

**Table 3-1  
 General Placarding Requirements**

<b>Category of material (Hazard class or division number and additional description, as appropriate)</b>	<b>Placard name</b>	<b>Placard Design Section Ref. (§)</b>
1.1	Explosives 1.1	172.523
1.2	Explosives 1.2	172.524
1.3	Explosives 1.3	172.525

**Table 3-2  
 General Placarding Requirements**

<b>Category of material (Hazard class or division number and additional description, as appropriate)</b>	<b>Placard name</b>	<b>Placard Design Section Ref. (§)</b>
1.4	Explosives 1.4	172.523
1.5	Explosives 1.5	172.524
1.6	Explosives 1.6	172.525

**Table 3-3  
 Storage Compatibility for Explosives & Ammunition**

<b>GROUP A</b>	
Bombs, demolition	Mines, HEAT nitrocellulose wet 8 to 30 percent water exposed to detonation hazards at less than intra line distance
Bombs, fragmentation	Nitroguanidine
Bombs, general purpose	Nitrostarch Octol
Boosters	PBX
Boosters, auxiliary	Pentolite
Bursters	PETN, wet
Charge, demolition, snake	Picratol
Charge, springing earth rod, blast driven	Picric acid
Charge, supplementary, HE	Projectiles, HE, fused or unfused
Compositions A, A-2, A-3, A-4, B, B-3, C, C-2, C-3, and C-4	RDX (Cyclonite), wet
Cutter, cable M1	Rocket heads, HE, and HEAT (except pentolite loaded) w/o motors
Cyclonite (RDX), wet	Shaped charges
Cyclotol	Tetranitrocarbazole (TNC)
Demolition Blocks	Tetryl
Destructor, HE, M10	Tetrytol

Detonating cord (primacord) exposed to detonation hazard at less than intra line distance	TNT
Dynamite	Tritonal
Ednatol	Torpex
Cyclonite (RDX), dry	Mercury fulminate, wet
HMX, dry	PETN, dry
Lead azide, wet	RDX (cyclonite), dry
Lead styphnate, wet	Tetracene, wet
<b>GROUP B</b>	
Fuses (except chemically actuated fuses containing ampules that may initiate, directly or indirectly, explosives and explosives-loaded components that are assembled in the conventional manner to form the finished explosive fuse).	Detonators
	Mines, practice, AP, M17
	Percussion elements
	Primer detonators
<b>GROUP C</b>	
Ammunition, blank and saluting, cannon	Cartridge, 90mm, canister, AP
Ammunition, .50 caliber, except API/incendiary	Cartridges, practice, over 40mm
Ammunition, 20mm, practice and high pressure test	Catapults, aircraft ejection seat, M3A1, M4A1, M5
Ammunition, 25mm, with inert projectile	Charge, propelling, not assembled to projectiles EC powder
Ammunition, 27mm, caseless	Detonating cord (primacord)
Ammunition, 30mm, ball and high pressure test	Nitrocellulose
Ammunition, 30mm, practice and training	Fuel (solid), emergency power unit
Ammunition, 37mm and 40mm, TP and AP	Propellant
Ammunition, 40mm, practice, M407A1, M382, and M385	Rockets, practice, 3.5-inch
Benite	Rocket motors, M3, M5, M6, M10, M13, M26, M30, M37, M42, M53, M66; Pershing 1 <sup>st</sup> and 2 <sup>nd</sup> stages; Spartan 1 <sup>st</sup> , 2 <sup>nd</sup> , and 3 <sup>rd</sup> stages
Baron Potassium	
<b>GROUP D</b>	
Adapter booster	Explosive D
Ammonium nitrate, except in original shipping container or equivalent	Explosives, cratering
Ammonium perchlorate, except when particle size is over 15 microns and in original shipping container or equivalent	Grenades, rifle, AT (except pentolite loaded)
Ammonium picrate (Explosive D)	HMX, wet
Bangalore torpedoes	Mine, APERS, MN, M14 (w/integral fuse)
Baratol	Mines, antipersonnel (bounding type)
Black powder, bulk	Mines, antipersonnel (cast iron block)
<b>GROUP E</b>	
Ammunition, HEP	Ammunition, fixed and semi-fixed, 90mm through 106mm, loaded with ammonal, amatol, Explosive D, composition B, or TNT
Ammunition, 20mm, HE, HEI and functional packs	Cartridge, heavy mortar over 81mm (including

containing HE and HEI	81mm M56), except chemical loaded
Ammunition, 30mm, HEDP	Cartridge, light mortar, 81mm or less (excluding 81mm M56), except chemical loaded
Ammunition, 37mm, HE	Redeye guided missiles, packaged three complete rounds w/launcher
Ammunition, 40mm, HE, RDX loaded	
Ammunition, 40mm, HE, M406, M386, M441, and M463	Rockets, HEAT, 3.5-inch, complete round
Ammunition, 57mm through 81mm, except WP smoke, HEP and blank	Rockets, HE, 2.75-inch (in LAU-3/A rocket launcher)
<b>GROUP F</b>	
Grenades, hand offensive	Grenades, fragmentation
<b>GROUP G</b>	
Ammunition, .50 caliber API and incendiary	Grenades, hand, CN1, ABC, M25A1, w/fuse C12
Ammunition, 20mm, API	Grenades, hand, CM1, ABC, M25A2, w/fuse C12
Ammunition, 20mm, incendiary and functional packs containing incendiary, except those containing HE or HEI	Grenades, illuminating and incendiary
Ammunition, 40mm, riot control and pyrotechnic loaded, except WP smoke	Grenades, practice, w/spotting charge
Bombs, photoflash	Grenades, rifle, smoke, XM48E1 and M22 and M23
Cartridge, igniter, M2	Grenades, smoke (except WP and PWP)
Cartridge, illuminating	Grenades, riot control, CS1, M25A2
Cartridge, photoflash	Igniter, spotting charge
Cartridge cases, primer (w/o Propellant)	Igniters for rocket motors (e.g., M12, M18, M20 and M29)
Charge, igniter assembly, for practice hand grenades	Ignition cartridge for trench mortar ammunition
Charge, spotting, APR practice, M8	Illuminating compositions (consolidated in final press operations)
Chemical ammunition, Group B, tear or smoke producing, w/explosive components, over 40mm	Mines, practice, w/spotting charge and /or fuse
Chemical ammunition, Group B, tear or smoke producing, w/o explosive components	Nuclear fire marker device 11-F2
Chemical ammunition, Group D, containing flammable solids, except for TEA or TPA, w/o explosive components	Photoflash powder
Chemical ammunition, Group D, fixed or semi-fixed rounds, containing flammable solids, except for TEA or TPA	Primers, artillery and cannon, percussion and electric
Clusters, incendiary bomb, M31 and M32 (w/o fusing components)	Projectiles, illuminating
Destroyer, file, M4	Rocket, riot control agent, CS, 2.75-inch FFAR, MX99
Detonation, simulator, explosive M80	Simulators, M110, M115, M116, M117, M118, M119, and XM142

Grenade, hand, smoke, HC, M8	Smoke pots
Grenades, hand CN, M7A1, w/fuse M201A1	Spotting charges (cartridge for miniature practice bombs)
Grenades, hand, CS, M7A3, w/fuse M210A1	
<b>GROUP H</b>	
Chemical ammunition, group C	Grenade rifle, WP, M19
Grenades, WP	
<b>GROUP J</b>	
Chemical ammunition, Group D, containing flammable liquids or gels, with or w/o explosive components	Chemical ammunition, Group D, fixed and semi-fixed rounds, containing flammable liquids or gels with or without explosive components
<b>Group K</b>	
Chemical ammunition, Group A, with or without explosive components	Chemical ammunition, Group B, with or without explosive components, designed for toxic or incapacitating effects greater than lachrymation
Rockets, toxic chemical agents. Complete rounds	
<b>GROUP L</b>	
Aluminum powder	Fuses, chemically actuated, containing ampoules which may initiate directly or indirectly, explosives and explosives loaded components which are assembled in the conventional manner to form the finished explosive fuse
Ammonium nitrate	Magnesium powder
Ammonium perchlorate	Grenades, rifle, AT (pentolite loaded)
Ammunition, pentolite loaded	Nitrates (inorganic), except ammonium nitrate (in original shipping container or equivalent)
Chemical Ammunition, Group A, without explosive components	Perchlorates
Chemical Ammunition, Group B, without explosive components, designed for toxic or incapacitating effects more severe than lachrymation	Peroxides, solid
Chemical ammunition, Group D, TEA or TPA components	Rocket heads, pentolite loaded, w/o motors
Chlorates	Zirconium (types I and II, spec. FED 1665)
DNT	
<b>GROUP S</b>	
Ammunition, 40mm, canister and multiple projectile	Fuse lighters
Ammunition, small arms, less than .50 caliber	Fuse safety
Explosive bellows	Squibs commercial
Firing devices	

**Table 3-4  
 Storage Compatibility Chart**

Groups	A	B	C	D	E	F	G	H	J	K	L	N	S
A	X	Z											
B	Z	X	Z	Z	Z	Z	Z					X	X
C		Z	X	X	X	Z	Z					X	X
D		Z	X	X	X	Z	Z					X	X
E		Z	X	X	X	Z	Z					X	X
F		Z	Z	Z	Z	X	Z					Z	X
G		Z	Z	Z	Z	Z	X					Z	X
H								X					X
J									X				X
K										Z			
L													
N		X	X	X	X	Z	Z					X	X
S		X	X	X	X	X	X	X	X			X	X

**Notes:**

1. The marking “X” at the intersection of the above chart indicates that these groups may be combined in storage. Otherwise, mixing is either prohibited or restricted per Note 2 below.
2. The marking “Z” at an intersection of the above chart indicates that, when warranted by operational considerations or magazine non-availability, and when safety is not sacrificed, these groups may be combined in storage.
3. The marking “U” on the above chart indicates that leaking toxic chemical munitions of one agent type, i.e., GB, with or without explosive components, may be stored together in one magazine specifically designated for storage of leakers of that agent type.
4. Equal numbers of separately packaged components of complete rounds of any single type of ammunition may be stored together. When so stored, compatibility is that of the assembled rounds; i.e., WP Filler in Group H, HE Filler in Groups D, E, or F, as appropriate.
5. Group K required not only separate storage from other groups, but also requires that munitions having different toxic chemical agent fillers be stored separately from each other.
6. Ammunition designated “PRACTICE: by NSN and nomenclature may be stored with the fully loaded ammunition it stimulates.

**Table 4-1  
 NEW and Hazard Division of Stored Explosives**

Magazine Type	Contents	Hazard Div.	Distance (in feet) From	
			Inhabited Bldgs.*	Public Traffic Rt.*
<b>Earth Covered Magazine</b>	<b>Initiating Explosives</b>			
	Detonating Cord, 80 Grain	1.1D		
	Shape Charge 19.5 Grams	1.4S		
	Booster ¼ lb.	1.1D		
			250/500	150/300
<b>Earth Covered Magazine</b>	<b>Initiating Explosives</b>			
	Blasting Cap, Elect.	1.4B		
			75	75
* From DOD 6055.9-STD				

**Table 4-2  
 Minimum Separation Distance by Area**

MRS	MGFD <sup>1</sup>	MSD (feet)					
		For Unintentional Detonations		For Intentional Detonations			
		Hazardous Fragment Distance (HFD)	K40 <sup>2</sup> (used for TSD)	Single Shots Without Engineering Controls and MSD to non-essential personnel from sifting plants and from soil/debris mechanical excavation sites  Distance listed is greater of: (MFR-H) or K328 <sup>4</sup>	Single Shots Using Sandbag Mitigation	Single Shots Using Water Mitigation	Consolidated Shots (TNT equivalent) (NEW-lbs) <sup>3</sup>
Seaside 4 (western portion)	Grenade, Mk II	62	21	390 (MFR-H)	200	200	1.4
Seaside 4 (central portion)	60mm, Mortar, M49A2	150	30	1127 (MFR-H)	200	200	33.8
Seaside 4 (eastern portion)	57mm, Projectile, M306	167	37	1073 (MFR-H)	200	200	29.1

**Notes:**

1. MGFD for each MRS is based on previous removals and sampling.
2. The K40 distance is the Team Separation Distance (TSD) for each of the MEC items identified as the MGFD for each MRS.
3. The consolidated shots net explosive weight (NEW) is the combined (TNT equivalent weights) NEW of all of the MEC items and the donor charges (times a 1.2 safety factor), whose K328 distance does not extend beyond the maximum fragment range of the MEC item.
4. To obtain the K328 for intentional detonation, add the donor charge NEW to the NEW of the MEC (determine the TNT equivalent weight of the explosive), multiply by the safety factor of 1.2, obtain the cube root of that product and multiply by 328 to get the actual MSD for intentional detonations.

**Table 5-1**  
**Recovery and Penetration Depths of MEC Previously Encountered in MRS-15SEA.1-4**

	Maximum Recovery Depth	Maximum Calculated Penetration Depths in sand
MEC Type	Depth (feet bgs)	Depth (feet bgs.)
Grenade: hand, several types	3	Surface Munition
Grenade: rifle, several types	1	Surface Munition
Fuze: grenade, hand	0.9	Surface Munition
Fuze, projectile, various	1.3	Surface Munition
Mine: anti-tank, practice	1.5	Surface Munition
Projectile: 3-inch, trench mortar (Stokes)	2	N/C
Projectile: 4-inch, trench mortar (Stokes)	1.8	N/C
Projectile: 37mm, LE	1.2	3.9
Projectile: 40mm, parachute	0.2	0.2
Projectile: 40mm	0.3	0.2
Projectile: 57mm, HE	1.5	2.7
Projectile: 60mm, HE, M49 Series	1	1.1
Projectile: 75mm, shrapnel	1	6.7
Projectile: 81mm, mortar	0.5	2.7
Projector: Livens	0.6	N/C
Rocket: 3.5-inch	0	0.8
Signal illumination: ground, various	0.3	Surface Munition

\*N/C - not calculated

**Table 5-2**  
**Coordinates of Geo-Reference Data Points**

Coordinate Name	Latitude	Longitude	HAE <sup>a</sup> (feet)
NASA (GU4242CCS)	36°35'21.71529N	121°46'19.67986W	250.53
R24N	36°35'43.69341N	121°49'33.87999W	—
NASA Check (GU4242CCS) <sup>b</sup>	36°35'21.71375N	121°46'19.680009W	250.53

a. HAE = height above ellipsoid. This coordinate was calculated by a Trimble 4700 GPS rover unit when the system's base station was placed over the Range 24 semi-permanent control point.

b. This coordinate was calculated by a Trimble 4700 GPS rover unit when the system's base station was placed over the Range 24 semi-permanent control point.



**Table 11-1  
 The Structure of Project Procedures**

Procedure Number	Type of Procedures
1-X	Scope of Work
2-X	Administrative Procedures, includes Document Control, Personnel Proficiency, Records Control, Data Control
3-X	Cost Engineering, Scheduling, Estimating
4-X	Quality Control, Inspection and Testing, Supplier Quality, Training
5-X	Design Control, Configuration Control
6-X	Procurement Control, Subcontractor Control
7-X	Operational Procedures
8-X	Environmental Compliance Procedure

**Table 11-2  
 Geophysical QC Steps**

Activity	QC Actions	Performed By	Overseen By
Digital Geophysical Mapping Surveys	Equipment Maintenance	Geophysical Field Team Coordinator	QC Geophysicist/ UXO QC
	Weekly Instrument Checks (Instrument Standardization)	Geophysical Teams	QC Geophysicist
	Daily Instrument Checks (Instrument Standardization)	Geophysical Teams	QC Geophysicist/ UXO QC
	Positioning Control Checks	Geophysical Teams	QC Geophysicist/ UXO QC
	Static Checks	Geophysical Teams	QC Geophysicist/ UXO QC
	Battery Strength Checks	Geophysical Teams	QC Geophysicist/ UXO QC
	Audio Response Checks	Geophysical Teams	QC Geophysicist/ UXO QC
	Field Data Quality	Geophysical Teams	QC Geophysicist/ UXO QC

**Table 11-2  
 Geophysical QC Steps**

<b>Activity</b>	<b>QC Actions</b>	<b>Performed By</b>	<b>Overseen By</b>
	Checks		
	Cable Shake Test	Geophysical Teams	QC Geophysicist
	Metal-free Operator check	Geophysical Teams	QC Geophysicist
	Download Checks	Digital Geophysical Teams/ Processing Geophysicists	QC Geophysicist
	Field Records Check	QC Geophysicist/ Database Manager	QC Geophysicist/ Database Manager
Digital Geophysical Mapping Data Processing	Data Quality Checks	Processing Geophysicists	QC Geophysicist
	Office Review of Field Forms	Processing Geophysicists	QC Geophysicist
	Instrument Standardization Checks	Processing Geophysicists	QC Geophysicist
	Data Sample Spacing Checks	Processing Geophysicists	QC Geophysicist
	Data Line Spacing Checks	Processing Geophysicists	QC Geophysicist
	Instrument Drift Checks	Processing Geophysicists	QC Geophysicist
	Processed Data Checks	Processing Geophysicists/ QC Geophysicist/ Project Geophysicist	QC Geophysicist
	Data Deliverable Checks	Processing Geophysicists/ QC Geophysicist/ Project Geophysicist	QC Geophysicist
	Database Checks	Database Manager/ QC Geophysicist/ UXO QC Specialist	Database Manager

**Table 11-2  
 Geophysical QC Steps**

Activity	QC Actions	Performed By	Overseen By
	Dig Sheet Checks Prior to Delivery to UXO Teams	Processing Geophysicists/ QC Geophysicist	QC Geophysicist
UXO Intrusive Operations	Field Verification of Geophysical Data vs. Intrusive Results	UXO Intrusive Teams/ Processing Geophysicists/ QC Geophysicist	QC Geophysicist/ UXOQCS
Digital QC Surveys	Verification of Anomaly Removal During Intrusive Actions and after Completion of Initial Survey	Geophysical Teams	QC Geophysicist
Analog QC Surveys	Field Analog QC Surveys	UXO QCS	UXO QC Manager
Field QA Seeding and Surveys	Field QA Surveys	UXO QC Manager  FORA QA Subcontractor  U.S. EPA, Cal EPA DTSC	WESTON UXO Service Line Leader, FORA, U.S. EPA, CAL EPA DTSC
All Operations	Impromptu Field Team Checks for Adherence to Field/QC Procedures	Project Geophysicist, UXO QCS	QC Geophysicist, UXO QC Manager
	Daily Quality Control Reporting	UXO QC	QCM
Document Preparation	Check document for appropriate and full description of QC activities.	UXO QC	QCM

**Table 11-3**  
**List of Document Types for the Document Control Log**

<b>Description</b>
Site Specific Removal Report
Report/Minutes, Record of Meeting
Telephone Conversations/Correspondence Records
Conventional Explosives Safety Submission (ESS)
Monthly Status Report
Weekly Status Report