

Administrative Changes to AFMCI 21-131, Demilitarization/Disposition Requirements Relating to the Design or Modification of Ammunition Items

OPR: AFMC/A4M

Changes to OPR information

OPR: Mark S. Dodge, GS-12, USAF

AF Conventional Munitions Designated Disposition Authority (DDA)/Demil Program Manager,
AFLCMC/EBHMB

OPR Workflow Email: mark.dodge@us.af.mil

OPR DSN: 775-3065

31 August 2015

16 JUNE 2004

**Certified Current On 19 March 2015
Maintenance**



**DEMILITARIZATION/DISPOSITION
REQUIREMENTS RELATING TO THE DESIGN
OF NEW OR MODIFICATION OF
AMMUNITION ITEMS**

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

NOTICE: This publication is available digitally on the AFDPO WWW site at:
<http://www.e-publishing.af.mil>

OPR: OO-ALC/WMCI (James Bracey)

Certified by: HQ AFMC/LGM
(Col Donald H. Campbell)

Pages: 11

Distribution: F

This instruction implements AFD 21-2, *Non-Nuclear and Nuclear Munitions*, 8 Jun 93, and AFI 21-201, *Management and Maintenance of Non-Nuclear Munitions*, 13 Jan 03, and establishes demilitarization and disposition policies, responsibilities, and procedures relating to requirements governing the concept, research, development, engineering, and release for production for all new or modified ammunition items. This instruction requires that, to the maximum extent possible, ammunition be designed for demilitarization and also requires the development of a formal demilitarization plan to accomplish safe and environmentally acceptable demilitarization/disposition of the ammunition.

Supplements to this regulation are prohibited. Send suggested or required changes to the Service Office of Primary Responsibility (OPR).

1. Background. This regulation expands and implements the joint agreement on demilitarization/disposition requirements relating to the design of new or modified ammunition items issued by the Commanders of AMC/NAVSEA/AFLC dated 14 April 1976. It applies to developers involved in developing or modifying ammunition items.

2. Scope. This regulation applies to AMC/NAVSEA/AFMC/MARCORSYSCOM Headquarters, major subordinate commands, installations, activities, depots, laboratories, and project/program managers having responsibilities for disposition requirements relating to the design of new or modification of ammunition items.

3. Objectives. The objectives of this regulation are to:

3.1. Influence the design of new or modified munitions items to facilitate the eventual demilitarization and disposition of the item by cost effective, safe, and environmentally acceptable means. Assure

that the design allows demilitarization and disposition in accordance with (IAW) the requirements of DoDI 5000.2.

3.2. Identify the processes, procedures and equipment necessary to effect the safe and environmentally acceptable demilitarization and disposition of a munitions item.

3.3. Assure that demilitarization or disposition and disposal considerations are an integral part of the planning and decision-making processes for all new or modified ammunition items from conception to final acceptance of the end item.

3.4. Provide for review and approval of demilitarization or disposition and disposal considerations and plans in accordance with program management procedures and in all instances prior to operational test and evaluation (OT&E).

3.5. Assure that safety and environmental quality are primary considerations in the demilitarization or disposition and disposal procedures developed.

3.6. Assure that maximum attainable recycling and recovery are achieved in accordance with the Resource Conservation and Recovery Act (RCRA).

4. Policy:

4.1. Demilitarization and disposition by acceptable means shall be mandatory in the design concept of new or modification of ammunition items. All Demilitarization/Disposition plans should have an environmentally accepted process or Resource Recovery and Recycling (R3) process as the preferable method for demilitarization/disposition. Open burn and open detonation (OB/OD) may be an acceptable secondary alternative.

4.2. Demilitarization and disposition considerations and procedures will be incorporated into the design and development of new or modified ammunition items to achieve compliance with applicable environmental requirements. Documentation shall include detailed chemical, physical, and quantitative characteristics of any radioactive, Resource Conservation and Recovery Act (RCRA), propellant, explosive, and pyrotechnics (PEP), or Toxic Release Inventory (TRI) chemical materials to be demilitarized.

4.3. Disassembly, recovery, and salvage of ammunition components for re-use or conversion to other applications will be given full consideration in all ammunition design and modification activities.

4.4. Development of new or modified PEP materials qualified for military use shall have an approved demilitarization/disposition plan IAW this regulation.

5. Responsibilities:

5.1. Activities, commands, divisions, centers, and program offices responsible for ammunition development or modification will implement actions necessary to comply with the policy of this regulation to include:

5.1.1. Ensuring that demilitarization and disposition considerations are incorporated as an integral part of planning and decision-making processes for all new or modified ammunition items. To support demilitarization and disposition planning, design constraints for demilitarization shall be documented in the Supportability Strategy prior to the Milestone B review.

- 5.1.2. Ensuring that, to the maximum extent possible, ammunition is designed for demilitarization. This is to be implemented by inclusion on each new ammunition team of a demilitarization expert and further implemented through the Acquisition Milestone sign-off responsibility.
 - 5.1.3. Preparing ammunition demilitarization and disposition plans in the format that is provided in Appendix A, page 5.
 - 5.1.4. A draft demilitarization and disposition plan shall be prepared prior to the Milestone C review. A draft final demilitarization and disposition plan shall be provided through existing Command channels to the applicable Service's Demilitarization Program Office prior to OT&E. Applicable Service's Demilitarization Program Office will accomplish final review and approval.
 - 5.1.5. Provide for review and approval of demilitarization/disposition plans that require rewriting or revision after OT&E of the munitions item.
- 5.2. Services Demilitarization Program Offices Will:
- 5.2.1. Review and approve all Demilitarization/Disposition Plans for their Service.
 - 5.2.2. Maintain copies of Demilitarization/Disposition Plans and make distribution to Single Manager for Conventional Ammunition (SMCA)
 - 5.2.3. Submit for review at least one new or modified Demilitarization/Disposition plan per year, per service, to Joint Ordnance Command group (JOCG) for compliance with this regulation.
 - 5.2.4. Issue appropriate regulations, instructions, or procedures to implement the policy and procedures in this regulation.
- 5.3. JOCG Munitions Demilitarization/Disposal Subgroup will:
- 5.3.1. Ensure implementation of these policies and make recommendations to the Joint Logistics Commanders as appropriate.
 - 5.3.2. Ensure review of at least one new or modified ammunition plan per year, per service, for compliance with this regulation.

GARY T. McCOY, Brig General, USAF
Director of Logistics

Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References

DOD 4160.21-M-1, *Defense Materiel Disposition Manual*

DOD 5160.65-M, *Single Manager For Conventional Ammunition (Implementing Joint Conventional Ammunition Policies And Procedures)*

DODI 5000.2, *Operation Of The Defense Acquisition System*

AFPD 21-2, *Nonnuclear And Nuclear Munitions*

AFI 21-201, *Management And Maintenance Of Non-Nuclear Munitions*

Terms

Ammunition—The term ammunition as applied in this regulation includes all non-surety ordnance components and explosives prepared to form a charge, complete round, or cartridge for small arms, rifle, gun, cannon or any other weapon or explosive-actuated device, impulse device, torpedo warhead, mine, bomb, grenades, depth charge, fuze, detonator, projectile, rocket or guided missile. Ammunition also includes all solid propellants, explosives, hypergolic liquid propellant systems, and other hazardous materials applied to ordnance uses and requiring surveillance for reasons of explosive safety and all Jet Assisted Take Off (JATOs) rockets, boosters, sustainers, military pyrotechnics, tactical missiles and non-surety chemical materials.

Demilitarization—The act of destroying the military offensive or defensive advantage inherent in ammunition. This process may be applied to serviceable, unserviceable, used or unused items, which are excess, obsolete, or uneconomically repairable, as well as, items determined to be hazardous for continued storage. Examples of ammunition demilitarization methods are disassembly, washout, melt-out, incineration, deactivation, mutilation, chemical neutralization, open burning, open detonation, or static firing. The environmentally and safety-approved methods will render the item inert and no longer usable for military applications.

Disposition—The process of redistributing, transferring, donating, selling, demilitarizing, treating, destroying or other end of life cycle guidance for DoD personal property. Disposition is the final stage of an asset's life cycle prior to exiting the DoD system. The item must pass through a specific system or set of guidance and controls to ensure that re-utilization, transfer, or sale options are exhausted by the appropriate Inventory Control Point (ICP). Examples of authorized means are reuse, recycling, conversion, or sale to an authorized buyer. In some instances, the act of demilitarization accomplishes disposal, as well. Disposal methods such as ocean dumping or land burial of items containing energetic materials are not typically authorized.

Disposal—End of life (EOL) Tasks and/or Actions for residual materials resulting from demilitarization or disposition operations.

Demilitarization/Disposition Plan—A written document that describes the item and identifies processes, procedures and equipment necessary to effect the safe and environmentally acceptable demilitarization or disposition, and disposal of the new or modified ammunition item. Instructions and an example of a Demilitarization/Disposition Plan are contained in Appendix A.

Resource Recovery and Recycling (R3)—A term used to describe a family of processes/technologies for demilitarization of ammunition using processes other than open burning and open detonation which results in all or part of the ammunition's components being recovered for recycle and reuse.

Developers—Manufacturers, vendors, contractors, activities, commands, laboratories, centers, and program offices involved in developing munitions items.

Attachment 2

DEMILITARIZATION/DISPOSITION PLAN

GUIDELINES

Basic guidelines and standard format information is provided below to assist in the development of demilitarization/disposition plans.

1. Demilitarization/disposition plans are not developed for emergency demilitarization.
2. All plans should be based on disassembly to the lowest level necessary to gain access to or remove energetic hazardous materials or components for demilitarization or disposition.
3. OB/OD are not considered the primary demilitarization or disposition option.
4. Plans for items containing subassemblies should be developed in tiers or appendices with a plan for the end item and individual plans for each subassembly. This is especially true for subassemblies that may be stocked as individual items in the supply system. An example; a 3"/50 cartridge consisting of a cartridge case, primer, propellant, projectile and fuze. Plans should be developed for the cartridge, primer and fuze separately. Disposition guidance for "after use" components such as cans, clips, cartridge cases and wooden boxes should also be developed.
5. The use of reference documents (e.g., TMs, TOs, Navy Instructions, DMWRs, SOPs, or approved Demilitarization/Disposition Plans) to satisfy portions of plan requirements is encouraged. However, reference documents (or applicable portions) used in this manner must accompany the plan.
6. Information on existing and emerging demilitarization and disposition alternatives for families of munitions are maintained by the JOCG at the Munitions Items Disposition Action System (MIDAS) web site (<http://www.dac.army.mil>).
7. Demilitarization of both energetic and inert components to prevent reuses IAW the requirements of the latest publication of DOD 4160.21-M-1 shall be addressed in the plan.

DEMILITARIZATION AND DISPOSITION PLAN FORMAT

COVER PAGE

Include ammunition item name, Department of Defense Identification Code (DODIC), preparer, distribution statement, revision/change and date (demilitarization/disposition plan identification number is optional).

TABLE OF CONTENTS

Self-explanatory.

LIST OF TABLES

Self-explanatory.

LIST OF FIGURES

Self-explanatory.

1. Purpose:

1.1. Objective: This plan identifies requirements necessary to accomplish safe and environmentally acceptable demilitarization/disposition of the item.

1.2. Scope: Provide a brief overview of the preferred process(es) being used.

1.3. Limitations: Identify areas not covered by the plan, e.g.; transportation, incinerator operations, washout operations, etc. Also, demilitarization/disposition of subassemblies covered in other plans.

2. Item Description:

2.1. Physical description: Provide a detailed description of the item configuration with attached illustration(s).

2.2. Functional description: Describe how the item functions when used as intended.

2.3. Product Baseline Table: Develop a table (spreadsheet) similar to the example shown in Table I. As a minimum, the table/spreadsheet should contain fields/columns for assembly levels, nomenclature, net explosive weight (NEW), unit weight, quantity, drawing/specification numbers, and composition. This table should essentially be the complete drawing package for the ammunition item excluding schematic drawings. Proprietary information should be included and as a minimum should identify basic constituents, if not exact formulae. Energetic and hazardous materials should be listed by name only (HNS, PBXN-5, Lithium, etc.) and an Energetic and Hazardous Materials table as described below (under safety summary) should be referenced for specific compositions.

2.4. Classification: Identify the source of classification for all classified items/components and provide minimum declassification requirements for each.

3. Safety Summary. This section will summarize hazards that are unique to the item and precautions/procedures that must be employed during demilitarization/disposition operations.

3.1. General. Provide an overview of the safety requirements for storage and handling of the item.

3.2. Specific. Identify the safety requirements directly related to the demilitarization process being used.

3.3. Energetic And Hazardous Materials Table. Develop a table listing all of the energetic and hazardous materials in the munitions item including the chemical composition of each material and the resultant products of combustion. Information will be made available on existing PEP materials. See Tables II and III.

4. Environmental Significance. This section will include an analysis describing the environmental significance of each demilitarization/disposition process.

4.1. General: Provide a brief overview of the regulations applicable to the preferred demilitarization/disposition process.

4.2. Specific: Identify the specific impact of all identified demilitarization/disposition processes. Identify the output products of all neutralization processes. Identify the method used to determine the products (e.g. computer models bang box data, other empirical techniques, etc.)

4.2.1. Recyclable Materials: List all of the recyclable materials generated by the preferred demilitarization/disposition process.

4.2.2. Waste Streams. Identify the hazardous and solid waste streams produced by the preferred demilitarization/disposition process. This will include the combustion products from the energetic and hazardous materials table.

4.3. Residual Analysis: Provide an analysis of residual material remaining in/on retrievable hardware items such as cartridge case, CAD's & JATO rocket motor cases, after the item has functioned as intended.

5. Demilitarization/Disposition Alternatives. This section will list alternative methods of demilitarization and disposition of the item(s) addressed by the plan identifying the preferred method. (Note: The Government shall provide information on available technology and equipment capability to the developer). The developer shall utilize this data in developing the demilitarization and disposition plan. Give a summary of the demilitarization options available for each item requiring demilitarization, e.g. incineration, mutilation of inert hardware by shredding or crushing, neutralization, hydrolysis, or plasma arc destruction.

NOTE: Alternatives are not required if the demilitarization and disposition process is based on disassembly.

6. Demilitarization/ Disposition Procedures. This section will describe each alternative method in detail including step-by-step procedures including safety precautions, disassembly diagrams, declassification procedures, and components and piece part tables. Provide a block flow diagram showing movement of ammunition components through the demilitarization/disposition process.

NOTE: Detailed operating procedures for equipment or processes covered by references are not required for the processes described here.

6.1. Disassembly: Provide step-by-step procedures for disassembling the munitions item to the point necessary to gain access and/or remove the energetic and hazardous materials. Examples: fuze removal, pull apart, explosive washout/meltout, or water jet cutting.

6.2. Demilitarization: This section will describe the processes used to remove or otherwise neutralize the military potential of munitions IAW DOD 4160.21-M-1. Such neutralization is to be carried out in a safe, cost effective, practicable, and environmentally responsible manner. Demilitarization is a necessary step for military "items prior to their release" to a non-military setting.

6.3. Disposition: List the available disposition options including treatment options for the demilitarized munitions items parts and residuals waste streams, e.g. "Incinerator ash to hazardous waste landfill, inert hardware for sale or recycling, explosives for reuse/alternate use. List the available treatment options for the waste stream generated by processes, e.g. hydrolysis of wastewater from explosive washout or wet scrub of incinerator off gasses.

7. Demilitarization/Disposition Special Tools And Equipment. This section will describe special tools and equipment required to accomplishing the procedures described.

8. Validation Test (When Required). This section will address the validation test when required. The validation plan will identify the quantity of items to be demilitarized, the tools and equipment required, the proposed location for the test, and any other pertinent information required to validate the planned demilitarization disposition process. Satisfactory completion of the validation test shall be required prior to approval of the demilitarization/disposition plan.

9. Reference Documents. List all technical references including any TMs, T.O.s, DMWR, DoD and non-DoD regulations applicable to the preferred demilitarization process.

10. Terms And Definitions (As Required).

Table A2.1. Product Baseline Table.

Assembly Level	Description	U.W. (LBS)	N.E.W (LBS)	QTY	Drawing	Specification	SDS	Composition
1.0.	Cartridge, .50 Caliber, API MK 211 Mod O	0.2521	0.0394	1	6086059	WS 25470	40939	
1.01	Case, Cartridge, .50 Cal	0.1243		1	5502646			Brass
1.02	Primer, Percussion	0.0026	0.0004	1	645339-1	MIL-P-46610	855	FED CTG K-75
1.02.01	Cup, Primer	0.0000		1				Brass
1.02.02	Mixture, Primer	0.0004	0.0004	1		Federal CTG #315		Table II
1.02.03	Disc	0.0000		1				
1.02.04	Anvil	0.0000		1				
1.03	Lacquer, Cellulose Nitrate, Green	AR		1		MIL-L-10287		
1.04	Lacquer, Cellulose Nitrate, Aluminum	AR		1		MIL-L-10287		
1.05	Propellant 3 alternates)	0.0143	0.0143	1	6086059			Table III
1.06	Compound, Waterproofing	AR		1		MIL-C-13783		
1.07	Projectile .50 CAL API (Multi-purpose)	0.0959	0.0052	1	6086061		40936	
1.07.01	Core & Core Body Assembly	0.0550		1	6086065			Tungsten Carbide
1.07.01.01	Core Body (Phosphate Coated IAW MIL-C-49)	0.0240		1	6086067	AISI 12L14/12L13		Tungsten Carbide
1.07.01.02	Core	0.0310		1	6086066			Tungsten Carbide
1.07.02	Zirconium	0.0013	0.0013	1	6068064		40937	Zirconium/ Hafnium
1.07.03	Composition A-4	0.0020	0.0020	1		MIL-C-440	311	Table II
1.07.04	Jacket, Projectile	0.0336		1	6086062	MIL-C-21768		Copper Alloy
1.07.05	Incendiary Mix #136	0.0019	0.0019	1	6086063	7548270	1772	Table II
1.07.06	Lead Seal	0.0022		1	6086068	MIL-L-13283	753	Lead
1.08	Unit Load, CTG, .50 CAL	4104.0000	453.8880	1		MIL-STD-1323-394		
1.08.01	Pallet, Steel MK 3 Mod 0	94.000		1	564200			Steel
1.08.02.01	Box, Wire Bound	0.0000		1	7553347	PPP-B-585		Wood
1.08.02.02.01	Box, Ammunition	0.0000		1	7553296			Steel
1.08.03	Strapping, Steel	16.0000		1				Steel

Assembly Level	Description	U.W. (LBS)	N.E.W (LBS)	QTY	Drawing	Specification	SDS	Composition
1.08.04	Base, Top & Bottom	29.0000		2				Plywood
1.08.05	Protector, Edge	0.0000		14				Steel

Table A2.2. Energetic and Hazardous Material.

Item	Composition	Drawing	Specification	N.E.W. (GRAINS)	SDS	Products of combustion
Projectile Load		6068064		36.2000		
	Zirconium			9.2000	40937	
Composition A-4	RDX/WAX		MIL-C-440	13.9000	311	
	RDX		MIL-R-398	13.4830	40425	
	Wax		MIL-W-20553	0.4170		
Incendiary mix	#136	6086063	7548270	13.1000	1772	
	Magnesium/Aluminum 50/50	7548270	JAN-M-454 TY A	6.4190	8/15	
	Potassium Perchlorate	7548270	MIL-P-217	6.4190	53	
	Calcium Resinate	7548270	MIL-C-20470 TY I	0.2620	10059	
Primer	K-75		FEDERAL CTG #315	2.7000		
	Lead Styphnate			1.0120	16	
	Tetracene			0.1350	18	
	Barium Nitrate			0.8100	4	
	Antimony Sulfide			0.3375	17	
	PETN			0.3375	110183	

Table A2.3. Propellant Compositions.

Item	Composition	Drawing	Specification	N.E.W. (GRAINS)	SDS
Propellant #1	WC860	10534811	MIL-P-3984	100.0000	10101
	Nitrocellulose		MIL-N-244	73.0000	31
	Dinitrotoluene		MIL-D-204	1.0000	439
	Graphite		MIL-G-155	0.4000	10161
	Potassium Nitrate		MIL-P-156	1.5000	38
	Sodium Sulfate		MIL-S-50004	0.5000	10067
	Calcium Carbonate		MIL-C-293	1.0000	10098
	Nitroglycerin		MIL-N-246	11.0000	30
	Diphenylamine		MIL-D-98	1.5000	408
	Dibutylphthalate		MIL-D-218	10.0000	482
	Tin Dioxide		MIL-S-50005	0.1000	
Propellant #2	RA-NC-167	6086060		100.0000	40938
	Nitrocellulose		MIL-N-244	94.8000	31
	Dibutylphthalate		MIL-D-218	1.5000	482
	Ethyl centralite		MIL-E-255	1.5000	37
	Diphenylamine		MIL-D-98	1.0000	408
	Potassium Sulfate		MIL-P-217	1.0000	53
	Graphite		MIL-G-155	0.2000	10161
Propellant #3	IMR5010	10534796	MIL-P-3984	100.0000	10040
	Nitrocellulose		MIL-N-244	83.7500	31
	Diphenylamine		MIL-D-98	1.2500	408
	Graphite		MIL-G-155	0.4000	10161
	Dinitrotoluene		MIL-D-204	10.0000	439
	Potassium Sulfate		MIL-P-193	1.0000	773