(1)	Symbols:	
(2)	Hazardous materials descriptions and proper shipping names:	Detonators, electric, <i>for blasting</i>
(3)	Hazard class or Division:	<u>1.4B</u>
(4)	Identification Numbers:	UN0255
(5)	PG:	Ш
(6)	Label Codes:	<u>1.4B</u>
(7)	Special provisions (§172.102):	<u>103</u> Detonators which will not mass detonate and undergo only limited preparation in the shipping package may be assigned to <u>1.4B</u> classification code. Mass detonate means that more than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional detonators in the outside packaging that explode may not exceed 25 grams.
(8)	Packaging (§173.***)	131
(8A)	Exceptions:	<u>173.63(f),63(g)</u>
(8B)	Non-bulk:	173.62
(8C)	Bulk:	None
(9)	Quantity limitations (see §§ 173.27 and 175.75)	
(9A)	Passenger aircraft/rail:	Forbidden
(9B)	Cargo aircraft only:	75 kg
(10)	Vessel stowage	06
(10A)	Location:	Stowage category "06" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a passenger vessel.
(10B)	Other:	Emergency Response Guidebook Guide page number: <u>114</u>

(1)	Symbols:	
(2)	Hazardous materials descriptions and proper shipping names:	<u>Detonators, non-electric, for blasting</u>
(3)	Hazard class or Division:	<u>1.4B</u>
(4)	Identification Numbers:	UN0267
(5)	PG:	П
(6)	Label Codes:	<u>1.4B</u>

(7)	Special provisions (§172.102):	103 Detonators which will not mass detonate and undergo only limited preparation in the shipping package may be assigned to $1.4B$ classification code. Mass detonate means that MOFE than 90 percent of the devices tested in a package explode practically simultaneously. Limited propagation means that if one detonator near the center of a shipping package is exploded, the aggregate weight of explosives, excluding ignition and delay charges, in this and all additional detonators in the outside packaging that explode may not exceed 25 grams.					
(8)	Packaging (§173.***)	131					
(8A)	Exceptions:	<u>173.63(f</u>	<u>),63(g)</u>				
(8B)	Non-bulk:	<u>173.62</u>					
(8C)	Bulk:	None					
(9)	Quantity limitations (see §§ 173.27 and 175.75)						
(9A)	Passenger aircraft/rail:	Forbidde	n				
(9B)	Cargo aircraft only:	75 kg					
(10)	Vessel stowage	06					
(10A)	Location:	Stowage category "06" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a passenger vessel					
(10B)	Other:	Emerger	ncy Response G	Guidebook Guid	de page number: <u>114</u>		
 131 PARTICULAR PACKING REQUIREMENTS OR EXCEPTION 1. For UN 0029, 0267 and 0455, bags a reels may not be used as inner packag 2. For UN 0030, 0255 and 0456, inner packaging are not required when detonators are packed in pasteboard t 			Bags paper plastics Receptacles fiberboard metal plastics wood Reels	Not necessary	Boxes steel (4A). aluminum (4B). wood, natural, ordinary (4C1). natural wood, sift proof walls (4C2). plywood (4D). reconstituted wood (4F). fiberboard (4G).		
spo the the the for	ools with the caps either placed spool or securely taped to the v spool, so as to restrict free mov caps and to protect them from ces.	inside wire on ving of impact	Inner Packing	Seconday Packing	steel, removable head (1A2). aluminum removable head (1B2). plywood (1D). fiber (1G). plastics, removable head (1H2).		
(1)	Symbols:						
(2)	Hazardous materials descriptions and proper	<u>Cord, detonating, <i>flexible</i></u>					

	shipping names:							
(3)	Hazard class or Division:	<u>1.1D</u>						
(4)	Identification Numbers:	UNO	065					
(5)	PG:	II						
(6)	Label Codes:	<u>1.1D</u>						
(7)	Special provisions (§172.102):	102The ends of the detonating cord must be tied fast so that the explosive cannot escape. The articles may be transported as in Division 1.4 Compatibility Group D (1.4D) if all of the conditions specified in §173.63(a) of this subchapter are met.						
(8)	Packaging (§173.***)	139						
(8A)	Exceptions:	173.63	B(a)					
(8B)	Non-bulk:	173.62	<u>}</u>					
(8C)	Bulk:	None						
(9)	Quantity limitations (see §§ 173.27 and 175.75)							
(9A)	Passenger aircraft/rail:	Forbid	lden					
(9B)	Cargo aircraft only:	Forbid	lden					
(10)	Vessel stowage	07						
(10A)	Location:	Stowa in clos to 12 p on a pa	ge category "07 ed cargo transpo bassengers) and assenger vessel.	" means the m ort units or "u "on deck" onl	naterial may be stowed "on deck" nder deck" on a cargo vessel (up y in closed cargo transport units			
(10B)	Other:	Emer	gency Response	e Guidebook	Guide page number: <u>112</u>			
 139 PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0065, 0102, 0104, 0289 and 0290, the ends of the detonating cord must be sealed, for example, by a plug firmly fixed so that the explosive cannot escape. The ends of CORD DETONATING flexible must be fastened securely. 2. For UN 0065 and UN 0289, inner packaging are not required when they are fastened securely in coils. 		ONS: d ord plug r hey	Bags plastics Receptacles fiberboard metal plastics wood Reels Sheets paper plastics	Not necessary Seconday Packing	Boxes. steel (4A). aluminum (4B). wood, natural, ordinary (4C1). wood, natural, sift proof walls (4C2). plywood (4D). reconstituted wood (4F). fiberboard (4G). plastics, solid (4H2). Outer Container Drums. steel, removable head (1A2). aluminum, removable head (1B2). plywood (1D). fiber (1G).			

(1)	Symbols:						
(2)	Hazardous materials descriptions and proper shipping names:	Cha	rges, explosive,	commerc	ial without detonator		
(3)	Hazard class or Division:	<u>1.1D</u>					
(4)	Identification Numbers:	UN04	442				
(5)	PG:	II					
(6)	Label Codes:	<u>1.1D</u>					
(7)	Special provisions (§172.102):						
(8)	Packaging (§173.***)	137					
(8A)	Exceptions:	None					
(8B)	Non-bulk:	173.62	2				
(8C)	Bulk:	None					
(9)	Quantity limitations (see §§ 173.27 and 175.75)						
(9A)	Passenger aircraft/rail:	Forbid	lden				
(9B)	Cargo aircraft only:	Forbid	lden				
(10)	Vessel stowage	07					
(10A)	Location:	Stowa in clos to 12 p on a pa	ge category "07" meased cargo transport up passengers) and "on c assenger vessel.	ans the materi nits or "under deck" only in	ial may be stowed "on deck" deck" on a cargo vessel (up closed cargo transport units		
(10B)	Other:	Emer	gency Response Gui	idebook Guid	le page number: <u>112</u>		
137 PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS For UN 0059, 0439, 0440 and 0441, when the shaped charges are packed singly, the conical cavity must face downwards and the package marked "THIS SIDE UP". When the shaped charges are packed in pairs, the conical cavities must face inwards to minimize the jetting effect in the event of accidental initiation.		9, ical f he ed f r r g I i	Bags plastics Inner Packing Boxes Fiberboard Tubes fiberboard metal plastics Dividing partitions in the outer packaging	Not necessary Seconday Packing	Boxes. steel (4A). aluminum (4B). wood, natural, ordinary (4C1). wood, natural, sift proof walls (4C2). plywood (4D). reconstituted wood (4F). fiberboard (4G).		

(1)	Symbols:	C-4						
(2)	Hazardous materials descriptions and proper shipping names:	Cyclotrimethylenetrinitramine, desensitized <i>or</i> Cyclonite, desensitized <i>or</i> Hexogen, desensitized <i>or</i> RDX, desensitized						
(3)	Hazard class or Division:	<u>1.1D</u>						
(4)	Identification Numbers:	UN048	3					
(5)	PG:	II						
(6)	Label Codes:	<u>1.1D</u>						
(7)	Special provisions (§172.102):							
(8)	Packaging (§173.***)	112						
(8A)	Exceptions:	None						
(8B)	Non-bulk:	173.62						
(8C)	Bulk:	None						
(9)	Quantity limitations (see §§ 173.27 and 175.75)							
(9A)	Passenger aircraft/rail:	Forbidde	en					
(9B)	Cargo aircraft only:	Forbidde	en					
(10)	Vessel stowage	10						
(10A)	Location:	Stowage category "10" means the material may be stowed "o in closed cargo transport units or "under deck" in closed carg transport units on a cargo vessel (up to 12 passengers) and "o only in closed cargo transport units on a passenger vessel						
(10B)	Other:	Emerger	ncy Response (Guidebook Guid	de page number: <u>112</u>			
 112(c) This packing instruction applies to solid dry powders. PARTICULAR PACKING REQUIREMENTS OR EXCEPTIONS: 1. For UN 0004, 0076, 0078, 0154, 0216, 0219 and 0386, packaging must be lead 			Bags paper, multiwall, water resistant. plastics woven plastics	Bags paper, multiwall, water resistant with inner lining. plastics	Boxes. steel (4A). aluminum (4B). wood, natural, ordinary (4C1). wood, natural, sift proof walls (4C2). plywood (4D).			
 0219 and 0386, packaging must be lead free. 2. For UN 0209, bags, sift-proof (5H2) are recommended for flake or prilled TNT in the dry state. Bags must not exceed a maximum net mass of 30 kg. 3. Inner packaging are not required if drums 			Receptacles fiberboard metal plastics wood Inner Packing	Receptacles metal plastics Seconday Packing	reconstituted wood (4F). fiberboard (4G). plastics, solid (4H2). Drums. Uter Container steel, removable head (1A2). aluminum, removable head (1B2).			

are used as the outer packaging.		plywood (1D).
		fiber (1G).
4. At least one of the packaging must be sift-		plastics, removable head
proof.		(1H2).

(1)	Symbols:	G
(2)	Hazardous materials descriptions and proper shipping names:	Substances, explosive, n.o.s.
(3)	Hazard class or Division:	<u>1.1D</u>
(4)	Identification Numbers:	UN0475
(5)	PG:	Ш
(6)	Label Codes:	<u>1.1D</u>
(7)	Special provisions (§172.102):	
(8)	Packaging (§173.***)	101 or see 112c above
(8A)	Exceptions:	None
(8B)	Non-bulk:	173.62
(8C)	Bulk:	None
(9)	Quantity limitations (see §§ 173.27 and 175.75)	
(9A)	Passenger aircraft/rail:	Forbidden
(9B)	Cargo aircraft only:	Forbidden
(10)	Vessel stowage	10
(10A)	Location:	Stowage category "10" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) and "on deck" only in closed cargo transport units on a passenger vessel.
(10B)	Other:	Emergency Response Guidebook Guide page number: <u>112</u>

173.60 General packaging requirements for explosives.

(a) Unless otherwise provided in this subpart and in $\underline{\$173.7(a)}$, packaging used for Class 1 (explosives) materials must meet Packing Group II requirements. Each packaging used for an explosive must be capable of meeting the test requirements of <u>subpart M</u> of <u>part 178</u> of this subchapter, at the specified level of performance, and the applicable general packaging requirements of paragraph (b) of this section.

(b) The general requirements for packaging of explosives are as follows:

(b)(1) Nails, staples, and other closure devices, made of metal, having no protective covering may not penetrate to the inside of the outer packaging unless the inner packaging adequately protects the explosive against contact with the metal.

(b)(2) The closure device of containers for liquid explosives must provide double protection against leakage, such as a screw cap secured in place with tape.

(b)(3) Inner packagings, fittings, and cushioning materials, and the placing of explosive substances or articles in packages, must be such that the explosive substance is prevented from becoming loose in the outer packaging during transportation. Metallic components of articles must be prevented from making contact with metal packagings. Articles containing explosive substances not enclosed in an outer casing must be separated from each other in order to prevent friction and impact. Padding, trays, partitioning in the inner or outer packaging, molded plastics or receptacles may be used for this purpose.

(b)(4) When the packaging includes water that could freeze during transportation, a sufficient amount of anti-freeze, such as denatured ethyl alcohol, must be added to the water to prevent freezing. If the anti-freeze creates a fire hazard, it may not be used. When a percentage of water in the substance is specified, the combined weight of water and anti-freeze may be substituted.

(b)(5) If an article is fitted with its own means of ignition or initiation, it must be effectively protected from accidental actuation during normal conditions of transportation.

(b)(6) The entry of explosive substances into the recesses of double-seamed metal packagings must be prevented.

(b)(7) The closure device of a metal drum must include a suitable gasket; if the closure device includes metal-to-metal screw-threads, the ingress of explosive substances into the threading must be prevented.

(b)(8) Whenever loose explosive substances or the explosive substance of an uncased or partly cased article may come into contact with the inner surface of metal packagings (1A2, 1B2, 4A, 4B and metal receptacles), the metal packaging should be provided with an inner liner or coating.

(b)(9) Packagings must be made of materials compatible with, and impermeable to, the explosives contained in the package, so that neither interaction between the explosives and the packaging materials, nor leakage, causes the explosive to become unsafe in transportation, or the hazard division or compatibility group to change (see $\frac{\$173.24(e)(2)}{2}$).

(b)(10) An explosive article containing an electrical means of initiation that is sensitive to external electromagnetic radiation, must have its means of initiation effectively protected from electromagnetic radiation sources (for example, radar or radio transmitters) through either design of the packaging or of the article, or both.

(b)(11) Plastic packagings may not be able to generate or accumulate sufficient static electricity to cause the packaged explosive substances or articles to initiate, ignite or inadvertently function. Metal packagings must be compatible with the explosive substance they contain.

(b)(12) Explosive substances may not be packed in inner or outer packagings where the differences in internal and external pressures, due to thermal or other effects, could cause an explosion or rupture of the package.

(b)(13) Packagings for water soluble substances must be water resistant. Packagings for desensitized or phlegmatized substances must be closed to prevent changes in concentration during transport. When containing less alcohol, water, or phlegmatizer than specified in its proper shipping description, the substance is a "forbidden" material.

(b)(14) Large and robust explosives articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged provided that a negative result was obtained in Test Series 4 of the UN Manual of Tests and Criteria on an unpackaged article. When such articles have propelling charges or are self-propelled, their ignition systems shall be protected against stimuli encountered during normal conditions of transport. Such unpackaged articles may be fixed to cradles or contained in crates or other suitable handling, storage or launching devices in such a way that they will not become loose during normal conditions of transport and are in accordance with DOD-approved procedures.

[Amdt. 173-224, 55 FR 52617, Dec. 21, 1990, as amended at 56 FR 66267, Dec. 20, 1991; Amdt. 173-241, 59 FR 67492, Dec. 29, 1994; 65 FR 50453 August 18, 2000]

Vessel Stowage

(k)(6) Stowage category "01" means the material may be stowed "on deck" or "under deck" on a cargo vessel (up to 12 passengers) and on a passenger vessel.

(k)(7) Stowage category "02" means the material may be stowed "on deck" or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a passenger vessel.

(k)(8) Stowage category "03" means the material may be stowed "on deck" or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" in closed cargo transport units on a passenger vessel.

(k)(9) Stowage category "04" means the material may be stowed "on deck" or "under deck" on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

(k)(10) Stowage category "05" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) and on a passenger vessel.

(k)(11) Stowage category "06" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a passenger vessel.

(k)(12) Stowage category "07" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) and "on deck" only in closed cargo transport units on a passenger vessel.

(k)(13) Stowage category "08" means the material may be stowed "on deck" in closed cargo transport units or "under deck" on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

(k)(14) Stowage category "09" means the material may be stowed "on deck only" in closed cargo transport units or "under deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) and on a passenger vessel.

(k)(15) Stowage category "10" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) and "on deck" only in closed cargo transport units on a passenger vessel.

(k)(16) Stowage category "11" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in magazine stowage type "c" on a cargo vessel (up to 12 passengers) and "on deck" only in closed cargo transport units on a passenger vessel.

(k)(17) Stowage category "12" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in magazine stowage type "c" on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

(k)(18) Stowage category "13" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in magazine stowage type "A" on a cargo vessel (up to 12 passengers) and "on deck" only in closed cargo transport units on a passenger vessel.

(k)(19) Stowage category "14" means the material may be stowed "on deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

(k)(20) Stowage category "15" means the material may be stowed "on deck" in closed cargo transport units or "under deck" in closed cargo transport units on a cargo vessel (up to 12 passengers) but the material is prohibited on a passenger vessel.

Passenger vessel means— (1) A vessel subject to any of the requirements of the International Convention for the Safety of Life at Sea, 1974, which carries more than 12 passengers;

(2) A cargo vessel documented under the laws of the United States and not subject to that Convention, which carries more than 16 passengers;

(3) A cargo vessel of any foreign nation that extends reciprocal privileges and is not subject to that Convention and which carries more than 16 passengers; and

(4) A vessel engaged in a ferry operation and which carries passengers.

§178.3 Marking of packagings.

(a) Each packaging represented as manufactured to a DOT specification or a UN standard must be marked on a non-removable component of the packaging with specification markings conforming to the applicable specification, and with the following:

(a)(1) In an unobstructed area, with letters, and numerals identifying the standards or specification (e.g. UN 1A1, DOT 4B240ET, etc.).

(a)(2) Unless otherwise specified in this part, with the name and address or symbol of the packaging manufacturer or, where specifically authorized, the symbol of the approval agency certifying compliance with a UN standard. Symbols, if used, must be registered with the Associate Administrator. Duplicative symbols are not authorized.

(a)(3) The markings must be stamped, embossed, burned, printed or otherwise marked on the packaging to provide adequate accessibility, permanency, contrast, and legibility so as to be readily apparent and understood.

(a)(4) Unless otherwise specified, letters and numerals must be at least 12.0 mm (0.47 inches) in height except that for packagings of less than or equal to 30L (7.9 gallons) capacity for liquids or 30 kg (66 pounds) capacity for solids the height must be at least 6.0 mm (0.2 inches). For packagings having a capacity of 5 L (1 gallon) or 5 kg (11 pounds) or less, letters and numerals must be of an appropriate size.

(a)(5) For packages with a gross mass of more than 30 kg (66 pounds), the markings or a duplicate thereof must appear on the top or on a side of the packaging.

(b) A UN standard packaging for which the UN standard is set forth in this part may be marked with the United Nations symbol and other specification markings only if it fully conforms to the requirements of this part. A UN standard packaging for which the UN standard is not set forth in this part may be marked with the United Nations symbol and other specification markings for that standard as provided in the ICAO Technical Instructions or the IMDG Code subject to the following conditions:

(b)(1) The U.S. manufacturer must establish that the packaging conforms to the applicable provisions of the ICAO Technical Instructions (IBR, see \$171.7 of this subchapter) or the IMDG Code (IBR, see \$171.7 of this subchapter), respectively.

(b)(2) If an indication of the name of the manufacturer or other identification of the packaging as specified by the competent authority is required, the name and address or symbol of the manufacturer or the approval agency certifying compliance with the UN standard must be entered. Symbols, if used, must be registered with the Associate Administrator.

(b)(3) The letters "USA" must be used to indicate the State authorizing the allocation of the specification marks if the packaging is manufactured in the United States.

(c) Where a packaging conforms to more than one UN standard or DOT specification, the packaging may bear more than one marking, provided the packaging meets all the requirements of each standard or specification. Where more than one marking appears on a packaging, each marking must appear in its entirety.

(d) No person may mark or otherwise certify a packaging or container as meeting the requirements of a manufacturing special permit unless that person is the holder of or a party to that special permit, an agent of the holder or party for the purpose of marking or certification, or a third party tester.

[Amdt. 178-97, 55 FR 52715, Dec. 21, 1990; 56 FR 66284, Dec. 20, 1991, as amended by Amdt. 178-106, 59 FR 67519, Dec. 29, 1994; Amdt. 178-113, 61 FR 21102, May 9, 1996; 65 FR 50455, Aug. 18, 2000; 66 FR 45386, Aug. 28, 2001; 67 FR 61015, Sept. 27, 2002; 68 FR 75748, Dec. 31, 2003; 70 FR 73166, Dec. 9, 2005]

<u>§176.116 General stowage conditions for Class 1 (explosive) materials.</u>

(a) *Heat and sources of ignition:* (1) Class 1 (explosive) materials must be stowed in a cool part of the ship and must be kept as cool as practicable while on board. Stowage must be well away from all sources of heat, including steam pipes, heating coils, sparks, and flame.

(a)(2) Except where the consignment of Class 1 (explosive) materials consists only of explosive articles, the wearing of shoes or boots with unprotected metal nails, heels, or tips of any kind is prohibited.

(b) *Wetness:* (1) Spaces where Class 1 (explosive) materials are stowed below deck must be dry. In the event of the contents of packages being affected by water when on board immediate advice must be sought from the shippers; pending this advice handling of the packages must be avoided.

(b)(2) Bilges and bilge sections must be examined and any residue of previous cargo removed before Class 1 materials (explosive) are loaded onto the vessel.

(c) *Security*: All compartments, magazines, and cargo transport units containing Class 1 (explosive) materials must be locked or suitably secured in order to prevent unauthorized access.

(d) *Secure stowage:* Class 1 (explosive) materials must be securely stowed to prevent shifting in transit; where necessary, precautions must be taken to prevent cargo sliding down between the frames at the ship's sides.

(e) Separation from accommodation spaces and machinery spaces: (1) Class 1 (explosive) materials must be stowed as far away as practicable from any accommodation spaces or any machinery space and may not be stowed directly above or below such a space. The requirements in paragraphs (e)(2) through (e)(4) of this section are minimum requirements in addition to the applicable requirements of 46 CFR chapter I. Where the requirements of this subpart are less stringent than those of 46 CFR chapter I, the 46 CFR chapter I requirements must be satisfied for ships to which they are applicable.

(e)(2) There must be a permanent A Class steel bulkhead between any accommodation space and any compartment containing Class 1 (explosive) materials. Division 1.1, 1.2, 1.3, or 1.5 materials may not be stowed within 3 m (10 feet) of this bulkhead; in the decks immediately above or below an accommodation space they must be stowed at least 3 m (10 feet) from the line of this bulkhead projected vertically.

(e)(3) There must be a permanent A Class steel bulkhead between a compartment containing Class 1 (explosive) materials and any machinery space. Class 1 (explosive) materials, except those in Division 1.4 (explosive), may not be stowed within 3 m (10 feet) of this bulkhead; and in the decks above or below the machinery space they must be stowed at least 3 m (10 feet) from the line of this bulkhead projected vertically. In addition to this separation, there must be insulation to Class A60 standard as defined in 46 CFR 72.05-10(a)(1) if the machinery space is one of Category 'A' unless the only Class 1 (explosive) materials carried are in Division 1.48 (explosive).

(e)(4) Where Class 1 (explosive) materials are stowed away from bulkheads bounding any accommodation space or machinery space, the intervening space may be filled with cargo that is not readily combustible.

(f) Under deck stowage of Class 1 (explosive) materials allocated stowage categories 09 and 10:

(f)(1) These Class 1 (explosive) materials must not be stowed in the same compartment or hold with other cargo that is readily combustible (such as items packaged in straw).

(f)(2) The position of stowage of these Class 1 (explosive) materials must be such as to maintain direct access to the hatchway by not overstowing with other cargo except for other Class 1 (explosive) materials.

(f)(3) In all cases, all cargo within the compartment or hold, including Class 1 (explosive) materials stowed in cargo transport units, must be secured so as to eliminate the possibility of significant movement. Where an entire deck is used as a magazine, the stowage must be so arranged that the Class 1 (explosive) materials stowed therein must be removed from the ship before working any cargo in any decks above or below the space in the same hold.

[66 FR 45385, Aug. 28, 2001; 68 FR 61906, Oct. 30, 2003; 69 FR 76183, Dec. 20, 2004]

§176.130 Magazine stowage Type A.

(a) In addition to protecting the Class 1 (explosive) materials and preventing unauthorized access, magazine stowage type A guards against friction between any spilled contents of packages and the vessel's sides and bulkheads.

(b) Class 1 (explosive) materials requiring magazine stowage type A must be stowed in a magazine which is tightly sheathed with wood on its inner sides and floor.

(c) When utilized as part of the magazine structure, the vessel's sides and bulkheads must be clean, free from rust or scale, and protected by battening or sweatboards spaced not more than 150 mm (6 inches) apart. All stanchions and other unprotected structural members must be similarly clean and battened. The underside of the deck above the magazine must be clean and free of rust and scale, but need not be battened.

(d) The top of the stow within the magazine must be at least 30 cm (12 inches) from the underside of the deck above.

(e) A type A magazine constructed in the square of a cargo space may not be loaded from the top.

(f) When other Class 1 (explosive) materials are stowed with Class 1 (explosive) materials for which rmagazine stowage type A is required, they or their packagings may have no exposed external parts made of ferrous metal or aluminum alloy.

<u>§176.137 Portable magazine.</u>

(a) Each portable magazine used for the stowage of Class 1 (explosive) materials on board vessels must meet the following requirements:

(a)(1) It must be weather-tight, constructed of wood or metal lined with wood at least 2 cm (0.787 inch) thick, and with a capacity of no more than 3.1 cubic m (110 cubic feet).

(a)(2) All inner surfaces must be smooth and free of any protruding nails, screws or other projections.

(a)(3) If constructed of wood, a portable magazine must be framed of nominal 5 cm X 10 cm (2 X 4 inch) lumber, and sheathed with nominal 20 mm (0.787 inch) thick boards or plywood.

(a)(4) When constructed of metal, the metal must be not less than 3.2 mm (0.126 inch) thick.

(a)(5) Runners, bearers, or skids must be provided to elevate the magazine at least 10 cm (3.9 inches) from the deck. Padeyes, ring bolts, or other suitable means must be provided for securing.

(a)(6) If the portable magazine has a door or hinged cover, the door or cover must have a strong hasp and padlock or equally effective means of securing.

(a)(7) The portable magazine must be marked on its top and four sides, in letters at least 8 cm (3 inches) high, as follows:

EXPLOSIVES-HANDLE CAREFULLY-KEEP LIGHTS AND FIRE AWAY

(b) A portable magazine which meets the requirements for a type 2 or type 3 magazine under 27 CFR part 55 subpart K may be used for the stowage of Class 1 (explosive) materials on board vessels.

(c) A portable magazine with a capacity exceeding 3.1 m^3 (110 cubic feet) may be used for the stowage of Class 1 (explosive) materials under such construction, handling, and stowage requirements as the COTP approves.

[66 FR 45185, Aug. 28, 2001]

secure against wind, rain, etc.) Random House Unabridged Dictionary, © Random House, Inc. 2006.

<u>§176.166 Transport of Class 1 (explosive) materials on passenger vessels.</u>

(a) Only the following Class 1 (explosive) materials may be transported as cargo on passenger vessels:

(a)(1) Division 1.4 (explosive) materials, compatibility group S.

(a)(2) Explosive articles designed for lifesaving purposes as identified in $\frac{176.142(b)(2)}{100}$, if the total net explosive mass (weight) does not exceed 50 kg (110 pounds).

(a)(3) Class 1 (explosive) materials in compatibility groups C, D, and E, if the total net explosive mass (weight) does not exceed 10 kg (22 pounds) per vessel.

(a)(4) Articles in compatibility group G other than those requiring special stowage, if the total net explosive mass (weight) does not exceed 10 kg (22 pounds) per vessel.

(a)(5) Articles in compatibility group B, if the total net explosive mass (weight) does not exceed 5 kg (11 pounds).

(b) Class 1 (explosive) materials which may be carried on passenger vessels are identified in Column (10) of the §172.101 Table. They must be stowed in accordance with Table §176.166(b).

	g , Goods,		Goods shipped under a specific proper shipping name												
Class/ Division	Samples, explosive	N.O.S. Class 1					Co	ompati	bilit	y gro	oup				
			A	B	С	D	Ε	F	G	H	J	K	L	N	S
1.1	d	d	с	e	e	e	e	c	e	-	c	_	c	_	-
1.2	d	d	_	e	e	e	e	c	e	c	c	c	c	_	-
1.3	d	d	-	-	e	e	_	c	e	c	c	с	c	_	-
1.4	d	d	_	b	b	b	b	c	b	-	-	_	_	_	а
1.5	d	d	-	-	_	e	_	_	-	-	-	_	_	_	-
1.6	d	d	-	_	_	_	_	_	_	_	-	_	_	e	-

Table 176.166(b).—Stowage Arrangements in Passenger Vessels

a-As for cargo ships, on deck or under deck.

b-As for cargo ships, on deck or under deck, in portable magazines only.

c–Prohibited.

d-As specified by the Associate Administrator, or the competent authority of the country in which the Class 1 (explosive) materials are loaded on the vessel.

e-In containers or the like, on deck only.

(c) Notwithstanding the provisions of paragraph (a) of this section, a combination of the substances and articles listed in paragraphs (a)(1) through (a)(5) of this section may be transported on the same passenger vessel provided the total net explosive mass (weight) of the combination of Class 1 (explosive) materials carried does not exceed the smallest quantity specified for any one of the substances or articles in the combination.

<u>§176.176 Signals.</u>

When Class 1 (explosive) materials are being loaded, handled, or unloaded on a vessel, the vessel must exhibit the following signals:

(a) By day, flag "B" (Bravo) of the international code of signals; and

(b) By night, an all-round fixed red light.

§176.182 Conditions for handling on board ship.

(e) *Intoxicated persons*. No person under the influence of alcohol or drugs to such an extent that the person's judgment or behavior is impaired may participate in any operation involving the handling of Class 1 (explosive) materials. The master of the vessel must keep any such person clear of any areas where Class 1 (explosive) materials are being handled.

<u>§176.190 Departure of vessel.</u>

When loading of Class 1 (explosive) materials is completed, the vessel must depart from the port area as soon as is reasonably practicable.

Type 2 Magazine

§55.208

be attached to the doors by welding, riveting or bolting (nuts on inside of door). They are to be installed in such a manner that the hinges and hasps cannot be removed when the doors are closed and locked.

(9) Locks. Each door is to be equipped with (i) two mortise locks; (ii) two padlock fastened in separate hasps and staples; (iii) a combination of a mortise lock and a padlock; (iv) a mortise lock that requires two keys to open: or (v) a three-point lock. Padlocks must have at least five tumblers and a casehardened shackle of at least 3% inch diameter. Padlocks must be protected with not less than $\frac{1}{4}$ inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

(10) Ventilation. Ventilation is to be provided to prevent dampness and heating of stored explosive materials. Ventilation openings must be screened to prevent the entrance of sparks. Ventilation openings in side walls and foundations must be offset or shielded for bullet-resistant purposes. Magazines having foundation and roof ventilators with the air circulating between the side walls and the floors and between the side walls and the ceiling must have a wooden lattice lining or equivalent to prevent the packages of explosive materials from being stacked against the side walls and blocking the air circulation.

(11) Exposed metal. No sparking material is to be exposed to contact with the stored explosive materials. All ferrous metal nails in the floor and side walls, which might be exposed to contact with explosive materials, must be blind nailed, countersunk, or covered with a nonsparking lattice work or other nonsparking material.

(b) Igloos, "Army-type structures", tunnels, and dugouts. Igloo, "Army-type structure", tunnel, and dugout magazines are to be constructed of reinforced concrete, masonry, metal, or a combination of these materials. They must have an earthmound covering of not less than 24 inches on the top, sides and rear unless the magazine meets the

27 CFR Ch. I (4-1-02 Edition)

requirements of paragraph (a)(7) of this section. Interior walls and floors must be constructed of, or covered with, a nonsparking material. Magazines of this type are also to be constructed in conformity with the requirements of paragraph (a)(4) and paragraphs (a)(8) through (11) of this section.

§ 55.208 Construction of type 2 magazines.

A type 2 magazine is a box, trailer, semitrailer, or other mobile facility.

(a) Outdoor magazines—(1) General. Outdoor magazines are to be bullet-resistant, fire-resistant, weather-resistant, theft-resistant, and ventilated. They are to be supported to prevent direct contact with the ground and, if less than one cubic yard in size, must be securely fastened to a fixed object. The ground around outdoor magazines must slope away for drainage or other adequate drainage provided. When unattended, vehicular magazines must have wheels removed or otherwise effectively immobilized by kingpin locking devices or other methods approved by the Director.

(2) Exterior construction. The exterior and doors are to be constructed of not less than ¹/₄-inch steel and lined with at least two inches of hardwood. Magazines with top openings will have lids with water-resistant seals or which overlap the sides by at least one inch when in a closed position.

(3) *Hinges and hasps*. Hinges and hasps are to be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps must be installed so that they cannot be removed when the doors are closed and locked.

(4) Locks. Each door is to be equipped with (i) two mortise locks; (ii) two padlocks fastened in separate hasps and staples; (iii) a combination of a mortise lock and a padlock; (iv) a mortise lock that requires two keys to open; or (v) a three-point lock. Padlocks must have at least five tumblers and a case-hardened shackle of at least ³/₈-inch diameter. Padlocks must be protected with not less than 1/4-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. These requirements do not apply to magazine doors that are adequately secured on the inside by means

Bureau of Alcohol, Tobacco and Firearms, Treasury

§55.210

of a bolt, lock, or bar that cannot be actuated from the outside.

(b) Indoor magazines-(1) General. Indoor magazines are to be fire-resistant and theft-resistant. They need not be bullet-resistant and weather-resistant if the buildings in which they are stored provide protection from the weather and from bullet penetration. No indoor magazine is to be located in a residence or dwelling. The indoor storage of high explosives must not exceed a quantity of 50 pounds. More than one indoor magazine may be located in the same building if the total quantity of explosive materials stored does not exceed 50 pounds. Detonators must be stored in a separate magazine (except as provided in §55.213) and the total quantity of detonators must not exceed 5.000.

(2) *Exterior construction*. Indoor magazines are to be constructed of wood or metal according to one of the following specifications:

(i) Wood indoor magazines are to have sides, bottoms and doors constructed of at least two inches of hardwood and are to be well braced at the corners. They are to be covered with sheet metal of not less than number 26gauge (.0179 inches). Nails exposed to the interior of magazines must be countersunk.

(ii) Metal indoor magazines are to have sides, bottoms and doors constructed of not less than number 12gauge (.1046 inches) metal and be lined inside with a nonsparking material. Edges of metal covers must overlap sides at least one inch.

(3) *Hinges and hasps*. Hinges and hasps are to be attached to doors by welding, riveting, or bolting (nuts on inside of door). Hinges and hasps must be installed so that they cannot be removed when the doors are closed and locked.

(4) Locks. Each door is to be equipped with (i) two mortise locks; (ii) two padlocks fastened in separate hasps and staples; (iii) a combination of a mortise lock and a padlock; (iv) a mortise lock that requires two keys to open; or (v) a three-point lock. Padlocks must have at least five tumblers and a case-hardened shackle of at least %-inch diameter. Padlocks must be protected with not less than ¼-inch steel hoods constructed so as to prevent sawing or lever action on the locks, hasps, and staples. Indoor magazines located in secure rooms that are locked as provided in this subparagraph may have each door locked with one steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least ¾inch diameter, if the door hinges and lock hasp are securely fastened to the magazine. These requirements do not apply to magazine doors that are adequately secured on the inside by means of a bolt, lock, or bar that cannot be actuated from the outside.

(c) Detonator boxes. Magazines for detonators in quantities of 100 or less are to have sides, bottoms and doors constructed of not less than number 12gauge (.1046 inches) metal and lined with a nonsparking material. Hinges and hasps must be attached so they cannot be removed from the outside. One steel padlock (which need not be protected by a steel hood) having at least five tumblers and a case-hardened shackle of at least %-inch diameter is sufficient for locking purposes.

§ 55.209 Construction of type 3 magazines.

A type 3 magazine is a "day-box" or other portable magazine. It must be fire-resistant, weather-resistant, and theft-resistant. A type 3 magazine is to be constructed of not less than number 12-gauge (.1046 inches) steel, lined with at least either ½-inch plywood or ½inch Masonite-type hardboard. Doors must overlap sides by at least one inch. Hinges and hasps are to be attached by welding, riveting or bolting (nuts on inside). One steel padlock (which need not be protected by a steel hood) having at least five tumblers and a casehardened shackle of at least 3%-inch diameter is sufficient for locking purposes. Explosive materials are not to be left unattended in type 3 magazines and must be removed to type 1 or 2 magazines for unattended storage.

§55.210 Construction of type 4 magazines.

A type 4 magazine is a building, igloo or "Army-type structure", tunnel, dugout, box, trailer, or a semitrailer or other mobile magazine.

GUIDE Explosives* - Division 1.1, 1.2, 1.3, 1.5 or 112 1.6; CLASS A or B

ERG2004

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- MAY EXPLODE AND THROW FRAGMENTS 1600 meters (1 MILE) OR MORE IF FIRE REACHES CARGO.
- For information on "Compatibility Group" letters, refer to Glossary section.

HEALTH

• Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Isolate spill or leak area immediately for at least 500 meters (1/3 mile) in all directions.
- Move people out of line of sight of the scene and away from windows.
- Keep unauthorized personnel away.
- · Stay upwind.
- · Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

• Consider initial evacuation for 800 meters (1/2 mile) in all directions.

Fire

- If rail car or trailer is involved in a fire and heavily encased explosives such as bombs or artillery projectiles are suspected, ISOLATE for 1600 m (1 mile) in all directions; also, initiate evacuation including emergency responders for 1600 m (1 mile) in all directions.
- When heavily encased explosives are not involved, evacuate the area for 800 meters (1/2 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CARGO Fires

- DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!
- Stop all traffic and clear the area for at least 1600 meters (1 mile) in all directions and let burn.
- Do not move cargo or vehicle if cargo has been exposed to heat.

TIRE or VEHICLE Fires

- Use plenty of water FLOOD it! If water is not available, use CO₂, dry chemical or dirt.
- If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 meters (330 feet) OF ELECTRIC DETONATORS.
- DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID

- Move victim to fresh air. Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

POTENTIAL HAZARDS

FIRE OR EXPLOSION

- MAY EXPLODE AND THROW FRAGMENTS 500 meters (1/3 MILE) OR MORE IF FIRE REACHES CARGO.
- For information on "Compatibility Group" letters, refer to Glossary section.

HEALTH

• Fire may produce irritating, corrosive and/or toxic gases.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- Isolate spill or leak area immediately for at least 100 meters (330 feet) in all directions.
- Move people out of line of sight of the scene and away from windows.
- · Keep unauthorized personnel away.
- · Stay upwind.
- · Ventilate closed spaces before entering.

PROTECTIVE CLOTHING

- Wear positive pressure self-contained breathing apparatus (SCBA).
- Structural firefighters' protective clothing will only provide limited protection.

EVACUATION

Large Spill

• Consider initial evacuation for 250 meters (800 feet) in all directions.

Fire

• If rail car or trailer is involved in a fire, ISOLATE for 500 meters (1/3 mile) in all directions; also initiate evacuation including emergency responders for 500 meters (1/3 mile) in all directions.

EMERGENCY RESPONSE

FIRE

CARGO Fires

- DO NOT fight fire when fire reaches cargo! Cargo may EXPLODE!
- Stop all traffic and clear the area for at least 500 meters (1/3 mile) in all directions and let burn.
- Do not move cargo or vehicle if cargo has been exposed to heat.

TIRE or VEHICLE Fires

- Use plenty of water FLOOD it! If water is not available, use CO₂, dry chemical or dirt.
- If possible, and WITHOUT RISK, use unmanned hose holders or monitor nozzles from maximum distance to prevent fire from spreading to cargo area.
- Pay special attention to tire fires as re-ignition may occur. Stand by with extinguisher ready.

SPILL OR LEAK

- ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area).
- All equipment used when handling the product must be grounded.
- Do not touch or walk through spilled material.
- DO NOT OPERATE RADIO TRANSMITTERS WITHIN 100 meters (330 feet) OF ELECTRIC DETONATORS.
- DO NOT CLEAN-UP OR DISPOSE OF, EXCEPT UNDER SUPERVISION OF A SPECIALIST.

FIRST AID

- Move victim to fresh air. Call 911 or emergency medical service.
- Give artificial respiration if victim is not breathing.
- Administer oxygen if breathing is difficult.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

SUPPLEMENTAL INFORMATION

- Packages bearing the 1.4S label or packages containing material classified as 1.4S are designed or packaged in such a manner that when involved in a fire, may burn vigorously with localized detonations and projection of fragments.
- Effects are usually confined to immediate vicinity of packages.
- If fire threatens cargo area containing packages bearing the 1.4S label or packages containing material classified as 1.4S, consider isolating at least 15 meters (50 feet) in all directions. Fight fire with normal precautions from a reasonable distance.



MATERIAL SAFETY DATA SHEET

OIL STAR ELECTRIC DETONATORS

Austin Star Detonator Company 901 Cantu Road Brownsville, TX 78520

DATE SEPTEMBER 2001 MSDS NO. ED-2 PAGE 1

OF 2	
SECTION I	Issued by the Safety and Compliance Dept.
For Technical Assistance and Emergencies Contact:	TRADE NAME AND SYNONYMS
AUSTIN POWDER COMPANY	
25800 SCIENCE PARK DRIVE	OIL STAR DETONATORS
CLEVELAND, OHIO 44122	Electric Blasting Caps
DAY 216-464-2400	A2b, A84, A85, A95, A96, A98, A105, A140
NIGHI 216-464-2407	Oil and Gas Detonator Type A-140F
	Oil and Gas Detonator Type A-161
SECTION II HAZARDOUS INGREDIENTS	
Explosive components are RDX and lead compounds sealed	in a metal shell.
Lead Azide, Pb $(N_3)_2$,	CAS No. 13424-46-9
Lead Styphnate, Lead Trinitroresorcinate, C ₆ H ₃ N ₃ O ₉ Pb	CAS No. 15245-44-0
RDX, Cyclotrimethylene Trinitramine, C ₃ H ₆ N ₆ O ₆	CAS No. 121-82-4
HNS, Hexanitrostilbene, $C_{14}H_6N_6O_{12}$	CAS No. 20062-22-0
SECTION III PHYSICAL DATA	
SPECIFIC GRAVITY ($H_2 U = 1$) N/A	VAPOR DENSITY (AIF = 1) N/A
PERCENT VOLATILE BY VOL. (%) N/A	EVAPORATION RATE: N/A
SOLUBILITY IN WATER: Insoluble	Toflan or high temperature polymer costed conner log
wires No odor	renon of high temperature polymer coated copper leg
SECTION IV FIRE AND EXPLOSION DATA	
FLASH POINT:	N/A
FLAMMABLE LIMITS:	N/A
EXTINGUISHING MEDIA:	See below.
SPECIAL FIREFIGHTING PROCEDURES:	Do not fight fire. Withdraw personnel immediately. Allow
	fire to burn itself out.
UNUSUAL FIRE AND EXPLOSION HAZARDS:	May explode when subjected to flame, heat, impact, friction,
	electric current, electrostatic of radio frequency energy. Avoid toxic fumes from fire. Do not every 250^{0} (177°C)
	for 1 hour. With Type Λ_161 detonators, which contain HNS
	do not exceed 475° E (246°C) for 1 bour
	TWA Load Elemental and Inorganic Compounds as Ph
OSHA: 50 JIG/M ³ PE	I wA, Leau, Elemental, and morganic compounds, as Pb.
EFFECTS OF OVEREXPOSURE: None likely when safe blas	sting procedures are employed
EMERGENCY AND FIRST AID PROCEDURES: Improper ba	andling or misuse may cause detonation resulting in injuries
from shrapnel. Lead and lead compounds are listed in the 19	387 IARC Monographs as possible human carcinogens
(Group 2B). Lead is not listed in the NTP annual report on ca	arcinogens.
	J J



MATERIAL SAFETY DATA SHEET

OIL STAR ELECTRIC DETONATORS

Austin Star Detonator Company 901 Cantu Road Brownsville, TX 78520

DATE SEPTEMBER 2001 MSDS NO. ED-2 PAGE 2 OF 2

SECTION VI REACTIVITY DATA Dept.

Issued by the Safety and Compliance

STABILITY: May explode when subjected to flame, heat, impact, friction, electric currents, electrostatic or radio frequency energy. Avoid static charge build up. Keep lead wires shunted until wiring into circuit.

INCOMPATIBILITY (MATERIALS TO AVOID): Do not exceed 350°F (177°C) for more than 1 hour. With Type A-161 detonators do not exceed 475°F (246°C) for more than 1 hour.. Avoid contact with acids or alkalies.

HAZARDOUS DECOMPOSITION PRODUCTS: Gaseous nitrogen oxides, carbon oxides, and lead fumes. HAZARDOUS POLYMERIZATION WILL NOT OCCUR.

SECTION VII SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Pick up containers or units by hand. Avoid conditions affecting stability. DO NOT use damaged detonators.

WASTE DISPOSAL METHOD: Dispose of under direct supervision of a qualified person according to local, state and federal regulations. Call Austin Powder for recommendations and assistance. This material may become a hazardous waste under certain conditions and must be collected, labeled, and disposed of per state and federal hazardous waste regulations.

TRANSPORTATION EMERGENCIES involving spills, leaks, fires or exposures in the United States: CALL CHEMTREC for emergencies only: 1-800-424-9300. For calls originating outside the U.S. dial the U.S. access number followed by: 1-703-527-3887. All calls are recorded.

SECTION VIII SPECIAL PROTECTION **INFORMATION:**

RESPIRATORY PROTECTION: VENTILATION: PROTECTIVE GLOVES: EYE PROTECTION:

Avoid breathing fumes from detonation. Not required. Not required. Not required.

SECTION IX SPECIAL PRECAUTIONS

COMPLY WITH THE SAFETY LIBRARY PUBLICATION NO. 4 "WARNINGS AND INSTRUCTIONS" AS ADOPTED BY THE INSTITUTE OF MAKERS OF EXPLOSIVES.

TRANSPORTATION, STORAGE AND USE MUST COMPLY WITH OSHA SAFETY AND HEALTH STANDARDS 29CFR1910.109, APPLICABLE MSHA REGULATIONS, THE DOT AND HAZARDOUS MATERIALS REGULATIONS, BATF REQUIREMENTS AND STATE AND LOCAL TRANSPORTATION, STORAGE AND USE REGULATIONS AND ORDINANCES.

DOT CLASSIFICATION:

Detonators,	Electric,	1.4B PGII
Detonators,	Electric,	1.1B PGII

UN NUMBER 0255 UN NUMBER 0030 IMO HAZARD CLASS: 1.4B 1.1B

Consult IME Safety Library Publication No. 20, SAFETY GUIDE FOR THE PREVENTION OF RADIO FREQUENCY RADIATION HAZARDS IN THE USE OF COMMERCIAL ELECTRIC DETONATORS, and Publication No. 22, RECOMMENDATIONS FOR THE SAFE TRANSPORTATION OF DETONATORS IN A VEHICLE WITH CERTAIN OTHER EXPLOSIVE MATERIALS AND THE GUIDE FOR THE USE OF THE IME 22 CONTAINER.

MATERIAL SAFETY DATA SHEET

ENSI124

None

	Page 1 of 5				
	SECTION I				
<u>Manufacturer's Name:</u>	Emergency Telephone No:				
The Ensign-Bickford Company	Product Information: 1-860-843-2276 CHEMTREC: 1-800-424-9300				
Address:					
660 Hopmeadow St., Simsbury, CT 06	5070				
Chemical Name and Synonyms:	Trade Name and Synonyms:				
N/A	Instant NON ELECTRIC DETONATOR				
Cage Code:EBCo P96336SMS	<u>roduct Code:</u> H40012-020				
UNU267					
SECTION II - H	IAZARDOUS INGREDIENTS				
Ingredient:	<u>C.A.S. No.</u> <u>OSHA PEL</u> <u>ACGIH TLV</u>				

PENTA	ERYTHRITOL	
TETRA	NITRATE (PETN	I)

PETN @	1.773
<u>Percent Volatile:</u> N/A	
Evaporation Rate:	
	<u>Evaporation Rate:</u> N/A

78-11-5

None

MATERIAL SAFETY DATA SHEET

ENSI124

I			Page 2 of 5
<u>Solubility in Water:</u>		Melting Point:	
PETN:	No	PETN:	140° C
Appearance and Odor Aluminum shell contain 400-800mg of Pentaeryt Tetranitrate (PETN) atta of PRIMALINE® deton approximately 6 grains/f PETN.	ing appox. hritol hritol houched to a length hating cord containing foot (1.3 gms/m) of		

SECTION	NTV - FIRE AND EXPLOSION HA	ZARD DATA
<u>Flash Point:</u>	Explosive Limits:	
N/A	LEL: N/A	UEL: N/A
Extinguishing Media:	Do not fight fires involving explosive through fixed extinguishing system (need not be present for the system to	es. Water may be applied sprinklers) as long as people operate.
<u>Special Fire Fighting</u> <u>Procedures:</u>	DO NOT FIGHT FIRES INVOLVIN THE AREA. EVACUATE PERSON EXPLOSIVE DETONATION CAN	IG EXPLOSIVES. ISOLATE INEL TO A SAFE PLACE. OCCUR.
<u>Unusual Fire and</u> <u>Explosion Hazards:</u>	May detonate if exposed to shock, he Hazardous gasses released are Oxide burned.	eat, impact, sparks or friction. s of Nitrogen and Carbon when
<u>Auto Ignition</u> <u>Temperature:</u>	PETN 190° 374° F PRIMALINE®	

SECTION V -	ROUTES OF ENTRY/EFFECTS OF OVEREXPOSURE
<u>Threshold Limit Value:</u>	Product is fully contained and presents low risk during normal handling. Personnel could be exposed to by-products during functional detonation of the unit and post clean-up.

MATERIAL SAFETY DATA SHEET

ENSI124

Page 3 of 5

Eye Contact:	Dust can irritate, corneal injury may result. Flush immediately with running water for at least 15 minutes. Seek medical attention.
Skin Contact:	Exposure From PRIMALINE® Could Result In Minor Irritation.
<u>Inhalation:</u>	Breathing dust can cause minor eye and skin irritation, nasal and respiratory irritation and lowering of blood pressure. PETN can lower blood pressure. PETN is a vasodilator.
Ingestion:	See Inhalation. Seek medical attention.

SECTION VI - EMERGENCY AND FIRST AID PROCEDURES

Eye Contact:	Flush with running water for at least 15 minutes. If irritation persists, seek medical attention.
<u>Skin Contact:</u>	Wash thoroughly with soap and water. If skin irritation occurs, seek medical attention.
Inhalation:	Remove victim to fresh air. If not breathing administer artificial respiration. Seek medical attention.
Ingestion:	Seek medical attention.

MATERIAL SAFETY DATA SHEET

ENSI124

Page 4 of 5

	SECTION VII - REACTIVITY DATA
<u>Stability:</u>	Stable, but improper handling can result in accidental detonation.
Conditions To Avoid:	Heat, shock, friction, impact, static charge.
Incompatibility:	Incompatible with acids, alkalis.
<u>Hazardous Decomp</u> <u>Products:</u>	Hazardous gasses produced are Oxides of Nitrogen and Carbon.
<u>Hazardous</u> Polymerization:	Will not occur.

SECTION VIII - SPILLS OR LEAK PROCEDURES		
<u>Steps To Be Taken In</u> <u>Case Material Is Released</u> <u>Or Spilled:</u>	Review Fire and Explosive Hazards and Safety Precautions before Proceeding with Clean-Up. Use appropriate Personal Protective Equipment during clean-up. Isolate the spill area; removing all sources of ignition from the location. Carefully collect the spilled material and place in a conductive bag. Contamination of this material with sand, grit, or dirt will render the material more sensitive to detonation. If safe, separate material that is not contaminated from contaminated material. "Loose" powder spills should be wetted down and cleaned using a damp rag or sponge. Store all collected material in a secure area, to await proper disposal.	
	In the event of any spill of loose powder, such as from a broken cap, PETN can detonate until proper disposal of the reactive material (see below) is complete. Only qualified personnel should perform any clean-up and disposal of material.	
<u>Waste Disposal Method:</u>	Waste detonators are classified as a hazardous waste with the characteristic of reactivity, EPA Hazardous Waste Number of D003; see CFR Part 261. Any such waste should be handled and stored in accordance with local, state and federal regulations. The current-preferred method of waste treatment for waste detonators is detonation in a confined chamber. The open (unconfined) detonation of waste detonators may result in the release of oxides of nitrogen and Carbon. Open burning of detonators is likely to result in detonation, and is not recommended. Open burning of PRIMALINE® may result in detonation. PRIMALINE ® that is kinked or knotted may also detonated, and is not recommended. Any treatment of waste detonators or waste PRIMALINE® must be performed by qualified personnel and at licensed facilities (TSD).	

MATERIAL SAFETY DATA SHEET

ENSI124

Page 5 of 5

SECTION IX - SPECIAL PROTECTION INFORMATION		
Respiratory Protection:	OSHA/NIOSH approved dust, mist and fume filter respirator.	
<u>Ventilation:</u>	Product is intended for outside use and in underground mines. Ventilation should be provided if used in underground mines or if any special testing is to be performed indoor.	
Protective Gloves:	Protective gloves should be worn during post clean-up operations.	
Eve Protection::	Safety glasses	
<u>Other:</u>		

	SECTION X - REACTIVITY DATA
<u>Precautions To Be Taken</u> <u>In Handling and Storing:</u>	Transportation and storage must be in accordance with Federal, State and Local Regulations. Store away from sparks or other ignition sources. Avoid heat, sparks, shock and impact.
<u>Other Precautions:</u>	Refer to Manufacturer's Instructions and Warnings supplied with product.
SARA 313 Information:	Manufactured unit does <u>not</u> contain any material subject to reporting requirements of SARA Title III, Section 313.

Data Sheet Prepared By: The Ensign-Bickford Company Last Data Sheet Revision: June 19, 2002

Material Safety Data Sheet

Date of Issue: July 2002



Not Classified as Hazardous according to criteria of Worksafe Australia

Note: This substance is an explosive product classified Class 1.1D Dangerous Good

COMPANY DETAILS

Company Name Address Emergency Telephone Telephone/Fax	Dyno Nobel Asia Pacific Limited (ACN 003 269 010) Level 20, AGL Building, 111 Pacific Highway, North Sydney NSW 2060 1800 098 836 Ph: +61 2 9968 9000Fax: +61 2 9964 0170
IDENTIFICATION	
Product Namo	Detenating Cord
Shin Name (CSN)	Cord Detonating Elevible
Other Names	Special 18 Detonating cord
Other Manles	Special 18AA Detonating cord
	Special 25 Detonating cord
	Special 25AA Detonating cord
	Special 50 Detonating cord
	Special 50AA Detonating cord
	Special 18T Detonating cord
	Special 25T Detonating cord
	Special 50T Detonating cord
	Special 25A Detonating cord
UN Number	0065
DG Class	1.1D
Packaging Group	See Link Here
Hazchem Code	E
Poisons Schedule	Not Scheduled
Product Use	Detonating cord for initiating charges

Physical Data

Appearance	Flexible cord with a white powder core protected within outer coverings of various
Melting Point	140°C (PETN)
Boiling Point	Not applicable
Vapour Pressure	Not applicable
Specific Gravity	1.76 g/cm3
Flash Point	Not applicable
Flamm. Limit LEL	Not applicable
Flamm. Limit UEL	Not applicable
Solubility in Water	Negligible.

Sensitivity to Impact Explosive material. Detonation can occur from heavy impact. **(Shock Sensitivity)**

Ingredients

Sensitivity to Impact Explosive material. Detonation can occur from heavy impact. **(Shock Sensitivity)**

HEALTH HAZARD IN	HEALTH HAZARD INFORMATION						
Health Effects							
Acute - Ingestion	Substantial amounts of PETN core may result in headache, dizziness, nausea and vomiting. PETN is a vasodilator and produces dilation of blood vessels.						
Acute - Eye	Exposure to PETN core may result in mild irritation. The cord can cause physical irritation to the eyes.						
Acute - Skin	PETN core may be a mild skin sensitiser.						
Acute - Inhalation	Not a likely route of exposure due to the packaging.						
Chronic	Repeated or prolonged exposure may cause skin sensitisation.						
Other Information	No adverse health effects expected if the product is handled in accordance with this Safety Data Sheet and the product label.						
First Aid							
Ingestion	Rinse mouth with water. Give plenty of water to drink. INDUCE VOMITING using fingers in the throat or Ipecac Syrup APF. Seek immediate medical assistance.						
Eye	Hold eye lids open and immediately flush with large amounts of fresh running water for at least 15 minutes. Eye lids should be held away from the eyeball to ensure thorough rinsing. In all cases of eye contamination, it is a sensible precaution to seek medical advice.						
Skin	Immediately wash contaminated skin with plenty of soap and water. Remove contaminated clothing and wash before re-use.						
Inhalation	Remove to fresh air.						
Advice To Doctor							

Advice to Doctor Treat symptomatically. Where ingestion of PETN has occurred, blood pressure may be lowered. Treat as for exposure to nitrates.

Other	Health	Hazard	Inform	ation

Entry Route(s) <u>Toxicity</u>:

Oral Lowest Lethal Dose (mouse) : 7 g/kg NOEL (rat) : 2 mg/kg PETN in diet for 1 year

PETN has been shown to be a vasodilator and overexposure can result in headaches, weakness and fall in blood pressure.

Skin sensitisation has been reported however the sensitising potential of the material is considered to be very low. Nonmutagenic in invitro mutagenicity tests.

PRECAUTIONS FOR USE

Exposure Limits Other Exposure Info. Engineering Controls	No specific value assigned for this product by NOHSC. Extra ventilation not required under normal use conditions.
Personal Protection	
Eye Protection Glove Type Protective Equip.	Avoid eye contact with the PETN core. Wear safety glasses. Impervious gloves. Avoid eye contact and repeated or prolonged skin contact with the PETN core. Always wash hands before smoking, eating, drinking or using the toilet.
Flammability	
Fire Hazards	Explosive material. Do not subject the material to impact, sparks or any form of heating.

SAFE HANDLING INFORMATION

Storage and Transport

Storage Precautions	Store and transport in accordance with Local, State and Federal requirements. Store in a well-ventilated, clean, dry magazine suitably licensed for Class 1.1D Explosives. Protect ends of cords from contact with moisture or oil. Handle with care. Do not store or consume food, drink or tobacco in areas where they may become contaminated with this material.								
Transport	Classified as a 1.1D Explosive for the purpose of transport. Refer to relevant regulations for transport requirements. Explosives shall not normally be carried on the same vehicle with dangerous goods of other classes.								
Proper Shipping Name EPG Number IERG Number	Cord, Detonating, Flexible. EXP1 02								
Spills and Disposal									
Spills and Leaks	Shut off all possible ignition sources. Collect and seal in labelled packages for disposal. Handle with care.								
	Surplus or defective explosives must not be placed in any waterway, thrown away, discarded or placed with rubbish.								
Disposal	Destruction of explosives must be carried out by suitably qualified personnel. If necessary, the relevant statutory authorities must be notified.								

In all circumstances, detonation is the preferred method disposal.

The residue from spills and the burning of explosives may be toxic to livestock and/or wildlife.

DETONATION:

The explosives to be destroyed must be placed in direct contact with fresh priming charge in a hole which is at least 0.6 m deep and then adequately stemmed. No detonators are to be inserted into defective explosives. Personnel must be evacuated to a safe distance in accordance with relevant local regulations prior to initiation of the charge.

<u>NOTE</u>: Detonations in loose or stony ground may be expected to cause fly rock.

BURNING:

Burning may result in the detonation of explosives. Burning explosives produces toxic fumes e.g. oxides of nitrogen and carbon.

Make a sawdust bed or trail adequate for the quantity of explosives to be burned approximately 400mm wide and 40mm deep, upon which the explosive will be laid. If sawdust is not available, newspaper may be used. Normal precautions should be taken against the spread of fire.

Individual trails should not be closer together than 600mm and should contain not more than 12kg of explosive.

Trails should be side-by-side, not in a line, and not more than four should be set up at one time. Remove any explosive that is not to be burnt to a distance of at least 300m.

Sufficient diesel oil (never petrol or other highly flammable liquid) should be used to thoroughly wet the sawdust (or paper). At least 4L per trail is recommended.

Light the trail from a long rolled paper 'wick' which should be placed downwind and in contact with the 1m of trail which is not covered with explosive. The wind should blow so that the flame from the wick (and later from the burning explosives) will blow away from the unburned explosives as detonation is more likely to occur if the explosives are preheated by the flame.

If plastic igniter cord (slow) is available, its use for lighting is recommended instead of paper. One end should be coiled into the sawdust or under the paper and the other end lit from a minimum distance of 7m from the trail. Retire to at least 300m or to a safe place.

Do not return to the site for at least 30 min after the burning has apparently finished.

If the fire goes out do not approach for at least 15 minutes after all traces of fire has gone. Do not add more diesel oil unless certain that the flame is completely extinguished.

Fire/Explosion Hazard	
Fire/Explos. Hazards	High explosive. Severe explosion hazard when exposed to heat. In case of all fires involving detonating cord, evacuate the area immediately.
Hazchem Code	DO NOT FIGHT FIRES. Under confined conditions, toxic fumes of oxides of nitrogen and carbon monoxide will be present. Evacuate up wind of fire.
	J
CONTACT POINT	
Contact	Dyno Nobel Asia Pacific Limited Mt Thorley Technical Centre Telephone: +61 2 65 74 2500 Fax: +61 2 65 74 6849
DISCLAIMER:	The information and suggestions above concern explosive products which should only be dealt with by persons having appropriate technical skills, training and licences. The results depend to a large degree on the conditions under which the products are stored, transported and used.
	While Dyno Nobel Asia Pacific makes every effort to ensure the details contained in the data sheet are as current and accurate as possible the conditions under which its products are used are not within Dyno Nobel Asia Pacific Limited's control. Each user is responsible for being aware of the details in the data sheet and the product applications in the specific context of the intended use.
	Buyers and users assume all risk, responsibility and liability arising from the use of this product and the information in this data sheet. Dyno Nobel Asia Pacific Limited is not responsible for damages of any nature resulting from the use of its products or reliance upon the information. Dyno Nobel Asia Pacific Limited makes no express or implied warranties other than those implied mandatory by Commonwealth, State or Territory legislation.

...END OF REPORT...

Product Identification: COMPOSITION C-4, TYPE II UN0483 Date of MSDS: 07/15/1987 Technical Review Date: 05/27/1999 FSC: 1375 NIIN: LIIN: 00N091093 Submitter: N EN Status Code: A MFN: 01 Article: N Kit Part: N

Manufacturer's Information

Manufacturer's Name: HOLSTON DEFENSE CORPORATION Manufacturer's Address1: WEST STONE DRIVE Manufacturer's Address2: KINGSPORT, TN 37660 Manufacturer's Country: US General Information Telephone: 615-247-9111 Emergency Telephone: 615-247-9111 Other Number for MSDS Information: 4113.0072, HH-3810 Emergency Telephone: 615-247-9111 Proprietary: N Reviewed: Y Published: Y CAGE: 1D893

Contractor Information

Contractor's Name: HOLSTON DEFENSE CORPORATION **Contractor's Address1:** WEST STONE DRIVE **Contractor's Address2:** KINGSPORT, TN 37660 **Contractor's Telephone:** 615-247-9111 **Contractor's CAGE:** 1D893

Section 2 - Compositon/Information on Ingredients COMPOSITION C-4, TYPE II

Ingredient Name: CYCLOTRIMETHYLENE-TRINITRAMINE (RDX, CYCLONITE, HEXOGEN) Ingredient CAS Number: Ingredient CAS Code: X RTECS Number: RTECS Code: X =WT: =WT Code: =Volume: =Volume Code: >WT: >WT Code: >Volume: >Volume Code: <WT: <WT Code: <Volume: <Volume Code: % Low WT: 89.9 % Low WT Code: M % High WT: 92. % High WT Code: M % Low Volume: % Low Volume Code: % High Volume: % High Volume Code: % Text: % Enviromental Weight: Other REC Limits: N/K (FP N) OSHA PEL: N/K (FP N) OSHA PEL Code: OSHA STEL: N/K (FP N) OSHA STEL Code: ACGIH TLV: 1.5 MG/M3 ACGIH TLV Code: M ACGIH STEL: 3.0 MG/M3 ACGIH STEL Code: M EPA Reporting Quantity: DOT Reporting Quantity: Ozone Depleting Chemical:

Section 3 - Hazards Identification, Including Emergency Overview COMPOSITION C-4, TYPE II

Health Hazards Acute & Chronic: SKIN/EYES: CAN CAUSE ALLERGIC SKIN REACTION. CAN CAUSE EYE IRRITATION. AVOID PROLONGED CONTACT WITH SKIN. AVOID CONTACT WITH EYES. INHALATION/INGESTION: CHRONIC EXPOSURE TO RDX DUST HAS BEEN REPOR TED TO CAUSE CONVULSIONS OR UNCONSCIOUSNESS. CHRONIC LOCAL AND SYSTEMIC EFFECTS ARE NOT FULLY KNOWN. INHALATION AN INGESTION CAN RESULT IN SYSTEMIC POISONING, USUALLY AFFECTING THE BONE MARROW (BLOO D-CELL-PRODUCING SYSTEM) AND THE LIVER. AVOID INHALATION AND INGESTION OF DUST.

Signs & Symptoms of Overexposure: SEE HEALTH HAZARDS.

Medical Conditions Aggravated by Exposure: N/P

LD50 LC50 Mixture: SEE TOXICOLOGICAL INFORMATION. Route of Entry Indicators: Inhalation: YES Skin: YES Ingestion: YES Carcenogenicity Indicators NTP: NO IARC: NO OSHA: NO Carcinogenicity Explanation: N/P

> Section 4 - First Aid Measures COMPOSITION C-4, TYPE II

First Aid:

EYES: FLUSH THORO W/LARGE AMOUNTS OF LOW PRESS WATER FOR AT LEAST 15 MINUTES. REMOVE CONT LENSES. GET MEDICAL ATTN. SKIN: WASH W/SOAP & WARM RUNNING WATER. CLEAN CLOTHING THORO & DISPOSE OF SHOES CONTAM W/EXPLOSIVES I/A/W EXPLOSIVE DISPOSAL PROCEDURES. GET MEDICAL ATTN FOR RASH/IRRIT. INHAL: REMOVE TO FRESH AIR, TREAT ANY IRRITATION SYMTOMATICALLY. IF BREATHING IS DIFFICULT, GIVE OXYGEN. G ET MEDICAL ATTN. INGEST: IF CONSCIOUS, INDUCE VOMIT IMMED BY GIVING 1-2 GLASSES OF WATER & TOUCHING BACK OF THROAT W/FINGER/BLUNT OBJECT/BY GIVING SYRUP OF IPECAC. NEVER GIVE ANYTHING BY MOUTH TO AN UNCONSCIOUS PERSON. GET MEDICAL ATTN.

Section 5 - Fire Fighting Measures COMPOSITION C-4, TYPE II

Fire Fighting Procedures:

WEAR NIOSH APPRVD SCBA & FULL PROT EQUIP (FP N). DO NOT ATTEMPT TO MANUALLY EXTING FIRES. BURNING EXPLO MAY ACCELERATE TO DETONATION AT ANY TIME WHEN SUBJECTED TO CONFINEMENT, SHOCK/OTHER SUFFICIENT INITIATION SOURCE. NO ATTEMPT TO FIGHT FIRE INVOLVING EXPLO SHOULD BE MADE EXCEPT FOR MANUAL (TRANSPORT INFO)

Unusual Fire or Explosion Hazard:

MUST NOT BE CONFINED IF BURNING. CONFINEMENT CAN CAUSE DEFLAGRATION/TRANSITION TO DETONATION W/EXTREMELY VIOLENT RSLTS. EXPLO MAY BE RETAINED IN FISSURES, CRACKS, & CREVICES OF STRUCTURES, EQUIP, & CONTRS WHICH HAVE BEEN EXPOSED TO EXPLO. PROPERTY WHICH MAY BE CONTAM BY EXPLO MUST NOT BE SUBJECTED TO (TRANSPORT INFO)

Extinguishing Media:

WATER SPRINKLER/DELUGE SYSTEM RECOMMENDED.

Flash Point: Flash Point Text: N/A

Autoignition Temperature:

Autoignition Temperature Text: N/P

Lower Limit(s): N/A Upper Limit(s): N/A

Section 6 - Accidental Release Measures COMPOSITION C-4, TYPE II

Spill Release Procedures:

CLEAN UP SPILLS IMMED USING SOFT BRISTLE BRUSH & CONDUCTIVE RUBBER PAN/RUBBER SHOVEL. USE CONDUCTIVE CONTRS & GROUND ALL CONTRS BEFORE TRANSFERRING EXPLO BETWEEN CONTRS. TREAT LIKE

FLAM SOLV W/REGAR D TO ELECTROSTATIC DISCHARGE. AVOID PINCHING MATL, METAL TO METAL CONT, IMPACT W/SHARP OBJECTS, FRICTION/OTHER SITUATIONS WHICH MAY INITIATE EXPLO. (SUP DAT)

Section 7 - Handling and Storage COMPOSITION C-4, TYPE II

Handling and Storage Precautions:

Other Precautions:

Section 8 - Exposure Controls & Personal Protection COMPOSITION C-4, TYPE II

Repiratory Protection:

NOT APPLICABLE. USE NIOSH APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N).

Ventilation:

NOT APPLICABLE.

Protective Gloves:

IMPERVIOUS GLOVES RECOMMENDED FOR PROLONGED OR REPEATED SKIN CONTACT.

Eye Protection: ANSI APPROVED CHEMICAL WORKERS GOGGLES (FP N). **Other Protective Equipment:** ANSI APPRVD EMER EYEWASH & DELUGE SHOWER (FP N). EXPLO-HNDLG: CAPS & COVERALLS FOR FULL BODY (ARMS & LEGS) PROT REC. COTTON UNDERWEAR, SOCKS, & CONDUCTIVE SHOES REC TO AVOID HUMAN STATIC DISCHARGE.

Work Hygenic Practices: AS A PRECAUTION, HANDLE ONLY IN WELL-VENTILATED AREAS, CHANGE CLOTHING DAILY, BATHE AT THE END OF THE WORK PERIOD, AND WASH HANDS THOROUGHLY AFTER HANDLING. WASH CONTAMINATED CLOTHING BEFORE REUSE.

Supplemental Health & Safety Information: SPILL PROC: AVOID SAND, GLASS, GRIT, & METAL FRAGMENTS WHICH MAY SENSITIZE MATL TO IMPACT &/OR FRICTION. WET W/WATER TO DESENSITIZE. WASTE DISP METH: PERS SHOULD WEAR FLAME-RESIST CLTHG. DISP OF EX PLO SHOULD COMPLY W/ALL APPLIC FED, STATE, & LOC REGS. REFER TO FIRE FIGHT PROC FOR PREC WHEN BURNING. (OTHER INFO)

Section 9 - Physical & Chemical Properties COMPOSITION C-4, TYPE II

HCC:

NRC/State License Number: Net Property Weight for Ammo: Boiling Point: Boiling Point Text: N/A Melting/Freezing Point: =205.C, 401.F Melting/Freezing Text: WITH DECOMPOSITION

Decomposition Point: Decomposition Text: N/P Vapor Pressure: 0 MM HG Vapor Density: N/A Percent Volatile Organic Content: Specific Gravity: 1.7 (H*2O=1) Volatile Organic Content Pounds per Gallon: pH: N/P Volatile Organic Content Grams per Liter: Viscosity: N/P Evaporation Weight and Reference: N/A Solubility in Water: INSOLUBLE Appearance and Odor: PUTTY-LIKE PLASTIC, WHITE TO OFF-WHITE. Percent Volatiles by Volume: N/A Corrosion Rate: N/P

Section 10 - Stability & Reactivity Data COMPOSITION C-4, TYPE II

Stability Indicator: NO

Materials to Avoid:

AVOID ALKALIS, PARTICULARLY AT ELEVATED TEMPERATURES, STRONG ACIDS AND PHYSICAL SENSITIZERS SUCH AS GLASS, SAND, AND METAL FRAGMENTS.

Stability Condition to Avoid:

AVOID SHOCK, HEAT, ELECTROSTATIC DISCHARGE, IMPACT, IMPINGEMENT AND FRICTION. HIGH EXPLOSIVE WILL DETONATE WHEN EXPOSED TO SUFFICIENT ENERGY LEVEL.

Hazardous Decomposition Products:

DURING DECOMPOSITION TOXIC OXIDES OF NITROGEN ARE EMITTED. Hazardous Polymerization Indicator: NO Conditions to Avoid Polymerization:

N/P

Section 11 - Toxicological Information COMPOSITION C-4, TYPE II

Toxicological Information:

THE TOXICOLOGICAL PROPERTIES OF RDX HAVE NOT BEEN FULLY INGESTIGATED. LDL0 (BASED ON RDX, LOWEST LETHAL DOSE) ORAL-RABBIT: 500 MG/KG; INTRAPERITONEAL-RAT: 10 MG/KG; ORAL-CAT: 100 MG/KG; INTRAVENOU S-RAT: 16 MG/KG; ORAL-MOUSE: 500 MG/KG; LD50 ORAL-RAT: 100 MG/KG; ORAL-MOUSE: 500 MG/KG. OSHA PEL-NOT ESTABLISHED FOR ANY COMPONENT IN THIS FORMULATION.

Ecological Information:

OTHER INFO: OF EXPLO OF MILITARY INTEREST, ARMY MATL COMMAND PAMPHLET 700-177. ADDNL INFO ABOUT FIRE FIGHT PROC, COLLECTION & DESTRUCTION OF WASTE, & STOR & HNDLG PREC CAN BE FOUND IN ARMY SFTY MANUA L, ARMY MATL COMMAND REGS 385-100 & DEPARTMENT OF DEFENSE CONTRACTOR'S SFTY MANUAL FOR AMMUNITION, EXPLO & RELATED DANGEROUS MATL, DOD 4145.26M. COMP C-4, TYPE II IS A MILITARY HIGH EXPLO. COMP C-4, TYPE II HAS BEEN ASSIGNED UNITED NATIONS ORGANIZATION CLASSIFICATION OF CLASS 1, DIVISION 1, (MASS DETONATING) BASED ON DEPARTMENT OF DEFENSE EXPLO HAZ CLASSIFICATION PROC, ARMY TECHNICAL BULLETIN 70 0-2.

Section 13 - Disposal Considerations COMPOSITION C-4, TYPE II

Waste Disposal Methods:

EXPLO SHOULD BE DESTROYED BU OPEN BURNING, BY BURNING IN APPRVD INCIN/BY CHEM TREATMENT W/CAUSTICS. DISP SITE SHOULD BE LOCATED TO PROVIDE ADEQ QTY DIST PROT FOR ADJACENT FACILITIES & PERS. EXPLO SH OULD NOT BE BURNED IN CONTRS. EXPLO SHOULD BE IGNITED REMOTELY. PERS SHOULD WEAR FLAME-RESIST CLTH G. (SARA REG INFO)

> Section 14 - MSDS Transport Information COMPOSITION C-4, TYPE II

Transport Information:

DOT NUMBER: 0072. FIRE FIGHT PROC: ACTIVATION OF INSTALLED FIRE EXTING EQUIP. PERS SHOULD LEAVE BLDG IMMED USING AS MUCH PROT COVER AS POSS & ACTIVATING DELUGE SYS & FIRE ALARM EQUIP WHILE ESCAPING. EXPLO HAZ: HEAT, SPKS/FLAME. DETONATION CAN OCCUR. THERMAL DECONTAM UNDER CONTROLLED CNDTNS IS REC METH FOR COMPLETE DECONTAM. THERMAL DECONTAM MUST BE PRECEDED BY WASHING/STEAMING & CHEM NEUTRAL IZATION/DISSOLUTION. CONTAM PROPERTY MUST NOT BE BURIED.

> Section 15 - Regulatory Information COMPOSITION C-4, TYPE II

SARA Title III Information:

WASTE DISPOSAL METHOD: STORE AND HANDLE WASTE EXPLOSIVES AS CLASS A EXPLOSIVES. TRANSPORT IN ACCORDANCE WITH THE DEPARTMENT OF TRANSPORTATION REGULATIONS FOR CLASS A EXPLOSIVES. OBTAIN APPROVAL FOR APPROPRIATE SAFETY AGENCY BEFORE DISPOSAL. Federal Regulatory Information: N/P State Regulatory Information:

Section 16 - Other Information COMPOSITION C-4, TYPE II

Other Information:

OTHER PREC: FLOOR & TABLE COVERINGS, PACKING MATLS, & OTHER SIMILAR MATLS & EQUIP. KEEP CONTR CLSD. EXTREME CARE SHOULD BE EXERCISED DURING MAINTENANCE OF EXPLO CONTAM EQUIP. DECONTAM PROC INCL WAS HING/STEAMING, CHEM DECONTAM, & THERMAL DECONTAM. DECONTAM SHOULD BE PERFORMED PRIOR TO WELDING, CUTTING/GRINDING METAL PARTS. PENETRATING OIL SHOULD BE USED LIBERALLY ON NUTS, BOLTS, & ALL THREADED CONNECTIONS TO AID IN DESENSITIZING HIDDEN EXPLO PRIOR TO DISASSEMBLY. REFER TO AMCR 385-100, PARAGRAPH 16-18. ADDNL INFO ABOUT PROPERTIES OF EXPLO CAN BE FOUND IN ENGINEERING DESIGN HANDBOOK, EXPL O SERIES, PROPERTIES (ECOLOGICAL INFO)

HAZCOM Label Information

Product Identification: COMPOSITION C-4, TYPE II **CAGE:** 1D893 Assigned Individual: N **Company Name: HOLSTON DEFENSE CORPORATION Company PO Box: Company Street Address1: WEST STONE DRIVE** Company Street Address2: KINGSPORT, TN 37660 US Health Emergency Telephone: 615-247-9111 Label Required Indicator: Y Date Label Reviewed: 05/27/1999 Status Code: A Manufacturer's Label Number: Date of Label: Year Procured: N/K **Organization Code:** F Chronic Hazard Indicator: Y **Eve Protection Indicator: YES** Skin Protection Indicator: YES **Respiratory Protection Indicator:** YES Signal Word: DANGER Health Hazard: Moderate Contact Hazard: Moderate Fire Hazard: Moderate **Reactivity Hazard:** Severe

						H)LS'	TON	AR	<u>H Y</u>	<u>}</u>	M M L		ITION	P		[7							-
В	y	T	E	R	I	y	I.	2	5 A	F	E	T	Y	D	y	T	X	ទ		H	E	E	T	
Nanufactu	ire H W K	r OI ES	2.51 5 T 1G:	roj S1 5P(f] r0])R'	DEI Ne F,	FEN: DRI TEI	SE C IVE NNES	OR	PO E	RA' 3'	T IC 766) N 50			<u></u>		Hols HSDS	t	on No	•		1053	- . 0072
For more	in	fc)rı	Lat	:i(מכ	abo	out	th SE	<u>is</u> CT	<u> </u>	SD:	<u>3,</u> [dial	{ (515	5)	247-	9	11	1,	ł	Ext.	<u>3302</u>
EFFECTIVE	DA	TE	2:	<u>05</u> No	5/2	2.4 / / Da	<u>/86</u>	/r.								HI	C	CHEN	•	N	ο.	<u>}</u>	N A	
LABEL NAME	::			C	M	205	5 1 T]	ION	B,	T	YPI	E 1	[,	GRADI	EJ	L U	IN04	DO 142	T	N (0.	<u>(</u>	072	
CHEMICAL N	AN	E :		N A	١																			
TRADE, CON	BO	N	NA	ME	:s,	. (THE	ER:	N	A														

CHEMICAL FORMULA: $C_3H_6N_6O_6$ (RDX) and $C_7H_5N_3O_6$ (TNT)

HOLECULAR WT.: 222.13 (RDX) - 227.13 (TNT)

SECTION II INGREDIENTS OF MIXTURE									
CHENICAL NAMES	COMMON NAME(S)	<u>WEIGHT 2</u>	ACGIH TLV (Units)						
Cyclotrimetheylene- trinitramine	RDX, Cyclonite, Hexogen	57.5- 61.5	1.5 mg/m ³ TWA 3.0 mg/m ³ STEL Skin						
Trinitrotoluene	Tolite, TNT, Trinitrotoluol	37.2- 41.8-	0.5 mg/m ³ TWA Skin						
Synthetic Wax	Wax	. 7 - 1 . 3	Not. Established						

SECTION III PHYSICAL DATA

BOILING POINT(OC): NASPECIFIC GRAVITY(H2O=1):1.7MELTING POINT(OC): TNT 79-80; RDX 205 with decompositionVAPOR PRESSURE(nm Hg):.1 @ 100 °CPERCENT VOLATILE(vol 2):NAVAPOR DENSITY(Air=1):NAEVAPORATION RATE: NASOLUBILITY IN WATER :insoluble @ 20 °CAPPEARANCE AND ODOR :light brown flaked solid

SECTION IV	FIRE AND EXPLOSIVE HAZARD DATA
FLASH POINT (⁰ C): NA (Method Used) : NA	FLANNABI.E LINITS (Vol 2) LEI.: NA UEL: NA
EXTINGUISHING NEDIA:	Water sprinkler/deluge system recommended.

Holston MSDS No. <u>4053.0072</u>

SECTION IV (Continuation)

FIRE FIGHTING PROCEDURES: to confinement, shock, or other sufficient initiation source.

No attempt to fight fires involving explosives should be made except for manual activation of installed fire extinguishing equipment. Personnel should leave the building immediately using as much protective cover as possible and activating deluge systems and fire alarm equipment while escaping.

FIRE AND EXPLOSION HAZARDS: Wust not be confined if burning. Confinement can cause deflagration or transition to detonation with extremely violent results. Explosives may be retained in fissures, cracks, and crevices of structures, equipment, and containers which have been exposed to explosives. Property which may be contaminated by explosives must not be subjected to heat, sparks, or flame. Detonation can occur. Thermal decontamination under controlled conditions is the recommended method for complete decontamination. Thermal decontamination must be preceded by washing/steaming and chemical neutralization or dissolution. Contaminated property must not be buried.

SECTI	ION V REACTIVITY DATA
STABILITY:	Composition B, Type 1, Grade A is a mili-
	tary high explosive. Composition B, .
	Type I, Grade A has been assigned the
United Nations Or	ganization Classification of 1, Division 1
(mass detonating)	based on the Department of Defense
Explosives Hazard	l Classification Procedures, Army Technical
Bulletin 700-2.	
CONDITIONS TO AVOID:	Avoid shock, heat, electrostatic dis-

charge, impact, impingement and friction. High explosive will detonate when exposed to sufficient energy level.

MATERIALS TO AVOID: Nith TNT to form dangerously sensitive compounds. Avoid contact with potassium hydroxide, sodium carbonate, sodium sulfide and potassium methylate. Avoid physical sensitizers such as glass, sand, and metal fragments.

HAZARDOUS DECOMPOSITION During decomposition toxic oxides of nitrogen are emitted.

HAZARDOUS POLYMERIZATION:

BAY OCCUR

XX WILL NOT OCCUR

Holston HSDS No. 4053.0072

SECTION VI HEALTH HAZARD DATAToxicological properties of RDX
and TNT have not been fully investi-
gated. RDX: LD-LO (lowest lethal dose) Oral-Rabbit-500
mg/kg; Intraperitonel Rat-10 mg/kg; Oral-Cat-100 mg/kg;
Intravenous-Rat-18 mg/kg; Oral-Mouse-500 mg/kg. LD50 Oral-
Rat-100 mg/kg; Oral-Mouse-500 mg/kg; OSHA PEL - Not
Established. TNT: LD50 Oral-Rat-990 mg/kg; Oral-Mouse-890
mg/kg. OSHA PEL - 1.5 mg/m³ - Skin
Synthetic Wax: The synthetic wax component of this material
is not expected to produce any significant toxicological
effects. OSHA PEL - Not Established.

CARCINOGENICITY:

ICITY: Components not listed as carcinogens by the International Agency for Research on Cancer, National Toxicology Program or Occupational Safety and Health Administration.

EFFECTS OF EXPOSURE: Skin reaction. Can cause allergic skin reaction. Can cause eye irritation. TNT can discolor skin and hair on contact. Avoid prolonged contact with skin. Avoid contact with eyes.

> <u>INHALATION AND INGESTION</u>: Chronic exposure to RDX dust has been reported to cause convulsions or unconsciousness. Chronic local and systemic effects are not fully known. Inhalation and ingestion can result in systemic poisoning, usually affecting the bone marrow (blood-cell-producing system) and the liver. Ingesting TNT causes nausea, vomiting, anorexia and can cause liver and blood damage, and aplastic anemia. Avoid inhalation and ingestion of dust.

F.B	EI	RG	EN	С	Y .	λ	N	D	F	I	RST
À	IJ	D	PR	0	CE	D	IJ	RE	S	:	

<u>EYES</u>: In case of contact, flush thoroughly with large amounts of low pressure water for at least 15 min. s. Get medical attention.

Remove contact lenses.

<u>SKIN</u>: Wash with soap and warm running water. Clean clothing thoroughly and dispose of shoes contaminated with explosives in accordance with explosive disposal procedures. Get medical attention for rash or irritation.

<u>INHALATION</u>: Remove to fresh air, treat any irritation symptomatically. If breathing is difficult, give oxygen. Get medical attention.

<u>INGESTION</u>: If conscious, induce vomiting immediately by giving 1 or 2 glasses of water and touching back of throat with finger or blunt object or by giving syrup of ipecac. Never give anything by mouth to an unconscious person. Get medical attention.

SECTION VII	SPECIAL PROTECTION INFORMATION
RESPIRATORY PROTECTION:	Use NIOSH approved respirator for
(specify type)	dusts and particulates if exposed to
	dusting.
HH-3810-2	Page 3 of 5

Holston HSDS No. <u>4053.0072</u>

SEC	TION VII (Continuation)
VENTILATION: LOCAL EXHAUST: Hoods operations ar NECHANICAL: General	for dusty SPECIAL: Dust collection equipment e required. required. OTHER: NA
PROTECTIVE GLOVES:	If prolonged or repeated skin contact may occur, impervious gloves are recommended.
EYE PROTECTION:	Industrial safety glasses are recommended for any type of industrial chemical handling.
OTHER PROTECTIVE EQUIPMENT:	For explosive-handling workers, caps and coveralls for full body (arms & legs) protec- tion are recommended. Cotton underwear,
socks, and conduct static discharge. washing facilitie: handle only in we bathe at the end after handling.	tive shoes are recommended to avoid human A safety shower, an eye bath, and s should be available. As a precaution, ll-ventilated areas, change clothes daily, of the work period, and wash hands thoroughly
SECTION V	III SPILL OR LEAK PROCEDURES
STEPS TO BE TAKEN IN EVENT MATERIAL IS RELEASED OR SPILLED: flammable solvent Avoid pinching mai sharp objects, fr the explosive. Av which may sensiti: Wet with water to	Clean up spills immediately using a soft bristle brush and a conductive rubber pan or rubber shovel. Use conductive containers and ground all containers before transferring explosives between containers. Treat like a with regard to electrostatic discharge. terial, metal-to-metal contact, impact with iction or other situations which may initiate void sand, glass, grit, and metal fragments ze the material to impact and/or friction. desensitize.
WASTE DISPOSAL METHOD: or by chemical treshould be located tection for adjace should not be burn ignited remotely. clothing. The dis applicable federal Refer to Section handle waste explo- accordance with th for Class A explo-	Explosives should be destroyed by open burn- ing, by burning in an approved incinerator, eatment with caustics. The disposal site to provide adequate quantity-distance pro- ent facilities and personnel. Explosives bed in containers. The explosives should be Personnel should wear flame resistant sposal of explosives should comply with all 1, state, and local regulations. IV for precautions when burning. Store and psives as Class A explosives. Transport in the Department of Transportation regulations
Safety Agency befo	pre disposal.
DECAUTIONS TO BE	IX SPECIAL PRECAUTIONS
TAKEN IN STORAGE AND HANDLING:	explosives magazines in accordance with AMCR 385-100. Storage and handling must be

carried out in accordance with appropriate Safety Agency regulations concerning quantity distance, barri-

.

Page 4 of 5

Holston MSDS No. 4053.0072

SECTION IX (Continuation)

PRECAUTIONS TO BE TAKEN IN STORAGE AND HANDLING (continued)

cading, personnel exposure and material handling equipment. Recycle or dispose of used containers in accordance with appropriate Safety Agency regulations. In buildings and locations where explosives with spark energies for initiation not greater than 0.02 Joules are handled, the relative humidity should be 50% or greater. Dust generated by handling must be cleaned up on a continuing basis.

OTHER PRECAUTIONS:

CAUTION: Explosives must be tested for compatibility with any materials which they contact. Materials include other explosives, solvents, adhesives, metals, plastics, paints, cleaning compound, floor and table coverings, packing materials, and other similar materials and equipment. Keep container closed. Wash thoroughly after handling. Wash contaminated clothing before reuse. Extreme care should be exercised during maintenance of explosive contaminated equipment. Decontamination procedures include washing/steaming, chemical decontamination, and thermal decontamination. Decontamination should be performed prior to welding, cutting or grinding metal parts. Penetrating oil should be used liberally on nuts, bolts, and all threaded connections to aid in desensitizing hidden explosives prior to disassembly. Refer to AMCR 385-100, paragraph 16-18.

SECTION X CONTINUATION

The notation NA is used to indicate that a section or item of information is not applicable for the chemical or ingredient.

Additional information about the properties of explosives can be found in the Engineering Design Handbook, Explosives Series, Properties of Explosives of Military Interest, Army Materiel Command Pamphlet 700-177.

Additional information about fire fighting procedures; collection and destruction of waste; and storage and handling precautions can be found in the Army Safety Manual, Army Materiel Command Regulation 385-100 and the Department of Defense Contractors' Safety Manual for Ammunition, Explosives and Related Dangerous Materiel, DoD 4145.26M.

The information contained herein is furnished without warranty of any Employers should use this information only as a supplement to kind. other information gathered by them and must make independent determinations of suitability and completeness of information from other sources to assure proper use of these materials and the safety and health of employees.