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MAINTENANCE

§ 153.1500 Venting system rupture disks.

The master shall ensure that a relief valve exposed to a cargo after the failure of a rupture disk or breaking pin is cleaned and operates properly before the next cargo is loaded into the tank.

§ 153.1502 Fixed ballast relocation.

No person may remove or relocate fixed ballast unless:

(a) The change is approved by the Commandant (G–MSO); or

(b) The ballast is temporarily moved under the supervision of a Coast Guard Marine Inspector for examination or repair of the tankship.

[CGD 73–96, 42 FR 49027, Sept. 26, 1977, as amended by CGD 82–063b, 48 FR 4782, Feb. 3, 1983]

§ 153.1504 Inspection of personnel emergency and safety equipment.

The master shall ensure that the personnel emergency and safety equipment required by § 153.214 is inspected each 30 days and found to be in good condition and operating properly.

Subpart D—Test and Calculation Procedures for Determining Stripping Quantity, Clingage NLS Residue, and Total NLS Residue

SOURCE: CGD 81–101, 52 FR 7788, Mar. 12, 1987, unless otherwise noted.

§ 153.1600 Equipment required for conducting the stripping quantity test.

The operator shall ensure the stripping quantity test is conducted with—

(a) Equipment that maintains a backpressure of at least 100 kPa (1 atm) (gauge) at the connection of the discharge line of the tank to be tested to the cargo transfer hose, including, but not limited to, piping whose discharge is 10 m above the manifold or a constant pressure valve in the discharge line and set at 100 kPa;

(b) A container for measuring the volume of water remaining in the tank to an accuracy of ± 5%;

(c) A squeegee or broom to collect standing water on the tank floor;

(d) One or more containers for collecting and transferring water; and

(e) One of the following for transferring the water remaining in the tank to the measuring container:

(1) A wet vacuum.

(2) A positive displacement pump.

(3) An eductor with an air/water separator in line.

§ 153.1602 Test procedure for determining the strippinq quantity.

(a) The stripping quantity of a tank must be determined by testing the tank under the procedures in paragraph (b) of this section unless the Coast Guard agrees under the provisions of § 153.10 to accept the stripping quantity, previously determined under paragraph (b) of this section, of a tank having similar geometry, internal structure, and piping system.

(b) When testing a tank for stripping quantity, the owner or operator of the ship shall proceed as follows:

(1) Make arrangements with the Officer in Charge, Marine Inspection, for a Coast Guard Marine Inspector to witness the stripping test.

(2) Clean and gas free the tanks to be tested.

(3) Determine the least favorable values of list and trim for drainage within the range allowed by the approved Procedures and Arrangements Manual.

(4) Maintain the ship's list and trim during the test to that determined under paragraph (b)(3) of this section.

(5) Load the tank with enough water so that unloading the water simulates the final stages of unloading a full tank of cargo.

(6) Pump out the water and strip the tank using the procedures specified in the approved Procedures and Arrangements Manual.

(7) After shutting the manifold valve, open any cargo pump foot valve to allow water trapped in the cargo pump to drain into the tank.

(8) Open all valves in the piping system except the manifold valve and allow the water to drain into the tank.

(9) Squeegee or sweep the water drained under paragraphs (b)(7) and (b)(8) of this section and any water that stands in puddles on the tank floor to the tank's low point or sump and collect in the container required

by §153.1600(b) using the equipment required in §153.1600(e).

(10) With the manifold valve still closed, drain any water remaining in the piping system on the ship's side of the cargo transfer manifold valve into containers, and add this water to that collected from the tank under paragraph (b)(9) of this section. Water collected from a cargo line serving a block of tanks may be prorated between all the tanks it serves if—

(i) The ship owner requests, under the provisions of §153.10, that the water be prorated; and

(ii) The ship's approved Procedures and Arrangements Manual specifies that no tank in the block be washed until all the tanks in the block have been discharged.

(c) Include any water that is trapped in dead end pipe sections, either by—

(1) Draining the pipe sections and adding the water to that collected in the container under paragraphs (b)(9) and (b)(10) of this section; or

(2) Adding an estimate of the water's volume to the sum calculated in paragraph (d) of this section using the pipe's dimensions, the ship's list and trim, and the geometry of the piping system.

(d) Measure the volume of water collected in the container under paragraphs (b)(9), (b)(10), and (c)(1) of this section and add to that volume the volume, if any, estimated under paragraph (c)(2) of this section.

§153.1604 Determining the stripping quantity from the test results.

(a) For a single test, the stripping quantity is the volume of water calculated under §153.1602(d).

(b) If multiple tests are made on a tank without modifications to the tank, pumping system, or stripping procedure between the tests, the stripping quantity must be taken as the average of the stripping quantities for all of the tests.

(c) If multiple tests are made on a tank with modifications to the tank, pumping system, or stripping procedure between the tests, the stripping quantity is the stripping quantity determined under paragraph (b) of this section using only those tests performed after the last modification.

§153.1608 Calculation of total NLS residue and clingage NLS residue.

(a) The total NLS residue for each tank is calculated by adding the stripping quantity and the clingage NLS residue.

(b) The clingage NLS residue for each tank is calculated using the following formula:

$$Q_{clingage} = 1.1\times10^{-4}\ A_d + 1.5\times10^{-5}\ A_w + 4.5\times10^{-4}\ L^{1/2}\ A_b$$

where:

A_b = Area of the tank bottom added to the area in square meters of tank structural components projected on a horizontal surface

A_d = Area of the tank underdecks added to the area in square meters of tank structural components projected on a horizontal surface

A_w = Area of the tank walls added to the area in square meters of tank structural components projected on a vertical surface

L = Length of tank in meters from fore to aft

$Q_{clingage}$ = volume of clingage in cubic meters

When using the formula in this paragraph, areas that are inclined more than 30° from the horizontal may be assumed to be vertical.

NOTE: The Commandant (G–MSO) (tel num;202–267–1217) has information that may be useful in approximating surface areas of typical structural members for the projected area calculations under §153.1608(b).

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Acetic acid	D	S	III	4m	PV	Restr	A	.238(a), **.409**, .527, .554	I–D
Acetic anhydride	D	S	II	4m	PV	Restr	A	.238(a), **.409** .526, .527, .554	I–D
Acetochlor	A	P	II	NR	Open	Open	A	.409	NA
Acetone cyanohydrin	A	S/P	II	B/3	PV	Closed	A	.238(a), .316, .336, .408, .525, .526, .527, .912(a)(2), .933, .1002, .1004, .1020, .1035.	I–D
Acetonitrile	III	S	II	B/3	PV	Restr	A	**.409**, 525, .526, .1020	I–D
Acrylamide solution (50% or less)	D	S	II	NR	Open	Closed	NSR	.409, .525(a), (c), (d), (e), .912(a)(1), .1002(a), .1004, .1020.	NA
•Acrylic acid	D	S	III	4m	PV	Restr	A	.238(a), **.409**, .526, .912(a)(1), **.933**, .1002(a), .1004	I–D
Acrylonitrile	B	S/P	II	B/3	PV	Closed	A	.236(a), (c), (d), .316, .408, .525, .526, .527, .912(a)(1), .1004, .1020.	I–D
Adiponitrile	D	S	III	4m	PV	Restr	A	.526	I–D
Alachlor technical (90% or more)	B	S/P	III	NR	Open	Open	A, C	.238(a), .409, .440, .488, .908(a), (b)	NA
Alcohol (C6–C17) (secondary) poly(3–6)ethoxylates.	A	P	II	NR	Open	Open	A	.409	NA
Alcohol (C6–C17) (secondary) poly(7–12)-ethoxylates.	B	P	III	NR	Open	Open	A	.409, .440, .908(a), (b)	NA
•Alcohol(C12–C15) poly(1–3)ethoxylates, *see* **Alcohol(C12–C15) poly(1–6)ethoxylates**.									
•Alcohol(C12–C15) poly(3–11)ethoxylates, *see* **Alcohol(C12–C15) poly(1–6)** *or* **poly(7–19)ethoxylates**.									
Alcohol(C12–C15) poly(1–6)ethoxylates	A	P	II	NR	Open	Open	A	.409	NA
Alcohol(C12–C15) poly(7–19)ethoxylates	B	P	III	NR	Open	Open	A	.409, **.440**, .908(a)	NA
Alcohol(C12–C15) poly(20+)ethoxylates	C	P	III	NR	Open	Open	A	None	NA
Alkanes(C6–C9) (*all isomers*)	C	P	III	4m	PV	Restr	A	.409	I–D
Alkane(C14–C17) sulfonic acid, sodium salt solution (65% or less).	B	P	III	NR	Open	Open	NSR	.440, .908(a)	NA
Alkaryl polyether (C9–C20)	B	P	III	NR	Open	Open	A, B	.409; (**.440, .908(a)**) [1]	NA
Alkyl acrylate-Vinyl pyridine copolymer in Toluene.	C	P	III	4m	PV	Restr	A	.409	NA
Alkyl(C3–C4)benzenes (*all isomers*)	A	P	III	4m	PV	Restr	A	.409	I–D
Alkyl(C5–C8)benzenes (*all isomers*)	A	P	II	NR	Open	Open	A	.409	I–D
•**Alkylbenzene, Alkylindane, Alkylindene mixture (each C12–C17)**.	A	P	II	NR	Open	Open	A	.409	NA
Alkylbenzenesulfonic acid *(greater than 4%)*.	C	S/P	III	NR	Open	Open	A, B	.440, .908(a)	NA
Alkylbenzenesulfonic acid, sodium salt solution.	C	P	III	NR	Open	Open	NSR	.440, .903, .908(a), (b)	NA
Alkyl(C7–C9) nitrates	A	S/P	II	NR	Open	Open	A, B	.409, .560, .1002	NA

Alkyl (C7-C12) phenol poly(4-12) ethoxylate.	B	P	III	NR	Open	Open	A	.409, .440, .488[1], .908 (a), (b)	I–D
Allyl alcohol	B	S/P	II	B/3	PV	Closed	A	.316, .408, .525, .526, .527, .933, .1020	I–C
Allyl chloride	B	S/P	II	B/3	PV	Closed	A	.316, .408, .525, .526, .527, .1020	I–D
Aluminum chloride (30% or less), Hydrochloric acid (20% or less) solution.	D	S	III	4m	PV	Restr	NSR	.252, .526, .527, .554, .557, .933, .1045, .1052	I–B
2-(2-Aminoethoxy) ethanol	D	S	III	NR	Open	Open	A, C, D	.236(b), (c), .409	NA
Aminoethylethanolamine	D	S	III	NR	Open	Open	A	.236(a), (b), (c), (g)	NA
N-Aminoethylpiperazine	D	S	III	4m	PV	Restr	A	.236(b), (c), .409, .526	I–C
2-Amino-2-methyl-1-propanol (90% or less).	D	S	III	NR	Open	Open	A	.236(a), (b), (c), (g)	I–D
Ammonia aqueous (28% or less), *see* Ammonium hydroxide (28% or less NH_3).									
Ammonium bisulfite solution (70% or less).	D	S	III	4m	PV	Restr	No	.238(e), .933, .1002	NA
Ammonium hydroxide (28% or less NH_3)	C	S/P	III	4m	PV	Restr	A, B, C	.236(b), (c), (f), .526, .527	I–D
Ammonium nitrate solution (greater than 45% and less than 93%).	D	S	II	NR	Open	Open	NSR	.238(d), .252, .336, .409, .554(a), (b)	NA
•Ammonium sulfide solution (45% or less).	**C**	S/P	II	B/3	PV	Closed	A, C	**.236(a), (b), (c), (g), .316, .408, .525, .526, .527, .933, .1002, .1020**.	I–D
Ammonium thiocyanate (25% or less), Ammonium thiosulfate (20% or less) solution.	C	P	III	NR	Open	Open	NSR	None	NA
Ammonium thiosulfate solution (60% or less).	C	P	III	NR	Open	Open	NSR	.440, .908(b)	NA
•(commercial, iso-, n-, sec-) Amyl acetate, *see* **Amyl acetate (all isomers)**.									
Amyl acetate (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Aniline	C	S/P	II	B/3	PV	Closed	A	.316, .408, .525, .526, .933, .1020	I–D
Anthracene oil (Coal tar fraction), *see* Coal tar.									
Aviation alkylates *(C8 paraffins and isoparaffins, b. pt. 95–120 deg. C).*	C	P	III	4m	PV	Restr	B	.409	I–C
Barium long chain alkaryl sulfonate (C11–C50).	[B]	P	III	NR	Open	Open	A	.409; (.440, .903, .908(a))[1]	NA
Barium long chain alkyl (C8–C14) phenate sulfide.	[A]	P	II	NR	Open	Open	A	.409	NA
Benzene hydrocarbon mixtures[2] *(having 10% Benzene or more).*	C[2]	S/P	III	B/3	PV	**Closed**	A,B	.316, **.409**, .440, .526, .908(b), .933, .1060	I–D
Benzenesulfonyl chloride	D	S	III	4m	PV	Restr	A, B, D	.236(a), (b), (c), (g), .409, .526	I–D
Benzene, Toluene, Xylene mixtures[2] *(having 10% Benzene or more).*	@C[2]	S/P	III	B/3	PV	**Closed**	B	.316, **.409** .440, .526, .908(b), .1060	I–D
Benzyl acetate	C	P	III	NR	Open	Open	A	None	I–D
Benzyl alcohol	C	P	III	NR	Open	Open	A	None	I–D
Benzyl chloride	B	S/P	II	B/3	PV	Closed	A, B	.316, .408, .525, .526, .527, .912(a)(2), .1004, .1020	I–D
Bromochloromethane	D	S	III	4m	PV	Restr	No	.236 (a), (b), (d), .526, .933	NA
Butene oligomer	B	P	III	NR	Open	Open	A	**.409**	NA
(iso-, n-) Butyl acetate, *see* **Butyl acetate (all isomers)**.									

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Butyl acetate (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
(iso-, n-) Butyl acrylate, *see* **Butyl acrylate (all isomers)**.									
Butyl acrylate (all isomers)	**B**	S/P	II	4m	PV	Restr	A	.409, .526, .912(a)(1), .1002(a), (b), .1004	I–D7
Butylamine (all isomers)	C	S/P	II	B/3	PV	Restr	A	.236(b), (c), .316, .408, .525, .526, .527, .1020	I–D
Butylbenzene (all isomers)	A	P	III	4m	PV	Restr	A	.409	I–D
Butyl benzyl phthalate	A	P	II	NR	Open	Open	A	.409	I–D
n-Butyl butyrate, *see* **Butyl butyrate (all isomers)**.									
Butyl butyrate (all isomers)	**B**	P	III	4m	PV	Restr	A	.409	I–D
1,2-Butylene oxide	C	S/P	III	4m	PV	Restr	A, C	.372, .409, .440, .500, .526, .530(a), (c), (e)–(g), (m)–(o), .1010, .1011.	I–B
n-Butyl ether	C	S/P	III	B/3	PV	Restr	A, D	**.409**, .500, .525, .526, .1020	I–C
Butyl heptyl ketone	[C]	P	III	NR	Open	Open	A	None	NA
iso-Butyl isobutyrate, *see* **Butyl butyrate (all isomers)**.									
Butyl methacrylate	D	S	III	4m	PV	Restr	A, D	**.409**, .526, .912(a)(1), .1002(a), (b), .1004	I–D
Butyl methacrylate, Decyl methacrylate, Cetyl-Eicosyl methacrylate mixture.	D	S	III	4m	PV	Restr	A, C, D	.912(a)(1), .1002(a), (b), .1004	I–D
n–Butyl propionate	C	P	III	4m	PV	Restr	A	.409	I–D
Butyl toluene	@A	P	II	NR	Open	Open	A	.409	I–D
•iso-Butyraldehyde, *see* **Butyraldehyde (all isomers)**.									
•n-Butyraldehyde, *see* **Butyraldehyde (all isomers)**.									
Butyraldehyde (all isomers)	**C**	S/P	III	4m	PV	**Restr**	A	**.409,** .526	I–C
Butyric acid	D	S	III	4m	PV	Restr	A	.238(a), .554	I–D
Calcium alkyl(C9)phenol sulfide, polyolefin phosphorosulfide mixture.	A	P	II	NR	Open	Open	A, B	.409	NA
•Calcium alkyl salicylate, *see* **Calcium long chain alkyl salicylate (C13+)**.									
•*Calcium bromide, Zinc bromide solution, see* Drilling brine (containing Zinc salts).									
Calcium hypochlorite solution (15% or less).	C	S/P	III	4m	PV	Restr	NSR	**.236(a), (b)**	NA
Calcium hypochlorite solution (more than 15%).	B	S/P	III	4m	PV	Restr	NSR	**.236 (a), (b), .409**	NA
Calcium long chain alkyl salicylate (C13+).	C	P	III	NR	Open	Open	A, B	(.440, .903, .908(a))[1]	NA

Camphor oil	B	S/P	II	4m	PV	Restr	A, B	.409	I–D
Carbolic oil	A	S/P	II	B/3	PV	Closed	A	.408, .440, .525, .526, .908(b), .933, .1020	NA
Carbon disulfide	B	S/P	II	B/3	PV	Closed	C	.236(c), .252, .408, .500, .515, .520, .525, .526, .527, .1020, .1040.	I–A
Carbon tetrachloride	B	S/P	III	B/3	PV	Closed	NSR	.316, .409, .525, .526, .527, .1020	NA
Cashew nut shell oil (untreated)	D	S	III	4m	PV	Restr	A, B	.526, .933	NA
•Caustic potash solution	**D**	**S**	III	NR	Open	Open	NSR	**.236(a), (c), (g), .933**	NA
Caustic soda solution	D	S	III	NR	Open	Open	NSR	.236(a), (c), (g), .933	NA
Cetyl-Eicosyl methacrylate mixture	III	S	III	NR	Open	Open	A, C, D	.912(a)(1), .1002(a), (b), .1004	NA
Chlorinated paraffins (C10–C13)	A	P	I	NR	Open	Open	A	.408	NA
Chloroacetic acid (80% or less)	C	S/P	II	B/3	PV	Closed	NSR	.238(e), .408, .440, .554, .908(b)	I–D
•Chlorobenzene	B	S/P	**III**	4m	PV	Restr	A, B	.409, .526	I–D
Chloroform	B	S/P	III	B/3	PV	Restr	NSR	.409, .525, .526, .527, .1020	NA
(crude) Chlorohydrins	D	S	II	B/3	PV	Closed	A	.408, .525, .526, .1020	I–D
•4-Chloro-2-methylphenoxyacetic acid, dimethylamine salt solution.	**C**	P	III	NR	Open	Open	NSR	.236(a), (b), (c), (g)	NA
•o-Chloronitrobenzene	B	S/P	II	B/3	PV	Closed	A, B, C, D	.316, .336, .408, .440, .525, .526, .908(a), (b), **.933**, .1020.	NA
2- or 3-Chloropropionic acid	C	S/P	III	NR	Open	Open	A	.238(a), (b), .440, .554, .908(a), (b)	NA
Chlorosulfonic acid	C	S/P	I	B/3	PV	Closed	NSR	.408, .525, .526, .527, .554, .555, .602, .933, .1000, .1020, .1045.	I–B
o-Chlorotoluene	A	S/P	III	4m	PV	Restr	A, B, C	.409, .526	I–D
m-Chlorotoluene	B	S/P	III	4m	PV	Restr	A, B, C	.409, .526	I–D
p-Chlorotoluene	B	S/P	II	4m	PV	Restr	A, B, C	.409, .440, .526, .908(b)	I–D
Chlorotoluenes (mixed isomers)	A	S/P	II	4m	PV	Restr	A, B, C	.409, .526	I–D
Coal tar	A	S/P	II	4m	PV	Restr	B, D	.409, .933, .1060	I–D
Coal tar naphtha solvent	B	S/P	III	4m	PV	Restr	A, D	.409, .526, .933, .1060	I–D
Coal tar pitch (molten)	D	S	III	4m	PV	Restr	B, D	.252, .409, .933, .1060	I–D
Cobalt naphthenate in solvent naphtha	A	S/P	II	4m	PV	Restr	A, D	.409, .526	I–D
Coconut oil, fatty acid	C	P	III	NR	Open	Open	A	.440, .903, .908(a), (b)	NA
Cottonseed oil, fatty acid	[C]	P	III	NR	Open	Open	A	.440, .903, .908(a)	NA
Creosote (coal tar)	A	S/P	II	NR	Open	Open	A, B, D	.409	I–D
Creosote (wood)	A	S/P	II	NR	Open	Open	A, B, D	.409	NA
Cresols (all isomers)	A	S/P	II	NR	Open	Open	A, B	.409, .440, .908(b)	I–D
Cresols with less than 5% Phenol, see Cresols (all isomers)									
Cresols with 5% or more Phenol, see Phenol									
Cresylate spent caustic *(mixtures of Cresols and Caustic soda solutions).*	A	S/P	II	NR	Open	Open	NSR	.236(a), (c), **.409**, .933	NA
Cresylic acid, dephenolized	A	S/P	II	NR	Open	Open	A, B	.409	NA
Cresylic acid, sodium salt solution, *see* Cresylate spent caustic.									
Crotonaldehyde	**A**	S/P	II	B/3	PV	Restr	A	.316, .409, .525, .526, .527, .1020	I–C
Cumene *(isopropylbenzene), see* **Propylbenzene (all isomers)**.									
•1,5,9-Cyclododecatriene	**A**	S/P	**I**	4m	PV	Restr	A	.236(b), (c), **.408**, .526, .912(a)(1), .1002(a), (b), .1004.	I–D
Cycloheptane	C	P	III	4m	PV	Restr	A	.409	I–D
Cyclohexane	C	P	III	4m	PV	Restr	A	.409, .440, .908(b)	I–D

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Cyclohexanone	D	S	III	4m	PV	Restr	A	.236(a), (b), **.409,** .526	I–D
•Cyclohexanone, Cyclohexanol mixture	**D**	**S**	III	4m	PV	Restr	A	.236(a), (b), .526	I–D
Cyclohexyl acetate	B	P	III	4m	PV	Restr	A	.409	I–D
Cyclohexylamine	C	S/P	III	4m	PV	Restr	A, C, D	.236(a), (b), (c), (g), **.409**, .526	I–D
1,3-Cyclopentadiene dimer (molten)	B	P	II	4m	PV	Restr	A	.409, .440, .488, .908(a), (b)	I–C
Cyclopentane	C	P	III	4m	PV	Restr	A	.409	I–D
Cyclopentene	B	P	III	4m	PV	Restr	A	.409	I–D
p-Cymene	C	P	III	4m	PV	Restr	A	.409	I–D
iso-Decaldehyde	@C	P	III	NR	Open	Open	A	None	I–C
n-Decaldehyde	@B	P	III	NR	Open	Open	A	None	I–C
Decanoic acid	C	P	III	NR	Open	Open	A	.440, .903, .908(a), (b)	NA
Decene	B	P	III	4m	PV	Restr	A	.409	I–D
Decyl acetate	B	P	III	NR	Open	Open	A	.409	NA
(iso-, n-) Decyl acrylate	A	S/P	II	NR	Open	Open	A, C, D	.236(a), (b), (c), .409, .912(a)(1), .1002(a), (b), .1004	I–D
Decyl alcohol (all isomers)	B	P	III	NR	Open	Open	A	.409, .440, .908(b)	I–D
Decyloxytetrahydro-thiophene dioxide	A	S/P	II	B/3	PV	Restr	A	.409, **.526**	NA
Dibromomethane	C	S/P	II	4m	PV	Restr	No	.236 (a), (b), (d), .408, .525 (a), (c), (d), (e), .526, .933, .1020.	NA
Dibutylamine	C	S/P	III	4m	PV	Restr	A, B, C, D	.236(b), (c), **.409**, .526	I–C
Dibutyl hydrogen phosphonate	B	P	III	NR	Open	Open	A	.409, .440, .908(a)	NA
•*ortho*-Dibutyl phthalate	A	P	II	NR	Open	Open	A	.409	I–D
•Dichlorobenzene (all isomers)[1]	**B**	**S/P**	II	4m	PV	Restr	A, B, D	.236(a), (b), .409, .440, .488[1], .526, .908(a), (b)[1]	I–D
3,4-Dichloro-1-butene	B	S/P	III	B/3	PV	Closed	A, B, C	.316, .409, .525 (a), (c), (d), (e), .526, .527, .933, .1020.	I–D
•1,1-Dichloroethane	**D**	S	III	4m	PV	Restr	A, B	.409, .526, .527	I–D
2,2'-Dichloroethyl ether	B	S/P	II	4m	PV	Restr	A	.236(a), (b), .409, .526	I–C
1,6–Dichlorohexane	B	S/P	II	4m	PV	Restr	A, B	.409, .526	NA
2,2'-Dichloroisopropyl ether	C	S/P	II	B/3	PV	Restr	A, B, C, D	.236(a), (b), .316, .408(a), .440, .525, .526, .1020	I–D
Dichloromethane	D	S	III	4m	PV	Restr	NSR	.526	I–D
2,4-Dichlorophenol[4]	A	S/P	II	4m	PV	Restr	A, B, C, D	.236(a), (b), (c), (g), .409, .440, .500, .501, .526, .908(b), .933.	I–D
2,4-Dichlorophenoxyacetic acid, diethanolamine salt solution.	A	S/P	III	NR	Open	Open	NSR	**.236(a), (b), (c), (g), .409**	NA
2,4-Dichlorophenoxyacetic acid, dimethylamine salt solution.	A	S/P	III	NR	Open	Open	NSR	**.236(a), (b), (c), (g),** .409	NA
2,4-Dichlorophenoxyacetic acid, triisopropanolamine salt solution.	A	S/P	III	NR	Open	Open	NSR	**.236(a), (b), (c), (g),** .409	NA

•1,1-, 1,2-, or 1,3-Dichloropropane, *see individual entries.*									
1,1-Dichloropropane	**C**	S/P	II	B/3	PV	Restr	A, B	**.409,** .525, .526, .1020	I–D
1,2-Dichloropropane	**C**	S/P	II	B/3	PV	Restr	A, B	**.409,** .525, .526, .1020	I–D
1,3-Dichloropropane	**D**	S	II	B/3	PV	Restr	A, B	**.409,** .525, .526, .1020	I–D
1,3-Dichloropropene	B	S/P	II	B/3	PV	Closed	A, B	.316, .336, .408, .525, .526, .527, .1020	I–D
Dichloropropene, Dichloropropane mixtures.	B	S/P	II	B/3	PV	Closed	A, B, C, D	.316, .336, .408, .526, .527	I–D
•2,2-Dichloropropionic acid	D	S	III	4m	PV	Restr	A	.238(e), .266, .500, .501, .554, **.933**	NA
Diethanolamine	**D**	S	III	NR	Open	Open	A	.236(b), (c)	NA
Diethylamine	C	S/P	III	B/3	PV	Restr	A	.236(a), (b), (c), (g), **.409,** .525, .526, .527, .1020	I–C
Diethylaminoethanol, *see* Diethylethanolamine									
•2,6-Diethylaniline	**C**	S/P	III	NR	Open	Open	B, C, D	.236(b), .409, .440, .908(b)	NA
Diethylbenzene	**A**	P	III	4m	PV	Restr	A	.409	I–D
Diethylenetriamine	D	S	III	NR	Open	Open	A	.236(b), (c)	NA
Diethylethanolamine	C	S/P	III	4m	PV	Restr	A, C	.236(a), (b), (c), (g), **.409**, .526	I–C
Diethyl ether, *see* Ethyl ether									
Di-(2-ethylhexyl) phosphoric acid	C	S/P	III	NR	Open	Open	A, B, C, D	.236(b), (c)	I–D
Diethyl phthalate	C	P	III	NR	Open	Open	A	None	I–D
Diethyl sulfate	B	S/P	II	4m	PV	Closed	A, D	.236(a), (c), (d), **.409,** .526	I–D
Diglycidyl ether of Bisphenol A	B	P	III	NR	Open	Open	A	.409, .440, .908(a)	NA
Diglycidyl ether of Bisphenol F	B	P	III	NR	Open	Open	A	.409, .440, .908(a)	NA
Di-n-hexyl adipate	B	P	III	NR	Open	Open	A	.409	NA
Diisobutylamine	C	S/P	II	4m	PV	Restr	A, B, C, D	.236(a), (b), (c), (g), .409, .525(a), (c), (d), (e), .526, .1020.	I–C
Diisobutylcarbinol	@C	P	III	NR	Open	Open	A	None	I–D
Diisobutylene	B	P	III	4m	PV	Restr	A	.409	I–D
Diisobutyl phthalate	B	P	III	NR	Open	Open	A	.409, .440, .908(a)	I–D
Diisopropanolamine	C	S/P	III	NR	Open	Open	A	.236(b), (c), .440, .908(a), (b)	I–D
Diisopropylamine	C	S/P	II	B/3	PV	Closed	A	.236(b), (c), .408, .525, .526, .527, .1020	I–C
Diisopropylbenzene (all isomers)	A	P	II	NR	Open	Open	A	.409	I–D
N,N-Dimethylacetamide	D	S	III	B/3	PV	Restr	B	.236(b), .316, .525, .526, .527, .1020	I–D
N,N-Dimethylacetamide solution (40% or less).	D	S	III	B/3	PV	Restr	B	.236(b), .316, .526	I–D
Dimethyl adipate	B	P	III	NR	Open	Open	A	.409, .440, .908(b)	NA
Dimethylamine solution (45% or less)	C	S/P	III	B/3	PV	Restr	A, C, D	.236(a), (b), (c), (g), **.409** .525, .526, .527, .1020	I–C
Dimethylamine solution (over 45% but not over 55%).	C	S/P	II	B/3	PV	Closed	A, C, D	.236(a), (b), (c), (g), .316, .408, .525, .526, .527, .1020.	I–C
Dimethylamine solution (over 55% but not over 65%).	C	S/P	II	B/3	PV	Closed	A, C, D	.236(a), (b), (c), (g), .316, .372, .408, .525, .526, .527, .1020.	I–C
2,6-Dimethylaniline	[C]	S/P	III	NR	Open	Open	B, C, D	.236(b), .409, .440, .908(b)	I–D
N,N-Dimethylcyclohexylamine	C	S/P	II	B/3	PV	Restr	A, C	.236(a), (b), (c), (g), .316, .409, .525, .526, .527, .1020.	NA
Dimethylethanolamine	D	S	III	4m	PV	Restr	A, D	.236(b), (c), **.409**, .526	I–C
Dimethylformamide	D	S	III	4m	PV	Restr	A, D	.236(b), **.409**, .526	I–D
Dimethyl glutarate	C	P	III	NR	Open	Open	A	None	NA
•Dimethyl hydrogen phosphite	**B**	**S/P**	III	4m	PV	Restr	A, D	.526	NA
Dimethyl naphthalene sulfonic acid, sodium salt solution.	[A]	P	III	NR	Open	Open	NSR	**.409**	NA

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Dimethyloctanoic acid	C	P	III	NR	Open	Open	A	.440, .903, .908(b)	I–D
Dimethyl phthalate	C	P	III	NR	Open	Open	A	None	I–D
Dimethyl succinate	C	P	III	NR	Open	Open	A	.440, .908(b)	NA
Dinitrotoluene (molten)	A	S/P	II	B/3	PV	Closed	A	.316, .408, .525, .526, .527, .1003, .1020,	I–C
1,4-Dioxane	D	S	II	B/3	PV	Closed	A	.408, .525, .526, .1020	I–C
Dipentene	C	P	III	4m	PV	Restr	A	.409	I–D
Diphenyl	A	P	I	NR	Open	Open	B	.408	I–D
Diphenylamines, alkylated	A	P	II	NR	Open	Open	A	.409	NA
Diphenylamine, reaction product with 2,2,4–Trimethylpentene.	A	S/P	I	NR	Open	Open	A	.408	NA
Diphenyl, Diphenyl ether mixtures	A	P	I	NR	Open	Open	B	.408	I–D
Diphenyl ether	A	P	III	NR	Open	Open	A	.409	I–D
Diphenyl ether, Biphenyl phenyl ether mixture.	A	P	III	NR	Open	Open	A, B	.409	NA
Diphenylmethane diisocyanate[6]	B	S/P	II	B/3	PV	Closed	A, B, C[6], D	.236(a), (b), .316, .409, .440, .500, .501, .525, .526, .602, .908(a), .1000, .1020.	NA
Diphenylol propane-epichlorohydrin resins.	B	P	III	NR	Open	Open	A, B	**.409**, .440, .908(a)	NA
Di-n-propylamine	C	S/P	III	4m	PV	Restr	A	.236(b), (c), .409, .525, .526, .1020	I–C
Dodecanol	B	P	III	NR	Open	Open	A	.409, .440, .488, .908(a), (b)	I–D
Dodecene (all isomers)	B	P	III	NR	Open	Open	A	.409	I–D
Dodecyl alcohol, *see* Dodecanol									
•Dodecylamine, Tetradecylamine mixture	**A**	S/P	**II**	4m	PV	Restr	A, D	**.236(b), (c), .409** .526	NA
Dodecyldimethylamine, Tetradecyldimethylamine mixture.	A	S/P	II	NR	Open	Open	B, C, D	.236(b), .409	NA
Dodecyl diphenyl ether disulfonate solution.	**A**	S/P	**II**	NR	Open	Open	NSR	.409	NA
Dodecyl hydroxypropyl sulfide	[A]	P	II	NR	Open	Open	A	.409	NA
Dodecyl methacrylate	III	S	III	NR	Open	Open	A, C	.236(b), (c), .912(a)(1), .1004	I–D
Dodecyl-Pentadecyl methacrylate mixture.	III	S	III	NR	Open	Open	A, C, D	.912(a)(1), .1002(a), (b), .1004	NA
Dodecyl phenol	A	P	I	NR	Open	Open	A	.408	I–D
•Drilling brine (containing Zinc salts)	**B**	P	**III**	NR	Open	Open	NSR	.409	NA
Epichlorohydrin	**A**	S/P	II	B/3	PV	Closed	A	.316, .408, .525, .526, .527, .1020	I–C
Ethanolamine	D	S	III	NR	Open	Open	A	.236(b), (c), .526	I–D
2-Ethoxyethyl acetate	C	P	III	4m	PV	Restr	A	.409	I–C
Ethyl acrylate	A	S/P	II	4m	PV	Restr	A	.409, .526, .527, .912(a)(1), .1002(a), (b), .1004	I–D
Ethylamine	C	S/P	II	B/3	PV	Closed	C, D	.236(b), (c), .252, .372, **.409,** .525, .526, .527, .1020	I–D
Ethylamine solution (72% or less)	C	S/P	II	B/3	PV	Closed	A, C	.236(a), (b), (c), (g), .372, .408, .525(a), (c), (d), (e), .526, .527, .1020.	I–D

Ethyl amyl ketone	C	P	III	4m	PV	Restr	A	.409	I–D
Ethylbenzene	**B**	P	III	4m	PV	Restr	A	.409	I–D
N-Ethylbutylamine	C	S/P	III	4m	PV	Restr	A	.236(a), (b), (c), (g), .409, .525(a), (c), (d), (e), .526, .1020.	I–C
Ethyl butyrate	C	P	III	4m	PV	Restr	A	.409	I–D
Ethylcyclohexane	C	P	III	4m	PV	Restr	A	.409	I–D
N–Ethylcyclohexylamine	D	S	III	4m	PV	Restr	A, C	.236(a), (b), (c), (g), .409, .526	I–C
Ethylene chlorohydrin	C	S/P	II	B/3	PV	Closed	A, D	.316, .408, .525, .526, .527, .933, .1020	I–D
Ethylene cyanohydrin	D	S	III	NR	Open	Open	A	None	NA
Ethylenediamine	C	S/P	II	4m	PV	Restr	A	.236(b), (c), .409, .440, .526, .908(b)	I–D
Ethylene dibromide	B	S/P	II	B/3	PV	Closed	NSR	.408, .440, .525, .526, .527, .908(b), .1020	NA
Ethylene dichloride	B	S/P	II	4m	PV	Restr	A, B	.236(b), .408, .526	I–D
Ethylene glycol butyl ether acetate	C	P	III	NR	Open	Open	A	None	I–C
Ethylene glycol diacetate	C	P	III	NR	Open	Open	A	None	I–D
Ethylene glycol ethyl ether acetate, *see* 2-Ethoxyethyl acetate									
Ethylene glycol methyl ether acetate	C	P	III	NR	Open	Open	A	None	I–C
Ethylene glycol monoalkyl ether *Including:* *2-Ethoxyethanol* *Ethylene glycol butyl ether* *Ethylene glycol tert-butyl ether* *Ethylene glycol ethyl ether* *Ethylene glycol methyl ether* *Ethylene glycol n-propyl ether* *Ethylene glycol isopropyl ether*	D	S	III	4m	PV	Restr	A	.409	I–C
Ethylene glycol monoalkyl ethers	D	S	III	4m	PV	Restr	A	.409	I–C
Ethylene glycol propyl ether, *see* Ethylene glycol monoalkyl ethers.									
Ethylene oxide (30% or less), Propylene oxide mixture.	**C**	**S/P**	II	B/3	PV	Closed	A, C	.252, .372, .408, .440, .500, .525, .526, .530, .1010, .1011, .1020.	I–B
Ethyl ether	III	S	II	4m	PV	Closed	A	.236(g), .252, .372, .408, .440, .500, .515, .526, .527	I–C
•Ethyl-3-ethoxypropionate	**C**	P	III	4m	PV	Restr	A	.409	NA
2-Ethylhexanol	@C	P	III	NR	Open	Open	A	None	I–D
2-Ethylhexyl acrylate	B	S/P	III	NR	Open	Open	A	.409, .912(a)(1), .1002(a), (b), .1004	I–D
2-Ethylhexylamine	B	S/P	II	B/3	PV	Restr	A	.236(b), (c), .409, .525, .526, .1020	I–D
Ethyl hexyl phthalate	C	P	III	NR	Open	Open	A	None	NA
Ethylidene norbornene	B	S/P	III	B/3	PV	Restr	A, B, C, D	.236(b), .409, .526	NA
Ethyl methacrylate	D	S	III	4m	PV	Restr	A, B, D	**.409** ,.526, .912(a)(1), .1002(a), (b), .1004	I–D
Ethylphenol	A	S/P	III	NR	Open	Open	B	.409	I–D
2-Ethyl-3-propylacrolein	**A**	S/P	III	4m	PV	Restr	A	.409, .526,	I–C
Ethyl toluene	B	P	III	4m	PV	Restr	A	.409	I–D
Ferric chloride solutions	C	S/P	III	NR	Open	Open	NSR	.409, .440, .554, .555, .908(b), .1045	I–B
Ferric nitrate, Nitric acid solution	C	S/P	II	4m	PV	Restr	NSR	.408, .526, .527, .554, .555, .559, .933, .1045	I–B
Fluorosilicic acid (30% or less)	C	S/P	III	B/3	PV	Restr	NSR	.252, .526, **.527**, .554, .555, .933, .1045	I–B
Formaldehyde (50% or more), Methanol mixtures.	#	S/P	III	4m	PV	Closed	A	**.409**, .526, .527	I–B
Formaldehyde solution (37% to 50%)	C	S/P	III	4m	PV	Restr	A	**.409** .440, .526, .527, .908(b)	I–B
Formic acid	D	S	III	4m	PV	Restr	A	.238(b), (c), **.409**, .526, .527, .554	I–D

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Fumaric adduct of rosin, water dispersion.	B	P	III	NR	Open	Open	NSR	.409, .440, .908(a)	NA
Furfural	C	S/P	III	4m	PV	Restr	A	**.409**, .526	I–C
Furfuryl alcohol	C	P	III	NR	Open	Open	A	None	I–C
Glutaraldehyde solution (50% or less)	D	S	III	NR	Open	Open	NSR	None	NA
Glycidyl ester of C10 Trialkyl acetic acid, *see* Glycidyl ester of Tridecyl acetic acid.									
Glycidyl ester of Tridecyl acetic acid	B	P	III	NR	Open	Open	A	.409	NA
Heptane (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Heptanol (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Heptene (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Heptyl acetate	B	P	III	NR	Open	Open	A	**.409**	NA
Hexamethylenediamine solution	C	S/P	III	4m	PV	Restr	A	.236(b), (c), .409, .440, .526, .908(b)	I–D
Hexamethyleneimine	C	S/P	II	4m	PV	Restr	A, C	.236(a), (b), (c), (g), **.409**, .526	I–C
Hexane (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Hexene (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Hexyl acetate	B	P	III	4m	PV	Restr	A	.409	I–D
Hydrochloric acid	D	S	III	4m	PV	Restr	NSR	.252, .526, .527, .554, .557, .933, .1045, .1052	I–B
Hydrogen peroxide solutions (over 8% but not over 60%).	C	S/P	III	B/3	PV	Closed	NSR	.238(a), (c), .355, .409, .440(a) (1)&(2), .500, .933, .1004(a)(2), .1500.	NA
Hydrogen peroxide solutions (over 60% but not over 70%).	C	S/P	II	B/3	PV	Closed	NSR	.238(a), (c), .355, .409, .440(a) (1)&(2), .500, .933, .1004(a)(2), .1500.	NA
2-Hydroxyethyl acrylate	B	S/P	II	B/3	PV	Closed	A	.408, .525, .526, .912(a)(1), .933, .1002(a), (b), .1004, .1020.	NA
•2-Hydroxy-4-(methylthio)butanoic acid	**C**	P	III	NR	Open	Open	A	.440, .903, .908(a)	NA
Icosa (oxypropane-2,3-diyl)s	B	P	III	NR	Open	Open	A	.409, .440, .908(a)	NA
Isophorone diamine	D	S	III	4m	PV	Restr	A	.236(b), (c), .526	NA
Isophorone diisocyanate[6]	B	S/P	**II**	B/3	PV	Closed	A, B, C[6], D	.236(a), (b), .316, **.409**, .500, .501, **.525** .526, .602, .1000, .1020.	NA
Isoprene	C	S/P	III	4m	PV	Restr	B	.372, **.409**, .440, .912(a)(1), .1002(a), (b), .1004	I–D
Isopropylbenzene (Cumene), *see* Propylbenzene (all isomers)									
Lactonitrile solution (80% or less)	B	S/P	II	B/3	PV	Closed	A, C, D	.238(d), .252, .316, .336, .408, .440, .525, .526, .527, .908(a), .912(a)(2), .1002, .1004, .1020, .1035.	I–D
Lauric acid	B	P	III	NR	Open	Open	A	**.409**, .440, .488, .908(a), (b)	NA
Lauryl polyglucose (50% or less)	[B]	P	III	NR	Open	Open	No	.409, .440, .488, .908 (a), (b)	NA
Long chain alkaryl polyether (C11–C20)	C	P	III	NR	Open	Open	A, B	(.440, .903, .908(a))[1]	NA
Long chain polyetheramine in alkyl(C2–C4)benzenes.	C	P	III	4m	PV	Restr	A	.409, .440, .903, .908(a)	I–D

Magnesium long chain alkyl salicylate (C11+).	C	P	III	NR	Open	Open	A, B	(.440, .903, .908(a))[1]	NA
Maleic anhydride[7]	D	S	III	4m	PV	Restr	[7]A, C	None	I–D
Mercaptobenzothiazol, sodium salt solution, *see* Sodium-2-mercaptobenzothiazol solution									
Mesityl oxide	D	S	III	4m	PV	Restr	A	.236(b), (c), .409, .526	I–D
Metam sodium solution	A	S/P	**II**	NR	Open	Open	NSR	.236(a), (b), (c), (g), .409	NA
Methacrylic acid	D	S	III	4m	PV	Restr	A	.238(a), .526, .912(a)(1), .1002(a), .1004	NA
Methacrylic resin in Ethylene dichloride	B	S/P	II	4m	PV	Restr	A, B	.236(b), .408, .440, .526, .908(a)	I–D
•Methacrylonitrile	**D**	**S**	II	B/3	PV	Closed	A	.236(b), .316, .408, .525, .526, .527, .912(a)(1), .1002(a), .1004, .1020.	NA
N-(2-Methoxy-1-methyl ethyl)-2-ethyl-6-methyl chloroacetanilide, *see* Metolachlor									
Methyl acrylate	B	S/P	II	4m	PV	Restr	A, B	.409, .526, .527, .912(a)(1), .1002(a), (b), .1004	I–D
Methylamine solution (42% or less)	C	S/P	II	B/3	PV	Closed	A, C, D	.236(a), (b), (c), (g), .316, .408, .525, .526, .527, .1020.	I–D
Methylamyl acetate	C	P	III	4m	PV	Restr	A	.409	I–D
•Methylamyl **alcohol**	C	P	III	4m	PV	Restr	A	.409	I–D
Methyl butyrate	C	P	III	4m	PV	Restr	A	.409	I–D
Methylcyclohexane	C	P	III	4m	PV	Restr	A	.409	I–D
Methylcyclopentadiene dimer	B	P	III	4m	PV	Restr	B	.409	I–B
•Methyl diethanolamine	**D**	**S**	III	NR	Open	Open	A	**.236(b), (c)**	I–C
Methylene chloride, see Dichloromethane									
2-Methyl-6-ethylaniline	C	S/P	III	NR	Open	Open	A, B, C, D	None	NA
2-Methyl-5-ethylpyridine	B	S/P	III	NR	Open	Open	A, D	.236(b), .409	I–D
Methyl formate	D	S	II	B/3	PV	Restr	A	.372, .408, .440, .525, .526, .527, .1020	I–D
Methyl heptyl ketone	B	P	III	4m	PV	Restr	A	.409	I–D
2-Methyl-2-hydroxy-3-butyne	III	S	III	4m	PV	Restr	A, B, C, D	.236(b), (d), (f), (g), .409, .526	I–D
Methyl methacrylate	D	S	II	4m	PV	Restr	A, B	**.409**, .526, .912(a)(1), .1002(a), (b), .1004	I–D
Methyl naphthalene (molten)	A	S/P	II	4m	PV	Restr	A, D	.409	I–D
•2-Methyl-1-pentene, *see* **Hexene (all isomers)**.									
•4-Methyl-1-pentene, *see* **Hexene (all isomers)**.									
•2-Methylpyridine	**D**	**S**	II	B/3	PV	Closed	A, C	.236(b), .408, .525(a), (c), (d), (e), .1020	I–D
•3-Methylpyridine	**C**	S/P	II	B/3	PV	Closed	A, C	.236(b), .408, .525(a), (c), (d), (e), .1020	I–D
•4-Methylpyridine	**D**	**S**	II	B/3	PV	Closed	A, C, D	.236(b), .408, .440, .525(a), (c), (d), (e), .526, .908(b), .1020.	I–D
Methyl salicylate	B	P	III	NR	Open	Open	A	.409	I–D
•alpha-Methylstyrene	A	S/P	III	4m	PV	Restr	A, D	**.409, .526, .912(a)(1), .1002(a), (b), .1004**	I–D
Metolachlor	B	P	III	NR	Open	Open	A	.409	NA
Morpholine	D	S	III	4m	PV	Restr	A	.236(b), (c), **.409**	I–C
Motor fuel anti-knock compounds (containing lead alkyls).	A	S/P	**I**	B/3	PV	Closed	A, B, C	.252, .316, .336, .408, .525, .526, .527, .933, .1020, .1025.	I–D
Naphthalene (molten)	A	S/P	II	4m	PV	Restr	A, D	.409, .440, .908(b)	I–D

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
Naphthalene sulfonic acid, sodium salt solution (40% or less).	[A]	P	III	NR	Open	Open	NSR	**.409**	NA
Naphthenic acid	A	P	II	NR	Open	Open	A	.409	NA
Naphthenic acid, sodium salt solution	[A]	P	II	NR	Open	Open	NSR	.409	NA
Neodecanoic acid	C	P	III	NR	Open	Open	A	None	NA
Nitrating acid *(mixture of sulfuric and nitric acids).*	C	S/P	II	B/3	PV	Closed	NSR	.316, .408, .526, .527, .554, .555, .556, .559, .602, .933, .1000, .1045.	I–B
Nitric acid (70% or less)	C	S/P	II	4m	PV	Restr	NSR	.408, .526, .527, .554, .555, .559, .933, .1045	I–B
Nitrobenzene	B	S/P	II	B/3	PV	Closed	A, D	.316, .336, .408, .440, .525, .526, .908(b), .933, .1020.	I–D
•o-Nitrochlorobenzene, *see* **o-Chloronitrobenzene**.									
Nitroethane[7]	D	S	III	4m	PV	Restr	[7]A,C	.236(b), .409, .526, .1002 (a), (b), .1003	I–C
o-Nitrophenol (molten)	B	S/P	II	B/3	PV	Closed	A, C, D	**.409**, .440, .525, .526, .908(a), (b), .1020	NA
1- or 2-Nitropropane[7]	D	S	III	4m	PV	Restr	[7]A, C	**.409**, .526	I–C
Nitropropane (60%), Nitroethane (40%) mixture[7].	D	S	III	4m	PV	Restr	[7]A, C	.236(b), **.409**, .526	I–C
Nitropropane (20%), Nitroethane (80%)[7]	D	S	III	4m	PV	Restr	[7]A,C	.236(b), .409, .526, .1002 (a), (b), .1003	I–C
(o-, p-) Nitrotoluene	**B**	S/P	II	B/3	PV	Closed	A, B	.316, .408, .440, .525, .526, .908(b), .1020	I–D
Nonane (all isomers)	C	P	III	4m	PV	Restr	B, C	.409	I–D
•Nonene **(all isomers)**	B	P	III	4m	PV	Restr	A	.409	I–D
Nonyl acetate	C	P	III	NR	Open	Open	A	.409	I–D
Nonyl alcohol (all isomers)	C	P	III	NR	Open	Open	A	None	I–D
Nonyl phenol	A	P	II	NR	Open	Open	A	.409	I–D
Nonyl phenol poly(4–12)ethoxylates	B	P	III	NR	Open	Open	A	.409, .440, .488[1], .908(a), (b)	I–D
Noxious liquid, N.F., (1) n.o.s. (''trade name'' contains ''principal components'') ST 1, Cat A.	A	P	I	NR	Open	Open	A	.408	NA
Noxious liquid, F., (2) n.o.s. (''trade name'' contains ''principal components'') ST 1, Cat A.	A	P	I	4m	PV	Restr	A	.408	NA
Noxious liquid, N.F., (3) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat A.	A	P	II	NR	Open	Open	A	.409	NA
Noxious liquid, F., (4) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat A.	A	P	II	4m	PV	Restr	A	.409	NA
•Noxious liquid, N.F., (5) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat B.	B	P	II	NR	Open	Open	A	.409; (**.440, .908**)[1]	NA

•Noxious liquid, N.F., (6) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat B, mp. equal to or greater than 15 deg. C.	B	P	II	NR	Open	Open	A	.409, .440, .488, .908(b); (**.908(a)**)[1]	NA
•Noxious liquid, F., (7) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat B.	B	P	II	4m	PV	Restr	A	.409; (**.440, .908**)[1]	NA
•Noxious liquid, F., (8) n.o.s. (''trade name'' contains ''principal components'') ST 2, Cat B, mp. equal to or greater than 15 deg. C.	B	P	II	4m	PV	Restr	A	.409, .440, .488, .908(b); (**.908(a)**)[1]	NA
Noxious liquid, N.F., (9) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat A.	A	P	III	NR	Open	Open	A	**.409**	NA
Noxious liquid, F., (10) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat A.	A	P	III	4m	PV	Restr	A	.409	NA
•Noxious liquid, N.F., (11) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat B.	B	P	III	NR	Open	Open	A	(**.409**, **.440, .908**)[1]	NA
•Noxious liquid, N.F., (12) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat B, mp. equal to or greater than 15 deg. C.	B	P	III	NR	Open	Open	A	**.409**, .440, .488, .908(b); (**.908(a)**)[1]	NA
•Noxious liquid, F., (13) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat B.	B	P	III	4m	PV	Restr	A	.409; (**.440, .908**)[1]	NA
•Noxious liquid, F., (14) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat B, mp. equal to or greater than 15 deg. C.	B	P	III	4m	PV	Restr	A	.409, .440, .488, .908(b); (**.908(a)**)[1]	NA
Noxious liquid, N.F., (15) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat C.	C	P	III	NR	Open	Open	A	(.440, .903, .908)[1]	NA
Noxious liquid, F., (16) n.o.s. (''trade name'' contains ''principal components'') ST 3, Cat C.	C	P	III	4m	PV	Restr	A	(.440, .903, .908)[1]	NA
Octane (all isomers)	C	P	III	4m	PV	Restr	A	.409	I–D
Octanol (all isomers)	C	P	III	NR	Open	Open	A	None	I–D
Octene (all isomers)	B	P	III	4m	PV	Restr	A	.409	I–D
Octyl acetate	C	P	III	NR	Open	Open	A	None	I–D
Octyl aldehydes	B	P	III	4m	PV	Restr	A	.409, .440, .908(b)	I–C
•Octyl nitrates (all isomers), *see* **Alkyl(C7–C9) nitrates**.	C	P	III	4m	PV	Restr	A	.409	I–D
Olefin mixtures (C5–C7)	C	P	III	4m	PV	Restr	A	.409	I–D
Olefin mixtures (C5–C15)	B	P	III	4m	PV	Restr	A	.409, .440, .908(a), (b)	I–D
alpha-Olefins (C6–C18) mixtures	B	P	III	4m	PV	Restr	A	.316, .408, .440, .526, .527, .554, .555, .556, .602, .908(a), .933, .1000, .1045, .1052.	I–B
Oleum	C	S/P	II	B/3	PV	Closed	NSR	.409, .526	NA
Oleylamine	A	S/P	II	4m	PV	Restr	A		

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
•**Palm kernel acid oil**	C	P	III	NR	Open	Open	A, B	.440, .903, .908(a), (b)	NA
Paraldehyde	C	S/P	III	4m	PV	Restr	A	**.409**, .440, .908(b)	I–C
Pentachloroethane	B	S/P	II	B/3	PV	Restr	NSR	.316, .409, .525, .526, .1020	NA
1,3-Pentadiene	C	S/P	III	4m	PV	Restr	A, B	**.409**, .526, .912(a)(1), .1002, .1004	I–D
Pentane (all isomers)	C	P	III	4m	PV	Restr	A	**.372,**.409	I–D
Pentene (all isomers)	C	P	III	4m	PV	Restr	A	**.409**	I–D
n–Pentyl propionate	C	P	III	4m	PV	Restr	A	.409	I–D
Perchloroethylene	B	S/P	III	**B/3**	PV	Restr	NSR	**.409**, .526	NA
•Phenol *(or solutions with 5% or more Phenol)*.	**C**	S/P	II	B/3	PV	Closed	A	.408, .440, .488, .525, .526, .908(a), (b), .933, .1020	I–D
1-Phenyl-l-xylyl ethane	C	P	III	NR	Open	Open	A, B	None	NA
Phosphoric acid	D	S	III	NR	Open	Open	NSR	.554, .555, .558, .1045, .1052	I–B
Phthalic anhydride (molten)	C	S/P	III	4m	PV	Restr	A, D	.440, .908(a), (b)	I–D
Pinene, *see the alpha- or beta- isomers.*									
alpha-Pinene	**A**	P	III	4m	PV	Restr	A	.409	I–D
beta-Pinene	B	P	III	4m	PV	Restr	A	.409	I–D
•Pine oil	**C**	P	III	NR	Open	Open	A	.440, .908(a)	I–D
•Polyalkyl(C18–C22) acrylate in Xylene	**C**	P	III	4m	PV	Restr	A	.409, .440, .903, .908(a)	NA
•Polyalkylene oxide polyol	**C**	P	III	NR	Open	Open	A	.440, .903, .908(a)	NA
Poly(2+)cyclic aromatics	A	P	II	4m	PV	Restr	A, D	.409	I–D
Polyethylene polyamines	C	S/P	III	NR	Open	Open	A	.236(b), (c), .400, .440, .908(b)	NA
Polyferric sulfate solution	C	S/P	III	NR	Open	Open	NSR	.238(d)	NA
Polymethylene polyphenyl isocyanate[6]	D	S	II	B/3	PV	Closed	A, C[6], D	.236(a), (b), .409, .500, .501, .525, .526, .602, .1000, .1020.	NA
Polyolefinamine in alkyl(C2–C4)benzenes.	C	P	III	4m	PV	Restr	A	.409, .440, .903, .908(a)	I–D
Polyolefin phosphorosulfide, barium derivative (C28–C250).	C	P	III	NR	Open	Open	A, B	(.440, .903, .908(a))[1]	NA
Potassium hydroxide solution, *see* Caustic potash solution									
Potassium oleate	C	P	III	NR	Open	Open	A	.409	NA
Potassium polysulfide, Potassium thiosulfate solution (41% or less).	[C]	S/P	III	NR	Open	Open	No	.236 (b), (c), .409	NA
Propanil, Mesityl oxide, Isophorone mixture.	[B]	S/P	III	4m	PV	Restr	A, B	.409, .440, .526, .908(a), (b)	NA
iso-Propanolamine	C	S/P	III	NR	Open	Open	A	.236(b), (c), .440, .526, .903, .908(b)	I–D
n-Propanolamine	C	S/P	III	NR	Open	Open	A, D	.236(b), (c), .440, .526, .908(b)	NA
Propionaldehyde	C	SP	III	4m	PV	Restr	A	.316, **.409**, .526, .527	I–C
Propionic acid	D	S	III	4m	PV	Restr	A	.238(a), **.409**, .527, .554	I–D
Propionic anhydride	C	S/P	III	4m	PV	Restr	A	.238(a), .526	I–D

Propionitrile	C	S/P	II	B/3	PV	Closed	A, D	.252, .316, .336, .408, .525, .526, .527, .1020	I–D
iso-Propylamine	C	S/P	II	B/3	PV	Closed	C, D	.236(b), (c), .372, .408, .440, .525, .526, .527, .1020	I–D
iso-Propylamine solution (70% or less)	C	S/P	II	B/3	PV	Closed	C,D	.236 (a), (b), (c), (g), .408, .440, .525, .526, .527, .1010.	I–D
n-Propylamine	C	S/P	II	B/3	PV	Closed	A, C, D	.236(b), (c), .408, .500, .525, .526, .527, .1020	I–D
n-Propylbenzene, *see* **Propylbenzene (all isomers)**.									
Propylbenzene (all isomers)	**A**	P	III	4m	PV	Restr	A	.409	I–D
n-Propyl chloride	D	S	III	4m	PV	Restr	A, B	.409	I–D
iso-Propylcyclohexane	C	P	III	4m	PV	Restr	A	.409, .440, .903, .908(a)	I–D
Propylene dimer	C	P	III	4m	PV	Restr	A	.409	NA
Propylene oxide	**C**	**S/P**	II	B/3	PV	Closed	A, C	.372, .408, .440, .500, .526, .530, .1010, .1011	I–B
Propylene tetramer	B	P	III	4m	PV	Restr	A	.409	I–D
Propylene trimer	B	P	III	4m	PV	Restr	A	.409	I–D
iso-Propyl ether	D	S	III	4m	PV	Restr	A	.409, .500, .515, .912(a)(1)	I–D
Pyridine	D	S	III	4m	PV	Restr	A	.236(b), .409	I–D
Rosin, *see* Rosin oil.									
Rosin oil	B	P	III	NR	Open	Open	A	.409, .440, .488, .908(a), (b)	I–D
Rosin soap (disproportionated) solution	B	P	III	NR	Open	Open	A	.409	NA
Sodium aluminate solution	D	S	III	NR	Open	Open	NSR	.236(a), (b), (c), (g), .933	NA
Sodium borohydride (15% or less), Sodium hydroxide solution.	C	S/P	III	NR	Open	Open	NSR	.236(a), (b), (c), (g), .440, .908(a), .933	NA
Sodium chlorate solution (50% or less)	III	S	III	NR	Open	Open	NSR	.409, .933, .1065	NA
Sodium dichromate solution (70% or less).	C	S/P	II	B/3	Open	Closed	NSR	.236(b), (c), .408, .525, .933, .1020	NA
•*Sodium dimethyl naphthalene sulfonate solution, see* Dimethyl naphthalene sulfonic acid, sodium salt solution.									
•Sodium hydrogen sulfide (6% or less), Sodium carbonate (3% or less) solution.	**B**	P	III	NR	Open	Open	NSR	**.409**	NA
Sodium hydrogen sulfite solution **(45% or less)**.	D	S	III	NR	Open	Open	NSR	None	NA
Sodium hydrosulfide solution (45% or less).	B	S/P	III	4m	PV	Restr	NSR	.409, .440, .526, .908(b), .933	NA
Sodium hydrosulfide, Ammonium sulfide solution.	B	S/P	II	B/3	PV	Closed	A, C	.236(a), (b), (c), (g), .316, .372, .408, .525, .526, .527, .933, .1002, .1020.	NA
Sodium hydroxide solution, *see* Caustic soda solution									
•Sodium hypochlorite solution (15% or less).	C	S/P	III	4m	PV	Restr	NSR	.236(a), (b), **.933**	NA
Sodium long chain alkyl salicylate (C13+).	[C]	P	III	NR	Open	Open	A	(.440, .903, .908(a))[1]	NA
Sodium-2-mercaptobenzothiazol solution	B	S/P	III	NR	Open	Open	NSR	.236(a), (b), (c), (g), .409, .440, .908(b), .933	NA
•*Sodium N-methyldithiocarbamate solution, see* Metam sodium solution.									
•*Sodium naphthalene sulfonate solution (40% or less), see* Naphthalene sulfonic acid, sodium salt solution (40% or less).									

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
•Sodium naphthenate solution, see Naphthenic acid, sodium salt solution.									
Sodium nitrite solution	B	S/P	II	NR	Open	Open	NSR	.408, .525(a), (c), (d), (e), .1020	NA
Sodium petroleum sulfonate	B	S/P	II	NR	Open	Open	A	.409, .440, .908(a)	NA
Sodium silicate solution	C	P	III	NR	Open	Open	A	None	NA
•Sodium sulfide solution (15% or less)	**C**	S/P	III	B/3	PV	Closed	NSR	.236(a), (b), .409, .440, .526, .908(b)	NA
Sodium sulfite solution (25% or less)	C	P	III	NR	Open	Open	NSR	.409, .440, .908(b)	NA
•**Sodium tartrates, Sodium succinates solution**.	D	S	III	NR	Open	Open	A, B	.238(e)	NA
Sodium thiocyanate solution (56% or less).	B	P	III	NR	Open	Open	NSR	.238(a), .409	NA
Styrene *monomer*	B	S/P	III	4m	PV	**Restr**	A, B	.236(b), .409, .912(a)(1), .1002(a), (b), .1004	I–D
Sulfohydrocarbon, long chain (C18+) alkylamine mixture.	B	P	III	NR	Open	Open	A, B	.409; (**.440, .908(a)**)[1]	NA
Sulfur (molten)	III	S	III	NR	Open	Open	NSR	.252, .440, .526, .545	I–C
Sulfuric acid	C	S/P	III	NR	Open	Open	NSR	.440, .554, .555, .556, .602, .908(a), (b), .933, .1000, .1045, .1046, .1052.	I–B
Tall oil *(crude and distilled)*	B	P	III	NR	Open	Open	A	.409, .440, .488, .908(a), (b)	NA
Tall oil, fatty acid *(resin acids less than 20%)*.	C	P	III	NR	Open	Open	A	.440, .908(a), (b)	NA
Tall oil fatty acid, barium salt	B	S/P	III	NR	Open	Open	A	.409, .440, .908(a)	NA
Tall oil soap (disproportionated) solution	B	P	III	NR	Open	Open	A	.409, .440, .908(a), (b)	NA
1,1,2,2-Tetrachloroethane	B	S/P	III	B/3	PV	Restr	NSR	.316, .409, .525, .526, .1020	NA
Tetraethylenepentamine[3]	D	S	III	NR	Open	Open	A	.236(b), (c), (g)	I–C
Tetrahydrofuran	D	S	III	4m	PV	Restr	A, D	**.409,** .526, .912(a)(2), .1004	I–C
Tetrahydronaphthalene	C	P	III	NR	Open	Open	A	None	I–D
1,2,3,5-Tetramethylbenzene, *see* **Tetramethylbenzene (all isomers)**.									
Tetramethylbenzene (all isomers)	**A**	P	III	NR	Open	Open	A	None	I–D
Toluene	C	P	III	4m	PV	Restr	A	.409	I–D
Toluenediamine	C	S/P	II	B/3	PV	Closed	A, B, C, D	.236(a), (b), (c), (g), .316, .408, .440, .525, .526, .527, .908(a), (b), .933, .1020.	NA
Toluene diisocyanate[6]	C	S/P	II	4m	PV	Closed	A, C[6], D	.236(b), .316, .408, .440, .500, .501, .525, .526, .527, .602, .908(b), .1000, .1020.	I–D
o-Toluidine	C	S/P	II	B/3	PV	Closed	A, C	.316, .408, .525, .526, .933, .1020	I–D
Tributyl phosphate	B	P	III	NR	Open	Open	A	.409	I–D
1,2,4-Trichlorobenzene	B	S/P	II	4m	PV	Restr	A, B, C	.409, .440, .526, .908(b)	I–D
•1,1,1-Trichloroethane	**C**	P	III	NR	Open	Open	A	.409	I–D
•1,1,2-Trichloroethane	**C**	S/P	III	B/3	PV	Restr	NSR	.409, .525, .526, **.933**, .1020	I–D
•Trichloroethylene	**C**	S/P	III	B/3	PV	Restr	NSR	.316, .409, .525, .526, .1020	I–D

•1,2,3-Trichloropropane	**C**	S/P	II	B/3	PV	Closed	A, B, C, D	.316, .408, .525, .526, **.933**, .1020	I–D
1,1,2-Trichloro-1,2,2-trifluoroethane	C	P	III	NR	Open	Open	NSR	None	NA
Tricresyl phosphate (less than 1% of the ortho isomer).	A	P	II	NR	Open	Open	A	.409	I–D
Tricresyl phosphate (1% or more of the ortho isomer).	A	S/P	I	4m	PV	Closed	A, B	.408, .525(a), (c), (d), (e), .1020	I–D
Tridecanoic acid	B	P	III	NR	Open	Open	A	.409, .440, .488, .908(a), (b)	NA
Triethanolamine	D	S	III	NR	Open	Open	A	.236(a), (b), (c), (g)	I–C
Triethylamine	C	S/P	II	B/3	PV	Restr	A, B, C	.236(b), (c), **.409**, .525, .526, .527, .1020	I–C
Triethylbenzene	A	P	II	NR	Open	Open	A	.409	I–D
Triethylene glycol di-(2-ethylbutyrate)	[C]	P	III	NR	Open	Open	A	None	I–C
Triethylenetetramine	D	S	III	NR	Open	Open	A	.236(a), (b), (c)	I–C
Triethyl phosphite	**B**	**S/P**	III	B/3	PV	Restr	A, B, D	**.409**, .526	NA
Trifluralin in Xylene	[A]	S/P	II	4m	PV	Restr	A, B	.409, .526	I–D
Triisopropylated phenyl phosphates	A	P	II	NR	Open	Open	A	.409	NA
Trimethylacetic acid	D	S	III	4m	PV	Restr	A, C	.238(a), .266, .554	I–D
Trimethylamine solution (30% or less)	C	S/P	II	B/3	PV	Closed	A, C	.236(a), (b), (c), (g), .372, .408, .440, .525, .526, .527, .908(b), .1020.	I–C
•Trimethylbenzene (all isomers)	**A**	P	III	4m	PV	Restr	A	.409	I–D
Trimethylhexamethylenediamine (2,2,4- and 2,4,4- isomers).	D	S	III	NR	Open	Open	A, C	.236(a), (b), (c), (g), .409	NA
Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4- isomers)[6].	B	S/P	II	B/3	PV	Closed	A, C[6]	.316, .409, .500, .501, .525, .526, .602, .1000, .1020	NA
2,2,4-Trimethyl-1,3-pentanediol-1-isobutyrate.	C	P	III	NR	Open	Open	A	None	I–D
Trimethyl phosphite	#	S	III	4m	PV	Restr	A, D	.409, .526, .602, .1000	I–D
1,3,5-Trioxane	D	S	III	4m	PV	Restr	A, D	.409	I–C
Trixylenyl phosphate	A	P	I	NR	Open	Open	A	.408	NA
Trixylyl phosphate, *see* Trixylenyl phosphate.									
Turpentine	B	P	III	4m	PV	Restr	A	.409	I–D
•Undecanoic acid	**B**	P	III	NR	Open	Open	A	**.440, .908(a), (b)**	NA
1-Undecene	B	P	III	NR	Open	Open	A	.409	I–D
1- Undecyl alcohol	B	P	III	NR	Open	Open	A	**.409**, .440, .908(b)	I–D
Urea, Ammonium nitrate solution (containing more than 2% NH_3).	C	S/P	III	4m	PV	Restr	A	.236(b), .526	I–D
iso-Valeraldehyde, *see* **Valeraldehyde (all isomers)**.									
n-Valeraldehyde, *see* **Valeraldehyde (all isomers)**.									
Valeraldehyde (all isomers)	**C**	**S/P**	III	4m	PV	Restr	A	**.409**, .500, .526	I–C
Vinyl acetate	C	S/P	III	4m	PV	**Restr**	A	**.409**, .912(a)(1), .1002(a), (b), .1004	I–D
Vinyl ethyl ether	C	S/P	II	4m	PV	Closed	A	.236(b), (d), (f), (g), .252, .372, .408, .440, .500, .515, .526, .527, .912(a)(1), .1002(a), (b), .1004.	I–C
•Vinylidene chloride	**D**	**S**	II	4m	PV	Restr	B	.236(a), (b), .372, .409, .440, **.500**, .526, .527, .912(a)(1), .1002(a), (b), .1004.	I–D
Vinyl neodecanate	B	S/P	III	NR	Open	Open	A, B	.409, .912(a)(1), .1002(a), (b), .1004	NA
Vinyltoluene	A	S/P	III	4m	PV	Restr	A, B, D	.236(a), (b), (c), (g), .409, .912(a)(1), .1002(a), (b), .1004.	I–D

TABLE 1.—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name	IMO Annex II pollution category	Haz.	Cargo containment system	Ventheight	Vent	Gauge	Fire protection system	Special requirements in 46 CFR Part 153	Electrical hazard class and group
a.	b.	c.	d.	e.	f.	g.	h.	i.	j.
White spirit (low (15–20%) aromatic)	B	P	II	4m	PV	Restr	A	.409	NA
Xylenes[8] *(ortho-, meta-, para-)*	C	P	III	4m	PV	Restr	A	.409, .440, .908(b)[8]	I–D
Xylenol	B	S/P	III	NR	Open	Open	A, B	.409, .440, .908(a), (b)	NA
Zinc alkaryl dithiophosphate (C7–C16) ...	C	P	III	NR	Open	Open	A, B	(.440, .903, .908(a))[1]	NA
Zinc alkyl dithiophosphate (C3–C14)	B	P	III	NR	Open	Open	A, B	.409; (**.440, .908(a)**)[1]	NA

Items with a bullet (•) or in **boldface** are changes since October 1, 1993.

Column Heading Footnotes:

a. The cargo name must be as it appears in this column (see 153.900, 153.907). Words in italics are not part of the cargo name but may be used in addition to the cargo name. When one entry references another entry by use of the word ''*see*'', and both names are in roman type, either name may be used as the cargo name (e.g., Diethyl ether, *see* Ethyl ether). However, the referenced entry is preferred.

The provisions contained in 46 CFR part 197, subpart C, apply to liquid cargoes containing 0.5% or more benzene by volume.

b. This column lists the IMO Annex II Pollution Category.

A, B, C, D—NLS Category of Annex II of MARPOL 73/78.
III—Appendix III of Annex II (non-NLS cargoes) of MARPOL 73/78.
#—No determination of NLS status. For shipping on an oceangoing vessel, see 46 CFR 153.900(c).
[ ]—A NLS category in brackets indicates that the product is provisionally categorized and that further data are necessary to complete the evaluation of its pollution hazards. Until the hazard evaluation is completed, the pollution category assigned is used.
@—The NLS category has been assigned by the U.S. Coast Guard, in absence of one assigned by the IMO. The category is based upon a GESAMP Hazard Profile or by analogy to a closely related product having an NLS assigned.

c. This column lists the hazard(s) of the commodity:

S—The commodity is included because of its safety hazards.
P—The commodity is included because of its pollution hazards.
S/P—The commodity is included because of both its safety and pollution hazards.

d. This column lists the type of containment system the cargo must have (see 153.230 through 153.232).
e. This column lists the height of any vent riser required (see 153.350 and 153.351).
f. This column lists any vent control valve required (see 153.355).
g. This column lists the type of gauging system required (see 153.400 through 153.406).

h. This column lists the type of fire protection system required. Where more than one system is listed, any listed system may be used. A dry chemical system may not be substituted for either type of foam system unless the dry chemical system is listed as an alternative or the substitution is approved by Commandant (G–MSO) (see 153.460). The types are as follows:

A is a foam system for water soluble cargoes (polar solvent foam).
B is a foam system for water insoluble cargoes (non-polar solvent foam).
C is a water spray system.
D is a dry chemical system.
NSR means there is no special requirement applying to fire protection systems.

i. This column lists sections that apply to the cargo in addition to the general requirements of this part. The 153 Part number is omitted.

j. This column lists the electrical hazard class and group used for the cargo when determining requirements for electrical equipment under Subchapter J (Electrical Engineering) of this chapter.

A number of electrical hazard class and group assignments are based upon that which appears in ''Classification of Gases, Liquids and Volatile Solids Relative to Explosion-Proof Electrical Equipment'', Publication NMAB 353–5, National Academy Press, 1982, when not appearing in NFPA 497M, ''Manual for Classification of Gases, Vapors and Dusts for Electrical Equipment in Hazardous (Classified) Locations.''

The I–B electrical hazard does not apply to weather deck locations (see 46 CFR Part 111) for inorganic acids: Chlorosulfonic acid; Hydrochloric acid; Nitrating acid; Nitric acid (70% or less); Oleum; Phosphoric acid; Sulfuric acid.

Abbreviations used in the Table:

NR—No requirement.
NA—Not applicable.

Abbreviations for Noxious Liquid cargoes:

N.F.—non-flammable (flash point greater than 60 deg C (140 deg F) closed cup (cc)).
F.—flammable (flash point less than or equal to 60 deg C (140 deg F) closed cup (cc)).
n.o.s.—not otherwise specified.
ST—Ship type.
Cat—Pollution category.

Footnotes for Specific Cargoes:

1. Special applicability:

153.440 and .908(a) apply to the chemical, and mixtures containing the chemical, with a viscosity of 25 mPa.s at 20 deg C (68 deg F).
153.440 and .908(b) apply to the chemical, and mixtures containing the chemical, with a melting point of 0 deg C (32 deg F) and above.
153.488 applies to the chemical, and mixtures containing the chemical, with a melting point of 15 deg C (59 deg F) and above.

2. Benzene containing cargoes.

Applies to mixtures containing no other components with safety hazards and where the pollution category is C or less.

3. Diammonium salt of Zinc ethylenediaminetetraacetic acid solution; Tetraethylenepentamine.

Aluminum is a questionable material of construction with this cargo since pitting and corrosion has been reported. The IMO Chemical Code prohibits aluminum as a material of construction for this cargo.

4. 2,4-Dichlorophenol.

Some tank pitting has been reported when this cargo is contaminated with water, including moisture in the air. The IMO Chemical Code requires that the vapor space over this cargo be kept dry.

5. Reserved.

6. Diphenylmethane diisocyanate; Isophorone diisocyanate; Polymethylene polyphenyl isocyanate; Toluene diisocyanate; Trimethylhexamethylene diisocyanate (2,2,4- and 2,4,4- isomers).

Water is effective in extinguishing open air fires but will generate hazardous quantities of gas if put on the cargo in enclosed spaces.

7. Maleic anhydride; Nitroethane; 1- or 2-Nitropropane; Nitropropane, Nitroethane mixtures.

Dry chemical extinguishers should not be used on fires involving these cargoes since some dry chemicals may react with the cargo and cause an explosion.

8. Xylenes.

Special requirement .908(b) only applies to the para- (p-) isomer, and mixtures containing the para-isomer having a melting point of 0 deg C (32 deg F) or more.

[CGD 92–100, 59 FR 17028, Apr. 11, 1994, as amended by CGD 94–900, 59 FR 45139, Aug. 31, 1994; CGD 94–902, 60 FR 34043, June 29, 1995; CGD 95–900, 60 FR 34050, 34051, June 29, 1995; 60 FR 39267, Aug. 2, 1995]

TABLE 2—CARGOES NOT REGULATED UNDER SUBCHAPTERS D OR O OF THIS CHAPTER WHEN CARRIED IN BULK ON NON-OCEANGOING BARGES

The cargoes listed in this table are not regulated under subchapter D or O of this title when carried in bulk on non-oceangoing barges. Category A, B, or C noxious liquid substance (NLS) cargo, as defined in §153.2 of this chapter, listed in this table, or any mixture containing one or more of these cargoes, must be carried under this subchapter if carried in bulk on an oceangoing ship. Requirements for Category D NLS cargoes and mixtures of non-NLS cargoes with Category D NLS cargoes are in 33 CFR part 151.

Cargoes	Pollution Category
2-Amino-2-hydroxymethyl-1,3-propanediol solution.	III
•Ammonium hydrogen phosphate solution	**D**
Ammonium lignosulfonate solution, *see also* Lignin liquor.	III
Ammonium nitrate solution (45% or less)	D
•Ammonium nitrate, Urea solution (2% or less NH_3), *see also* **Urea, Ammonium nitrate solution (2% or less NH_3)**.	D
•Ammonium phosphate, Urea solution, *see also* **Urea, Ammonium phosphate solution**.	D
•Ammonium polyphosphate solution	**D**
Ammonium sulfate solution (20% or less)	D
Apple juice	III
Calcium bromide solution	III
Calcium carbonate slurry	III
Calcium chloride solution	III
Calcium hydroxide slurry	D
Calcium lignosulfonate solution, *see also* Lignin liquor.	III
Calcium nitrate, Magnesium nitrate, Potassium chloride solution.	III
Caramel solutions	III
Chlorinated paraffins (C14–C17) (with 52% Chlorine).	III
2-Chloro-4-ethylamino-6-isopropylamino-5-triazine solution.	#
Choline chloride solution	D
Clay slurry	III
Coal slurry	III
Dextrose solution	III
Diethylenetriamine pentaacetic acid, pentasodium salt solution.	III
1,4-Dihydro-9,10-dihydroxy anthracene, disodium salt solution.	D
Dodecenylsuccinic acid, dipotassium salt solution.	D
Drilling brine (containing Calcium, Potassium, or Sodium salts) (*see also* Potassium chloride solution (10% or more)).	
•Drilling brine (containing Zinc salts)	**B**
Drilling mud (low toxicity) *(if non-flammable and non-combustible).*	[III]
Ethylenediaminetetraacetic acid, tetrasodium salt solution.	D
Ethylene-Vinyl acetate copolymer *(emulsion)*	III
Ferric hydroxyethylethylenediamine triacetic acid, trisodium salt solution.	D
•Fish solubles *(water based fish meal extracts)*	**III**
Fructose solution	#
Glucose solution	III
Glycine, sodium salt solution	III
•Hexamethylenediamine adipate *solution*	D
N-(Hydroxyethyl)ethylenediamine triacetic acid, trisodium salt solution.	D
Kaolin clay solution	III
Kaolin slurry	III
Kraft pulping liquor (free alkali content, 1% or less) *including: Black, Green, or White liquor.*	#
Lignin liquor (free alkali content, 1% or less) *including*:.	#
Ammonium lignosulfonate solution	III
Calcium lignosulfonate solution	III
Sodium lignosulfonate solution	III
Lignin sulfonic acid, sodium salt solution	III
Magnesium chloride solution	III
Magnesium hydroxide slurry	III
Milk	III
Molasses	III
Molasses residue *(from fermentation)*	[III]
Naphthenic acid, sodium salt solution	**[A]**
Noxious liquid, N.F., (1) n.o.s. (''trade name'' contains ''principle components'') ST 1, Cat A *(if non-flammable or non-combustible).*	A
Noxious liquid, N.F., (3) n.o.s. (''trade name'' contains ''principle components'') ST 2, Cat A *(if non-flammable or non-combustible).*	A
Noxious liquid, N.F., (5) n.o.s. (''trade name'' contains ''principle components'') ST 2, Cat B *(if non-flammable or non-combustible).*	B
Noxious liquid, N.F., (6) n.o.s. (''trade name'' contains ''principle components'') ST 2, Cat B, mp. equal to or greater than 15 deg. C *(if non-flammable or non-combustible).*	B
Noxious liquid, N.F., (9) n.o.s. (''trade name'' contains ''principle components'') ST 3, Cat A *(if non-flammable or non-combustible).*	A
Noxious liquid, N.F., (11) n.o.s. (''trade name'' contains ''principle components'') ST 3, Cat B *(if non-flammable or non-combustible).*	B
Noxious liquid, N.F., (12) n.o.s. (''trade name'' contains ''principle components'') ST 3, Cat B, mp. equal to or greater than 15 deg. C *(if non-flammable or non-combustible).*	B
Noxious liquid, N.F., (15) n.o.s. (''trade name'' contains ''principle components'') ST 3, Cat C *(if non-flammable or non-combustible).*	C
Noxious liquid, n.o.s. (17) (''trade name,'' contains ''principal components''), Category D *(if non-flammable or non-combustible).*	D
Non-noxious liquid, n.o.s. (18) (''trade name,'' contains ''principal components''), Appendix III *(if non-flammable or non-combustible).*	III
Pentasodium salt of Diethylenetriamine pentaacetic acid solution, *see* Diethylenetriamine pentaacetic acid, pentasodium salt solution.	III
Polyaluminum chloride solution	III
Potassium chloride solution (10% or more)(*see also the drilling brines entry.*	III
Sewage sludge, treated *(treated so as to pose no additional decompositional and fire hazard; stable, non-corrosive, non-toxic, non-flammable).*	#
Silica slurry	[III]
Sludge, treated *(treated so as to pose no additional decompositional and fire hazard; stable, non-corrosive, non-toxic, non-flammable).*	#
Sodium acetate, Glycol, Water mixture (containing 1% or less, Sodium hydroxide) *(if non-flammable or non-combustible).*	#
Sodium aluminosilicate slurry	III

Cargoes	Pollution Category
Sodium carbonate solution	D
Sodium lignosulfonate solution, *see also* Lignin liquor.	III
Sodium naphthenate solution (free alkali content, 3% or less), *see* Naphthenic acid, sodium salt solution.	**[A]**
•Sodium **poly(4+)acrylate** solution	**III**
•Sodium silicate solution	**C**
•Sodium sulfate solution	**III**
Sorbitol solution	III
Tetrasodium salt of Ethylenediaminetetraacetic acid solution, *see* Ethylenediaminetetraacetic acid, tetrasodium salt solution.	D
1,1,1-Trichloroethane	**C**
1,1,2-Trichloro-1,2,2-trifluoroethane	C
Trisodium salt of N-(Hydroxyethyl)-ethylenediaminetriacetic acid solution, *see* N-(Hydroxyethyl)ethylenediamine triacetic acid, trisodium salt solution.	D
Urea, Ammonium mono- and di-hydrogen phosphate, Potassium chloride solution.	D
•Urea, Ammonium nitrate solution (2% or less NH_3), *see also* Ammonium nitrate, Urea solution (2% or less).	D
•Urea, Ammonium phosphate solution, *see also* Ammonium phosphate, Urea solution.	D
Urea solution	III
Vanillan black liquor (free alkali content, 1% or less).	#
Vegetable protein solution *(hydrolysed)*	III
Water	III
•*Zinc bromide, Calcium bromide solution, see* Drilling brine (containing Zinc salts).	

Items with a bullet (•) or in **boldface** are changes since October 1, 1993.

Explanation of Symbols: As used in this table, the following stand for:

A, B, C, D—NLS Category of Annex II of MARPOL 73/78.

I—Considered an ''oil'' under Annex I of MARPOL 73/78.

III—Appendix III of Annex II (non-NLS cargoes) of MARPOL 73/78.

LFG—Liquefied flammable gas.

#—No determination of NLS status. For shipping on an oceangoing vessel, see 46 CFR 153.900(c).

[ ]—A NLS category in brackets indicates that the product is provisionally categorized and that further data are necessary to complete the evaluation of its pollution hazards. Until the hazard evaluation is completed, the pollution category assigned is used.

@The NLS category has been assigned by the U.S. Coast Guard, in absence of one assigned by the IMO. The category is based upon a GESAMP Hazard Profile or by analogy to a closely related product having an NLS assigned.

Abbreviations for Noxious liquid Cargoes:

N.F.—non-flammable (flash point greater than 60 degrees C (140 degrees F) cc).
n.o.s.—not otherwise specified.
ST—Ship type.
Cat—Pollution category.

[CGD 88–100, 54 FR 43584, Oct. 26, 1989; CGD 92–100, 59 FR 17044, Apr. 11, 1994, as amended by CGD 94–900, 59 FR 45142, Aug. 31, 1994; CGD 94–902, 60 FR 34043, June 29, 1995; CGD 95–900, 60 FR 34052, June 29, 1995]

APPENDIX I [RESERVED]

APPENDIX II—METRIC UNITS USED IN PART 153

Parameter	Metric (SI unit)	Abbreviation	Equivalent to English or common metric
Force	Newton	N	0.225 lbs.
Length	Meter	m	39.37 in.
	Centimeter	cm	.3937 in.
Pressure	Pascal	Pa	1.450×10^{-4} lbs/in^2.
	Kilo-Pascal (1,000 Pascals).	kPa	0.145 lbs/in^2.
	Kilo-Pascal	kPa	1.02×10^{-2} kg/cm^2.
	....do	kPa	1×10^3 N/m^2.
Temperature	Degree Celsius	° C	5/9 (°F–32).
Viscosity	milli-Pascal second.	mPa. sec.	1.0 centipoise.
Volume	Cubic meter	m^3	264 gallons (gal).
	....do	m^3	35.3 ft^3.

[CGD 73–96, 42 FR 49027, Sept. 26, 1977, as amended by CGD 78–128, 47 FR 21212, May 17, 1982; CGD 81–101, 52 FR 7799, Mar. 12, 1987. Redesignated by CGD 92–100, 59 FR 17045, Apr. 11, 1994]

PART 154—SAFETY STANDARDS FOR SELF-PROPELLED VESSELS CARRYING BULK LIQUEFIED GASES

Subpart A—General

Sec.

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154.30 Liquefied gases not included in Table 4.
154.32 Equivalents.
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