

be packaged in strong outer packagings, unless the receptacles containing the hazardous materials are afforded adequate protection by the construction of the machinery or apparatus. Each package must conform to the packaging requirements of subpart B of this part, except for the requirements in §§ 173.24(a)(1) and 173.27(e), and the following requirements:

(a) If the machinery or apparatus contains more than one hazardous material, the materials must not be capable of reacting dangerously together.

(b) The nature of the containment must be as follows—

(1) Damage to the receptacles containing the hazardous materials during transport is unlikely. However, in the event of damage to the receptacles containing the hazardous materials, no leakage of the hazardous materials from the machinery or apparatus is possible. A leakproof liner may be used to satisfy this requirement.

(2) Receptacles containing hazardous materials must be secured and cushioned so as to prevent their breakage or leakage and so as to control their movement within the machinery or apparatus during normal conditions of transportation. Cushioning material must not react dangerously with the content of the receptacles. Any leakage of the contents must not substantially impair the protective properties of the cushioning material.

(3) Receptacles for gases, their contents and filling densities must conform to the applicable requirements of this subchapter, unless otherwise approved by the Associate Administrator.

(c) The total net quantity of hazardous materials contained in one item of machinery or apparatus must not exceed the following:

(1) 1 kg (2.2 pounds) in the case of solids;

(2) 0.5 L (0.1 gallons) in the case of liquids;

(3) 0.5 kg (1.1 pounds) in the case of Division 2.2 gases. For transportation by aircraft, Division 2.2 gases with subsidiary risks and refrigerated liquefied gases are not authorized; and

(4) A total quantity of not more than the aggregate of that permitted in paragraphs (c)(1) through (c)(3) of this section, for each category of material

in the package, when a package contains hazardous materials in two or more of the categories in paragraphs (c)(1) through (c)(3) of this section.

(d) Except for transportation by aircraft, when a package contains hazardous materials in two or more of the categories listed in paragraphs (c)(1) through (c)(3) of this section the total quantity required by § 172.202(c) of this subchapter to be entered on the shipping paper must be either the aggregate quantity, or the estimated quantity, of all hazardous materials, expressed as net mass.

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**§ 173.223 Packagings for certain flammable solids.**

(a) Packagings for “Musk xylene,” “5-tert-Butyl-2,4,6-trinitro-m-xylene,” “Azodicarbonamide,” or “Isosorbide-5-mononitrate,” when offered for transportation or transported by rail, highway, or vessel, must conform to the general packaging requirements of subpart B of part 173, and to the requirements of part 178 of this subchapter at the Packing Group III performance level and may only be transported in the following packagings:

(1) Fiberboard box (4G) with a single inner plastic bag, and a maximum net mass of not more than 50 kg (110 lbs).

(2) Fiberboard box (4G) or fiber drum (1G), with a plastic inner packaging not exceeding 5 kg (11 lbs), and a maximum net mass of not more than 25 kg (55 lbs).

(3) Fiber drum (1G), and a maximum net mass of not more than 50 kg (110 lbs), that may be fitted with a coating or lining.

(b) [Reserved]

[Doc. No. 2002-13658, 68 FR 45035, July 31, 2003; 75 FR 5394, Feb. 2, 2010]

**§ 173.224 Packaging and control and emergency temperatures for self-reactive materials.**

(a) *General.* When the § 172.101 table of this subchapter specifies that a Division 4.1 material be packaged in accordance with this section, only packagings which conform to the provisions

of this section may be used. Each packaging must conform to the general packaging requirements of subpart B of this part and the applicable requirements of part 178 of this subchapter. Non-bulk packagings must meet Packing Group II performance levels. To avoid unnecessary confinement, metallic non-bulk packagings meeting Packing Group I are not authorized. Self-reactive materials which require temperature control are subject to the provisions of §173.21(f). Packagings required to bear a Class 1 subsidiary label must conform to §§173.60 through 173.62.

(b) *Self-Reactive Materials Table.* The Self-Reactive Materials Table specifies, by technical name, those self-reactive materials that are authorized for transportation and not subject to the approval provisions of §173.124(a)(2)(iii). A self-reactive material identified by technical name in the following table is authorized for transportation only if it conforms to all applicable provisions of the table. The column headings of the Self-Reactive Materials Table are as follows:

(1) *Technical name.* Column 1 specifies the technical name.

(2) *ID number.* Column 2 specifies the identification number which is used to identify the proper shipping name in the §172.101 table.

(3) *Concentration of self-reactive material.* Column 3 specifies the concentra-

tion (percent) limitations, if any, in mixtures or solutions for the self-reactive material. Limitations are given as minimums, maximums, or a range, as appropriate. A range includes the lower and upper limits (i.e., “53–100” means from, and including, 53 percent to, and including 100 percent).

(4) *Packing method.* Column 4 specifies the highest packing method which is authorized for the self-reactive material. A packing method corresponding to a smaller package size may be used, but a packing method corresponding to a larger package size may not be used. The Table of Packing Methods in §173.225(d) defines the packing methods. Bulk packagings for Type F self-reactive substances are authorized by §173.225(f) for IBCs and §173.225(h) for bulk packagings other than IBCs. Additional bulk packagings are authorized if approved by the Associate Administrator.

(5) *Control temperature.* Column 5 specifies the control temperature in °C. Temperatures are specified only when temperature controls are required (see §173.21(f)).

(6) *Emergency temperature.* Column 6 specifies the emergency temperature in °C. Temperatures are specified only when temperature controls are required (see §173.21(f)).

(7) *Notes.* Column 7 specifies other applicable provisions, as set forth in notes following the table.

SELF-REACTIVE MATERIALS TABLE

Self-reactive substance (1)	Identifi- cation No. (2)	Concentration— (%) (3)	Packing method (4)	Control tem- perature—(°C) (5)	Emergency temperature (6)	Notes (7)
Acetone-pyrogallol copolymer 2-diazo-1-naphthol-5-sulphonate.	3228	100 .....	OP8			
Azodicarbonamide formulation type B, temperature controlled.	3232	<100 .....	OP5	.....	.....	1
Azodicarbonamide formulation type C .....	3224	<100 .....	OP6			
Azodicarbonamide formulation type C, temperature controlled.	3234	<100 .....	OP6	.....	.....	1
Azodicarbonamide formulation type D .....	3226	<100 .....	OP7			
Azodicarbonamide formulation type D, temperature controlled.	3236	<100 .....	OP7	.....	.....	1
2,2'-Azodi(2,4-dimethyl-4-methoxyvaleronitrile).	3236	100 .....	OP7	-5 .....	+5.	
2,2'-Azodi(2,4-dimethylvaleronitrile) .....	3236	100 .....	OP7	+10 .....	+15.	
2,2'-Azodi(ethyl 2-methylpropionate) .....	3235	100 .....	OP7	+20 .....	+25.	
1,1-Azodi(hexahydrobenzoxonitrile) .....	3226	100 .....	OP7			
2,2-Azodi(isobutyronitrile) .....	3234	100 .....	OP6	+40 .....	+45.	
2,2'-Azodi(isobutyronitrile) as a water based paste.	3224	≤50 .....	OP6			
2,2-Azodi(2-methylbutyronitrile) .....	3236	100 .....	OP7	+35 .....	+40.	

SELF-REACTIVE MATERIALS TABLE—Continued

Self-reactive substance (1)	Identifi- cation No. (2)	Concentration— (%) (3)	Packing method (4)	Control tem- perature—(°C) (5)	Emergency temperature (6)	Notes (7)
Benzene-1,3-disulphonylhydrazide, as a paste.	3226	52 .....	OP7			
Benzene sulphonylhydrazide .....	3226	100 .....	OP7			
4-(Benzyl(ethyl)amino)-3- ethoxybenzenediazonium zinc chloride.	3226	100 .....	OP7			
4-(Benzyl(methyl)amino)-3- ethoxybenzenediazonium zinc chloride.	3236	100 .....	OP7	+40 .....	+45.	
3-Chloro-4- diethylaminobenzenediazonium zinc chloride.	3226	100 .....	OP7			
2-Diazo-1-Naphthol sulphonic acid ester mixture.	3226	<100 .....	OP7			4
2-Diazo-1-Naphthol-4-sulphonyl chloride	3222	100 .....	OP5			
2-Diazo-1-Naphthol-5-sulphonyl chloride	3222	100 .....	OP5			
2,5-Dibutoxy-4-(4-morpholinyl)-Benzene- diazonium, tetrachlorozincate (2:1).	3228	100 .....	OP8			
2,5-Diethoxy-4- morpholinobenzenediazonium zinc chloride.	3236	67–100 .....	OP7	+35 .....	+40.	
2,5-Diethoxy-4- morpholinobenzenediazonium zinc chloride.	3236	66 .....	OP7	+40 .....	+45.	
2,5-Diethoxy-4- morpholinobenzenediazonium tetrafluoroborate.	3236	100 .....	OP7	+30 .....	+35.	
2,5-Diethoxy-4- (phenylsulphonyl)benzenediazonium zinc chloride.	3236	67 .....	OP7	+40 .....	+45.	
2,5-Diethoxy-4-(4-morpholinyl)-benzene- diazonium sulphate.	3226	100 .....	OP7			
Diethylene glycol bis(allyl carbonate) + Diisopropylperoxydicarbonate.	3237	≥88+≤12 .....	OP8	–10 .....	0.	
2,5-Dimethoxy-4-(4- methylphenylsulphon- y)benzenediazonium zinc chloride.	3236	79 .....	OP7	+40 .....	+45.	
4-Dimethylamino-6-(2- dimethylaminoethoxy)toluene-2-diazo- nium zinc chloride.	3236	100 .....	OP7	+40 .....	+45.	
4-(Dimethylamino)-benzenediazonium trichlorozincate (-1).	3228	100 .....	OP8			
N,N'-Dinitroso-N, N'-dimethyl- terephthalamide, as a paste.	3224	72 .....	OP6			
N,N'-Dinitrosopentamethylenetetramine ..	3224	82 .....	OP6			2
Diphenyloxide-4,4'-disulphonylhydrazide .....	3226	100 .....	OP7			
Diphenyloxide-4,4'-disulphonylhydrazide .....	3226	100 .....	OP7			
4-Dipropylaminobenzenediazonium zinc chloride.	3226	100 .....	OP7			
2-(N,N-Ethoxycarbonylphenylamino)-3- methoxy-4-(N-methyl-N- cyclohexylamino)benzenediazonium zinc chloride.	3236	63–92 .....	OP7	+40 .....	+45.	
2-(N,N-Ethoxycarbonylphenylamino)-3- methoxy-4-(N-methyl-N- cyclohexylamino)benzenediazonium zinc chloride.	3236	62 .....	OP7	+35 .....	+40.	
N-Formyl-2-(nitromethylene)-1,3- perhydrothiazine.	3236	100 .....	OP7	+45 .....	+50.	
2-(2-Hydroxyethoxy)-1-(pyrrolidin-1- yl)benzene-4-diazonium zinc chloride.	3236	100 .....	OP7	+45 .....	+50.	
3-(2-Hydroxyethoxy)-4-(pyrrolidin-1- yl)benzenediazonium zinc chloride.	3236	100 .....	OP7	+40 .....	+45.	
2-(N,N-Methylaminoethylcarbonyl)-4-(3,4- dimethyl-phenylsulphonyl)benzene dia- zonium zinc chloride.	3236	96 .....	OP7	+45 .....	+50.	
4-Methylbenzenesulphonylhydrazide .....	3226	100 .....	OP7			
3-Methyl-4-(pyrrolidin-1- yl)benzenediazonium tetrafluoroborate.	3234	95 .....	OP6	+45 .....	+50.	
4-Nitrosophenol .....	3236	100 .....	OP7	+35 .....	+40.	
Self-reactive liquid, sample .....	3223	.....	OP2			3

SELF-REACTIVE MATERIALS TABLE—Continued

Self-reactive substance (1)	Identifi- cation No. (2)	Concentration— (%) (3)	Packing method (4)	Control tem- perature—(°C) (5)	Emergency temperature (6)	Notes (7)
Self-reactive liquid, sample, temperature control.	3233	.....	OP2	.....	.....	3
Self-reactive solid, sample .....	3224	.....	OP2	.....	.....	3
Self-reactive solid, sample, tempera- ture control.	3234	.....	OP2	.....	.....	3
Sodium 2-diazo-1-naphthol-4-sulphonate	3226	100 .....	OP7			
Sodium 2-diazo-1-naphthol-5-sulphonate	3226	100 .....	OP7			
Tetramine palladium (II) nitrate .....	3234	100 .....	OP6	+30 .....	+35.	

NOTES: 1. The emergency and control temperatures must be determined in accordance with § 173.21(f).  
 2. With a compatible diluent having a boiling point of not less than 150 °C.  
 3. Samples may only be offered for transportation under the provisions of paragraph (c)(3) of this section.  
 4. This entry applies to mixtures of esters of 2-diazo-1-naphthol-4-sulphonic acid and 2-diazo-1-naphthol-5-sulphonic acid.

(c) *New self-reactive materials, formulations and samples.* (1) Except as provided for samples in paragraph (c)(3) of this section, no person may offer, accept for transportation, or transport a self-reactive material which is not identified by technical name in the Self-Reactive Materials Table of this section, or a formulation of one or more self-reactive materials which are identified by technical name in the table, unless the self-reactive material is assigned a generic type and shipping description and is approved by the Associate Administrator under the provisions of § 173.124(a)(2)(iii).

(2) Except as provided by an approval issued under § 173.124(a)(2)(iii), intermediate bulk and bulk packagings are not authorized.

(3) *Samples.* Samples of new self-reactive materials or new formulations of self-reactive materials identified in the Self-Reactive Materials Table in paragraph (b) of this section, for which complete test data are not available, and which are to be transported for further testing or product evaluation, may be assigned an appropriate shipping description for Self-reactive materials Type C, packaged and offered for transportation under the following conditions:

(i) Data available to the person offering the material for transportation must indicate that the sample would pose a level of hazard no greater than that of a self-reactive material Type B and that the control temperature, if any, is sufficiently low to prevent any dangerous decomposition and suffi-

ciently high to prevent any dangerous phase separation;

(ii) The sample must be packaged in accordance with packing method OP2;

(iii) Packages of the self-reactive material may be offered for transportation and transported in a quantity not to exceed 10 kg (22 pounds) per transport vehicle; and

(iv) One of the following shipping descriptions must be assigned:

(A) Self-reactive, liquid, type C, 4.1, UN3223.

(B) Self-reactive, solid, type C, 4.1, UN3224.

(C) Self-reactive, liquid, type C, temperature controlled, 4.1, UN3233.

(D) Self-reactive, solid, type C, temperature controlled, 4.1, UN3234.

[Amdt. 173–241, 59 FR 67511, Dec. 29, 1994, as amended by Amdt. 173–242, 60 FR 26806, May 18, 1995; Amdt. 173–246, 60 FR 49110, Sept. 21, 1995; Amdt. 173–256, 61 FR 51338, Oct. 1, 1996; Amdt. 173–261, 62 FR 24734, 24735, May 6, 1997; 62 FR 45702, Aug. 28, 1997; 64 FR 10779, Mar. 5, 1999; 65 FR 58630, Sept. 29, 2000; 66 FR 33431, June 21, 2001; 66 FR 45379, Aug. 28, 2001; 68 FR 45035, July 31, 2003; 69 FR 76159, Dec. 20, 2004; 71 FR 78633, Dec. 29, 2006]

**§ 173.225 Packaging requirements and other provisions for organic peroxides.**

(a) *General.* When the § 172.101 table specifies that an organic peroxide must be packaged under this section, the organic peroxide must be packaged and offered for transportation in accordance with the provisions of this section. Each packaging must conform to the general requirements of subpart B