

JJH: JCL: TGG: RF

XF: Ballinal

TO: Dave Mahler

FROM: Tom Grumbles

DATE: March 11, 1985

Interoffice
Communication

SUBJ: TRANSPORTATION OF FLAMMABLE SOLIDS

VISTA

Flammable solids must be packaged in specification containers as listed in 49 CFR 173.154. The only exception is for a limited quantity of flammable solids, which is one pound.

All container marking and labeling requirements, and bill of lading description requirements for hazardous materials must be met. Please let me know if you need further details on these requirements. Applicable pages of the regulations are enclosed.



T. G. Grumbles

cc: Tom Huffman

Enclosure

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§172.101 Hazardous Materials Table—Contd.

+/ E/ A/ W	(2) Hazardous materials descriptions and proper shipping names	(3) Hazard class	(3A) Identification number	(4) Label(s) required (if not excepted)	(5) Packaging		(6) Maximum net quantity in one package		(7) Water shipments		
					(a) Exceptions	(b) Specific requirements	(a) Passenger carrying aircraft or railcar	(b) Cargo aircraft only	(a) Cargo vessel	(b) Passenger vessel	(c) Other requirements
	<i>Firecracker. See Fireworks, common or special.</i> <i>Firecracker salute. See Fireworks, common or special.</i> Fire extinguisher <i>Fire extinguisher charge containing not more than 50 grains of propellant explosive per unit. Not subject to requirements of this subchapter.</i> Fire extinguisher charge containing sulfuric acid Fireworks, common <i>Fireworks, exhibition display piece. See Fireworks, special.</i> Fireworks, special	Nonflammable gas Corrosive material Class C explosive Class B explosive	UN1044 UN1774	Nonflammable gas Corrosive Explosive C explosive Explosive B	173.306 173.261 None None	 173.100 173.108 173.88 173.91	 150 pounds 1 quart 50 pounds Forbidden	 300 pounds 1 gallon 200 pounds 200 pounds	 1.2 1.2 1.3 3	 1.2 1.2 1.3 3	 Passenger vessels in metal lockers only Passenger vessels in metal lockers only. Toy torpedoes must not be packed with other special fireworks
W	Fish meal or fish scrap containing 6% to 12% water	ORM-C	NA2216	None	173.505	173.995			1.2	1.2	Segregation same as for flammable solids. Separate from flammable gases or liquids, oxidizing materials, or organic peroxides. Use double strip stowage for cargo 6-12 percent moisture containing not more than 12 percent fat. Use single strip stowage for cargo 6-12 percent moisture containing 12-15 percent fat.
	Fish meal or fish scrap containing less than 6% or more than 12% water	Flammable solid	NA1374	Flammable solid	None	173.171	Forbidden	Forbidden	1.2	1.2	Separate from flammable gases or liquids, oxidizing materials, or organic peroxides
	Fissile radioactive material. See Radioactive material, fissile										
	Flame retardant compound liquid	Corrosive material	NA1760	Corrosive	173.244	173.291	1 quart	10 gallons	1.2	1.2	
+	Flammable gas n.o.s. See Compressed gas, n.o.s.										
	Flammable liquid, corrosive, n.o.s.	Flammable liquid	UN2924	Flammable liquid and Corrosive	None	173.119	1 quart	1 quart	1.2	1	
	Flammable liquid, n.o.s.	Flammable liquid	UN1993	Flammable liquid	173.118	173.119	1 quart	10 gallons	1.2	1	
	Flammable liquid, poisonous, n.o.s.	Flammable liquid	UN1992	Flammable liquid and Poison	None	173.119	1 quart	10 gallons	1.2	1	
	Flammable solid, corrosive, n.o.s.	Flammable solid	UN2925	Flammable solid and Corrosive	173.153	173.154	25 pounds	25 pounds	1	4	
	Flammable solid, n.o.s.	Flammable solid	UN1325	Flammable solid	173.153	173.154	25 pounds	25 pounds	1.2	1.2	
	Flammable solid, poisonous, n.o.s.	Flammable solid	UN2926	Flammable solid and Poison	173.153	173.154	25 pounds	25 pounds	1.2	1	
	<i>Flare. See Fireworks, common.</i> <i>Flare, airplane. See Fireworks, special.</i> <i>Flash cartridge. See Fireworks, special or Low explosives.</i> <i>Flash cracker. See Fireworks, common or special.</i> <i>Flash powder. See Fireworks, special or Low explosives.</i>										
	Flexible linear shaped charge, metal clad	Class C explosive		Explosive C	None	173.104	50 pounds	300 pounds	1.3	1.3	
	Flowers of sulfur. See Sulfur										
	Flue dust, poisonous	Poison B	NA2811	Poison	173.364	173.368	50 pounds	200 pounds	1.2	1.2	

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DEPARTMENT OF TRANSPORTATION REGULATIONS FOR SHIPPERS—
FLAMMABLE SOLIDS, OXIDIZERS, AND ORGANIC PEROXIDES;
DEFINITIONS AND PREPARATION

(49 CFR 173; 41 FR 42434, September 7, 1976, revised as of October 1, 1982; 47 FR 54824, December 6, 1982; 48 FR 10218, March 10, 1983; 48 FR 52306, November 17, 1983; 48 FR 52306, November 17, 1983; 49 FR 2250, January 19, 1984)

Subpart E—Flammable Solids, Oxidizers, and Organic Peroxides; Definitions and Preparation

§ 173.150 Flammable solid; definition.

For the purpose of this subchapter, "Flammable solid" is any solid material, other than one classed as an explosive, which, under conditions normally incident to transportation is liable to cause fires through friction, retained heat from manufacturing or processing, or which can be ignited readily and when ignited burns so vigorously and persistently as to create a serious transportation hazard. Included in this class are spontaneously combustible and water-reactive materials.

§ 173.151 Oxidizer; definition.

An oxidizer for the purpose of this subchapter is a substance such as a chlorate, permanganate, inorganic peroxide, or a nitrate, that yields oxygen readily to stimulate the combustion of organic matter.

§ 173.151a Organic peroxide; definition.

(a) An organic compound containing the bivalent —O—O— structure and which may be considered a derivative of hydrogen peroxide where one or more of the hydrogen atoms have been replaced by organic radicals must be classed as an organic peroxide unless:

(1) The material meets the definition of an explosive A or explosive B, as prescribed in Subpart C of this part, in which case it must be classed as an explosive.

(2) The material is forbidden to be offered for transportation according to § 172.101 or § 173.21 of this subchapter.

(3) It is determined that the predominant hazard of the material containing an organic peroxide is other than that of an organic peroxide, or

(4) According to data on file with the Materials Transportation Bureau, it has been determined that the material does not present a hazard in transportation.

§ 173.152 Packing.

(a) Flammable solids or oxidizing

materials must not be packed in the same outside container with corrosive liquids unless the corrosive liquids are in bottles, cushioned by incombustible absorbent material, in tightly closed metal containers.

NOTE 1: Oxidizing or other materials in quantity not exceeding 4 ounces, in securely closed metal cans, packed in the same compartment with other securely packed materials necessary for a complete fumigant, are acceptable for transportation.

(b) Closing and cushioning. All containers must be tightly and securely closed. Inside containers must be cushioned as prescribed or in any case when necessary to prevent breakage or leakage.

§ 173.153 Limited quantities of flammable solids, oxidizers and organic peroxides.

(a) Limited quantities of flammable solids for which exceptions are permitted as noted by reference to this section in § 172.101 of this subchapter, are excepted from labeling (except when offered for transportation by air) and specification packaging requirements when packed according to the following paragraph. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.317.

(1) Flammable solids in inside containers not over 1 pound net weight each, in outside containers not exceeding 2 pounds net weight each.

(b) Limited quantities of oxidizers and organic peroxides for which exceptions are permitted as noted by reference to this section in § 172.101 of this subchapter are excepted from labeling (except when offered for transportation by air) and specification packaging requirements when packed according to the following paragraphs. In addition, shipments are not subject to Subpart F of Part 172 of this subchapter, to Part 174 of this subchapter except § 174.24 and to Part 177 of this subchapter except § 177.317.

(1) Oxidizers in inside containers having a rated capacity of not over one pint for liquids or a net weight of not over one pound for solids, in strong outside packagings not exceeding 25 pounds net weight each.

(2) Organic peroxides, except acetyl benzoyl peroxide and benzoyl peroxide, as follows:

(i) In inside containers which must be securely packed and cushioned with non-combustible cushioning material (except that cushioning material is not required when the liquid is contained in strong, securely closed plastic packagings of not over 1 ounce by volume capacity each), further overpacked in strong outside packagings containing not over 1 pint or 1 pound net weight of the material.

(ii) In not more than 24 inside fiberboard containers each having not more than 70 securely closed tubes having a maximum fluid capacity each of 1/2-ounce and securely packed in non-combustible cushioning material.

(c) Special exceptions for shipment of certain flammable solids, oxidizers and organic peroxides in the ORM-D Class are provided in Subpart N of this part.

§ 173.154 Flammable solids, organic peroxide solids and oxidizers not specifically provided for.

(a) Flammable solids, organic peroxide solids and oxidizers as defined in §§ 173.150 and 173.151, other than those for which special packing requirements are prescribed, must be packed in specification containers of a design and constructed of materials that will not react dangerously with or be decomposed by the chemical packed therein. Specific packaging requirements are as follows:

(1) Specification 6B or 6C (§§ 178.98, 178.99 of this subchapter). Metal barrels or drums.

(2) Spec. 17C, 17E, 17H, 37A or 37B (§§ 178.115, 178.116, 178.118, 178.131, or 178.132 of this chapter), metal drums (single-trip).

(3) Specification 57 (§ 178.253 of this subchapter). Portable tanks. Tanks must have a fusible plug having a fusing temperature between 70° C and 80° C. Authorized only for dicumyl peroxide, dry and a, a'-bis(t-butylperoxy) diisopropylbenzene, solid.

(4) Specification MC 303, MC 304, MC 306, MC 307, MC 311 or MC 312 (§§ 178.341, 178.342, 178.343 of this subchapter). Tank motor vehicles. Tanks must comply with § 178.340-8. Discharge valves must

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be located inside the tank or at a point outside the tank where the line enters or leaves the tank. The valve seat must be located inside the tank or within the welded flange, its companion flange, nozzle, or coupling. Each product discharge opening shall have a secondary closing means, remote from tank filling or discharge openings, for operation in event of fire or other accident. Tanks may have heating coils if an inorganic heating medium is used. Authorized only for sodium perchlorate or magnesium perchlorate, wet, with 10 percent or more of water, equally distributed within the cargo tank. Specification MC 311 and MC 312 also authorized for potassium nitrite solution. Only Specification MC 304 and MC 307 are authorized for transportation by vessel.

[49 FR 2250, Jan. 19, 1984]

(5) Specification 56 (§178.252 of this subchapter). Metal portable tank. Authorized only for flammable solids (including water reactive materials) and dry oxidizer.

(6) Spec. 12B (§178.205 of this chapter). Fiberboard boxes with inside containers which must be metal cans; sliding-lid wooden boxes; fiber cans or boxes, spec. 2G (§178.26 of this chapter), not over 5 pounds capacity each; or glass bottles not over 1 pound capacity each. Packages containing glass containers must not weigh over 65 pounds gross.

(7) Spec. 15A or 15B (§178.168 of 178.169 of this subchapter). Wooden boxes lined, spec. 2F or 2M (§178.35 or 178.31 of this subchapter).

(8) Specification 15A, 15B, 15C, 16A, 19A, or 19B (§178.168, 178.169, 178.170, 178.185, 178.190, 178.191 of this subchapter). Wooden boxes with inside containers.

(9) Specification 21C (§178.224 of this subchapter). Fiber drums. Maximum net weight may not exceed 225 pounds except that a 21C400 fiber drum may have a net weight not exceeding 350 pounds.

(10) Spec. 22A (§178.196 of this subchapter). Plywood drums.

(11) Spec. 22B (§178.197 of this subchapter). Plywood drums with inside metal drums, spec. 2F (§178.25 of this subchapter).

(12) Spec. 12B (§178.205 of this subchapter). Fiberboard boxes constructed of at least 275-pound test double-faced fiberboard and provided with a perimeter liner and bottom pad of at least 300-pound test fiberboard. Boxes constructed of at least 350-pound fiberboard having top and bottom pads shall not require perimeter liner. Product must be contained within a tightly closed polyethylene or other equally efficient plastic bag constructed of material having minimum thickness of 0.004 inch. Not more than 25 pounds net weight of product may be packed in one outside box.

(13) Spec. 12A (§178.210 of this subchapter). Fiberboard boxes with inside glass bottles not over 5 pounds capacity each. Not more than four bottles having capacity of 5 pounds each, shall be

packed in one outside container. Shipper must have established that completed package meets test requirements prescribed by §178.210-10 of this subchapter.

(14) Specification 12B (§178.205 of this subchapter). Fiberboard boxes with inside polyethylene bottles not over 1-gallon capacity each or polyethylene jars not over 9 pints capacity each. Each jar shall contain not more than 10 pounds net weight of product. Not more than four bottles or jars may be packed in one outside container. Authorized only for materials which will not cause decomposition of polyethylene or container failure.

(15) Specification 103, 103W, 111A-60W1, or 111A60F1 (§179.200, 179.201 of this subchapter). Tank cars. Authorized only for sodium perchlorate or magnesium perchlorate wet with 10 percent or more water equally distributed.

(16) Specification 35 (§178.16 of this subchapter) non-reusable, removable head polyethylene drum for use without overpack and not over seven gallons capacity. Authorized only for dry or paste material that will maintain its form to a minimum temperature of 130° F.

(17) Specification 103ALW or 111A60ALW (§179.200, 179.201 of this subchapter). Insulated tank cars designed for operation at temperatures up to 250° F. Authorized only for ammonium nitrate with 15 percent or more water in solution at a maximum temperature of 240° F. Transportation by water is not authorized.

(18) Specification MC 307 or MC 311 (§178.340, 178.342 of this subchapter). Insulated tank motor vehicles designed for operation at temperatures up to 250° F. Authorized only for ammonium nitrate with 15 percent or more water in solution at a maximum temperature of 240° F. Transportation by water is not authorized.

(19) Specification 6D or 37M (§178.102, 178.134 of this subchapter). Cylindrical steel overpacks (non-reusable containers) with inside specification 2S, 2SL, or 2U (§178.35, 178.35a, 178.24 of this subchapter) polyethylene packaging.

(20) As prescribed in §173.163(a)(7). Authorized only for ammonium persulfate, hydrated calcium hypochlorite, potassium persulfate, sodium carbonate peroxide, sodium chlorate, dry, sodium perborate monohydrate and sodium persulfate.

[49 FR 2250, Jan. 19, 1984]

(21) Specification 105A200ALW (§179.100, 179.101 of this subchapter). Tank cars. Authorized only for a mixture of 24 to 26 percent ammonia, 68 to 70 percent ammonium nitrate and 5 to 7 percent water. Transportation by water is not authorized.

¹ The use of existing tanks authorized but new construction not authorized.

(22) Specification 44P (§178.241 of this subchapter). All plastic bags. Authorized only for ammonium persulfate, potassium persulfate, sodium carbonate peroxide, sodium perborate monohydrate and sodium persulfate. Net weight may not exceed 81 pounds.

[49 FR 2250, Jan. 19, 1984]

(23) Specification 44B or 44C (§178.236, 178.237 of this subchapter). Multiwall paper bags. Authorized only for ammonium persulfate, dibasic lead phosphite, potassium persulfate, sodium carbonate peroxide, sodium perborate monohydrate and sodium persulfate.

[49 FR 2250, Jan. 19, 1984]

§173.154a Fuses.

(a) A fusee is a device designed to burn at a controlled rate and to produce visible effects for signaling purposes. It consists of a pasteboard or fiber tube containing a colored flare mixture and with or without a means of support. The composition of the fusee must be such that spontaneous ignition does not occur when the moistened composition is exposed to a temperature of 212° F. for 72 consecutive hours. Fusees must have individual tip, head, or similar ignition point or surface entirely covered and securely protected against accidental contact or friction. Fusees must be securely packed in packages complying with the following specifications:

(1) Specifications 15A, 15B, 15C, 16A, 19A, or 19B (§178.168, 178.169, 178.170, 178.185, 178.190, 178.191 of this subchapter). Wooden boxes having a gross weight not to exceed 150 pounds for specification 19B boxes; 200 pounds for the other boxes. When specification 15C boxes are used, devices must be packed in airtight inside metal receptacles.

(2) Specification 12B (§178.205 of this subchapter) fiberboard boxes. Boxes must have reinforced ends proven to be capable of preventing penetration of spikes through the outside box when a sample package, prepared as for shipment, is subjected to two drops from a height of 4 feet onto a solid surface. The package must be dropped so as to strike diagonally with the spikes in a downward position. Gross weight not to exceed 65 pounds except that gross weight not to exceed 75 pounds is authorized in boxes made in accordance with §173.205-24 of this subchapter.

(3) Specification 29 (§178.226 of this subchapter). Mailing tubes, provided the penetration of the spikes of the fusees through the outside container is prevented by the method specified for fiberboard boxes, specification 12B, in subparagraph (2) of this paragraph. Gross weight not to exceed 5 pounds.

(4) Fusees without spikes when offered for shipment may be packed in packages prescribed in this paragraph.

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