for 5,000 to 10,000 troops.	Asg as required----------	Eqp includes 3 truck-mounted, 400-gal decon apparatuses and radiac eqp.
Team HC, Decontamination.	1	----	40	41	Decon of critical areas and materiel for 10,000 to 25,000 troops.	Asg as required----------	Eqp includes 6 truck-mounted, 400-gal, decon apparatuses and radiac eqp.
Operational Teams, Technical Intelligence							
Team IA, Technical Intelligence.	3	----	5	8	Collecting en CBR materiel, evaluating its comp, use, and effectiveness, and instructing troops in its hdlg, use, and maint when required; selecting and expediting the flow of captured en CBR materiel and pertinent reports for intel purposes; locating, evaluating, and exploiting those aspects of en instls pertinent to the design, construction, research, pdn, or storage responsibilities of CmlC materiel.	Asg to thtr of operations as required by subor comd to assist the stf cml officer in fulfilling his technical and scientific intel responsibilities.	Eqp includes cml agent detecting, sampling, and analyzing kits and also radiac eqp.
Team IB, Technical Intelligence.	3	----	7	10	Collecting en CBR materiel, evaluating its comps, use, and effectiveness, and instructing troops in its hdlg, use, and maint when required; selecting	Asg to thtr of operations as required by subor comd, to assist the stf cml officer in fulfilling his technical	Eqp includes cml agent detecting, sampling, and analyzing kits and also radiac eqp.

Table IV. Characteristics of Chemical Service Organization (TOE 3-500D) Teams—Continued

Type	Strength				Capability	Allocation basis	Remarks
	O	WO	EM	Agg			
Team IB—Continued					and expediting the flow of captured en CBR materiel and pertinent reports for intel purposes; locating, evaluating, and exploiting those aspects of en instl pertinent to the design, construction, research, pdn, or storage responsibilities of CmlC materiel.	and scientific intel responsibilities.	
Operational Team, Mobile Laboratory							
Team JA, Mobile Laboratory.	4	----	13	17	Provides lab examination, evaluation, and identification of CBR materiel; develops temporary devices and measures for cml warfare activities; provides lab assistance toward solution of problems of cml nature.	Two mobile lab teams normally asg to comz in spt of fld army.	Eqp includes cml agent detecting, sampling, and analyzing kits and one mobile cml lab.
Operational Teams, Chemical Munitions Safety Control							
Team KA, Demolition and Destruction.	1	----	16	17	Demilitarizes, destroys, or deactivates CmlC mun and chemical fillings of Ordnance type mun.	Asg as required----------	Eqp includes cml bomb svc kit, dml eqp set, and cml mun safety control tool set.
Team KB, Escort Crew---	1	----	4	5	Escorts hazardous types of CmlC materiel while in transit by air, land, or sea.	Asg as required----------	Eqp includes cml bomb svc kit and cml mun safety control tool set.

Team KC, Safety	1	----	2	3	Assists and advises in prov and maint of safety and security programs at plants, arsenals, instl, and activities where hazards exist in the manufacture and hdlg of CmlC mun and related items.	Asg as required.
Fallout Prediction Team						
Team LA, Radiological Center.	1	----	4	5	Operates one radiological center in which wea info is used to prepare expected fallout plots; corrects predictions as more info becomes available; maintains contamination plots showing change of activity with time; can augment division, corps, and army radiological centers or operate a minimum radiological center in rear area operations.	Asg as required.

9.5. Vehicular Equipment

Vehicular equipment, including vehicles and vehicle-mounted equipment, for chemical service organization (TOE 3–500D) teams is listed in table V.

Table [illegible] Vehicular Equipment, Chemical Service Organiz[illegible]n Teams

Vehicle	Team																		
	Admin & hq[a]		Supply				Maint				Decon			Tech intel		Mbl lab	Cml mun safety control[b]	
	AB	AC	EA	EB	EC	ED	FA	FB	FC	FD	HA	HB	HC	IA	IB	JA	KA	KB
Truck																		
Cargo, ¾-ton, 4x4	1	1	----	----	----	----	----	1	2	2	----	----	----	1	----	1	----	----
Cargo, 2½-ton, 6x6, LWB	----	----	2	2	2	4	1	1	2	2	1	2	4	----	1	1	1	----
Cargo, 2½-ton, 6x6, LWB, W/WN	1	1	----	----	----	----	----	----	----	----	----	1	2	----	----	----	----	----
Tractor, 4–5 ton, 4x4	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
Utility, ¼-ton, 4x4	----	1	1	1	1	2	1	1	1	1	1	1	2	3	3	1	1	----
Van, shop, 2½-ton, 6x6	----	----	----	----	----	----	1	1	1	2	----	----	----	----	----	----	----	----
Truck-Mounted Equipment																		
Crane shovel, ⅜-cu yd, gas driven (6x6, 2 engine drive).	----	----	----	1	1	1	----	----	----	----	----	----	----	----	----	----	----	----
Decon apparatus, power-driven, 400-gal (2½-ton, 6x6, LWB).	----	----	----	----	----	----	----	----	----	----	1	3	6	----	----	----	----	----
Trailer																		
Cargo, amphibious, ¼-ton, 2-wheel	----	1	1	1	1	2	1	1	1	1	1	1	2	3	3	1	1	----
Cargo, 1½-ton, 2-wheel	----	----	1	1	1	2	1	1	2	2	1	3	6	----	1	1	----	----
Tank, water, 1½-ton, 2-wheel	1	1	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----
Trailer-Mounted Equipment																		
Welding Shop, 1½-ton, 2-wheel	----	----	----	----	----	----	1	1	1	1	----	----	----	----	----	----	----	----
Semitrailer																		
Van, Shop, Cargo, 6-ton, 2-wheel	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1	----
Automobile																		
Sedan, 5-pass, light	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	1

[a] Team AA is not listed because it has no vehicles or vehicular-mounted equipment.
[b] Team KC is not listed because it has no vehicles or vehicular-mounted equipment.

9.6. Mess and Automotive Maintenance Teams

Mess and automotive maintenance detachments are organized from teams provided by the composite service organization (TOE 29-500D). Characteristics and vehicular equipment of mess and automotive maintenance teams are given in table VI.

Table VI. Characteristics and Vehicular Equipment of Mess and Automotive Maintenance Teams

Type	Strength				Capabilities	Vehicular equipment	Remarks
	O	WO	EM	Agg			
Mess Detachments							
Team CA, Unit Mess	----	----	4	4	Provides min basic pers and eqp necessary for operation of unit mess subsisting not more than 62 indiv.	1 truck, cargo, 2½-ton, 6x6, lwb. 1 trailer, tank, water, 1½-ton, 2-wheel.	
Team CB, Mess, Augmentation.	----	----	1	1	Provides for required augmentation of unit mess with one team CB when additional indiv to be subsisted increases the unit strength in excess of 62; an additional team CB is authorized for each increase of 60 indiv, or major fraction thereof in excess of 75, but not exceeding 195 indiv; an additional team CB is authorized for each increase of 75 indiv or major fraction thereof in excess of 195 but not exceeding 500 indiv; an additional team CB is authorized for each increase of 90 indiv or major fraction thereof in excess of the first 500. When a unit mess operates on a 24-hour basis and at least 15 percent of the rations are consumed at night, team CB or multiples of this team provides for augmentation of unit mess not to	None.	

Table VI. Characteristics and Vehicular Equipment of Mess and Automotive Maintenance Teams—Continued

Type	Strength				Capabilities	Vehicular equipment	Remarks
	O	WO	EM	Agg			
Team CB—Continued					exceed one-third overstrength of total cooks authorized.		
Team CC, mess, Augmentation.	----	----	1	----	Provides for augmentation of unit mess operating two or more separate echelon messes of combined strength of more than 300 indiv.	None.	
Automotive Maintenance Detachments							
Team DA, company autmv maint, Wheel.	----	----	1	1	Provides minimum basic pers and equip necessary for operation by company or smaller unit of an autmv maint section when servicing 12 wheel vehicle equiv or major fraction thereof.	1 truck, cargo, 2½-ton, 6x6, lwb.	
Team DC, Bn Autmv Maint, Wheel.	----	----	2	2	Provides min basic pers and eqp necessary for operation by separate company, bn, or higher unit of an autmv maint section when authorized 30 wheel vehicle equiv or major fraction thereof.	1 truck, cargo, 2½-ton, 6x6, lwb.	Team DC supplements teams authorized under company or smaller unit when not otherwise provided.
Team DE, Wheel Vehicle Mechanic, Augmentation.	----	----	1	1	Provides for augmentation of autmv maint section, of company or smaller unit, with an autmv mechanic, not otherwise provided, for each 12 wheel equiv or major fraction thereof based on total authorized the unit.	None.	

9.7. Characteristics of Machine Record Stock Accounting Teams

a. Team FA. The strength and capabilities of the team are given below. The team has no vehicular equipment.

(1) *Strength.* 1 officer and 13 enlisted men, aggregating 14.

(2) *Capabilities.* Provides the minimum basic personnel and equipment required for one shift operation of an electric accounting machine section handling 8,000 to 15,000 transaction lines per month.

b. Team FB. The strength and capabilities of the team are given below. The team has no vehicular equipment.

(1) *Strength.* 1 warrant officer and 13 enlisted men, aggregating 14.

(2) *Capabilities.* Provides for the augmentation of team FA with a second shift when an electric accounting machine section is required to handle from 15,000 to 30 000 transaction lines per month.

Table VII. Rescinded.

Table VIII. Rescinded.

Table IX. Rescinded.

CHAPTER 3

OPERATIONS

Section I. TROOP PLANNING

10. Troop Planning Slices

Troop planning slices and basic slice factors are discussed in FM 101-10.

11. Authorized Troop Strengths

TOE authorized troop strengths of Chemical Corps units are shown in table X. They include full and reduced strengths and the strength of supervisory United States military personnel for type B units. The reduced strength column is adapted to the requirements for personnel and equipment during prolonged noncombat periods and for a limited period of combat. The strength of United States military personnel shown in the type B unit column may be modified as required by local area conditions when authorized by the Department of the Army. Interpreters and translators for type B units are provided from teams of TOE 30-600D. The number of non-United States personnel of a type B unit to fill position vacancies is determined by the major commander to which the units is assigned and depends upon the productive capacity of available personnel, number of work shifts, and other local conditions. For information concerning the mission, assignment, basis of allocation, and capabilities of the units, see table I.

Table X. Troop Strength of Chemical Corps Units

Unit (TOE)	Strength														
	Full					Reduced					Type B				
	O	WO	NCO	Other EM	T	O	WO	NCO	Other EM	T	O	WO	NCO	Other EM	T
Hq & hq det, cml gp (3–32D)	10	2	13	28	53	10	2	12	22	46	------	------	------	------	------
Hq & hq det, cml bn, svc (3–36D).	5	2	8	17	32	5	1	8	12	26	------	------	------	------	------
Cml co, cmbt spt (3–7D)	9	------	46	191	246	7	------	28	125	160	------	------	------	------	------
Cml maint co (3–47D)	4	------	13	82	99	3	------	12	68	83	------	------	------	------	------
Cml dep co (3–67D)	4	1	20	119	144	4	1	20	78	103	4	1	20	56	81
Cml processing co (3–77D)	4	------	13	76	93	3	------	7	43	53	------	------	------	------	------
Cml lab (3–97D)	9	1	9	33	52	9	1	9	17	36	------	------	------	------	------
Cml dep co, CommZ (3–117D)	2	2	7	63	74	2	1	7	49	59	2	2	7	24	35
Cml decon co (3–217D)	4	------	19	92	115	4	------	16	74	94	4	------	19	40	63
Hq & hq det, cml smoke genr bn (3–266D).	4	1	5	12	22	3	------	5	9	17	------	------	------	------	------
Cml smoke genr co (3–267D)	7	------	25	110	142	5	------	21	83	109	7	------	25	52	84

12. Troop Disposition

Table XI. See chapter 4, Part III, FM 101-10, May 1959.

Figure 20. Rescinded.

Table XII. Rescinded.

Section II. TROOP MOVEMENTS

13. Movement of Chemical Units by Motor

a. References. Information pertaining to troop movement by motor vehicle is given in FM's 25-10, 100-5, 100-10, 101-5, and 101-10, and in supply bulletins of the 3-series. Logistical information about military vehicles is given in TM's 9-2800 and 9-2800-1.

b. Mobile Unit. A mobile unit is a unit equipped with sufficient organic vehicles for the purpose of transporting all assigned personnel and equipment from one location to another at one time.

c. Chemical Unit Motor Movement Data. Chemical unit motor movement data are given in table XIII. The data include degrees of unit mobility, expressed in percentage, and vehicle requirements for movement of units, including personnel and individual and organizational equipment. Teams of the chemical service organization (TOE 3-500D) are not listed in the table because the degree of mobility of cellular units must be computed for each specific combination of teams used.

Figure 21. Rescinded.

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Table XIII. Movement of Chemical Units by Motor

Unit (TOE)	Mobility (percent)	Remarks
Hq & hq det, cml gp (3-32R)	50	One additional, nonorganic, 2½-ton cargo truck required for unit to move at one time, or unit can move with organic vehicles by shuttling once with one 2½-ton cargo truck.
Hq & hq det, cml bn, svc (3-36R).	60	One additional, nonorganic, 2½-ton cargo truck required for unit to move at one time or unit can move with organic vehicles by shuttling once with one 2½-ton cargo truck.
Cml maint co (3-47R)	90	Two additional, nonorganic, 2½-ton cargo trucks required for unit to move at one time or unit can move with organic vehicles by shuttling once with two 2½-ton cargo trucks.
Cml dep co (3-67R)	80	Two additional, nonorganic, 2½-ton cargo trucks required for unit to move at one time or unit can move with organic vehicles by shuttling once with two 2½-ton cargo trucks; requirements for moving depot stocks are not included.
Cml processing co (3-77R)	10	Twenty-two additional, nonorganic, 5-ton, 4 x 2 stake and platform trucks and three 2½-ton, 6 x 6 cargo trucks (including one kitchen truck with trailer when troops mess enroute) required for on-highway movement of company at one time. Impregnators and dryers should be loaded on low-bed trailers if loading on 5-ton stake and platform trucks does not provide clearance for movement on bridges, under trestles, or through tunnels.
Cml lab (3-97R)	30	Ten additional, nonorganic, 2½-ton cargo trucks or equiavlent required to move the unit at one time.
Cml dep co, comm Z (3-117R).	95	Four additional, nonorganic 2½-ton cargo trucks, three truck-tractors, and three low-bed trailers required to move the unit at one time; requirements for moving depot stocks are not included.
Cml decon co (3-217R)	100	
Hq & hq det, cml smoke genr bn (3-266R).	100	
Cml smoke genr co (3-267R)	100	

14. Movement of Chemical Units by Airplane

Logistical information and data pertaining to the movement of chemical units by airplane are given in table XIV.

Note. Chemical service trucks are to be replaced by ordnance and engineer vehicles.

Table XIV. Movement of Chemical Corps Unit by Air

Unit	TOE	Wt of unit (short tons)[a]	Personnel	Major items of equipment																				Aircraft requirements		
				Trk, c go, 2½-ton, 6 x 6	Trk, cml svc, M1, 2½-ton, 6 x 6	Decon apparatus, power-driven, trk-mtd (2½-ton, 6 x 6)	Trk, shop, van, 2½-ton, 6 x 6	Trk, cargo, ¾-ton, 4 x 4	Trk, util, ¼-ton, 4 x 4	Trl, cgo, 1½-ton, 2w	Trl, water tank, 1½-ton, 2w	Trl, welding equip, 1¼-ton, 2w	Trl, cargo, ¼-ton, 2w	Generator, smoke, mechanical	Generator set, 5 KW cap	Pump, cntrf, gas driven, 55 gpm	Lab, mobile, CWS, M3	Supplementary equip set, No. 17, depot	Compressor, air, gas driven, 6 cm	Crane-shovel, trk mtd, air-borne, 2-ton cap (2½-ton, 6 x 6)	Set, equip, maint and repair	Med C–119	Hv C–124	Unused allowable cargo load (short tons)
Hq & hq det, cml gp	3–32R	21	36	1	---	---	---	---	5	1	---	---	5	---	---	---	---	---	---	---	---	3	0	3
																						0	1	4
Hq & hq det, cml gp w/aug sec.	3–32R	26	55	1	---	---	---	---	7	1	---	---	7	---	---	---	---	---	---	---	---	4	0	6
																						0	2	24
Hq & hq det, cml bn, svc	3–36R	18	33	1	---	---	---	---	4	1	---	---	4	---	---	---	---	---	---	---	---	3	0	6
																						0	1	7
Cml maint co	3–47R	93	99	5	---	---	2	4	1	5	1	1	1	---	---	---	---	---	---	---	---	9	1	6
																						0	4	7
Cml depot co	3–67R	103	144	5	3	---	---	---	4	3	1	---	3	---	---	---	---	---	---	3	---	10	1	2
																						0	5	22
Cml decon co	3–217R	[b]142	116	5	---	12	---	---	4	16	1	---	4	---	---	3	---	---	---	---	---	18	0	2
																						0	6	8
Hq & hq det, cml smoke genr bn.	3–266R	22	22	1	---	---	---	2	2	1	---	---	2	---	---	---	---	---	---	---	---	3	0	4
																						0	1	5
Cml smoke genr co	3–267R	[c]247	139	15	---	---	---	4	29	11	3	---	29	48	---	---	---	---	---	---	---	31	0	1
																						0	10	3

Team AA (plat hq)	3-500R	5	2																							
Team AB (plat hq)	3-500R	11	4	1				1			1													2	0	5
																								0	1	14
Team AC (co hq)	3-500R	13	7	1				1	1		1		1											2	0	3
																								0	1	12
Team EA (supply)	3-500R	16	12	1	1				1	1			1											2	0	0
																								0	1	9
Team EB (supply)	3-500R	26	18	1	1				1	1			1									1		1	1	7
																								0	2	24
Team EC (supply)	3-500R	27	27	1	1				1	1			1									1		1	1	6
																								0	2	23
Team ED (supply)	3-500R	43	37	2	2				2	2			2						1		1			3	1	6
																								0	2	7
Team FA (maint)	3-500R	26	17	1			1		1	1			1		1				1		1			1	1	7
																								0	2	24
Team FB (maint)	3-500R	30	20	1			1	1	1	1			1		1				1		1			1	1	3
																								0	2	20
Team FC (maint)	3-500R	41	32	2			1	2	1	2					1				1		1			2	1	0
																								0	2	9
Team FD (maint)	3-500R	51	49	2			2	2	1	2		1	1						1		1			4	1	6
																								0	2	0
Team HA (decon)	3-500R	16	8	1		1			1	1			1											2	0	0
																								0	1	9
Team HB (decon)	3-500R	43	22	3		3			1	3			1											6	0	5
																								0	2	7
Team HC (decon)	3-500R	85	41	6		6			2	6			2											12	0	11
																								0	4	15
Team IA (tech intel)	3-500R	10	8					1	3				3											2	0	6
																								0	1	15
Team IB (tech intel)	3-500R	14	10	1					3	1			3											2	0	2
																								0	1	11
Team JA (mbl lab)	3-500R	17	17	1				1	1	1			1				1							3	0	7
																								0	1	8

[a] Weight of unit is sum of combined weights of personnel, individual equipment, major items of organizational equipment, class I supplies for 3 days, class III supplies for 300 miles, and a basic load of class V supplies for tactical units.

[b] Decontaminating agents not included.

[c] Includes basic load of fog oil (48.7 short tons).

a. Computation of Weight of Unit. The aircraft requirements given in the table are based on the movement of an entire unit with no followup echelons. The weight (in short tons) of a unit is the sum of the combined weights of TOE personnel, individual equipment, major items of organizational equipment, class I supplies for 3 days, class III supplies for 300 miles, and a basic load of class V supplies for tactical units. Weights of class V supplies (ammunition) for nontactical units were not considered in the calculations for table XIV since most of the ammunition is carried by individuals. An average weight of 240 pounds was assumed for each man, including his individual equipment. In the computation of the weight of class I supplies an average weight of 6.6 pounds per ration per man per day was taken. The amount of classes II and IV supplies for chemical units are so small that they were not included in the computations for table XIV. Class III supplies are based upon the weight of gasoline, oil, and lubricants required to operate vehicles a minimum of 300 miles. Items of equipment for which allowances are authorized by theater commanders or by continental United States army commanders were not included in the computation of a unit's weight.

b. Aircraft Requirements. The aircraft requirements given in the table are based on the movement of an entire unit with no followup echelons. The numbers of required planes computed are those which permit the loading of trailers and their towing trucks in the same aircraft. In the aircraft requirements column, the upper row of figures for each unit is based on use of only the minimum number of C–124 heavy transport airplanes with the remainder of the unit being transported by C–119 medium transport airplanes; the lower row of figures is based on movement of the unit in C–124 airplanes only. The allowable cargo load of the C–119 airplane is assumed to be 16,000 pounds and of the C–124 airplane, 50,000 pounds. Loadings are based on optimum conditions of range (distance units are to be transported), aircraft balance, weather, altitude, takeoff runway, and landing field.

c. Requirements for Cellular Units. Requirements for movement of a cellular type chemical service unit (company, platoon, or detachment), organized with teams from the chemical service organization (TOE 3–500R) depend upon the specific combination of teams which comprise the unit.

d. References. For information pertaining to the movement of units by airplane and to the characteristics of airplanes used, see FM 101–10 and TM 57–210. For dimensions, weights, and other logistical data pertaining to general purpose motor vehicles, see TM's 57–210, 9–2800, and 9–2800–1.

15. Helicopter Loading Data

Logistical information on chemical supplies and equipment for loading on helicopters is given in table XV. For information on helicopter characteristics and capabilities see FM 101–10.

Table XV. Helicopter Loading Data

Item	Gross wt, packed (lb)	Wt of ea item unpacked (lb)	Shipping container		Limitations on transportability	Tie-down characteristic	Number for 400-lb load		Number for 1,300-lb load		Number for 2,000-lb load		Number for 3,000-lb load		Remarks
			Cubage (cu ft)	Dimensions (in.)			Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	
Flame thrower, portable M2A1.	110	44.0	8.50	33⅞ x 24¼ x 18¼	None	Good	3	9	11	29	18	45	27	68	
Flame thrower, mechanized, M3–4–3.	1,310	687.0	61.60	48½ x 33 x 36	Too heavy for H–13 or H–23.	Good	------	------	------	1	1	2	2	4	
Generator, smoke, mechanical, M2A1.	315	180.0	16.30	42½ x 29½ x 33	None	Good	1	2	4	7	6	11	9	16	
Generator, smoke, M3A1	250	136.0	18.80	51 x 23½ x 28½	None	Good	1	3	5	10	8	15	12	23	
Decontaminating apparatus, portable, 3 gallon, M1.	75	11.5	8.7	39⅜ x 28 x 15	None	Good	8	34	26	113	40	174	60	260	2 per box.
Curtain, gasproof, M1	114	86.0	4.40	38 x 17½ x 12	None	Good	3	4	11	15	17	23	26	34	8 per box.
Thickener, M1:															
(5¼ lb can)	50	6.40	2.10	20 x 18 x 9½	None	Good	8	62	26	203	40	312	60	468	6 cans per box.
(15¾-lb drum)	21	15.75	1.10	13 x 11¾ diameter	None	Good	19	25	62	82	95	127	142	191	
(100-lb drum)	125	100.00	6.50	29 x 19¼ diameter	None	Good	3	4	10	13	16	20	24	30	
Thickener, M3 (10-lb drum).	16	------	1.20	------	None	Good	25	------	81	------	125	------	187	------	
Cresylic acid:															
(1-gal container)	10	------	0.20	------	None	Good	40	------	130	------	200	------	300	------	
(55-gal drum)	524	414	13.10	35 x 25¼ diameter	Too heavy for H–13 or H–23.	Good	------	------	2	------	2	------	5	------	

Table XV. Helicopter Loading Data—Continued

Item	Gross wt, packed (lb)	Wt of ea item unpacked (lb)	Shipping container		Limitations on transportability	Tie-down characteristic	Number for 400-lb load		Number for 1,300-lb load		Number for 2,000-lb load		Number for 3,000-lb load		Remarks
			Cubage (cu ft)	Dimensions (in.)			Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	
Mask, protective, field, M9A1.	56	5.0	3.30	21 x 19 x 14	None	Good	7	80	22	260	35	400	53	600	6 per box.
Mask, gas, optical, lightweight, M2-10A1-6.	56	5.0	3.30	21 x 19 x 14	None	Good	7	80	22	260	35	400	53	600	6 per box.
Mask, gas, acid and organic vapors, M10.	74	5.5	4.40	29½ x 16½ x 14½	None	Good	5	72	17	236	27	363	40	545	6 per box.
Respirator, dust, M4	29	0.3	1.60	18 x 16 x 9⅝	None	Too small to tie down unpacked.	13	------	44	------	69	------	103	------	90 per box.
Protective ointment kit, M5A1.	50	0.5	1.40	22½ x 10 x 10¾		Too small to tie down unpacked.	8	------	26	------	40	------	60	------	70 per box.
Cover, outlet valve, M1	50	0.10	.40	33¼ x 15 x 13½	Transport packed only.	Too small to tie down if unpacked.	8	------	26	------	40	------	60	------	1,800 per box.
Filter, particulate, 600, cfm, M6.	215	------	16.70	59 x 21½ x 26¼	None	Good	1	9	4	30	7	46	11	69	3 per box.
Mask, gas, dog, M6-12-8	51	3.0	3.90	32½ x 25⅝ x 12½	None	Good	7	133	25	433	39	666	59	1,000	12 per box.
Mask, gas, horse, M5	60	15.0	5.40	22½ x 15 x 14¾	None	Good	6	26	21	86	33	133	50	200	2 per box.
Bag, pigeon, protective, M4	74	13.5	2.80	20⅝ x 15 x 17¾	None	Too small to tie down unpacked.	5	------	17	------	27	------	40	------	6 per box.
Fog oil, SGF-1, SGF-2:															
(5-gal can)	61	------	1.15	8 x 14 x 24	None	Good	6	------	20	------	32	------	49	------	
(55-gal drum)	475	------	13.1	35 x 25¼ diameter	Too heavy for H-13 or H-23.	Good	------	------	3	------	4	------	6	------	
Decontaminating agent, STB.	61	50.0	1.40	15¾ x 13½ diameter.		Good	6	8	21	26	32	40	49	60	
DANC solution unit, 4½ gallon, M4.	82	69.0	1.70			Good	4	5	15	18	24	29	36	43	1 can per box.
DANC solution unit, 3 gallon, M4.	59	46.5	1.20	16 x 14½ x 13		Good	6	8	22	27	33	43	50	64	1 can per box.

Brush, window, decontaminating, M1.	50	2.0	3.00	28¾ x 15½ x 21½	None	Good	8	200	26	650	40	1,000	60	1,500	15 per box.
Paint, liquid vesicant detector, M5 (4 oz can).	58	0.25	1.60	21¾ x 15½ x 8	Transport packed only	Too small to tie down unpacked.	6	------	19	------	34	------	51	------	96 cans per box.
Paper, liquid vesicant detector, M6 (book of 25 sheets).	45	0.12	1.00	12½ x 12½ x 11	Transport packed only.	Too small to tie down unpacked.	8	------	28	------	44	------	66	------	100 books per box.
Crayon, vesicant detector, M7A1 (can of 3).	35	0.2	0.60	14 x 14 x 8	Transport packed only.	Too small to tie down unpacked.	11	------	37	------	57	------	85	------	128 cans per box.
Kit, chemical agent detector, M9A2.	50	3.0	2.10	20½ x 18¾ x 10	Transport packed only.	Fragile unpacked.	8	------	26	------	40	------	60	------	8 per box.
Kit, chemical agent analyser, M10A1.	45	26.0	2.10	23 x 9¼ x 10¼	Transport packed only.	Fragile unpacked.	15	------	50	------	76	------	115	------	
Kit, smoke identification, M11.	26	-------	1.30	23 x 9⅛ x 10¼	Trasnport packed only.	Fragile unpacked.	15	------	50	------	76	------	115	------	
Kit, agent sampling, M12.	43	40.0	2.30	21¼ x 17¾ x 10¾	Transport packed only.	Fragile unpacked.	7	------	30	------	46	------	69	------	
Tool set, mechanical smoke generator M10.	68	-------	3.20	29½ x 13 x 12½	None	Too small to tie down unpacked.	44	------	144	------	222	------	333	------	
Candle, smoke, oil SGF2, M6.	35	1.82	0.8	11½ x 11½ x 6⅞	None	Too small to tie down unpacked.	11	------	37	------	58	------	87	------	16 per box.
Pot, smoke, HC, M1	48	12.0	0.9	21¼ x 7 x 10½	None	Good	8	33	27	108	41	166	62	250	3 per box.
Pot, smoke, floating, HC, M4A2.	48	38.0	2.1	14¾ x 15¾ diameter.	None	Good	8	10	27	34	41	52	62	79	
Pot, smoke, HC, 30-lb, M5.	47	33.0	1.1	13 x 10⅜ x 11	None	Good	8	12	26	39	42	60	63	90	
Grenade, hand, irritant, CN-DM, M6.	33	1.06	0.8	14 x 12½ x 7¾	Transport packed only.	Too small to tie down unpacked.	12	------	39	------	60	------	90	------	16 per box.
Grenade, hand, tear, CN, M7A1.	35	1.16	0.8	14 x 12½ x 7¾	Transport packed only.	Too small to tie down unpacked.	11	------	37	------	57	------	85	------	16 per box.
Grenade, incendiary, TH3, AN-M14.	47	2.00	0.8	14 x 12½ x 7¾	Transport packed only.	Too small to tie down unpacked.	8	------	27	------	42	------	63	------	16 per box.
Grenade, hand, smoke, WP, M15.	46	1.93	0.8	14 x 12½ x 7¾	Transport packed orly.	Too small to tie down unpacked.	8	------	28	------	43	------	65	------	16 per box.
Grenade, smoke, white, HC, AN-M8.	41	1.60	0.8	15¼ x 13¾ x 7½	Transport packed only.	Too small to tie down unpacked.	9	------	31	------	48	------	73	------	16 per box.
Grenade, hand, riot, CN, M25A1.	60	0.47	2.0	21 x 19 x 8¾	Transport packed only.	Too small to tie down unpacked.	6	------	21	------	33	------	50	------	50 per box.
Grenade, smoke, green, M18.	34	1.20	0.8	14 x 12½ x 8	Transport packed only.	Too small to tie down unpacked.	11	------	38	------	58	------	88	------	16 per box.

Table XV. Helicopter Loading Data—Continued

Item	Gross wt, packed (lb)	Wt of ea item unpacked (lb)	Shipping container		Limitations on transportability	Tie-down characteristic	Number for 400-lb load		Number for 1,300-lb load		Number for 2,000-lb load		Number for 3,000-lb load		Remarks
			Cubage (cu ft)	Dimensions (in.)			Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	Packed	Unpacked	
Grenade, smoke, red, M18	34	1.20	0.8	14 x 12½ x 8	Transport packed only.	Too small to tie down unpacked.	11	------	38	------	58	------	88	------	16 per box.
Grenade, smoke, violet, M18.	34	1.20	0.8	14 x 12½ x 8	Transport packed only.	Too small to tie down unpacked.	11	------	38	------	58	------	88	------	16 per box.
Grenade, smoke, yellow, M18.	34	1.20	0.8	14 x 12½ x 8	Transport packed only.	Too small to tie down unpacked.	11	------	38	------	58	------	88	------	16 per box.
Incendiary, safe destroying, TH1, M1A2.	55	34.00	1.1	28⅜ x 19½ x 3¼	Transport packed only.	Too small to tie down unpacked.	7	------	23	------	36	------	54	------	
Starter, fire, M1	40	0.16	1.7	17⅜ x 13½ x 11⅜	Transport packed only.	Too small to tie down unpacked.	10	------	32	------	50	------	75	------	216 per box.
Apparatus, filling, field, land mine, M2.	198	------	8.0	31 x 27¾ x 16	None	Too small to tie down unpacked.	2	------	6	------	10	------	15	------	
Kit, testing, impregnite in clothing, M1.	62	1.0	1.3	17½ x 14 x 11	Fragile unpacked.	Too small to tie down unpacked.	6	------	21	------	32	------	48	------	32 per box.
Kit, service, portable flame thrower, M2A1.	83.0	------	3.2	24 x 18¾ x 11¾	------	Too small to tie down unpacked.	4	------	15	------	24	------	36	------	
Cylinder, ignition, portable flame thrower, M1.	52	0.70	1.2	16 x 14 x 9½	None	Too small to tie down unpacked.	7	------	25	------	38	------	57	------	2 per can — 50 cans per box.
Kit, fuel filling, flame thrower, M to A.	88	55.00	3.2	25½ x 19½ x 11	None	Too small to tie down unpacked.	5	------	18	------	28	------	42	------	

16. Movement of Chemical Units by Assault Type Vessels

Chemical units transported by assault type vessels in amphibious operations may include chemical smoke generator units or chemical supply, decontamination, and technical intelligence detachments and other units organized with teams from the chemical service organization (TOE 3–500R). Data pertaining to the movement of chemical units by typical assault type vessels are given in table XVI. For information pertaining to the characteristics of assault type vessels see FM 101–10.

Table XVI. Data for Movement of Chemical Units by Assault Type Vessels[1]

Unit (TOE)	Total personnel	Total vehicles	Weight (short tons)	Cubage (measurement tons)[2]
Cml smoke genr co[3] (3–267R)	139	48	325	1,650
Cml tech intel det (team IB) (3–500R)	10	4	12	100
Cml supply det[4] (3–500R)				

[1] APA (auxiliary transport, attack) has a capacity of 1,300 troops with individual equipment and 700 short tons of cargo, including loaded vehicles; AKA (cargo ship, attack) has a capacity of 200 troops with individual equipment and 2,000 short tons of cargo, including loaded vehicles; LSM (landing ship, medium) has capacity of 50 troops with individual equipment and 165 short tons of cargo, including loaded vehicles.

[2] Measurement ton = 40 cubic feet (ship ton).

[3] Combat loaded; tonnage and cubage are based on number of vehicles required to transport the unit after it lands at the beachhead, class I supplies for 3 days, class III supplies for 300 miles, a basic load of class V supplies, and classes II and IV supplies as required.

[4] Requirements depend upon the number and types of teams which comprise the detachment.

17. Movement of Chemical Units by Rail

General information on planning factors for movement of units by rail are given in FM 101–10. Before computing loading combinations, the computer should check with the transportation officer concerning Interstate Commerce Commission regulations, which vary with the individual type car. When units are to be moved in an oversea area the computer should obtain from the transportation officer information as to the characteristics of rolling stock of foreign railroads. Spacing requirements for bracing and tying down equipment vary with different types of cars and must be allowed for in computation.

a. Movement of Cellular Unit. Requirements for movement of a cellular type chemical service unit (company, platoon, or detachment) organized with teams from the chemical service organization (TOE 3–500R) depend upon the specific combination of teams which comprise the unit.

b. Movement of Chemical Unit Organizational Equipment by

Rail. Data pertaining to the movement of chemical unit organizational equipment, including vehicles, are given in table XVII. Railway car requirements are computed on the basis of weights and cubages of crated equipment and on the number and dimensions of the vehicles, which are uncrated. Supplies, ammunition, and spare parts are not included in the computation.

Table XVII. Movement of Chemical Unit Organizational Equipment by Rail

Unit (TOE)	Organizational equipment (except vehicles)		Railway cars required		
	Gross weight (short tons)	Gross cubage (cu ft)	For crated equipment	For vehicles	
			Box or stock	40-ft flat	50-ft flat
Hq & hq det, cml gp (3–32R)	3.6	396	0.10	4	----
Hq & hq det, cml gp, w/aug secs (3–32R).	5.1	561	0.20	5	----
Hq & hq det, cml bn, svc (3–36R)	2.9	318	0.10	2	1
Cml maint co (3–47R)	10.7	950	0.40	3	4
Cml depot co (3–67R)	10.9	1,090	0.40	4	5
Cml processing co (3–77R)	111.0	15,168	8.00	2	1
Cml lab (3–97R)	23.8	2,658	0.90	3	----
Cml dep co, comm Z (3–117R)	15.6	2,141	0.70	6	4
Cml decon co (3–217R)	7.8	1,026	0.40	7	9
Hq & hq det, cml smoke genr bn (3–266R).	1.5	163	0.10	3	----
Cml smoke genr co (3–267R)	21.8	2,482	0.80	24	5
Hq & admn team AA (3–500R)	----	----	----	----	----
Hq & admn team AB (3–500R)	0.8	73	0.03	----	1
Hq & admn team AC (3–500R)	0.9	78	0.03	2	----
Supply team EA (3–500R)	3.2	303	0.10	3	----
Supply team EB (3–500R)	4.0	383	0.10	2	1
Supply team EC (3–500R)	4.7	445	0.10	2	1
Supply team ED (3–500R)	9.1	1,091	0.40	3	1
Maint team FA (3–500R)	8.1	959	0.30	3	----
Maint team FB (3–500R)	8.2	997	0.30	3	----
Maint team FC (3–500R)	9.0	1,063	0.40	4	----
Maint team FD (3–500R)	11.5	1,269	0.40	3	1
Decon team HA (3–500R)	1.0	109	0.04	3	----
Decon team HB (3–500R)	1.4	167	0.06	5	----
Decon team HC (3–500R)	3.1	373	0.10	6	4
Tech intel team IA (3–500R)	0.7	80	0.03	2	----
Tech intel team IB (3–500R)	0.9	99	0.03	1	1
Mobile lab team JA (3–500R)	4.2	416	0.10	1	1

c. Movement by Rail of Chemical Unit Personnel. Requirements for rail movement of personnel of chemical units are listed in table XVIII. The requirements include individual equipment of personnel. The table includes coach, pullman, and kitchen-baggage car requirements. Coach requirements are computed on the basis of 55 individuals per car. Pullman (standard or tourist) requirements are computed on the basis of two officers or three EM per section. One kitchen-baggage car in which a portion of individual equipment may be loaded is allowed each unit.

Table XVIII. Movement by Rail of Chemical Unit Personnel

Unit (TOE)	Personnel	Coach	Pullman (standard or tourist) section	Kitchen-baggage car
Hq & hq det, cml gp (3–32R)	36	0.66	14	1
Hq & hq det, cml gp, w/aug secs (3–32R)	55	1.00	21	1
Hq & hq det, cml bn, svc (3–36R)	33	0.60	13	1
Cml maint co (3–47R)	99	1.80	34	1
Cml dep co (3–67R)	144	2.62	50	1
Cml processing co (3–77R)	93	1.70	32	1
Cml lab (3–97R)	41	0.75	16	1
Cml dep co, comm Z (3–117R)	75	1.36	26	1
Cml decon co (3–217R)	116	2.11	40	1
Hq & hq det, cml smoke genr bn (3–266R)	22	0.40	9	1
Cml smoke genr co (3–267R)	139	2.53	48	1
Hq & admn team AA (3–500R)	2	0.04	1	-------
Hq & admn team AB (3–500R)	4	0.08	2	-------
Hq & admn team AC (3–500R)	7	0.13	3	-------
Supply team EA (3–500R)	12	0.22	4	-------
Supply team EB (3–500R)	18	0.33	7	-------
Supply team EC (3–500R)	27	0.49	10	-------
Supply team ED (3–500R)	37	0.67	13	-------
Maint team FA (3–500R)	17	0.31	6	-------
Maint team FB (3–500R)	20	0.36	7	-------
Maint team FC (3–500R)	32	0.58	12	-------
Maint team FD (3–500R)	49	0.89	17	-------
Decon team HA (3–500R)	8	0.15	3	-------
Decon team HB (3–500R)	22	0.40	8	-------
Decon team HC (3–500R)	41	0.75	14	-------
Tech intel team IA (3–500R)	8	0.15	4	-------
Tech intel team IB (3–500R)	10	0.18	5	-------
Mobile lab team JA (3–500R)	17	0.31	7	-------
Demolition & destruction team KA (3–500R)	17	0.31	6	-------
Escort crew team KB (3–500R)	5	0.09	2	-------
Safety team KC (3–500R)	3	0.05	2	-------

Section III. CHEMICAL TRAINING

18. References

Training publications are listed in DA Pam 310–3. For information pertaining to tables of allowances for training see DA Pam 310–7.

19. Training of Units

a. Chemical Corps Units. Chemical Corps units are trained in accordance with Army training programs and appropriate directives.

b. Units of the Army. All units of the Army are trained in defense against CBR attack in accordance with FM 21–40 and other pertinent publications.

Section IV. CHARACTERISTICS OF CHEMICAL MUNITIONS

20. General

Characteristics of chemical munitions, including chemical agents, ground chemical munitions, flame throwers, smoke generators, air chemical munitions, and airplane smoke tanks are given in tables XIX through XXVII.

21. Characteristics of Chemical Agents

Characteristics of chemical agents are listed in table XIX. The markings shown in the first column of the table are the markings on the ammunition and other munitions for which the chemical agents are fillers. For additional information about chemical agents see FM's 3–5 and 101–10 and TM's 3–215 and 3–250.

Table XIX. Characteristics of Chemical Agents

Name, symbol, marking	Odor	Tactical and physiological classifications	State at 68° F.	Effect on body	Persistency	Possible dispersion methods	Stability in storage	Temperature effects	Munition used in
Distilled mustard [1] HD. Two green bands. HD GAS.	Like garlic or horseradish.	Casualty gas. Blister gas.	Colorless to pale yellow liquid.	Injures eyes and lungs; blisters skin.	Summer: 3 or 4 days in open; 1 week in woods. Winter: several weeks.	Artillery bomb, land mine, mortar, rocket, spray.	Very stable.	Freezes at 58° F.; boils at 443° F.	Bombs: M113, M70A1, or M70. 1-gal land mine. 4.2-in. mortar shell: M2. 105-mm how shell: M60. 155-mm how shell: M110. 155-mm gun shell: M104. Airplane smoke tank: M10.
Mustard [1] H. Two green bands. H GAS.	Like garlic or horseradish.	Casualty gas. Blister gas.	Dark liquid.	Injures eyes and lungs; blisters skin.	Summer: 3 or 4 days in open; 1 week in woods. Winter: several weeks.	Artillery bomb, land mine, mortar, rocket, spray.	Decomposes because of impurities; produces pressure.	Freezes at 48° F.; boils above 400° F.	Bombs: M113, M70A1, or M70. 1-gal land mine. 4.2-in. mortar shell: M2. 105-mm how shell: M60. 155-mm how shell: M110. 155-mm gun shell: M104. Airplane smoke tank: M10.
Nitrogen mustard.[1] HN1. Two green bands. HN GAS.	Odorless to faint fishy.	Casualty gas. Blister gas.	Dark liquid.	Injures eyes and lungs; blisters skin.	Summer: 3 or 4 days in open; 1 week in woods. Winter: several weeks.	Artillery bomb, land mine, mortar, rocket, spray.	Adequate.	Freezes at −30° F.; boils at 185° F. and 10 mm.	Bombs: M113; M70A1, or M70. 1-gal land mine. 4.2-in. mortar shell: M2. 105-mm how shell: M60. 155-mm how shell: M110 155-mm gun shell: M104. Airplane smoke tank: M10.

See notes at end of table.

Table XIX. Characteristics of Chemical Agents—Continued

Name, symbol, marking	Odor	Tactical and physiological classifications	State at 68° F.	Effect on body	Persistency	Possible dispersion methods	Stability in storage	Temperature effects	Munition used in
Mustard T-mixture.[1] [6] HT. Two green bands. HT GAS.	Like garlic or horseradish.	Casualty gas. Blister gas.	Clear to pale yellow liquid.	Injured eyes and lungs; blisters skin.	Summer: More persistent than HD or H. Winter: More persistent than HD or H.	Artillery bomb, land mine, mortar, rocket, spray.	Stable in steel and glass.	Freezes at 34° F.; boils above 442° F.	4.2-in. mortar shell: M2.
Lewisite.[1] L. Two green bands. L GAS.	Irritating, unpleasant; faintly like geraniums.	Casualty gas. Blister gas.	Dark, oily liquid.	Injures eyes, blisters skin.	Summer: 1 day in open; 2 or 3 days in woods. Winter: 1 week or longer.	Artillery bomb, land mine, mortar, rocket, spray.	Very stable.	Freezes at 0° F; boils at 374° F.	Land mine. 4.2-in. mortar shell: M2. 105-mm how shell: M60. 155-mm how shell: M110. 155-mm gun shell: M104. Airplane smoke tank: M10.
GA.[1] One green band. GA GAS.	Faintly fruity, sweetish.	Casualty gas (fast acting). Nerve gas.	Colorless to brown liquid.	Causes blurred vision with pinpointing of pupils, skin and eye spasms, difficult breathing, tight chest, salivation, mental confusion, convulsions.	Summer: 10 minutes—24 hours. Winter: 10 minutes—24 hours.	Artillery bomb, land mine, mortar, rocket, spray.	Stable in steel.		
GB.[1] One green band. GB GAS.	Odor scarcely detectable; none when pure.	Casualty gas (fast acting). Nerve gas.	Colorless liquid.	Causes blurred vision with pinpointing of pupils,	Summer: 10 minutes—12 hours. Winter: 10 min-	Artillery bomb, land mine, mortar, rocket,	Stable when pure.		

				skin and eye spasms, difficult breathing, tight chest, salivation, mental confusion, convulsions.	utes—12 hours.	spray.			
Hydrocyanic acid (hydrogen cyanide).[2] AC. One green band. AC GAS.	Like bitter almonds.	Casualty gas (fast acting) Blood gas.	Colorless liquid.	Causes dizziness, convulsions, parzalysis, coma, collapse.	Summer: 1–10 minutes. Winter: several hours.	Artillery bomb, grenade, mortar, rocket.	Stable if pure or stabilized; often burns on shell burst.	Freezes at 7° F.; boils at 78° F.	Bomb: AN–M79.
Cyanogen chloride.[2] CK. One green band. CK GAS	Somewhat like AC, but irritating.	Casualty gas (fast acting). Blood gas.	Colorless gas.	Injures lungs; causes convulsions, paralysis, respiratory arrest.	5–10 minutes.	Artillery bomb, grenade, mortar, rocket.	Unstable; Tends to polymerize, sometimes with explosive violence.	Freezes at 20° F.; boils at 55° F.	Bombs: AN–M78, AN–M79 4.2-in. mortar shell: M2.
Phosgene.[2] CG. One green band. CG GAS	Like new mown hay or ensilage.	Casualty gas (delayed action). Choking gas.	Colorless gas.	Injures lungs, causing accumulation of fluid.	Summer: 5 minutes in open; 10 minutes in woods. Winter: 10 minutes in open; 20 minutes in woods.	Artillery bomb, mortar, rocket.	Stable in steel if CG is dry.	Freezes at —155° F.; boils at 47° F.	Bombs: AN–M78, AN M79. Rocket: M25. 4.2-in. mortar shell: M2.

See notes at end of table.

Table XIX. Characteristics of Chemical Agents—Continued

Name, symbol, marking	Odor	Tactical and physiological classifications	State at 68° F.	Effect on body	Persistency	Possible dispersion methods	Stability in storage	Temperature effects	Munition used in
Chloroacetophenone.[2] CN. One red band. CN GAS.	Fragrant like apple blossoms.	(For riot control and training). Tear gas.	White solid.	Causes tears and irritates skin; no permanent injury.	Summer: 1–10 minutes. Winter: 1–10 minutes.	Candle, grenade, mortar, pot.	Stable.	Freezes at 138° F; boils at 476° F.	Grenades: M6, M7, M7A1, M25A1.
Chloroacetophenone solution.[2] CNB. One red band. CNB GAS.	Like benzene.	(For riot control and training). Tear gas.	Clear liquid.	Causes tears and irritates skin.	Summer: 1–10 minutes. Winter: 1–10 minutes.	Artillery bomb, grenade, mortar, spray.	Adequate.	Freezes at 19° F.; boils from 167° to 477° F.	4.2-in. mortar shell: M2. Airplane smoke tank: M10.
Chloroacetophenone solution.[2] CNC. One red band. CNC GAS.	Like chloroform.	(For riot control and training). Tear gas.	Clear liquid.	Causes tears and irritates skin.	Summer: 1–10 minutes. Winter: 1–10 minutes.	Artillery bomb, grenade, mortar, spray.	Adequate.	Freezes at 32° F.; boils from 140° to 477° F.	4.2-in. mortar shell: M2. Airplane smoke tank: M10.
Chloroacetophenone solution.[2] CNS. One red band. CNS GAS.	Sweetish like flypaper	(For riot control and training.) Tear gas.	Clear liquid.	Causes violent tears and irritates eyes and skin.	Summer: 1 minute—1 hour. Winter: 1 minute—1 hour.	Artillery bomb, grenade, mortar, spray.	Adequate.	Freezes at 35° F.; boils from 140° to 477° F.	4.2-in. mortar shell: M2. 155-mm how shell: M110. Airplane smoke tank: M10.
Adamsite.[2,4] DM. One red band. CN-DM GAS.	Odorless to slightly like coal smoke.	(For riot control and training.) Vomiting gas.	Yellow to green solid.	Headache, nausea, violent sneezing, temporary mental depression.	Summer: 1–10 minutes. Winter: 1–10 minutes.	Candle, grenade.	Stable in steel or glass.	Freezes at 383° F.; decomposes at 770° F.	Grenade: M6.

Diphenylchloroarsine.[2 4] DA. One red band. DA GAS.	Odorless to slightly like coal smoke.	(For riot control and training.) Vomiting gas.	White to brown solid.	Causes headache, nausea, vomiting, sneezing.	Summer: 1–10 minutes. Winter: 1–10 minutes.	Candle, grenade.	Stable when pure.	Freezes at 111° F.; decomposes above 721° F.	
Hexachloroethane-zinc oxide mixture.[3] HC. One yellow band. HC SMOKE	Like camphor, slightly acrid.	Screening smoke.	Solid.	30-minute exposure to ordinary concentration harmless; 1 hour exposure to heavy concentration may irritate nose and throat and cause illness.	Subject to atmospheric conditions.	Artillery bomb, grenade, motor, pot, rocket.	Stable in steel drums; is fire hazard with moisture.	None for mixture.	Grenade: AN–M8. 3.5-in. rocket. 105-mm how. shell: M84. 155-mm how. shell: M16. Smoke pot: M1, M4A2, M5.
Titanium Tetrachloride.[3] FM. One yellow band. FM SMOKE.	Acrid or pungent.	Screening smoke.	Colorless liquid.	Smoke slightly irritates nose and throat; spray droplets or liquid injure eyes; liquid burns skin.	Subject to atmospheric conditions.	Artillery, mortar, spray.	Stable in absence of moisture.	Freezes at −22° F.; boils at 275° F.	4.2-in. mortar shell: M2. Airplane smoke tank: M10.
Sulfur trioxide in chlorosulfonic acid.[3] FS. One yellow band. FS SMOKE.	Acrid.	Screening smoke.	White, milky liquid.	Smoke not toxic in ordinary concentration; high concentration irritates eyes, throat, and chest and may cause illness; liquid is corrosive and burns skin.	Evaporates immediately; subject to atmospheric conditions.	Artillery mortar, rocket, spray.	Stable in absence of moisture.	Freezes at −22° F.; boils at 176° F.	4.2-in. mortar shell: M2. 75-mm how. shell: M64. 81-mm mortar shell: M57. 105-mm how. shell: M60. 155-mm how. shell: M110. 155-mm gun shell: M104. Airplane smoke tank: M10.

See notes at end of table.

Table XIX. Characteristics of Chemical Agents—Continued

Name, symbol, marking	Odor	Tactical and physiological classifications	State at 68° F.	Effect on body	Persistency	Possible dispersion methods	Stability in storage	Temperature effects	Munition used in
Fog oil (summer).[5] SGF 1. SGF OIL.	Like petroleum oil.	Screening smoke.	Liquid.	Prolonged exposure can irritate lungs and throat.	Subject to atmospheric conditions.	Smoke generator.	Very stable.	Pours at 0° F.; ignites at 490° F.	Smoke generators: M2A1, M3.
Fog oil (winter).[6] SGF 2. SGF OIL.	Like petroleum oil.	Screening smoke.	Liquid.	Prolonged exposure can irritate lungs and throat.	Subject to atmospheric conditions.	Smoke generator.	Very stable.	Pours at −40° F.; ignites at about 495° F.	Smoke generators: M2A1, M3. Smoke candle: M6.
White phosphorus.[7] WP. One yellow band. WP SMOKE.	Like burning matches.	Screening smoke.	Pale, yellow translucent solid.	Smoke is harmless; solid particles burn flesh.	Subject to atmospheric conditions.	Artillery bomb, grenade, mortar, rocket.	Stable in steel drums when not contacted by oxygen or air.	Freezes at 111° F.; boils at 554° F.	Bombs: M47 series. Hand grenade: M15. Rifle grenade: M19A1. Igniter: M15 or M16. 2.3-in. rocket: M10A4. 4.2-in. mortar shell: M2. 57-mm rifle shell: M308A1. 60-mm mortar shell: M302. 75-mm gun shell: M64. 75-mm how shell: M64. 75-mm rifle shell: M311A1. 75-mm gun shell: M312. 81-mm mortar shell: M57A1. 90-mm gun shell: M313. 105-mm how shell: M60. 105-mm gun shell: M325. 155-mm how shell: M110. 155-mm gun shell: M104.

Plasticized white phosphorus. PWP. One yellow band. PWP SMOKE.	Like burning matches.	Screening smoke.	Finely divided WP in gel of rubber and xylene.	Same effect on body as WP.	2-3 minutes.	Artillery bomb grenade, mortar, rocket.	Stable in steel when not contacted by oxygen or air.	Freezes at 111° F.; boils at 554° F.	Bombs: AN-M47A3, AN-M47A4.
Green smoke. GS. One yellow band.	Acrid.	Signaling smoke.			Subject to atmospheric conditions.	Artillery, bomb, grenade.			Rifle grenade: M22; streamer, M23. Hand grenade: M18. 105-mm how shell: M84. 155-mm how shell: M116.
Red smoke. RS. One yellow band.	Acrid.	Signaling smoke.			Subject to atmospheric conditions.	Artillery, bomb, grenade.			Rifle grenade: M22; streamer, M23. Hand grenade: M18. 105-mm how shell: M84. 155-mm how shell: M116.
Violet smoke. VS. One yellow band.	Acrid.	Signaling smoke.			Subject to atmospheric conditions.	Artillery, bomb, grenade.			Rifle grenade: M22; streamer, M23. Hand grenade: M18. 105-mm how shell: M84. 155-mm how shell: M116.
Yellow smoke. YS. One yellow band.	Acrid.	Signaling smoke			Subject to atmospheric conditions.	Artillery, bomb. grenade.			Rifle grenade: M22; streamer, M23. Hand grenade: M18. 105-mm how shell: M84. 155-mm how shell: M116.
Incendiary mixture.[8] PT1. One purple band. INCEND.	Like petroleum oil.	Incendiary.	Soft, black, elastic, homogeneous mixture.	Can cause severe burns when ignited.	None.	Bomb.	Stable but flammable.		Bomb: M74, AN-M76, AN-M47A4.

See notes at end of table.

Table XIX. Characteristics of Chemical Agents—Continued

Name, symbol, marking	Odor	Tactical and physiological classifications	State at 68° F.	Effect on body	Persistency	Possible dispersion methods	Stability in storage	Temperature effects	Munition used in
Incendiary oil.[9] (isobutyl methacrylate). IM. One purple band. IM INCEND.	Like gasoline.	Incendiary.		Can cause severe burns when ignited.	None.	Bomb.	Stable but flammable.		Bombs: AN-M69, M69X, M47 series.
Incendiary oil [10]. NP. One purple band. NP INCEND.	Like petroleum oil.	Incendiary.		Can cause severe burns when ignited.	None.	Bomb, flame thrower.	Stable but flammable.		Bombs: M69X, AN-M69, M47 series. Portable flame thrower. Mechanized flame thrower. Fire bomb: M116.
Incendiary oil.[11] OT.	Like petroleum oil.	Incendiary.		Can cause severe burns when ignited.	None.	Bomb, flame thrower.	Stable but flammable.		Fire bomb: M116.
Incendiary oil.[12] NP2.	Like petroleum oil.	Incendiary.		Can cause severe burns when ignited.	None.	Bomb.	Stable but flammable.		Fire bomb: M116.
Incendiary oil.[13] NP3.	Like kerosene.	Incendiary.		Can cause severe burns when ignited.	None.	Fire starter.			Fire starter.
Thermite. TH1. One purple band. TH1 INCEND.	None.	Incendiary.		Can cause severe burns when ignited.	None.	Equipment and safe destroying incendiary.	Stable but flammable.		Safe destroying incendiary: M1 series. Equipment destroying incendiary: M2A1.

Thermate. TH2. One purple band. TH2 INCEND.	None.	Incendiary.		Can cause severe burns when ignited.	None.	Grenade.	Stable but flammable.		Grenade: AN–M14.
Thermate. TH3. One purple band. TH3 INCEND.	None.	Incendiary.		Can cause severe burns when ignited.	None.	Bomb, grenade.	Stable but flammable.		Bomb: AN–M50 series. Bomb, instructional: M1 series, M2 series. Grenade: AN–M14.

[1] Requires protective clothing and mask.
[2] Requires protective mask.
[3] Mask required in dense concentrations.
[4] Decomposes below boiling point at normal atmospheric pressure.
[5] Used when air temperature is above 40° F.
[6] Used when air temperature is between 0° F. and 40° F.
[7] Secondary tactical classification is as an antipersonnel agent; agent also has some incendiary effect.
[8] PT1 is composed of petroleum oil, magnesium waste, and isobutyl-methacrylate polymer as thickener.
[9] Incendiary oil, IM, is composed largely of isobutyl methacrylate and gasoline.
[10] NP is composed of petroleum oil and napalm (M1 thickener).
[11] OT is composed of petroleum oil and octal (M3 thickener).
[12] NP2 is composed of petroleum oil and antiagglomerated napalm (M2 thickener).
[13] NP3 is composed of kerosene and napalm.

22. Characteristics of Ground Chemical Munitions

Characteristics of ground chemical munitions are shown in table XX. Munitions for which entries are made in the evaporation or burning time column of the table are burning (nonexplosive) type munitions. The burning time given is the normal or expectable time. Munitions for which entries are made in the effective burst radius column are bursting (explosive) type munitions. For additional information on ground chemical munitions see FM's 3–5 and 101–10 and TM's 3–300, 3–305, 9–1900, and 9–1901.

Table XX. Characteristics of Ground Chemical Munitions

Nomenclature	Filling		Filled munition weight (lb)	Chemical efficiency [a] (percent)	Evaporation or burning time	Marking bands		Maximum distance projected (yd)	Effective burst radius (yd)
	Agent (symbol)	Weight (lb)				No.	Color		
Candle, smoke, oil, SGF2, M6	SGF2	0.22	1.82	12.1	1–2 min	1	Yellow		
Flame thrower, portable, M2A1 [b]									
Flame thrower, mechanized, M3–4–3 [b]									
Flame thrower, combat vehicle, main armament, M5–4. [b]									
Generator, smoke, M3A1 [c]									
Generator, smoke, mechanical, M2A1 [d]									
Grenade, hand, irritant, CN–DM, M6	CN–DM	.64	1.06	60.3	Aprx 1 min	1	Red	[e] 35–40	
Grenade, hand, tear, CN, M7A1	CN	.79	1.16	68.2	Aprx 1 min	1	Red	[e] 35–40	
Grenade, hand, tear, CN, M7	CN	.64	1.06	60.3	Aprx 1 min	1	Red	[e] 35–40	
Grenade, smoke, white, HC, AN–M8	HC	1.20	1.60	75.0	1¼–2½ min	1	Yellow		
Grenade, incendiary, TH3, AN–M14	TH3	1.65	2.00	82.5	30 sec	1	Purple	[e] 35–40	
Grenade, hand, riot, CN, M25A1	CN	.21	.47	44.7		1	Red [f]	[e] 35–40	
Grenade, hand, smoke, WP, M15	WP	.95	1.93	49.2	Aprx 1 min	1	Yellow	[e] 35–40	
Grenade, smoke, green, M18	GS	.73	1.20	60.8	Aprx 1 min	1	Yellow [g]		
Grenade, smoke, red, M18	RS	.73	1.20	60.8	Aprx 1 min	1	Yellow [g]		
Grenade, smoke, violet, M18	VS	.72	1.2	60.0	Aprx 1 min	1	Yellow [g]		

22. Characteristics of Chemical Filled Munitions and Ammunition

Characteristics of chemical filled munitions and ammunition are shown in table XX.

a. General. The Chemical Corps stores and issues class V chemical filled munitions and ammunition, except artillery and mortar shell, rifle grenades, and smoke rockets which, after being filled by the Chemical Corps, are stored and issued by the Ordnance Corps.

b. Identification Markings. Markings on chemical filled munitions and ammunition are based on their tactical use and are not a sure guide for classification according to storage and safety aspects of the agent filler. Chemical filled munitions and ammunition are identified by the overall base color, gray. The general type chemical agent used as a filler is indicated on the munition or ammunition by the number of bands painted in color on the base color, as follows: 1 green band indicates low persistency casualty agent; 2 green bands, persistent casualty agent; 1 red band, irritant harassing agent (training and riot control gas); 1 yellow band, smoke; and 1 purple band, incendiary. The specific chemical agent used as a filler is indicated in the marking on the munition or ammunition by the agent symbol in the same color as the band. Examples of agent symbols are: H for mustard; CG for phosgene; and WP for white phosphorus. In some instances where the munition is unpainted, such as the M25A1 hand grenade, there is no marking on the munition, but the container only is marked with a colored stripe on a gray background. The Chemical Corps symbol for the agent filler, manufacturer's lot number, date of filling, and other pertinent information are stenciled on the munition in the same color as the band.

c. Storage Group Classification. To simplify problems of safety and fire-fighting, chemical munitions and ammunition have been divided, for storage purposes, into four groups according to the nature of the chemical agents, as follows:

Group A—chemical agents against which complete protective clothing and protective mask are required.

Group B—chemical agents and screening smokes against which protective mask is required.

Group C—spontaneously flammable chemical agents.

Group D—incendiary and readily flammable chemical agents.

d. Explosive and Tonexplosive Nypes. Munitions and ammunition for which entries are made in the "Burning time" column of the table are

burning (nonexplosive) type. Those for which entries are made in the "Radius of burst" column are bursting (explosive) type.

e. References. Field manuals, technical manuals, technical bulletins, and other publications which give detailed information about chemical filled munitions and ammunition are listed in the "Remarks" column of the table.

Table XX. Characteristics of Chemical Filled Munitions

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Candle, smoke, oil, SGF2, M6.	S	SGF2	0.22	1.80	12	1–2	-------	1	Yellow	-------	D	Filling identification on shipping container, none on candle; Navy training munition; TM 3–300.
Canister, smoke, HC, 105-mm shell, M1.	S	HC	1.65	-------	------	⅔–4	-------	1	Yellow	-------	D	Component of M84 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, green smoke, 105-mm shell, M2.	S	GS	0.90	-------	------	¾–2	-------	1	Yellow	-------	D	Component of M84 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, red smoke, 105-mm shell, M2.	S	RS	0.97	-------	------	¾–2	-------	1	Yellow	-------	D	Component of M84 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, violet smoke 105-mm	LS	VS	0.97	-------	------	¾–2	-------	1	Yellow	-------	D	Component of M84 base-ejection shell;

shell, M2.											filling identification on shipping container, none on canister; for training or demonstration use only; TM 3-300.
Canister, yellow smoke, 105-mm shell, M2.	S	YS	0.84	----------	------	¾-2	--------	1	Yellow	----------	D	Component of M84 base-ejection shell; filling identification on shipping container, none on canister; TM 3-300.
Canister, smoke, HC, 155-mm shell, M1.	S	HC	5.80	----------	------	2-5	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3-300.
Canister, smoke, HC, 155-mm shell, M2.	S	HC	3.00	----------	------	1-4	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3-300.
Canister, green smoke, 155-mm shell, M3.	S	GS	3.31	----------	------	1-3	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3-300.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Canister, red smoke, 155-mm shell, M3.	S	RS	3.31	--------	------	1–3	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, violet smoke, 155-mm shell, M3.	LS	VS	3.31	--------	------	1–3	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; for training or demonstration use only; TM 3–300.
Canister, yellow smoke, 155-mm shell, M3.	S	YS	2.98	--------	------	1–3	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, green smoke, 155-mm shell, M4.	S	GS	1.65	--------	------	½–3	--------	1	Yellow	----------	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister;

											TM 3–300.
Canister, red smoke, 155-mm shell, M4.	S	RS	1.65	----------	------	½–3	--------	1	Yellow	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, violet smoke, 155-mm shell, M4.	LS	VS	1.65	----------	------	½–3	--------	1	Yellow	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; for training or demonstration use only; TM 3–300.
Canister, yellow smoke, 155-mm shell, M4.	S	YS	1.68	----------	------	½–3	--------	1	Yellow	D	Component of M116 base-ejection shell; filling identification on shipping container, none on canister; TM 3–300.
Canister, smoke, WP, 5-inch projectile, M5.	S	WP	7.06	----------	------	--------	--------	1	Yellow	C	Nomenclature marking on canister; filling identification on shipping container; component of 5-in. WP smoke projectile; Navy munition; radius of burst data not available; TM 3–300.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (per cent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Capsule, CN	LS	CN						1	Red		B	1 gm of CN in gelatin capsule; filling identification on shipping container, none on canister; for training use in gas chamber; burning time data not available; TM 3–300.
Cryptographic equipment destroyer, incendiary, TH1, M1A2.	S	TH1	28.00	34.00	82	1		1	Purple		D	For destruction of cryptographic equipment in safe; TM 3–300.
Cryptographic equipment destroyer, incendiary, TH1, M1A1.	LS	TH1	28.00	34.00	82	1		1	Purple		D	For destruction of cryptographic equipment in safe; TM 3–300.
Cryptographic equipment destroyer, incendiary, TH1, M2A1.	S	TH1	8.50	11.50	74	1		1	Purple		D	For destruction of specified cryptographic equipment; TM 3–300.
Document destroyer, emergency, incendiary, M3.	S					20		1	Purple		D	Burning-type munition; filling includes 95 lbs of sodium nitrate; 4¼-lb igniter charge includes charcoal,

												sodium nitrate and technical sugar; for destruction of documents in 55-gal drum by burning; filling identification on shipping container; TB 3–300–1.
File destroyer, incendiary, M4.	S	----------	--------	--------	------	30	--------	1	Purple	----------	D	Burning-type munition; filling includes 73 lbs of sodium nitrate igniter charge includes 3-lb mixture of sodium nitrate and wood flour; for destruction of papers in filing cabinet by burning; filling identification on shipping container; TM 3–300.
Grenade, hand, incendiary, TH3, AN–M14.	S	TH3	1.65	2.00	82	½	35	1	Purple	40 by hand 182 by rifle 77 by carbine.	D	Burning-type grenade; ignited by 1–2 sec delay fuze or, when modified, by electric squib; provides intense heat for destruction of metal equipment; may be converted to bursting type; projected from rifle or carbine by

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
												grenade adapter; grenades filled with TH2 are limited standard; TM 3–300; FM 23–30.
Grenade, hand, irritant, CN–DM, M6.	S	CN–DM	0.64	1.06	60	1	--------	1	Red	40 by hand 202 by rifle 115 by carbine.	B	Burning-type grenade; ignition by 1–2 sec delay fuze; for training and riot control; projected from rifle or carbine by grenade adapter; TM 3–300; FM 23–30.
Grenade, hand, riot, CN, M25A1.	S	CN	0.21	0.47	49	--------	5	1	Red	40 by hand	B	Bursting-type grenade with 1½–3 sec delay detonating fuze; for riot control; filling identification on shipping container, none on grenade; TM 3–300; FN 23–30.
Grenade, hand, tear, CN, M7A1.	S	CN	0.79	1.16	68	1	--------	1	Red	40 by hand 202 by rifle	B	Burning-type grenade; ignition by 1–2 sec delay fuze; for training and riot control;

										115 by carbine.		projected from rifle or carbine by grenade adapter; TM 3-300; FM 23-30.
Grenade, hand, tear, CN, M7	SS	CN	0.64	1.06	60	1	--------	1	Red	40 by hand 202 by rifle 115 by carbine.	B	Burning-type grenade; ignition by 1–2 sec delay fuze; for training and riot control; projected from rifle or carbine by grenade adapter; TM 3-300; FM 23-30.
Grenade, hand, smoke, WP, M15.	S	WP	0.95	1.93	49	--------	35*	1	Yellow	40 by hand	C	Bursting-type grenade with 2½–6 sec delay detonating fuze; for screening, casualty or incendiary effect, signaling or target designation; not projected from rifle or carbine; TM 3-300; FM 23-30; FM 21-60.
Grenade, hand, smoke, HC, AN-M8.	S	HC	1.20	1.60	75	2–3	--------	1	Yellow	40 by hand 191 by rifle 93 by carbine.	D	Burning-type grenade; ignition by 1–2 sec delay fuze; for signaling or screening; projected from rifle or carbine by grenade adapter; TM 3-300; FM 23-30; FM 21-60.

* Probable maximum distance to which WP particles will travel from point of detonation is 35 yards.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Grenade, hand, green smoke, M18.	S	GS	0.73	1.20	60	1	--------	1	Yellow	40 by hand 202 by rifle 115 by carbine.	D	Burning-type grenade; ignition by 1–2 sec delay fuze; for signaling; grenade top painted green for smoke color identification; projected from rifle or carbine by grenade adapter; TM 3–300; FM 23–30; FM 21–60.
Grenade, hand, red smoke, M18.	S	RS	0.73	1.20	60	1	--------	1	Yellow	40 by hand 202 by rifle 115 by carbine.	D	Burning-type grenade; ignition by 1–2 sec delay fuze; for signaling; grenade top painted red for smoke color identification; projected from rifle or carbine by grenade adapter; TM 3–300; FM 23–30; FM 21–60.
Grenade, hand,[b] violet smoke, M18.	S	VS	0.72	1.20	60	1	--------	1	Yellow	----------	D	Burning-type grenade; ignition by 1–2 sec delay fuze; for sig-

												naling or marking; grenade top painted violet for smoke color identification; TM 3–300.
Grenade, hand, yellow smoke, M18.	S	YS	0.73	1.20	60	1	--------	1	Yellow	40 by hand 202 by rifle 112 by carbine.	D	Burning-type grenade; ignition by 1–2 sec delay fuze; for signaling; grenade top painted yellow for smoke color identification; projected from rifle or carbine by grenade adapter; TM 3–300; FM 23–30; FM 21–60.
Grenade, rifle, smoke, WP, M19A1.	S	WP	0.53	1.57	33	--------	20	1	Yellow	300 by rifle 150 by carbine.	C	Bursting-type grenade with impact-type fuze; for screening, casualty effect, or incendiary use; TM 9–1900; FM 23–30; FM 21–60.
Grenade, rifle, green smoke, M22A2.	S	GS	0.40	1.25	32	1	--------	1	Yellow	330 by rifle 170 by carbine.	D	Burning-type grenade with impact-type fuze; smoke color identified by one extra green band; for signaling; TM 9–1900; FM 23–30; FM 21–60.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Grenade, rifle, red smoke, M22A2.	S	RS	0.40	1.25	32	1	--------	1	Yellow	330 by rifle 170 by carbine.	D	Burning-type grenade with impact-type fuze; smoke color identified by one extra red band; for signaling; TM 9–1900; FM 23–30; FM 21–60.
Grenade, rifle, yellow smoke, M22A2.	S	YS	0.40	1.25	32	1	--------	1	Yellow	330 by rifle 170 by carbine.	D	Burning-type grenade with impact-type fuze; smoke color identified by one extra yellow band; for signaling; TM 9–1900; FM 23–30; FM 21–60.
Grenade, rifle, green smoke streamer, M23.	S	GS	0.40	0.94	43	⅕	--------	1	Yellow	203 by rifle 97 by carbine.	D	Burning-type grenade; fuze ignited by muzzle blast from propelling cartridge; for signaling; TM 9–1900; FM 23–30; FM 21–60.
Grenade, rifle, red smoke streamer,	S	RS	0.40	0.94	43	⅕	--------	1	Yellow	203 by rifle 97	D	Burning-type grenade; fuze ignited by muz-

M23.										by carbine.		zzle blast from propelling cartridge; for signaling; TM 9–1900; FM 23–30; FM 21–60.
Grenade, rifle, yellow smoke streamer, M23.	S	YS	0.40	0.94	43	⅕	--------	1	Yellow	203 by rifle 97 by carbine.	D	Burning-type grenade; fuze ignited by muzzle blast from propelling cartridge; for signaling; TM 9–1900; FM 23–30; FM 21–60.
Mine, land, chemical, 1-gallon, HD.	S	HD	9.90	11.00	90	--------	5	2	Green	----------	A	Bursting charge detonated by detonating cord or electric blasting cap; TM 3–300.
Pellet, CN, M2-----	S	CN	--------	--------	------	--------	--------	1	Red	----------	B	1 gm of CN in pellet form; filling identification on shipping container; for training use in gas chamber; FM 21–48.
Rocket, smoke, WP, 3.5-inch, M30.	LS	WP	2.23	8.90	25	--------	10–15	1	Yellow	850	C	Fired in rocket launcher; TM 9–1900; TM 9–1950.
Rocket, smoke, FS, 4.5-inch, Mk 7 Mod 0.	------	FS	12.10	28.80	42	--------	--------	1	Yellow	1,130	B	Fired from rocket launcher; Navy munition; radius of burst data not available; TM 9–1900; TM 9–1950.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Rocket, smoke, WP, 4.5-inch, Mk 10 Mod 0.	------	WP	12.10	28.80	42	--------	--------	1	Yellow	1,130	C	Fired from rocket launcher; Navy munition; radius of burst data not available; TM 9–1900; TM 9–1950.
Rocket, HVAR, smoke, PWP, 5.0-inch, Mk 4 Mod 1.	------	PWP	19.30	--------	------	--------	--------	1	Yellow	----------	C	Fired from rocket launcher; Navy munition; radius of burst data not available.
Shell, smoke, WP, 57-mm rifle, M308A1.	S	WP	0.37	2.75	13	--------	15–20	1	Yellow	4,860	C	TM 9–1901
Shell, smoke, WP, 60-mm mortar, M302.	S	WP	0.76	3.98	19	--------	15–20	1	Yellow	1,610	C	TM 9–1901
Shell, smoke, WP, 75-mm gun, M64.	S	WP	1.35	14.70	9	--------	10–30	1	Yellow	14,000	C	TM 9–1901
Shell, smoke, WP, 75-mm howitzer, M64.	S	WP	1.34	14.90	9	--------	10–30	1	Yellow	9,620	C	TM 9–1901
Shell, smoke, FS, 75-mm howitzer, M64.	SS	FS	1.51	14.70	10	--------	10–30	1	Yellow	9,620	B	TM 9–1901
Shell, (cartridge),	S	WP	1.35	15.10	9	--------	10–30	1	Yellow	7,020	C	TM 9–1901

smoke, WP, 75-mm rifle, M311A1.												
Shell, smoke, WP, 3-inch (76-mm) gun, M312.	S	WP	0.73	12.95	6	--------	10–30	1	Yellow	14,360	C	TM 9–1901
Shell, smoke, WP, 3-inch (76-mm) gun, M312B1.	LS	WP	0.78	12.95	6	--------	10–30	1	Yellow	14,360	C	
Shell, smoke, WP, 3-inch (76-mm) gun, M312B2.	S	WP	0.73	12.95	6	--------	10–30	1	Yellow	14,360	C	
Shell, smoke, WP, 81-mm mortar, M57A1 (w/fuze, PD, M5A2).	S	WP	4.09	12.38	33	--------	--------	1	Yellow	2,470	C	Radius of burst data not available.
Shell, smoke, WP, 81-mm mortar, M57A1 (w/fuze, TSQ, M77).	S	WP	4.09	12.80	32	--------	--------	1	Yellow	2,470	C	Radius of burst data not available.
Shell, smoke, FS, 81-mm mortar, M57A1 (w/fuze, PD, M5A2).	S	FS	4.59	12.18	38	--------	--------	1	Yellow	2,470	B	Radius of burst data not available.
Shell, smoke, FS 81-mm mortar, M57A1 (w/fuze, TSQ, M77).	S	FS	4.59	13.10	35	--------	--------	1	Yellow	2,470	B	Radius of burst data not available.
Shell, smoke, WP, 90-mm gun, M313.	S	WP	1.97	23.64	8	--------	--------	1	Yellow	19,560	C	Radius of burst data not available; TM 9–1901.

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Shell, smoke, HC, BE, 105-mm howitzer, M84.	S	HC	4.96	32.86	15	⅔–4	--------	1	Yellow	12,205	D	Base-ejection type shell TM 9–1901.
Shell (cartridge), gas, GB, nonpersistent, 105-mm howitzer, M360.	S	GB	--------	--------	------	--------	--------	1	Green	12,205	A	Radius of burst data not available.
Shell, green smoke, BE, 105-mm howitzer, M84.	S	GS	5.12	30.48	17	¾–2	--------	1	Yellow	12,205	D	Base-ejection type shell; TM 9–1901.
Shell, red smoke, BE, 105-mm howitzer, M84.	S	RS	5.32	30.68	17	¾–2	--------	1	Yellow	12,205	D	Base-ejection type shell; TM 9–1901.
Shell, violet smoke, BE, 105-mm howitzer, M84.	LS	VS	5.12	30.48	17	¾–2	--------	1	Yellow	12,205	D	Base-ejection type shell; for training and demonstration use only; TM 9–1901.
Shell, yellow smoke, BE, 105-mm howitzer, M84.	S	YS	4.92	30.29	16	¾–2	--------	1	Yellow	12,205	D	Base-ejection type shell; TM 9–1901.
Shell, smoke, WP, 105-mm howitzer, M60.	S	WP	4.06	34.83	12	--------	15–50	1	Yellow	12,205	C	TM 9–1901
Shell, smoke, FS, 105-mm howitzer,	SS	FS	4.61	35.38	13	--------	15–50	1	Yellow	12,205	B	TM 9–1901

M60.											
Shell, gas, H, 105-mm howitzer, M60.	SS	H	3.17	33.94	9	--------	15–50	2	Green	12,205	A	TM 9–1901
Shell, gas, HD, 105-mm howitzer, M60.	S	HD	2.97	33.20	9	--------	15–50	2	Green	12,205	A	TM 9–1901
Shell, smoke, WP, 105-mm rifle, M325.	SS	WP	4.06	34.58	12	--------	15–50	1	Yellow	----------	C	TM 9–1901
Shell, gas, persistent, H, 155-mm gun, M104.	SS	H	11.70	94.81	12	--------	18–60	2	Green	25,715	A	TM 9–1901
Shell, gas, nonpersistent, GB, 155-mm gun, M122.	S	GB	--------	--------	------	--------	--------	1	Green	25,715	A	Radius of burst data not available.
Shell, smoke, WP, 155-mm gun, M104.	S	WP	15.60	98.71	16	--------	18–60	1	Yellow	25,715	C	TM 9–1901
Shell, smoke, FS, 155-mm gun, M104.	SS	FS	16.90	100.01	17	--------	18.60	1	Yellow	25,715	B	TM 9–1901
Shell, smoke, WP, 155-mm gun, M110.	S	WP	15.60	98.39	16	--------	18.60	1	Yellow	25,715	C	
Shell, green smoke, BE, 155-mm gun, M116.	S	GS	17.19	86.44	20	½–4	--------	1	Yellow	25,715	D	Base-ejection type shell
Shell, red smoke, BE, 155-mm gun, M116.	S	RS	17.19	86.44	20	½–4	--------	1	Yellow	25,715	D	Base-ejection type shell

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Shell, yellow smoke, BE, 155-mm gun, M116.	S	YS	17.19	86.44	20	½–4	--------	1	Yellow	25,715	D	Base-ejection type shell
Shell, smoke, HC, BE, 155-mm gun, M116.	S	HC	20.20	94.35	21	--------	--------	1	Yellow	25,715	D	Burning time of shell with M2 canisters is 1–4 min, with M1 canisters, 2–5 min; base-ejection type shell.
Shell, gas, persistent, HD, 155-mm howitzer, M110.	S	HD	11.70	94.49	12	--------	18–60	2	Green	16,355	A	TM 9–1901
Shell, smoke, WP, 155-mm howitzer, M110.	S	WP	15.60	98.39	16	--------	18–60	1	Yellow	16,355	C	TM 9–1901
Shell, smoke, HC, BE, 155-mm howitzer, M116.	S	HC	20.20	94.35	21	0.5–4	--------	1	Yellow	16,700	D	Base-ejection type shell; TM 9–1901.
Shell, green smoke, BE, 155-mm howitzer, M116.	S	GS	17.19	86.44	20	0.5–4	--------	1	Yellow	16,300	D	Base-ejection type shell; TM 9–1901.
Shell, red smoke, BE, 155-mm howitzer, M116.	S	RS	17.19	86.44	20	0.5–4	--------	1	Yellow	16,300	D	Base-ejection type shell; TM 9–1901.
Shell, violet smoke,	SS	VS	17.19	86.44	20	0.5–4	--------	1	Yellow	16,300	D	Base-ejection type shell;

BE, 155-mm howitzer, M116.												for training and demonstration use only; TM 9–1901.
Shell, yellow smoke, BE, 155-mm howitzer, M116.	S	YS	17.19	86.44	20	0.5–4	--------	1	Yellow	16,300	D	Base-ejection type shell; TM 9–1901.
Shell, gas, nonpersistent, CG, 4.2-inch mortar, M2.	S	CG	6.25	23.80	26	--------	40	1	Green	4,300	B	TM 9–1901
Shell, gas, nonpersistent, CK, 4.2-inch mortar, M2.	S	CK	5.00	22.60	22	--------	40	1	Green	4,300	B	TM 9–1901
Shell, gas, persistent, H, 4.2-inch mortar, M2.	SS	H	6.20	23.70	26	--------	40	2	Green	4,300	A	TM 9–1901
Shell, gas, persistent, HD, 4.2-inch mortar, M2.	S	HD	6.00	23.50	26	--------	40	2	Green	4,300	A	TM 9–1901
Shell, gas, persistent, HT, 4.2-inch mortar, M2.	SS	HT	5.75	23.30	24	--------	40	2	Green	4,300	A	TM 9–1901
Shell, gas, irritant, CNB, 4.2-inch mortar, M2.	LS	CNB	5.45	23.10	24	--------	40	1	Red	4,300	B	TM 9–1901
Shell, gas, irritant, CNS, 4.2-inch mortar, M2.	LS	CNS	7.00	24.60	28	--------	40	1	Red	4,300	B	TM 9–1901
Shell, smoke, WP, 4.2-inch mortar, M2.	S	WP	7.50	25.10	30	--------	40	1	Yellow	4,300	C	TM 9–1901

Table XX. Characteristics of Chemical Filled Munitions—Continued

Nomenclature	Status	Agent filling		Filled munition weight (lb)	Chemical efficiency (percent)	Burning time (minutes)	Radius of burst (yd)	Filling identification		Maximum distance munition projected (yd)	Storage group	Remarks
		Symbol	Weight (lb)					Band or stripe	Color			
Shell, smoke, FS, 4.2-inch mortar, M2.	SS	FS	7.50	25.10	30	--------	40	1	Yellow	4,300	B	TM 9–1901
Shell, smoke, FM, 4.2-inch mortar, M2.	LS	FM	7.50	25.10	30	--------	40	1	Yellow	4,300	B	TM 9–1901
Shell, smoke, WP, 4.2-inch mortar, M328.	------	WP	8.14	28.66	28	--------	--------	1	Yellow	----------	C	Radius of burst data not available; TM-9–1901.
Shell, smoke, PWP, 4.2-inch mortar, M2.	S	PWP	6.25	23.80	26	--------	40	1	Yellow	4,300	C	TM 9–1901
Smoke pot, HC, M1	LS	HC	9.5–11	12–13.5	80	5–8	--------	1	Yellow	----------	D	Burning-type pot; ignited by match head and scratcher block; 10 sec delay in production of smoke; for training; TM 3–300.
Smoke pot, HC, 30-lb, M5.	S	HC	31.00	33.00	94	12–22	--------	1	Yellow	----------	D	Burning-type pot; ignited by match head and scratcher block or electric squib; 20–30 sec delay in production of smoke; TM 3–300.

Smoke pot, floating, HC, M4A2.	LS	HC	27.50	38.00	72	10–15	----------	1	Yellow	----------	D	Burning-type pot; ignition by M208 fuze; 10–20 sec delay in production of smoke; TM 3–300.
Smoke pot, floating, SGF2, AN–M7.	S	SGF2	13.00	40.00	32	12–17	----------	1	Yellow	----------	D	Thermal generator type pot; ignition by M208 fuze or M209 electrical fuze; 8–20 sec delay in production of smoke; TM 3–300.
Smoke pot, floating, SGF2, Mk 5 Mod 2.	LS	SGF2	13.00	39.00	33	12–17	----------	1	Yellow	----------	D	Thermal generator type pot; ignition by M208 fuze or M209 electrical fuze; 8–20 sec delay in production of smoke; Navy munition; TM 3–300.
Starter, fire, NP3, M2.	S	NP3	0.01	0.03	33	4	----------	1	Purple	----------	D	One end of munition is painted red; TM 3–300.
Starter, fire, NP3, M1.	LS	NP3	0.05	0.16	31	13	----------	------	Purple	----------	D	Purple body; TM 3–300.

23. Characteristics of Flame Throwers

Characteristics of portable and mechanized flame throwers are shown in table XXI. Publications that give detailed information about the flame throwers are listed in the "Remarks" column of the table.

Table XXI. Characteristics of Flame Throwers

Nomenclature	Status	Weight		Dimensions (in.)	Fuel		Duration of continuous fire (sec)	Maximum effective range		Pressure		Remarks
		Empty (lb)	Filled (lb)		Operating cap. (gal.)	Discharge rate (gal./sec)		Thickened fuel (meters)	Unthickened fuel (meters)	Pressure container (psi)	Fuel container (operating pressure) (psi)	
Flame thrower, portable, one-shot, M8.	Std-A	12.5	27	33¾ (long) x 8¾ (wide) x 4½ (high)	2	0.50	4	73[a]	----------	550[b]	350	Fuel ignited by igniter; weapon fired electrically, manually, or by lanyard; initial pressure on ball piston: 1200 psi; TM 3-1040-200-12.
Flame thrower, portable, M2A1-7.	Std-A	41.3	70.3	----------	4.50 to 4.75	0.50 to 0.75	6 to 9	49	19	1700 to 2100	300 to 350	Fuel ignited by incendiary charge of ignition cylinder.
Components:												
Gun, M7	-------	4.5	------	⅝ (diam) x 21 (long)								
Hose, fuel, M8.	-------	1.8	------	¾ (ID) x 38¾ (long)								

Fuel and pressure unit, M2A1 (tank group).	-------	35	------	27 (high) x 20 (wide) x 11 (deep)	-------	-------	------	-------	----------	-------	-------	Includes 2½-gal. interconnected fuel tanks and one pressure tank; pressure tank charged with compressed air or nitrgoen [c].
Flame thrower, portable, M2A1.	Std-B	43	72	----------	4.50 to 4.75	0.50 to 0.75	6 to 9	46	19	1700 to 2100	300 to 350	Fuel ignited by incendiary charge of ingition cylinder; TM 3-376.
Components:												
Gun, M2A1.	-------	7	------	¾ (diam) x 30 (long)								
Hose, fuel, M1.	-------	1	------	⅞ (ID) x 37 (long)								
Fuel and pressure unit, M2A1.	-------	35	------	27 (high) x 20 (wide) x 11 (deep)	-------	-------	------	-------	----------	-------	-------	Includes two 2½-gal. interconnected fuel tanks and one pressure tank charged with compressed air or nitrogen [c].

See footnotes at end of table.

Table XXI. Characteristics of Flame Throwers—Continued

Nomenclature	Status	Weight		Dimensions (in.)	Fuel		Duration of continuous fire (sec)	Maximum effective range		Pressure		Remarks
		Empty (lb)	Filled (lb)		Operating cap. (gal.)	Discharge rate (gal./sec)		Thickened fuel (meters)	Unthickened fuel (meters)	Pressure container (psi)	Fuel container (operating pressure) (psi)	
Flame thrower, mechanized, main armament, turret mounted, M7A1–6.	Std–A	------	------	----------	Aprx 380	------	------	Aprx 183[d]	Not recommended	3000	255–280[c]	Installed in M48A2 medium tank; flame fuel ingited by spark plug and atomized gasoline and/or secondary fuel.
Components:												
Gun, M6	------	------	------	----------	------	------	------	----------	----------	------	------	Mounted in dummy 90-mm gun tube.
With 7/8 in. nozzle.	------	------	------	----------	------	6.70	55					
With 3/4 in. nozzle.	------	------	------	----------	------	6.20	61					
Fuel and pressure unit, M7A1.	------	------	------	----------	------	------	------	----------	----------	------	------	Includes fuel and pressure containers located in tank turret; pressure containers charged with compressed air or nitrogen[e].

Flame thrower, mechanized, main armament turret mounted, M7-6.	Std-A				378			Aprx 183[d]	Not recommended	3000	255-280[c]	Installed in M48A1 medium tank for use by Marine Corps; flame fuel ignited by spark plug and atomized gasoline and/or secondary fuel; Marine Corps Manual ORD-MM-7005.
Components:												
Gun, M6												Mounted in dummy 90-mm gun tube.
With 7/8 in. nozzle.						6.70	55					
With 3/4 in. nozzle.						6.20	61					
Fuel and pressure unit, M7.												Includes fuel and pressure containers located in tank turret; pressure containers charged with compressed air or nitrogen[c].

[a] For scatter effect; for point target, range is 45 meters.
[b] There is no pressure container but pressure is generated.
[c] **Caution: Never use oxygen, hydrogen, acetlene, or other flammable gas for pressurizing.**
[d] Based on use with 7/8 in. nozzle; range is lightly less when 3/4 in. nozzle is used.
[e] Pressure setting on large volume regulator is 325 psi, but this regulator recovers too slowly to maintain greater pressure than 280 psi in fuel containers.

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24. Characteristics of Mechanical Smoke Generators

Characteristics of mechanical smoke generators are listed in table XXII. (For detailed information, see TM's 3–431, 3–390, and MWO CML 15.)

Table XXII. Characteristics of Mechanical Smoke Generators

Characteristic	M3A3 Generator	M3A2 Generator	M3A1 Generator	M2A1 Generator
Status	Standard–A	Standard–B	Standard–B	Limited Standard–C.
Weight:				
Empty	190 lb	173 lb	137 lb	180 lb.
Filled	207 lb	190 lb	156 lb	266 lb.
Dimensions:				
Length	40 in.	40 in.	40 in.	33½ in.
Width	17 in.	17 in.	17 in.	19½ in.
Height	23 in.	23 in.	23 in.	23½ in.
Engine:				
Type	Pulse jet	Pulse jet	Pulse jet	Internal combustion.
Description	Single cycle, air cooled, 60 pulses per sec.	Single cycle, air cooled, 60 pulses per sec.	Single cycle, air cooled, 60 pulses per sec.	1 cylinder, 4 cycle, air cooled.
Starting method	Magneto and hand operated air pump.	Magneto and hand operated air pump.	Batteries and coil and hand operated air pump.	Hand crank with ratchet cable starter.
Delay in smoke production after starting of engine.	½ min	½ min	½ min	½ min.

Table XXII. Characteristics of Mechanical Smoke Generators—Continued

Characteristic	M3A3 Generator	M3A2 Generator	M3A1 Generator	M2A1 Generator
Fog oil pump, M4 [a]:				
Description	Air motor-oil pump combination; air motor operated by exhaust engine gases.			
Capability	20–50 gal per hr.			
Fog oil drum operating pressure.	None	6 to 9 psi	6 to 9 psi	None.
Generator mount:				
¼-ton truck	M2 mount	M2 mount	M2 mount	M1 mount.
¼-ton trailer	M2 mount	M2 mount	M2 mount	M1 mount.
Fog oil drum mount for ¼-ton trailer.	M3 mount	M3 mount	M3 mount	M3 mount.
Gasoline:				
Tank capacity	3½ gal	3½ gal	3½ gal	6 gal.
Octane rating	76 or higher	76 or higher	76 or higher	76 or higher.
Consumption rate	3 gal per hr	3 gal per hr	3 gal per hr	5 gal per hr.
Fog oil consumption rate:				
Minimum	25 gal per hr [b]	25 gal per hr [b]	25 gal per hr [b]	20 gal per hr.
Maximum	50 gal per hr	50 gal per hr	50 gal per hr	50 gal per hr.
Normal	40 gal per hr	40 gal per hr	40 gal per hr	(c)
Temperature limits for use of fog oil:				
SGF1				Above 40° F.
SGF2	Above 32° F.	Above 32° F.	Above 32° F.	40° F. to 0° F.
75–25 mixture [d]	32° F. to −25° F.	32° F. to −25° F.	32° F. to −25° F.	
50–50 mixture [e]		−25° F. to −40° F.	−25° F. to −40° F.	0° F. to −25° F.
40–60 mixture [f]	−25° F. to −40° F.			

Water:				
Tank capacity	None	None	None	6 gal.
Consumption rate	None	None	None	5 gal per hr.
Water-alcohol mixture for low temperatures:				
80–20 mixture [g]	None	None	None	32° F. to 15° F.
70–30 mixture [g]	None	None	None	15° F. to −5° F.
60–40 mixture [g]	None	None	None	Below −5° F.

[a] M3A2 and M3A1 generators to be converted to M3A3 model by installation of M4 fog oil pump.

[b] Operation at rate of 25 gal per hr should be limited to relatively short period to prevent damage to generator; usual minimum rate is 30 to 35 gal per hr.

[c] Consumption rate varies according to type of smoke screen to be produced.

[d] 75 parts SGF2 and 25 parts jet fuel (JP–3 or JP–4) or wax-free kerosene.

[e] 50 parts SGF2 and 50 parts jet fuel (JP–3 or JP–4) or wax-free kerosene.

[f] 40 parts SGF2 and 60 parts jet fuel (JP–3 or JP–4) or wax-free kerosene.

[g] Proportionate parts of water and denatured alcohol.

25. Characteristics of Air Chemical Munitions

Characteristics of chemical bombs including fire, incendiary, gas, and smoke bombs; incendiary and gas bomb clusters; and the airplane smoke tank are given in tables XXIV through XXVI.

a. Chemical Bomb Data. Components of a typical complete bomb (complete round) include a bomb body, filling, tail fin, burster or igniter, one or more fuzes, and arming wires. Small (10-lb and less) bombs are called bomblets when loaded into clusters. The bodies of small gas bombs are round in cross section while those of small incendiary bombs are hexagonal. Large (100-lb and more) bombs are not loaded into clusters but are dropped individually from aircraft. The bodies of large bombs are cylindrical in cross section and have rounded or ogival noses and tapered rear sections. They have lugs for suspension of the bombs from aircraft bomb racks. Lugs may be permanently attached to the bomb body or may be removable. Chemical bombs have steel bodies, with the exception of fire bombs, which have aluminum bodies, and small TH3 incendiary bombs, which have magnesium bodies.

b. Color Markings of Chemical Bombs. The bodies of chemical bombs are painted gray, with the exception of fire bombs and the magnesium portion of small TH3 incendiary bombs which are not painted. The colors of marking bands designate the type of filling—purple for incendiary, green for gas, and yellow for smoke. Fire bombs have no color bands. A chart listing the color, number, and location of marking bands is given below.

Bomb type	Filling	Bomb size	Band color	Number and location of bands
Incendiary	IM, NP, or PT1.	Small	Purple	One single band at middle.
Incendiary	TH3	Small	Purple	One single band at nose end.
Incendiary	NP or PT1	100-lb	Purple	One single band at middle.
Incendiary	PT1	500-lb	Purple	Three single bands: one at nose end, one at middle, one at tail end.
Gas	GB	Small	Green	One single band at middle.
Gas	HD or H	115-lb	Green	One double band at middle.
Gas	AC, CG, or CK.	500-lb or 1000-lb.	Green	Three single bands: one at nose end, one at middle, one at tail end.
Smoke	WP or PWP.	100-lb	Yellow	One single band at middle.

c. Chemical Bomb Storage Group Classification. For storage purposes, chemical bombs are divided into four groups according to the nature of the chemical agent filling, as follows:

Bomb filling	*Storage group*
GB, H, or HD	Group A—war gases requiring protective masks and complete protective clothing.
AC, CG, or CK	Group B—war gases requiring protective masks.
WP or PWP	Group C—spontaneously flammable.
NP, NP2, PT1, or TH3	Group D—incendiary and readily flammable.

d. Characteristics of Bombs. Characteristics of fire, incendiary, gas, and smoke bombs are listed in table XXIV. For additional information see TM 3-400.

Table XXIV. Characteristics of Fire,

Designation	Status [a]	Agent filling		Complete round Weight (lb)	Chemical efficiency (percent) [b]	Dimensions: length, diameter (in.)	Nose fuze
		Symbol	Weight (lb)				
Bomb, fire, 750-lb, M116A2.	S-A	NP2	615				AN-M173A1
Bomb, fire, 750-lb, M116A1.	LS-C	NP or NP2.	615	720	85	137 x 18 5/8	AN-M173A1 or M173.
Bomb, incendiary, oil, 6-lb, AN-M69.						19 1/2 x 2 7/8 [c]	M1
IM	LS-C	IM	2.2	6.1	36		
NP	LS-C	NP	2.2	6.1	36		
Bomb, incendiary, NP, 100-lb, AN-M47A3.	LS-C	NP	40	69.8	57	52 9/16 x 8 1/2 [c]	AN-M159 or AN-M126A1.
Bomb, incendiary, PT1, 100-lb, AN-M47A4.	S-A	PT1	60	89.4	67	52 9/16 x 8 1/2 [c]	AN-M159 or AN-M126A1.
Bomb, incendiary, PT1, 500-lb, AN-M76.	LS-C	PT1	174	467	37	59 x 14 3/16	M163, AN-M103A1, or AN-M103.
Bomb, incendiary, PT1, 10-lb, M74A1.	S-A	PT1	2.75	8.5	32	19 1/2 x 2 7/8	M197
Bomb, incendiary, PT1, 10-lb, M74.	LS-C	PT1	2.75	8.5	32	19 1/2 x 2 7/8	M142A1
Bomb, incendiary, TH3, 4-lb, AN-M50A3.	S-B	TH3	0.63	3.5	18	21 1/32 x 1 5/8	None
Bomb, incendiary, TH3, 4-lb, M126.	S-A	TH3	0.63	3.6	17	19 9/16 x 1 5/8	None

See footnotes at end of table.

Incendiary, Gas, and Smoke Bombs

Tail fuze	Burster	Arming wire	Tail fin	Remarks
AN-M173A1	None	M17	None	Filling is approx 100 gal; two AN-M23A1 (WP) igniters and two arming wires required; impact bursts bomb and WP igniter sets fire to scattered filling.
AN-M173A1 or M173.	None	M17	None	Filling is approx 100 gal; two AN-M23A1 or M23 (WP) igniters and two arming wires required; impact bursts bomb and WP igniter sets fire to scattered filling.
None	None	None	4 streamers	Bombs assembled on M12 cluster; on impact, fuze sets off black powder which explodes and ejects filling; WP igniting charge ignites filling; burning time: 8 to 20 min.
None	AN-M12	M2 or C5	Integral	On impact, fuze activates burster which shatters bomb and ignites and scatters filling; radius of burst: 10 to 15 yd.
None	AN-M12	M2 or C5	Integral	On impact, fuze activates burster which shatters bomb and ignites and scatters filling; radius of burst: 10 to 15 yd.
AN-M161, AN-M101A1, or AN-M102A1.	AN-M14	AN-M7A1 or M5.	AN-M109A1	One M115A1 or M115 adapter-booster, one adapter-booster holder, one M14 bomb fuze primer-detonator (non-delay or time delay), and one AN-M5 (WP) igniter required; burster shatters bomb and WP igniter sets fire to scattered filling.
None	None	None	Integral	Bomb has WP igniting charge; bombs assembled in M35 cluster; on impact, fuze sets off black powder which explodes and ejects filling; WP igniting charge ignites filling; burning time: 5 to 10 min.
None	None	None	Integral	Bomb has WP igniting charge; bombs assembled in M31 cluster; on impact, fuze sets off black powder which explodes and ejects filling; WP igniting charge ignites filling; burning time: 5 to 10 min.
None	None	None	None	Bombs assembled in M32 cluster; on impact, firing pin strikes primer, igniting first-fire mixture which ignites TH3 which ignites magnesium body; burning time: 5 to 8 min.
None	None	None	M15, integral	Bombs assembled in M36 cluster; on impact, firing pin strikes primer, igniting first-fire mixture which ignites TH3 which ignites magnesium body; burning time: 5 to 8 min.

Table XXIV. Characteristics of Fire,

Designation	Status [a]	Agent filling		Complete round Weight (lb)	Chemical efficiency (percent) [b]	Dimensions: length, diameter (in.)	Nose fuze
		Symbol	Weight (lb)				
Bomb, gas, nonpersistent, 500-lb, AN-M78.						59 x 19 3/16	AN-M103A1 or AN-M103.
CG	S-A	CG	205	496	41		
CK	LS-C	CK	176	467	38		
Bomb, gas, nonpersistent, 1000-lb, AN-M79.						69 1/2 x 18 3/4	AN-M103A1 or AN-M103.
AC	LS-C	AC	195	728	27		
CG	S-A	CG	415	948	44		
CK	LS-C	CK	351	884	40		
Bomb, nonpersistent gas, GB, 10-lb, M125A1.	S-A	GB	2.6	8.5	31	12 x 3 5/16	M196
Bomb, nonpersistent gas, GB, 10-lb, M125.	LS-C	GB	2.6	8.5	31	12 x 3 5/16	M196
Bomb, gas, persistent HD, 115-lb, M70A1.	S-A	HD	60	128	47	51 1/2 x 8 3/32	AN-M158 or AN-M110A1.
Bomb, gas, persistent H, 115-lb, M70	LS-C	H	60	128	47	51 1/2 x 8 3/32	AN-M158 or AN-M110A1.
Bomb, smoke, PWP, 100-lb, AN-M47A3.	LS-C	PWP	74	105	71	52 9/16 x 8 1/2	AN-M159 or AN-M126A1.
Bomb, smoke, PWP, 100-lb, AN-M47A3.	S-A	PWP	74	105	71	52 9/16 x 8 1/2	AN-M159 or AN-M126A1.
Bomb, smoke, WP, 100-lb, AN-M47A4.	LS-C	WP	100	131	77	52 9/16 x 8 1/2	AN-M159 or AN-M126A1.

[a] S-A is standard type-modernization code A; S-B is standard type-modernization code B; LS-C is limited standard type-modernization code C

[b] Chemical efficiency is ratio of filling weight to complete round weight, expressed in percentage.

[c] Diameter for hexagonal cross section is distance across parallel sides of bomb body.

[d] For use with bomb adapted for release from high-performance aircraft.

Incendiary, Gas, and Smoke Bombs—Continued

Tail fuze	Burster	Arming wire	Tail fin	Remarks
M175 [d], M161, M101A1, or AN-M102A2.	AN-M15	M13 [d], AN-M7A1, or M5.	M128 [d], or AN-M109A1.	One M115A1 or M115 adapter-booster and one M14 primer-detonator (non-delay or time delay) required; on impact, burster ruptures bomb and releases filling.
M176 [d], M162, or AN-M102A2.	AN-M16	M13 [d], AN-M7A1, or M7.	M129 [d], AN-M113A1, or M113.	One M115A1 or M115 adapter-booster and one M14 primer-detonator (non-delay or time delay) required; on impact, burster ruptures bomb and releases filling.
None	M31	See remarks	Parachute	Arming device is M1A1 bomb parachute opening delay; bombs assembled in M34A1 cluster; burster ruptures bomb and releases filling.
None	M31	See remarks	Parachute	Arming device is M1A1 bomb parachute opening delay; bombs assembled in M34 cluster; burster ruptures bomb and releases filling.
None	M10	M2	AN-M103A1, AN-M102, or AN-M102A1.	Burster shatters bomb and releases filling.
None	M10	M2	AN-M103A1, AN-M102, or AN-M102A1.	Burster shatters bomb and releases filling.
None	AN-M20	M2 or C5	None	Burster shatters bomb and scatters filling which ignites spontaneously and produces smoke.
None	AN-M20	M2 or C5	None	Burster shatters bomb and scatters filling which ignites spontaneously and produces smoke.
None	AN-M18 or AN-M4.	M2 or C5	None	AN-M18 burster for low-altitude burst; AN-M4 burster for high-altitude burst; burster shatters bomb and scatters filling which ignites spontaneously and produces smoke.

Table XXV. Characteristics of

Designation	Status [a]	Complete round weight (lb)	Dimensions		Bombs clustered	
			Length (in.)	Diameter (in.)	Type	No.
Cluster, incendiary bomb, PT1, 750-lb, M35	S-A	690	90	16	M74A1	57
Cluster, incendiary bomb, TH3, 750-lb, M36	S-A	900	90	16	M126	182
Cluster, gas bomb, nonpersistent GB, 1000-lb						
M34A1	S-A	1,130	68½	19⅛	M125	76
M34	LS-C	1,130	68½	19⅛	M125A1	76
Cluster, gas bomb, nonpersistent GB, 1000-lb, (modified):						
M34A1	S-A	1,130	124	19	M125	76
M34	LS-C	1,130	124	19	M125A1	76

[a] S-A is standard type-modernization code A; LS-C is limited standard type-modernization code C.

Incendiary and Gas Bomb Clusters

Cluster adapter	Tail fuze		Tail fin	Arming wire	Remarks
	Type	No.			
M30	AN-M152A1 or M152.	2		M23	Detonating cord burster installed in cluster adapter.
M30	AN-M152A1 or M152.	2	M14	M23	Detonating cord burster installed in cluster adapter.
M29	AN-M152A1 or M152.	2	M13	M22	Detonating cord burster installed in tail fin; four M3 ignition cartridges required for cluster ejection.
M29	AN-M152A1 or M152.	2	M13	M22	
					Conversion set, external stowage, M16 required for converting bomb cluster for release from high-performance aircraft; detonating cord and four MC cluster ejection cartridges required.
	AN-M152A1	2	M129	M47	
	AN-M152A1	2	M129	M47	

e. Characteristics of Incendiary and Gas Bomb Clusters. Characteristics of incendiary and gas bomb clusters are listed in table XXV. Incendiary bomb clusters are marked with one purple band. Nonpersistent GB gas bomb clusters are marked with one green band. For storage purposes, clusters are divided into groups according to the nature of the chemical agent filling of the bomblets, as listed in paragraph 25*c*. For additional information about clusters see TM 3-400.

f. Characteristics of Airplane Smoke Tank, M10. Characteristics of the airplane smoke tank, M10 are listed in table XXVI.

Table XXVI. Characteristics of Airplane Smoke Tank, M10

Filling					Remarks
Type (symbol)	Unit weight (lb per gal)	Operating volume (gal)[a]	Operating weight (lb)	Filled tank weight (lb)[b]	
CNB	9.50	30	285	353	Weight of empty M10 tank is 68 lb; maximum dimensions are 14 in. in diameter, 21 in. high, and 69 in. long; auxiliary equipment includes M10 set accessories, M10 insulating cover, M2A1 hand-driven pump, M3 filling line, M1 orifice, M2 hoisting beam, and M1 carrying stand.
CNC	10.88	30	326	394	
FS	16.00	30	480	548	
H	11.30	30	339	407	
HD	10.70	30	321	389	
MR [c]	8.80	30	264	332	

[a] Maximum volume of tank is 33 gal; 3 gal void left for expansion of filling.
[b] When insulating cover is used, add approximately 40 pounds.
[c] For training purposes.

26. Filling and Laying of Chemical Land Mines

a. Filling of Chemical Land Mines. For planning purposes, the toxic gas sections of the chemical depot company (TOE 3-67D) are considered capable of filling a total of approximately 4,320 1-gallon land mines with toxic agent from bulk containers per 12-hour period of daylight operations by means of 6 M2 land mine field filling apparatus. Factors causing capability to vary are weather, enemy action, location of filling operations, terrain, and type of protective

clothing worn. If land mine filling is to be accomplished at night in addition to the 12-hour daytime operations, augmentation of the toxic gas sections will be necessary. Factors causing nighttime filling capability to be less than daytime capability include lighting, blackouts, and the increased possibility of accidents.

b. Laying of Chemical Land Mines. Any troop unit can lay chemical land mines. Advice of the staff chemical officer and advice and/or assistance of engineers should be requested as required. Capabilities of units to lay chemical land mines will vary widely because of the differences in the nature of the terrain, the tactical situation, and the training and experience of the troops involved. Capabilities of troop units to lay persistent gas land mines are shown in table XXVIII. For additional information see FM 3–5.

Table XXVIII. Capabilities of Units to Lay Persistent Gas Land Mines

Nature of task	Squad (6 men and 1 2½-ton truck) task	Platoon (4 squads) task	Company (12 squads) task	Average time required [1]	
				To install time fuze and detonating cord	To wire mines for electrical firing
Barrier contamination.[2]	300 yd wide; 100 yd deep; 300 mines.	1,300 yd wide, 100 yd deep; 1,300 mines.	5,000 yd wide, 100 yd deep; 5,000 mines.	4 hours	8 hours.
Road contamination.[3]	1,600 yd long; 3,200 yd of cord; 330 mines.	6,400 yd long; 12,800 yd of cord; 1,320 mines.	19,200 yd long; 38,400 yd of cord; 3,960 mines.	15 to 20 minutes.	2 hours.

[1] Time increased 50 percent for night work.
[2] For surface emplacement.
[3] Detonating cord laid from truck: mines placed on cord.

CHAPTER 4

CHEMICAL SUPPLY DATA

Section I. INTRODUCTORY INFORMATION

27. General

Chemical Corps supply includes determination of requirements for, and procurement, storage, and issue of the following: CBR (chemical, biological, and radiological) items of common usage, to include materials of both offensive and defensive nature (except items specifically assigned to other agencies, such as chemical filled artillery and mortar ammunition which are the responsibility of the Ordnance Corps); CBR weapons, such as portable and mechanized flame throwers; CBR munitions, including bombs, land mines, and hand grenades; smoke producing equipment, such as smoke generators and airplane smoke tanks; CBR protective equipment, such as protective masks and collective protectors; CBR decontaminating equipment and materials; CBR agent sampling and testing equipment; bulk chemical agents (toxic and nontoxic); supplies such as incendiary oil thickeners; and spare parts and tools necessary for the maintenance of Chemical Corps materiel.

28. References

Information pertaining to Chemical Corps supply are found in army regulations, special regulations, supply manuals, supply bulletins, tables of allowances, and tables of organization and equipment.

a. Supply Manuals. Chemical Corps end items and maintenance parts are listed in Chemical Corps section, Department of the Army supply manuals. Instructions for use of the manuals are given in DA Supply Manual CML 1. A list of supply manuals is given in SR 310–20–23.

b. Tables of Allowances. The issue of Chemical Corps items to supplement TOE issue to units and installations is provided in the tables of allowances listed in table XXIX. For additional information see SR 310–20–7.

Table XXIX. Allowances of Chemical Corps Items

TA	Title
3–100	Allowances of Chemical Corps Expendable Supplies.
3–101	Allowances of Chemical Corps Expendable Supplies (Reagent Chemicals).
20	Field Installations and Activities.
20–2	Equipment for Training Purposes.
23–100	Training Ammunition.
23–101	Miscellaneous Ammunition and Explosives.
23–102	Annul Allowances of Miscellaneous Ammunition.

29. End Item Identification System

Chemical Corps end items are divided into six stock classes or major classifications as shown in table XXX. The code number is the first digit of the six-digit stock number. Stock numbers are employed for the identification of Chemical Corps end items of storage or issue. Each digit has significance: the first digit indicates the stock class or major classification, the second digit indicates the subclassification, the third and fourth digits indicate the item classification, and the fifth and sixth digits indicate the item modification. For example, in the stock number, 440318, which identifies flame thrower, mechanized, M3–4–3, the first number, 4, indicates weapon; the second number, 4, indicates flame thrower; the third and fourth numbers, 03, indicate the type of flame thrower—mechanized; while the fifth and sixth numbers, 18, indicate the flame thrower modification. For detailed information concerning end item identification see DA Supply Manual CML 1.

Table XXX. Stock Class or Major Classification Codes

Code No.	Class or major classification
1	Chemicals.
2	Smoke, incendiary, and chemical explosive materials and equipment.
3	Toxic and irritant materials and equipment.
4	Weapons.
5	Protective materials and equipment.
6	Material handling equipment.

30. Component Item Identification System

A component is identified by a three-section hyphenated stock number generally prefixed by a letter; for example, atomizer, assembly is identified by the letter and number A81–1–753. A component stock number prefixed by the letter A, B, C, D, or E is also the drawing number for that item and generally denotes a part peculiar to the Chemical Corps. A component stock number prefixed by the letter

R is for an item either peculiar to the Chemical Corps or peculiar to a single manufacturer, and for which a Chemical Corps drawing does not exist. A component stock number prefixed by the letter H is a commercially obtainable item not peculiar to any one manufacturer, and for which a Chemical Corps drawing does not exist. For detailed information see DA Supply Manual CML 1.

31. Maintenance Parts

a. Listing of Parts and Authorized Quantities. A list of spare parts and the quantities authorized for organizational (first and second echelon), field (third and fourth echelon), and depot (fifth echelon) maintenance are published in the CML 7- and 8-series of Department of the Army supply manuals. Maintenance part stockage guides for combat zone and communication zone issue depots and for base depots are also published in the CML 8-series manuals.

b. Reference. For detailed information pertaining to the computation of maintenance allowances and depot stockage guides for maintenance parts, see DA Supply Manual CML 1.

32. Sets, Kits, and Outfits

a. Replacement Factors. Replacement factors for tools, accessories, and other component parts of sets, kits, and outfits are published in the CML 6-series of Department of the Army supply manuals as guidance for theater of operations commanders in estimating 6-month stock levels to support the demands of using organizations.

b. Reference. For detailed information pertaining to the use of replacement factors in the computation of 6-month replenishment requirements for component parts of sets, kits, and outfits, see DA Supply Manual CML 1.

33. Regulated Items

A Chemical Corps regulated item is an item over which the Chief Chemical Officer exercises close issue supervision. The purpose of the supervision is to insure distribution of items to proper units and commands in accordance with Department of the Army priorities because the item is scarce, costly, or of a highly technical or hazardous nature. Chemical Corps regulated items are listed in SR 725–15–2.

34. Selected Items of Property

Chemical Corps selected items of property on which inventory data are reported under special regulations of the 711–45-series are listed in SR 711–45–11.

34.1. Mobilization Planning Allowances for Nonexpendable Class IV Chemical Items

(Added)

Allowances for mobilization planning purposes for nonexpendable class IV chemical items are listed in table XXX.1. These allowances are not to be construed as authority for current issue.

Table XXX.1. Mobilization Planning Allowances for Nonexpendable Class IV Chemical Items

Item	Factor		Basis
	Quantity	Unit	
Compressor, reciprocating, power-driven, 7 CFM.	2	ea	Per Inf battle group.
	1	ea	Per Armd rifle bn.
	2	ea	Per Abn battle group.
Filter unit, gas-particulate, EMD or GED.	[a] 50	ea	Per theater division slice
			or
	[a] 200	ea	Per theater corps slice.
Filter unit, gas-particulate, hospital, six-man.	[a] 1	ea	Per 100-patient general or station hospital.
	As required		Per Maxillo Facial center or hospital specializing in treatment of head and neck wounds.
Filter unit, gas-particulate, tank, three-man.	[a] 2	ea	Per full tracked Engr combat vehicle.
	[a] 2	ea	Per tank.
	[a] 1	ea	Per armored, full tracked, personnel carrier.
Flame thrower, mechanized, main armament.	5	ea	Per tank bn.
Flame thrower, portable	1	ea	Per rifle platoon.
Fuel filling kit, flame thrower	2	ea	Per Inf battle group.
	1	ea	Per Armd rifle bn.
	2	ea	Per Abn battle group.
Service kit, portable flame thrower.	2	ea	Per Inf battle group.
	1	ea	Per Armd rifle bn.
	2	ea	Per Abn battle group.
Service unit, flame thrower, truck mounted.	1	ea	Per tank bn.
	2	ea	Per Inf battle group.
	1	ea	Per Armd rifle bn.
	2	ea	Per Abn battle group.

[a] Gas warfare.

34.2. Formula for Replacement of Protective Mask Canister (Added)

For determining when to replace the canister of a field protective mask during gas warfare, credit the life of each canister with 100 units, subtract the appropriate number of units for each type of gas attack listed below, and replace the canister when the 100 units have been exhausted.

Type of gas attack	*Units to be subtracted per attack*
Ground-delivered nerve gas	½
Air-delivered nerve gas	1
Blister gas	1
*CK (30 sec to 2 min surprise attack)	10
All other gases, including unidentified	6

*If canister is exposed to heavy CK attack for a period of 15 to 60 minutes, replace canister without further use.

35. Day of Supply

a. Definition. The day of supply is the estimated weight of supplies required to support 1 man (soldier or officer, air plus ground) in an oversea theater for 1 day based on total strengths and maintenance tonnage experience over a long period of time. The factors considered do not include initial equipment of troop units, but do include tonnages for project equipment and similar supplies (other than civilian or other relief supplies) which are required to support troops.

b. Supply Requirements. The unit of measure, "tons per division slice," is considered the most appropriate for long-range planning for supply of the Army and Air Force in a theater of operations. The division slice is defined as "the strength of an average division plus proportionate shares of the total corps, army, communications zone, and theater overhead units." The theater day of supply requirements under nongas warfare conditions for chemical classes II and IV supplies shown in table XXXI are based on a division slice of 40,000 men and two Air Force wing slices of 5,000 men each. For more detailed information see FM 101–10.

Table XXXI. Theater Day of Supply Requirements for Chemical Classes II and IV Supplies

Consumption [1]	Pounds per day	Short tons per month [2]	Conversion factor [3]	Measurement tons per month [4]	Measurement tons per month with 15 percent stowage
Per each of 40,000 Army men in theater	0. 070	0. 0011	2. 3	0. 0025	0. 0029
Per each of 10,000 Air Force men in theater	. 030	. 0005	2. 3	. 0012	. 0014
Per each of 50,000 Army and Air Force men in theater	. 062	. 0009	2. 3	. 0021	. 0025

[1] Based on nongas warfare conditions.
[2] Short ton is 2,000 pounds.
[3] Factor for converting short tons to measurement tons is based on average cubage for items.
[4] Measurement ton (40 cubic feet) is determined by multiplying the short tonnage by the conversion factor.

36. Ground Ammunition Day of Supply

a. Definition. Ground ammunition day of supply is the estimated quantity of ammunition required per day to sustain operations in an active combat theater. It is expressed in terms of rounds per weapon per day for ammunition items fired by weapons; for example, 1 ignition cylinder per portable flame thrower per day. It is expressed in terms of other units of measure for bulk allotment of ammunition items; for example, 1.2199 WP smoke grenades per 1,000 men per day.

b. Rates. Ground ammunition day of supply rates for Chemical Corps and Ordnance Corps ammunition are published in SB 38–26. They are applicable, under active combat nongas warfare conditions, to a balanced theater army command of not less than 150,000 men. They are used in the computation of mobilization plans, in the recomputation of Department of the Army reserve stocks, and in the computation of requirements for foreign or special programs when conputations at combat rates are necessary. The rates require evaluation and adjustment when the army command is unbalanced or when it consists of a number of men less than 150,000. For detailed information see SB 38–26.

37. Chemical Ammunition Day of Supply Data

a. Hand Grenades. Day of supply (rounds per organization per day) data for chemical hand grenades are listed in table XXXII.

Table XXXII. Chemical Ammunition Day of Supply for Hand Grenades

Item	Unit or vehicle	Day of supply (rounds per organization or vehicle per day)	Shipping container		Average weight per round, including packing (lb)
			Rounds	Gross weight (lb)	
Grenade, hand, irritant, CN–DM, M6.	MP escort guard co	2.0	16	33	2.0
Grenade, hand, tear, CN, M7A1.	MP escort guard co	2.0	16	35	2.2
	MP co	2.0			
or					
Grenade, hand, tear, CN, M7.			16	33	2.1
Grenade, smoke, white, HC, AN–M8.	Inf co	.5	16	41	2.6
	MP co	2.0			
Grenade, incendiary, TH3, AN–M14.	Co, engr combat bn	1.0	16	47	2.9
	Co, armd engr bn	1.0			
	Engr pon bridge co	.5			
	Engr float bridge co	.5			
	Co, engr abn bn	3.0			
	Inf regt, except abn	20.0			
	Inf regt, abn*	40.0			
Grenade, hand, smoke, WP, M15.	Combat veh (including half-track veh).	.2	16	46	2.9
	Armed car	.1			
	Co, armd engr bn	1.0			
	Co, engr combat bn	1.0			
	Engr pon bridge co	.5			
	Engr float bridge co	.5			
	Inf co	2.0			

Table XXXII. Chemical Ammunition Day of Supply for Hand Grenades—Con.

Item	Unit or vehicle	Day of supply (rounds per organization or vehicle per day)	Shipping container		Average weight per round, including packing (lb)
			Rounds	Gross weight (lb)	
Grenade, smoke, colored, M18 (green, red, violet, yellow).	Combat veh (including towed guns).	0.2	16	34	2.1
	AAA gun btry	.5			
	Inf rifle co	.7			
	Recon co	1.0			
	FA btry	1.0			
	AAA bn hq	1.0			
	FA searchlight btry	1.0			
	Inf bn hq	1.5			
	FA hq btry	1.5			
	AAA AW btry	1.5			
Grenade, hand, riot CN, M25A1.	Combat veh (including towed guns).	.2	50	60	1.2
	AAA gun btry	.5			
	Inf rifle co	.7			
	Recon co	1.0			
	FA btry	1.0			
	AAA bn hq	1.0			
	FA searchlight btry	1.0			
	Inf bn hq	1.5			
	FA hq btry	1.5			
	AAA AW btry	1.5			

*Applies only when engaged in an airborne assault; otherwise same as infantry.

b. Miscellaneous Ammunition Items. Day of supply (rounds per organization per day) data for miscellaneous chemical ammunition items including equipment and safe destroying incendiaries, land mines, smoke pots, and fire starters are listed in table XXXIII.

Table XXXIII. Chemical Ammunition Day of Supply for Miscellaneous Items

Item (round)	Day of supply (rounds per organization per day)	Shipping container		Average weight per round, including packing (lb)
		Rounds	Gross weight (lb)	
Incendiary, equipment destroying, TH1, M2A1.	(Data not published)-----	2	33	16. 5
Incendiary, safe destroying, TH1, M1A1.	(Data not published)-----	1	55	55. 0
Incendiary, safe destroying, TH1, M1A2.	(Data not published)-----	1	55	55. 0
Mine, land, chemical, 1-gallon.[a]	(Data not published)-----	10	14	1. 5
Pot, smoke, floating, SGF2, AN–M7.[b]	60 per cml smoke genr co-	1	37	37. 0
Pot, smoke, floating, HC, M1.	60 per cml smoke genr co-	3	48	16. 0
Pot, smoke, floating, HC, M4A2.	30 per cml smoke genr co-	1	48	48. 0
Pot, smoke, HC, 30-lb, M5-	(Data not published)-----	1	48	47. 0
Starter, fire, M1----------	6 per mtn co; 6 per prcht co; 6 per jungle co; 2 per co, except mtn, prcht, and jungle co.	216	40	. 2

[a] Shipped empty; filled just before use.
[b] Filled in field immediately prior to issue to using troops.

c. Ordnance Smoke Filled Ammunition. Day of supply data for ordnance smoke filled ammunition including WP smoke rifle grenades and WP smoke mortar, howitzer, and gun shell are listed in FM 101–10.

38. Replacement Factor

a. Definition. A replacement factor is a number expressed as a decimal which, when multiplied by the total projected quantity of an item in use, gives the quantity of that item required to be replaced during a given period of time.

b. Chemical Corps Replacement Factors. Monthly replacement factors for Chemical Corps nonexpendable items for wartime (nongas warfare) conditions and for gas warfare conditions are published in SB 3–28. Factors for peacetime conditions are published in SB 3–27. Replacement factors are subject to periodic revision. (For information pertaining to determination of the factors, see SR 726–10–10.)

c. Wartime (Nongas Warfare) Replacement Factors. Monthly wartime (nongas warfare) replacement factors are listed in SB 3–28 for three areas, as follows: for an active area (area in which the United States Army is engaged in a major combat operation), for an inactive area (area in which the United States Army is engaged in strategic holding operations), and for ConUS (continental United States in which troops are engaged in accelerated training operations for static-defense activities and for replacement of troops in active theaters).

(1) The following equation may be used to compute the quantity of an item required to be replaced monthly:
Quantity of an item to be replaced monthly=replacement factor × total projected quantity of the item in use.

(2) For example, assuming that for an active area the monthly replacement factor for the portable flame thrower is 0.0417 and that the total projected quantity of flame throwers in use in the area is 1,000, then the quantity of flame throwers to be replaced monthly is calculated as $0.0417 \times 1{,}000 = 42$.

d. Gas Warfare Replacement Factors. Monthly gas warfare replacement factors listed in SB 3–28 are applicable to any area in which troops are engaged in gas warfare. Because the use of certain Chemical Corps nonexpendable items is expected to be greatly increased under gas warfare conditions, the replacement factors for these items are likewise increased.

e. Peacetime Replacement Factors. Monthly peacetime replacement factors are listed in SB 3–27 for three areas and one category, as follows:

(1) Continental United States (ConUS) which includes the 48 States, the District of Columbia, and areas under command jurisdication of the following: the commanding general, United States Army, Alaska (USARAL); the commanding general, United States Army, Pacific (USARPAC); and the commanding general, United States Army, Caribbean (USARCARIB).

(2) United States Army, Europe (USAREUR), formerly EUCOM, which includes the area under the command or jurisdiction of the commanding general, United States Army, Europe.

(3) United States Army, Far East (USAFE), formerly FECOM, which includes the area under the commond or jurisdiction of the commanding general, United States Army, Far East.

(4) Continental United States, part time, which includes civilian components or other troops not participating in military activities on a full time basis, such as the Army Reserve, the Army R. O. T. C., and the National Guard of the United States.

39. Consumption Rate

a. Definition. A consumption rate is the average quantity of an item consumed or expended during a given time interval, expressed in quantities per applicable basis. Typical bases of consumption rates are rounds per weapon per day, pounds per man per day, pounds per item of equipment per month, quantities per item of equipment per month, and quantities per 1,000 individuals per month.

b. Chemical Corps Consumption Rates. Monthly consumption rates for Chemical Corps expendable items for wartime (nongas warfare) conditions and for gas warfare conditions are published in SB 3–28. Rates for peacetime conditions are published in SB 3–27. Consumption rates are subject to periodic revision. For information pertaining to determination of the rates, see SR 726–10–10.

c. Wartime (Nongas Warfare) Consumption Rates. Monthly wartime (nongas warfare) consumption rates are listed in SB 3–28 for three areas—active, inactive, and continental United States. The basis for consumption rates is expressed in pounds per equipment per month, in pounds per 1,000 individuals per month, or in quantity per 1,000 individuals per month. For example, in an active theater, the consumption rates and bases include—

(1) 467.4400 pounds of chlorinated paraffin per clothing impregnating plant per month.

(2) 33.0000 pounds of STB decontaminating agent per 1,000 individuals per month (for manual decontamination).

(3) 5.0210 cans of vesicant detector crayon per 1,000 individuals per month.

d. Quantitative Consumption Requirement.

(1) The following equation may be used to compute the quantitative consumption requirement for an item for 1 month with a factor based on 1,000 individuals: Quantitative consumption requirement for an item for 1 month =

$$\frac{\text{consumption rate} \times \text{number of individuals}}{1{,}000}$$

(2) For example, assuming that the number of individuals in an inactive theater is 100,000 and that the monthly consumption factor for the protective ointment kit is 7.7676 per 1,000 individuals, then the quantitative consumption requirement for the kits is

$$\frac{7.7676 \times 100{,}000}{1{,}000} = 777$$

e. Gas Warfare Consumption Rates. Monthly consumption rates for Chemical Corps expendable items having an increased rate of consumption during gas warfare are tabulated in SB 3–28. They are applicable to any area in which troops are engaged in gas warfare.

f. Peacetime Consumption Rates. Monthly peacetime consumption rates for Chemical Corps items are listed in SB 3–27 for the same areas and category for which peacetime replacement factors (par. 38*e*) are listed. Each rate represents the average quantity of a consumable type item expended or used up during a month per 1,000 using individuals.

Section II. CHEMICAL SUPPLIES

40. General

Data pertaining to classes II, IV, IVA, and V (including class VA) chemical supplies are given in tables XXXIV through XXXVI. For detailed information pertaining to the storage of supplies and equipment in sheds and in the open, see SB 38–8–1, and for detailed information pertaining to the preservation, packaging, and packing of military supplies and equipment, see TM 38–230.

41. Class II Chemical Supplies

Data pertaining to class II chemical supplies, both expendable and nonexpendable, are given in table XXXIV. For a listing of Chemical Corps current issue class II items of supply see DA Supply Manuals CML 3–1 and CML 3–3.

Table XXXIV. Class II Chemical Supplies

EXPENDABLE ITEMS

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
α-naphthol, reagent	126002	10-gm bottle					Laboratory reagent	Shed.
Antiset, M1	574535	Lb	6½	Drum	7	0. 2	Fiberboard drum; spec: MIL–A–11029.	Shed.
Antiset, M1	574536	3-lb bag	4	Carton			Packed 1 bag per can, 4 cans per carton; spec: MIL–A–11029.	Shed.
Bag, waterproofing, protective mask, M1.	519830	Ea	250	Box	50	1. 5		Shed.
Brush, window, decontaminating, M1.	572105	Ea	15	Box	50	3. 0	Spec: MIL–B–11458	Shed.
Calcium acetate, reagent	111241	1-lb bottle					Laboratory reagent	Shed.
Chlorinated lime, technical, grade 3.	574116	Lb	43	Drum	61	1. 4	Packaged in 8-gallon drum; spec: 97–54–281.	Shed.
Chlorinated paraffin, technical, type I.	135901	Lb	483	Drum	550	11. 7	Packaged in 55-gallon drum; spec: MIL–JAN–P–429.	Open.
Crayon, vesicant detector, M7.	564140	12 per box	60	Box	28	. 6	Spec: 97–54–212	Shed.
Crayon, vesicant detector, M7.	564141	3 per can	128	Box	35	. 6	Spec: 97–54–212	Shed.
Crayon, vesicant detector, M7A1.	564142	3 per can	128	Box	35	. 6	Spec: JAN–C–314	Shed.

Danc solution unit, 3 gallon, M4.	574209	3-gal container.	1	Box	59	1. 2	Packaged in metal dual container; spec: MIL–D–3208.	Open.
Danc solution unit, 4½-gallon, M4.	574205	4½-gal container.	1	Box	82	1. 7	Packaged in metal, 2-compartment container; spec: MIL–D–3208.	Open.
Decontaminating agent, RH195.	136903	Lb	100	8-gal drum	131	4. 6	Store in dry place; spec: JAN–D–282.	Shed.
Decontaminating agent, STB.	574530	Gal	8	8-gal drum	61	1. 4	Store in dry place; spec: MIL–D–12468.	Shed.
Dye mix, olive drab	131600	Lb	500	50-gal drum	610	14. 4	Spec: JAN–D–431	Open.
Food testing and screening kit, ABC–M3.	564917	Ea	24	Box	45	. 8		Shed.
Impregnite, CC2	535110	Lb	150	Drum	162	3. 9	Fiberboard drum; spec: MIL–I–285.	Shed.
Impregnite, XXCC3	535115	Lb	75	Drum	86	2. 7	Fiberboard drum or plywood drum lined with kraft bag-type liner; spec: MIL–I–292A.	Shed.
Kit, repair, gas mask, company, MII.	519106	Ea	144	Box	48	1. 8	Spec: 97–54–1.	
Kit, repair, gas mask, M3	519108	Ea	70	Box	50	1. 5	Spec: MIL–R–10087B	Shed.
Paint, liquid vesicant detector, M5.	564120	4-oz can	96	Box	58	1. 6	Spec: JAN–P–274	Shed.
Paper, liquid vesicant detector, M6.	564130	Book of 25 sheets.	100	Box	45	1. 0	Spec: JAN–P–253	Shed.
Polyvinyl alcohol	136250	Lb	100	Drum	120	3. 3	Granular; spec: JAN–A–265	Shed.
Protective ointment kit, M5A1.	555125	Ea	70	Box	50	1. 4	Spec: MIL–P–11028A	Shed.

Table XXXIV. Class II Chemical Supplies—Continued

EXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Set, anti-fog, M2	519205	Ea	600	Box	42	2.4	Spec: 197–54–447	Shed.
Set, gas identification, instructional, M1.	562505	Ea	1	Box	18	.8	Shipping container (packing box) is nonexpendable, returnable for refill; spec: 97–54–23.	Open.
Set, gas identification, instructional, M2.	562567	Ea	15	Box	70	4.0	Spec: 97–54–396	Open.
Supplementary reagents, water testing and screening kit, AN–M2.	564922							Shed.
Tetrachloroethane	128452	Lb	690	55-gal drum	800	13.1	Spec: JAN–T–247	Open.
Water testing and screening kit, M1.	564921	Ea	48	Box	62	1.5	Spec: MIL–W–25038	Shed.
Water testing and screening kit, M1A1.	564923	Ea	48	Box	62	1.5	Spec: MIL–W–20538	Shed.
Water testing and screening kit, AN–M2.	564919	Ea	24	Box	50	1.0	Spec: MIL–W–20538	Shed.

NONEXPENDABLE ITEMS

Adapter, line filling, 1 ton container, M1.	641125	Ea	8	Box	124	5.8	Spec: MIL–A–11610A	Open.

Apparatus, filling, field, land mine, M2.	630110	Ea	1		198	8.0	Spec: MIL–A–12391	Open
Bag, pigeon, protective, M4.	516407	Ea	6		74	2.8	Drawing C5–6–101; for use with Signal Corps pigeon containers.	Shed
Bag, pigeon, protective, M5	516408	Ea	3		71	2.5	Drawing C5–6–127; for use with Signal Corps pigeon crates.	Shed
Beam, grab, M1	644210	Ea	1	Box	192	3.2	For handling one ton container; component of M1 service truck; spec: MIL–B–12264.	Open
Beam, hoisting, airplane smoke tank, M2.	644110	Ea	2	Box	42	0.6	Spec: MIL–B–12259	Open
Decontaminating apparatus, portable, 1½-quart, M2.	572160	Ea	6	Box	50	2.0	Includes M1 funnel; for Marine Corps use; spec: 97–54–113.	Open
Decontaminating apparatus, portable, 3-gallon, M1.	572155	Ea	2	Box	75	8.7	Includes M2 funnel and C3 stirring paddle; spec: 197–54–125E.	Open
Decontaminating apparatus, power-driven, truck-mounted, M3A1.	570118	Ea	1	None	11,090	1,103.0	Mounted on 2½-ton, 6 x 6 truck chassis; auxiliary equipment includes M1 portable water heater; spec: 197–54–200.	Open
Decontaminating apparatus, power-driven, truck-mounted, M3A2.	570119	Ea	1	None	11,090	1,103.0	Mounted on 2½-ton, 6 x 6 truck chassis; auxiliary equipment includes M1 portable water heater.	Open

Table XXXIV. Class II Chemical Supplies

NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Decontaminating apparatus power-driven, truck-mounted, M3A3.	570121	Ea	1	None	14, 280	1, 106. 0	Mounted on 2½-ton, 6 x 6 truck chassis; auxiliary equipment includes M1 portable water heater.	Open.
Decontaminating apparatus, power-driven, truck-mounted, M4.	570125	Ea	1	None	11, 500	1, 250. 0	Mounted on 2½-ton, 6 x 6 truck chassis; apparatus, less chassis, packaged in crate—gross weight, 4,600 pounds-cubage, 288 cubic feet; auxiliary equipment includes M1 portable water heater; spec: 197–54–276.	Open.
Faucet, oil, 2-inch, M1	631612	Ea	10	Box	66	1. 8	Spec: MIL–F–10665	Shed.
Funnel, M3	631608	Ea	5	Box	75	5. 8	Spec: MIL–F–10365	Shed.
Generator, smoke, M3	217126	Ea	1	Crate	242	18. 8	Spec: 196–31–94	Open.
Generator, smoke, M3A1.	217127	Ea	1	Crate	250	18. 8	Spec: 196–31–94	Open.
Generator, smoke, mechanical, M2.	217122	Ea	1	Crate	314	16. 3	Spec: MIL–G–12308	Open.

Generator, smoke, mechanical, M2A1.	217125	Ea	1	Crate	315	16. 3	Spec: MIL–G–11124	Open.
Impregnating plant, clothing, M2.	532120	Ea	1	Crate	89, 535	7, 146. 0	Packaged in 13 crates; spec: 197–54–518.	Open.
Impregnating plant, clothing, M2A1.	532130	Ea	1	Crate				Open.
Kit, agent sampling, M12.	563010	Ea	1	Box	43	2. 3	Spec: MIL–K–3194	Shed.
Kit, chemical agent analyser, M10A1.	562561	Ea	1	Box	45	2. 1	Spec: MIL–K–10395	Shed.
Kit, chemical agent, detector, M9A2.	564916	Ea	8	Box	50	2. 1	Spec: MIL–D–12419	Shed.
Kit, mixing and transfer, thickened fuel, M1.	635103	Ea	1	Box	465	35. 8	Spec: MIL–K–12338	Shed.
Kit, service, chemical bomb, M13.	635104	Ea	1	Box	165	4. 6	Spec: MIL–K–10335	Shed.
Kit, smoke identification, M11.	562565	Ea	1	Box	26	1. 3	Spec: MIL–K–3292	Shed.
Laboratory, base, CWS, M2.	567204	Ea	1	Box	22, 029	1, 356. 0	Packaged in 65 boxes; boxes when empty are used as laboratory tables; spec: 197–54–374.	Shed.
Laboratory, mobile, CWS, M3.	567310	Ea	1	Box	3, 158	145. 0	Packaged in 13 boxes; spec: 197–54–414.	Shed.
Line, filling, airplane smoke tank, M3.	641120	Ea	1	Box	48	2. 2	Spec: MIL–L–12238	Open.
Mask, gas, M9 (large, left cheek canister).	510228	1 per carton	6	Box	55	3. 2	Spec: MIL–M–10121	Shed.
		1 per can	6	Box	56	3. 3		
Mask, gas, M9 (large, right cheek canister).	510227	1 per carton	6	Box	55	3. 2	Spec: MIL–M–10121	Shed.
		1 per can	6	Box	56	3. 2		

Table XXXIV. Class II Chemical Supplies—Continued

NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Mask, gas, M9 (medium, left, cheek canister).	510230	1 per carton	6	Box	55	3.2	Spec: MIL-M-10121	Shed.
		1 per can	6	Box	56	3.3		
Mask, gas, M9 (medium, right cheek canister).	510229	1 per carton	6	Box	55	3.2	Spec: MIL-M-10121	Shed.
		1 per can	6	Box	56	3.3		
Mask, gas, M9 (small, left cheek canister).	510232	1 per carton	6	Box	55	3.2	Spec: MIL-M-10121	Shed.
		1 per can	6	Box	56	3.3		
Mask, gas, M9 (small, right cheek canister).	510231	1 per carton	6	Box	55	3.2	Spec: MIL-M-10121	Shed.
		1 per can	6	Box	56	3.3		
Mask, gas, acid and organic vapors, M10.	510951	Ea	6	Box	74	4.4	Spec: MIL-M-12309	Shed.
Mask, gas, all-purpose, M11.	510952	Ea	6	Box	74	4.4	Federal spec: GGG-M-131.	Shed.
Mask, gas, all-purpose, M11A1.	511705	Ea	6	Box	74	4.4	Federal spec: GGG-M-131.	Shed.
Mask, gas, ammonia, M12.	510953	Ea	6	Box	74	4.4	Spec: MIL-M-12310	Shed.
Mask, gas, dog, M6-12-8.	516201	Ea	12	Box	51	3.9		Shed.
Mask, gas, horse, M4	516103	Ea	2	Box	60	5.4		Shed.
Mask, gas, horse, M5	516106	Ea	2	Box	60	5.4		Shed.
Mask, gas, optical,	513718	1 per carton	6	Box	55	3.2	Spec: MIL-M-10661A	Shed.

lightweight, M2-10A1-6.		1 per can	6	Box	56	3.3			
Mask, gas, oxygen breathing, M13.	511605	Ea	1	Box	40	2.2	Includes 3 canisters		Shed.
Mask, gas, service, lightweight, M3-10A1-6.	510718	1 per carton	6	Box	55	3.2	Spec: MIL-M-10666A		Shed.
		1 per can	6	Box	56	3.3			
Mask, gas, service, lightweight, M3A1-10A1-6.	510719	1 per carton	6	Box	55	3.2	Spec: MIL-M-820		Shed.
		1 per can	6	Box	56	3.3			
Mask, gas, service, lightweight, M4-10A1-6.	510721	Ea	6	Box	56	3.2			Shed.
Mask, gas, service, lightweight, M4A1-10A1-6.	510722	Ea	6	Box	56	3.2			Shed.
Mask, gas, service, snout-type, M8-11-10.	511511	1 per carton	6	Box	50	2.5	Spec: 97-51-308		Shed.
		1 per can		Box	50	3.1			
Mask, gas, special, M2A2-acid vapor MI-IIIA1.	510933	1 per carton	6	Box	50	3.5	Spec: MIL-M-10564A		Shed.
Mask, gas, special, M2A2-all-purpose MI-IIIA1.	510936	1 per carton	6	Box	50	3.5	Spec: MIL-M-10553A		Shed.
Mask, gas, special, M2A2-HCN M2-IVA1.	510943	1 per carton	6	Box	50	3.5	Spec: MIL-M-10552A		Shed.
Mask, gas, special, M2A2-oil vapor MI-IIIA1.	510942	1 per carton	6	Box	50	3.5	Spec: MIL-M-10524		Shed.
Mask, gas, special, M2A3-all-purpose MI-IIIA1.	510944	1 per carton	6	Box	50	3.5	Spec: 97-51-339		Shed.

Table XXXIV. Class II Chemical Supplies—Continued

NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Mask, gas, special, M4-oil vapor, MI-IIIA1.	510947	1 per carton	6	Box	50	3.5		Shed.
Mask, protective, field, M9A1 (large, left cheek canister).	510239	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mask, protective, field, M9A1 (large, right cheek canister).	510240	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mask, protective, field, M9A1 (medium, left cheek canister).	510241	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mask, protective, field, M9A1(medium, right cheek canister).	510242	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mask, protective, field, M9A1 (small, left cheek canister).	510243	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mask, protective, field, M9A1 (small, right cheek canister).	510244	1 per carton	6	Box	55	3.2	Spec: MIL-M-12296	Shed.
		1 per can	6	Box	56	3.3		
Mechanism, valve replacement, M1.	643110	Ea	1	Chest	375	14.5	For type A ton container; spec: MIL-V-12971.	Shed.

Mixing and transfer unit, incendiary oil, M2.	635105	Ea	1	Crate	396	20. 4	For warm climate use; spec: MIL–M–11145.	Shed.
Pump, airplane smoke tank, M2.	641510	Ea	1	Box	109	6. 5	Spec: MIL–P–13611	Open.
Rack, drain, barrel, M7	631604	Ea	1	Box	75	5. 8	Formerly—stand, barrel, M7; spec: 196–31–91.	Open.
Radioactive source, M3							For training	
Components:								
1 Source, radioactive cobalt 60, M1.	D124–10–101	Ea	1	Box	150	3. 8		
1 Tongs, remote handling, M2.	D124–2–219	Pr	1	Box	20	1. 4		
Repair set, CWS equipment, M9.	639165	Ea	1	Box	4, 555	225. 6	Packaged in 10 boxes; spec: 197–54–410A.	Open.
Set, accessories, for airplane smoke tank, M10.	455200						Not packaged as complete end item.	
Components:								
1 Set, accessories, for airplane smoke tank, M10, less blasting caps.	R28–19–18	Ea	1	Box	47	1. 9	Spec: MIL–S–10230A	Open.
100 Cap, blasting	R28–19–19	Ea	100	Box			Includes 50 caps, blasting, electric, No. 6, w/9 ft lead wire (H–22–47–18) and 50 caps, blasting, electric, No. 4, w/6 ft lead wire (H–22–47–13); spec: 196–31–24.	Shed.

Table XXXIV. Class II Chemical Supplies—Continued

NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Set, accessories, gas identification detonation, M1.	562155	Ea	1	Box	77	3.0	Spec: MIL-S-12398	Open.
Set, equipment, maintenance and repair, M1	639160	Ea Ea	1 1	Box Box	7,992 4,376	359.0 232.0	Packaged in 18 boxes; boxes when empty are used as work benches; modified sets packaged in 12 boxes; spec: 197-54-232D.	Open
Set, equipment, maintenance and repair, M1A1.	639161	Ea	1	Box	2,589	104.0	Packaged in 7 boxes; spec: MIL-S-13422.	Open.
Set, inert air chemical munitions, M13.	321015	Ea	1	Box	1,700	79.3	Spec: MIL-T-3274A	Open.
Set, inert ground chemical munitions, M11.	321005	Ea	1	Chest	83	3.8	Spec: MIL-T-3270B	Open.
Set, sectionalized air chemical munitions, M14.	321020	Ea	1	Chest	638	25.9	Spec: MIL-T-3269A	Open.
Set, sectionalized ground chemical munitions, M12.	321010	Ea	1	Chest	123	3.8	Spec: MIL-T-3273A	Open.
Skid, barrel, 10 ft, M1	631620	Ea	1	Box	55	4.5	Spec: 196-31-90	Open.

Stand, carrying, M1	640410	Ea	1	Crate	75	12.4	Spec: MIL–S–12773	Open.
Stand, loading, airplane chemical spray tank, M2.	640215	Ea	1	Box	188	10.9	Spec: 96–31–21	Open.
Stencil, marking, CmlC insignia, large.	639121	Ea	1	Box	2	0.1	Drawing: B18–17–1	Shed.
Stencil, marking, CmlC insignia, small.	639120	Ea	1	Box	1	0.1	Drawing: E18–17–3	Shed.
Tachometer, mechanical, hand held, M1.	217124	Ea	2	Box	9	0.3	Spec: MIL–T–10793A	Shed.
Tool set, mechanical smoke generator, M10.	217510	Ea	1	Chest	68	3.2	Spec: MIL–T–10782	Shed.
Tool set, repair, gas mask, universal, M8.	519124	Ea	10	Box	49	1.4	For Navy use; spec: MIL–T–10748A.	Shed.
Trailer, chemical handling, M2.	624115	Ea	1		5,015	244.0	Spec: 96–31–33	Open.
Trailer, chemical service, M1.	624110	Ea	1		3,670	460.0	Spec: 96–31–18	Open.
Tripod, drum hoisting, M1.	640210	Ea	1	Box	188	9.4	Spec: MIL–T–3407	Open.
Truck, chemical service, M1.	620110	Ea	1	None	11,000	1,553.0	Spec: MIL–T–11594	Open.
Water testing kit, poisons, M4.	564918	Ea	1	Chest	55	1.3		Shed.
Wrench, valve removing, M1.	643510	Ea	10	Box	135	6.0	For type D ton container; spec: MIL–W–12307.	Shed.
Wrench, valve removing, M2.	643514	Ea	10	Box	140	6.2	For type A ton container; spec: MIL–W–12307.	Shed.

42. Class IV Chemical Supplies

Data pertaining to class IV chemical supplies, both expendable and nonexpendable, are given in table XXXV. For a listing of Chemical Corps current issue class IV items of supply see DA Supply Manual CML 3–1.

Table XXXV. Class IV Chemical Supplies

EXPENDABLE ITEMS

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Acetone, technical	120215	1-gal can					Organic chemical; spec: JAN–A–489.	Shed.
Acetone, technical	120216	5-gal can					Organic chemical; spec: JAN–A–489.	Shed.
Alcohol, denatured, grade III	123786	1-gal can					Organic chemical; spec: O–A–396.	Shed.
Alcohol, denatured, grade III	123793	5-gal can					Organic chemical; spec: O–A–396.	Shed.
Alcohol, denatured, grade III	123791	55-gal drum					Organic chemical; spec: O–A–396.	Open.
Ammonium hydroxide, 28%	110302	4-lb bottle					Inorganic chemical; spec. O–A–451.	Shed.
Boric acid, ACS, crystal	111023	1-lb bottle					Inorganic chemical	Shed.
Carbon tetrachloride, technical	122586	1-lb bottle					Organic chemical; spec: O–C–141.	Shed.
Carbon tetrachloride, technical	122588	1-qt can					Organic chemical; spec: O–C–141.	Shed.

Table XXXV. Class IV Chemical Supplies—Continued

EXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Carbon tetrachloride, technical	122589	1-gal can					Organic chemical; spec: O–C–141.	Shed.
Chemical set, clothing impregnation, M3.	530105	Ea	1	Box	53	1.7	Spec: MIL–C–11873	Shed.
Chromium trioxide, technical, flake.	111600	5-lb container					Inorganic chemical; spec: O–C–303.	Shed.
Cupric carbonate, reagent, powder.	112329	1-lb bottle					Inorganic chemical	Shed.
Ethyl alcohol, 95%	123788	1-gal can					Organic chemical; spec: JAN–A–463.	Shed.
Ethyl alcohol, 95%	123794	5-gal can					Organic chemical; spec: JAN–A–463.	Shed.
Glycerine, reagent	124340	4-oz bottle					Organic chemical; spec: O–G–491.	Shed.
Glycerine, reagent	124341	1-gal can					Organic chemical; spec: O–G–491.	Shed.
Hydrochloric acid, technical, 31.5%.	110117	2-lb bottle					Inorganic chemical; spec: O–A–86.	Shed.
Hydrochloric acid, technical, 31.5%.	110118	13-gal carboy					Inorganic chemical; spec: O–A–86.	Shed.
Hydrogen peroxide, technical, 27.5%.	112819	5-lb bottle					Packaged in dark bottle; inorganic chemical.	Shed.

Magnesium fluoride, reagent, granular.	113719	¼-lb jar					Inorganic chemical; spec: JAN–M–621.	Shed.
Manganese carbonate, technical, powder.	113725	10-lb bottle					Inorganic chemical	Shed.
Potassium cyanide, technical, granular.	114840	1-lb bottle					Inorganic chemical	Shed.
Set, impregnating, field, M1	530110	Ea	1	Box	72	2. 9	Spec: 197–54–306	Shed.
Sodium hydroxide, reagent, pellets.	116310	1-lb can					Inorganic chemical	Shed.
Sodium hydroxide solution, reagent, 0.1 normal.	116309	1-gal bottle					Inorganic chemical	Shed.
Sodium hydroxide, technical, flake.	116307	1-lb can					Inorganic chemical; spec: P–S–631.	Shed.
Sodium hydroxide, technical, flake.	116308	50-lb can					Inorganic chemical; spec: P–S–631.	Shed.
Sodium silicate solution	116312	1-gal can					Inorganic chemical; spec: O–S–605.	Shed.
Trichloroethylene, technical	123867	5-gal can					Organic chemical; spec: O–T–634.	Shed.
Trichloroethylene, technical	123868	55-gal drum					Organic chemical; spec: O–T–634.	Shed.

NONEXPENDABLE ITEMS

Compressor, reciprocating, gasoline engine driven, 7 cfm, M1.	631110	Ea	1	Crate	1, 300	69. 0	Spec: 96–131–150	Open.
Compressor, reciprocating, gasoline engine driven, 7 cfm, M1A1.	631112	Ea	1	Crate	1, 300	69. 0	Spec: 96–131–150	Open.

Table XXXV. Class IV Chemical Supplies—Continued

NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Cover, outlet valve, M1	519803	Ea	1, 800	Box	50	4. 0	Spec: MIL–C–12794	Shed.
Curtain, gasproof, M1	529110	Ea	8	Box	114	4. 4	Spec: MIL–C–11821A	Open.
Decontaminating apparatus, power-driven, skid-mounted, M6.	570126	Ea	1	Crate	4, 600	270. 0	For Navy use	Open.
Decontaminating apparatus, power-driven, trailer-mounted, 150 gallon, M7.	570127	Ea	1	None	2, 600		For Navy use; spec: MIL–T–15007.	Open.
Decontaminating apparatus, power-driven, trailer-mounted, 150 gallon, M7A1.	570128	Ea	1	None	2, 600		For Navy use; spec: MIL–T–15007.	Open.
Device, charging, CN spray gun, Mk I, Mod O.	623110	Ea	5	Box			For Navy use; for charging gun spray, CN training, Mk I, Mod 1.	Open.
Filter, gas, 150 cfm, M8	524220	Ea	5	Box	265	8. 4	For use with collective protector; spec: MIL–F–11137.	Shed.
Filter, particulate, 15 cfm, M1	524210	Ea	60	Box	210	11. 9	For use with collective protector	Shed.
Filter, particulate, 30 cfm, M2	524211	Ea	36	Box	200	11. 9	For use with collective protector	Shed.
Filter, particulate, 150 cfm, M3	524212	Ea	10	Box	215	16. 7	For use with collective protector	Shed.
Filter, particulate, 300 cfm, M4	524213	Ea	6	Box	240	17. 2	For use with collective protector	Shed.
Filter, particulate, 600 cfm, M5	524214	Ea	3	Box	265	16. 9	For use with collective protector	Shed.
Filter, particulate, 600 cfm, M6	524215	Ea	3	Box	215	16. 7	For use with collective protector	Shed.
Filter, particulate, 600 cfm, M7	524216	Ea	3	Box	290	20. 0	For use with collective protector	Shed.

Flame thrower, combat vehicle, main armament, M5–4.	440313	Ea	1	None			For installation in M42B1 or M42B3 tank; formerly, flame thrower, mechanized, E12–7R1; spec: MIL–F–10071A.	Open.
Flame thrower, mechanized, M3–4–3.	440318	Ea	1	Crate	1,310	61.6	Packaged in 2 crates; formerly, E4R4–4R5–5R1 model; spec: 96–131–346.	Open.
Flame thrower, mechanized, M3–4–3 alternate.	440309	Ea	1	Crate	1,310	61.6	Packaged in 2 crates; formerly, E4R2–4R3–5R1 model; spec: 96–131–346.	Open.
Flame thrower, mechanized, M6.	440321	Ea	1	Crate	1,310	61.6	Packaged in 2 crates; formerly, M3–4–E6R3 model; drawing D81–1–2136.	Open.
Flame thrower, mechanized, main armament, M7–6.		Ea	1				For installation in T67 flame thrower tank; for use by Marine Corps; spec: 196–131–574.	Open.
Flame thrower, portable, M2A1.	440117	Ea	1	Chest	112	8.2	Spec: MIL–F–11385	Open.
Kit, fuel filling, flame thrower, M10A1.	445903	Ea	1	Box	88	3.6	Spec: MIL–K–3778	Open.
Kit, service, mechanized flame thrower, M3.	445302	Ea	1	Chest	60	2.8	Spec: 96–131–353	Open.
Kit, service, mechanized flame thrower, M14.	445305	Ea	1	Chest	60	2.8	Drawing C81–6–197	Open.
Kit, service, portable flame thrower, M2A1.	445122	Ea	1	Chest	83	3.2	Spec: MIL–S–10749A	Open.
Kit, testing, impregnite in clothing, M1.	539110	Ea	32	Box	62	1.3	Spec: MIL–K–327A	Shed.
Mask, oxygen and protective, horse, M6.	516107	Ea					For use in transportation of horse or mule by air at high altitude.	Shed.

Table XXXV. Class IV Chemical Supplies—Continued
NONEXPENDABLE ITEMS—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Protector, collective, M2	520210	Ea	1	Crate	916	71. 4	Field, semifixed type; packaged in two crates; spec: 197–54–129.	Shed.
Protector, collective, M2A2	520219	Ea	1	Crate	1, 135	53. 5	Skid-mounted; spec: MIL–P–12161.	Shed.
Protector, collective, field, GED, ABC–M6.	520225	Ea	1	Crate	705	37. 1	Gasoline engine driven; spec: MIL–P–10934.	Shed.
Protector, collective, field, EMD, ABC–M6.	520226	Ea	1	Crate	705	37. 1	Electric motor driven; spec: MIL–P–10934.	Shed.
Protector, collective, hospital, six-man, M7.	520518	Ea	1	Box	125	5. 5	Spec: 197–54–541	Shed.
Protector, collective, hospital, six-man, M7A1.	520519	Ea	1	Box	138	5. 7		Shed.
Protector, collective, tank, three-man, M8.	529310	Ea	1	Box	125	5. 0	For use by Army and Marine Corps.	Shed.
Protector, collective, tank, three-man, M8A1.	529311	Ea	1	Box	135	5. 7	For use by Army and Marine Corps.	Shed.
Regulator, air pressure, M1	529210	Ea	2	Box	50	2. 0	For use with collective protector; spec: MIL–R–3295.	Shed.
Respirator, dust, M4	540411	Ea	90	Box	29	1. 6	Spec: MIL–R–3308	Shed.
Respirator, paint spray, M5	545102	Ea	12	Box	70	4. 1	Spec: MIL–R–11148	Shed.
Service unit, flame thrower, combat vehicle, M4.	445306	Ea	1	None	16, 500	1, 656. 0	Mounted on 2½-ton 6 x 6 truck chassis; spec: 96–131–406.	Open.
Valve, antibackdraft, M1	529205	Ea	1	Box	30	1. 6	For use with collective protector; spec: MIL–V–3293.	Shed.

42.1. Class IVA Chemical Supplies

(Added)

Data pertaining to nonexpendable class IVA chemical supplies are given in table XXXV.1. For a listing of Chemical Corps current issue class IVA items of supply see DA Supply Manual CML 3–1.

Table XXXV.1. (Added) Class IVA Chemical Supplies

NONEXPENDABLE ITEMS

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Cover, insulating, for airplane smoke tank, M10.	451210	Ea	2	Box	100	9. 4	Spec: MIL–C–13646	Open.
Mixing and transfer unit, incendiary oil, M3.	635110	Ea	1	Crate	1, 885	129. 0	Spec: MIL–M–12727	Shed.
Mixing and transfer unit, incendiary oil, AN–M3A1.	635111	Ea	1	Crate	2, 030	145. 0		Shed.
Orifice, airplane smoke tank, M2.	452011	Ea	50	Box	14	0. 3	Spec: MIL–O–1352A	Open.
Tank, smoke, airplane, M10.	450210	Ea	1	Crate	177	23. 5	Spec: MIL–S–13610	Open.

43. Class V Chemical Supplies

Data pertaining to class V chemical supplies are given in table XXXVI. Bombs, bomb clusters, and their components are class VA supplies (class V chemical supplies for issue to the Air Force) and are included in table XXXVI for convenience. All class V and VA supplies are expendable except the gun, spray, CN training, Mk I, Mod 1 which is nonexpendable. For a listing of current issue class V and VA supplies (ammunition), see DA Supply Manual CML3–2 and for a listing of ammunition components see DA Supply Manual CML 5–2–7.

Table XXXVI. Class V Chemical Supplies

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Adapter-booster, M115	R14–5–927	Ea	25	Box	115	3.6	Bomb component	Shed.
		Ea	50	Box	200	3.6		
Adapter-booster, AN–M115A1	R14–5–928	Ea	50	Box	200	3.6	Bomb component; spec: MIL–A–12027A.	Shed.
Adapter-booster, M119	B14–5–1133	Ea	50	Box	101	2.1	Bomb component; spec: MIL–A–12023A.	Shed.
Adapter-booster, holder, loading, assembly, M115.	R14–5–672	Ea	6	Box	78	1.2	Bomb component; shipped complete, or adapter-booster and holder shipped separately.	Shed.
Adapter-booster, holder, loading, assembly, M115A1.	R14–5–971	Ea	6	Box	78	1.2	Bomb component; shipped complete, or adapter-booster and holder shipped separately; spec: MIL–A–12027.	Shed.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, fire, 750-lb, M116 (less filling).	250373						Not packaged as complete end item; assembled and filled in field with NP, NP2, or OT incendiary oil.	
Components:								
1 Bomb, fire, 750-lb unfilled, less fuzing components, M116.	R14-23-1483	Ea	1	Crate	160	31.5		Open.
2 Wire, arming, M17	R14-5-2149						Packed in crate with empty bomb. (See separate listing.)	
2 Igniter, fire bomb, WP, less fuze, AN-M23A1 or	B14-5-2151						(See separate listing.)	
2 Igniter, fire bomb, WP, less fuze, M23.	B14-5-805						(See separate listing.)	
2 Fuze, igniter, fire bomb, AN-M173A1 or	B14-15-636						(See separate listing.)	
2 Fuze, igniter, fire bomb, M173.	B14-15-281						(See separate listing.)	

Bomb, fire, 750-lb, M116A1 (less filling).	250374						Not packaged as complete end item; assembled and filled in field with NP, NP2, or OT incendiary oil.	
Components:								
1 Bomb, fire, 750-lb, unfilled, less fuzing components, M116A1.		Ea	1	Crate	160	31.5		Open.
2 Wire, arming, M17	R14-5-2149						Packed in crate with empty bomb. (See separate listing.)	
2 Igniter, fire bomb, WP, less fuze, AN-M23A1 or	B14-5-2151						(See separate listing.)	
2 Igniter, fire bomb, WP, less fuze, AN-M23.	B14-5-805						(See separate listing.)	
2 Fuze, igniter, fire bomb, AN-M173A1 or	B14-15-636						(See separate listing.)	
2 Fuze, igniter, fire bomb, AN-M173.	B14-15-281						(See separate listing.)	
Bomb, gas, AC, 1,000-lb, AN-M79	350167						Not packaged as complete end item; components shipped separately.	

Components:								
1 Adapter-booster, M115A1 or	R14–5–928						(See separate listing.)	
1 Adapter-booster, M115	R14–5–927						(See separate listing.)	
1 Bomb, gas, AC, 1,000-lb, less fuzing components, AN–M79.	R14–5–1366	Ea	1	None	719	17. 5	Packed in shipping bands	Open.
1 Burster, AN–M16	E14–5–938						(See separate listing.)	
1 Fin assembly, AN–M113A1 or	C14–5–922						Requires nut, fin lock, M2; packed 15 nuts per box. (See separate listing.)	
1 Fin assembly, M113	R14–5–1365						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103A1 or	R14–15–72							
1 Fuze, bomb, nose, AN–M103.	R14–15–379						Instantaneous fuze, M163, M164, M165, AN–M139A1, or AN–M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M162 or	R14–15–381						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	
1 Fuze, bomb, tail, AN–M102A2.	R14–15–380						(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14–15–369						(See separate listing.)	
1 Wire, arming, AN–M7A1 or	R14–5–1277						(See separate listing.)	
1 Wire, arming, M7	R14–5–924						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, gas, CG, 500-lb, AN–M78	310142						Not packaged as complete end item; components shipped separately.	
Components:								
1 Adapter-booster, M115A1 or	R14–5–928						(See separate listing.)	
1 Adapter-booster, M115	R14–5–927						(See separate listing.)	
1 Bomb, gas, CG, 500-lb, less fuzing components, AN–M78.	R14–5–1362	Ea	1	None	492	10.1	Packed in shipping bands	Open.
1 Burster, AN–M15	E14–5–1362						(See separate listing.)	
1 Fin assembly, AN–M109A1 or	D14–5–673						(See separate listing.)	
1 Fin assembly, M109	R14–5–1364						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103A1 or	R14–15–72						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103.	R14–15–379						Instantaneous fuze, M163, M164, M165, AN–M139A1, or AN–M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M161 or	R14–15–372						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	

1 Fuze, bomb, tail, AN–M101A1 or	R14–15–382						(See separate listing.)	
1 Fuze, bomb, tail, AN–M101A2.	R14–15–71						(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14–15–369						(See separate listing.)	
1 Wire, arming, AN–M7A1 or	R14–5–1277						(See separate listing.)	
1 Wire, arming, M5	R14–5–671						(See separate listing.)	
Bomb, gas, CG, 1,000-lb, AN–M79	310167						Not packaged as complete end item; components shipped separately.	
Components:								
1 Adapter-booster, M115A1 or	R14–5–928						(See separate listing.)	
1 Adapter-booster, M115	R14–5–927						(See separate listing.)	
1 Bomb, gas, CG, 1,000-lb, less fuzing components, AN–M79.	R14–5–1362	Ea	1	None	939	17. 5	Packed in shipping bands	Open.
1 Burster, AN–M16	E14–5–938						(See separate listing.)	
1 Fin assembly, AN–M113A1 or	C14–5–922						(See separate listing.)	
1 Fin assembly, M113	R14–5–1365						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103A1 or	R14–15–72						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103	R14–15–379						Instantaneous fuze, M163, M164, M165, AN–M139A1, or AN–M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M162 or	R14–15–381						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, gas, CG, 1,000-lb, AN-M79—Continued								
Components—Continued								
1 Fuze, bomb, tail, M102A2	R14-15-380						(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14-15-369						(See separate listing.)	
1 Wire, arming, AN-M7A1 or	R14-5-1277						(See separate listing.)	
1 Wire, arming, M7	R14-5-924						(See separate listing.)	
Bomb, gas, CK, 500-lb, AN-M78	350242						Not packaged as complete end item; components shipped separately.	
Components:								
1 Adapter-booster, M115A1 or	R14-5-928						(See separate listing.)	
1 Adapter-booster, M115	R14-5-927						(See separate listing.)	
1 Bomb, gas, CK, 500-lb, less fuzing components, AN-M78.	R14-5-944	Ea	1	None	463	10.1	Packed in shipping bands	Open.
1 Burster, AN-M15	E14-5-937						(See separate listing.)	
1 Fin assembly, AN-M109A1	D14-5-673						(See separate listing.)	
1 Fin assembly, M109	R14-5-1364						(See separate listing.)	
1 Fuze, bomb, nose, AN-M103A1 or	R14-15-72						(See separate listing.)	

1 Fuze, bomb, nose, AN–M103	R14–15–379						Instantaneous fuze, M163, M164, M165, AN–M139A1, or AN–M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M161 or	R14–15–372						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	
1 Fuze, bomb, tail, AN–M101A1 or	R14–15–382						(See separate listing.)	
1 Fuze, bomb, tail, AN–M101A2.	R14–15–71						(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14–15–369						(See separate listing.)	
1 Wire, arming, AN–M7A1 or	R14–5–1277						(See separate listing.)	
1 Wire, arming, M5	R14–5–671						(See separate listing.)	
Bomb, gas, CK 1,000-lb, AM–M79	350267						Not packaged as complete end item; components shipped separately.	
Components:								
1 Adapter-booster, M115A1 or	R14–5–928						(See separate listing.)	
1 Adapter-booster, M115	R14–5–927						(See separate listing.)	
1 Bomb, gas, CK, 1,000-lb, less fuzing components, AN–M79.	R14–5–945	Ea	1	None	875	17.5	Packed in shipping bands. (See separate listing.)	Open.
1 Burster, AN–M16	E14–5–938						(See separate listing.)	
1 Fin assembly, AN–M113A1 or	C14–5–922						(See separate listing.)	
1 Fin assembly, M113	R14–5–1365						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, gas, CK 1,000-lb, AM–M79—Continued								
Components—Continued								
1 Fuze, bomb, nose, AN–M103A1 or	R14–15–72						(See separate listing.)	
1 Fuze, bomb, nose, AN–M103.	R14–15–379						Instantaneous fuze, M163, M164, M165, AN–M139A1, or AN–M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M162 or	R14–15–381						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	
1 Fuze, bomb, tail, AN–M102A2.	R14–15–380						(See separate listing.)	
1 Prime-detonator, non-delay, M14.	R14–15–369						(See separate listing.)	
1 Wire, arming, AN–M7A1 or	R14–5–1277						(See separate listing.)	
1 Wire, arming, M7	R14–5–924						(See separate listing.)	
Bomb, gas, persistent, H, 115-lb, M70.	320125						Not packaged as complete end item; components shipped separately.	

Components:								
1 Bomb, gas, persistent, H, 115-lb, less fuzing components, M70.	R14–5–943	Ea	1	None	135	3. 9	Packed in shipping bands. (See separate listing.)	Open.
1 Burster, M10	B14–5–947						(See separate listing.)	
1 Fin assembly, AN–M103A1 or	R14–5–948						(See separate listing.)	
1 Fin assembly, AN–M102 or	R14–5–949						(See separate listing.)	
1 Fin assembly, AN–M102A1	R14–5–936						(See separate listing.)	
1 Fuze, bomb, nose, AN–M158 or	R14–15–378						(See separate listing.)	
1 Fuze, bomb, nose, AN–M110A1.	R14–15–371						(See separate listing.)	
1 Wire, arming, M2	R14–5–923						One arming wire packed with AN–M102 or AN–M102A1 fin assembly or may be shipped separately. (See separate listing.)	
Bomb, gas, persistent, HD, 115-lb, M70A1.	320325						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, gas, persistent, HD, 115-lb, less fuzing components, M70A1.	R14–5–942	Ea	1	None	135	3. 9	Packed in shipping bands; spec: MIL–B–12654.	Open.
1 Burster, M10	B14–5–947						(See separate listing.)	
1 Fin assembly, AN–M103A1 or	R14–5–948						(See separate listing.)	
1 Fin assembly, AN–M102 or	R14–5–949						(See separate listing.)	
1 Fin assembly, AN–M102A1	R14–5–936						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, gas, persistent, HD, 115-lb, M70A1—Continued								
Components—Continued								
1 Fuze, bomb, nose, AN–M158 or	R14–15–378						(See separate listing.)	
1 Fuze, bomb, nose, AN–M110A1.	R14–15–371						(See separate listing.)	
1 Wire, arming, M2	R14–5–923						One arming wire packed with AN–M102 or AN–M102A1 fin assembly, or may be shipped separately. (See separate listing.)	
Bomb, gas, persistent, HD, 125-lb, M113.	320330						Not packaged as complete end item; components shipped separately.	
Components:								
1 Adapter-booster, M119	B14–5–1133						(See separate listing.)	
1 Bomb, gas, persistent, HD, 125-lb, less fuzing components, M113.	D14–5–1142	Ea	1	None	148	3.9	Packed in shipping bands; spec: MIL–B–12860.	Open.
1 Burster, M25	B14–5–1081						(See separate listing.)	
1 Fin assembly, M125A1 or	R14–5–1519						(See separate listing.)	
1 Fin assembly, M125	C14–5–956						(See separate listing.)	

1 Fuze, bomb, nose, AN-M103A1 or	R14-15-72						(See separate listing.)	
1 Fuze, bomb, nose, AN-M103.	R14-15-379						Instantaneous fuze, M163, M164 M165, AN-M139A1, or AN-M140A1 may be used. (See separate listing.)	
1 Fuze, bomb, tail, M160 or	R14-15-412						Requires longer air arming time; alternate tail fuzes may be used. (See separate listing.)	
1 Fuze, bomb, tail, AN-M100A2.	R14-15-413						(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14-15-369						(See separate listing.)	
1 Wire, arming, AN-M1A2 or	R14-5-1515						(See separate listing.)	
1 Wire, arming, M1A1	R14-5-1514						(See separate listing.)	
Bomb, incendiary, IM, 100-lb, AN-M47A3 (with AN-M12 burster and no igniter).	250332						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, incendiary, IM, 100-lb, less fuzing components, AN-M47A3.	R14-5-682	Ea	1	Box	118	3.8		Open.
1 Burster, AN-M12	B14-5-315						(See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-15-256						(See separate listing.)	
1 Fuze, bomb, nose, AN-M126A1	R14-15-69						(See separate listing.)	
1 Wire, arming, M2 or	R14-5-923						(See separate listing.)	
1 Wire, arming, C5	R14-5-1518						(See separate listing.)	

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Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, incendiary, IM, 100-lb, AN-M47A4 (with AN-M12 burster and no igniter).	250343						Not packaged as complete end item; components shipped separately; drawing: C14-5-651.	
Components:								
1 Bomb, incendiary, IM, 100-lb, less fuzing components, AN-M47A4.	R14-5-730	Ea	1	Box	118	3.8		Open.
1 Burster, AN-M12	B14-5-315						(See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-15-256						(See separate listing.)	
1 Fuze, bomb, nose, AN-M126A1.	R14-15-69						(See separate listing.)	

1 Wire, arming, M2 or	R14-5-923						(See separate listing.)	
1 Wire, arming, C5	R14-5-1518						(See separate listing.)	
Bomb, incendiary, instructional, TH3, M1A1.	250111	Ea	24	Box	43	.8	4 bombs packed in carton; 6 cartons per box; spec: 96-131-58.	Shed.
Bomb, incendiary, instructional, TH3, M2.	250210	Ea	24	Box	65	.8	4 bombs packed in carton; 6 cartons per box; spec: 96-131-66.	Shed.
Bomb, incendiary, instructional, TH3, M2A1.	250211	Ea	24	Box	65	.8	4 bombs packed in carton; 6 cartons per box; spec: 96-131-66.	Shed.
Bomb, incendiary, NP, 100-lb, AN-M47A3 (with AN-M12 burster and no igniter).	250335						Not packaged as complete end item; components shipped separately; drawing: C14-5-651.	
Components:								
1 Bomb, incendiary, NP, 100-lb, less fuzing components, AN-M47A3.	R14-5-683	Ea	1	Box	118	3.8		Open.
1 Burster, AN-M12	R14-5-315						(See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-5-256						(See separate listing.)	
1 Fuze, bomb, nose, AN-M126A1.	R14-15-69						(See separate listing.)	
1 Wire, arming, M2 or	R14-5-923						(See separate li ting.)	
1 Wire, arming, C5	R14-5-1518						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, incendiary, NP, 100-lb, AN-M47A4 (with AN-M12 burster and no igniter).	250338						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, incendiary, NP, 100-lb, less fuzing components, AN-M47A4.	R14-5-729	Ea	1	Box	118	3.8		Open
1 Burster, AN-M12	B14-5-315						(See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-15-256						(See separate listing.)	
1 Fuze, bomb, nose, AN-M126A1.	R14-15-69						(See separate listing.)	
1 Wire, arming, M2 or	R14-5-923						(See separate listing.)	
1 Wire, arming, C5	R14-5-1518						(See separate listing.)	

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Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, incendiary, oil, IM, 6-lb, AN-M69.	250902	Ea Ea	25 20	Drum Box	225 157	8.3 3.5	Component of bomb cluster; normally packed, shipped, and stored in clusters; spec: MIL-B-11643.	Open.
Bomb, incendiary, oil, NP, 6-lb, AN-M69.	250905	Ea Ea	25 20	Drum Box	225 -------	8.3 -------	Component of bomb cluster; normally packed, shipped, and stored in clusters; spec: MIL-B-11643.	Open.

Bomb, incendiary, oil, IM, 6-lb, AN-M69A1.	R14-5-1512	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored in clusters.	Open.
Bomb, incendiary, oil, NP, 6-lb, AN-M69A1.	R14-5-1513	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored in clusters.	Open.
Bomb, incendiary, oil, IM, 6-lb, M69X.	R14-5-703	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored in clusters.	Open.
Bomb, incendiary, oil, NP, 6-lb, M69X.	R14-5-696	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored in clusters.	Open.
Bomb, incendiary, PT1, 10-lb, M74.	250903	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored n clusters; spec: MIL-B-10084.	Open.
Bomb, incendiary, PT1, 10-lb, M74A1.	----	----	----	----	----	----	Component of bomb cluster; normally packed, shipped, and stored in clusters; drawing: D14-5-2154.	
Bomb, incendiary, PT1, 100-lb, AN-M47A4 (with AN-M12 burster and no igniter).	250700	----	----	----	----	----	Not packaged as complete end item; components shipped separately; drawing: C14-5-651.	
Components:								
1 Bomb, incendiary, PT1, 100-lb, less fuzing components, AN-M47A4.	R14-5-935	Ea	1	Box	138	3.8	----	Open.
1 Burster, AN-M12	B14-5-935	----	----	----	----	----	(See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-15-256	----	----	----	----	----	(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
1 Fuze, bomb, nose, AN-M126A1.	R14–15–69						(See separate listing.)	
1 Wire, arming, M2 or	R14–5–923						(See separate listing.)	
1 Wire, arming, C5	R14–5–1518						(See separate listing.)	

Bomb, incendiary, PT1, 500-lb, AN-M76.	250372						Not packaged as complete end item; components shipped separately; drawing: C14-5-741.	
Components:								
1 Adapter-booster, holder, loading, assembly, M115A1 or	R14-5-971						(See separate listing.)	
1 Adapter-booster, holder, loading, assembly, M115 or	R14-5-672						(See separate listing.)	
1 Adapter-booster, AN-M115A1 or	R14-5-928						(See separate listing.)	
1 Adapter-booster, M115	R14-5-927						(See separate listing.)	
1 Bomb, incendiary, PT1, 500-lb, less fuzing components, AN-M76.	R14-5-772	Ea	1	None	447	9.6	Packed in shipping bands.	Open.
1 Burster, AN-M14	R14-5-573						(See separate listing.)	
1 Fin assembly, M109A1	D14-5-673						(See separate listing.)	
1 Fuze, bomb, nose, M163 or	R14-15-373						(See separate listing.)	
1 Fuze, bomb, nose, AN-M103A1 or	R14-15-72						(See separate listing.)	
1 Fuze, bomb, nose, AN-M103.	R14-15-379						(See separate listing.)	
1 Fuze, bomb, tail, M161 or	R14-15-372						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, incendiary, PT1, 500-lb, AN-M76—Continued.								
Components—Continued								
1 Fuze, bomb, tail, AN-M101A1 or	R14-15-382	------	------	------	------	------	(See separate listing.)	
1 Fuze, bomb, tail, AN-M101A2.	R14-15-71	------	------	------	------	------	(See separate listing.)	
1 Primer-detonator, non-delay, M14.	R14-15-369	------	------	------	------	------	(See separate listing.)	
1 Igniter, AN-M5	C14-5-734	------	------	------	------	------	(See separate listing.)	
1 Wire, arming, AN-M7A1 or	R14-5-1277	------	------	------	------	------	(See separate listing.)	
1 Wire, arming, M5	R14-5-671	------	------	------	------	------	(See separate listing.)	
Bomb, incendiary, TH3, 4-lb, AN-M50A2.	250901	Ea	25	Drum	117	3.0	Component of bomb cluster; normally packed, shipped, and stored in clusters; spec: 96-131-273.	Open.
		Ea	20	Box	88	1.7		
Bomb, incendiary, TH3, 4-lb, AN-M50A3.	250904	Ea	25	Drum	117	3.0	Component of bomb cluster: normally packed, shipped, and stored in clusters; spec: MIL-B-11392.	Open.
		Ea	20	Box	88	1.7		

Bomb, incendiary, TH3, 4-lb, AN–M50X–A3.	C14–5–271						Component of bomb cluster; normally packed, shipped, and stored in clusters.	Open.
Bomb, smoke, PWP, 100-lb, AN–M47A3.	210121						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, smoke, PWP, 100-lb, less fuzing components, AN–M47A3.	R14–5–953	Ea	1	Box	153	3. 7		Open.
1 Burster, AN–M20	B14–5–892						(See separate listing.)	
1 Fuze, bomb, nose, AN–M159 or	R14–15–256						(See separate listing.)	
1 Fuze, bomb, nose, AN–M126A1.	R14–15–69						(See separate listing.)	
1 Wire, arming, M2 or	R14–5–923						(See separate listing.)	
1 Wire, arming, C5	R14–5–1518						(See separate listing.)	
Bomb, smoke, PWP, 100-lb, AN–M47A4.	210122						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, smoke, PWP, 100-lb, less fuzing components, AN–M47A4.	C15–5–883	Ea	1	Box	153	3. 7		Open.
1 Burster, AN–M20	B14–5–892						(See separate listing.)	
1 Fuze, bomb, nose, AN–M159 or	R14–15–256						(See separate listing.)	
1 Fuze, bomb, nose, AN–M126A1.	R14–15–69						(See separate listing.)	
1 Wire, arming, M2 or	R14–5–923						(See separate listing.)	
1 Wire, arming, C5	R14–5–1518						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Bomb, smoke, WP, 100-lb, AN-M47A4.	210123						Not packaged as complete end item; components shipped separately.	
Components:								
1 Bomb, smoke, WP, 100-lb, less fuzing components, AN-M47A4.	R14-5-1361	Ea	1	Box	179	3.7		Open.
1 Burster, M18 or	R14-5-931						For low altitude. (See separate listing.)	
1 Burster, AN-M4	R14-5-917						For high altitude. (See separate listing.)	
1 Fuze, bomb, nose, AN-M159 or	R14-15-256						(See separate listing.)	
1 Fuze, bomb, nose, AN-M126A1.	R14-15-69						(See separate listing.)	
1 Wire, arming, M2 or	R14-5-923						(See separate listing.)	
1 Wire, arming, C5	R14-5-1518						(See separate listing.)	
Burster, AN-M4	R14-5-917	Ea	50	Box	155	2.9	Bomb component; for high altitude.	Open.
Burster, C8R1 (with fuze, bomb, M157).	R4-6-96	Ea	50	Box	54	1.3	Igniter component; spec: JAN-B-349.	Open.
Burster, AN-M12	B14-5-315	Ea	20	Box	54	1.2	Bomb component; spec: 96-131-112.	Open.

Burster, AN–M13	B14–5–500	Ea	100	Box	41	1. 1	Bomb component; spec: MIL–B–11780.	Open.
Burster, AN–M14	R14–5–573	Ea	20	Box	74	2. 0	Bomb component	Open.
Burster, AN–M15	E14–5–937	Ea	25	Box	107	20. 6	Bomb component; spec: MIL–B–11439.	Open
		Ea	12	Box	70	1. 7		
Burster, AN–M16	E14–6–938	Ea	8	Box	65	1. 5	Bomb component	Open.
Burster, AN–M18	R14–5–931	Ea	50	Box	120	2. 9	Bomb component; for low altitude.	Open.
Burster, AN–M20	B14–5–892	Ea	50	Box	155	2. 7	Bomb component; spec: MIL–B–11007A.	Open.
Burster, M10	B14–5–947	Ea	50	Box	155	2. 9	Bomb component	Open.
Burster, M25	B14–5–1081	Ea	50	Box	85	2. 0	Bomb component; spec: MIL–B–12380.	Open.
Candle, smoke, oil, SGF2, M6	215519	Ea	16	Box	35	. 8	For Navy use; spec: MIL–C–11141.	Shed.
Canister, smoke, HC, 105-mm shell, M1.	216460	Ea	48	Box	129	1. 4	Component of ordnance artillery shell; spec: MIL–C–3119.	Shed.
Canister, smoke, HC, 155-mm shell, M1.	216480	Ea	24	Box	181	2. 1	Component of ordnance artillery shell; packed 18 M1 and 6 M2 canisters (216485) in box; spec: MIL–C–3120.	Shed.
Canister, smoke, HC, 155-mm shell, M2.	216485	Ea	24	Box	181	2. 1	Component of ordnance artillery shell; packed 6 M2 and 18 M1 canisters (216480) in box; spec: MIL–C–3121.	Shed.
Canister, smoke, green, 105-mm shell, M2.	226210	Ea	48	Box	93	1. 4	Component of ordnance artillery shell; spec: MIL–C–3298.	Shed.
Canister, smoke, red, 105-mm shell, M2.	226410	Ea	48	Box	93	1. 4	Component of ordnance artillery shell; spec: MIL–C–3298.	Shed.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Canister, smoke, violet, 105-mm shell, M2.	226510	Ea	48	Box	93	1. 4	Component of ordnance artillery shell; spec: MIL–C–3298.	Shed.
Canister, smoke, yellow, 105-mm shell, M2.	226610	Ea	48	Box	93	1. 4	Component of ordnance artillery shell; spec: MIL–C–3298.	Shed.
Canister, smoke, green, 155-mm shell, M3.	226220	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 18 M3 and 6 M4 canisters (226230) in box; spec: MIL–C–3299.	Shed.
Canister, smoke, red, 155-mm shell, M3.	226220	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 18 M3 and 6 M4 canisters (226430) in box; spec: MIL–C–3299.	Shed.
Canister, smoke, violet, 155-mm shell, M3.	226520	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 18 M3 and 6 M4 canisters (226530) in box; spec: MIL–C–3299.	Shed.
Canister, smoke, yellow, 155-mm shell, M3.	226620	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 18 M3 and 6 M4 canisters (226630) in box; spec: MIL–C–3299.	Shed.

Canister, smoke, green, 155-mm shell, M4.	226230	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 6 M4 and 18 M3 canisters (226220) in box; spec: MIL–C–3297.	Shed.
Canister, smoke, red, 155-mm shell, M4.	226430	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 6 M4 and 18 M3 canisters (226420) in box; spec: MIL–C–3297.	Shed.
Canister, smoke, violet, 155-mm shell, M4.	226530	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 6 M4 and 18 M3 canisters (226520) in box; spec: MIL–C–3297.	Shed.
Canister, smoke, yellow, 155-mm shell, M4.	226630	Ea	24	Box	130	2. 1	Component of ordnance artillery shell; packed 6 M4 and 18 M3 canisters (226630) in box; spec: MIL–C–3297.	Shed.
Canister, smoke, WP, 5-inch projectile, M5.	216101	Ea					Component of Navy projectile.	Shed.
Capsule, CN	337110	Ea	1, 250	Box	17	.7	Packed 50 per can, 25 cans per box; for training purposes.	Shed.
		Ea	1, 250	Box	49	1. 0	Packed 50 per bottle, 25 bottles per box; for training purposes; spec: MIL–C–10777A.	
Cartridge, ignition, M2	R14–23–1154	Ea					Bomb cluster component spec: 96–81–217.	Shed.
Chloroacetophenone, CN	334110	Lb	374	55-gal drum.	384	13. 1	Spec: MIL–C–10338A	Open.
Chlorine, Cl	314210	Lb	1, 855	1-ton container.	3, 455	42. 7	Type A container; for training purposes; spec: 4–1.	Open.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Cluster, aimable, incendiary bomb, AN–M14 (500-lb).	251135						Not packaged as complete end item; 104 AN–M50T–A2 and AN–M50X–A3 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, AN–M14.	C14–23–453	Ea	1	Crate	562	12. 9	Round crate	Open.
		Ea	1	Box	625	17. 5	Box also contains fin, adapter, C3.	Open.
1 Fin, adapter, C3	C14–5–235						(See separate listing.)	
1 Fuze, bomb, nose, mechanical, time, AN–M145.	R14–15–231						(See separate listing.)	
1 Wire, arming, C1	B14–5–1516						(See separate listing.)	
Cluster, aimable, incendiary bomb AN–M14A1 (500-lb).	251186						Not packaged as complete end item; 88 AN–M50T–A2 and 22 AN–M50T–X–A3 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, AN–M14A1.	C14–23–591	Ea	1	Crate	625	12. 9	Round crate	Open.
1 Fin, adapter, C3	C14–5–235							
1 Fuze, bomb, nose, mechanical time, AN–M145.	R14–15–231							
1 Wire, arming, C1	R14–5–1516							

Cluster, aimable, incendiary bomb, IM, AN–M19A2 (500-lb).	251351						Not packaged as complete end item; 38 IM AN–M69A1 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, IM, less fuzing components, M19A2.		Ea	1	Drum	605	20. 8		Open.
1 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						(See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, aimable, incendiary bomb, IM, M19 (500-lb).	251313						Not packaged as complete end item; 38 IM AN–M69 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, IM, less fuzing components, M19.	R14–23–464	Ea	1	Drum	605	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, aimable, incendiary bomb, IM, M21 (500-lb).	251344						Not packaged as complete end item; 38 IM M69X bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, IM, less fuzing components; M21.	R14–23–601	Ea	1	Drum	650	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Cluster, aimable, incendiary bomb, M22 (500-lb).	251346						Not packaged as complete end item; 110 AN–M50A2 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, M22.	C14–23–730	Ea	1	Crate	562	12. 9	Round crate	Open.
		Ea	1	Box	625	17. 5	Box also contains fin, adapter, C3; spec: MIL–C–10779A.	Open.
1 Fin, adapter, C3	C14–5–235							
1 Fuze, bomb, nose, mechanical time, AN–M145.	R14–15–231							
1 Wire, arming, C1	R14–5–1516							
Cluster, aimable, incendiary bomb, M22A1 (500–lb).	251347						Not packaged as complete end item; 110 AN–M50A3 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, M22A1.	C14–23–949	Ea	1	Crate	562	12. 9	Round crate	Open.
		Ea	1	Box	625	17. 5	Box also contains fin, adapter, C3; spec: MIL–C–10322A.	Open.
1 Fin, adapter, C3	C14–5–235						(See separate listing.)	
1 Fuze, bomb, nose, mechanical time, AN–M145.	R14–15–231						(See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	

Cluster, aimable, incendiary bomb, NP, 500-lb, M19A2.	251356						Not packaged as complete end item; 38 NP AN–M69A1 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incenidary bomb, NP, less fuzing components, M19A2.		Ea	1	Drum	605	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, aimable, incendiary bomb, NP, M19 (500-lb).	251303						Not packaged as complete end item; 38 NP AN–M69 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, M19.	R14–23–465	Ea	1	Drum	605	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, aimable, incendiary bomb, NP, M21 (500-lb).	251342						Not packaged as complete end item; 38 NP M69X bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, M21.	C14–23–599	Ea	1	Drum	650	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Cluster, aimable, incendiary bomb, PT1, M20 (500-lb).	251304						Not packaged as complete end item; 38 PT1 M74 bombs; components shipped separately.	
Components:								
1 Cluster, aimable, incendiary bomb, less fuzing components, M20.	C14–23–458	Ea	1	Drum	692	20. 8		Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, aimable, incendiary bomb, PT1, M20A1 (500-lb).	251345						Not packaged as complete end item; 38 PT1 M74 bombs.	
Components:								
1 Cluster, aimable, incendiary bomb, PT1, less fuzing components, M20A1.	C14–23–695	Ea	1	Drum	692	20. 8	Spec: MIL–C–10106A	Open.
2 Fuze, bomb, tail, mechanical time, M152.	R14–15–368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14–5–1517						(See separate listing.)	
Cluster, incendiary bomb, M12 (100-lb).	251312	Ea	1	Drum	133	3. 2	14 NP or IM AN–M69 bombs; packed and shipped as complete round.	Shed.

Cluster, incendiary bomb, 500-lb, M32.	251187						Not packaged as complete end item; 108 AN-M50A3 bombs; components shipped separately.	
Components:								
3 cartridge, ignition, M2	R14-23-1154						(See separate listing.)	
1 Cluster, incendiary bomb, less fuzing components, M32.	R14-23-1152	Ea	1	None	592	11.6	Packed in shipping bands; spec: MIL-C-11202.	Open.
1 Fin, 500-lb cluster, M7	R14-23-1153						Includes 38 inches of detonating cord. (See separate listing).	
2 Fuze, bomb, tail, mechanical time, M152.	R14-15-368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4	R14-5-1517						(See separate listing.)	
Cluster, incendiary bomb, PT1, 500-lb, M31.	251348						Not packaged as complete end item; 38 PT1 M74 bombs; components shipped separately.	
Components:								
3 Cartridge, ignition, M2	R14-23-1154						(See separate listing.)	
1 Cluster, incendiary bomb, PT1, less fuzing components, M31.	R14-23-1153	Ea	1	None	537	10.9	Packed in shipping bands	Open.
1 Fin, 500-lb cluster, M7	R14-23-1153						Includes 38 inches of detonating card. (See separate listing.)	
2 Fuze, bomb, tail, mechanical time, M152	R14-15-368						One long and one short delay. (See separate listing.)	
1 Wire, arming, C4							(See separate listing.)	
CN solution, CNB	334310	Lb	445	55-gal drum.	555	13.1	Spec: MIL-G-10620A	Open.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
CN solution, CNC	334510	Lb	580	55-gal drum.	693	13. 1	Spec: MIL–C–10371A	Open.
CN solution, CNS	444210	Lb	583	55-gal drum.	693	13. 1	Spec: MIL–C–10619	Open.
Cresylic acid	136255	Lb	10	1-gal can	10	. 2	Peptizer for thickened fuel below 60° F.	Shed.
Cresylic acid	139590	Lb	414	55-gal drum.	524	13. 1	Peptizer for thickened fuel below 60° F.	Open.
Cyanogen chloride, CK	354210	Lb	1, 600	1-ton container.	3, 200	42. 7	Type A container; spec: MIL–C–10463A.	Open.
Cylinder, ignition portable flame thrower, M1.	446104	Ea	100	Box	52	1. 2	Spec: MIL–C–11525A	Shed.
Diphenylaminechlorarsine, DM	344210	Lb	284	55-gal drum.	384	13. 1	Spec: MIL–D–11772A	Open.
Diphenylchlorarsine, DA	344110	Lb	284	55-gal drum.	384	13. 1		Open.
Fin, adapter, C3	C14–5–235	Ea	1	Box	18	1. 3	Bomb cluster component	Open.
Fin assembly, AN–M102	R14–5–949	Ea	8	Box	47	5. 0	Bomb component; packed in carton with 1 arming wire, 8 cartons per box; requires nut, fin lock, assembly, M1, packed 20 per box.	Open.

Fin assembly, AN–M102A1	R14–5–936	Ea	8	Box		4. 3	Bomb component; requires nut, fin lock, assembly, M1, packed 20 per box.	Open.
Fin assembly, AN–M103A1	R14–5–948	Ea	8	Box	80	5. 2	Bomb component; requires nut, fin lock, assembly, M1, packed 20 per box; spec: MIL–F–12032A.	Open.
Fin assembly, M109	R14–5–1364	Ea	1	Box	29	1. 6	Bomb component	Open.
Fin assembly, AN–M109A1	D14–5–673	Ea	1	Box	29	1. 6	Bomb component; requires nut, fin lock, assembly, M2, packed 15 per box; spec: MIL–F–12025A.	Open.
Fin assembly, M113	R14–5–1365	Ea	1	Box	46	3. 9	Bomb component	Open.
Fin assembly, AN–M113A1	C14–5–922	Ea	1	Box	56	3. 9	Bomb component; also packed in metal crate; requires nut, fin lock, assembly, M2, packed 15 per box; spec: MIL–F–12026A.	Open.
Fin assembly, M125	C14–5–956	Ea	8	Box	67	4. 6	Bomb component; packed in carton with 1 arming wire, 8 cartons per box; spec: MIL–F–12891.	Open.
Fin assembly, M125A1	R14–5–1519	Ea	8	Box	67	4. 6	Bomb component; spec: MIL–F–12891.	Open.
Fin, 500-lb cluster, M7	R14–23–1153	Ea	1	Box	32	1. 8	Bomb cluster component; includes 38 inches of detonating cord; spec: MIL–F–11404.	Open.
Fuze, bomb, M157, and Burster, C8R1.	R4–6–96	Ea	50	Box	54	1. 3	Igniter component; spec: MIL–F–1282A.	Shed.
Fuze, bomb, nose, AN–M103	R14–15–379	Ea	25	Box	138	2. 2	Bomb component	Shed.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Fuze, bomb, nose, AN–M103A1	R14–15–72	Ea	25	Box	138	2. 2	Bomb component	Shed.
		Ea	9	Box	52	. 9		
Fuze, bomb, nose, AN–M110A1	R14–15–371	Ea	48	Box	77	1. 7	Bomb component	Shed.
		Ea	24	Box	53	1. 3		
Fuze, bomb, nose, AN–M126A1	R14–15–69	Ea	50	Box	110	2. 3	Bomb component	Shed.
		Ea	48	Box	80	1. 5		
		Ea	24	Box	54	1. 2		
Fuze, bomb, nose, AN–M158	R14–15–378	Ea	30	Box	58	1. 6	Bomb component	Shed.
Fuze, bomb, nose, AN–M159	R14–15–256	Ea	30	Box	56	1. 5	Bomb component; spec: MIL-F-12978.	Shed.
Fuze, bomb, nose, M163	R14–15–373	Ea	25	Box	138	2. 2	Bomb component	Shed.
		Ea	9	Box	52	. 9		
Fuze, bomb, nose, mechanical time, AN–M145.	R14–15–231	Ea	15	Box	49	1. 3	Bomb cluster component	Shed.
Fuze, bomb, tail, AN–M100A2	R14–15–413	Ea	25	Box	119	2. 5	Bomb component	Shed.
Fuze, bomb, tail, AN–M101A1	R14–15–382	Ea	25	Box	132	2. 9	Bomb component	Shed.
Fuze, bomb, tail, AN–M101A2	R14–15–71	Ea	25	Box	132	2. 9	Bomb component	Shed.
Fuze, bomb, tail, AN–M102A2	R14–15–380	Ea	25	Box	149	3. 5	Bomb component	Shed.
Fuze, bomb, tail, mechanical time, M152.	R14–15–368	Ea	15	Box	54	1. 3	Bomb cluster component	Shed.
Fuze, bomb, tail, M160	R14–15–412	Ea	25	Box	119	2. 5	Bomb component	Shed.
		Ea	9	Box	44	1. 1		
Fuze, bomb, tail, M161	R14–15–372	Ea	25	Box	132	2. 9	Bomb component	Shed.
		Ea	9	Box	49	1. 3		

Fuze, bomb, tail, M162	R14–15–381	Ea	25	Box	149	3. 5	Bomb component	Shed.
		Ea	9	Box	56	1. 5		
Fuze, floating smoke pot, M208	B36–7–9	Ea	200	Box	61	2. 1	Smoke pot component; spec: MIL–F–11522B.	Shed.
Fuze, floating smoke pot, electric, M209.	B36–7–25	Ea	300	Box	76	1. 2	Smoke pot component; one fuze per 10 pots; spec: MIL–F–11673.	Shed.
Fuze, igniter, fire bomb, M173	B14–15–281	Ea	50	Box	65	1. 6	Bomb igniter component; packed 1 per can, 50 cans per box; spec: MIL–F–11206.	Shed.
Fuze, igniter, fire bomb, AN–M173A1.	B14–15–636	Ea	50	Box	65	1. 6	Bomb igniter component; packed 1 per can, 50 cans per box.	Shed.
GA	354315	Lb	1, 400	1-ton container.	3, 000	42. 7	Type D container	Open.
GB	354310	Lb	1, 500	1-ton container.	3, 100	42. 7	Type D container	Open.
Grenade, hand, irritant, CN–DM, M6.	342303	Ea	16	Box	33	. 8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–10124.	Shed.
Grenade, hand, riot, CN, M25A1	332115	Ea	50	Box	60	2. 0	Packed 1 per can; 50 cans per box; stored and issued as complete round; spec: MIL–G–10280.	Shed.
Grenade, hand, smoke, WP, M15	212120	Ea	16	Box	46	. 8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12237.	Shed.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Grenade, hand, tear, CN, M7	332110	Ea	16	Box	33	0.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: 196–111–18C.	Shed.
Grenade, hand, tear, CN, M7A1	332112	Ea	16	Box	35	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–11968.	Shed.
Grenade, incendiary, TH3, AN–M14.	252210	Ea	16	Box	47	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as eomplete round; older stocks filled with TH2; spec: MIL–G–12297.	Shed.
Grenade, smoke, green, M18	222220	Ea	16	Box	34	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12326.	Shed.

Grenade, smoke, red, M18	222420	Ea	16	Box	34	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12326.	Shed.
Grenade, smoke, violet, M18	222520	Ea	16	Box	34	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12326.	Shed.
Grenade, smoke, white, HC, AN–M8.	212415	Ea	16	Box	41	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12327.	Shed.
Grenade, smoke, yellow, M18	222620	Ea	16	Box	34	.8	Packed 1 per can or fiberboard unit container; 16 per box; stored and issued as complete round; spec: MIL–G–12326.	Shed.
Hexachloroethane mixture, HC	214410						Plant mixed only.	
Hydrogen cyanide, AC	354110	Lb	1,000	1-ton container.	2,600	42.7	Type A container; spec: 96–21–16.	Open.
Igniter, fire bomb, WP, M23	257151						Not packaged as complete end item; components shipped separately.	
Components:								
1 Igniter, fire bomb, WP, less fuze, M23.	B14–5–805	Ea	25		125	2.3		Shed.
1 Fuze, igniter, fire bomb, M173.	B14–15–281							

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Igniter, fire bomb, WP, AN-M23A1.	257152	------	------	----------	------	------	Not packaged as complete end item; components shipped separately.	
Components:								
1 Igniter, fire bomb, WP, less fuze, AN-M23A1.	B14-5-2151	Ea-----	25	----------	125	2.3	----------	Shed.
1 Fuze, igniter, fire bomb, AN-M173A1.	B14-15-636							
Igniter, Na, M15----------	257134	------	------	----------	------	------	Not packaged as complete end item; components shipped separately.	
Components:								
1 Burster, C8R1 (with fuze, bomb, M157).	R4-6-96							
1 Igniter, Na, less fuze and burster, M15.	R4-6-89							
Igniter, Na, M16----------	257140	------	------	----------	------	------	Not packaged as complete end item; components shipped separately.	
Components:								
1 Burster, C8R1----------	R4-6-96							
1 Igniter, Na, less fuze and burster, M16.	R4-6-85							

Igniter, WP, M15	257133						Not packaged as complete end item; components shipped separately.	
Components:								
1 Burster, C8R1 (with fuze, bomb, M157).	R4–6–96							
1 Igniter, WP, less fuze and burster, M15.	R4–6–88							
Igniter, WP, M16	257139						Not packaged as complete end item; components shipped separately.	
Components:								
1 Burster, C8R1 (with fuze, bomb, M157).	R4–6–96							
1 Igniter, WP, less fuze and burster, M16.	R4–6–84							
Igniter, fire bomb, WP, less fuze, M23.	B14–5–805	Ea	25	Box	125	2. 3	Component of igniter, fire bomb, WP, M23.	Shed.
Igniter, fire bomb, WP, less fuze, AN–M23A1.	B14–5–2151	Ea	25	Box	125	2. 3	Component of igniter, fire bomb, WP, AN–M23A1.	Shed.
Igniter, AN–M5	C14–5–734	Ea	2	Box	49	. 8	Bomb component	Shed.
Igniter, Na, AN–M9	R14–5–632	Ea	20	Box	115	1. 6	Bomb component; spec: MIL–I–12885.	Shed.
Igniter, WP, AN–M9	R14–5–631	Ea	20	Box	115	1. 6	Bomb component	Shed.
Igniter, Na, less fuze and burster, M15.	R4–6–89	Ea	16	Box	55	2. 1	Component of igniter, Na, M15.	Shed.
Igniter, Na, less fuze and burster, M16.	R4–6–85	Ea	16	Box	78	3. 2	Components of igniter, Na, M16.	Shed.
Igniter, WP, less fuze and burster, M15.	R4–6–88	Ea	16	Box	16	2. 1	Component of igniter, WP, M15.	Shed.
Igniter, WP, less fuze and burster, M16.	R4–6–84	Ea	16	Box	85	3. 2	Component of igniter, WP, M16.	Shed.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Incendiary, equipment destroying, TH1, M2A1.	257215	Ea	2	Box	33	0. 8	Packed 1 per carton, 2 cartons per box; spec: MIL–I–10244.	Shed.
Incendiary, file destroyer, M4	257216	Ea	1	Box	160	4. 1		Shed.
Incendiary mixture, PT1	254304						Plant mixed.	
Incendiary oil, IM	254302						Plant mixed.	
Incendiary oil, NP	254303						Plant mixed, includes thickener, M1.	
Incendiary oil, NP							Field mixed, includes thickener, M1.	
Incendiary oil, NP2							Field mixed, includes thickener, M1.	
Incendiary oil, NP3							Plant mixed.	
Incendiary oil, OT							Field mixed; includes thickener, M3	
Incendiary, safe destroying, TH1, M1A1.	257211	Ea	1	Box	55	1. 1	Packed in fiberboard container, 1 container per box; spec: MIL–I–10243.	Shed.
Incendiary, safe destroying, TH1, M1A2.	257213	Ea	1	Box	55	1. 1	Packed in fiberboard container, 1 container per box; spec: MIL–I–12469.	Shed.
Lewisite, L	324210	Lb	1, 900	1-ton container.	3, 500	42. 7	Type D container, spec: MIL–L–10658A.	Open.

Mine, land, chemical, one-gallon (empty).	327115	Ea	10	Carton	15	2.0	Filled and assembled in the field.	Shed.
Mustard, distilled, HD	324111	Lb	532	55-gal drum.	645	13.7		Open.
		Lb	1,800	1-ton container.	3,400	42.7	Type D container	Open.
Mustard, H	324110	Lb	567	55-gal drum.	680	13.7		Open.
			1,900	1-ton container.	3,500	42.7	Type D container	Open.
Mustard, simulated, MR	324910	Lb	510	55-gal drum.	590	11.7	For training purposes	Open.
Mustard-T-mixture, HT	324114	Lb	1,800	1-ton container.	3,400	42.7	Type D container	Open.
Nitrogen mustard, HN1	324410	Lb	1,800	1-ton container.	3,400	42.7	Type D container	Open.
Pellet, CN, M2	337111	Ea	1,250		17	.7	Packed 50 per can, 25 cans per box; for training purposes.	Shed.
Phosgene, CG	314110	Lb	1,600	1-ton container.	3,200	42.7	Type A container	Open.
		Lb	1,650	1-ton container.	2,750	42.7	Type E container	Open.
Plasticized white phosphorus, PWP.	214115						Plant mixed.	
Pot, smoke, floating, HC, M4A2	215434	Ea	1	Drum	48	2.1	Spec: JAN–P–637	Open.
		Ea	1	Box	47	2.0	Spec: JAN–P–637	Open.
Pot, smoke, floating, SGF2, AN–M7.	215522	Ea	1		37	1.5	Filled in field immediately prior to issue to using groups; weight of filling is 12½ pounds.	Open.

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Pot, smoke, floating, SGF2, AN-M7 (w/o filling and fuze).	R36-1-108	Ea	1		25	1.5	For Navy use	Open.
Pot, smoke, floating, SGF2, Mk 5, Mod 2.	215520							
Components:								
1 Pot, smoke, floating, Mk 5, Mod 2 (w/o filling and fuze).	C36-1-45	Ea	1		26	1.5	For Navy use	Open.
1 Fuze, floating, smoke pot, M208 or	B36-7-9						(See separate listing.)	
Fuze, floating smoke pot, electric, M209.	B36-7-25						One per 10 pots. (See separate listing.)	
Oil, fog, SGF2							Quartermaster item of issue; 12½ pounds per pot.	
Pot, smoke, HC, M1	215409	Ea	3	Box	48	.9	Spec: MIL-P-12030A	Open.
Pot, smoke, HC, 30-lb, M5	215438	Ea	1	Box	47	1.1	Spec: 96-111-105	Open.
Primer-detonator, non-delay, M14	R14-15-369	Ea	100	Box	70	.8	Component of tail fuzes AN-M100A2, AN-M101, AN-M101A1, AN-M101A2, AN-M102A2, M160, M161, M162; may be shipped separately or with fuze; spec: MIL-P-20365.	

Rocket, gas, CG, 7.2-inch, M25	318102	Ea	1	Box	102	4.0	For use with Ordnance multiple rocket launcher; stored and issued as a complete round, unassembled.	Shed.
Set, gas identification, detonation, M1.	562105	Ea	1	Steel cylinder.	110	2.1	For training purposes; steel cylinder (container, shipping, C1) is nonexpendable; cylinder holds 12 glass tubes containing chemical agents; spec: MIL–S–11149A.	Open.
Set, gas, toxic, M1	325110	Ea	1	Steel cylinder.	83	2.1	For training purposes; cylinder container, shipping, M1 is nonexpendable; cylinder holds 24 bottles of H or HD; spec: MIL–S–10333A.	Open.
Smoke, green, GS 1	224010						Plant mixed.	
Smoke, red, RS	224015						Plant mixed.	
Smoke, violet, VS	224020						Plant mixed.	
Smoke, yellow, YS	224025						Plant mixed.	
Squib, electric, flash vented, M1	267401	Ea	600	Box	53	2.1	Packed 50 per can, 12 cans per box; spec: MIL–S–10740.	Shed.
Starter, fire, M1	257318	Ea	216	Box	40	1.6	Spec: MIL–S–10741A	Shed.
Starter, fire, M2	257319	Ea	500	Box	35	1.2	For Air Force use; Spec: MIL–S–13175.	Shed.
Sulfur trioxide solution, FS	214210	Lb	747	55-gal drum.	860	13.7		Open.
Thermite, TH1							Formerly, incendiary mixture I; incendiary filling.	

Table XXXVI. Class V Chemical Supplies—Continued

Description	Stock No.	Unit	Shipping container				Remarks	Limited storage
			Units per container	Type	Gross wt (lb)	Cubage (cu ft)		
Thermate, TH2							Formerly, Therm 8–2; incendiary filling.	
Thermate, TH3							Formerly, Therm 64–C; incendiary filling.	
Thickener, M1	135215	5¼ lb can.	6	Box	50	2. 1	Incendiary fuel thickener (napalm).	Shed.
Thickener, M1	135219	Lb	15¾	Drum	21	1. 1	Incendiary fuel thickener (napalm).	Open.
Thickener, M1	135216	Lb	100	Drum	125	6. 5	Incendiary fuel thickener (napalm).	Open.
Thickener, M2	135608	Lb	20	Drum	25	1. 2	Incendiary fuel thickener (antiagglomerated napalm).	Open.
Thickener, M2	135609	Lb	100	Drum	125	6. 5	Incendiary fuel thickener (antiagglomerated napalm).	Open.
Thickener, M3	135611	Lb	10	Drum	16	1. 2	Incendiary fuel thickener (octal).	Open.
Titanium tetrachloride, FM	214310	Lb	722	55-gal drum.	835	13. 7		Open.
White phosphorus, WP	214110						Shipped in tank car.	
Wire, arming, C1	B14–5–1516	Ea	500	Box	95	3. 5	Bomb cluster component	Shed.
Wire, arming, C4	R14–5–1517	Ea	100	Box	30	1. 8	Bomb cluster component	Shed.
Wire, arming, C5	R14–5–1518	Ea	500	Box	95	3. 5	Bomb component	Shed.
Wire, arming, M1A1	R14–5–1514	Ea	100	Box	40	1. 8	Bomb component; packed 5 per can, 20 cans per box.	Shed.

Wire, Arming, AN–M1A2	R14–5–1515	Ea	50	Box			Bomb component	Shed.
Wire, arming, M2	R14–5–923	Ea	100	Box	40	1. 8	Bomb component; packed 5 per can, 20 cans per box.	Shed.
Wire, arming, M5	R14–5–671	Ea	100	Box	41	1. 8	Bomb component; packed 5 per can, 20 cans per box.	Shed.
Wire, arming, M7	R14–5–924	Ea	100	Box	40	1. 8	Bomb component; packed 5 per can, 20 cans per box.	Shed.
Wire, arming, AN–M7A1	R14–5–1277	Ea	50	Box			Bomb component	Shed.
Wire, arming, M17	R14–5–2149	Ea					Bomb component	Shed.

Section III. CHEMICAL CORPS CLASS III SMOKE AGENTS

44. General

Fog oils, SGF1 and GSF2, are Chemical Corps class III smoke agents and also Quartermaster Corps class III expendable items of supply. They are stored and issued by the Quartermaster Corps. Data pertaining to fog oils are given in table XXXVII.

Table XXXVII. Class III Smoke Agents

Nomenclature	QMC stock No.	Unit	Shipping container			
			No. of units	Type	Cubage (cu ft)	Gross wt (lb)
Oil, fog, SGF1----	14–0–875–50	Gal----	53	55 - gal drum (16-gage).	11. 2	468
Oil, fog, SGF1----	14–0–875–55	Gal----	53	55 - gal drum (18-gage).	11. 2	455
Oil, fog, SGF2----	14–0–880–50	Gal----	53	55 - gal drum (16-gage).	11. 2	461
Oil, fog, SGF2----	14–0–880–55	Gal----	53	55 - gal drum 18-gage.	11. 2	448

Section IV. CHEMICAL UNIT EQUIPMENT AND SUPPLIES

45. General

Equipment and supplies used by Chemical Corps units fall into three broad categories—equipment listed in TOE, equipment and supplies listed in TA and Department of the Army and Theater Commander directives, and spare (organizational maintenance) parts listed in DA supply manuals of the 7-series. Quantities of chemical, engineer, ordnance, quartermaster, and signal spare parts which a unit is authorized to have on hand are specified in the 7-series of DA supply manuals listed in special regulations of the SR 310–20 series. In some instances the 7-series manuals are published in combination with the 8-series manuals which specify quantities of parts authorized for field and depot maintenance. Information concerning the 7-series manuals are given in DA Supply Manuals, CML 1, ENG 1, ORD 1, QM 1, and SIG 1. Quantities of parts authorized for organizational maintenance of chemical items, such as M2A1 mechanical smoke generator, are given in CML 7–217125; parts for ordnance items, such as M2 Browning caliber .50 machinegun, are given in ORD 7 SNL A–39; and parts for chemical items mounted on ordnance equipment, such as M2 chemical handling trailer, are given in CML 7 & 8–624115–1 (which gives parts for the trailer superstructure, a chemical item) and in ORD 7 & 8 SNL G74 (which gives parts for the trailer chassis, an ordnance item). Detailed information about items of

equipment and supplies are given in Department of the Army technical and supply manuals, technical and supply bulletins, supply manuals, and other publications of the services issuing the items. Data pertaining to equipment and supplies for general logistical planning for Chemical Corps units are given in table XXXVIII.

46. Summation Table

Summation of weights and cubages of individual equipment, weights of major items of organizational equipment, and weights of classes I and III supplies of Chemical Corps units are shown in table XXXVIII. Weights of class V (ammunition) supplies are not given because most of the ammunition is carried by individuals. Since the weights of class II expendable supplies and class IV supplies have a relatively negligible effect on logistical planning, they are not included in the table. The total weight of equipment and supplies of a cellular type chemical service unit (company, platoon, or detachment) organized with teams from the chemical service organization (TOE 3–500R) depends upon the specific combination of teams which comprise the unit.

Table XXXVIII. Chemical Unit Equipment and Supplies

Unit (TOE)	Equipment				Supplies	
	Individual [a]			Organizational [b]	Class I [c]	Class III [d]
	Personnel	Gross wt (short tons)	Cubage (cu ft)	Gross wt (short tons)	Gross wt (lb)	Gross wt (lb)
Hq & hq det, cml gp (3-32R)	36	2.7	468	14.7	713	912
Hq & hq det, cml gp, w/aug secs (3-32R)	55	4.1	715	17.9	1,089	1,203
Hq & hq det, cml bn, svc (3-36R)	33	2.5	429	13.4	653	796
Cml maint co (3-47R)	99	7.4	1,287	77.0	1,960	3,314
Cml dep co (3-67R)	144	10.8	1,872	82.5	2,851	3,433
Cml processing co (3-77R)	93	7.0	1,209	127.5	1,841	1,271
Cml lab (3-97R)	41	3.1	533	25.6	812	848
Cml dep co, comm Z (3-117R)	75	5.6	975	83.6	1,485	2,623
Cml decon co (3-217R)	116	8.7	1,508	124.2	2,297	4,975
Hq & hq det, cml smoke genr bn (3-266R)	22	1.7	286	16.5	436	1,090
Cml smoke genr co (3-267R)	139	10.4	1,807	177.2	2,752	15,871 [e]
Team AA (plat hq) (3-500R)	2	.2	26	------	------	--------
Team AB (plat hq) (3-500R)	4	.4	52	9.7	------	--------
Team AC (co hq) (3-500R)	7	.6	91	11.3	------	--------
Team EA (supply) (3-500R)	12	1.1	156	14.0	------	--------
Team EB (supply) (3-500R)	18	1.6	204	23.0	------	--------
Team EC (supply) (3-500R)	27	2.4	351	22.9	------	--------
Team ED (supply) (3-500R)	37	3.2	481	36.8	------	--------
Team FA (maint) (3-500R)	17	1.5	221	23.5	------	--------
Team FB (maint) (3-500R)	20	2.5	364	26.0	------	--------
Team FC (maint) (3-500R)	32	2.8	416	36.0	------	--------
Team FD (maint) (3-500R)	49	4.3	637	43.8	------	--------
Team HA (decon) (3-500R)	8	.7	104	14.6	------	--------
Team HB (decon) (3-500R)	22	1.9	286	39.3	------	--------
Team HC (decon) (3-500R)	41	3.6	533	78.1	------	--------
Team IA (tech intel) (3-500R)	8	.7	104	8.6	------	--------
Team IB (tech intel) (3-500R)	10	.9	130	12.4	------	--------
Team JA (mbl lab) (3-500R)	17	1.5	221	14.5	------	--------

[a] Includes one bedding roll and equipment contained in two barracks bags—a total weight of 150 pounds and 13 cubic feet per individual; does not include weight of individual.

[b] Major items of equipment (crated) and vehicles (uncrated).

[c] Based on 3 days class I supplies with average weight of 6.6 pounds per ration.

[d] Based on weight of gasoline, oil, and lubricants required to operate organic vehicles a distance of 300 miles.

[e] Chemical smoke generator company also carries basic load (43.7 short tons) of fog oil (class III item of supply).

Section V. WATER SUPPLY

47. References

The data in this section are based in general on logistical planning factors outlined in FM 101–10.

48. Water Requirements for Operations of Chemical Units

Water supply requirements for operations of chemical units under temperate climatic conditions are shown in table XXXIX. In hot climates, maximum requirements may exceed the given values by 15 to 100 percent.

Table XXXIX. Water Supply Requirements for Operations of Chemical Units

Water consumer	Daily water consumption (gal)	Remarks
Motor vehicle	⅛ to ½ (in level or rolling terrain).	Consumption varies with size of vehicle.
Motor vehicle	¼ to 1 (in mountainous terrain).	Consumption varies with size of vehicle.
Smoke generator, M2 or M2A1.	150	Based on continuous operation; use of unfiltered water should be avoided; M3-series smoke generators do not use water.
Clothing impregnating plant.	4,400	Includes 400 gallons for washing and cleaning purposes; 5 gallons distilled water also required daily for plant laboratory.
Power-driven, truck-mounted, 400-gallon decontaminating apparatus.	4,000	For decontamination purposes; apparatus normally filled from natural source.
Power-driven, truck-mounted, 400-gallon decontaminating apparatus.	4,000	For bathing purposes; apparatus normally filled from natural source.
Mobile laboratory, M3	200	15 gallons distilled water also required daily.
Laboratory, M2 (theater).	300	25 gallons distilled water also required daily.

49. Water Distribution and Storage Equipment

The water distribution and storage equipment of Chemical Corps units and teams are listed in table XL.

Table XL. Water Distribution and Storage Equipment of Chemical Units

Item	Capacity (gal)	No. per using unit	Using unit TOE	No. per using unit	Using unit TOE	No. per using unit	Using unit TOE
Bag, canvas, water, sterilizing		1	3-32R.	1	3-67R.	1	3-117R.
		1	3-36R.	2	3-77R.	1	3-217R.
		1	3-47R.	1	3-97R.	1	3-267R.
Bucket, metal, galvanized, 14-quart	3½	2	3-32R.	1	3-267R.	4	Team FD.[a]
		1	3-36R.	2	Team EA.[a]	2	Team HA.[a]
		1	3-47R.	2	Team EB.[a]	6	Team HB.[a]
		8	3-67R.	4	Team EC.[a]	12	Team HC.[a]
		26	3-77R.	8	Team ED.[a]	2	Team JA.[a]
		1	3-97R.	1	Team FA.[a]	2	Team KA.[a]
		1	3-117R.	2	Team FB.[a]	1	Team KB.[a]
		74	3-217R.	2	Team FC.[a]		
Can, water	5	12	3-32R.	220	3-267R.	1	Team HA.[a]
		7	3-36R.	1	Team EA.[a]	1	Team HB.[a]
		7	3-47R.	1	Team EB.[a]	3	Team HC.[a]
		10	3-67R.	2	Team EC.[a]	1	Team IA.[a]
		18	3-77R.	2	Team ED.[a]	1	Team IB.[a]
		8	3-97R.	1	Team FA.[a]	1	Team JA.[a]
		6	3-117R.	1	Team FB.[a]	1	Team KA.[a]
		8	3-217R.	2	Team FC.[a]	1	Team KB.[a]
		4	3-266R.	3	Team FD.[a]		
Decontaminating apparatus, power-driven, truck-mounted.	400	12	3-217R.	3	Team HB.[a]	6	Team HC.[a]
		1	Team HA.[a]				
Heater, immersion type, for corrugated can.		6	3-47R.	6	3-77R.	6	3-217R.
		6	3-67R.	3	3-117R.	6	3-267R.

Heater, water, immersion, gasoline operated.		1	3–47R.	1	3–217R.	1	Team AB.[a]
		1	3–67R.	3	3–267R.	1	Team AC.[a]
		1	3–117R.				
Heater, water, M1[b]		12	3–217R.	3	Team HB.[a]	6	Team HC.[a]
		1	Team HA.[a]				
Hose, fire, 1½ in. by 50 ft		4	3–77R.	2	Team HA.[a]	4	Team HC.[a]
		6	3–217R.	2	Team HB.[a]		
Hose, suction, water, 2 in. by 10 ft		10	3–77R.	5	Team HA.[a]	10	Team HC.[a]
		15	3–217R.				
Hose, water, ¾ in. by 50 ft		6	3–77R.				
Pump, centrifugal, gasoline driven	55 gpm at 50-ft head.[c]	2	3–77R.	1	Team HA.[a]	2	Team HC.[a]
		3	3–217R.	1	Team HB.[a]		
Tank, storage, canvas, water	3,000	2	3–77R.	1	Team HA.[a]	2	Team HC.[a]
		3	3–217R.	1	Team HB.[a]		
Trailer, 1½-ton, water tank, 2-wheel	400	1	3–67R.	1	3–217R.	1	Team AB.[a]
		1	3–117R.	3	3–267R.	1	Team AC.[a]
Water purification equipment, diatomite, set No. 2, pack.	15 gpm[c]	1	3–97R.				

[a] TOE 3–500R.
[b] Auxiliary equipment of 400-gallon, power-driven, truck-mounted decontaminating apparatus.
[c] gpm—gallons per minute.

Section VI. STORAGE AND HANDLING OF SUPPLIES

50. Storage of Supplies

For information pertaining to the storage of supplies, chemical agents, Chemical Corps munitions, and chemical filled munitions, see TM's 38–402, 3–250, 3–300, 3–400, and 9–1900 and SB 3–24.

51. Storage Area Factors

For information pertaining to storage area factors for general planning purposes see FM 101–10.

52. Handling of Supplies

Handling of supplies is planned from labor requirements data, the known efficiencies of handling crews, and time estimates based on actual experience. Labor requirements are generally estimated in accordance with the method anticipated and from data contained in FM 101–10. Planning should provide for the optimum number of personnel per handling crew. Time estimates, based on manual handling, may be made from data contained in FM 101–10.

53. Materials Handling Equipment

a. Quartermaster and Engineer Materials Handling Equipment. For information pertaining to the dimensions, weight, capacity, and characteristics of quartermaster and engineer materials handling equipment used by Chemical Corps units see FM 101–10 and TM 10–1619.

b. Chemical Filling and Handling Equipment. For information about chemical filling and handling equipment see TM's 3–250 and 3–255.

Table XLI. Rescinded.

54. One-Ton Containers and Drums

a. Characteristics of 1-Ton Containers. Characteristics of 1-ton containers are given in table XLII.

Table XLII. Characteristics of 1-Ton Containers

Type	Weight (empty) (lb)	Weight (maximum gross) (lb)	Capacity (gal)	Cubage (cu ft)	Filling (chemical agent)
A	1,600	3,500	170	42.7	Blood gas. Choking gas.
D	1,600	3,500	170	42.7	Blister gas. Nerve gas.
E*	900		170	42.7	

* Substitute for type A or D container.

b. Chemical Agents in 1-Ton Containers. Data pertaining to chemical agents in 1-ton containers are given in table XLIII.

Table XLIII. Chemical Agents in 1-Ton Containers

Chemical agent				Gallons per 1-ton container	Container	
Nomenclature, symbol	Density (gm per cc)	Pounds per gallon	Pounds per 1-ton container		Type	Gross weight (lb)
Chlorine, Cl			1,855		A	3,455
Cyanogen chloride, CK			1,600		A	3,200
GB			1,500		D	3,100
Hydrogen cyanide, AC			1,000		A	2,600
Mustard, H	*1.35	*11.3	1,900	168	D	3,500
Mustard, distilled, HD	*1.27	*10.6	1,800	170	D	3,400
Mustard-T-mixture, HT			1,800		D	3,400
Nitrogen mustard, HN1			1,800		D	3,400
Phosgene, CG			1,600		A	3,200
Phosgene, CG			1,850		E	2,750

* At 68° F.

c. Characteristics of 55-Gallon Drums. Data pertaining to 55-gallon drums of Interstate Commerce Commission types 5, 5A, and 5B are given in table XLIV. Drums of these types are used for the shipment of war gases and have either expanded or attached rolling hoops.

Table XLIV. Characteristics of 55-Gallon Drums

Type	Weight empty (lb)	Capacity (gal)	Cubage (cu ft)
5	110	55	13.1
5A	113	55	13.7
5B (bung type)	80	55	11.7
5B (open head type)	90	55	12.2

CHAPTER 5

CHEMICAL SERVICE DATA

Section I. CHEMICAL MAINTENANCE

55. References

Publications pertinent to chemical maintenance include AR 750–5; FM 3–60; and the Chemical Corps section, Department of the Army supply manuals.

56. Repair Parts Requirements

Computation of repair parts requirements based on organizational, field, and depot maintenance allowances is made in accordance with instructions given in Department of the Army Supply Manual CML 1.

57. Work Performance Standards

Work performance standards being developed for chemical maintenance are based on cost accounting data gathered under provisions of AR 35–247. Chemical maintenance company functions consist chiefly of maintenance, recovery, modification, development, manufacture, supply, training, and overhead. For most functions, the performance unit of measure is the number of man-hours expended per quantity of major items processed. The percentages per function shown in table XLV are sufficiently realistic for planning operations and studies pending the adoption of work performance standards.

Table XLV. Chemical Maintenance Company Functions

Maintenance echelon	Maintenance (percent)	Recovery (percent)	Modification (percent)	Development (percent)	Manufacture (percent)	Supply (percent)	Training (percent)	Overhead (percent)
Third (Fld)	45	20	5	3	2	5	5	15
Fourth (Fld)	35	15	10	7	6	5	10	12
Fifth (Dep)	30	5	15	10	10	5	15	10

58. Covered Shop Requirements of Chemical Units

Covered shop requirements in square feet of floor space for various chemical units are shown in table XLVI.

Table XLVI. Covered Shop Requirements

Unit	Square feet	Unit	Square feet
Cml dep co, comz	1,000	Maint team FA	700
Cml lab	5,200	Maint team FB	900
Cml maint co	4,600	Maint team FC	1,400
Cml processing co	11,900	Maint team FD	2,000
Lab team JA	1,000		

Section II. DECONTAMINATION

59. References

References pertinent to decontamination include FM 21–40, FM 21–41, FM 21–45, TM 3–215, TM 3–220, TM 3–223, and TB 3–220–7.

60. Decontaminating Apparatus

Decontaminating apparatus are either power driven or hand operated.

a. Power-Driven, Truck-Mounted, Decontaminating Apparatus. The power-driven, truck-mounted decontaminating apparatus is mounted on the chassis of a standard 2½-ton, 6 x 6 truck. The data given below are applicable to the M3A2 model. For additional information, see TM 3–223.

Weight and Dimensions of Unit (Truck and Apparatus)

Weight (empty)	11,100 pounds
Height	98 inches
Length	252½ inches
Width	87 inches

Capacity

Tank (working capacity)	400 gallons
Water per filling (for slurry)	225 gallons
Bleach per filling	1,300 pounds
M1 antiset per filling	7½ pounds

Performance

Working pressure	400 pounds per square inch
Time required for—	
Loading tank with water	10 minutes
Adding M1 antiset to water in tank and agitating	3 minutes
Loading tank with bleach	20 minutes
Mixing bleach and water	15 minutes
Coverage per filling (average for smooth surface)	1,300 square yards
Discharge rate for slurry (one spray gun)	11 gallons per minute
Discharge rate for slurry (two spray guns)	20 gallons per minute

b. Hand-Operated Decontaminating Apparatus. The M1 decontaminating apparatus is hand operated and has a tank capacity of 3 gallons. For additional information see TM 3–220 and TB 3–220–7. The following weight data are applicable to the M1 model:

Weight of empty apparatus	17.5 pounds
Weight of filling (3 gallous of DANC solution)	40.0 pounds
Weight of filled apparatus	57.5 pounds

61. Decontamination of War Gases and Other Chemical Agents

a. Decontaminants for War Gases. The more common and effective decontaminants for war gases are shown in table XLVII. In addition to those listed in the table, the following decontaminants may be used to destroy or remove war-gas contamination: lime, bleach,

baking soda, chlorine, ammonia, caustic potash, sodium sulfite, chloramine-T, dichloramine-T, alcoholic caustic soda, and alcoholic caustic potash. Aeration is a method of decontamination for war gases, particularly nonpersistent gases. Aeration also is a method for decontaminating lightly contaminated clothing and fabric material. Gentle heating accelerates evaporation and can be used to decontaminate many fragile and complicated items. Hot or cold water alone, or in combination with soaps or detergents may be used to remove war-gas contamination from surfaces which are adaptable to washing. Various common organic solvents may be used to remove contaminants from equipment which might be damaged by water. These include kerosene and allied petroleum fractions (diesel fuel, naphtha, and dry-cleaning fluid), alcohol, and carbon tetrachloride. Since water and organic solvents effect only a removal of contaminants and do not neutralize them, suitable precautions must be taken to dispose of the solvent waste as contaminated material.

Table XLVII. Decontaminants for War Gases

Decontaminant	War gases used against—	Decontaminant container	Remarks
BAL eye ointment	Lewisite	¾-oz tube	Salve.
DANC solution	Blister gases	3-gal and 4½-gal containers.	2.5-lb RH 195 decontaminating agent per 3-gal tetrachoroethane.
Detergent and wetting agent.	Persistent gases		
GUNK (Air Force cleaner).	Persistent gases	55-gal drum	Water-dispersible solution (1.34-lb GUNK per gal kerosene).
HTH (high test bleach).	Blister gases, nerve gases.		Oxidizing agent; releases chlorine.
Protective ointment	Blister gases	¾-oz tube	Salve.
Sodium carbonate (washing soda).	Nerve gases, tear gases.		White, alkaline powder; dissolves easily in water.
Sodium hydroxide (caustic soda or lye).	Blood gases, nerve gases.	Steel drum	Water solution (0.5-lb lye per gal water).
Sodium hypochlorite (household bleach).	Persistent gases	Carboy or barrel.	Unstable as solid; more stable in solution.
STB (supertropical bleach).	Blister gases, lewisite, nerve gases.	8-gal, 50-lb can.	White powder containing 30 percent available chlorine.
Steam	Blister gases		Hydrolyzes certain war gases.
Soap and water	Nerve gases, blister gases.		

b. Decontaminants for Specific Chemical Agents. The principal decontaminants for specific chemical agents in the liquid or solid state are given in table XLVIII.

Table XLVIII. Principal Decontaminants for Specific Chemical Agents

Chemical agent	Principal decontaminant
Mustard gases (H, HD, HN, HT)	DANC solution or bleach.
Lewisite (L)[1] ethyldichloroarsine (ED) methyldichloroarsine (MD), phenyldichloroarsine (PD).	DANC solution, sodium hydroxide solution, bleach, or water.
Phosgene (CG) [2]	Water followed by alkaline solution.[3]
Chloropicrin (PS)	Sodium sulfite in alcohol-water solution.
Cyanogen chloride (CK)[4], hydrocyanic acid (AC).[5]	Sodium hydroxide solution.[1]
G-series war gases (GA, GB)	Hot soapy water, slurry, or aqueous alkaline solution.[3]
Adamsite (DM), diphenylchloroarsine (DA).	Slurry.
Diphenylcyanoarsine (DC) [1]	Alkaline solution.[3]
Chloroacetophenone (CN), Tear gas solution (CNS).	Hot aqueous solution of sodium carbonate or hot alcoholic solution of sodium hydroxide.
Tear gas solution (CNB)	Aqueous sodium hydroxide or aqueous sodium carbonate.
White phosphorus (WP, PWP)	Copper sulfate solution or water.
Sulfur trioxide-chlorosulfonic acid (FS), titanium tetrachloride (FM).	Large amounts of water followed by alkaline solution.[3]
HC mixture (HC)	Water.

[1] Products are very toxic but fairly stable and nonvolatile.
[2] Liquid at temperature below 47° F.
[3] Sodium hydroxide (caustic soda, lye), sodium carbonate (washing soda), sodium bicarbonate (baking soda), or ammonium hydroxide (household ammonia).
[4] Liquid at temperatures below 55° F.
[5] Liquid at temperatures below 77° F.

c. Persistent War Gas Decontamination Data for Various Materials. Persistent war gas decontamination data for various materials are given in table XLIX.

Table XLIX. Persistent War Gas Decontamination Data for Various Materials

Basic material	Used in—	Decontaminant (method)		Field expedient
		Primary	Secondary	
Asphalt [1]	Roads, roofing	Bleach [2]	Slurry	Cover with earth.[3]
Brick or stone [1]	Buildings, roads	Bleach [2]	Slurry	Cover with earth.[3]
Canvas	Cartridge belts, covers, mask carriers, tarpaulin, tentage.	Hot, 5 percent washing soda (sodium carbonate) aqueous solution (immerse for ½ to 1 hour).	Boiling water	Aerate.
Cotton and wool	Barracks bags, coveralls, field jackets, gloves, hoods, leggings, overcoats, shirts, socks, ties, trousers, underwear.	Boiling water (immerse for ½ to 1 hour; for cottons, water must be made alkaline—2 oz washing soda per 10 gal water).	Laundering process	Apply protective ointment. Aerate.
Concrete [1]	Buildings, gun emplacements, pillboxes, roads, tank obstacles.	Bleach.[3] Slurry	DANC solution [4]	Cover with earth.[3]
Earth [1]	Bivouac areas, bomb craters, gun emplacements, pathways, roads.	Bleach [2]	Slurry	Cover with uncontaminated earth. Scrape off 3 to 4 inches of top soil. Allow to weather. Burn.
Glass	Lenses, windows	DANC solution [4]	Washing [1]	Blot off surfaces.
Grass and low vegetation.[1]	Fields, open terrain	Bleach.[2] Slurry	Fire	Cover with earth. Scrape off 3 to 4 inches of top soil. Allow to weather.
Impermeable fabrics	Impermeable aprons, gas resistant curtains, impermeable, clothing.	Boiling water (immerse for ½ to 1 hour).	Slurry (keep bleach off of fabric side).	Allow to weather.

Leather	Boots and other items	Water at 120° F. (immerse for 4 hours).	Aeration DANC solution.[4]	Blot off surfaces.
Metals (bare) [1]	Canned rations, mess gear, polished parts, working parts.	Water	DANC solution [4] (then clean and oil). Solvents.	Aerate.
Painted surfaces	Boxes, buildings, equipment, vehicles.	DANC solution [4]	Slurry. Washing solvents.	Blot off surfaces.[1]
Plaster [1]	Building interiors	Slurry	Aeration	Allow to weather.
Plastics (opaque)[1]	Insulation, panel boards, telephones.	Slurry (apply carefully)	Washing. Weathering.	Allow to weather.
Plastics (transparent)[1]	Eyepieces, airplane canopies, glider noses.	Hot soapy water	Gasoline or kerosene.	Blot off surfaces.[1]
Rubber (natural and synthetic).	Boots, gloves, hose, insulation, mats. tires.	Boiling water [5] (immerse for 2 to 3 hours).	Slurry	Apply protective ointment.
	Facepieces and other rubber articles coming in direct contact with the skin.	Boiling water [5] (immerse for 6 to 8 hours).	Slurry	Apply protective ointment.
Sand	Beaches, deserts	Bleach	Slurry	Cover with earth. Scrape off 3 to 4 inches of top layer. Allow to weather. Burn.
Undergrowth and tall grass.	Forests, jungles, meadows	Slurry.[1] Explosives	Fire. Exploding of bleach drums.	Allow to weather.
Wood	Buildings, boxes, crates, gunstocks, vehicle bodies.	Bleach. Slurry.[1] Boiling water (immerse for ½ to 1 hour).	DANC solution [4]	Burn.

[1] Aerate after treatment.

[2] When liquid contaminant is visible and personnel are nearby, dry mix should be used.

[3] If applicable.

[4] Do not use DANC solution for decontamination of G-series war gases (table XLVIII).

[5] Length of treatment depends on amount of contamination, thickness of rubber, and future use.

d. Decontamination Process Time Factors. Time factors for chemical decontamination processes are given in table L. Decontamination coverage in square yards is also listed.

Table L. Time Factors for Decontamination of Persistent War Gases

Means	Filling and mixing time (minutes)	Discharge time (minutes)	Coverage (square yards)
Slurry with 400-gallon, power-driven decontaminating apparatus.	45 to 50 (2 men adding bleach).	20, continuous spray (1 hose—11 gallons per minute; 2 hose—20 gallons per minute).	1,300 (smooth surface); 650 short grass); 400 to 433 (tall grass and brush).
Hot water and cleansing chemical with 400-gallon, power-driven decontaminating apparatus.	25 (2 heaters), 40 (1 heater).	Same as for slurry if continuous; 35 to 45, scrubbing and cutting rinse.	100 (metal surface).
Dry mix	5 to 10 (2 men mixing 50 pounds of bleach).	45 to 60	50 per hour per man.*
Bleach (unmixed)	2 (50 pounds)	30 to 45	125 per hour per man.*
3-gallon decontaminating apparatus.	10 (DANC solution or hot, soapy water).	10	50, or 1 cargo truck (3 applications).

*Divide by 2 for gravel; by 3 for tall grass and brush.

e. Storage Data for Decontaminants. Storage data on several decontaminants for chemical agents are shown in table LI. Decontaminants not listed are adequately stable in storage.

Table LI. Storage Data for Decontaminants

Decontaminant	Storage characteristics	Surveillance requirements	
			Frequency of inspection in months
Tetrachloroethane (acetylene tetrachloride).	Stable; attacks metals in the presence of moisture.	Mean shade temperature in hottest months:	
		Over 90° F	6
		70° to 90° F	9
		Under 70° F	12
Chlorinated lime, technical, grade 3.	Unstable in hot or moist storage.	Routine surveillance to detect breaks, other defects in drums. Test sample at least once a year.	
STB	Stable for 6 weeks at temperatures up to 158° F.	Routine surveillance to detect defects in drums.	
RH 195	Decomposes gradually, should be stored in cool, dry place.	Routine surveillance to detect defects in drums.	
Sodium hydroxide	Stable in tightly sealed drums; absorbs moisture and carbon dioxide.	Routine surveillance to detect defects in drums.	

62. Decontamination of Biological Agents

Decontamination procedures and decontaminants for war gases are usually equally effective against biological agents.

a. Biological Decontaminants. In addition to the biological decontaminants listed in tables LII and LIII, many of the materials and techniques shown in table XLIX would be quite effective for decontamination of biological agents.

b. Biological Decontamination. A brief outline of biological decontamination methods is given in table LII. For specific information, see FM 21–40 and TM 3–220.

Table LII. Chemicals for Biological Decontamination

Material	Application	Limitations	Remarks
Formaldehyde solution (formalin); 37 percent by weight of formaldehyde with methanol and water.	Applied as a vapor by heat, paint-spraying equipment, high-pressure, or steam bubbled through pan of material. For temperatures above 70° F., 1 quart of formaldehyde solution is required for each 1,000 cubic feet of space; twice as much is required for each 20° increment below 70° F. The vapor is allowed to remain 16 hours in a closed structure. Gas resistant sealing of room is not required; however, major openings must be sealed. (Ideal temperature is between 70° and 80° F.; relative humidity, 85 percent.)	Vapors are highly toxic. Vapors are flammable when subjected to open flame. When steam is used to vaporize, steam source should be outside area being decontaminated. Formaldehyde solution will not penetrate cloth and similar material as effectively as a sterilizing gas will. Open flame is not suitable for vaporizing. Decontamination below 40° F. is not advisable. May cause damage to delicate instruments; dampness may curl and ripple paper. Rubber gloves or protective agents are required to cover skin of handlers. To be usable, buildings require 24-hour aeration after formalin is used. Vapor polymerizes and deposits toxic white powder on horizontal surfaces; hot water is required for washing off powder deposit. Personnel should wear oxygen breather masks when handling formaldehyde solution.	Once vaporization has started, no personnel, masked or unmasked, should enter area until process is complete. Formalin is packaged in 55-gallon drums.

Ethylene oxide	Contaminated equipment is exposed to ethylene oxide vapor under a gas resistant tarpaulin for 12 hours. Edges of tarpaulin should be covered with earth. Ethylene oxide gas is introduced at bottom of shelter. A length of hose is connected at top of shelter and closed when ethylene oxide starts to escape. After all air has been driven out, ethylene oxide is released under the shelter as required. For temperatures above 80° F., 30 pounds of ethylene oxide is required for each 1,000 cubic feet of space. The amount is doubled for each 20° F. drop in temperature. (Ethylene oxide gas is highly penetrating and noncorrosive.)	Inclosure must be gas resistant to be effective. As ethylene oxide gas is highly explosive in mixtures of air, it is not suitable for use in buildings. Ethylene oxide gas is toxic and very flammable. If ground is wet a protective cover should be placed beneath gas resistant tarpaulin. To release ethylene oxide gas at a suitable rate, cylinders should be heated in water bath. Since ethylene oxide is very flammable and toxic it must be used only by specially trained personnel and in such a manner as to protect other individuals. Personnel subject to concentrated vapors should use oxygen breather masks.	Tarpaulins may be treated with heavy vinyl plastic coating. Ethylene oxide is packaged in 100-pound cylinders. Must be stored away from fires. Cylinders should be protected from rough handling and sparks.

Table LII. Chemicals for Biological Decontamination—Continued

Material	Application	Limitations	Remarks
Carboxide (carboxide in liquid form is a mixture of ethylene oxide and carbon dioxide).	Contaminated equipment is exposed to carboxide gas in a gas resistant chamber for 12 to 24 hours. A building must be tightly sealed when used as an improvised chamber. To conserve gas the chamber selected should be as small as practicable. Air ducts, inlets, and outlets should be avoided or sealed off. Sprayed plastic can be used to form an airtight seal. For temperatures above 80° F., 60 pounds of carboxide is required for each 1,000 cubic feet of space; the amount is doubled for each 20° F. drop in temperature.	Inclosure must be gas resistant to be effective. As carboxide gas is not explosive in mixtures of air, it is suitable for use in buildings. Toxic if improperly used. Decontamination below 40° F. is not advisable.	One pound of liquefied carboxide gas is equivalent to 8.8 cubic feet of free carboxide gas at normal temperature and pressure. Carboxide is noncorrosive. Cylinders do not require heating to release gas at suitable rate. Carboxide is packaged in 60-pound cylinders.
Chlorinated lime (grade 3).	Slurry (40 parts chlorinated lime and 60 parts water, by weight) is applied to vertical surfaces by means of 400-gallon decontaminating apparatus.	Very corrosive to metals.	Average coverage of slurry is 1 gallon per 8 square yards; when slurry is prepared, ½ pound antiset is added per 100 pounds bleach. Chlorinated lime is packaged in 8-gallon drums.
Decontaminating agent STB.	Clear solution (13 parts STB and 87 parts water) is sprayed on horizontal surfaces.	Personnel must wear protective masks when working with solutions.	Decomposes very slowly in storage. Packaged in 8-gallon drums.

Sodium hypochlorite (household bleach).	Can be sprayed (full strength) by means of 3-gallon or 400-gallon decontaminating apparatus.		Should be stored in cool place.
Calcium hypochlorite (HTH).	Used in water purification.		
Sodium hydroxide (caustic soda or lye).	Average application ⅛-gallon per square yard on horizontal surfaces; solution strength should be 10 percent by weight.	Highly toxic. Highly corrosive. Will damage fabrics. Solution should not be mixed in aluminum, copper, tin-, or zinc containers.	Effectiveness is directly proprotional to strength of solution. Solid caustic soda stored in sealed steel drums to keep moisture out and prevent absorption of atmospheric carbon dioxide. Caustic soda solution may be kept in steel or glass containers having rubber stoppers.

c. Chlorine Compounds for Biological Decontamination. Chlorine compounds for use as contaminants for biological agents are listed in table LIII.

Table LIII. Chlorine Compounds for Use as Decontaminants for Biological Agents

Decontaminant	Use	Percent available chlorine as packaged	Recommended mix (parts by wt)		Type of surface to be treated	Approximate coverage		Packaging
			Decontaminant	Water		Gal	Sq yd	
Calcium hypochlorite (HTH)	Water purification.	70	7	93	Horizontal concrete	1	8	
			7	93	Horizontal packed earth	1	2	
STB or grade 3 chlorinated lime*	Chemical decontamination.	30–35	13	87	Horizontal concrete	1	8	8-gal drums.
			13	87	Horizontal packed earth	1	2	
			40	60	Vertical concrete	1	8	
Sodium hypochlorite (ordinary household bleach).	Bleaching	5	(Full strength).	------	Horizontal concrete	1	8	1-qt jars and 5-gal carboys.
					Horizontal packed earth	1	2	

*As bleach in storage for extended time will lose some available chlorine, concentration of mix must be increased appropriately.

d. Biological Decontamination Methods. A brief outline of biological decontamination methods is given in table LIV. For detailed information see FM 21–40 and TM 3–220.

Table LIV. Biological Decontamination

Item	Method	Remarks
Cotton clothing	Boiling in water for 15 minutes.	
	Autoclaving for 45 minutes at 123° C.	
	Immersion in 7 percent bleach solution for 30 minutes.	Immediate rinse required.
	Laundering	Destroys or inactivates all but highly resistant spore-forming organisms.
	Methyl bromide vapors [1] in delousing bags.	Leave in bag for 12 hours, then aerate for 2 hours to remove vapor.
Fine instruments, mask facepieces.[2]	Methyl bromide vapors [1] in delousing bags.	Leave in bag for 12 hours, then aerate for 2 hours to remove vapor.
Helmets and mess gear.	Washing with soap and water and boiling for 15 minutes.	
	Methyl bromide vapors [1] in delousing bags.	Leave in bag for 12 hours, then aerate for 2 hours or wash to remove vapor.
Leather and rubber items.	Methyl bromide vapors [1] in delousing bags.	Leave in bag for 12 hours, then aerate for 2 hours to remove vapor.
	Scrubbing with soap and hot water for 20 minutes.	
Large items	Scrubbing with DANC solution, or 7 percent bleach solution.	Requires water rinsing or flushing after scrubbing.
Buildings	Fumigation with formaldehyde and steam.	1 milliliter of formaldehyde solution per cubic foot. Building is sealed before fumigation and thoroughly aerated afterwards.
	Spraying with formaldehyde, or glycerin-formaldehyde.	Suitable for furniture and interior surfaces of buildings.
	Using decontaminating apparatus for washing with soap and water.	Suitable for interior of buildings.
	Weathering	Sun, wind, and rain usually eliminate exterior germs within a few hours.

See footnotes at end of table.

Table LIV. Biological Decontamination—Continued

Item	Method	Remarks
Terrain:		
All	Weathering	Evacuate contaminated area and allow sufficient time for weathering.
All	Wetting with water	Will keep germs on ground.
Porous	Spraying with slurry (20 percent bleach solution).	Suitable to limited extent for some types of terrain.
Hard surfaced roads.	Pouring, spraying, or spreading oil.	Will keep germs on ground.
Vegetation.	Burning with flame thrower	Can be used to burn off areas and passageways.
Air (inclosed spaces)	Filter air by means of protective collector.	Renders air relatively free from germs.
	Spraying calcium or sodium hypochlorite solution.	Can kill considerable portion, though not all, of airborne germs in inclosed spaces.
	Vaporizing triethylene glycol.	Can kill considerable portion, though not all, of airborne germs in inclosed spaces.
Water [3]	Boiling for 10 minutes.	
	Chlorination	Generally effective for killing most harmful organisms.
	Super-chlorination	For heavy contamination. Follow with dechlorination.
Food [3]	Boiling in water for 10 minutes.	
	Cooking	Thorough cooking insures effective destruction of micro-organisms.
	Immersion or spraying	Packaged food, or food which is peeled or pared may be immersed or sprayed.
Personnel (Hands) [4]	Bathing with soap and warm water.	Remove clothing and shower for 20 minutes.[5]
	Washing with hypochlorite or cresol.	

[1] In five times the quantity used for ordinary delousing. Ethylene oxide is used when methyl bromide is not available.

[2] To effectively decontaminate facepieces of protective masks, boil in water, wash in lukewarm soapy water, rinse in clear water, and then dry at room temperature. Masks determined to be infected with mycobacterium tuberculosis or pathogenic spore forming organisms should be destroyed by burning.

[3] Should not be consumed until pronounced safe by a medical officer.

[4] Minor cuts and abrasions should be treated immediately.

[5] When showering, head should be held back to prevent run-off from passing over eyes, nose, and mouth.

63. RADIOLOGICAL DECONTAMINATION

Radioactive contaminants cannot be made safe by chemical action. They must be removed or shielded if it is impracticable to wait for natural decay. Therefore, radiological decontamination is the process of reducing the hazard of radioactivity to a permissible level by removal and disposal of the contamination, or by shielding against the radiation.

a. Radiological Decontaminants. Radiological decontaminants are shown in table LV.

Table LV. Radiological Decontaminants

Decontaminant	Type	Remarks
Soapless detergent, soap, wetting agent.	Detergent	Practicable for field use.
Gasoline, kerosene, water	Solvent	Practicable for field use.
Steam	Solvent	Practicable for field use.
Potassium hydroxide, sodium hydroxide, trisodium phosphate.	Solvent	Practicable for field use.
Acetone, alcohol*, ether, paint remover.	Solvent	Practicable for small scale operations only.
Carbonates, citrates, oxalates	Complexing agent	Practicable for small scale operations only.
Aqua regia, hydrochloric acid, nitric acid.	Corroding agent	Practicable for small scale operations only. ***Caution:*** To be handled by experienced personnel only.

*Methyl, ethyl, propyl, or isopropyl.

b. Radiological Decontamination Equipment. Chemical Corps equipment used in radiological decontamination includes the 400-gallon power-driven decontaminating apparatus, 3-gallon portable decontaminating apparatus, portable water heater, and decontaminating brushes. Radiological decontamination equipment is listed in table LVI.

Table LVI. Radiological Decontamination Equipment

Item	Use
Brush	Scrubbing.
Bulldozer	Disposal of contaminated objects; large scale burial.
Decontaminating apparatus (portable, 3-gallon).	Primarily small scale, but some large scale hosing and spraying.
Decontaminating apparatus (power-driven, 400-gallon).	Large scale hosing and spraying operations (large areas, buildings, vehicles, and machinery).
Hose (fire and garden)	Hosing and scrubbing operations; also used in bulldozer or road grader operations to hold down dust.
Portable water heater	Heating water for cleaning operations.
Road grader	Scraping away contaminated surfaces.
Scraper (long handle)	Paint scraping.
Shovel	Disposal and burial of contaminated objects and materials.
Steam jenny	Cleaning greasy or hard dirt film surfaces; also for cleaning complicated machinery and equipment.
Chemical service truck	Dipping or disposal of small objects.

c. Radiological Decontamination Methods. Specific radiological decontamination methods are described in TM 3–220. Outlines and comments on the methods are presented in table LVII.

Table LVII. Radiological Decontamination Methods

Method	Surface	Action	Technique	Advantage	Disadvantage
Abrasive		Surface removal		Activity may be reduced to as low a level as is desired.	
Wet sandblasting	Nonporous surfaces.		Use conventional procedures, but keep surface damp to avoid dust hazard. Collect used abrasive.		Impracticable for porous surfaces. Contaminant spread over area must be recovered for disposal.
Vacuum blasting	Porous and nonporous surfaces.	Controlled removal by vacuum suction.	Hold tool flush to surface to prevent escape of contamination.	Controlled disposal	Contamination of equipment.
Acid mixture: Hydrochloric or sulfuric with acetates or citrates.	Nonporous surfaces (especially those having porous deposits); circulatory pipe systems.	Dissolving	Apply in same manner as for inorganic acids. Mixture consists of 0.1 gallons of hydrochloric acid, 0.2 pounds sodium acetate, 1.0 gallon of water.	Dissolving action may reduce contamination by 90 percent in 1 hour (unweathered surfaces).	Weathered surfaces may require prolonged treatment.
Caustic: Lye (sodium hydroxide), calcium hydroxide, potassium hydroxide.	Painted surfaces (horizontal).	Strong dissolving power softens paint (harsh method).	Allow paint-remover solution to remain on surface until paint is softened to the point where it may be washed off with water.	Minimum contact with contaminated surfaces. Easily stored.	Personnel danger (painful burns). Reaction slow. Difficult to apply to vertical or overhead surfaces Should not be used on aluminum or magnesium.
Trisodium phosphate.	Painted surfaces (vertical, overhead).	Mild dissolving power.	Remove remaining paint with long-handled scraper. Apply hot 10 percent solution. Use standard wiping technique.	Reduces activity to tolerance in one or two applications.	Destructive effect on paint.
Complexing agent: Carbonates, citrates, oxalates.	Nonporous surfaces (especially unweathered, calcareous surfaces).	Forms soluble complexes with contaminated material.	Solution should contain 3 percent (by weight) of agent. Spray solution on surface. Keep surface moist for 30 minutes by spraying with solution periodically; after allotted time flush material off with water. Solution may be mixed with mechanical foam for use on vertical and overhead surfaces.	Holds contamination in solution. On unweathered surfaces contamination is reduced 75 percent in 4 minutes. Easily stored. Nontoxic; noncorrosive.	Requires application for 5 to 30 minutes. Not much penetrating power. Of small value on weathered surfaces.

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Table LVII. Radiological Decontamination Methods—Continued

Method	Surface	Action	Technique	Advantage	Disadvantage
Detergent	Nonporous surfaces (especially industrial film).	Emulsifying agent; wetting agent.	Rub surface 1 minute and wipe with dry rag; use clean surface of rag for each application. (Moist application is all that is desired.) Do not allow solution to drip on other surfaces. Solution may be applied with a powered rotary brush, or, from a distance, with a pressure proportioner.	Dissolves industrial film which holds contamination. Contamination may be reduced by 90 percent.	Mild method not efficient on long-standing contamination.
Inorganic acids: hydrochloric (9 to 18 percent); sulfuric (3 to 6 percent).	Metal surfaces (especially those with porous deposits) (rust or calcareous growths); circulatory pipe systems.	Strong dissolving power on metals and porous deposits.	Dip bath technique is advisable for movable items. Reaction time on weathered surfaces should be 1 hour, on pipe systems 2 to 4 hours; afterwards surface should be neutralized and rinsed with 9 to 18 percent hydrochloric and 3 to 6 percent sulfuric acid (acid mixture should not be heated).	Corrosive action on metal and porous deposits may be moderated by addition of corrosion inhibitors to solution.	Good ventilation required. Corrosive. Sulfuric acid not effective on calcareous deposits.
Organic solvent	Nonporous surfaces (greasy or waxed; paint or plastic finish).	Solution of organic materials (oil, paint, and varnish).	Entire unit may be immersed in solvent or solvent may be applied by wiping.	Quick dissolving action. Recovery of solvent possible by distillation.	Requires good ventilation and fire precautions. Toxic. Material bulky.
Steam	Nonporous surfaces (especially painted or oiled surfaces).	Solution and erosion.	Work from top to bottom and from upwind; clean surface at rate of 4 feet per minute. Efficiency may be greatly increased by addition of detergent.	Steam reduces contamination approximately 90 percent on painted surfaces.	Steam subject to the same limitations as water; waterproof outfit necessary.
Vacuum cleaning	Dry surfaces	Removal of contaminated dust by suction.	Use conventional vacuum technique with efficient filter.	Good on dry, porous surface.	Dust must be filtered out of exhaust. Machine may be contaminated.
Water	Nonporous surfaces (metal, paint, or plastic). Unsuitable on porous material such as canvas, concrete, or wood.	Solution and erosion.	For heavy contamination, apply water at high pressure; work from top to bottom and from upwind. Optimum operation from 15 to 20 feet from surface; hose vertical surfaces at 30° to 45° angle. Determine cleaning rate experimentally, if possible, otherwise clean at a rate of 4 square feet per minute.	All water equipment may be utilized. Contamination may be reduced 50 percent. Solutions of other agents may be used in water equipment.	Drainage must be controlled. Porous material absorbs contaminant. Oiled surface cannot be decontaminated. Not applicable on dry surface (vacuum). Spray is contaminated.

d. Radiological Decontamination. Radiological decontamination data for various items are presented in table LVIII. See TM 3–220 for additional information on radiological decontamination.

Table LVIII. Radiological Decontamination

Item	Method	Equipment or decontaminant	Remarks
Clothing	Vacuum clean	Vacuum cleaning machinery.	Dispose of contamination removed by machine filter.
	Wash	Laundry*	Dispose of water used for washing and rinsing.
Equipment	Depends on nature of surface.		See tables LVI and LVII.
Buildings	Abrasion, caustics.		See tables LVI and LVII.
Terrain	Decay	None	Wait for natural decay.
Water	Filter	Filters, stills, and purifiers (engineer equipment).	Must be pronounced safe by medical officer or water specialist.
Food exposed.	None; dispose of, isolate, or shield.	Digging equipment.	Not safe or practicable to attempt to remove radiological contamination from exposed or opened food.
Food covered.	Scrub or wash	Brushes or hose	Must not be unwrapped or peeled until lowering of contamination level is adequate and pronounced safe by medical officer.
Personnel	Bathing, scrubbing, showering, washing.	Brushes, hose, showers, soap.	Bathing and scrubbing must be continued until contamination is lowered to a safe level.

*See TM 3–220 for details.

Section III. CLOTHING IMPREGNATION

64. References

For information on chemical impregnation of clothing see FM 3–30 and TM 3–281.

65. Operating Data

a. General. The chemical processing company is equipped with two clothing impregnating plants each capable of processing approximately 4,000 pounds (1,000 uniforms) per 24-hour day. Each uniform is considered to consist of a pair of short drawers, a pair of socks, a pair of fabric gloves, and a one-piece or two-piece herringbone twill outfit. Chemical processing units usually operate in conjunction with quartermaster laundry units.

b. Clothing Impregnating Plant. The M2A1 and M2 clothing impregnating plants employ aqueous suspension impregnation methods.

(1) *Operating supply requirements.* The weight and storage space requirements for operating supplies needed to impregnate approximately 4,000 pounds of clothing during a 24-hour operating day are shown in table LIX.

Table LIX. Supplies Required for 24-Hour Day Operation of M2A1 or M2 Impregnating Plant

Item	Gross weight (lb)	Floor space (sq ft)	Volume (cu ft)	Remarks
Boiler water (400 gallons)	3, 342	------	------	3,000-gallon canvas tank (11-foot diameter) normally is used.
Chlorinated paraffin	660	12. 0	23. 4	In 55-gallon drums stored on side, 2 drums high.
72 octane gasoline (fuel for 2 electric generators).	770	12. 0	36. 0	In 55-gallon drums stored on side, 2 drums high.
No. 3 fuel oil (for steam generator).	2, 360	18. 0	60. 0	In 55-gallon drums stored on side, 2 drums high.
Impregnite, XXCC3	850	8. 5	27. 0	In metals container, 16 inches in diameter and 26 inches, high, stored on side, 2 containers high.
Polyvinyl alcohol, granular.	32	3. 0	3. 3	In 120-pound drums, 16 inches in diameter and 30 inches high, stored on side.

(2) *Laboratory material requirements.* Monochlorobenzene and tetrachloroethane are shipped in 55-gallon drums and are stored at a safe distance from the generators. The quantities of laboratory materials required for a 24-hour day operation of processing 4,000 pounds of clothing are listed in table LX.

(3) *Lubricant requirements.* The lubricants required for the M2A1 or M2 impregnating plant include oil (usually supplied in 55-gallon drums) and grease (usually supplied in 10-pound pails). The quantities required for a 24-hour day impregnation of 4,000 pounds of clothing are listed in table LX.

Table LX. M2A1 or M2 Impregnating Plant Laboratory Material and Lubricant Requirements

Item	Reagent or lubricant	Quantity required for 4,000-pound output per 24-hour day
Reagent or material	Acetic acid, glacial, CP	8.3 liters.
	Monochlorobenzene	9 gallons.
	Potassium iodide crystals	1.8 pounds.
	Sodium thiosulfate crystals	0.83 pound.
	Sodium thiosulfate fixanal	0.25 carton.
	Stopcock grease	Very small amount.
	Tetrachloroethane	1.8 gallons.
Lubricant	Lubricating grease	3.2 ounces.
	Lubricating oil	5.5 gallons.

66. Plant Layout

The covered shop (floor area) requirements for an M2A1 or M2 impregnating plant is approximately 5,200 square feet.

Section IV. CHEMICAL LABORATORY SERVICE

67. References

For information pertaining to the chemical laboratory see FM 3–25 and TM 3–215.

68. Operating Data

Chemical laboratories perform analyses, examinations, studies, tests, and surveillance.

a. Laboratory Services. The services performed by chemical laboratories for the Air Force and for various branches of the Army are listed in table LXI.

Table LXI. Chemical Laboratory Services

Agency for which service is performed	Service performed
Chemical Corps	Collection and identification of enemy chemical agents. Determination of adequacy of protective equipment. Provision of methods of emergency decontamination and protection against new chemical agents. Provision of miscellaneous technical advice.
Air Force	Analysis of material for indications of sabotage. Investigation of corrosion inhibitors. Tests of cleaning mixtures. Tests of cooling liquids for aircraft. Tests of parachute material.
Corps of Engineers	Analysis of water and concrete. Study of problems of photo processes.
Army Medical Service	Analysis and testing of insecticides. Determination of purity of solvents. Examination of water and foods for toxic contamination. Identification of drugs. Supplementary analyses of blood and urine.
Military Intelligence	Investigation of foreign materiel.
Ordnance Corps	Analysis of sludges from motors. Analysis of soldering flux. Examination and testing of detonators. Examination and testing of explosives. Examination and testing of primers. Examination and testing of propellants.
Quartermaster Corps	Analysis of various substances. Development of insect powders, sunburn creams, windburn salves. Tests on stored tentage and clothing. Examination of dyes.

b. Surveillance. Typical surveillance procedures accomplished by chemical laboratories are shown in table LXII.

Table LXII. Chemical Laboratory Surveillance Procedures

Test	Test method	Time required for test	Personnel required for test
Effect of agent on humans	Hematology	30 min	1
	Urinalysis	45 min	1
Effect of agent on rats	Pathology	1 hr	1
Canister ammonia evolution	Physiological	3 hr	2
	Analytical	2 hr	2
Canister gas life	Agent filtration	4 hr	2
Canister smoke penetration	Standard smoke filtration	1 hr	2
Canister resistance	Pressure drop	30 min	1
Canister water content	Weight gain	5 min	1
	Air drying	6 hr	1
	Heat absorbent sample	3 hr	1
Impermeable vesicant resistance	Penetration to indicator	7 hr	2
Lung irritant action	Gas chamber	10 days	1
Penetration of protective material.	Standard drop	48 hr	1
	Vapor cup	48 hr	1
Permeable fabric available chlorine.	Analytical	1 hr	1
Permeable fabric vapor resistance.	Filtered vapor through bubbler-indicators.	4 hr	2
Shell-tapping	Drilling	1 hr	1
Skin irritability to various materials.	Patch testing	48 hr	1
Vesicant action on skin	Rod	72 hr	1
	Vapor cup	72 hr	1
	Solution	72 hr	1

Section V. PROTECTIVE SHELTERS

69. References

For detailed information on protective shelters see FM 5–15, FM 21–40, and TM 3–350.

70. Collective Protectors

Characteristics of collective protectors are given in table LXIII. For additional information see TM 3–350, TB 3–350–1, and TB 3–350–2.

Table LXIII. Characteristics of Collective Protectors

Description	Wt (lb)	Dimensions (in.)			Purified air delivery (cfm)	Means of operation
		L	W	H		
M2 (field, semifixed)	650	31	31	66	200	Gasoline engine, ½ HP
M2A2 (skid-mounted)	615	64	25	[a] 32	200	Gasoline engine, 1 HP
M6 (gasoline engine driven).	400	34	24	39	300	Gasoline engine, 1½ HP.
M6 (electric motor driven).	400	34	24	39	300	Electric motor, 1 HP, 110 volts, 60 cycle, 746 watts.
M7 (hospital, 6-man)	125 (gross)	(b)	(b)	(b)	[c] 12	Electric DC, motor, operated by either two 12-volt or four 6-volt batteries, or through a transformer connected to a 110-volt AC source.

[a] Exclusive of support pipe and air inlet hose.
[b] 5 cubic feet.
[c] Delivers 2 cfm to each of 6 patients.

CHAPTER 6

MISCELLANEOUS DATA

Section I. RADIOLOGICAL DEFENSE DATA

71. References

For additional information on radiological defense, see DA pamphlets 20–111, and 20–112.

72. Exponentials

a. Exponentials (Negative). Exponentials for e^{-n} with n ranging from 0 to 10 are given in table LXIV.

*Table LXIV. Negative Exponentials**

e^{-n}

n	0	1	2	3	4	5	6	7	8	9
0.0	1. 0000	. 9901	. 9802	. 9705	. 9608	. 9512	. 9418	. 9324	. 9231	. 9139
0.1	. 9048	. 8958	. 8869	. 8781	. 8694	. 8607	. 8521	. 8437	. 8353	. 8270
0.2	. 8187	. 8106	. 8025	. 7945	. 7866	. 7788	. 7711	. 7634	. 7558	. 7483
0.3	. 7408	. 7335	. 7262	. 7189	. 7118	. 7047	. 6977	. 6907	. 6839	. 6771
0.4	. 6703	. 6637	. 6571	. 6505	. 6440	. 6376	. 6313	. 6250	. 6188	. 6126
0.5	. 6065	. 6005	. 5945	. 5886	. 5828	. 5770	. 5712	. 5655	. 5599	. 5543
0.6	. 5488	. 5434	. 5379	. 5326	. 5273	. 5221	. 5169	. 5117	. 5066	. 5016
0.7	. 4966	. 4916	. 4868	. 4819	. 4771	. 4724	. 4677	. 4630	. 4584	. 4538
0.8	. 4493	. 4459	. 4404	. 4361	. 4317	. 4274	. 4232	. 4190	. 4158	. 4107
0.9	. 4066	. 4025	. 3985	. 3946	. 3906	. 3867	. 3829	. 3791	. 3753	. 3716

*For entries less than .1000, number of decimal places preceding significant figures is indicated in parentheses. For example, .00764 is written (2)764.

Table LXIV. Negative Exponentials—Continued*

e^{-n}

n	0	1	2	3	4	5	6	7	8	9
1.0	.3679	.3642	.3606	.3570	.3535	.3499	.3465	.3430	.3396	.3362
1.1	.3329	.3296	.3263	.3230	.3198	.3166	.3135	.3104	.3073	.3042
1.2	.3012	.2982	.2952	.2923	.2894	.2865	.2837	.2808	.2780	.2753
1.3	.2725	.2698	.2671	.2645	.2619	.2592	.2567	.2541	.2516	.2491
1.4	.2466	.2441	.2417	.2393	.2369	.2346	.2322	.2299	.2276	.2254
1.5	.2231	.2209	.2187	.2165	.2144	.2123	.2101	.2081	.2060	.2039
1.6	.2019	.1999	.1979	.1959	.1940	.1921	.1901	.1883	.1864	.1845
1.7	.1827	.1809	.1791	.1773	.1755	.1738	.1720	.1703	.1686	.1670
1.8	.1653	.1637	.1620	.1604	.1588	.1572	.1557	.1541	.1526	.1511
1.9	.1496	.1481	.1466	.1452	.1437	.1423	.1409	.1395	.1381	.1367
2.0	.1353	.1340	.1327	.1313	.1300	.1287	.1275	.1262	.1249	.1237
2.1	.1225	.1212	.1200	.1188	.1177	.1165	.1153	.1142	.1130	.1119
2.2	.1108	.1097	.1086	.1075	.1065	.1054	.1044	.1033	.1023	.1013
2.3	.1003	.0993	.0983	.0973	.0963	.0954	.0944	.0935	.0926	.0916
2.4	.0907	.0898	.0889	.0880	.0872	.0863	.0854	.0846	.0837	.0829
2.5	.0821	.0813	.0805	.0797	.0789	.0781	.0773	.0765	.0758	.0750
2.6	.0743	.0735	.0728	.0721	.0714	.0707	.0700	.0693	.0686	.0679
2.7	.0672	.0665	.0659	.0652	.0646	.0639	.0633	.0637	.0620	.0614
2.8	.0608	.0602	.0596	.0590	.0584	.0578	.0573	.0567	.0561	.0556
2.9	.0550	.0545	.0539	.0534	.0529	.0523	.0518	.0513	.0508	.0503

3.0	.0498	.0493	.0488	.0483	.0478	.0474	.0469	.0464	.0460	.0455
3.1	.0451	.0446	.0442	.0437	.0433	.0429	.0424	.0420	.0416	.0412
3.2	.0408	.0404	.0400	.0396	.0392	.0388	.0384	.0380	.0376	.0373
3.3	.0369	.0365	.0362	.0358	.0354	.0351	.0347	.0344	.0341	.0337
3.4	.0334	.0330	.0327	.0324	.0321	.0318	.0314	.0311	.0308	.0305
3.5	.0302	.0299	.0296	.0293	.0290	.0287	.0284	.0282	.0279	.0276
3.6	.0273	.0271	.0268	.0265	.0263	.0260	.0257	.0255	.0252	.0250
3.7	.0247	.0245	.0242	.0240	.0238	.0235	.0233	.0231	.0228	.0226
3.8	.0224	.0222	.0219	.0217	.0215	.0213	.0211	.0209	.0207	.0205
3.9	.0202	.0200	.0198	.0196	.0195	.0193	.0191	.0189	.0187	.0185
4.0	.0183	.0181	.0180	.0178	.0176	.0174	.0173	.0171	.0169	.0167
4.1	.0166	.0164	.0162	.0161	.0159	.0158	.0156	.0155	.0153	.0152
4.2	.0150	.0149	.0147	.0146	.0144	.0143	.0141	.0140	.0138	.0137
4.3	.0136	.0134	.0133	.0132	.0130	.0129	.0128	.0127	.0125	.0124
4.4	.0123	.0122	.0120	.0119	.0118	.0117	.0116	.0115	.0113	.0112
4.5	.0111	.0110	.0109	.0108	.0107	.0106	.0105	.0104	.0103	.0102
4.6	.0101	(2)995	(2)985	(2)976	(2)966	(2)956	(2)947	(2)937	(2)928	(2)919
4.7	(2)910	(2)901	(2)892	(2)883	(2)874	(2)865	(2)857	(2)848	(2)840	(2)831
4.8	(2)823	(2)815	(2)807	(2)799	(2)791	(2)783	(2)775	(2)767	(2)760	(2)752
4.9	(2)745	(2)737	(2)730	(2)723	(2)716	(2)708	(2)701	(2)694	(2)687	(2)681
5.0	(2)674	(2)667	(2)660	(2)654	(2)647	(2)641	(2)635	(2)628	(2)622	(2)616
5.1	(2)610	(2)604	(2)598	(2)592	(2)586	(2)580	(2)574	(2)569	(2)563	(2)557
5.2	(2)552	(2)546	(2)541	(2)535	(2)530	(2)525	(2)520	(2)514	(2)509	(2)504
5.3	(2)499	(2)494	(2)489	(2)484	(2)480	(2)475	(2)470	(2)465	(2)461	(2)456
5.4	(2)452	(2)447	(2)443	(2)438	(2)434	(2)430	(2)425	(2)421	(2)417	(2)413

*For entries less than .1000, number of decimal places preceding significant figures is indicated in parentheses. For example, .00764 is written (2)764.

Table LXIV. Negative Exponentials—Continued*

e^{-n}

n	0	1	2	3	4	5	6	7	8	9
5.5	(2)409	(2)405	(2)401	(2)397	(2)393	(2)389	(2)385	(2)381	(2)377	(2)374
5.6	(2)370	(2)366	(2)363	(2)359	(2)355	(2)352	(2)348	(2)345	(2)341	(2)338
5.7	(2)335	(2)331	(2)328	(2)325	(2)322	(2)318	(2)315	(2)312	(2)309	(2)306
5.8	(2)303	(2)300	(2)297	(2)294	(2)291	(2)288	(2)285	(2)282	(2)280	(2)277
5.9	(2)274	(2)271	(2)269	(2)266	(2)263	(2)261	(2)258	(2)255	(2)253	(2)250
6.0	(2)248	(2)245	(2)243	(2)241	(2)238	(2)236	(2)233	(2)231	(2)229	(2)227
6.1	(2)224	(2)222	(2)220	(2)218	(2)216	(2)213	(2)211	(2)209	(2)207	(2)205
6.2	(2)203	(2)201	(2)199	(2)197	(2)195	(2)193	(2)191	(2)189	(2)187	(2)186
6.3	(2)184	(2)182	(2)180	(2)178	(2)176	(2)175	(2)173	(2)171	(2)170	(2)168
6.4	(2)166	(2)165	(2)163	(2)161	(2)160	(2)158	(2)157	(2)155	(2)153	(2)152
6.5	(2)150	(2)149	(2)147	(2)146	(2)144	(2)143	(2)142	(2)140	(2)139	(2)137
6.6	(2)136	(2)135	(2)133	(2)132	(2)131	(2)129	(2)128	(2)127	(2)126	(2)124
6.7	(2)123	(2)122	(2)121	(2)120	(2)118	(2)117	(2)116	(2)115	(2)114	(2)113
6.8	(2)111	(2)110	(2)109	(2)108	(2)107	(2)106	(2)105	(2)104	(2)103	(2)102
6.9	(2)101	(3)998	(3)988	(3)978	(3)968	(3)959	(3)949	(3)940	(3)930	(3)921
7.0	(3)912	(3)903	(3)894	(3)885	(3)876	(3)867	(3)859	(3)850	(3)842	(3)833
7.1	(3)825	(3)817	(3)809	(3)801	(3)793	(3)785	(3)777	(3)769	(3)762	(3)754
7.2	(3)747	(3)739	(3)732	(3)725	(3)717	(3)710	(3)703	(3)696	(3)689	(3)682
7.3	(3)676	(3)669	(3)662	(3)656	(3)649	(3)643	(3)636	(3)630	(3)624	(3)617
7.4	(3)611	(3)605	(3)599	(3)593	(3)587	(3)581	(3)576	(3)570	(3)564	(3)559

7.5	(3)553	(3)547	(3)542	(3)537	(3)531	(3)526	(3)521	(3)516	(3)511	(3)506
7.6	(3)501	(3)496	(3)491	(3)486	(3)481	(3)476	(3)471	(3)467	(3)462	(3)457
7.7	(3)453	(3)448	(3)444	(3)439	(3)435	(3)431	(3)427	(3)422	(3)418	(3)414
7.8	(3)410	(3)406	(3)402	(3)398	(3)394	(3)390	(3)386	(3)382	(3)378	(3)375
7.9	(3)371	(3)367	(3)363	(3)360	(3)356	(3)352	(3)349	(3)346	(3)342	(3)339
8.0	(3)336	(3)332	(3)329	(3)326	(3)322	(3)319	(3)316	(3)313	(3)310	(3)307
8.1	(3)304	(3)301	(3)298	(3)295	(3)292	(3)289	(3)286	(3)283	(3)280	(3)277
8.2	(3)275	(3)272	(3)269	(3)267	(3)264	(3)261	(3)259	(3)256	(3)254	(3)251
8.3	(3)249	(3)246	(3)244	(3)241	(3)239	(3)236	(3)234	(3)232	(3)229	(3)227
8.4	(3)230	(3)223	(3)220	(3)218	(3)216	(3)214	(3)212	(3)210	(3)208	(3)206
8.5	(3)204	(3)201	(3)199	(3)198	(3)196	(3)194	(3)192	(3)190	(3)188	(3)186
8.6	(3)184	(3)182	(3)181	(3)179	(3)177	(3)175	(3)173	(3)172	(3)170	(3)168
8.7	(3)167	(3)165	(3)163	(3)162	(3)160	(3)159	(3)157	(3)155	(3)154	(3)152
8.8	(3)151	(3)149	(3)148	(3)146	(3)145	(3)143	(3)142	(3)141	(3)139	(3)138
8.9	(3)136	(3)135	(3)134	(3)132	(3)131	(3)130	(3)128	(3)127	(3)126	(3)125
9.0	(3)123	(3)122	(3)121	(3)120	(3)119	(3)117	(3)116	(3)115	(3)114	(3)113
9.1	(3)112	(3)111	(3)110	(3)108	(3)107	(3)106	(3)105	(3)104	(3)103	(3)102
9.2	(3)101	(3)100	(4)990	(4)981	(4)971	(4)961	(4)952	(4)942	(4)933	(4)923
9.3	(4)914	(4)905	(4)896	(4)887	(4)878	(4)870	(4)861	(4)852	(4)844	(4)836
9.4	(4)827	(4)819	(4)811	(4)803	(4)795	(4)787	(4)779	(4)771	(4)764	(4)756
9.5	(4)749	(4)741	(4)734	(4)726	(4)719	(4)712	(4)705	(4)698	(4)691	(4)684
9.6	(4)677	(4)671	(4)664	(4)657	(4)651	(4)644	(4)638	(4)632	(4)625	(4)619
9.7	(4)613	(4)607	(4)601	(4)595	(4)589	(4)583	(4)577	(4)571	(4)566	(4)560
9.8	(4)555	(4)549	(4)544	(4)538	(4)533	(4)528	(4)522	(4)517	(4)512	(4)507
9.9	(4)502	(4)497	(4)492	(4)487	(4)482	(4)477	(4)473	(4)468	(4)463	(4)459

*For entries less than .1000, number of decimal places preceding significant figures is indicated in parentheses. For example, .00764 is written (2)764.

b. Exponentials (Positive). Exponentials for e^n with n ranging from 0 to 10 are given in table LXV.

Table LXV. Positive Exponentials

e^n

n	0	1	2	3	4	5	6	7	8	9
0.0	1.000	1.010	1.020	1.030	1.041	1.051	1.062	1.073	1.083	1.094
0.1	1.105	1.116	1.127	1.139	1.150	1.162	1.174	1.185	1.197	1.209
0.2	1.221	1.234	1.246	1.259	1.271	1.284	1.297	1.310	1.323	1.336
0.3	1.350	1.363	1.377	1.391	1.405	1.419	1.433	1.448	1.462	1.477
0.4	1.492	1.507	1.522	1.537	1.553	1.568	1.584	1.600	1.616	1.632
0.5	1.649	1.665	1.682	1.699	1.716	1.733	1.751	1.763	1.786	1.804
0.6	1.822	1.840	1.859	1.878	1.896	1.916	1.935	1.954	1.974	1.994
0.7	2.014	2.034	2.054	2.075	2.096	2.117	2.138	2.160	2.181	2.203
0.8	2.226	2.248	2.270	2.293	2.316	2.340	2.363	2.387	2.411	2.435
0.9	2.460	2.484	2.509	2.535	2.560	2.586	2.612	2.638	2.664	2.691
1.0	2.718	2.746	2.773	2.801	2.829	2.858	2.886	2.915	2.945	2.974
1.1	3.004	3.034	3.065	3.096	3.127	3.158	3.190	3.222	3.254	3.287
1.2	3.320	3.354	3.387	3.421	3.456	3.490	3.525	3.561	3.597	3.633
1.3	3.669	3.706	3.743	3.781	3.819	3.857	3.896	3.935	3.975	4.015
1.4	4.055	4.096	4.137	4.179	4.221	4.263	4.306	4.349	4.393	4.437
1.5	4.482	4.527	4.572	4.618	4.665	4.712	4.759	4.807	4.855	4.904
1.6	4.953	5.003	5.053	5.104	5.155	5.207	5.259	5.312	5.367	5.420
1.7	5.474	5.529	5.585	5.641	5.697	5.755	5.812	5.871	5.930	5.990
1.8	6.050	6.110	6.172	6.234	6.297	6.360	6.424	6.488	6.554	6.619
1.9	6.686	6.753	6.821	6.890	6.959	7.029	7.099	7.171	7.243	7.316
2.0	7.389	7.463	7.538	7.614	7.691	7.768	7.846	7.925	8.005	8.085
2.1	8.166	8.248	8.331	8.415	8.499	8.585	8.671	8.758	8.846	8.935

2.2	9.025	9.116	9.207	9.300	9.393	9.488	9.583	9.679	9.778	9.875
2.3	9.974	10.07	10.18	10.28	10.38	10.49	10.59	10.70	10.81	10.91
2.4	11.02	11.13	11.25	11.36	11.47	11.59	11.71	11.82	11.94	12.06
2.5	12.18	12.31	12.43	12.55	12.68	12.81	12.94	13.07	13.20	13.33
2.6	13.46	13.60	13.74	13.87	14.01	14.15	14.30	14.44	14.86	14.73
2.7	14.88	15.03	15.18	15.33	15.49	15.64	15.80	15.96	16.12	16.28
2.8	16.45	16.61	16.78	16.95	17.12	17.29	17.46	17.64	17.81	17.99
2.9	18.17	18.36	18.54	18.73	18.92	19.11	19.30	19.49	19.69	19.89
3.0	20.09	20.29	20.49	20.70	20.91	21.12	21.33	21.54	21.76	21.98
3.1	22.20	22.42	22.65	22.87	23.10	23.34	23.57	23.81	24.05	24.29
3.2	24.53	24.78	25.03	25.28	25.53	25.79	26.05	26.31	26.58	26.84
3.3	27.11	27.39	27.66	27.94	28.22	28.50	28.79	29.08	29.37	29.67
3.4	29.96	30.27	30.57	30.88	31.19	31.50	31.82	32.14	32.46	32.79
3.5	33.12	33.45	33.78	34.12	34.47	34.81	35.16	35.52	35.87	36.23
3.6	36.60	36.97	37.33	37.71	38.09	38.48	38.86	39.25	39.65	40.05
3.7	40.45	40.85	41.26	41.68	42.10	42.52	42.95	43.38	43.82	44.26
3.8	44.70	45.15	45.60	46.06	46.53	46.99	47.47	47.94	48.42	48.91
3.9	49.40	49.90	50.40	50.91	51.42	51.94	52.46	52.96	53.52	54.06
4.0	54.60	55.15	55.70	56.26	56.83	57.40	57.97	58.56	59.15	59.74
4.1	60.34	60.95	61.56	62.18	62.80	63.43	64.07	64.72	65.37	66.02
4.2	66.69	67.36	68.03	68.72	69.41	70.11	70.81	71.52	72.24	72.97
4.3	73.70	74.44	75.19	75.94	76.71	77.48	78.26	79.04	79.84	80.64
4.4	81.45	82.27	83.10	83.93	84.78	85.63	86.49	87.36	88.24	89.12
4.5	90.02	90.92	91.84	92.76	93.69	94.63	95.58	96.54	97.51	98.49
4.6	99.48	100.5	101.5	102.5	103.5	104.6	105.6	106.7	107.8	108.9
4.7	110.0	111.1	112.2	113.3	114.4	115.6	116.8	117.9	119.1	120.3
4.8	121.5	122.7	124.0	125.2	126.5	127.7	129.0	130.3	131.6	133.0
4.9	134.3	135.6	137.0	138.4	139.8	141.2	143.6	144.0	145.5	146.9

Table LXV. Positive Exponentials—Continued

e^n

n	0	1	2	3	4	5	6	7	8	9
5.0	148.4	149.9	151.4	152.9	154.5	156.0	157.6	159.2	160.8	162.4
5.1	164.0	165.7	167.3	169.0	170.7	172.4	174 2	175.9	177.7	179.5
5.2	181.3	183.1	184.9	186.8	188.7	190.6	192.5	194.4	196.4	198.3
5.3	200.3	202.4	204.4	206.4	208.5	210.6	212.7	214.9	217.0	219.2
5.4	221.4	223.6	225.9	228.2	230.4	232.8	235.1	237.5	239.9	242.3
5.5	244.7	247.2	249.6	252.2	254.7	257.2	259.8	262.4	265.1	267.7
5.6	270.4	273.2	275.9	278.7	281.5	284.3	287.1	290.0	293.0	295.9
5.7	298.9	301.9	304.9	308.0	311.1	314.2	317.3	320.5	323.8	327.0
5.8	330.3	333.6	337.0	340.4	343.8	347.2	350.7	354.2	357.8	361.4
5.9	365.0	368.7	372.4	376.2	379.9	383.8	387.6	391.5	395.4	399.4
6.0	403.4	407.5	411.6	415.7	419.9	424.1	428.4	432.7	437.0	441.4
6.1	445.9	450.4	454.9	459.5	464.1	468.7	473.4	478.2	483.0	487.9
6.2	492.8	497.8	502.7	507.8	512.9	518.1	523.2	528.5	533.8	539.2
6.3	544.6	550.1	555.6	561.2	566.8	572.5	578.2	584.1	589.9	595.9
6.4	601.9	607.9	614.0	620.2	626.4	632.7	639.0	645.5	652.0	658.5
6.5	655.1	671.8	678.5	685.4	692.2	699.2	706.2	713.3	720.5	727.8
6.6	735.1	742.5	749.9	757.5	765.1	772.8	780.5	788.4	796.3	804.3
6.7	812.4	820.6	828.8	837.2	845.5	854.1	862.6	871.3	880.1	888.9
6.8	897.9	907.0	916.0	925.3	934.5	944.0	953.4	963.0	972.7	982.5
6.9	992.3	1002	1012	1023	1033	1043	1054	1064	1075	1086
7.0	1097	1108	1119	1130	1141	1153	1164	1176	1188	1200
7.1	1212	1224	1236	1249	1261	1274	1287	1300	1313	1326
7.2	1339	1353	1366	1380	1394	1408	1422	1437	1451	1466

7. 3	1480	1495	1510	1525	1541	1556	1572	1588	1604	1620
7. 4	1636	1653	1669	1686	1703	1720	1737	1755	1772	1790
7. 5	1808	1826	1845	1863	1882	1901	1920	1939	1959	1978
7. 6	1998	2018	2039	2059	2080	2101	2122	2143	2165	2186
7. 7	2208	2231	2253	2276	2298	2322	2345	2368	2392	2416
7. 8	2441	2465	2490	2515	2540	2566	2591	2618	2644	2671
7. 9	2697	2725	2752	2780	2807	2836	2864	2893	2922	2951
8. 0	2981	3011	3041	3072	3103	3134	3165	3197	3229	3262
8. 1	3295	3328	3361	3395	3429	3464	3498	3533	3569	3605
8. 2	3641	3678	3715	3752	3790	3828	3866	3905	3944	3984
8. 3	4024	4065	4105	4147	4188	4230	4273	4316	4359	4403
8. 4	4447	4492	4537	4583.	4629	4675	4722	4770	4818	4866
8. 5	4915	4960	5010	5061	5111	5163	5214	5269	5320	5373
8. 6	5432	5487	5541	5597	5653	5710	5767	5825	5884	5943
8. 7	6003	6064	6124	6186	6248	6311	6374	6438	6503	6568
8. 8	6634	6701	6768	6837	6905	6975	7044	7115	7187	7259
8. 9	7332	7406	7480	7556	7631	7708	7785	7864	7943	8023
9. 0	8103	8185	8267	8350	8434	8519	8604	8691	8778	8866
9. 1	8955	9046	9136	9228	9321	9415	9509	9605	9701	9799
9. 2	9897	9997	10197	10199	10301	10405	10509	10615	10722	10829
9. 3	10938	11048	11159	11272	11384	11499	11614	11731	11849	11968
9. 4	12088	12210	12332	12457	12581	12708	12835	12964	13095	13227
9. 5	13360	13495	13630	13767	13905	14045	14186	14329	14473	14619
9. 6	14765	14914	15063	15215	15367	15522	15677	15835	15995	16156
9. 7	16318	16483	16648	16816	16984	17155	17326	17501	17677	17855
9. 8	18034	18216	18398	18584	18770	18959	19149	19341	19536	19733
9. 9	19930	20131	20333	20538	20743	20952	21162	21375	21590	21807

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73. Mass-Energy Conversions

Factors for converting mass to energy are given in table LXVI.

Table LXVI. Mass-Energy Conversion Factors

Multiply—	By—	To obtain—
Mass units (mu)	9.31×10^{2}	Mev.
	1.49×10^{-3}	Ergs.
	3.56×10^{-11}	Calories.
	4.15×10^{-17}	Kilowatt-hours.
Mev	1.07×10^{-3}	Mass units.
	1.60×10^{-6}	Ergs.
	3.83×10^{-14}	Calories.
	4.45×10^{-20}	Kilowatt-hours.
Ergs	6.71×10^{2}	Mass units.
	6.24×10^{5}	Mev.
	2.39×10^{-8}	Calories.
	2.78×10^{-14}	Kilowatt-hours.
Calories (cal)	2.81×10^{19}	Mass units.
	2.62×10^{13}	Mev.
	4.18×10^{7}	Ergs.
	1.16×10^{-6}	Kilowatt-hours.
Kilowatt-hours (kw-hr)	2.41×10^{16}	Mass units.
	2.25×10^{19}	Mev.
	3.60×10^{13}	Ergs.
	8.60×10^{5}	Calories
Gram (gm)	6.03×10^{23}	Mass units.

74. Intensity and Dosage Equations

Pertinent equations are given below.

a. Decay of a Single Isotope.

$$I = I_0 e^{-\lambda t}$$

Where: I_0 = intensity of radiation in roentgens per hour, or disintegration rate, present at time t_0 at a fixed distance from the isotope.

I = intensity of radiation in roentgens per hour, or disintegration rate, present at the same distance from the sample at time t_1.

t = time elapsed from the observation at t_0 to the observation at t_1

λ = decay constant of the isotope.

e = base of the natural logarithms (tables LXIV and LXV).

$$\lambda T_{\frac{1}{2}} = 0.693; \quad \lambda = \frac{0.693}{T_{\frac{1}{2}}}$$

Where: $T_{\frac{1}{2}}$=half-life of isotope.

b. Dosage Received From Single Isotope Decay.

$$D_{\infty}=I/\lambda$$

Where: I=intensity (roentgens/hour) present in an area because of contamination by a single isotope at the time of entry into the area.

D_{∞}=dosage received by remaining in the area for an infinite time.

λ=decay constant of the isotope.

$$D=D_{\infty 1}-D_{\infty 2}=\frac{I_1-I_2}{\lambda}$$

Where: I_1=intensity present in a single isotope contaminated area at time of entry into the area.

I_2=intensity present in the area at time of exit from the area (use decay formula).

D=dosage received from stay in area.

c. Decay of a Multiple Isotope Mixture. When the many different isotopes resulting from the detonation of a fission weapon are present the overall decay of the mixture may be approximately represented by—

$$I_1 t_1^{\,n}=I_2 t_2^{\,n}$$

Where: I_1=intensity of radiation in roentgens per hour, or disintegration rate, present at the same distance from the sample at time t_1.

t_1=time elapsed from the detonation of the weapon to the observation of I_1.

I_2=intensity present in the contaminated area at time t_2.

t_2=time elapsed from the detonation of the weapon to the observation of I_2.

n=a constant exponent having the value 1.2 when the mixture consists of the *fission products* of nuclear fission only, and taking different values when the mixture includes various neutron induced activities.

d. Dosage Received from Multiple Isotope Decay.

$$D_{\infty}=\frac{It}{n-1}$$

Where: I=intensity (roentgens per hour) present in an area because of contamination by a single isotope at the time of entry into the area.

t=time elapsed from detonation of the weapon until entry into the area.

D_{∞}=dosage that an individual would receive if he should remain in the area for an infinite time.

$$D=D_{\infty 1}-D_{\infty 2}=\frac{I_1 t_1-I_2 t_2}{n-1}$$

Where: I_1=intensity present in the area at the time of entry into the area.

t_1=time elapsed from detonation of the weapon until entry into the area.

I_2=intensity present in the area at the time of exit from the area (use decay formula).

t_2=time elapsed from detonation of the weapon until exit from the area.

n=a constant exponent having the value 1.2 when the mixture consists of the *fission products* of nuclear fission only. (This exponent has different values when the mixture includes various neutron induced activities.)

e. Absorption of Gamma Radiation.

$$I=I_0e^{-\mu x}$$

Where: I_0=Intensity present on side of shielding barrier exposed to radiation field.

I=intensity present on shielded side of shielding barrier of thickness x.

x=thickness of shielding barrier.

μ=absorption coefficient of shielding material.

e=base of natural logarithms (see table LXIV and LXV).

$$\mu X_{\frac{1}{2}}=0.693$$

Where: $X_{\frac{1}{2}}$=half-thickness of shielding material.

f. Intensity from a Point Source.

$$I_{(mr/hr)}=\frac{\text{mg of Ra}}{(\text{yd})^2}$$

Where: $I_{(mr/hr)}$=Intensity from the source in the unit milliroentgens per hour.

mg of Ra=activity of the source expressed in the unit milligrams of radium equivalent.

yd=distance from the source to the point of observation of the intensity expressed in yards.

75. Tolerance to Radiation Exposure

The maximum permissible exposure to *external* gamma radiation in laboratory, industrial, and recurrent training situations is 0.3 roentgen per week when the entire body is exposed. For detailed information on tolerances and medical requirements see Department of the Army Pamphlet 8–11.

76. Relative Effects of Atomic Bursts

The relative effects of different types of atomic bursts are illustrated in table LXVII. In the table maximum effectiveness of bursts is indicated by the figure 1. Proportional effectiveness is indicated by fractions. For the purposes of this table an *air burst* is defined as a burst in which the fireball does not contact the surface, *a subsurface burst* (underground or underwater) as a burst in which the fireball is entirely below the surface, and a *surface burst* as any intermediate burst.

Table LXVII. Relative Effect of Atomic Bursts

Effect	Air burst	Surface burst	Underwater burst	Underground burst
Antipersonnel effects:				
Blast	1	⅔	½	½
Flash burns	1	⅛	0	0
Burns from secondary fires	1	⅔	½	½
Prompt radiations:				
Gamma	1	1	0	0
Neutron	1	1	0	0
Persistent radiations	0	⅛	¼	1
Material damage:				
Buildings destroyed	1	⅔	½	½
Fires	1	⅔	½	½
Transportation	1	⅔	½	½
Communication	1	⅔	½	½

Section II. BIOLOGICAL DEFENSE DATA

77. References

Publications pertaining to biological defense include FM 21-40, FM 21-41, TM 3-216, and TM 3-220.

78. Typical Diseases Injurious to Man and Animals

Characteristics of typical diseases injurious to man and animals are shown in table LXVIII.

Table LXVIII. Typical Diseases Injurious to Man and Animals

Disease	Psittacosis	Influenza	Q Fever.
Host	Humans and birds	Humans	Humans.
Type of agent	Rickettsia	Virus	Rickettsia.
How spread	By air, humans, and birds	By air and humans	By air and vectors (dust and ticks).
Portals of entry	Respiratory tract	Respiratory tract	Respiratory tract.
Normal symptoms and final results.	6 to 15 days after exposure—chills, headache, sore throat, fever with extreme weakness; few days later—coughing up of yellow sputum; death often follows with older patients.	Sudden onset of body aches, sore throat, and fever 24 to 72 hours after exposure; fever, coughing 1 day to 1 week, then slow recovery; ordinary influenza not fatal, but more fatal types possible.	Incubation for 2 or 3 weeks, then sudden headaches, chilly sensations, profuse sweating, with restlessness and weakness; pneumonia often develops, but most patients recover after 3 weeks of illness.
Prevention and treatment	Preventive vaccines being developed; penicillin and sulfadiazine may help victim.	Vaccines exist, tend to reduce incidence; rest is best therapy known.	Experimental vaccines developed; isolation required; terramycin useful in treatment.
Advantages as biological agent.	Slow convalescence; difficult diagnosis.	With other agents, diagnosis difficult.	Unusual disease; no retroactivity.*
Disadvantages as biological agent.	Possible retroactivity*	Great potential retroactivity*	Detection easy.

See footnote at end of table.

Disease	Pneumonic plague	Tularemia	Melioidosis.
Host	Humans	Humans, rodents, ticks	Humans and rodents.
Type of agent	Bacteria	Bacteria	Bacteria.
How spread	By air	By air, water, and biting insects	By air.
Portals of entry	Respiratory tract	Skin, mucous membranes; gastro-intestinal tract.	Gastro-intestinal tract.
Normal symptoms and final results.	2 to 12 days after breathing in germs—violent headaches and high fever difficult breathing, may turn blue, cough up sputum, some blood; almost sure death within 3 days unless immediate treatment, extremely contagious.	2 to 10 days incubation, then lymph nodes of victim become swollen and pus-filled; chills and fever, extreme weakness; several weeks disablement, but recovery usual; permanent immunity after attack.	Incubation period not known; cheesy nodules in lungs, intestines, other parts; nodules often degenerate to ulcers; high fever, lymph nodes swell and harden, mucous membranes inflame; death usual within 3 weeks.
Prevention and treatment	Repeated dose of vaccine effective; quick use of streptomycin and sulfadiazine can save victim.	Effective vaccine developed; streptomycin beneficial during illness and convalescence.	No satisfactory vaccine; no useful treatment.
Advantages as biological agent.	Extremely resistant bacteria; mass production possible; highly contagious.	Not retroactive;* highly infective easily cultivated; resistant; prostrating disease.	Rare disease; easily cultivated; resistant; difficult to detect.
Disadvantages as biological agent.	High retroactivity*	Not contagious	Limited experience, may have low infectivity; unpredictable mass effects.

See footnote at end of table.

Table LXVIII. Typical Diseases Injurious to Man and Animals—Continued

Disease	Brucellosis	Botulism	Rinderpest.
Host	Humans and animals	Humans and animals	Cattle and buffalo.
Type of agent	Bacterial	Toxin from bacteria	Virus.
How spread	By air	By air, food, and water	By water and feed.
Portals of entry	Skin, mucous membranes; gastro-intestinal tract.	Gastro-intestinal tract	Gastro-intestinal tract.
Normal symptoms and final results.	1 to 4 weeks after infection, brucellosis symptoms gradually appear; chills, fever, pains, aches in joints and muscles, and severe sweats recur for several months; possible temporary muscle and nerve disorders.	Toxin attacks central nervous system after 12 to 36 hours; double vision, difficult breathing, great thirst, vomiting; general muscular weakness, often leading to respiratory paralysis within 1 week, and then death.	Cattle begin to lose weight and give less milk in 3 to 14 days; ulcers form on mouth and nose, mucous membranes turn scarlet; high fever; constipation or bloody diarrhea and deterioration of body until death.
Prevention and treatment	No satisfactory vaccine; aureomycin or streptomycin with sulfadiazine may help victim.	Toxoids exist for 2 main types of toxin; after poisoning, antitoxins not much help.	Vaccines may help; infected animals must be destroyed, grounds disinfected.
Advantages as biological agent.	Insidious onset, long convalescence; easily cultivated; resistant; not retroactive.*	Attack rate almost 100 percent; easily produced; not retroactive.*	High mortality rate.
Disadvantages as biological agent.	Noncontagious from man to man; low virulence; long and variable incubation period; infection often fails to incapacitate and rarely kills.	Injection of toxoid possible; toxin not very resistant.	

See footnote at end of table.

* U. S. GOVERNMENT PRINTING OFFICE : 1959 O—499910

Disease	Foot and mouth.	Hog cholera.	Fowl plague (pest).
Host	Cattle, sheep, pigs.	Hogs.	Fowl.
Type of agent	Virus.	Virus.	Virus.
How spread	By water or feed.	By water or feed.	By air.
Portals of entry	Gastro-intestinal tract.	Gastro-intestinal tract.	Skin, mucous membranes.
Normal symptoms and final results.	Large blisters on tongue, gums, inner checks, udders, and skin around hoofs within 2 to 4 days; cattle lose weight, give less milk, prone to abortion; animals that recover are not productive.	Hogs lose appetite, cough violently 1 to 7 days after infection; purple spots on belly, saliva flow increases, constipation or diarrhea develops; almost all hogs in herd are certain to die in few days.	Tears flow profusely from eyes of chickens and trukeys 2 to 4 days after exposure; heads and wattles swell, and gray or bloody discharge comes from nostrils and beaks; severe diarrhea; nearly 100 percent die in few days.
Prevention and treatment	Partial protection by vaccines; disposal of infected, exposed animals essential.	Combination of serums prevents; disposal of infected, exposed animals essential.	No prevention or treatment is known.
Advantages as biological agent.	Relatively resistent; highly contagious.	Complicated by other diseases; resistant virus.	Lack of prevention or treatment.
Disadvantages as biological agent.	Highly retroactive.*	Vaccination possible.	

*Retroactive—likely to produce effects harmful to the using force.

79. Typical Diseases Injurious to Plants

Characteristics of typical diseases injurious to plants are given in table LXIX.

Table LXIX. Typical Diseases Injurious to Plants

Disease	Wheat stem rust.	Corn smut.	Potato late blight.	Bean blight.	Plant growth regulator.
Type	Fungus spores.	Fungus spores.	Fungus spores.	Bacteria.	Chemical.
How spread	By air.	By air.	By air.	By air.	By spray.
Effects	Spores develop into fungus growths in few days, produce brown pustules on wheat leaves, leaf stocks, and stems; grain shrivels; once rust starts, spreads throughout field; crop usually badly damaged.	Black spots on tassels, ears, and leaves are first effects; blisters soon appear on leaves; white fungus forms on tips of ears, darkens to sooty black, then ruptures to release fungus; small amounts of smutted corn can be fed animals.	Potato plant leaves become covered with brown patches which rot; most of upper plant may rot away; once blight is established, plant is almost certain to die.	Resistant bacteria produces brown spots on garden and soy bean leaves; spots spread until leaves look scorched and wilted; red streaks color stems; oozing spots appear on pods, then dry; bean seeds become spotted, may shrivel until worthless.	Causes abnormal growth resulting in no yield, a reduced and ineffective yield, or unusable yield.
Prevention and control.	Resistant strains may be found; spraying sulfur or copper dust useful but expensive.	No resistant varieties known; dusting with sulfur some help.	Resistant strains exist; diethane spray can prevent, also treat.	Resistant strains may be found; after disease starts, dust or spray will not help.	After contact is made with susceptible plant, no measure will help.

80. Field Sanitation

The individual should take the following field sanitation measures for his own protection against biological agents:

a. Report all illnesses to authorities to help in the identification of epidemics.

b. As soon as possible after exposure to a cloud of biological agents, remove clothing and take a thorough soap and water shower; treat minor cuts and abrasions immediately by ordinary first aid measures.

c. If disinfection of exposed clothing is not possible in laundries or impregnating plants, sterilize clothing with boiling water and soap, and then let it dry in the sunshine.

d. To disinfect water, boil for at least 10 minutes.

e. Thorough cooking at high temperatures will disinfect food. To decontaminate food covering, spray or immerse in hypochlorite solution. Avoid eating while attack is in progress.

f. To decontaminate leather and rubber equipment, wash and scrub contaminated items in soap and hot water for at least 20 minutes; to decontaminate helmets and mess gear, immerse in boiling water for 20 minutes.

g. Bury or burn contaimnated food or trash to eliminate likely breeding places for remaining disease germs.

81. Field Training

The simulated agents, serratia marcescens and bacillus globigii, are suitable for use in defense training because they are not disease-producing and because, when grown on a nutrient media, they produce characteristic colors which are aids to quick and easy identification of the bacteria. These simulated agents are not to be used indiscriminately upon personnel.

Section III. MATHEMATICAL DATA

82. Conversion Factors

a. Linear Measure Conversion Factors. Linear measure conversion factors are shown in table LXX.

Table LXX. Linear Measure Conversion Factors

	Nautical miles	Statute miles	Kilometers	Cable lengths	Rods	Fathoms	Meters	Yards	Feet	Inches	Centimeters	Millimeters
1 nautical mile	1	1. 1516	1. 853	8. 446	368. 5	1, 014	1, 853	2, 027	6, 080. 2	72, 960		
1 statute mile	0. 8684	1	1. 6093	7. 33	320	880	1, 609. 3	1, 760	5, 280	63, 360		
1 kilometer	0. 5396	0. 6214	1	4. 56	198. 85	546. 7	1, 000	1, 094	3, 280. 8	39, 372		
1 cable length				1	43. 636	120	219. 5	240	720	8, 640		
1 rod				0. 0229	1	2. 75	5. 0292	5. 5	16. 5	198		
1 fathom				0. 0084	0. 3636	1	1. 829	2	6	72	182. 9	1, 829
1 meter				0. 0046	0. 1988	0. 5467	1	1. 094	3. 281	39. 37	100	1, 000
1 yard				0. 0042	0. 1818	0. 5	0. 9144	1	3	36	91. 44	914. 4
1 foot				0. 0014	0. 0606	0. 167	0. 3048	0. 3333	1	12	30. 48	304. 8
1 inch							0. 0254	0. 0277	0. 0833	1	2. 54	25. 4
1 centimeter									0. 0328	0. 3937	1	10
1 millimeter										0. 0394	0. 1	1

b. Surface Measure Conversion Factors. Surface measure conversion factors are shown in table LXXI.

Table LXXI. Surface Measure Conversion Factors

	Square miles	Square kilometers	Hectares	Acres	Ares	Square rods	Square meters*	Square yards	Square feet	Square inches	Square centimeters
1 square mile	1	2.59	259	640	25,900	102,400	2,589,998	3,097,600			
1 square kilometer	0.3861	1	100	247	10,000	39,537	1,000,000	1,195,985			
1 hectare	0.00386	.01	1	2.471	100	395.4	10,000	11,960			
1 acre	0.00156	0.00405	0.4047	1	40.47	160	4,046.87	4,840	43,560		
1 are			0.01	0.0247	1	3.9537	100	119.6	1,076.4		
1 square rod			0.00253	0.00625	0.253	1	25.29	30.25	272.25		
1 square meter*			0.0001	0.00025	0.01	0.0395	1	1.196	10.764	1.550	
1 square yard				0.00021	0.0084	0.0331	0.8361	1	9	1,296	
1 square foot							0.0929	0.1111	1	144	929
1 square inch									0.0069	1	6.4514
1 square centimeter										0.155	1

* Also expressed as centiare.

c. Volumetric Measure Conversion Factors. Volumetric measure conversion factors are shown in table LXXII.

Table LXXII. Volumetric Measure Conversion Factors

	Cubic inches	Cubic feet	Cubic yards	Cubic centimeters	Cubic decimeters	Cubic meters	Measurement tons	Register tons
Cubic inches	1	0.00058		16.387	0.0164			
Cubic feet	1,728	1	0.037		28.317	0.0283		
Cubic yards		27	1		764.56	0.7646		
Cubic centimeters	61.025			1	0.001			
Cubic decimeters		0.0353		1,000	1	0.001		
Cubic meters		35.314	1.3079		1,000	1		
Measurement tons*		40	1.48			1.133	1	0.4
Register tons		100	3.704			2.83	2.5	1

* Also expressed as ship ton.

d. Liquid Measure Conversion Factors. Liquid measure conversion factors are shown in table LXXIII.

Table LXXIII. Liquid Measure Conversion Factors

	Cubic centimeters	Cubic inches	Liters	United States			British		
				Pints	Quarts	Gallons	Pints	Quarts	Gallons
1 cubic centimeter	1	0. 061	0. 001						
1 cubic inch	16. 387	1	0. 0164	0. 0346	0. 0173	0. 0043	0. 0288	0. 0144	0. 0036
1 liter	1, 000	61. 025	1	2. 1134	1. 0567	0. 2642	1. 76	0. 88	0. 22
1 US pint	473. 17	28. 875	0. 473	1	0. 5	0. 125	0. 8327	0. 4164	0. 1042
1 US quart	946. 33	57. 75	0. 9643	2	1	0. 25	1. 665	0. 8327	0. 208
1 US gallon	3, 785. 33	231	3. 785	8	4	1	6. 66	3. 33	0. 8327
1 British pint	568. 75	34. 668	0. 5688	1. 201	0. 6	0. 15	1	0. 5	0. 125
1 British quart	1, 136. 2	69. 335	1. 1365	2. 402	1. 201	0. 3	2	1	0. 25
1 British gallon	4, 544. 8	277. 34	4. 546	9. 616	4. 808	1. 201	8	4	1

e. Dry Measure Conversion Factors. Dry measure conversion factors are shown in table LXXIV.

Table LXXIV. Dry Measure Conversion Factors

	Cubic centimeters	Cubic inches	Liters	United States				British			
				Pints	Quarts	Pecks	Bushels	Pints	Quarts	Pecks	Bushels
1 cubic centimeter	1	0. 061	0. 001								
1 cubic inch	16. 387	1	0. 0164	0. 0297	0. 0148	0. 0019	0. 00047	0. 0288			
1 liter	1, 000	61. 025	1	1. 8162	0. 908	0. 1135	0. 0284	1. 759	0. 8795	0. 1099	0. 0275
1 US pint	550. 6	33. 6	0. 55	1	0. 5	0. 0625	0. 156	0. 969	0. 4845	0. 0605	0. 015
1 US quart		67. 2	1. 101	2	1	0. 125	0. 0313	1. 938	0. 969	0. 121	0. 03
1 US peck		537. 6	8. 810	16	8	1	0. 25	15. 5	7. 752	9. 69	0. 2422
1 US bushel		2, 150. 42	35. 238	64	32	4	1	62. 016	31. 01	3. 876	0. 969
1 British pint	568. 3	34. 68	0. 5679	1. 03205	0. 516	0. 0645	0. 0164	1	0. 5	0. 0625	0. 0156
1 British quart		69. 35	1. 1359	2. 064	1. 03205	0. 129	0. 0323	2	1	0. 125	0. 0313
1 British peck		554. 83	9. 0865	16. 513	8. 256	1. 03205	0. 258	16	8	1	0. 25
1 British bushel		2, 219. 34	36. 367	66. 052	33. 026	4. 128	1. 03205	64	32	4	1

f. Weight (Avoirdupois) Measure Conversion Factors. Weight (avoirdupois) measure conversion factors are shown in table LXXV.

Table LXXV. Weight (Avoirdupois) Measure Conversion Factors

	Grams	Kilograms	Ounces	Pounds	Metric tons*	Short tons	Long tons
1 gram	1	0.001	0.0353	0.0022			
1 kilogram	1,000	1	35.2739	2.2046			
1 ounce	28.349	0.0284	1	0.0625			
1 pound	453.59	0.4536	16	1			
1 metric ton*		1,000		2,204.6	1	1.1023	0.9842
1 short ton		907.2		2,000	0.9072	1	0.8929
1 long ton		1,016		2,240	1.016	1.12	1

*Sometimes expressed as millier.

g. Speed Measure Conversion Factors. Speed measure conversion factors are shown in table LXXVI.

Table LXXVI. Speed Measure Conversion Factors

	Feet per second	Feet per minute	Meters per second	Meters per minute	Statute miles per hour	Kilometers per hour	Knots*
Feet per second	1	60	0.3048	18.288	0.6818	1.097	0.5921
Feet per minute	0.0167	1	0.005	0.3048	0.0114	0.0183	0.00987
Meters per second	3.281	196.85	1	60	2.237	3.6	1.9175
Meters per minute	0.0547	3.281	0.0167	1	0.0373	0.06	0.03196
Statute miles per hour	1.467	88	0.447	26.8	1	1.6093	0.8684
Kilometers per hour	0.911	54.68	0.2778	16.667	0.6214	1	0.5396
Knots*	1.689	101.34	0.515	30.9	1.1516	1.853	1

*Knot equals 1 nautical mile per hour.

h. Miscellaneous Conversion Factors. Miscellaneous conversion factors are shown in table LXXVII.

Table LXXVII. Miscellaneous Conversion Factors

1 grain = 0.0648 gram.
1 troy or apothecary ounce = 1.0971 avoirdupois ounces or 31.103 grams.
1 troy or apothecary pound = 0.8229 avoirdupois pound.

i. Simplified Conversion Factors. Simplified conversion factors are shown in table LXXVIII.

*Table LXXVIII. Simplified Conversion Factors**

Inches to centimeters—multiply by 10 and divide by 4.
Yards to meters—Multiply by 9 and divide by 10.
Miles to kilometers—Multiply by 8 and divide by 5.
Gallons to liters—Multiply by 4 and subtract ⅛ of the number of gallons.
Pounds to kilograms—Multiply by 5 and divide by 11.

83. Miscellaneous Formulas

Miscellaneous formulas are shown in table LXXIX.

Table LXXIX. Miscellaneous Formulas

Centigrade to Fahrenheit: (C° × ⅘) + 32.
Fahrenheit to Centigrade: (F° − 32) × ⅝.
Circumference of a circle = diameter × 3.1416.
Area of a circle = square of diameter × 0.7854, or square of radius × 3.1416.
Area of sector of circle = length of arc × radius ÷ 2.
Area of an ellipse = long axis × short axis × 0.7854.
Area of a square or oblong = length × breadth.
Area of a triangle = base × perpendicular ÷ 2.
Area of any right-lined figure of four or more unequal sides is found by dividing it into triangles, finding the area of each, and adding together the areas of the triangles.
Cubic content of a sphere = cube of diameter × 0.5236.
Cubic content of cone or pyramid = ⅓ × area of base × perpendicular height.
Cubic content of cube = length × breadth × depth.
Cubic content of prism or cylinder = area of base × height.
Surface of sphere = square of diameter × 3.1416.
Surface of cone or pyramid = (½ slant height × perimeter of base) + area of base
Surface of a prism or cylinder = (area of two ends) + (length × perimeter).
Surface of cube = sum of areas on all the sides.

*Simplified conversion factors are approximate but are accurate to within 2 percent.

84. Decimal Equivalents

Decimal equivalents are shown in table LXXX.

Table LXXX. Decimal Equivalents

			1/64	0.015625				33/64	0.515625
		1/32		.03125			17/32		.53125
			3/64	.046875				35/64	.546875
	1/16			.0625		9/16			.5625
			5/64	.078125				37/64	.578125
		3/32		.09375			19/32		.59375
			7/64	.109375				39/64	.609375
1/8				.125	5/8				.625
			9/64	.140625				41/64	.640625
		5/32		.15625			21/32		.65625
			11/64	.171875				43/64	.671875
	3/16			.1875		11/16			.6875
			13/64	.203125				45/64	.703125
		7/32		.21875			23/32		.71875
			15/64	.2344375				47/64	.734375
1/4				.25	3/4				.75
			17/64	.265625				49/64	.765625
		9/32		.28125			25/32		.78125
			19/64	.296875				51/64	.796875
	5/16			.3125		13/16			.8125
			21/64	.328125				53/64	.828125
		11/32		.34375			27/32		.84375
			23/64	.359375				55/64	.859375
3/8				.375	7/8				.875
			25/64	.390625				57/64	.890625
		13/32		.40625			29/32		.90625
			27/64	.421875				59/64	.921875
	7/16			.4375		15/16			.9375
			29/64	.453125				61/64	.953125
		15/32		.46875			31/32		.96875
			31/64	.484375				63/64	.984375
1/2				.5	1				1.0

Section IV. GLOSSARY OF CHEMICAL, BIOLOGICAL, AND RADIOLOGICAL TERMS

85. General

Definitions of chemical, biological, and radiological terms are given below. See SR 320–5–1 for definitions of additional terms.

86. Terms Common to CBR Warfare

Aerosol—suspension of fine, solid or liquid particles in air or gas.

Collective protection—equipment, installation, and techniques used by a unit or small group for defense of personnel, materiel, and animals against any type of attack, including chemical, biological, and radiological attack.

Contamination—presence of, or act of placing a CBR agent on a person, object, or area.

Decontaminant—anything which is used to bring about decontamination of a person, object, or area.

Decontamination—process of covering, removing, absorbing, destroying, neutralizing, or making harmless chemical or biological agents or of removing or covering radiological agents; decontamination may be performed on personnel and on objects and areas to make them safe for unprotected personnel.

Detector—chemical, electrical, or mechanical device for detection and identification of chemical agents, biological agents, or radioactive materials.

Gradient—rate of change of temperature or pressure in a given direction; mathematical expression giving the direction and amount of the most rapid rate of decrease of temperature or pressure. (See *Temperature gradient.*)

Reaction—any process involving a chemical or nuclear change.

Temperature gradient—difference in temperature between the air 6 feet above the ground and the air 1 foot above the ground, expressed in degrees F.

87. Chemical Terms

Airplane smoke tank—container for war gas or screening smoke attached to or within aircraft for release of chemical agent to produce gas spray or aerial smoke screen. Also called airplane spray tank.

Blinding smoke—smoke screen placed directly on enemy positions to prevent enemy ground observation.

Blister gas—war gas used for casualty effect; injures the eyes and lungs and blisters the skin; formerly called vesicant.

Blood gas—war gas which, when absorbed into the body by breathing, by ingestion, or through the skin, affects various body functions by its primary action on the elements of the blood.

Casualty gas—war gas capable of producing serious injury or death in effective concentrations.

Chemical agent—solid, liquid, or gas which through its chemical properties produces lethal, injurious, or irritant effects; screening or signaling smoke; or incendiary agent. War gases, smokes, and incendiaries are the three main groups of chemical agents.

Chemical exposure—personnel exposure to war gas; the product of gas concentration and time of exposure, commonly measured as milligram minutes per cubic meter of air. See *Median lethal gas exposure.*

Chemical projectile—bomb, grenade, rocket, or shell containing a chemical agent.

Chemical security—all measures of protection taken against enemy use of chemical agents.

Chemical spray—aerial release or device for aerial release of liquid war gas for casualty effect, or of liquid smoke for aerial smoke screens. See *airplane smoke tank.*

Chemical warfare—tactics and technique of conducting warfare by use of chemical agents.

Choking gas—casualty gas which causes irritation and inflammation of the bronchial tubes and lungs. Phosgene is an example of this type of gas.

Cloud attack—attack made by means of a toxic gas or aerosol cloud for harassing and/or casualty effect.

Concentration—amount of war gas or screening smoke present in a given volume of air; expressed in milligrams per cubic meter (mg/m^3).

Contamination—presence of or act of placing a chemical agent in dangerous amount or concentration on a person, object, or area.

Dosage—concentration of war gas to which a person is subjected multiplied by length of time of exposure; usually expressed as *Ct:* concentration (C) multiplied by time (t).

Gas barrier—zone contaminated by a persistent war gas which denies passage to ground troops.

Gas casualty—person who has been affected sufficiently by a war gas to be rendered incapable of performing his functions or duties.

Gas munition—munition such as bomb, shell, pot, candle, grenade, or spray tank containing a war gas and means of release.

Harassing concentration—concentration of war gas sufficient to require masking and interfere with normal operations but insufficient to kill.

Incendiary agent—chemical agent used primarily for igniting combustible substances with which it is in contact by generating sufficient heat to cause ignition.

Incendiary munition—munition with flammable filling and means of release and/or ignition.

Incendiary warfare—warfare in which incendiary bombs, flame throwers, and other incendiary munitions are used. Such warfare is directed against personnel and combustible targets.

Lethal concentration—that concentration of a war gas which can kill personnel.

Median lethal gas exposure (LCt_{50})—the exposure of a war gas required to kill 50 percent of those exposed. The unit used to express LCt_{50} is milligram minutes per cubic meter.

Nerve gas—war gas which when absorbed into the body by breathing, by ingestion, or through the skin affects the various body functions by its primary action on the nerve structures of the body.

Nongas warfare—warfare conducted without the use of war gases. See *Chemical warfare.*

Nonpersistent gas—war gas normally effective in the open for less than 10 minutes at the point of dispersion. See *Persistency.*

Persistency—length of time a war gas normally remains effective (capable of producing casualties among unprotected personnel) in the open at the point of dispersion.

Persistent gas—war gas which is normally effective in the open at the point of dispersion for more than 10 minutes; used against troop concentrations for casualty effect or on materiel and terrain to restrict its use through threat of casualties. A moderately persistent gas is one which is normally effective in the open at the point of dispersion from 10 minutes to 12 hours. A gas is highly persistent if effective for more than 12 hours.

Screening smoke—chemical agent which, when burned, hydrolyzed, or atomized, produces an obscuring smoke; used to deny observation and reduce effectiveness of aimed fire.

Signaling smoke—any type of smoke, but usually colored smoke, from a hand or rifle grenade or from a pyrotechnic signal, used for conveying a message.

Smoke blanket—dense concentration of smoke established over and around friendly areas to protect them from aerial visual observation and visual precision bombing attack or established over enemy areas to protect attacking aircraft from antiaircraft fire. Blankets can also be used at night to prevent enemy observed aerial attack by flare light.

Smoke curtain—vertical smoke screen placed between friendly and hostile troops or installations to prevent enemy ground observation.

Smoke haze—light concentration of smoke placed over friendly installations to restrict accurate enemy observation and fire but not dense enough to hamper friendly operations. Density of haze is equivalent to that of light fog.

Smoke operations—the action of using smoke to prevent observation of activities or location of vital areas.

Smoke projectile—any projectile containing a smoke-producing chemical agent which is released on impact or burst. Also called *smoke shell.*

Smoke screen—cloud of smoke used to mask either friendly or enemy installations or maneuvers; may be a smoke blanket, smoke haze, smoke curtain, or blinding smoke.

Tear gas—chemical agent which causes a blinding flow of tears and intense, though temporary, eye irritation; used for training and riot control.

Vesicant—See *Blister gas.*

Vomiting gas—chemical agent which causes coughing, sneezing, pain in nose and throat, nasal discharge, and sometimes tears—often followed by headache; may cause vomiting; formerly called irritant smoke or sternutator. Adamsite is an example of a vomiting gas.

War gas—toxic chemical agent, irrespective of its physical state.

88. Biological Terms

Aerobe—micro-organism which can live and grow in the presence of free oxygen.

Agar-agar—gelatinous substance prepared from Ceylon moss and added to various compounds to prepare solid media for growing bacteria. It dissolves in boiling water and solidifies at about 38° C.

Agglutination—clumping of cells which occurs only in the presence of the specific antibody.

Anabolism—constructive or building up stage of the metabolic process concerned with growth and repair of the organism.

Antibiotic—substance produced by and obtained from living cells, usually those of lower plants, such as bacteria and molds; antibiotics are antagonistic to other forms of life, including pathogenic organisms. Examples are penicillin and streptomycin. Some may also be produced synthetically.

Antibody—specific substance formed by the body in antagonism to a specific foreign body (antigen), such as bacteria and toxins; examples are antitoxins and agglutinins.

Antigen—any substance which when introduced in the body stimulates the formation of an antibody. Antigens are usually protein in nature, and react in an antagonistic manner with the specific antibodies.

Antiseptic—substance that will inhibit the growth and development of micro-organisms without necessarily destroying them.

Antiserum—serum containing an antibody or antibodies. It may be obtained from an animal subjected to an antigen either by injection or as the result of an infection.

Antitoxin—substance, found in the blood serum or tissues, which is specifically antagonistic to a toxin.

Attenuation—process of reducing or weakening the virulence of a microorganism by cultivation on artificial media or by animal passage.

Autoclave—apparatus for sterilizing by steam under pressure.

Bacillus (bacilli, plural)—rod-shaped bacterium.

Bacterium (bacteria, plural)—one-celled micro-organisms which have no chlorophyl and multiply by dividing in one, two, or three directions.

Bactericide—any agent that destroys bacteria.

Basic stains—stains which show a definite affinity for the nuclei of cells; nuclear stains.

Biological agents—viruses, any of certain classifications of micro-organisms and toxic substances derived from living organisms used to produce death or disease in man, animals, and growing plants.

Biological warfare—tactics and techniques of conducting warfare by use of biological agents.

Botulism—poisoning by botulinum toxin.

Bubo—inflammatory swelling of a lymphatic gland, usually in the groin or armpit.

Capsule—fibrous or membranous envelope or covering.

Carrier—individual who harbors specific disease organisms without showing symptoms, thus serving as a means of conveying infection.

Catabolism—process of destruction or breakdown of tissues and cells of the body from complex to simpler compounds.

Cell—small mass of protoplasm, generally including a nucleus and surrounded by a semipermeable membrane or cell wall. It is the structural and functional unit of all living organisms, plant and animal, with the possible exception of viruses.

Cilia—hairlike projections or lashes found on many cells, capable of vibratory or lashing movement. They may serve as organs of locomotion for small organisms, or produce a current of fluid, as in the upper respiratory tract of man.

Coccus—spherical bacterium.

Colony—collection or group of micro-organisms in a culture; they are derived from the increase of a single organism or group of organisms. On solid culture media a colony may be visible to the naked eye.

Commensal—organism, not truly parasitic, which lives in, with, or on another organism, partaking usually of the same food.

Counterstain—a stain applied to render the effects of another stain more discernible.

Culture—growth of micro-organisms.

Culture medium—any preparation used for the culture of micro-organisms.

Cytolysis—process of dissolution or destruction of cells.

Cytoplasm—protoplasm of the cell exclusive of the nucleus. (The protoplasm is the watery content of the cell in which are dispersed a variety of granules and vacuoles.)

Differential blood count—determination of the percentage of the different types of cells in the blood.

Droplet infection—infection by droplets of contaminated respiratory or oral discharges dispersed in the air by sneezing and coughing.

Endemic—native to, or prevalent in, a particular district or region; an endemic disease has a low incidence but is constantly present in a given community.

Endotoxin—poisonous substance that is retained within a micro-organism until the cell disintegrates.

Enzootic—occurring endemically among animals; constantly present in small amounts in a given animal population.

Epidemic—an outbreak of disease which spreads rapidly and attacks many individuals in the same region at the same time. Analogous to epiphytotic in plants and epizootic in animals.

Epiphytotic—widespread among plants, such as certain fungal diseases. Analogous to epidemics in man and epizootics among animals.

Epizootic—rapidly spreading and widely diffused among animals. Analogous to epidemics in man and epiphytotics in plants.

Exotoxin—toxin formed and excreted by a micro-organism in the surrounding medium.

Filterable viruses—organisms small enough to pass through a bacterial filter made of unglazed porcelain or compressed infusorial earth that arrests bacteria. Filterable viruses are ultramicroscopic.

Fission—act of splitting. This is a form of asexual reproduction, where the cell divides into two nearly equal parts, as in bacteria.

Fixing—preparation of tissues for study or staining in such a way that their form is preserved.

Flagella—whiplike processes used to propel a micro-organism; ~~also known as cilia~~.

Fomite—any substance other than food which may transmit or harbor a disease, such as infected bedding, clothing, and dishes.

Formalin—approximately 40 percent solution of gaseous formaldehyde in water.

Fumigation—exposure to fumes of a chemical which destroys micro-organisms.

Fungus—any one of a group of thallophytic plants comprising the molds, mildews, rusts, smuts, and mushrooms; they do not contain chlorophyl and reproduce mainly by asexual spores.

Germ—micro-organism; microbe.

Germicide—any agent that destroys germs or micro-organisms.

Gram's stain—differential stain for bacteria.

Hormone—specific chemical substance secreted into the body fluids by an internal secretory gland and producing a specific effect on the activities of other organs. Examples: adrenalin, pituitrin.

Host—any animal or plant which harbors or nourishes another organism.

Immunity—state or power of resisting the development of a disease or poison. Active immunity is acquired through production of antibodies within the immune organism; passive immunity is acquired by injection of immune serum from another individual or animal.

Incubation Period—time between which infection occurs and first symptoms appear.

Infectious disease—one which is caused by a living agent such as bacteria, protozoa, viruses, or fungi; may or may not be contagious.

Ingestion—process of taking in food for digestion.

Inoculate—to introduce a micro-organism, disease, vaccine, or immunizing serum.

Lag phase—early period following a bacterial inoculation into a culture medium in which the growth is slow.

Lesion—an injury, mechanical or pathological.

Leukocyte—white or colorless blood corpuscle; an ameboid cell found in the blood, lymph, and body tissues, and forming the chief cellular element in pus.

Lymphatic system—system of absorbent vessels which drain the lymph from various body tissues and return it to the blood stream.

Macrophage—large, mononuclear, wandering phagocyte cell which originates in the tissues.

Microbe—any individual micro-organism.

Micro-organism—minute living organism, usually microscopic in size.

Molds—~~parasitic and saprophytic fungi which cause moldiness.~~ multicellular fungi which forms a filamentous branching growth known as mycelium

Motile—exhibiting or capable of spontaneous movement which is neither conscious nor volitional.

Mucous membrane—membrane secreting mucous and lining the cavities of the body which connect with the outside air such as the respiratory, digestive and genito-uninary tract.

Nonspecific immunity—increase of antibodies or production of immunity resulting from the injection of some nonspecific antigen.

Nucleolus (nucleoli, plural)—body within the nucleus of a cell which takes part in the metabolic process of the cell and plays a part in its multiplication.

Nucleus—round body within a cell, forming the essential and vital part.

Organism—any organized living being, animal or plant.

Pandemic—widely epidemic, affecting or attacking all or most of the population of a region.

Panzootic—occurring pandemically among animals; attacking all or most of an animal species of a region.

Parasite—plant or animal living on or within another living organism or host, at whose expense it is maintained.

Passive immunity—immunity conferred by introduction of an immune serum.

Pasteurization—partial sterilization of a fluid to a moderate temperature (131° to 158° F.) for a definite time, with destruction of certain pathogens and undesirable micro-organisms.

Pathogen—any disease-producing micro-organism or material.

Pathology—science that treats of disease.

Penicillium—genus of molds which is characterized by the development of fruiting organs resembling a broom, or the bones of the hands and fingers; the antibiotic, penicillin, is derived from penicillium.

Phagocyte—any white blood cell that is active in ingesting and destroying waste and harmful bodies in the blood or tissues.

Plasma—fluid portion of the blood in which the corpuscles are suspended.

Polyvalent vaccine—stock vaccine made up of many strains of the same organism or different organisms.

Prognosis—forecast of the course of a disease; also the outlook for recovery as indicated by the nature and symptoms of the case.

Prophylaxis—prevention of disease, or preventive treatment.

Protoplasm—only known form of matter in which life is manifested; the essential substance of the cell. It is usually a thick, viscous, semifluid or almost jellylike, colorless, translucent material containing a large proportion of water, holding fine granules in suspension.

Protozoa—lowest division of the animal kingdom, including one-celled organisms.

Pure culture—specific growth of only one type of organism.

Retroactivity—liklihood that a biological agent will produce harmful effects against the using force.

Rickettsiae—Gram-negative, nonmotile, intracellular, one-celled parasitic micro-organisms, probably intermediate between the bacteria and viruses.

Saprophyte—any micro-organism living upon dead or decaying organic matter.

Septic—produced by putrefaction,

Serum—clear liquid which separates, in the clotting of blood, from the clot and the corpuscles. It differs from plasma in that it does not contain fibrin.

Slant—solid media allowed to harden in test tubes set at an angle to increase the surface for the growth of colonies.

Smear—thin layer of material spread on a glass slide for microscopic examination.

Spirilla—small comma-shaped or spiral bacterial which are motile.

Spore—primitive reproductive bodies or resistant resting cells, produced by some plants and some micro-organisms.

Stain—any dye reagent, or other material used in coloring tissues or organisms for microscopical study.

Staphylococcus—any of a genus of Gram-positive bacteria (cocci) which often form grapelike clusters.

Stationary phase—stage in the growth of a bacterial culture at which multiplication of organisms gradually decreases so that there are as many formed as die.

Sterilization—process of freeing completely of micro-organisms, by heat or chemicals, or otherwise, all life being destroyed.

Strains—group of organisms within a species characterized by some particular quality (such as high virulence).

Streak—inoculation of slants or plates in such a manner as to produce a direct line movement across the surface of culture media.

Streptococcus—any of a genus of nonmotile, Gram-positive bacteria, occurring in pairs or chains and dividing in one plane only.

Symbiosis—the living together or close association of two dissimilar organisms with mutual benefit.

Thallophyta—division of the plant kingdom to which algae, bacteria, fungi, and lichens belong.

Thermophilic—~~not able to grow without heat.~~ Bacteria which grow best at a temperature of about 45° C. and resist temperatures up to 65° C. or more; for example, bacteria found in fermenting manure and hot springs.

Thermostable—not easily affected by moderate heat, and not destroyed by a temperature of over 55° C.

Tissue—group of specialized cells united in the performance of a particular function.

Toxemia—general poisoning or intoxication due to absorption of bacterial products (toxins) formed at a local source of infection.

Toxin—generally any poisonous substance of microbic, vegetable, or animal origin. True toxins are of a proteinlike nature, more or less unstable, require a period of incubation or a latent period to produce symptoms, and induce in suitable animals the formation of specific antitoxins.

Toxoid—detoxified toxin which is still antigenic and produces active immunity when injected.

Vaccine—preparation of killed or attenuated infective agent used in inoculating to produce active artificial immunity.

Vector—carrier, especially the animal or host that carries the pathogen from one host to another, as the malarial mosquito.

Vegetative cell—nonsporeforming bacteria or sporeforming bacteria in their nonsporing state.

Vibrio—short, curved, rod-shaped bacteria, motile by means of one, two, or three polar flagellae.

Virulence—disease-producing ability; the relative infectiousness of an organism.

Virus—minute infectious agents, smaller than most bacteria, capable of passing through filters that will retain the latter, and of multiplying only within a living susceptible host cell.

89. Radiological Terms

Absorption coefficient—fractional decrease in intensity of a beam of radiation per unit thickness (linear absorption coefficient), per unit volume (mass absorption coefficient), or per atom (atomic absorption coefficient) of absorber.

Activation energy—outside energy which must be added to a nucleus before a particular nuclear reaction will begin.

Alpha particle—helium nucleus, consisting of two protons and two neutrons, with a double positive charge. Its mass is 4.002764 mu (mass units).

Alpha ray—stream of fast-moving helium nuclei; a strongly ionizing and weakly penetrating radiation.

Amplification—as related to detection instruments, the process (either gas, electronic, or both) by which ionization effects are magnified to a degree suitable for their measurement.

Anion—negatively charged ion.

Atomic Number—number of protons in the nucleus, hence the number of positive charges on the nucleus. Also the number of electrons outside the nucleus of a neutral atom. Symbol: Z.

Avalanche—process in which one electron produces a large number of additional free electrons by collision.

Backround Counting rate—rate of radiation counting due to cosmic rays, to radioactive materials in the vicinity, and to a slight radioactive contamination of the materials of which the instrument is made.

Backscattering—process of multiple scattering of radioactive particles from radioactive samples mounted on or near other matter. This results in additional particles entering a detector. Corrections for this effect may be made for each geometry factor used.

Beta particle—charged particle emitted from a nucleus and having a mass and charge equal in magnitude to those of the electron.

Beta ray—stream of beta particles, more penetrating but less ionizing than alpha rays; a stream of high-speed electrons.

Cation—positively charged ion.

Chain reaction—any chemical or nuclear process in which some of the products of the process are instrumental in the continuation or magnification of the process.

Coincidence correction—correction of the observed counting to indicate the true counting rate, made necessary because counters have an insensitive time. Sometimes called coincidence loss correction.

Conservation of energy—the principle that energy can neither be created nor destroyed, and therefore the total amount of energy in the universe is constant. This law of classifical physics is modified for certain nuclear reactions. (See *Conservation of mass-energy.*)

Conservation of mass-energy—the principle that energy and mass are interchangeable in accordance with equation $E=mc^2$, where E is energy, m is mass, and c is velocity of light.

Critical size—for a fissionable material, the minimum amount of a material which will support a chain reaction.

Curie—quantity of any radioactive material giving 3.7×10^{10} disintegrations per second.

Dead time—time interval, after recording a count, during which the counter tube and its circuit are completely insensitive and do not detect other ionizing events.

Decay—disintegration of the nucleus of an unstable element by the spontaneous emission of particles and/or photons.

Decay curve—graph relating decay rate (disintegrations per unit time) of a radioactive sample to time.

Decay time—see half life.

Densitometer—instrument used to measure the amount of darkening of a film badge in order to determine the radiation dosage received by the wearer.

Deuterium—heavy isotope of hydrogen having one proton and one neutron in the nucleus. Symbol: D or ${}_1H^2$.

Deuteron—nucleus of a deuterium atom, containing one proton and one neutron.

Dosage—quantity of radiation absorbed by exposed personnel; it is the product of radiation intensity and time and is measured in roentgens.

Dosimeter—instrument used to measure the total amount of radiation absorbed during a period of time.

Dyne—unit of force, which when acting upon a mass of 1 gm, will produce an acceleration of 1 cm/sec^2.

Efficiency of a radiation counter tube—probability that a count will take place when the radiation to be detected enters the effective volume of the counter tube.

Electron—negatively charged particle which is a constituent of every atom.

Electron volt—amount of energy gained by an electron in passing through a potential difference of 1 volt. Abbreviation: ev.

Electroscope—instrument for detecting the presence of electric charges by the divergence of charged bodies (usually gold leaves).

Energy—capacity for doing work. Potential energy is the energy inherent in a mass because of its position with reference to other masses. Kinetic energy is the energy possessed by a mass because of its motion.

Erg—1. Unit of work done by a force of 1 dyne acting through a distance of 1 cm. 2. Unit of energy which can exert a force of 1 dyne through a distance of 1 cm.

Film badge—device used to measure total dosage of radiation.

Fission yield—percentage of a given isotope formed in a fission reaction.

Force—the push or pull which tends to impart motion to a body at rest, or to increase or diminish the speed or change the direction of a body already in motion.

Frequency—number of cycles, revolutions, or vibrations completed in a unit of time.

Gamma ray—high frequency electromagnetic radiation with wave length range from 10^{-9} to 10^{-12} cm, emitted from the nucleus.

Gas amplification—ratio of the charge collected to the charge produced by the initial ionizing event in radiation detection tubes and chambers.

Geiger counter—instrument for detecting and measuring relatively low intensities of radiation. Also called Geiger-Mueller-type survey meter.

Geiger region—voltage interval in which the charge transferred per isolated count is independent of the charge produced by the initial ionizing event.

Geiger threshold—lowest voltage at which all pulses produced by an ionizing event are the same size regardless of the energy of the initial ionizing radiation.

Half life—time required for a radioactive isotope to lose 50 percent of its activity by decay.

Half thickness—thickness of absorbing material necessary to reduce the intensity of gamma radiation by one-half.

Heavy water—popular name for water which is composed of two atoms of deuterium and one atom of oxygen.

Hydrogen atom—the atom of lightest mass and simplest atomic and nuclear structure, consisting of one proton with one orbital electron. Its mass is 1.008123 mu.

Initial ionizing event—ionizing event which initiates a count in radiation detection tubes.

Integrating circuit—electronic circuit which records at any time an average value for the number of events occurring per unit time; or an electrical circuit which records total number of ions collected in a given time.

Intensity of radiation—amount of radiant energy emitted in a specified direction per unit time and per unit surface area.

Ion—atomic particle, atom, or chemical radical (group of chemically combined atoms) bearing an electrical charge, either positive or negative, caused by an excess or deficiency of electrons.

Ion chamber—instrument used for detecting and measuring relatively high intensity gamma radiation.

Ionization—act or result or any process by which a neutral atom or molecule acquires either a positive or a negative charge.

Ionization potential—the potential necessary to separate one electron from an atom with the formation of an ion with one elementary charge.

Ionizing event—event in which an ion is produced.

Isobars—elements having the same mass number but different atomic numbers.

Isotope—one of two or more forms of an element having the same atomic number (nuclear charge) and hence occupying the same position in the periodic table. All isotopes are identical in chemical behavior, but are distinguishable by small differences in atomic weight. The nuclei of all isotopes of a given element have the same number of protons but differ in the number of neutrons.

Joule—unit of work or energy; 1 joule$=10^7$ ergs.

Kilowatt-hour—the quantity of energy equivalent to the expenditure of 1 kilowatt of power during 1 hr; 1 kw-hr$=1.341$ hp-hr. Abbreviation: kw-hr.

Kinetic energy—energy which a body possesses by virtue of its mass and velocity. The equation is: $E_k=\frac{1}{2}mv^2$.

Mass—quantity of matter. One of the fundamental dimensions.

Mass number—the number of nucleons in the nucleus of an atom. Symbol: A.

Mass unit—unit of mass based upon $\frac{1}{16}$ the weight of an oxygen atom ($_8O^{16}$) taken as 16.00000. Abbreviation: mu.

Median lethal radiation dosage—dosage estimated to be fatal in 50 percent of all cases exposed to that degree of radiation; commonly expressed as LD–50. See *Radiation dosage.*

Meson—short-lived particle carrying a positive or negative charge or no charge and having a variable mass in multiples of the mass of the electron. Also called mesotron.

Metastable state—excited state of a nucleus which returns to the ground state by the emission of a gamma ray over a measurable half life.

Mev—abbreviation for one million electron volts. (See *Electron volt.*)

Monitoring—using instrument to detect and measure radiological contamination of an area, material, object, or individual.

Neutron—elementary nuclear particle with a mass approximately the same as that of a hydrogen atom and electrically neutral; a constituent of the atomic nucleus. Its mass is 1.00893 mu.

Nonselfquenching counter tube—counter tube which requires the use of a quenching circuit to terminate the discharge.

Nuclear fission—a special type of nuclear transformation characterized by the splitting of a nucleus into at least two other nuclei and the release of a relatively large amount of energy.

Nuclear fission products—elements and/or particles produced by fission.

Nucleon—common name for the constituent parts of the nucleus.

Nucleus—heavy central part of an atom in which most of the mass and the total positive electric charge are concentrated. The charge of the nucleus, an integral multiple (Z) of the charge of the proton, is the essential factor which distinguishes one element from another. Z is the atomic number.

Nuclide—general term referring to all nuclear species—both stable (about 270) and unstable (about 500)—of the chemical elements as distinguished from the two or more nuclear species of a single chemical element which are called isotopes.

Operating voltage—voltage across a radiation counter tube in the quiescent state.

Overshoot—effect on a counter if the change in voltage of the anode is greater than the overvoltage.

Overvoltage—difference between the operating voltage and the Geiger threshold of a radiation counter tube.

Photoelectric effect—process by which a photon ejects an electron from its atom. All the energy of the photon is absorbed in ejecting the electron and imparting kinetic energy to it.

Photographic dosimetry—determination of the accumulative dosage of radiation by use of photographic film.

Photon—quantity of energy emitted in the form of electromagnetic radiation whose value is the product of its frequency and Planck's constant. The equation is: $E=hv$.

Plateau—approximately horizontal portion of the counting rate-voltage characteristic of a radiation counter tube. Voltage range throughout which any ionizing event, regardless of type or energy, will give the same size pulse.

Positron—nuclear particle equal in mass to the electron and having an equal but opposite charge. Its mass is 0.000548 mu.

Primary electron—electron ejected from an atom by an initial ionizing event, as caused by a photon or beta particle.

Proportional counter—gas-filled radiation detection tube in which the pulse produced is proportional to the number of ions formed in the gas by the primary ionizing particle.

Proportional region—voltage range in which the gas amplification is greater than one and in which the charge collected is proportional to the charge produced by the initial ionizing event.

Proton—nuclear particle with a positive electric charge equal numerically to the charge of the electron and a mass of 1.007575 mu.

Quenching—process of terminating the discharge in a counter tube.

Quenching circuit—circuit which causes the discharge to cease.

Quenching vapor—polyatomic gas used in Geiger-Mueller counters to quench or extinguish a pulse, thus eliminating the need for an external quenching resistor of an electronic circuit. The quenching action of vapor results from its absorption of ultraviolet photons emitted by excited atoms and prevents emission of secondary electrons when ions reach the cathode.

Radiac equipment—equipment used to detect, measure, and indicate radio-activity. The letters in the term, "radiac," represent the expression: radioactivity, detection, indications, and computation.

Radiation—1. Any electromagnetic wave (quantum). 2. Any moving electron or nuclear particle, charged or uncharged, emitted by a radioactive substance.

Radiation dosage—quantity of radiation absorbed by exposed personnel; it is the product of radiation intensity and time and is measured in roentgens. (See *Median lethal radiation dosage.*)

Radiation intensity—rate at which radiation is being received at a given point; commonly measured in roentgens per hour.

Radioactivity—process whereby certain nuclides undergo spontaneous atomic disintegration in which energy is liberated, generally resulting in the formation of new nuclides. The process is accompanied by the emission of one or more types of radiation, such as alpha particles, beta particles, and gamma radiation.

Radiological agent—any of a family of substances which produce casualties by emitting radiation.

Radiological defense—the methods, plans, and procedures involved in establishing and exercising defensive measures against the radiation effects of an attack by atomic weapons or radiological warfare agents. It encompasses both the training and the implementation of these methods, plans, and procedures. Because of the close association of the other effects of atomic weapons with the radiological effects, the term often connotes "atomic weapons defense." (See *Radiological safety.*)

Radiological survey instrument—apparatus for measuring radiological contamination in an area. (See *Geiger counter* and *Ion chamber.*)

Radiological warfare—tactics and techniques of conducting warfare by use of radioactive materials or by methods which result in the production of radioactivity.

Rate meter—see *Integrating circuit.*

Recovery time—time interval, after a count recording, before the pulses produced by the next ionizing event in the counter are of substantially full size.

Region of limited proportionality—voltage interval below the Geiger threshold in which the gas amplification depends on the number of ions produced by the initial ionizing event and also on the operating voltage.

Relative plateau slope—relative increase in the number of counts as a function of voltage expressed in percentage per 100 volts increased above the Geiger threshold.

Rem (roentgen equivalent, man)—an amount of any type of radiation equivalent in its physiological effect on man to 1 roentgen of gamma radiation.

Rep (roentgen equivalent, physical)—an amount of any type of ionizing radiation which imparts the same amount of energy to 1 gram of human tissue that 1 roentgen of gamma radiation imparts to 1 gram of air.

Resolving time—minimum time interval between counts which can be detected; may refer to an electronic circuit, a mechanical recording device, or a counter tube.

Roentgen—radiation dosage equivalent to that which would be received in 1 hour at a distance of 1 yard from an unshielded 1-gram sample of radium.

Rutherford—unit of radioactive disintegration rate equal to one million (10^6) disintegrations per second. Abbreviation: rd.

Secondary electron—electron ejected from an atom by the primary electron or by another secondary electron already ejected.

Self-absorption—absorption of radiation by the source material itself.

Self-quenching counter tube—counter tube in which the discharge is terminated by an internal mechanism within the tube.

Spinthariscope—instrument containing a particle of radioactive material mounted in front of a zinc sulfide or other suitably responsive screen. Scintillations caused by the bombardment of alpha particles are observed on the screen through an eyepiece.

Starting potential—voltage which must be applied to a counter to cause it to count with the particular recording circuit which may be attached. This potential is not necessarily the same as, and generally is not equal to, the Geiger threshold. Experimentally, this potential is that at the foot of the plateau curve of a Geiger counter.

Velocity of a wave—velocity of propagation in terms of wave length and period T or frequency v. The equation is: $v=\frac{\lambda}{T}=v\lambda$

Velocity of light (in vacuum)—$c=3 \times 10^{10}$ cm/sec.

Voltage pulse—change in the voltage of the central electrode system of a counter tube.

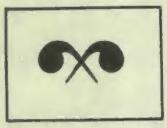
Wave length—distance between any two similar points of two consecutive waves.

Wave motion—progressive disturbance propagated in a medium by periodic vibration of the particles of the medium. *Transverse* wave motion is that in which the vibration of the particles is perpendicular to the direction of propagation. *Longitudinal* wave motion is that in which the vibration of the particles is parallel to the direction of propagation.

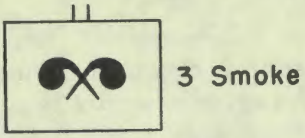
Section V. MILITARY SYMBOLS AND PERIODIC TABLE

90. Military Symbols

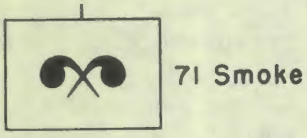
Examples of military symbols related to chemical operations are shown in figures 22 through 24. For additional information about military symbols, see FM 21–30.



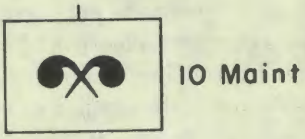
Chemical Unit



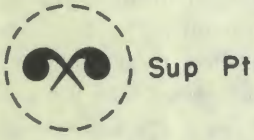
3d Chemical Smoke Generator Battalion



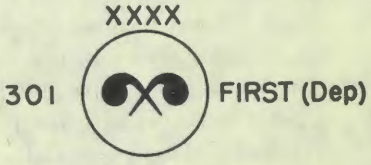
71st Chemical Smoke Generator Company



10th Chemical Maintenance Company



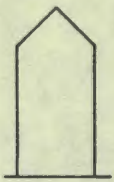
Proposed Chemical Supply Point



Chemical Depot, Number 301, First Army

Figure 22. Military symbols, units and supply installations.

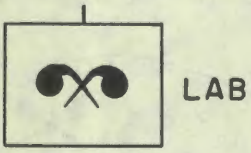
Chemical Supply Installation



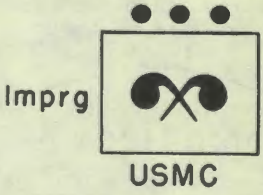
Class V Supplies-All Types
(Including chemical ammunition)

Class V Supplies-Chemical Only

Smoke Generator Location



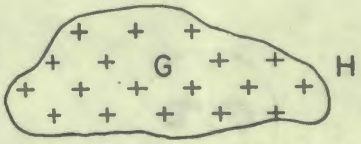
Chemical Laboratory



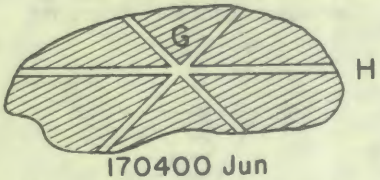
Cml Imprg Plat, Svc Comd, FMF

Figure 23. Military symbols, units and supplies.

Chemical Land Mine
(Yellow)



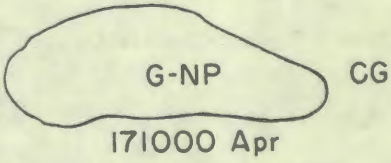
Chemical Land Mine Barrier
(Mines emplaced but not fired,
show agent)
(Yellow)



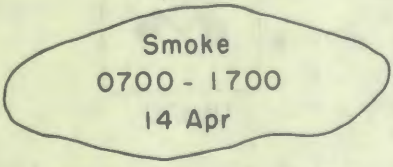
Contaminated Road Block (Chemical)
(Show agent, time, and date fired)
(Yellow)

Contaminated Demolition (Chemical)
(Show agent, time, and date fired)
(Yellow)

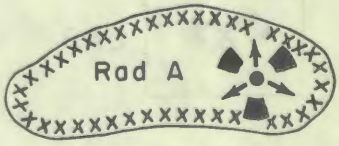
Gassed Area to be Avoided
(Show agent, time, and date fired)
(Yellow)



Area to be Gassed, Nonpersistent
(Show agent, time, date to be fired)
(Yellow)



Area to be Blanketed by Smoke
(Show time and date)



Radioactive Area
(Intensity & other characteristics
indicated as required)

Figure 24. Military symbols, obstacles.

91. Periodic Table

The periodic table of the elements is shown in figure 25.

LIGHT METALS I A	II A	HEAVY METALS												NON METALS III A	IV A	V A	VI A	VII A	INERT GASES
																			1 H 1.008
3 Li 6.940	4 Be 9.02																		2 He 4.003
11 Na 22.997	12 Mg 24.32	BRITTLE III B	IV B	V B	VI B	VII B	DUCTILE VIII			I B	LOW MELTING II B		13 Al 26.97	14 Si 28.06	15 P 30.98	16 S 32.06	17 Cl 35.457	18 A 39.944
19 K 39.096	20 Ca 40.08	21 Sc 45.10	22 Ti 47.90	23 V 50.95	24 Cr 52.01	25 Mn 54.93	26 Fe 55.85	27 Co 58.94	28 Ni 58.69	29 Cu 63.54	30 Zn 65.38	31 Ga 69.72	32 Ge 72.60	33 As 74.91	34 Se 78.96	35 Br 79.916	36 Kr 83.7
37 Rb 85.48	38 Sr 87.63	39 Y 88.92	40 Zr 91.22	41 Nb 92.91	42 Mo 95.95	43 Tc 99±	44 Ru 101.7	45 Rh 102.91	46 Pd 106.7	47 Ag 107.880	48 Cd 112.41	49 In 114.76	50 Sn 118.70	51 Sb 121.76	52 Te 127.61	53 I 126.92	54 Xe 131.3
55 Cs 132.91	56 Ba 137.36	57-71 See Lanthanide Series	72 Hf 178.6	73 Ta 180.88	74 W 183.92	75 Re 186.31	76 Os 190.2	77 Ir 193.1	78 Pt 195.23	79 Au 197.2	80 Hg 200.61	81 Tl 204.39	82 Pb 207.21	83 Bi 209.00	84 Po 210±	85 At 211±	86 Rn 222
87 Fr 223±	88 Ra 226.05	89-96 See Actinide Series															

Lanthanide Series (Rare Earth Elements)	57 La 138.92	58 Ce 140.13	59 Pr 140.92	60 Nd 144.27	61 Pm 147	62 Sm 150.43	63 Eu 152.0	64 Gd 156.9	65 Tb 159.2	66 Dy 162.46	67 Ho 164.94	68 Er 167.2	69 Tm 169.4	70 Yb 173.04	71 Lu 174.99
ACTINIDE SERIES	89 Ac 227±	90 Th 232.12	91 Pa 231	92 U 238.07	93 Np 237±	94 Pu 239±	95 Am 241±	96 Cm 242±	97 Bk 243±	98 Cf 244±					

Figure 25. Periodic table of the elements.

APPENDIX I

REFERENCES

Pam 108-1	Index of Army Motion Pictures, Film Strips, Slides, and Phono-Recordings.
Pam 310-1	Index of Administrative Publications.
Pam 310-2	Index of Blank Forms.
Pam 310-3	Index of Training Publications.
Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Bulletins, Lubrication Orders, and Modification Work Orders.
Pam 310-5	Index of Graphic Training Aids and Devices.
Pam 310-7	Index of Tables of Organization and Equipment, Tables of Organization, Type Tables of Distribution, and Tables of Allowances.
Pam 310-23	Index of Supply Manuals—Chemical Corps.
AR 220-58	Organization and Training for Chemical, Biological, and Radiological Warfare.
AR 711-60	Replacement Factors and Consumption Rates for Army Materiel.
AR 740-15	Storage and Shipment of Supplies and Equipment—Preservation, Packaging, and Packing.
AR 740-20	Storage and Shipment of Supplies and Equipment—Preparation for Shipment.
AR 750-5	Maintenance Responsibilities and Shop Operation.
SR 310-30-4	Equipment Authorization Tables.
SR 320-5-1	Dictionary of United States Army Terms.
SR 320-50	Authorized Abbreviations.
FM 3-5	Tactics and Techniques of Chemical, Biological, and Radiological Warfare.
FM 3-9	Staff Chemical Officer.
FM 3-25	Chemical Laboratory.
FM 3-30	Chemical Processing Company.
FM 3-50	Chemical Smoke Generator Battalion and Chemical Smoke Generator Company.
FM 3-60	Chemical Maintenance Company.
FM 3-65	Chemical Depot Company.
FM 3-70	Chemical Decontamination Company.
FM 3-80	Chemical Group (Field Army or Communications Zone) and Chemical Battalion.
FM 5-15	Field Fortifications.
FM 5-25	Explosives and Demolitions.
FM 5-35	Engineers' Reference and Logistical Data.

FM 9–10	Ordnance Maintenance and General Supply in the Field.
FM 9–40	Explosive Ordnance Reconnaissance and Disposal.
FM 10–13	Quartermaster Reference Data.
FM 21–5	Military Training.
FM 21–30	Military Symbols.
FM 21–40	Defense Against CBR Attack.
FM 21–41	Soldier's Manual for Defense Against CBR Attack.
FM 23–30	Hand and Rifle Grenades.
FM 25–10	Motor Transportation, Operations.
FM 100–5	Field Service Regulations—Operations.
FM 100–10	Field Service Regulations—Administration.
FM 101–1	Staff Officers' Field Manual—The G1 Manual.
FM 101–5	Staff Officers' Field Manual—Staff Organization and Procedure.
FM 101–10	Staff Officers' Field Manual—Organization, Technical, and Logistical Data.
FM 105–5	Maneuver Control.
TM 3–215	Military Chemistry and Chemical Agents.
TM 3–216	Military Biology and Biological Warfare Agents.
TM 3–220	Decontamination.
TM 3–223	Decontaminating Apparatus, Power-Driven, Truck-Mounted, M3A2.
TM 3–240	Field Behavior of Chemical Agents.
TM 3–250	Storage, Shipment, and Handling of Chemical Agents and Hazardous Chemicals.
TM 3–255	Chemical Filling and Handling Equipment.
TM 3–281	Impregnating Plant, Clothing, M 2.
TM 3–300	Ground Chemical Munitions.
TM 3–304	Protective Clothing and Accessories.
TM 3–350	Improvised CBR Protective Shelters.
TM 3–366	Flame Thrower and Fire Bomb Fuels.
TM 3–376	M2A1 Portable Flame Thrower.
TM 3–390	Generator, Smoke, M3A1.
TM 3–400	Chemical Bombs and Clusters.
TM 3–407	Decontaminating Apparatus, Power-Driven, Truck-Mounted, M3A3.
TM 3–409	Impregnating Plant Clothing, M2A1.
TM 3–420	Filter Unit, Gas-Particulate, GED and EMD, ABC–M6.
TM 3–428	Protector, Collective, Hospital, Six-Man, M7A1.
TM 3–430	Protector, Collective, Tank, Three-Man, M8A1.
TM 3–431	Generator, Smoke, Mechanical, M3A2.

TM 3-522-15	Repair Parts List for Mask, Protective, Field, M9, and Mask, Protective, Field, M9A1.
TM 8-285	Treatment of Chemical Warfare Casualties.
TM 9-1900	Ammunition, General.
TM 9-1901	Artillery Ammunition.
TM 9-1950	Rockets.
TM 9-2800	Military Vehicles.
TM 9-2800-1	Military Vehicles (Ordnance Corps Responsibility).
TM 10-1619	Quartermaster Materials Handling Equipment.
TM 38-230	Preservation, Packaging, and Packing of Military Supplies and Equipment.
TM 57-210	Air Movement of Troops and Equipment.
TM 743-200	Storage and Materials Handling.
TM 743-200-1	Storage and Materials Handling.
TB 3-350-1	Protectors, Collective, M1A1, M2, M2A1, and M2A2.
SB 3-27	Peacetime Replacement Factors and Consumption Rates, Chemical Corps.
SB 3-28	Wartime Replacement Factors and Consumption Rates, Chemical Corps.
SB 38-8-1	Storage of Army Supplies and Equipment in Shed and Open Storage.
(C) SB 38-26	Ammunition Day of Supply (U).
SB 38-100	Preservation, Packaging, and Packing Materials, Supplies, and Equipment Used by the Army.
SB 725-350	Chemical Corps: Regulated Items.
TA 3-104	Allowances of Chemical Corps Expendable Supplies.
TA 20	Field Installations and Activities.
TA 20-2	Equipment for Training Purposes.
TA 21 (Mob)	Clothing and Equipment.
TA 23-100	Ammunition for Training.
TA 23-101	Miscellaneous Ammunition and Explosives.
MWO CML 15	Generator, Smoke, Mechanical, M2; and Set, Accessories.

Tables of Organization and Equipment—3-Series.
Supply Manuals—3-Series.

APPENDIX II

CHEMICAL TOE UNITS

3-7 (Current Suffix)	Chemical Company, Combat Support.
3-32 (Current Suffix)	Headquarters and Headquarters Detachment, Chemical Group.
3-36 (Current Suffix)	Headquarters and Headquarters Detachment, Chemical Battalion, Service, Army or Communications Zone.
3-47 (Current Suffix)	Chemical Maintenance Company.
3-67 (Current Suffix)	Chemical Depot Company.
3-77 (Current Suffix)	Chemical Processing Company.
3-97 (Current Suffix)	Chemical Laboratory.
3-117 (Current Suffix)	Chemical Depot Company, Communications Zone.
3-217 (Current Suffix)	Chemical Decontamination Company.
3-266 (Current Suffix)	Headquarters and Headquarters Detachment, Chemical Smoke Generator Battalion.
3-267 (Current Suffix)	Chemical Smoke Generator Company.
3-500 (Current Suffix)	Chemical Service Organization.

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[AG 322 (6 Jul 54)]

BY ORDER OF THE SECRETARY OF THE ARMY:

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