

Appendix H

Hazardous Materials Information

This appendix consists primarily of charts that provide data required to prepare munitions shipments. As always, safety is a primary consideration when handling, processing, and transporting munitions. See DOD 4500.9-R and Title 49, Code of Federal Regulations, Part 172, for more information.

UNO AMMUNITION AND EXPLOSIVES SHIPMENTS

H-1. Tables H-1 through H-3 contain the elements of UNO information required to prepare munitions for shipment and to complete required forms. PSNs are limited to those shown in regular type (not italic type). PSNs may be used in the singular or plural and in either capital or lower-case letters. Although punctuation marks and words in italics are not part of the PSN, they may also be included. The word "or" in italics indicates that terms in the sequence may be used as the PSN, as appropriate. These elements are established by and defined in 49 CFR.

Table H-1. UNO HC 1 Requirements Data

UNO Number	Proper Shipping Name	HC/DIV with SCG
0004	<i>Ammonium picrate, dry or wetted with less than 10 percent water by mass</i>	1.1D
0005	<i>Cartridges for weapons, with bursting charge</i>	1.1F
0006	<i>Cartridges for weapons, with bursting charge</i>	1.1E
0007	<i>Cartridges for weapons, with bursting charge</i>	1.2F
0009	<i>Ammunition, Incendiary with or without burster, expelling charge, or propelling charge</i>	1.2G
0010	<i>Ammunition, Incendiary with or without burster, expelling charge, or propelling charge</i>	1.3G
0012	<i>Cartridges for weapons, inert projectile or Cartridges, small arms</i>	1.4S
0014	<i>Cartridges for weapons, blank or Cartridges, small arms, blank</i>	1.4S
0015	<i>Ammunition, smoke with or without burster, expelling charge or propelling charge</i>	1.2G
0016	<i>Ammunition, smoke with or without burster, expelling charge or propelling charge</i>	1.3G

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0018	Ammunition, tear-producing <i>with burster, expelling charge or propelling charge</i>	1.2G
0019	Ammunition, tear-producing <i>with burster, expelling charge or propelling charge</i>	1.3G
0020*	Ammunition, toxic <i>with burster, expelling charge, or propelling charge</i>	1.2K
0021*	Ammunition, toxic <i>with burster, expelling charge, or propelling charge</i>	1.3K
0027	Black powder <i>or</i> Gunpowder, <i>granular or as a meal</i>	1.1D
0028	Black powder, compressed <i>or</i> Gunpowder, compressed <i>or</i> Black powder, in pellets <i>or</i> Gunpowder, in pellets	1.1D
0029	Detonators, nonelectric, <i>for blasting</i>	1.1B
0030	Detonators, electric, <i>for blasting</i>	1.1B
0033	Bombs, <i>with bursting charge</i>	1.1F
0034	Bombs, <i>with bursting charge</i>	1.1D
0035	Bombs, <i>with bursting charge</i>	1.2D
0037	Bombs, photo-flash	1.1F
0038	Bombs, photo-flash	1.1D
0039	Bombs, photo-flash	1.2G
0042	Boosters, <i>without detonator</i>	1.1D
0043	Bursters, <i>explosive</i>	1.1D
0044	Primers, cap type	1.4S
0048	Charges, demolition	1.1D
0049	Cartridges, flash	1.1G
0050	Cartridges, flash	1.3G
0054	Cartridges, signal	1.3G
0055	Cases, cartridge, empty with primer	1.4S
0056	Charges, depth	1.1D
0059	Charges, shaped, commercial, <i>without detonator</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0060	Charges, supplementary explosive	1.1D
0065	Cord, detonating, <i>flexible</i>	1.1D
0066	Cord, igniter	1.4G
0070	Cutters, cable, explosive	1.4S
0072	Cyclotrimethylenetrinitramine, wetted <i>or</i> Cyclonite, wetted <i>or</i> Hexogen, wetted <i>or</i> RDX, wetted <i>with not less than 15 percent water by mass</i>	1.1D
0073	Detonators for ammunition	1.1B
0074	Diazodinitrophenol, wetted <i>with not less than 40 percent water or mixture of alcohol and water, by mass</i>	1.1A
0075	Diethyleneglycol dinitrate, desensitized <i>with not less than 25 percent nonvolatile water-insoluble phlegmatizer, by mass</i>	1.1D
0076	Dinitrophenol, <i>dry or wetted with less than 15 percent water, by mass</i>	1.1D
0077	Dinitrophenolates <i>alkali metals, dry or wetted with less than 15 percent water, by mass</i>	1.3C
0078	Dinitroresorcinol, <i>dry or wetted with less than 15 percent water, by mass</i>	1.1D
0079	Hexanitrodiphenylamine <i>or</i> Dipicrylamine <i>or</i> Hexyl	1.1D
0081	Explosive, blasting, type A	1.1D
0082	Explosive, blasting, type B	1.1D
0083	Explosive, blasting, type C	1.1D
0084	Explosive, blasting, type D	1.1D
0092	Flares, surface	1.3G
0093	Flares, aerial	1.3G
0094	Flash powder	1.1G
0099	Fracturing devices, explosive, <i>without detonators for oil wells</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0101	Fuse, instantaneous, nondetonating <i>or</i> Quickmatch	1.3G
0102	Cord detonating <i>or</i> Fuse detonating <i>metal clad</i>	1.2D
0103	Fuse, igniter <i>tubular metal clad</i>	1.4G
0104	Cord, detonating, mild effect <i>or</i> Fuse, detonating, mild effect <i>metal clad</i>	1.4D
0105	Fuse, safety	1.4S
0106	Fuzes, detonating	1.1B
0107	Fuzes, detonating	1.2B
0110	Grenades, practice, <i>hand or rifle</i>	1.4S
0113	Guanyl nitrosaminoguanilydene hydrazine, wetted <i>with not less than 30 percent water, by mass</i>	1.1A
0114	Guanyl nitrosaminoguanilyltetrazene, wetted <i>or</i> Tetrazene, wetted <i>with not less than 30 percent water or mixture of alcohol and water, by mass</i>	1.1A
0118	Hexolite, <i>or</i> Hexotol <i>dry or wetted with less than 15 percent water, by mass</i>	1.1D
0121	Igniters	1.1G
0124	Jet perforating guns, charged <i>oil well, without detonator</i>	1.1D
0129	Lead azide, wetted <i>with not less than 20 percent water or mixture of alcohol and water, by mass</i>	1.1A
0130	Lead styphnate, wetted <i>or</i> Lead trinitroresorcinate, wetted <i>with not less than 20 percent water or mixture of alcohol and water, by mass</i>	1.1A
0131	Lighters, fuse	1.4S
0132*	Deflagrating metal salts of aromatic nitroderivatives, n.o.s.	1.3C
0135	Mercury fulminate, wetted <i>with not less than 20 percent water, or mixture of alcohol and water, by mass</i>	1.1A
0136	Mines <i>with bursting charge</i>	1.1F
0137	Mines <i>with bursting charge</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0138	Mines <i>with bursting charge</i>	1.2D
0143	Nitroglycerin, <i>desensitized with not less than 40 percent nonvolatile water insoluble phlegmatizer, by mass</i>	1.1D
0144	Nitroglycerin, solution in alcohol, <i>with more than 1 percent but not more than 10 percent nitroglycerin</i>	1.1D
0146	Nitrostarch, <i>dry or wetted with less than 20 percent water, by mass</i>	1.1D
0147	Nitro urea	1.1D
0150	Pentaerythrite tetranitrate, wetted or Pentaerythritol tetranitrate, wetted, or PETN, <i>wetted with not less than 25 percent water, by mass, or Pentaerythrite tetranitrate, or Pentaerythritol tetranitrate, or PETN, desensitized with not less than 15 percent phlegmatizer by mass</i>	1.1D
0151	Pentolite, <i>dry or wetted with less than 15 percent water, by mass</i>	1.1D
0153	Trinitroaniline or Picramide	1.1D
0154	Trinitrophenol or Picric acid, <i>dry or wetted with less than 30 percent water, by mass</i>	1.1D
0155	Trinitrochlorobenzene or Picryl chloride	1.1D
0158	Potassium salts of aromatic nitro-derivatives, <i>explosive</i>	1.3C
0159	Powder cake, wetted or Powder paste, <i>wetted with not less than 25 percent water, by mass</i>	1.3C
0160	Powder, smokeless	1.1C
0161	Powder, smokeless	1.3C
0167	Projectiles, <i>with bursting charge</i>	1.1F
0168	Projectiles, <i>with bursting charge</i>	1.1D
0169	Projectiles, <i>with bursting charge</i>	1.2D
0171	Ammunition, <i>illuminating with or without burster, expelling charge or propelling charge</i>	1.2G

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0173	Release devices, explosive	1.4S
0174	Rivets, explosive	1.4S
0180	Rockets, <i>with bursting charge</i>	1.1F
0181	Rockets, <i>with bursting charge</i>	1.1E
0182	Rockets, <i>with bursting charge</i>	1.2E
0183	Rockets, <i>with inert head</i>	1.3C
0186	Rocket motors	1.3C
0190*	Samples, explosive, <i>other than initiating explosives</i>	None Listed
0191	Signal devices, hand	1.4G
0192	Signals, railway track, explosive	1.1G
0193	Signals, railway track, explosive	1.4S
0194	Signals, distress, <i>ship</i>	1.1G
0195	Signals, distress, <i>ship</i>	1.3G
0196	Signals, smoke	1.1G
0197	Signals, smoke	1.4G
0203*	Sodium salts of aromatic nitro-derivatives, n.o.s. <i>explosive</i>	1.3C
0204	Sounding devices, explosive	1.2F
0207	Tetranitroaniline	1.1D
0208	Trinitrophenylmethylnitramine <i>or</i> Tetryl	1.1D
0209	Trinitrotoluene <i>or</i> TNT, <i>dry or wetted with less than 30 percent water, by mass</i>	1.1D
0212	Tracers for ammunition	1.3G
0213	Trinitroanisole	1.1D
0214	Trinitrobenzene, <i>dry or wetted with less than 30 percent water, by mass</i>	1.1D
0215	Trinitrobenzoic acid, <i>dry or wetted with less than 30 percent water, by mass</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0216	Trinitro-meta-cresol	1.1D
0217	Trinitronaphthalene	1.1D
0218	Trinitrophenetole	1.1D
0219	Trinitroresorcinol <i>or</i> Styphnic acid, <i>dry or wetted with less than 20 percent water, or mixture of alcohol and water, by mass</i>	1.1D
0220	Urea nitrate, <i>dry or wetted with less than 20 percent water, by mass</i>	1.1D
0221	Warheads, torpedo <i>with bursting charge</i>	1.1D
0222	Ammonium nitrate, <i>with more than 0.2 percent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance</i>	1.1D
0224	Barium azide, <i>dry or wetted with less than 50 percent water, by mass</i>	1.1A
0225	Boosters with detonator	1.1B
0226	Cyclotetramethylenetetranitramine, <i>wetted or HMX, wetted or Octogen, wetted with not less than 15 percent water, by mass</i>	1.1D
0234	Sodium dinitro-o-cresolate, <i>dry or wetted with less than 15 percent water, by mass</i>	1.3C
0235	Sodium picramate, <i>dry or wetted with less than 20 percent water, by mass</i>	1.3C
0236	Zirconium picramate, <i>dry or wetted with less than 20 percent water, by mass</i>	1.3C
0237	Charges, shaped, flexible, linear	1.4D
0238	Rockets, line-throwing	1.2G
0240	Rockets, line-throwing	1.3G
0241	Explosive, blasting, type E	1.1D
0242	Charges, propelling, for cannon	1.3C
0243	Ammunition, incendiary, white phosphorus, <i>with burster, expelling charge or propelling charge</i>	1.2H
0244	Ammunition, incendiary, white phosphorus, <i>with burster, expelling charge or propelling charge</i>	1.3H

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0245	Ammunition, smoke, white phosphorus <i>with burster, expelling charge, or propelling charge</i>	1.2H
0246	Ammunition, smoke, white phosphorus <i>with burster, expelling charge, or propelling charge</i>	1.3H
0247	Ammunition, incendiary <i>liquid or gel, with burster, expelling charge or propelling charge</i>	1.3J
0248*	Contrivances, water-activated, <i>with burster, expelling charge or propelling charge</i>	1.2L
0249*	Contrivances, water-activated, <i>with burster, expelling charge or propelling charge</i>	1.3L
0250	Rocket motors with hypergolic liquids <i>with or without an expelling charge</i>	1.3L
0254	Ammunition, illuminating <i>with or without burster, expelling charge or propelling charge</i>	1.3G
0255	Detonators, electric, <i>for blasting</i>	1.4B
0257	Fuzes, detonating	1.4B
0266	Octolite or Octol, <i>dry or wetted with less than 15 percent water, by mass</i>	1.1D
0267	Detonators, nonelectric, <i>for blasting</i>	1.4B
0268	Boosters with detonator	1.2B
0271*	Charges, propelling	1.1C
0272*	Charges, propelling	1.3C
0275	Cartridges, power device	1.3C
0276	Cartridges, power device	1.4C
0277	Cartridges, oil well	1.3C
0278	Cartridges, oil well	1.4C
0279	Charges, propelling, for cannon	1.1C
0280	Rocket motors	1.1C
0281	Rocket motors	1.2C
0282	Nitroguanidine or Picrite, <i>dry or wetted with less than 20 percent water, by mass</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0283	Boosters, <i>without detonator</i>	1.2D
0284	Grenades, <i>hand or rifle, with bursting charge</i>	1.1D
0285	Grenades, <i>hand or rifle, with bursting charge</i>	1.2D
0286	Warheads, <i>rocket with bursting charge</i>	1.1D
0287	Warheads, <i>rocket with bursting charge</i>	1.2D
0288	Charges, <i>shaped, flexible, linear</i>	1.1D
0289	Cord, <i>detonating, flexible</i>	1.4D
0290	Cord, <i>detonating or Fuse, detonating metal clad</i>	1.1D
0291	Bombs, <i>with bursting charge</i>	1.2F
0292	Grenades, <i>hand or rifle, with bursting charge</i>	1.1F
0293	Grenades, <i>hand or rifle, with bursting charge</i>	1.2F
0294	Mines <i>with bursting charge</i>	1.2F
0295	Rockets, <i>with bursting charge</i>	1.2F
0296	Sounding devices, <i>explosive</i>	1.1F
0297	Ammunition, <i>illuminating with or without burster, expelling charge or propelling charge</i>	1.4G
0299	Bombs, <i>photo-flash</i>	1.3G
0300	Ammunition, <i>incendiary with or without burster, expelling charge or propelling charge</i>	1.4G
0301	Ammunition, <i>tear-producing with burster, expelling charge or propelling charge</i>	1.4G
0303	Ammunition, <i>smoke with or without burster, expelling charge or propelling charge</i>	1.4G
0305	Flash powder	1.3G
0306	Tracers for ammunition	1.4G
0312	Cartridges, <i>signal</i>	1.4G
0313	Signals, <i>smoke</i>	1.2G
0314	Igniters	1.2G

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0315	Igniters	1.3G
0316	Fuzes, igniting	1.3G
0317	Fuzes, igniting	1.4G
0318	Grenades, practice, <i>hand or rifle</i>	1.3G
0319	Primers, tubular	1.3G
0320	Primers, tubular	1.4G
0321	Cartridges for weapons, <i>with bursting charge</i>	1.2E
0322	Rocket motors with hypergolic liquids <i>with or without an expelling charge</i>	1.2L
0323	Cartridges, power device	1.4S
0324	Projectiles, <i>with bursting charge</i>	1.2F
0325	Igniters	1.4G
0326	Cartridges for weapons, blank	1.1C
0327	Cartridges for weapons, blank <i>or</i> Cartridges, small arms, blank	1.3C
0328	Cartridges for weapons, inert projectile	1.2C
0329	Torpedoes <i>with bursting charge</i>	1.1E
0330	Torpedoes <i>with bursting charge</i>	1.1F
0331	Explosive, blasting, type B <i>or</i> Agent blasting, Type B	1.5D
0332	Explosive, blasting, type E <i>or</i> Agent blasting, Type E	1.5D
0333	Fireworks	1.1G
0334	Fireworks	1.2G
0335	Fireworks	1.3G
0336	Fireworks	1.4G
0337	Fireworks	1.4S
0338	Cartridges for weapons, blank <i>or</i> Cartridges, small arms, blank	1.4C

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0339	Cartridges for weapons, inert projectile or Cartridges, small arms	1.4C
0340	Nitrocellulose, <i>dry or wetted with less than 25 percent water (or alcohol), by mass</i>	1.1D
0341	Nitrocellulose, <i>unmodified or plasticized with less than 18 percent plasticizing substance, by mass</i>	1.1D
0342	Nitrocellulose, <i>wetted with not less than 25 percent alcohol, by mass</i>	1.3C
0343	Nitrocellulose, <i>plasticized with not less than 18 percent plasticizing substance, by mass</i>	1.3C
0344	Projectiles, <i>with bursting charge</i>	1.4D
0345	Projectiles, <i>inert with tracer</i>	1.4S
0346	Projectiles, <i>with burster or expelling charge</i>	1.2D
0347	Projectiles, <i>with burster or expelling charge</i>	1.4D
0348	Cartridges for weapons, <i>with bursting charge</i>	1.4F
0349*	Articles, explosive, n.o.s.	1.4S
0350*	Articles, explosive, n.o.s.	1.4B
0351*	Articles, explosive, n.o.s.	1.4C
0352*	Articles, explosive, n.o.s.	1.4D
0353*	Articles, explosive, n.o.s.	1.4G
0354*	Articles, explosive, n.o.s.	1.1L
0355*	Articles, explosive, n.o.s.	1.2L
0356*	Articles, explosive, n.o.s.	1.3L
0357*	Substances, explosive, n.o.s.	1.1L
0358*	Substances, explosive, n.o.s.	1.2L
0359*	Substances, explosive, n.o.s.	1.3L
0360	Detonator assemblies, nonelectric, <i>for blasting</i>	1.1B
0361	Detonator assemblies, nonelectric, <i>for blasting</i>	1.4B
0362	Ammunition, practice	1.4G

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0363	Ammunition, proof	1.4G
0364	Detonators for ammunition	1.2B
0365	Detonators for ammunition	1.4B
0366	Detonators for ammunition	1.4S
0367	Fuzes, detonating	1.4S
0368	Fuzes, igniting	1.4S
0369	Warheads, rocket <i>with bursting charge</i>	1.1F
0370	Warheads, rocket <i>with burster or expelling charge</i>	1.4D
0371	Warheads, rocket <i>with burster or expelling charge</i>	1.4F
0372	Grenades, practice, <i>hand or rifle</i>	1.2G
0373	Signal devices, hand	1.4S
0374	Sounding devices, explosive	1.1D
0375	Sounding devices, explosive	1.2D
0376	Primers, tubular	1.4S
0377	Primers, cap type	1.1B
0378	Primers, cap type	1.4B
0379	Cases, cartridges, empty with primer	1.4C
0380	Articles, pyrophoric	1.2L
0381	Cartridges, power device	1.2C
0382*	Components, explosive train, n.o.s.	1.2B
0383*	Components, explosive train, n.o.s.	1.4B
0384*	Components, explosive train, n.o.s.	1.4S
0385	5-Nitrobenzotriazol	1.1D
0386	Trinitrobenzenesulfuric acid	1.1D
0387	Trinitrofluorenone	1.1D
0388	Trinitrotoluene and Trinitrobenzene mixtures <i>or</i> TNT and trinitrobenzene mixtures <i>or</i> TNT and hexanitrostilbene mixtures <i>or</i> Trinitrotoluene and hexanitrostilbene mixtures	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0389	Trinitrotoluene mixtures containing Trinitrobenzene and Hexanitrostilbene <i>or</i> TNT mixtures containing trinitrobenzene and hexanitrostilbene	1.1D
0390	Tritonal	1.1D
0391	RDX and HMX mixtures, wetted <i>with not less than 15 percent water by mass or</i> RDX and HMX mixtures, desensitized <i>with not less than 10 percent phlegmatizer by mass</i>	1.1D
0392	Hexanitrostilbene	1.1D
0393	Hexotonal	1.1D
0394	Trinitroresorcinol, wetted <i>or</i> Styphnic acid, wetted <i>with not less than 20 percent water, or mixture of alcohol and water by mass</i>	1.1D
0395	Rocket motors, liquid fueled	1.2J
0396	Rocket motors, liquid fueled	1.3J
0397	Rockets, liquid fueled <i>with bursting charge</i>	1.1J
0398	Rockets, liquid fueled <i>with bursting charge</i>	1.2J
0399	Bombs with flammable liquid, <i>with bursting charge</i>	1.1J
0400	Bombs with flammable liquid, <i>with bursting charge</i>	1.2J
0401	Dipicryl sulfide, <i>dry or wetted with less than 10 percent water, by mass</i>	1.1D
0402	Ammonium perchlorate	1.1D
0403	Flares, aerial	1.4G
0404	Flares, aerial	1.4S
0405	Cartridges, signal	1.4S
0406	Dinitrosobenzene	1.3C
0407	Tetrazol-1-acetic acid	1.4C
0408	Fuzes, detonating, <i>with protective features</i>	1.1D
0409	Fuzes, detonating, <i>with protective features</i>	1.2D
0410	Fuzes, detonating, <i>with protective features</i>	1.4D
0411	Pentaerythrite tetranitrate <i>or</i> Pentaerythritol tetranitrate <i>or</i> PETN, <i>with not less than 7 percent wax by mass</i>	1.1D

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0412	Cartridges for weapons, <i>with bursting charge</i>	1.4E
0413	Cartridges for weapons, blank	1.2C
0414	Charges, propelling, for cannon	1.2C
0415*	Charges, propelling	1.2C
0417	Cartridges for weapons, inert projectile or Cartridges, small arms	1.3C
0418	Flares, surface	1.1G
0419	Flares, surface	1.2G
0420	Flares, aerial	1.1G
0421	Flares, aerial	1.2G
0424	Projectiles, <i>inert, with tracer</i>	1.3G
0425	Projectiles, <i>inert, with tracer</i>	1.4G
0426	Projectiles, <i>with burster or expelling charge</i>	1.2F
0427	Projectiles, <i>with burster or expelling charge</i>	1.4F
0428	Articles, pyrotechnic <i>for technical purposes</i>	1.1G
0429	Articles, pyrotechnic <i>for technical purposes</i>	1.2G
0430	Articles, pyrotechnic <i>for technical purposes</i>	1.3G
0431	Articles, pyrotechnic <i>for technical purposes</i>	1.4G
0432	Articles, pyrotechnic <i>for technical purposes</i>	1.4S
0433	Powder cake, wetted or Powder paste, wetted <i>with not less than 17 percent alcohol by mass</i>	1.1C
0434	Projectiles, <i>with burster or expelling charge</i>	1.2G
0435	Projectiles, <i>with burster or expelling charge</i>	1.4G
0436	Rockets, <i>with expelling charge</i>	1.2C
0437	Rockets, <i>with expelling charge</i>	1.3C
0438	Rockets, <i>with expelling charge</i>	1.4C
0439	Charges, shaped, commercial <i>without detonator</i>	1.2D
0440	Charges, shaped, commercial <i>without detonator</i>	1.4D
0441	Charges, shaped, commercial <i>without detonator</i>	1.4S

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0442	Charges, explosive, commercial <i>without detonator</i>	1.1D
0443	Charges, explosive, commercial <i>without detonator</i>	1.2D
0444	Charges, explosive, commercial <i>without detonator</i>	1.4D
0445	Charges, explosive, commercial <i>without detonator</i>	1.4S
0446	Cases, combustible, empty, without primer	1.4C
0447	Cases, combustible, empty, without primer	1.3C
0448	5-Mercaptotetrazol-1-acetic acid	1.4C
0449	Torpedoes, liquid fueled, with or without bursting charge	1.1J
0450	Torpedoes, liquid fueled, with inert head	1.3J
0451	Torpedoes with bursting charge	1.1D
0452	Grenades, practice, <i>hand or rifle</i>	1.4G
0453	Rockets, line-throwing	1.4G
0454	Igniters	1.4S
0455	Detonators, nonelectric <i>for blasting</i>	1.4S
0456	Detonators, electric <i>for blasting</i>	1.4S
0457	Charges, bursting, plastics bonded	1.1D
0458	Charges, bursting, plastics bonded	1.2D
0459	Charges, bursting, plastics bonded	1.4D
0460	Charges, bursting, plastics bonded	1.4S
0461*	Components, explosive train, n.o.s.	1.1B
0462*	Articles, explosive, n.o.s.	1.1C
0463*	Articles, explosive, n.o.s.	1.1D
0464*	Articles, explosive, n.o.s.	1.1E
0465*	Articles, explosive, n.o.s.	1.1F
0466*	Articles, explosive, n.o.s.	1.2C
0467*	Articles, explosive, n.o.s.	1.2D
0468*	Articles, explosive, n.o.s.	1.2E

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0469*	Articles, explosive, n.o.s.	1.2F
0470*	Articles, explosive, n.o.s.	1.3C
0471*	Articles, explosive, n.o.s.	1.4E
0472*	Articles, explosive, n.o.s.	1.4F
0473*	Substances, explosive, n.o.s.	1.1A
0474*	Substances, explosive, n.o.s.	1.1C
0475*	Substances, explosive, n.o.s.	1.1D
0476*	Substances, explosive, n.o.s.	1.1G
0477*	Substances, explosive, n.o.s.	1.3C
0478*	Substances, explosive, n.o.s.	1.3G
0479*	Substances, explosive, n.o.s.	1.4C
0480*	Substances, explosive, n.o.s.	1.4D
0481*	Substances, explosive, n.o.s.	1.4S
0482*	Substances, explosive, very insensitive, n.o.s., <i>or</i> Substances, EVI, n.o.s.	1.5D
0483	Cyclotrimethylenetrinitramine, desensitized <i>or</i> Cyclonite, desensitized <i>or</i> Hexogen, desensitized <i>or</i> RDX, desensitized	1.1D
0484	Cyclotetramethylenetetranitramine, desensitized <i>or</i> Octogen, desensitized <i>or</i> HMX, desensitized	1.1D
0485*	Substances, explosive, n.o.s.	1.4G
0486	Articles, explosive, extremely insensitive <i>or</i> Articles, EEI	1.6N
0487	Signals, smoke	1.3G
0488	Ammunition, practice	1.3G
0489	Dinitroglycoluril <i>or</i> Dingu	1.1D
0490	Nitrotriazolone <i>or</i> NTO	1.1D
0491*	Charges, propelling	1.4C
0492	Signals, railway track, explosive	1.3G

Table H-1. UNO HC 1 Requirements Data (Continued)

UNO Number	Proper Shipping Name	HC/DIV with SCG
0493	Signals, railway track, explosive	1.4G
0494	Jet perforating guns, charged, <i>oil well, without detonator</i>	1.4D
0495*	Propellant, liquid	1.3C
0496	Octonal	1.1D
0497*	Propellant, liquid	1.1C
0498*	Propellant, solid	1.1C
0499*	Propellant, solid	1.3C

* An asterisk appearing after the UN or NA Serial Number indicates that, unless otherwise excepted, the technical name of the hazardous material must be entered in parentheses on documentation and package marking in association with the basic description.

H-2. Table H-2 below lists HC 1 NA identification numbers, PSNs, and HC/DIV with SCG. These PSNs are appropriate for describing materials for domestic transportation but may be inappropriate for international transportation under the provisions of international regulations (e.g., IMO, ICAO). An alternate PSN may be selected when either domestic or international transportation is involved. Table H-3 lists UN identification numbers, PSNs, and HC/DIV for Non-Hazard Class 1 entries.

Table H-2. NA HC 1 Requirements Data

NA ID Number	Proper Shipping Name	HC/DIV with SCG
0006	Explosive pest control devices	1.1E
0124	Jet perforating guns, charged oil well, with detonator	1.1D
0133	Mannitol hexanitrate, wetted or Nitromannite, wetted <i>with not less than 40 percent water, by mass or mixture of alcohol and water</i>	1.1A
0276	Model rocket motor	1.4C
0323	Model rocket motor	1.4S
0331	Ammonium nitrate-fuel oil mixture <i>containing only prilled ammonium nitrate and fuel oil</i>	1.5D
0337	Toy Caps	1.4S

Table H-2. NA HC 1 Requirements Data (Continued)

NA ID Number	Proper Shipping Name	HC/DIV with SCG
0349	Grenades, empty primed	1.4S
0350	Boosters with detonator	1.4B
0412	Explosive pest control devices	1.4E
0473	Barium styphnate <i>or</i> Lead mononitroresorcinate <i>or</i> Nitrosoguanidine	1.1A
0474*	Propellant explosive, liquid	1.1C
0477*	Propellant explosive, liquid	1.3C
0494	Jet perforating guns, charged oil well, with detonator	1.4D

* An asterisk appearing after the UN or NA Serial Number indicates that, unless otherwise excepted, the technical name of the hazardous material must be entered in parentheses on documentation and package marking in association with the basic description.

Table H-3. UN Non-HC 1 Requirements Data

UN ID Number	Proper Shipping Name	HC/DIV
1325*	Flammable solids, organic, n.o.s.	4.1
1360	Calcium phosphide	4.3
1381	Phosphorus, white dry <i>or</i> Phosphorus, white, under water <i>or</i> Phosphorus, white, in solution <i>or</i> Phosphorus, yellow dry <i>or</i> Phosphorus, yellow, under water <i>or</i> Phosphorus, yellow, in solution	4.2
1693*	Tear gas substances, liquid, n.o.s. <i>or</i> Tear gas substances, solid, n.o.s.	6.1
1697	Chloroacetophenone (CN), <i>solid or liquid</i>	6.1
1993*	Flammable liquids, n.o.s.	3.
2016*	Ammunition, toxic, nonexplosive, <i>without burster or expelling charge, nonfuzed</i>	6.1

Table H-3. UN Non-HC 1 Requirements Data (Continued)

UN ID Number	Proper Shipping Name	HC/DIV
2017	Ammunition, tear-producing, nonexplosive, <i>without burster or expelling charge, nonfuzed</i>	6.1
2805	Lithium hydride, fused solid	4.3

* An asterisk appearing after the UN or NA Serial Number indicates that, unless otherwise excepted, the technical name of the hazardous material must be entered in parentheses on documentation and package marking in association with the basic description.

Appendix I

Storage Compatibility Groups

Munitions are assigned to one of thirteen SCGs based on ammunition and explosives storage principles and mixed storage considerations. The SCGs are discussed in detail in this appendix.

COMPATIBILITY GROUP CRITERIA

I-1. Criteria used to assign munitions to the appropriate SCG (i.e., A-D, F-H, J-L, N, or S) are given below. Descriptions include examples of the types of munitions within each group.

GROUP A

I-2. Group A consists of bulk initiating explosives with sufficient sensitivity to heat, friction, or percussion to qualify them for use as initiating elements in an explosive train. Examples of initiating explosives are wet lead azide, wet lead styphnate, wet mercury fulminate, wet tetacene, and dry RDX and PETN.

GROUP B

I-3. Group B consists of detonators and similar initiating devices not containing two or more independent safety features. Examples include detonators, blasting caps, small arms primers, and fuzes.

GROUP C

I-4. Group C consists of bulk propellants, propelling charges, and devices containing propellant with or without means of ignition. Upon initiation, these items will deflagrate, explode, or detonate. They include single-, double-, and triple-base and composite propellants; rocket motors (solid propellants); and ammunition with inert projectiles.

GROUP D

I-5. Group D includes black powder, HE, and ammunition containing HE without its own means of initiation and without propelling charge, or a device containing an initiating explosive and containing two or more independent safety features. Munitions in this category can be expected to explode or detonate when any item or component is initiated except for devices containing initiating explosives with independent safety features. Examples include bulk TNT, Comp B, black powder, and wet RDX or PETN, bombs, projectiles, CBU's, depth charges, and torpedo warheads. Black powder saluting charges, torpedo warheads, and fuzes with two or more safing features are also part of this group.

GROUP E

I-6. Group E consists of ammunition containing HE without its own means of initiating and with propelling charge. Examples include artillery ammunition, rockets, or guided missiles.

GROUP F

I-7. Group F consists of ammunition containing HE with its own means of initiation and with or without propelling charge. Examples are grenades, sounding devices, and similar items having an inline explosive train in the initiator.

GROUP G

I-8. Group G consists of fireworks; illuminating, incendiary, or smoke munitions (including HC); or tear-producing, incendiary smoke (including JIC), or sound effects. This category does not include munitions that are water-actuated or that contain white phosphorus or flammable liquid or gel. Examples of Group G munitions are flares, signals, incendiary or illuminating ammunition, and other smoke- or tear-producing devices.

GROUP H

I-9. Group H munitions contain fillers that are spontaneously flammable when exposed to the atmosphere. These include white phosphorus, plasticized white phosphorus, or other pyrophoric material.

GROUP J

I-10. Group J munitions contain both explosives and flammable liquids or gels other than those that are spontaneously flammable when exposed to water or the atmosphere. Examples include liquid- or gel-filled incendiary ammunition, FAE devices, flammable liquid-fueled missiles, and torpedoes.

GROUP K

I-11. Group K munitions contain both explosives and toxic chemical agents. Items in this category contain chemicals specifically designed for incapacitating effects more severe than lachrymation (i.e., excessive secretion of tears). They include artillery or mortar ammunition, fuzed or unfuzed; and grenades, rockets, or bombs filled with lethal or incapacitating chemical agents.

GROUP L

I-12. Group L is comprised of munitions not included in other compatibility groups. Types presenting similar hazards may be stored together but not mixed with other groups. Examples include water-activated devices, prepackaged liquid-fueled rocket engines, FAE, TEA, and damaged or suspect munitions of any group.

GROUP N

I-13. Group N consists of munitions containing only EIDs. Examples are bombs and warheads.

GROUP S

I-14. Group S contains munitions that present no specific hazards. Included in this category is ammunition designed or packed to confine or contain any explosive effect to the item or package. If the package has

been degraded by fire, all blasts will be limited to the extent that they do not significantly hinder firefighting. An incident may destroy all items in a single pack but must not be communicated to other packs so that all are destroyed. Examples of Group S munitions are thermal batteries, explosive switches or valves, and other items packaged to meet group criteria.

MEANS OF INITIATION

I-15. A munitions item with its “own means of initiation” is one that has a normal initiating device assembled to it. This configuration presents a significant risk during storage because detonation can occur during accidental functioning of the device. However, the term does not apply when the initiating device is packaged in such a way as to eliminate the risk of detonation or when fuzed end items are configured and packaged to prevent arming. If safety features are in place to prevent initiation or detonation of the explosive filler, the initiating device may be assembled to munitions.

MIXING COMPATIBILITY GROUPS

I-16. Table I-1 demonstrates how different SCGs can be mixed in storage. Groups that are intersected by an “X” (e.g., A-A, B-B, B-S, C-S, etc.) may be combined in storage. Groups intersected by a “Z” may be approved by the MACOM for mixed storage of limited quantities. Approval constitutes a waiver and may be granted only when warranted by operational considerations or magazine nonavailability and when safety is not sacrificed. DA determines which items within Group K may be stored together and which must be stored separately. Group K requires not only separate storage from other groups but may also require separate storage within the group. Exceptions to the table are discussed in this section.

Table I-1. Storage Compatibility Mixing Chart

GROUP	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	Z	X					X	X
G		Z	Z	Z	Z	Z	X					X	X
H								X					X
J									X				
K										Z			
L													
N		X	X	X	X	X	X					X	X
S		X	X	X	X	X	X	X	X			X	X

COMPATIBILITY CRITERIA

I-17. When evaluating storage compatibility criteria, consider the following points, if relevant:

- Compliance with compatibility criteria is not required for mission essential or operationally necessary quantities of explosives in HC/D 1.4 or 6.1 (excluding toxic chemical munitions); up to 100 pounds NEW HC/D 1.3; and up to 50 pounds NEW HC/D (04)1.2. See DA Pam 385-64 for Q-D requirements.
- 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 round (i.e., WP filler in Group H, HE filler in Groups D, E, or F as appropriate).
- Munitions that do not contain explosives but do contain substances properly belonging to another U.N.HC/D may be assigned to the same compatibility group as items containing explosives and the same substances. They may also be stored with them.
- DA may authorize munitions items designated "Practice" by NSN and nomenclature to be stored with the fully loaded munitions they simulate.
- The MACOM may authorize the mixing of compatibility groups (except items in Groups A, K, and L) in quantities not exceeding 1,000 pounds NEW per storage site.
- For purposes of mixing, all items must be packaged in approved storage containers. Items must not be unpackaged at the storage location.
- Groups B and F munitions will be segregated in storage from articles of other groups by means that effectively prevent propagation.
- If dissimilar HC/D 1.6, SCG N munitions (such as MK 82 and MK 84 bombs) are mixed together and have not been tested to assure nonpropagation, the mixed munitions are considered to be HC/D 1.2, SCG D for purposes of transportation and storage. See DA Pam 385-64 about changing Q-D class/divisions when mixing SCG N munitions with SCG B through G.

EXCEPTIONS TO COMPATIBILITY CRITERIA

I-18. Certain locations are authorized to store munitions without regard to compatibility. These include the following:

- Areas within the US, its territories and possessions designated by the Army and with site approval from the DDESB to store munitions in rapid response configurations.
- Basic load ammunition holding areas outside the US.

The maximum NEQ at any of these locations storing munitions in mixed compatibility must not exceed 4,000 kg (8,820 pounds NEW) calculated IAW DA Pam 385-64.

Appendix J

Forward Arming and Refueling Points

A FARP is the temporary arming and refueling facility that an aviation unit commander organizes, equips, and deploys to support combat tactical operations. This appendix provides information on operations, location, and safety procedures for FARPs.

PURPOSE

J-1. Aviation provides a degree of versatility not replicated by other members of the combined arms combat team. It maneuvers rapidly and brings decisive combat power to bear at crucial points and times in the area of operations. Synchronizing aviation and ground maneuver forces allows the task force commander to shape the battleground and set the conditions for the close fight. Also, aviation's ability to rapidly deploy and operate effectively in austere environments is invaluable in SASO. In general, the same principles and tenets that apply to aviation forces in combat operations also apply for SASO. However, aviation units with SASO missions may use terms other than FARP to identify arming and refueling facilities.

J-2. During combat operations, the FARP increases the time-on-station for the commander by reducing the turnaround time associated with refueling and rearming of aviation assets. The increase in time-on-station gives the commander more time to apply continuous pressure on the enemy. The FARP provides fuel and ammunition for aviation units in combat and is flexible enough to be self-deployed or inserted by air. However, it must be properly task-organized to meet the Class III/V needs of mission aircraft.

PERSONNEL

J-3. Personnel allocations for the FARP include the following MOSs:

- 55B Ammunition specialist. Receives and transports Class V munitions from the supply point to the rearm pads. Has no aircraft-specific duties.
- 68J Aircraft armament/missile systems repairer. Repairs aircraft fire control systems, loads and arms attack aircraft.
- 68X AH-64 Armament/electrical systems repairer. Repairs fire control systems, loads and arms AH-64 aircraft.
- 77F Petroleum supply specialist. Transports Class III and refuels aircraft.

In the heavy division/corps aviation attack battalions, 55B and 77F personnel are assigned to the Class III/V platoon of the battalion HHC. In light divisions, these personnel are assigned to the brigade HHC. Medical or maintenance personnel, battle damage assessment teams, Stinger teams, and others also may be positioned at the FARP.

COMMAND, CONTROL, AND COMMUNICATIONS

J-4. The aviation commander is responsible for the overall success of the FARP. Based on METT-TC, the commander decides how FARP assets will be used to support his operational intent. Other command and control elements are as follows:

- S3. The S3 formulates the commander's plan and consults with the S4 and the HHC commander to ensure that the plan can be supported logistically.
- S4. The S4 calculates fuel and ammunition needed to support the mission, plans distribution of supplies, and coordinates requirements with higher headquarters.
- Platoon leader. The Class III/V platoon leader is responsible for accomplishing the FARP mission and keeping the S4 informed about the amounts of fuel and ammunition on hand.

LOCATION

J-5. The FARP should be located as close to the area of operations as the tactical situation permits, usually as far forward as 18 to 25 kilometers (METT-TC dependent) behind the FLOT and within a committed brigade's area of operation. If possible, the FARP is kept outside the threat of medium-range artillery. Movement and resupply are by ground or air. A FARP is only expected to remain in one location for three to six hours, although the time may be influenced by METT-TC. Size depends on the number of aircraft to be serviced and the type of refueling equipment available. Four to eight refueling points are normally sufficient. The following METT-TC factors determine the location of a FARP:

- Mission. Deep, close, and rear are the three types of missions conducted on the battlefield. Unless the target is extremely large or the mission is lengthy, a deep attack normally does not require a FARP behind enemy lines. Most FARPs are located within the close area.
- Enemy. The S2 determines the type of threat likely to be encountered in a certain location, including enemy capabilities, posture, and weapon systems. The S2 determines the type of intelligence-gathering devices and sensors that the enemy has oriented on the proposed FARP position.
- Terrain. Terrain should be selected to allow for the tactical dispersion of aircraft and vehicles. Tree lines, vegetation, shadows, and built-up areas should be used to conceal FARP operations. Also, terrain folds and reverse slopes will mask the FARP and main ground and air routes from visual or electronic detection.
- Troops. The platoon leader determines if enough troops are available for FARP operations. The proper number and type of personnel must be present and trained on aircraft ammunition management, refueling, and weapons system loading. In most cases, FARP personnel are responsible for security.
- Time available. The duration of the mission is critical since more security and Class III/V products are required for longer missions.

Planners must include the length of time to drive or fly to the FARP. Setup and tear down, as well as distance from supply trains, are other critical factors to consider when selecting a site.

EMPLACEMENT

J-6. The most efficient means of siting a FARP is by combining ground and air assets. FARPs should be separated by at least IBD from all inhabited sites. FARP emplacement depends on the system's mobility, aircraft requirements, enemy situation, higher echelon support, and expected operational time. The FARP is normally established using ground vehicles that carry bulk quantities of Class III/V supplies. Also, ground vehicles are the primary means for displacing and resupplying the FARP. The use of ground vehicles limits rapid positioning, and there is always the possibility of adverse road and traffic conditions. If a resupply vehicle is lost, it may jeopardize the success of the mission. Air emplacement offers speed and uses open fields as potential sites. Disadvantages include unavailability of aircraft and support vehicles.

J-7. The refueling and munitions areas of the FARP are collocated but separated as much as operations allow. Because of the hazards associated with Class III/V stocks, safety is a key factor in site layout and operations. Figure J-1 shows typical FARP layouts.

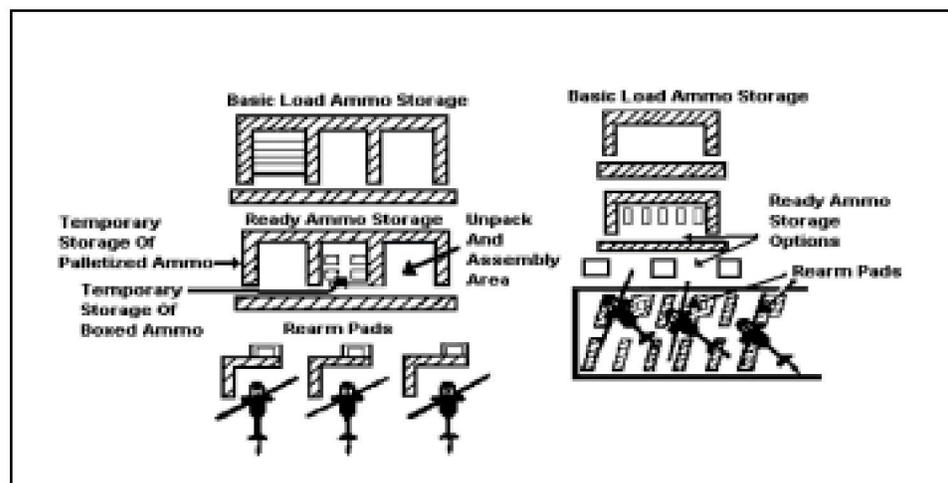


Figure J-1. Typical FARP layouts

FARP AMMUNITION OPERATIONS

J-8. FARP ammunition operations include procedures for storage, safety, arming, and training. Generally, these procedures are subject to the same stringent safety requirements as munitions operations in any other tactical or training environment.

STORAGE

J-9. The RASA contains the ammunition authorized to support initial arming of the aircraft and current missions. It is separated from the rearm pads by a

barricade and should have separate cubicles for assembling and disassembling of rockets, aircraft flares, and malfunctioned items.

J-10. The BLAHA, separate from the RASA, contains a specific quantity of munitions required and authorized to support at least three days of combat. The basic load may consist of small arms, grenades, mines, and aircraft-specific items. Store munitions by lot number to maintain lot integrity and accountability and to ensure the proper reporting of malfunctions.

J-11. The rearm pads are located near the aircraft with barricades between the aircraft, RASA, and rearm pads. Depending on surface type, movement from the rearm pads to the aircraft may be difficult. FARP personnel may need to improvise. Improvised trailers and carts may be used if the rated load of the trailer or cart is not exceeded, the load is secured and balanced, and the trailer or cart is covered to protect items from the weather.

SAFETY PROCEDURES

J-12. All personnel must observe the safety procedures that follow to prevent accidental firing, damage to munitions and aircraft, and injury to personnel.

Fin Protectors

J-13. Fin protector springs are designed to short-circuit the igniter leads, thus preventing accidental ignition. The shorting wire clips and fin protectors must be installed on rockets immediately after an aircraft launcher is unloaded and when the rockets are not in a launcher. A sufficient number of clips and protectors must be on hand at all times. Do not discard the clips and protectors once the aircraft is armed. They must be properly secured to prevent foreign object damage to aircraft.

Dropped Munitions

J-14. Dropped items, crated or not crated, must be turned in to the supporting ASP. Complete rounds, rocket motors, or fuzed-warhead combinations that have been dropped may cause premature functioning or may not function properly.

Unfired Rockets

J-15. After a mission, check the torque on all unfired rockets before loading for the next mission.

Barricades

J-16. Barricades must be built around the RASA, the BLAHA, and the rearm pads. Barricades should be at least three feet thick to effectively reduce hazards from fire and explosion. Rockets should face the back of the barricade. See DA Pam 385-64 for further guidance.

Weather Protection

J-17. Munitions must be protected from the weather. Missile systems are susceptible to heat damage. In a high-temperature environment, ensure that coverings do not create excessive heat. Dark covers, in particular, create excessive heat and should be avoided. Certain guided missiles, such as the

Hellfire, have explosively activated covers that protect them from the effects of weather.

Rocket Storage

J-18. Rockets should not be stored on top of each other to avoid damage to the bottom layers. If they need to be unpacked, they should be stored on racks built at the site. Wooden pallets may be placed under rockets as long as they are blocked to prevent rolling. Never store rockets directly on the ground.

EXPLOSIVE LIMITS

J-19. For maximum safety, the amount of munitions stored at the RASA and the rearm pads should always be kept to a minimum. The following limits should not be exceeded:

- Each rearm pad is limited to the amount of munitions required to fully arm one aircraft plus one reload. This facilitates switching the missile launcher for rocket launchers as the mission dictates.
- The ammunition for a second aircraft should be stored off the rearm pad, properly covered and barricaded.
- The RASA will meet requirements of DA Pam 385-64. See Table J-1 for the items typically used during rearm operations. Table J-2 shows the minimum distances permitted between rearm points, RASAs, and nonmunitions-related activities that require safety distance.

Table J-1. Munitions Used During Helicopter Rearm Operations

ITEM	NET EXPLOSIVE WEIGHT (Per Round)
Hellfire missile	34.4 pounds
TOW missile	12.18 pounds
Rocket, 2.75-in, HE (H489 or H490)	10 pounds
Rocket, 2.75-in, HE (H488 or H534)	11 pounds
Cartridge, 30mm, HE (B130 or B131)	.058 ounces
Cartridge, 20mm, HE (A653)	.028 ounces
Small arms ammunition	None

ARMING OPERATIONS

J-20. Pads must contain the minimum amount of munitions needed to conduct efficient operations. Proper setup of the armament pad increases aircraft turnaround time. During combat operations, unless otherwise directed, munitions for one aircraft arming sequence should be placed on the rearm pad before the aircraft arrives and laid out in the order in which it will be loaded.

J-21. Some munitions containers and Hellfire missiles require two people to lift during loading. When a full complement of munitions types is required, the safest approach is to load the turret weapon system first and follow with the inboard wing stores. Arming instructions are in the aircraft operator manual.

Table J-2. Distances Between Rearm Points and Ready Ammunition Storage Areas

REQUIRED DISTANCE (IN FEET)			
FROM	TO	Barricaded	Unbarricaded
Rearm point	Rearm point	100*	100*
Rearm point	Inhabited buildings and unarmed aircraft	400	800
Rearm point	Public highways	240	480
Rearm point	POL storage or refuel facilities	450	800
Ready ammunition storage area	Rearm point	75	140
Ready ammunition storage area	Inhabited buildings and unarmed aircraft	50	1,010
Ready ammunition storage area	Public highways	305	610
Ready ammunition storage area	POL storage or refuel facilities	505	1,010

*Distance based on rotor clearance.

J-22. Simultaneously arming and refueling minimizes the time that the aircraft is on the ground and increases turnaround time. This is a risky operation. Therefore, the aviation commander must ensure that all personnel are thoroughly trained and the SOP is well rehearsed.

J-23. Arming the weapon system is accomplished in a specific sequence. Initially, the weapon system must be placed in the safe mode, beginning with the outboard systems and moving inboard. The system is left on, and a stray current check conducted on the rocket pod. The turret weapon system and the wing stores opposite refueling port are the only weapon systems that should be armed while the aircraft is being refueled. Once refueling is complete, the inboard systems are loaded, followed by the outboard weapon systems on the refueling port side of the aircraft. Required maintenance equipment must be brought to the FARP to maintain the weapon systems.

TRAINING

J-24. Mission success depends on the ability of FARP personnel to set up and provide rapid and responsive arming and refueling services. The different arming configurations of aircraft require armament personnel to be trained in the handling, loading, and arming of all armament systems. Armament technical manuals show the required training levels for aircraft armament/missile systems repairers. Because of the dangers of arming "hot aircraft," the commander must ensure that ammunition specialists are thoroughly trained in handling ammunition around aircraft. The training guidelines discussed below should be followed.

Training Realism

J-25. Training must be as realistic as possible. All FARP operations must be practiced and conducted under combat-like conditions. Ensure that the program allows for 24-hour operations under varying levels of MOPP.

Operation Skills

J-26. A successful FARP is the final product of a program that builds on individual skills and cross-trains assigned and attached personnel. Integrating individual skills with team training results in safe and well-coordinated operations. The commander must continually evaluate the FARP team's ability to deploy and conduct operations.

Individual and Collective Training

J-27. FARP operations are successful when all personnel are trained to operate as a team. Individual and collective training for every team member should not be limited to just arming and refueling activities but should include the following:

- Firefighting and rescue procedures IAW FM 10-67-1.
- Class III/V helicopter sling load operations, to include hand and arm signals, IAW FM 10-450-3.
- Day and night land navigation proficiency.
- NBC detection and decontamination.
- Aircraft recognition.
- Self-aid and buddy-aid procedures.
- Night vision device training.
- Extensive driver training.

Appendix K

Sling Load Operations

The use of air assets continues to be an essential part of the munitions distribution system in both emergency and routine resupply operations. Helicopters play a major role in delivering munitions. Munitions units deliver munitions to the sling load area and ensure that operations are conducted safely and efficiently. Ground crew training and performance determine the success of the sling load mission. This appendix provides general guidance on sling load operations. Additional information can be found in FM 10-450-3.

PLANNING

K-1. Operations planning begins with site selection and setup of the sling load area. Sling load sites must be at least 550 meters from munitions storage locations, working areas, and inhabited areas. Other criteria include the following:

- Must be located where aircraft will never pass over munitions storage areas, inhabited areas, or public roads when approaching, landing, taking off, or leaving the site.
- Must be at least 25 meters square and constructed of the best material available. Perforated steel planking is a good field expedient material.
- Must use prevailing wind direction as the baseline for establishment to facilitate helicopter landing and takeoff and to limit downwind contamination in case of accidents involving chemical munitions.

Setup planning should provide for load and hookup positions, rigging area, emergency landing area, rendezvous points, control of equipment, vehicles and roads, and establishment of a firefighting equipment point.

SAFETY

K-2. Because compatibility and Q-D cannot be maintained, the sling load area must not be used to store munitions. All incoming shipments and field returns must be cleared immediately and properly stored in the storage facility. Only those munitions to be placed in cargo nets should be on the site. Cargo nets may be loaded at the storage facility and then transported to the sling load area. MHE must be kept clear of the area while helicopters are landing or taking off.

K-3. Ground crew personnel must be thoroughly trained and aware of the dangers of working under hovering helicopters. These dangers are not always apparent. Chances of injury are minimized by strictly observing the following guidelines:

- Avoid flying debris and foreign object damage. Pick up loose equipment and dispose of trash.

- Avoid cargo leg entanglement. Tape legs every three feet and carefully coil legs on top of load.
- Avoid sharp objects protruding from load or aircraft. Pad sharp edges and wear a helmet while under aircraft.
- Avoid top-heavy or unbalanced loads. Always load heavy items on bottom center of cargo net.
- Avoid being caught between the load and the aircraft. Never place yourself between moving and stationary objects.
- Watch aircraft carefully; be prepared to move quickly should the aircraft move suddenly.
- Avoid moving and protruding parts of the aircraft, such as the main and tail rotor blade, landing gear, and swinging cargo nets.
- Avoid tripping over static discharge wand grounding cables or grounding rods.
- Be alert for damaged lifting equipment. Stop operations if damage is discovered.
- Use special care on slippery or wet surfaces. Clear ice and snow from work areas.
- Wear all required safety equipment.
- Always use the static discharge wand regardless of type of aircraft in use. Maintain solid contact until load is connected to cargo hook. Static electricity is dangerous and may cause injury or death.
- Be aware of obstacles that may cause tripping or falling.
- Keep an eye on fellow soldiers to prevent them from getting into hazardous situations.
- Double-check all loads for proper rigging and sling attachment.
- Do not participate in or allow horseplay of any type. Anyone observing unsafe acts is obligated to make immediate corrections.
- Know individual positions in relation to aircraft at all times; this is especially critical during periods of limited visibility.
- Closely watch movement of aircraft and aircrew signals.
- Follow established SOPs and emergency procedures.
- Stay clear of the hookup area if not part of the hookup team.
- Ensure that everyone is familiar with the tasks that they are responsible for performing.

K-4. Ground crew teams are classified by their locations: the hookup team (at the landing site) and the receiving team (at the supported unit site). The hookup team consists of at least three soldiers to handle signaling, grounding, and hookup. Additional soldiers may be required for hookup for dual or multiple-hook aircraft. Because they control the helicopter, soldiers responsible for signaling play a major role in sling load operations.

K-5. All ground crew members working beneath a hovering helicopter must wear PPE for maximum personal safety. Eye goggles, earplugs, a securely fastened helmet, and leather or electrical worker gloves must be worn at all times. Clothing must be securely buttoned with sleeves down. Watches, rings,

and other jewelry (except for military identification tags) must be removed to prevent snags in cargo nets or loads.

K-6. Army helicopters commonly used during sling load operations are the UH-1N/P Iroquois (HUEY), the UH-60 Blackhawk, and the CH-47 Chinook (C and D models). Characteristics of these aircraft include the following:

- UH-1N/P. The HUEY is a single-engine, single main rotor, general-purpose helicopter used for transporting troops, cargo, and injured personnel. The UH-1N is the twin-engine version. The UH-1P and UH-1N have maximum cargo hook capacities of 4,000 and 5,000 pounds respectively.
- UH-60. The Blackhawk is a single-engine, single main rotor helicopter used to transport personnel, supplies, and equipment. It has a cargo hook capacity of 8,000 pounds. The Navy version (SH-60B) has a maximum cargo hook capacity of 4,000 pounds.
- CH-47C/D Chinook. The Chinook is a twin-engine, tandem rotor helicopter used to transport personnel, supplies, and equipment. The CH-47C has a maximum hook capacity of 20,000 pounds. The CH-47D has a maximum hook capacity of 26,000 pounds.

K-7. Regardless of the type aircraft used for sling load operations, the load weight must be accurately determined and reported to the aircrew. Inaccurate load weights could cause the pilot to lose control of the aircraft.

Glossary

ABL	ammunition basic load
ABLCS	Ammunition Basic Load Computation System
AC	Active Component
AC	hydrogencyanide (blood agent)
ACC	ammunition condition code
AD	air-droppable
ADACS	Automatic Data Collection System
ADAM	air defense antimissile
AGM	air-to-ground missile
AINS	ammunition information notices
AIT	automatic information technology
AJI	antijamming improvements
AMCOM	(US Army) Aviation and Missile Command
AMSTAT	ammunition status report
AO	area of operations
AP	armor piercing
APDS-T	armor-piercing, discarding sabot-tracer
APE	ammunition peculiar equipment
APERS	antipersonnel
APFSDS-T	armor-piercing, fin-stabilized, discarding sabot-tracer
API	armor-piercing incendiary
APOD	aerial port of debarkation
AR	Army regulation
ARDEC	Armament Research, Development and Engineering Center
ARNG	Army National Guard
ARTEP	Army Training and Evaluation Program
ASA	ammunition support activity
ASCC	Army service component commander
ASIS	Ammunition Surveillance Information System
ASL	authorized stockage list
ASP	ammunition supply point
AST	ammunition support team

AT	antitank
ATACMS	Army Tactical Missile System
atck	attack
ATP	ammunition transfer point
ATR	Ammunition Transfer Record (DA Form 4508)
BAO	brigade ammunition office
BCLST	bar code laser scanner terminal(s)
BCM	binary chemical munitions
BCT	brigade combat team
BGM	basic guided missile
BIDS	Biological Identification Detection System
BII	basic issue item(s)
BLAHA	basic load ammunition holding area
BLSA	basic load storage area
BLSTG	blasting
BOE	Bureau of Explosives
BOIP	basis of issue plan
BSA	brigade/battalion support area
C&P	component and packaging
C2	command and control
C3I	command, control, communications, and intelligence
cal	caliber
CARC	chemical agent-resistant coating
CB	chemical, biological
CBU	cluster bomb unit
CCSS	Commodity Command Standard System
CDT	cargo documentation team
CEA	captured enemy ammunition
CEE	captured enemy equipment
CEM	captured enemy materiel
centigray	A unit of absorbed dose of radiation (one centigray equals one rad).
CFR	Code of Federal Regulations

cGy	centigray
CHE	cargo/container handling equipment
chem	chemical
CIIC	controlled inventory item code
CINC	commander in chief
CLASS III	(supply) petroleum, oil, and lubricants
CLASS V	(supply) ammunition
CLGP	cannon-launched guided projectile (Copperhead)
CLSTR	cluster
CMCC	corps movement control center
CMEC	captured materiel exploitation center
CMMC	corps materiel management center
CN	A chemical agent (tear gas).
cntr	container
CO	commander/commanding officer
COMMZ	communications zone
COMP	composition
COMTECHREP	complementary technical report
CONUS	Continental United States
CONUSA	Continental United States Army
COSCOM	corps support command
COTS	commercial off-the-shelf
CP	command post
CS	combat service
CS	chlorobenzalmalononitrile (chemical agent, tear gas)
CSA	corps storage area
CSB	corps support battalion
CSG	corps support group
CSR	controlled supply rate
CSS	combat service support
CSSCS	Combat Service Support Control System
CTA	common table of allowances
ctg	cartridge
ctn	carton

CTT	common task test
DA	Department of the Army
DAAS	Defense Automated Address System
DAC	Defense Ammunition Center (formerly USADACS); also Department of the Army civilian
DAMMS-R	Department of the Army Movement Management System- Redesigned
DAO	division ammunition office(r)
DARCOM	(US Army) Development and Readiness Command
DAS-3	Decentralized Automated Service Support System-3
DCS	Defense Communications System
DDESB	Department of Defense Explosives Safety Board
DED	detailed equipment decontamination
demo	demolition
DETECHREP	detailed technical report
DISCOM	division support command
div	division
DIVARTY	division artillery
DLA	Defense Logistics Agency
DMMC	division materiel management center
DMWR	depot maintenance work requirement
DOD	Department of Defense
DODAAC	Department of Defense activity address code
DODAC	Department of Defense ammunition code
DODIC	Department of Defense identification code
DOD STD	Department of Defense standard
DOL	director of logistics
DOS	days of supply
DOT	Department of Transportation
DP	dual purpose
DS	direct support
DSA	division support area
DSR	depot surveillance record
DTD	detailed troop decontamination

DTO	division transportation office(r)
DTR	daily transaction report
DWG	drawing
EAC	echelon above corps
ECCM	electronic counter-countermeasures
ECM	electronic countermeasures
ECP-S	engineering change proposal-software
ED	emergency destruction
e.g.	for example
EID	explosive initiating device
EMP	electromagnetic pulse
EOD	explosive ordnance disposal
ETA	estimated time of arrival
FAE	fuel-air explosive
F/AP	fragmentary/armor-piercing
FARP	forward arming and refueling point
FEDLOG	Federal Logistics Record
FLOT	forward line of own troops
FM	field manual
FMIG	Foreign Materiel Intelligence Group
FMTV	Family of Medium Tactical Vehicles
FORSCOM	(US Army) Forces Command
frag	fragment/fragmentary
FSB	forward support battalion
FSC	field storage category
FSC	Federal Supply Classification
FSCG	Federal Supply Classification Group
FSTC	US Army Foreign Science and Technology Center
FSU	field storage unit
FTX	field training exercise
FY	fiscal year
G2	division security/intelligence staff
G3	division operations staff
G4	division logistics staff

GB	chemical nerve agent, Sarin
GCSS-Army	Global Combat Support System-Army
GM	guided missile
GMLR	guided missile and large rocket
GREN	grenade
grnd	ground
GS	general support
GSA	General Services Administration
GTA	graphic training aid
HC	aluminum zinc oxide hexachloroethane (chemical smoke)
HC	hazard class
HC/D	hazard class/division
HE	high explosive(s)
HEAT	high explosive antitank
HEDP	high explosive, dual purpose
HEI	high explosive incendiary
HEI-T	high explosive incendiary-tracer
HEMTT	heavy expanded mobility tactical truck
HEP	high explosive plastic
HEP-T	high explosive plastic-tracer
HHC	headquarters and headquarters company
HHD	headquarters and headquarters detachment
HLP	heavy lift platoon
HN	host nation
HNS	host nation support
HQDA	Headquarters, Department of the Army
hzd	hazard
IAEA	International Atomic Energy Agency
IATA	International Air Transportation Association
IAW	in accordance with
IBD	inhabited building distance
IBM	International Business Machines
ICAO	International Civil Aviation Organization
ICM	improved conventional munitions

ICS3	Integrated Combat Service Support System
i.e.	that is
Illum	illuminating
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Association
incd	incendiary
INSCOM	(US Army) Intelligence and Security Command
IPE	individual protective equipment
IR	infrared
ISB	intermediate staging base
ISO	International Standardization Organization
ITV	in-transit visibility
J2	joint staff (intelligence)
J3	joint staff (operations)
J4	joint staff (logistics)
JATO	jet-assisted takeoff
JCMEC	Joint Captured Materiel Exploitation Center
JHCS	Joint Hazard Classification System
JIC	Joint Intelligence Center
LAN	local area network
LAP	link access procedure/process
LAPES	low altitude parachute extraction system
lb	pound
lkd	linked
LMTV	light medium tactical vehicle
lnchr	launcher
LOC	lines of communication
LOGPLAN	logistics plan
LOGSA	logistics support activity
LSE	logistics support element
MACOM	major command
MATO	materiel and transportation office(r)
MCA	movement control agency
MCB	movement control battalion

MCC	movement control center
MCL	mission configured load
MCO	movement control officer
MCT	movement control team
METL	mission essential task list
METT-TC	mission, enemy, terrain, troops, time available, and contractors on the battlefield
MHE	materials handling equipment
MI	military intelligence
MICLIC	mine clearing line charge
MILHBK	military handbook
MILSTAMP	Military Standard Transportation and Movement Procedures
MIL-STD	military standard
MILSTRIP	Military Standard Requisitioning and Issue Procedures
MLP	medium lift platoon
MLRS	Multiple Launch Rocket System
mm	millimeter
MMC	materiel management center
MMR	Military Munitions Rule
MOADS	Maneuver Oriented Ammunition Distribution System
MOADS-PLS	Maneuver Oriented Ammunition Distribution System Palletized Load System
mod	modified
MOPP	mission oriented protective posture
MOPP-4	mission oriented protective posture-4
MOS	military occupational specialty
MP	military police
MPSM	multipurpose submunition
MRCT	movement regulating control team
MRO	materiel release order
MSB	main support battalion

MSR	main supply route
MT	megaton
mtl	metal
MTMC	Military Traffic Management Command
MTOE	modified table(s) of organization and equipment
MTSQ	mechanical time, super quick (fuze)
NA	North America
NBC	nuclear, biological, chemical
NCO	noncommissioned officer
NCOIC	noncommissioned officer in charge
NDI	nondevelopmental item
NEQ	net explosive quantity
NEW	net explosive weight
NFPA	National Fire Protection Association
NGB	National Guard Bureau
NICP	National Inventory Control Point
NIIN	national item identification number
NSN	national stock number
OCONUS	outside continental United States
OD	olive drab
OPLAN	operations plan
OPLOG	operations logistics
OPORD	operations order
OPSEC	operations security
OSC	Operations Support Command (Comprised of former AMCCOM and IOC)
OSHA	Occupational Safety and Health Agency
pam	pamphlet
para	parachute
PC	personal computer
PD	point detonating
pers	personnel
PETN	pentaerythrite tetranitrate (explosive)
pk	package

PLL	prescribed load list
PLS	palletized load system
POC	point of contact
POD	port of debarkation
POE	port of embarkation
POL	petroleum, oil, and lubricants
POW	prisoner of war
PPE	personal protective equipment
prac	practice
PRETECHREP	preliminary technical report
proj	projectile
PSN	proper shipping name
PWP	plasticized white phosphorus
QA	quality assurance
QA/QC	quality assurance/quality control
QANET	quality assurance network
QASAS	quality assurance specialist(s) (ammunition surveillance)
Q-D	quantity-distance
QRF	quick reaction force
qty	quantity
RAAM	remote antiarmor mine (munition)
RAOC	rear area operations center
RAP	rear area protection
RASA	ready ammunition storage area
RB	rubidium
rd(s)	round(s)
RDX	rapid detonating explosive (cyclotrimethylenetrinitramine)
REPSHIP	report of shipment
RF	radio frequency
RIC	routing identifier code
rkt(s)	rocket(s)
RMP	reprogrammable microprocessor
ROD	report of discrepancy
RSO&I	reception, staging, onward movement, and integration

RSP	render safe procedure
RSR	required supply rate
RTCH	rough terrain container handler
S&P	stake and platform
S&T	supply and transportation
S&TI	scientific and technical intelligence
S2	battalion or brigade level security/intelligence staff
S3	battalion or brigade level operations staff
S4	battalion or brigade level logistics staff
SAAS	Standard Army Ammunition System
SAAS-DAO	Standard Army Ammunition System-Division Ammunition Office
SAAS-MOD	Standard Army Ammunition System-Modernization
SALUTE	size, activity, location, unit, time, and equipment
SAM	system administrator manual
SASO	stability and support operations
SB	supply bulletin
SCG	storage compatibility group
SCL	strategic configured load
scrng	screening
ser	series
SF	special form
SIDPERS	Standard Installation/Division Personnel System
simul	simulated/simulation
SITREP	situation report
SM	soldiers' manual
SME	subject matter expert
smk	smoke
SOFA	status of forces agreement(s)
SOP	standing operating procedure
SOUMS	safety of use messages
SPBS-R	Standard Property Book System-Redesign
SPOD	sea port of debarkation
SSA	supply support activity

ST	short ton(s)
STAMIS	Standard Army Management Information System
STANAG	standardization agreement
STRAC	Standards in Training Commission
STRAP	system training plan
surf	surface
TAACOM	theater army area command
tac	tactical
TACCS	Tactical Army Combat Service Support Computer System
TAFR	Training Ammunition Forecast Report
TAMIS-R	Training Ammunition Management Information System-Redesigned
TAMMC	theater army materiel management center
TAT	to accompany troops
TAV	total asset visibility
TB	technical bulletin
TC	training circular
TC-AIMS-II	Transportation Coordinators Automated Information for Movement System-II
TCF	tactical combat force
TCMD	transportation control movement document
TCN	transportation control number
TEA	triethyl aluminum
TECHINT	technical intelligence
TEU	technical escort unit
T-LKD	tracer-linked
TM	technical manual
TMR	transportation movement release
TMT	transportation motor transport
TNT	trinitrotoluene (dynamite)
TO	theater of operations
TOE	table(s) of organization and equipment
TOW	tube-launched, optically-tracked wire-guided missile system
TP	target practice

TPCSDS-T	target practice cone-stabilized discarding sabot-tracer (ammunition)
TP-T	target practice-tracer (ammunition)
TRADOC	(United States Army) Training and Doctrine Command
TSA	theater storage area
TSC	theater support command
TTP	trailer transfer point
UIC	unit identification code
UK	United Kingdom
ULLS-S4	Unit Level Logistics System, S4 Module
UNO	United Nations Organization
UPS	uninterruptible power system/supply
US	United States
USA	United States Army
USAEHA	United States Army Environmental Hygiene Agency
USAF	United States Air Force
USAIA	United States Army Intelligence Agency
USAMC	United States Army Materiel Command
USAR	United States Army Reserve
USCG	United States Coast Guard
UXO	unexploded ordnance
VT	variable time
VTAADS	Vertical Army Authorization Document System
WARS	Worldwide Ammunition Reporting System
whd	warhead
WHNS	wartime host nation support
wht	white
WMD	weapons of mass destruction
wnd	wooden
WP	white phosphorus
wt	weight
XO	executive officer