

TABLE 151.05 TO SUBPART 151.05 OF PART 151—SUMMARY OF MINIMUM REQUIREMENTS

| Cargo name            | Cargo identification <sup>1</sup> |       | Hull type | Cargo segregation tank | Tanks             |      |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 46 CFR Part 151     | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|-----------------------|-----------------------------------|-------|-----------|------------------------|-------------------|------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|
|                       | Pressure                          | Temp. |           |                        | Type              | Vent | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                     |
| a.                    | b.                                | c.    | d.        | e.                     | f.                | g.   | h.             | i.             | j.      | k.                    | l.                   | m.                       | n.  | o.                                | p.                     | q.                                  |
| Acetaldehyde .....    | Press.                            | Amb.  | II        | 1NA<br>2ii             | Ind. Pressure.    | SR   | Restr.         | II             | P-1     | Inert                 | Vent F               | Yes                      | .55-1(h)                                    | I-C                               | NA                     | G                                   |
| Acetic acid .....     | Atmos.                            | Amb.  | III       | 1i<br>2ii              | Integral Gravity. | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .50-73<br>.55-1(g)                          | I-D                               | NA                     | G                                   |
| Acetic anhydride ...  | Atmos.                            | Amb.  | III       | 1i<br>2ii              | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .50-73<br>.55-1(g)                          | I-D                               | NA                     | G                                   |
| Acetone cyano-hydrin. | Atmos.                            | Amb.  | I         | 1ii<br>2i              | Integral Gravity. | PV   | Closed         | I              | G-1     | NR                    | Vent F               | Yes                      | .50-5 ...<br>.50-70(b).<br>.50-73<br>.50-81 | I-D                               | NA                     | G                                   |
| Acetonitrile .....    | Atmos.                            | Amb.  | III       | 1i<br>2ii              | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | No .....                                    | I-D                               | NA                     | G                                   |
| Acrylic acid .....    | Atmos.                            | Amb.  | III       | 1ii<br>2ii             | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .50-70(a).<br>.50-73<br>.50-81<br>.58-1(a)  | I-D                               | NA                     | G                                   |
| Acrylonitrile .....   | Atmos.                            | Amb.  | II        | 1ii<br>2ii             | Integral Gravity. | PV   | Closed         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(e)<br>.50-70(a).                      | I-D                               | NA                     | G                                   |
| Adiponitrile .....    | Atmos.                            | Amb.  | II        | 1ii<br>2i              | Integral Gravity. | PV   | Open           | II             | G-1     | NR                    | Vent F               | Yes                      | No .....                                    | I-D                               | NA                     | G                                   |

| Cargo identification <sup>1</sup>            |          | Hull type | Cargo segregation tank | Tanks        |                    |              | Cargo transfer |              |         | Environmental control |                      | Special requirements in 46 CFR Part 151 | Elec-trical hazard class and group  | Temp. control install. | Tank in-ternal in-spect. period—years |                          |
|--|----------|-----------|------------------------|--------------|--------------------|--------------|----------------|--------------|---------|-----------------------|----------------------|---|-------------------------------------|------------------------|---------------------------------------|--------------------------|
| Cargo name                                   | Pressure |           |                        | Temp.        | Type               | Vent         | Gauging device | Piping class | Control | Cargo tanks           | Cargo handling space |   |                                     |                        |                                       | Fire protection required |
| a.   | b.       | c.        | d.                     | e.           | f.                 | g.           | h.             | i.           | j.      | k.                    | l.                   | m.                                      | n.                                  | o.                     | p.                                    | q.                       |
| Alkylbenzenesulfonic acid (greater than 4%). | Atmos.   | Elev.     | III                    | 1 ii<br>2 ii | Integral Grav-ity. | Open         | Open           | II           | G-1     | NR                    | Vent N               | Yes                                     | .50-73<br>.58-1(e)                  | I-B                    | NA                                    | G                        |
| Alkyl(C7–C9) ni-trates.                      | Atmos.   | Amb.      | III                    | 1 i<br>2 ii  | Integral Grav-ity. | Open         | Open           | II           | G-1     | NR                    | Vent N               | Yes                                     | .50-81<br>.50-86                    | NA                     | NA                                    | G                        |
| Allyl alcohol .....                          | Atmos.   | Amb.      | I                      | 1 ii<br>2 ii | Integral Grav-ity. | PV           | Closed         | I            | G-1     | NR                    | Vent F               | Yes                                     | .50-5 ...<br>.50-73                 | I-C                    | NA                                    | G                        |
| Allyl chloride .....                         | Atmos.   | Amb.      | I                      | 1 ii<br>2 ii | Integral Grav-ity. | PV           | Closed         | I            | G-1     | NR                    | Vent F               | Yes                                     | .50-5 ...                           | I-D                    | NA                                    | G                        |
| Aluminum sulfate solution.                   | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Integral Grav-ity. | Open         | Open           | II           | G-1     | NR                    | Vent N               | Yes                                     | .58-1(e)                            | NA                     | NA                                    | G                        |
| Aminoethylethanol-amine.                     | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Integral Grav-ity. | Open         | Open           | II           | G-1     | NR                    | Vent N               | Yes                                     | .55-1(b)                            | NA                     | NA                                    | G                        |
| Ammonia, anhy-drous.                         | Press.   | Amb.      | II                     | 1NA<br>2 ii  | Ind. Pres-sure.    | SR250 p.s.i. | Restr.         | II           | P-2     | NR                    | Vent F               | No                                      | .50-30<br>.50-32                    | I-D                    | NA                                    | G                        |
| Ammonia, anhy-drous.                         | Atmos.   | Low       | II                     | 1NA<br>2 ii  | Ind. Grav-ity.     | PV           | Restr.         | II-L         | G-2     | NR                    | Vent F               | No                                      | .50-30<br>.50-32                    | I-D                    | .40-1(b)(1)                           | 8                        |
| Ammonium bisulfite solution (70% or less).   | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Integral Grav-ity. | Open         | Open           | II           | G-1     | NR                    | Vent N               | No                                      | .50-73<br>.56-1(a),<br>(b),<br>(c). | NA                     | NA                                    | G                        |

|   | Atmos. | Amb.          | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | PV   | Restr. | II   | G-1 | NR | Vent F | No  | .56-<br>1(a),<br>(b),<br>(c),<br>(f),<br>(g).   | I-D | NA       | G |
|---|--------|---------------|-----|--------------|---------------------------|------|--------|------|-----|----|--------|-----|---|-----|----------|---|
| Ammonium hydroxide (28% or less NH <sub>3</sub> ).                                |        |               |     |              |                           |      |        |      |     |    |        |     |   |     |          |   |
| Aniline .....   | Atmos. | Amb.          | I   | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Closed | I    | G-1 | NR | Vent F | Yes | .50-5<br>.50-73                                 | I-D | NA       | G |
| Anthracene oil (Coal tar fraction).   | Atmos. | Amb.<br>Elev. | II  | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | Open | Open   | II   | G-1 | NR | Vent N | Yes | No .....  | I-D | NA       | G |
| Argon, liquefied .....  | Press. | Low           | III | 1NA<br>2 i   | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II-L | P-1 | NR | Vent F | No  | .40-1(a)<br>.50-30<br>.50-36                    | NA  | .40-1(a) | G |
| Benzene .....   | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Closed | II   | G-1 | NR | Vent F | Yes | .50-60  | I-D | NA       | G |
| Benzene hydrocarbon mixtures (containing Acetylenes (having 10% Benzene or more). | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Closed | II   | G-1 | NR | Vent F | Yes | .50-60<br>.56-<br>1(b),<br>(d),<br>(f),<br>(g). | I-D | NA       | G |
| Benzene hydrocarbon mixtures (having 10% Benzene or more).                        | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Closed | II   | G-1 | NR | Vent F | Yes | .50-60  | I-D | NA       | G |
| Benzene, Toluene, Xylene mixtures (having 10% Benzene or more).                   | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Closed | II   | G-1 | NR | Vent F | Yes | .50-60  | I-D | NA       | G |
| Butadiene .....   | Press. | Amb.          | II  | 1NA<br>2 ii  | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II   | P-2 | NR | Vent F | Yes | .50-<br>70(a).<br>.50-73                        | I-B | NA       | G |

| Cargo name  |        | Cargo identification <sup>1</sup> |       | Hull type  | Cargo segregation tank | Tanks |        |                | Cargo transfer |         | Environmental control |                      | Fire protection required  | Special requirements in 15 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|---|--------|-----------------------------------|-------|------------|------------------------|-------|--------|----------------|----------------|---------|-----------------------|----------------------|---|---|-----------------------------------|------------------------|-------------------------------------|
|   |        | Pressure                          | Temp. |            |                        | Type  | Vent   | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |   |   |                                   |                        |                                     |
| a.  | b.     | c.                                | d.    | e.         | f.                     | g.    | h.     | i.             | j.             | k.      | l.                    | m.                   | n.  | o.                                      | p.                                | q.                     |                                     |
| Butadiene, Butylene mixtures (containing Acetylenes). | Press. | Amb.                              | II    | 1NA<br>2ii | Ind. Pressure.         | SR    | Restr. | II             | P-1            | NR      | Vent F                | Yes                  | .50-30<br>.50-70(a).<br>.50-73<br>.56-1(b),<br>(d),<br>(f),<br>(g). | I-B                                     | NA                                | G                      |                                     |
| Butyl acrylate (all isomers).                         | Atmos. | Amb.                              | III   | 1i<br>2ii  | Integral Gravity.      | PV    | Restr. | II             | G-1            | NR      | Vent F                | Yes                  | .50-70(a).<br>.50-81(a),<br>(b).                                    | I-D                                     | NA                                | G                      |                                     |
| Butylamine (all isomers).                             | Atmos. | Amb.                              | II    | 1ii<br>2ii | Ind. Gravity.          | PV    | Closed | II             | G-1            | NR      | Vent F                | Yes                  | .55-1(c)  | I-D                                     | NA                                | G                      |                                     |
| Butyl methacrylate                                    | Atmos. | Amb.                              | III   | 1i<br>2ii  | Integral Gravity.      | PV    | Restr. | II             | G-1            | NR      | Vent F                | Yes                  | .50-70(a).<br>.50-81(a),<br>(b).                                    | I-D                                     | NA                                | G                      |                                     |
| Butylaldehyde (all isomers).                          | Atmos. | Amb.                              | III   | 1i<br>2ii  | Integral Gravity.      | PV    | Open   | II             | G-1            | NR      | Vent F                | Yes                  | .55-1(h)  | I-C                                     | NA                                | G                      |                                     |
| Camphor oil (light)                                   | Atmos. | Amb.                              | II    | 1ii<br>2ii | Integral Gravity.      | Open  | Open   | II             | G-1            | NR      | Vent N                | Yes                  | No .....  | I-D                                     | NA                                | G                      |                                     |
| Carbolic oil .....                                    | Atmos. | Amb.                              | I     | 1ii<br>2ii | Integral Gravity.      | PV    | Closed | I              | G-1            | NR      | Vent F                | Yes                  | .50-5...<br>.50-73  | NA                                      | NA                                | G                      |                                     |

|                                      | Press. | Low           | III | 1NA<br>2i  | Ind.<br>Pres-<br>sure.    | SR              | Restr.   | I-L | P-1 | NR    | Vent F | No  | .50-30                     | NA  | .40-<br>1(b)(1) | G |
|--------------------------------------|--------|---------------|-----|------------|---------------------------|-----------------|----------|-----|-----|-------|--------|-----|----------------------------|-----|-----------------|---|
| Carbon dioxide, /iq-<br>uefied.      | Atmos. | Amb.          | II  | 1NA<br>2ii | Ind.<br>Grav-<br>ity.     | PV              | Restr.   | II  | G-1 | Inert | Vent F | Yes | .50-40<br>.50-41           | I-A | NA              | G |
| Carbon tetra-<br>chloride.           | Atmos. | Amb.          | III | 1i<br>2i   | Integral<br>Grav-<br>ity. | PV              | Open     | II  | G-1 | NR    | Vent N | No  | No .....                   | NA  | NA              | G |
| Cashew nut shell<br>oil (untreated). | Atmos. | Amb.          | III | 1ii<br>2i  | Integral<br>Grav-<br>ity. | PV              | Restr.   | II  | G-2 | NR    | Vent N | Yes | .50-73                     | NA  | NA              | G |
| Caustic potash so-<br>lution.        | Atmos. | Amb.<br>Elev. | III | 1i<br>2i   | Integral<br>Grav-<br>ity. | Open            | Open     | II  | G-1 | NR    | NR     | No  | .50-73<br>.55-1(j)         | NA  | NA              | G |
| Caustic soda solu-<br>tion.          | Atmos. | Amb.<br>Elev. | III | 1i<br>2i   | Integral<br>Grav-<br>ity. | Open            | Open     | II  | G-1 | NR    | NR     | No  | .50-73<br>.55-1(j)         | NA  | NA              | G |
| Chlorine .....                       | Press. | Amb.          | I   | 1NA<br>2ii | Ind.<br>Pres-<br>sure.    | SR300<br>p.s.i. | Indirect | I   | P-2 | NR    | Vent F | No  | .50-30<br>.50-31           | NA  | NA              | 3 |
| Chlorobenzene .....                  | Atmos. | Amb.          | III | 1i<br>2ii  | Integral<br>Grav-<br>ity. | PV              | Open     | II  | G-1 | NR    | Vent N | Yes | No .....                   | I-D | NA              | G |
| Chloroform .....                     | Atmos. | Amb.          | III | 1i<br>2i   | Integral<br>Grav-<br>ity. | Open            | Open     | II  | G-1 | NR    | Vent F | No  | No .....                   | NA  | NA              | G |
| Chlorohydrins<br>( <i>crude</i> ).   | Atmos. | Amb.          | I   | 1ii<br>2ii | Integral<br>Grav-<br>ity. | PV              | Closed   | I   | G-1 | NR    | Vent F | Yes | .50-5 ...                  | I-D | NA              | G |
| o-<br>Chloronitrobenze-<br>ne.       | Atmos. | Amb.          | I   | 1ii<br>2ii | Integral<br>Grav-<br>ity. | PV              | Closed   | I   | G-1 | NR    | Vent F | Yes | .50-5 ...<br>.50-73        | NA  | NA              | G |
| Chlorosulfonic acid                  | Atmos. | Amb.          | III | 1ii<br>2ii | Integral<br>Grav-<br>ity. | PV              | Open     | II  | G-1 | NR    | Vent N | No  | .50-20<br>.50-21<br>.50-73 | I-B | NA              | G |
| Coal tar naphtha<br>solvent.         | Atmos. | Amb.          | III | 1i<br>2i   | Integral<br>Grav-<br>ity. | PV              | Restr.   | II  | G-1 | NR    | Vent F | Yes | .50-73                     | I-D | NA              | G |

| Cargo identification <sup>1</sup>                                   |          | Hull type | Cargo segregation tank | Tanks        |      |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|---|----------|-----------|------------------------|--------------|------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|
|   |          |           |                        | Type         | Vent | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                     |
| Cargo name  | Pressure | Temp.     |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |
| Coal tar naphtha solvent.   | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .50-73                                  | I-D                               | NA                     | G                                   |
| Coal tar pitch (molten).  | Atmos.   | Elev.     | III                    | 1 ii<br>2 ii | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .50-73                                  | I-D                               | NA                     | G                                   |
| Creosote .....  | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | No .....                                | NA                                | NA                     | G                                   |
| Cresols (all isomers).  | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | No .....                                | NA                                | NA                     | G                                   |
| <i>Cresols with less than 5% Phenol, see Cresols (all isomers).</i> |          |           |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |
| <i>Cresols with 5% or more Phenol, see Phenol.</i>                  |          |           |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |
| Cresylate spent caustic.  | Atmos.   | Amb.      | III                    | 1 ii<br>2 i  | Open | Open           | II             | G-1     | NR                    | Vent N               | No                       | .50-73<br>.55-1(b)                      | NA                                | NA                     | G                                   |
| Cresylic acid, sodium salt solution, see Cresylate spent caustic.   |          |           |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |
| Crotonaldehyde .....  | Atmos.   | Amb.      | II                     | 1 ii<br>2 ii | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(h)                                | I-C                               | NA                     | G                                   |
| Cyclohexanone .....   | Atmos.   | Amb.      | III                    | 1 i<br>2 ii  | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .56-1(a),<br>(b).                       | I-D                               | NA                     | G                                   |

|   | Atmos. | Amb. | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .56-1(b)   | I-D | NA | G |
|---|--------|------|-----|--------------|---------------------------|------|--------|----|-----|----|--------|-----|--|-----|----|---|
| Cyclohexanone,<br>Cyclohexanol<br>mixture.                                  |        |      |     |              |                           |      |        |    |     |    |        |     |  |     |    |   |
| Cyclohexylamine ...   | Atmos. | Amb. | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .56-<br>1(a),<br>(b),<br>(c),<br>(g).                | I-D | NA | G |
| Cyclopentadiene,<br>Styrene, Ben-<br>zene mixture.                          | Atmos. | Amb. | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | Vent F | Yes | .50-60<br>.56-1(b)                                   | I-D | NA | G |
| iso-Decyl acrylate ..   | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | Vent N | Yes | .50-<br>70(a),<br>.50-<br>81(a),<br>(b),<br>.55-1(c) | NA  | NA | G |
| Dichlorobenzene<br>(all isomers).   | Atmos. | Amb. | III | 1 ii<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .56-<br>1(a),<br>(b).                                | I-D | NA | G |
| Dichlorodifluoro-<br>methane.   | Press. | Amb. | III | 1NA<br>2 i   | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II | P-1 | NR | NR     | No  | No .....   | NA  | NA | G |
| 1,1-Dichloroethane  | Atmos. | Amb. | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | No .....   | I-D | NA | G |
| 2,2'-Dichloroethyl<br>ether.  | Atmos. | Amb. | II  | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .55-1(f)   | I-C | NA | G |
| Dichloromethane ...   | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | No  | No .....   | I-D | NA | G |
| 2,4-<br>Dichlorophenoxy<br>acetic acid,<br>diethanolamine<br>salt solution. | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | Vent N | No  | .56-<br>1(a),<br>(b),<br>(c),<br>(g).                | NA  | NA | G |

| Cargo identification <sup>1</sup>                                 |            | Hull type | Cargo segregation tank | Tanks             |        |                | Cargo transfer |         | Environmental control |                          | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|---|------------|-----------|------------------------|-------------------|--------|----------------|----------------|---------|-----------------------|--------------------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|
|   |            |           |                        | Type              | Vent   | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space     |                          |   |                                   |                        |                                     |
| 2,4-Dichlorophenoxyacetic acid, dimethylamine salt solution.      | Atmos.     | III       | 1 i<br>2 i             | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent F                   | No                       | .56-1(a), (b), (c), (g).                | NA                                | G                      |                                     |
|   | Amb. Elev. |           |                        | Open              | Open   | G-1            | NR             | Vent N  | No                    | .56-1(a), (b), (c), (g). | NA                       | G                                       |                                   |                        |                                     |
| 2,4-Dichlorophenoxyacetic acid, trisopropanolamine salt solution. | Atmos.     | III       | 1 i<br>2 i             | Integral Gravity. | Open   | Open           | II             | G-1     | NR                    | Vent N                   | No                       | .56-1(a), (b), (c), (g).                | NA                                | G                      |                                     |
|   | Amb.       |           |                        | PV                | Restr. | II             | G-1            | NR      | Vent F                | Yes                      | No .....                 | I-D                                     | NA                                | G                      |                                     |
| 1,1-Dichloropropane.  | Atmos.     | III       | 1 i<br>2 ii            | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent F                   | Yes                      | No .....                                | NA                                | G                      |                                     |
| 1,2-Dichloropropane.  | Atmos.     | III       | 1 i<br>2 ii            | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent F                   | Yes                      | No .....                                | NA                                | G                      |                                     |
| 1,3-Dichloropropane.  | Atmos.     | III       | 1 i<br>2 ii            | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent F                   | Yes                      | No .....                                | NA                                | G                      |                                     |
| 1,3-Dichloropropene.  | Atmos.     | II        | 1 ii<br>2 ii           | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent F                   | Yes                      | No .....                                | NA                                | G                      |                                     |
| Dichloropropene, Dichloropropane mixtures.                        | Atmos.     | II        | 1 ii<br>2 ii           | Integral Gravity. | PV     | Closed         | II             | G-1     | NR                    | Vent F                   | Yes                      | No .....                                | NA                                | G                      |                                     |
|   | Amb.       |           |                        | Open              | Open   | II             | G-1            | Dry     | Vent F                | Yes                      | .50-73 .58-1(e)          | NA                                      | G                                 |                        |                                     |
| 2,2-Dichloropropionic acid.                                       | Atmos.     | II        | 1 ii<br>2 i            | Integral Gravity. | PV     | Restr.         | II             | G-1     | NR                    | Vent N                   | Yes                      | .55-1(c)                                | NA                                | G                      |                                     |
| Diethanolamine .....  | Atmos.     | III       | 1 i<br>2 i             | Integral Gravity. | Open   | Open           | II             | G-1     | NR                    | Vent N                   | Yes                      | .55-1(c)                                | NA                                | G                      |                                     |



| Diethylamine .....                 | Atmos. | Amb.  | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR           | Vent F | Yes | .55-1(c)                           | I-C | NA  | G |
|------------------------------------|--------|-------|-----|--------------|---------------------------|------|--------|----|-----|--------------|--------|-----|------------------------------------|-----|-----|---|
| Diethylenetriamine                 | Atmos. | Amb.  | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR           | Vent N | Yes | .55-1(c)                           | NA  | NA  | G |
| Diethyl ether, see<br>Ethyl ether. |        |       |     |              |                           |      |        |    |     |              |        |     |                                    |     |     |   |
| Diisobutylamine .....              | Atmos. | Amb.  | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR           | Vent F | Yes | .55-1(c)                           | I-C | NA  | G |
| Diisopropanolamine                 | Atmos. | Amb.  | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR           | Vent N | Yes | .55-1(c)                           | NA  | NA  | G |
| Diisopropylamine ...               | Atmos. | Amb.  | II  | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Closed | II | G-1 | NR           | Vent F | Yes | .55-1(c)                           | I-C | NA  | G |
| N,N-<br>Dimethylacetami-<br>de.    | Atmos. | Amb.  | III | 1 ii<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR           | Vent F | Yes | .56-1(b)                           | I-D | NA  | G |
| Dimethylamine .....                | Press. | Amb.  | II  | 1NA<br>2 ii  | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II | P-2 | NR           | Vent F | Yes | .55-1(c)                           | I-C | NA  | G |
| Dimethylethanolam-<br>ine.         | Atmos. | Amb.  | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR           | Vent F | Yes | .56-<br>1(b),<br>(c).              | I-C | NA  | G |
| Dimethylformamide                  | Atmos. | Amb.  | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR           | Vent F | Yes | .55-1(e)                           | I-D | NA  | G |
| 1,4-Dioxane .....                  | Atmos. | Amb.  | II  | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Closed | II | G-1 | Inert        | Vent F | Yes | No .....                           | I-C | NA  | G |
| Diphenylmethane<br>diisocyanate.   | Atmos. | Elev. | II  | 1 ii<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Closed | I  | G-1 | Inert<br>Dry | Vent F | Yes | .50-5 ...<br>.56-<br>1(a),<br>(b). | NA  | Yes | G |

| Cargo identification <sup>1</sup>                       |        | Hull type | Cargo segregation tank | Tanks             |      |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal spec. period—years |
|---|--------|-----------|------------------------|-------------------|------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|----------------------------------|
|   |        |           |                        | Type              | Vent | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                  |
| Di-n-propylamine ...                                    | Atmos. | Amb.      | II                     | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(c)                                | I-C                               | NA                     | G                                |
| Dodecyl-dimethylamine, Tetradecyldimethylamine mixture. | Atmos. | Amb.      | III                    | Integral Gravity. | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .56-1(b)                                | NA                                | NA                     | G                                |
| Dodecyl phenol .....                                    | Atmos. | Amb.      | I                      | Integral Gravity. | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .50-73                                  | I-D                               | NA                     | 2                                |
| Epichlorohydrin .....                                   | Atmos. | Amb.      | I                      | Integral Gravity. | PV   | Closed         | I              | G-1     | NR                    | Vent F               | Yes                      | .50-5 ...                               | I-C                               | NA                     | G                                |
| Ethanolamine .....                                      | Atmos. | Amb.      | III                    | Integral Gravity. | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .55-1(c)                                | I-D                               | NA                     | G                                |
| Ethyl acrylate .....                                    | Atmos. | Amb.      | III                    | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .50-70(a), .50-81(a), (b).              | I-D                               | NA                     | G                                |
| Ethylamine solution (72% or less).                      | Atmos. | Amb.      | II                     | Integral Gravity. | PV   | Closed         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(b)                                | I-D                               | NA                     | G                                |
| N-Ethylbutylamine                                       | Atmos. | Amb.      | III                    | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(b)                                | I-C                               | NA                     | G                                |
| Ethyl chloride .....                                    | Press. | Amb.      | II                     | Ind. Pressure.    | SR   | Restr.         | II             | P-2     | NR                    | Vent F               | Yes                      | No .....                                | I-D                               | NA                     | 8                                |
| N-Ethylcyclohexylamine.                                 | Atmos. | Amb.      | III                    | Integral Gravity. | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | Yes                      | .55-1(b)                                | I-C                               | NA                     | G                                |

|  | Atmos. | Amb. | I   | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Closed | I  | G-1 | NR    | Vent F | Yes<br>.50-5<br>.50-73  | I-D | NA       | G |
|--|--------|------|-----|--------------|---------------------------|------|--------|----|-----|-------|--------|-------------------------|-----|----------|---|
| Ethylene<br>chlorohydrin.  |        |      |     |              |                           |      |        |    |     |       |        |                         |     |          |   |
| Ethylene cyano-<br>hydrin.   | Atmos. | Amb. | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes<br>No .....         | NA  | NA       | G |
| Ethylenediamine ...  | Atmos. | Amb. | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR    | Vent F | Yes<br>.55-1(c)         | I-D | NA       | G |
| Ethylene dibromide   | Atmos. | Amb. | II  | 1 ii<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Closed | II | G-1 | NR    | Vent F | No<br>No .....          | NA  | NA       | G |
| Ethylene dichloride  | Atmos. | Amb. | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR    | Vent F | Yes<br>No .....         | I-D | NA       | G |
| Ethylene glycol<br>monoalkyl ethers.<br>Including:<br>2-Ethoxyethanol<br>Ethylene glycol<br>butyl ether<br>Ethylene glycol tert-<br>butyl ether<br>Ethylene glycol<br>ethyl ether<br>Ethylene glycol<br>methyl ether<br>Ethylene glycol n-<br>propyl ether<br>Ethylene glycol iso-<br>propyl ether | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR    | Vent F | Yes<br>No .....         | I-C | NA       | G |
| Ethylene glycol<br>hexyl ether.  | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes<br>No .....         | NA  | NA       | G |
| Ethylene glycol<br>propyl ether.   | Atmos. | Amb. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes<br>No .....         | NA  | NA       | G |
| Ethylene oxide .....   | Press. | Amb. | I   | 1NA<br>2 ii  | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II | P-2 | Inert | Vent F | Yes<br>.50-10<br>.50-12 | I-B | .40-1(c) | 4 |

| Cargo name                          |  | Cargo identification <sup>1</sup> |       | Hull type | Cargo segregation tank | Tanks                     |      |                | Cargo transfer |         |             | Environmental control |     | Fire protection required                 | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal spec. period—years |
|-------------------------------------|--|-----------------------------------|-------|-----------|------------------------|---------------------------|------|----------------|----------------|---------|-------------|-----------------------|-----|--|---|-----------------------------------|------------------------|----------------------------------|
|                                     |  | Pressure                          | Temp. |           |                        | Type                      | Vent | Gauging device | Piping class   | Control | Cargo tanks | Cargo handling space  |     |  |   |                                   |                        |                                  |
| Ethyl ether .....                   |  | Atmos.                            | Amb.  | II        | 1NA<br>2ii             | Ind.<br>Grav-<br>ity.     | PV   | Closed         | II             | G-1     | Inert       | Vent F                | Yes | .50-40<br>.50-42                         | I-C                                     | NA                                | G                      |                                  |
| 2-Ethyl/hexyl acrylate.             |  | Atmos.                            | Amb.  | III       | 1i<br>2ii              | Integral<br>Grav-<br>ity. | Open | Open           | II             | G-1     | NR          | Vent N                | Yes | .50-<br>70(a).<br>.50-<br>81(a).<br>(b). | I-D                                     | NA                                | G                      |                                  |
| Ethylidene norbornene.              |  | Atmos.                            | Amb.  | II        | 1ii<br>2ii             | Integral<br>Grav-<br>ity. | PV   | Closed         | II             | G-1     | NR          | Vent F                | Yes | .50-5 ...<br>.50-74                      | NA                                      | NA                                | G                      |                                  |
| Ethyl methacrylate                  |  | Atmos.                            | Amb.  | III       | 1ii<br>2ii             | Integral<br>Grav-<br>ity. | PV   | Restr.         | II             | G-1     | NR          | Vent F                | Yes | .50-<br>70(a).                           | I-D                                     | NA                                | G                      |                                  |
| 2-Ethyl-3-propylacrolein.           |  | Atmos.                            | Amb.  | III       | 1i<br>2i               | Integral<br>Grav-<br>ity. | PV   | Restr.         | II             | G-1     | NR          | Vent F                | Yes | No .....                                 | I-C                                     | NA                                | G                      |                                  |
| Ferric chloride solutions.          |  | Atmos.                            | Amb.  | III       | 1ii<br>2ii             | Integral<br>Grav-<br>ity. | Open | Open           | II             | G-1     | NR          | Vent N                | No  | .50-20<br>.50-75                         | I-B                                     | NA                                | G                      |                                  |
| Fluosilicic acid (30% or less).     |  | Atmos.                            | Amb.  | II        | 1ii<br>2ii             | Ind.<br>Grav-<br>ity.     | PV   | Closed         | II             | G-1     | NR          | Vent F                | No  | .50-20<br>.50-22<br>.50-73<br>.50-77     | I-B                                     | NA                                | 4                      |                                  |
| Formaldehyde solution (37% to 50%). |  | Atmos.                            | Amb.  | III       | 1ii<br>2ii             | Integral<br>Grav-<br>ity. | PV   | Restr.         | II             | G-1     | NR          | Vent F                | No  | .55-1(h)                                 | I-B                                     | NA                                | G                      |                                  |
| Formic acid .....                   |  | Atmos.                            | Amb.  | III       | 1ii<br>2i              | Integral<br>Grav-<br>ity. | PV   | Restr.         | II             | G-1     | NR          | Vent F                | Yes | .50-73<br>.55-1(i)                       | I-D                                     | NA                                | G                      |                                  |
| Furfural .....                      |  | Atmos.                            | Amb.  | III       | 1ii<br>2i              | Integral<br>Grav-<br>ity. | PV   | Restr.         | II             | G-1     | NR          | Vent F                | Yes | .55-1(h)                                 | I-C                                     | NA                                | G                      |                                  |

|   | Atmos. | Amb. | III | 1 i<br>2 i  | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | Vent N | No  | No .....  | NA  | NA | G |
|---|--------|------|-----|-------------|---------------------------|------|--------|----|-----|----|--------|-----|---|-----|----|---|
| Glutaraldehyde so-<br>lution (50% or<br>less).  |        |      |     |             |                           |      |        |    |     |    |        |     |   |     |    |   |
| Glyoxylic acid solu-<br>tion (50% or less).   | Atmos. | Amb. | III | 1 i<br>2 ii | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | Vent N | Yes | .50-73<br>.50-81<br>.58-1(e)                                    | NA  | NA | G |
| Hexamethylenedia-<br>mine solution.   | Atmos. | Amb. | III | 1 i<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .55-1(c)  | I-D | NA | G |
| Hexamethylenemini-<br>me.   | Atmos. | Amb. | II  | 1 ii<br>2 i | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR | Vent F | Yes | .56-<br>1(b),<br>(c).   | I-C | NA | G |
| Hydrochloric acid ...   | Atmos. | Amb. | III | 1NA<br>2 ii | Ind.<br>Grav-<br>ity.     | Open | Open   | II | G-1 | NR | Vent F | No  | .50-20<br>.50-22<br>.50-73                                      | I-B | NA | 4 |
| <i>Hydrofluorosilicic<br/>acid (25% or<br/>less), see<br/>Fluorosilicic acid<br/>(30% or less).</i>                           |        |      |     |             |                           |      |        |    |     |    |        |     |   |     |    |   |
| 2-Hydroxyethyl ac-<br>rylate.   | Atmos. | Amb. | I   | 1 ii<br>2 i | Integral<br>Grav-<br>ity. | PV   | Closed | I  | G-1 | NR | Vent F | Yes | .50-5 ...<br>.50-<br>70(a),<br>.50-73<br>.50-<br>81(a),<br>(b). | NA  | NA | G |
| Isoprene .....  | Atmos. | Amb. | III | 1 i<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Open   | II | G-1 | NR | Vent F | Yes | .50-<br>70(a),<br>.50-<br>81(a),<br>(b).                        | I-D | NA | G |
| Kraft pulping liquors<br>(free alkali con-<br>tent 3% or more)<br>(including: <i>Black,<br/>Green, or White<br/>liquor</i> ). | Atmos. | Amb. | III | 1 i<br>2 i  | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR | NR     | No  | .50-73<br>.56-<br>1(a),<br>(c),<br>(g).                         | NA  | NA | G |

| Cargo identification <sup>1</sup>           |          | Hull type | Cargo segregation tank | Tanks                          |      |        | Cargo transfer |              | Environmental control |             | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|---|----------|-----------|------------------------|--------------------------------|------|--------|----------------|--------------|-----------------------|-------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|
| Cargo name                                  | Pressure |           |                        | Temp.                          | Type | Vent   | Gauging device | Piping class | Control               | Cargo tanks |                          |   |                                   |                        |                                     |
| Mesityl oxide .....                         | Atmos.   | Amb.      | III                    | 1 ii<br>Integral Grav-<br>ity. | PV   | Restr. | II             | G-1          | NR                    | Vent F      | Yes                      | No .....                                | I-D                               | NA                     | G                                   |
| Methylacetylene<br>Propadiene mix-<br>ture. | Press.   | Amb.      | III                    | 1 NA<br>Ind. Pres-<br>sure.    | SR   | Restr. | II             | P-2          | NR                    | Vent F      | Yes                      | .50-79                                  | I-C                               | NA                     | G                                   |
| Methyl acrylate .....                       | Atmos.   | Amb.      | III                    | 1 i<br>Integral Grav-<br>ity.  | PV   | Restr. | II             | G-1          | NR                    | Vent F      | Yes                      | .50-70(a),<br>.50-81(a),<br>(b).        | I-D                               | NA                     | G                                   |
| Methylamine solu-<br>tion (42% or less).    | Atmos.   | Amb.      | II                     | 1 NA<br>Ind. Grav-<br>ity.     | PV   | Closed | II             | G-1          | NR                    | Vent F      | Yes                      | .56-1(a),<br>(b),<br>(c),<br>(g).       | I-D                               | NA                     | G                                   |
| Methyl bromide .....                        | Press.   | Amb.      | I                      | 1 NA<br>Ind. Pres-<br>sure.    | SR   | Closed | I              | P-2          | NR                    | Vent F      | Yes                      | .50-5 ...                               | I-D                               | NA                     | 2                                   |
| Methyl chloride .....                       | Press.   | Amb.      | II                     | 1 NA<br>Ind. Pres-<br>sure.    | SR   | Restr. | II             | P-2          | NR                    | Vent F      | Yes                      | .55-1(c)                                | I-D                               | NA                     | 8                                   |
| Methycyclopentadi-<br>ene dimer.            | Atmos.   | Amb.      | III                    | 1 i<br>Integral Grav-<br>ity.  | PV   | Restr. | II             | G-1          | NR                    | Vent F      | Yes                      | No .....                                | I-B                               | NA                     | G                                   |
| Methyl diethanolamine.                      | Atmos.   | Amb.      | III                    | 1 i<br>Integral Grav-<br>ity.  | Open | Open   | II             | G-1          | NR                    | Vent N      | Yes                      | .56-1(b),<br>(c).                       | I-C                               | NA                     | G                                   |
| 2-Methyl-5-<br>ethylpyridine.               | Atmos.   | Amb.      | III                    | 1 i<br>Integral Grav-<br>ity.  | Open | Open   | II             | G-1          | NR                    | Vent N      | Yes                      | .55-1(e)                                | I-D                               | NA                     | G                                   |

|   |        |      |     |               |                    |      |        |      |     |    |        |     |                                  |     |          |       |
|---|--------|------|-----|---------------|--------------------|------|--------|------|-----|----|--------|-----|----------------------------------|-----|----------|-------|
| Methyl methacrylate.  | Atmos. | Amb. | III | 1 i<br>2 ii   | Integral Grav-ity. | PV   | Restr. | II   | G-1 | NR | Vent F | Yes | .50-70(a),<br>.50-81(a),<br>(b). | I-D | NA       | G     |
| 2-Methylpyridine ...  | Atmos. | Amb. | III | 1 i<br>2 ii   | Integral Grav-ity. | PV   | Restr. | II   | G-1 | NR | Vent F | Yes | .55-1(c)                         | I-D | NA       | G     |
| alpha-Methylstyrene.  | Atmos. | Amb. | III | 1 i<br>2 ii   | Integral Grav-ity. | PV   | Restr. | II   | G-1 | NR | Vent F | Yes | .50-70(a),<br>.50-81(a),<br>(b). | I-D | NA       | G     |
| Monochlorodifluoromethane.                                  | Press. | Amb. | III | 1NA<br>2 i    | Ind. Pres-sure.    | SR   | Restr. | I    | P-1 | NR | NR     | No  | No .....                         | NA  | NA       | G     |
| Morpholine .....  | Atmos. | Amb. | III | 1 i<br>2 ii   | Integral Grav-ity. | Open | Open   | II   | G-1 | NR | Vent N | Yes | .55-1(c)                         | I-C | NA       | G     |
| Motor fuel anti-knock com-pounds (con-taining lead alkyls). | Atmos. | Amb. | I   | 1 i i<br>2 ii | Ind. Grav-ity.     | PV   | Closed | I    | G-1 | NR | Vent F | Yes | .50-6 ...<br>.50-73              | I-D | NA       | .50-6 |
| Nitric acid (70% or less).                                  | Atmos. | Amb. | II  | 1 i i<br>2 ii | Integral Grav-ity. | PV   | Restr. | II   | G-1 | NR | Vent F | No  | .50-20<br>.50-73<br>.50-80       | I-B | NA       | 4     |
| Nitrobenzene .....  | Atmos. | Amb. | I   | 1 i i<br>2 ii | Integral Grav-ity. | PV   | Closed | I    | G-1 | NR | Vent F | Yes | .50-5 ...<br>.50-73              | I-D | NA       | G     |
| Nitrogen, liquefied   | Press. | Low  | III | 1NA<br>2 i    | Ind. Pres-sure.    | SR   | Restr. | II-L | P-1 | NR | Vent F | No  | .40-1(a)<br>.50-30<br>.50-36     | NA  | .40-1(a) | G     |
| 1- or 2-Nitropropane.                                       | Atmos. | Amb. | III | 1 i i<br>2 ii | Integral Grav-ity. | PV   | Restr. | II   | G-1 | NR | Vent F | Yes | .50-81                           | I-C | NA       | G     |
| o-Nitrotoluene .....  | Atmos. | Amb. | I   | 1 i i<br>2 ii | Integral Grav-ity. | PV   | Closed | I    | G-1 | NR | Vent F | Yes | .50-5 ...<br>.50-73              | I-D | NA       | G     |

| Cargo identification <sup>1</sup>                              |          | Hull type | Cargo segregation tank | Tanks        |                    |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 15 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal spec. period—years |
|--|----------|-----------|------------------------|--------------|--------------------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|----------------------------------|
|  |          |           |                        | Type         | Vent               | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                  |
| Cargo name   | Pressure | Temp.     |                        |              |                    |                |                |         |                       |                      |                          |   |                                   |                        |                                  |
| <i>Octyl nitrates (all isomers), see Alky(C7–C9) nitrates.</i> |          |           |                        |              |                    |                |                |         |                       |                      |                          |   |                                   |                        |                                  |
| Oleum .....  | Atmos.   | Amb.      | III                    | 1 ii<br>2 ii | Integral Grav-ity. | Open           | Open           | II      | G-1                   | NR                   | Vent N                   | No .50-20<br>.50-21<br>.50-73           | I-B                               | NA                     | 4                                |
| Pentachloroethane  | Atmos.   | Amb.      | III                    | 1 ii<br>2 i  | Integral Grav-ity. | PV             | Restr.         | II      | G-1                   | NR                   | Vent F                   | No No .....                             | NA                                | NA                     | G                                |
| 1,3-Pentadiene .....   | Atmos.   | Amb.      | III                    | 1 i<br>2 ii  | Integral Grav-ity. | PV             | Restr.         | II      | G-1                   | NR                   | Vent F                   | Yes .50-70(a)<br>.50-81                 | I-D                               | NA                     | G                                |
| Perchloroethylene ..   | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Integral Grav-ity. | PV             | Restr.         | II      | G-1                   | NR                   | Vent F                   | No No .....                             | NA                                | NA                     | G                                |
| Phenol .....   | Atmos.   | Amb.      | I                      | 1 ii<br>2 i  | Integral Grav-ity. | PV             | Closed         | I       | G-1                   | NR                   | Vent F                   | Yes .50-5 ...<br>.50-73                 | I-D                               | NA                     | 2                                |
| Phosphoric acid .....  | Atmos.   | Amb.      | III                    | 1 ii<br>2 i  | Integral Grav-ity. | Open           | Open           | II      | G-1                   | NR                   | Vent N                   | No .50-20<br>.50-23<br>.50-73           | I-B                               | NA                     | 4                                |
| Phosphorus, white (elemental).                                 | Atmos.   | Elev.     | I                      | 1 ii<br>2 ii | Integral Grav-ity. | PV             | Closed         | I       | G-1                   | Water Pad            | Vent F                   | Yes .50-50                              | NA                                | NA                     | 4-8                              |
| Phthalic anhydride (molten).                                   | Atmos.   | Elev.     | III                    | 1 ii<br>2 ii | Integral Grav-ity. | PV             | Restr.         | II      | G-1                   | NR                   | Vent F                   | Yes No .....                            | I-D                               | NA                     | G                                |
| Polyethylene polyamines.                                       | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Integral Grav-ity. | Open           | Open           | II      | G-1                   | NR                   | Vent N                   | Yes .55-1(e)                            | NA                                | NA                     | G                                |



|   | Atmos. | Amb.          | II  | 1 ii<br>2 i  | Integral<br>Grav-<br>ity. | PV   | Closed | II | G-1 | Dry   | Vent F | Yes | .55-1(e)                            | NA  | NA | G |
|---|--------|---------------|-----|--------------|---------------------------|------|--------|----|-----|-------|--------|-----|-------------------------------------|-----|----|---|
| Polymethylene polyphenyl isocyanate.                              |        |               |     |              |                           |      |        |    |     |       |        |     |                                     |     |    |   |
| Potassium hydroxide solution, <i>see</i> Caustic potash solution. |        |               |     |              |                           |      |        |    |     |       |        |     |                                     |     |    |   |
| iso-Propanolamine   | Atmos. | Amb.          | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes | .55-1(c)                            | I-D | NA | G |
| Propanolamine (iso-, n-).   | Atmos. | Amb.          | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes | .56-1(b),<br>(c).                   | I-D | NA | G |
| Propionic acid .....  | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | Yes | .50-73<br>.55-1(g)                  | I-D | NA | G |
| iso-Propylamine .....   | Atmos. | Amb.          | II  | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Closed | II | G-1 | NR    | Vent F | Yes | .55-1(c)                            | I-D | NA | G |
| Propylene oxide .....   | Press. | Amb.          | II  | 1NA<br>2 ii  | Ind.<br>Pres-<br>sure.    | SR   | Restr. | II | P-1 | Inert | Vent F | Yes | .50-10<br>.50-13                    | I-B | NA | G |
| iso-Propyl ether .....  | Atmos. | Amb.          | III | 1 ii<br>2 ii | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | Inert | Vent F | Yes | .50-70(a).                          | I-D | NA | G |
| Pyridine .....  | Atmos. | Amb.          | III | 1 i<br>2 ii  | Integral<br>Grav-<br>ity. | PV   | Restr. | II | G-1 | NR    | Vent F | Yes | .55-1(e)                            | I-D | NA | G |
| Sodium aluminate solution (45% or less).                          | Atmos. | Amb.<br>Elev. | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | NR     | No  | .50-73<br>.56-1(a),<br>(b),<br>(c). | NA  | NA | G |
| Sodium chlorate solution (50% or less).                           | Atmos. | Amb.          | III | 1 i<br>2 i   | Integral<br>Grav-<br>ity. | Open | Open   | II | G-1 | NR    | Vent N | No  | .50-73                              | NA  | NA | G |

| Cargo identification <sup>1</sup>  |          | Hull type | Cargo segregation tank | Tanks        |      |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |  |
|--|----------|-----------|------------------------|--------------|------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|--|
|  |          |           |                        | Type         | Vent | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                     |  |
| Cargo name   | Pressure | Temp.     |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |  |
| Sodium dichromate solution (70% or less).  | Atmos.   | Amb.      | II                     | 1 ii<br>2 ii | Open | Closed         | II             | G-1     | NR                    | Vent N               | No                       | .50-5(d)<br>.50-73<br>.56-1(b),<br>(c). | NA                                | NA                     | G                                   |  |
| Sodium hydroxide solution, <i>see</i> Caustic soda solution.                                       |          |           |                        |              |      |                |                |         |                       |                      |                          |   |                                   |                        |                                     |  |
| Sodium hypochlorite solution (20% or less).  | Atmos.   | Amb.      | III                    | 1 i<br>2 ii  | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | No                       | .50-73<br>.56-1(a),<br>(b).             | NA                                | NA                     | G                                   |  |
| Sodium sulfide, hydrosulfide solutions (H <sub>2</sub> S 15ppm or less).                           | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Open | Open           | II             | G-1     | NR                    | Vent N               | No                       | .50-73<br>.55-1(b)                      | NA                                | NA                     | G                                   |  |
| Sodium sulfide, hydrosulfide solutions (H <sub>2</sub> S greater than 15ppm but less than 200ppm). | Atmos.   | Amb.      | III                    | 1 ii<br>2 i  | PV   | Restr.         | II             | G-1     | NR                    | Vent F               | No                       | .50-73<br>.55-1(b)                      | NA                                | NA                     | G                                   |  |
| Sodium sulfide, hydrosulfide solutions (H <sub>2</sub> S greater than 200ppm).                     | Atmos.   | Amb.      | II                     | 1 ii<br>2 i  | PV   | Closed         | II             | G-1     | NR                    | Vent F               | No                       | .50-73<br>.55-1(b)                      | NA                                | NA                     | G                                   |  |
| Sodium thiocyanate solution (56% or less).   | Atmos.   | Amb.      | III                    | 1 i<br>2 i   | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .58-1(a)                                | NA                                | NA                     | G                                   |  |
| Styrene monomer ..   | Atmos.   | Amb.      | III                    | 1 i<br>2 ii  | Open | Open           | II             | G-1     | NR                    | Vent N               | Yes                      | .50-70(a),<br>.50-81(a),<br>(b).        | I-D                               | NA                     | G                                   |  |

| Sulfur (molten) .....          | Atmos. | Elev. | III | 1 i<br>2 ii | Integral Grav-<br>ity. | Open | Open   | II    | G-1 | Vent N                | Vent N | Yes | .50-55  | I-C | .40-<br>1(f)(1) | G |
|--------------------------------|--------|-------|-----|-------------|------------------------|------|--------|-------|-----|-----------------------|--------|-----|---|-----|-----------------|---|
| Sulfur dioxide .....           | Press. | Amb.  | I   | 1NA<br>2ii  | Ind.<br>Pres-<br>sure. | SR   | Closed | ..... | P-2 | NR                    | Vent F | No  | .50-30<br>.50-84<br>.55-1(i)                    | NA  | NA              | 2 |
| Sulfuric acid .....            | Atmos. | Amb.  | III | 1ii<br>2ii  | Integral Grav-<br>ity. | Open | Open   | II    | G-1 | NR                    | Vent N | No  | .50-20<br>.50-21<br>.50-73                      | I-B | NA              | 4 |
| Sulfuric acid, spent           | Atmos. | Amb.  | III | 1ii<br>2ii  | Integral Grav-<br>ity. | Open | Open   | II    | G-1 | NR                    | Vent N | No  | .50-20<br>.50-21<br>.50-73                      | I-B | NA              | 4 |
| 1,1,2,2-<br>Tetrachloroethane. | Atmos. | Amb.  | III | 1ii<br>2ii  | Integral Grav-<br>ity. | PV   | Restr. | II    | G-1 | NR                    | Vent F | No  | No .....  | NA  | NA              | G |
| Tetraethylenepenta-<br>mine.   | Atmos. | Amb.  | III | 1 i<br>2 ii | Integral Grav-<br>ity. | Open | Open   | II    | G-1 | NR                    | Vent N | Yes | .55-1(c)  | I-C | NA              | G |
| Tetrahydrofuran .....          | Atmos. | Amb.  | III | 1 i<br>2 ii | Integral Grav-<br>ity. | PV   | Restr. | II    | G-1 | NR                    | Vent F | Yes | .50-<br>70(b).                                  | I-C | NA              | G |
| Toluenediamine .....           | Atmos. | Elev. | II  | 1ii<br>2i   | Integral Grav-<br>ity. | PV   | Closed | II    | G-1 | NR                    | Vent F | Yes | .50-73<br>.56-<br>1(a),<br>(b),<br>(c),<br>(g). | NA  | NA              | G |
| Toluene<br>dithiocyanate.      | Atmos. | Amb.  | I   | 1ii<br>2ii  | Integral Grav-<br>ity. | PV   | Closed | I     | G-1 | Dry<br>N <sub>2</sub> | Vent F | Yes | .50-5 ...<br>.55-1(e)                           | I-D | NA              | G |
| o-Toluidine .....              | Atmos. | Amb.  | II  | 1ii<br>2ii  | Integral Grav-<br>ity. | PV   | Closed | II    | G-1 | NR                    | Vent F | Yes | .50-5 ...<br>.50-73                             | I-D | NA              | G |
| 1,2,4-<br>Trichlorobenzene.    | Atmos. | Amb.  | III | 1ii<br>2ii  | Integral Grav-<br>ity. | PV   | Restr. | II    | G-1 | NR                    | Vent F | Yes | No .....  | I-D | NA              | G |

| Cargo name  |        | Cargo identification <sup>1</sup> |       | Hull type         | Cargo segregation tank | Tanks |        |                | Cargo transfer |         | Environmental control |                      | Fire protection required | Special requirements in 46 CFR Part 151 | Electrical hazard class and group | Temp. control install. | Tank internal inspect. period—years |
|---|--------|-----------------------------------|-------|-------------------|------------------------|-------|--------|----------------|----------------|---------|-----------------------|----------------------|--------------------------|---|-----------------------------------|------------------------|-------------------------------------|
|   |        | Pressure                          | Temp. |                   |                        | Type  | Vent   | Gauging device | Piping class   | Control | Cargo tanks           | Cargo handling space |                          |   |                                   |                        |                                     |
| 1,1,2-Trichloroethane.  | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i i 2 i              | PV    | Restr. | II             | G-1            | NR      | Vent F                | No                   | .50-73 .56-1(a)          | I-D                                     | NA                                | G                      |                                     |
| Trichloroethylene ...   | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i                | PV    | Restr. | II             | G-1            | NR      | Vent F                | No                   | No .....                 | I-D                                     | NA                                | G                      |                                     |
| 1,2,3-Trichloropropane.   | Atmos. | Amb.                              | II    | Integral Gravity. | 1 i i 2 i              | PV    | Restr. | II             | G-1            | NR      | Vent F                | Yes                  | .50-73 .56-1(a)          | I-D                                     | NA                                | G                      |                                     |
| Triethanolamine ....  | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i                | Open  | Open   | II             | G-1            | NR      | Vent N                | Yes                  | .55-1(b)                 | I-C                                     | NA                                | G                      |                                     |
| Triethylamine .....   | Atmos. | Amb.                              | II    | Integral Gravity. | 1 i i 2 i i            | PV    | Restr. | II             | G-1            | NR      | Vent F                | Yes                  | .55-1(e)                 | I-C                                     | NA                                | G                      |                                     |
| Triethylenetetramine.   | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i                | Open  | Open   | II             | G-1            | NR      | Vent N                | Yes                  | .55-1(b)                 | I-C                                     | NA                                | G                      |                                     |
| Triphenylborane (10% or less) Caustic soda solution.                        | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i                | Open  | Open   | II             | G-1            | NR      | NR                    | No                   | .56-1(a), (b), (c).      | NA                                      | NA                                | G                      |                                     |
| Trisodium phosphate solution.   | Atmos. | Amb. Elev.                        | III   | Integral Gravity. | 1 i 2 i                | Open  | Open   | II             | G-1            | NR      | NR                    | No                   | .50-73 .56-1(a), (c).    | NA                                      | NA                                | G                      |                                     |
| Urea, Ammonium nitrate solution (containing more than 2% NH <sub>3</sub> ). | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i                | PV    | Restr. | II             | G-1            | NR      | Vent F                | No                   | .56-1(b)                 | I-D                                     | NA                                | G                      |                                     |
| Valeraldehyde (all isomers).  | Atmos. | Amb.                              | III   | Integral Gravity. | 1 i 2 i i              | PV    | Restr. | II             | G-1            | Inert   | Vent F                | Yes                  | No .....                 | I-C                                     | NA                                | G                      |                                     |

| Vanillin black liquor (free alkali content 3% or more). | Atmos. | Amb.  | III   | 1 i<br>2 i  | Integral Gravity. | Open  | Open   | II    | G-1   | NR     | NR     | No  | .50-73<br>.56-1(a),<br>(c),<br>(g).                   | NA                     | NA  | G     |
|---|--------|-------|-------|-------------|-------------------|-------|--------|-------|-------|--------|--------|-----|---|------------------------|-----|-------|
| Vinyl acetate .....                                     | Atmos. | Amb.  | III   | 1 i<br>2 ii | Integral Gravity. | PV    | Open   | II    | G-1   | NR     | Vent F | Yes | .50-70(a),<br>.50-81(a),<br>(b).                      | NA                     | NA  | G     |
| Vinyl chloride .....                                    | Press. | Amb.  | II    | 1NA<br>2 ii | Ind. Pressure.    | SR    | Closed | II    | P-2   | NR     | Vent F | Yes | .50-30<br>.50-34                                      | NA                     | NA  | 8     |
| Vinyl chloride .....                                    | Atmos. | Low   | II    | 1NA<br>2 ii | Ind. Gravity.     | PV    | Closed | II-L  | G-2   | NR     | Vent F | Yes | .50-30<br>.50-34                                      | .40-1(b)(1)            | NA  | 8     |
| Vinylidene chloride                                     | Atmos. | Amb.  | II    | 1NA<br>2 ii | Ind. Gravity.     | PV    | Closed | II    | P-2   | Padded | Vent F | Yes | .55-1(f)<br>.50-70(a),<br>.50-81(a),<br>(b).          | NA                     | NA  | G     |
| Vinyltoluene .....                                      | Atmos. | Amb.  | III   | 1 i<br>2 ii | Integral Gravity. | PV    | Restr. | II    | G-1   | NR     | Vent F | Yes | .50-70(a),<br>.50-81-56-1(a),<br>(b),<br>(c),<br>(g). | NA                     | NA  | G     |
| For requirements see these sections in Part 151.        | .....  | ..... | .10-1 | .13-5       | .15-1 ...         | .15-5 | .15-10 | .20-1 | .20-5 | .25-1  | .25-2  | .30 | .....   | 111.105 (Subchapter J) | .40 | .04-5 |

See Table 2 of Part 153 for additional cargoes permitted to be carried by tankbarge.

Terms and symbols—

Segregation—Tank—

Line 1—Segregation of cargo from surrounding waters:

i—Skin of vessel (single skin) only required. Cargo tank wall can be vessel's hull.

ii—Double skin required. Cargo tank wall cannot be vessel's hull.

Line 2—Segregation of cargo space from machinery spaces and other spaces which have or could have a source of ignition:

i—Single bulkhead only required. Tank wall can be sole separating medium.

ii—Double bulkhead required. Cofferdam, empty tank, pumproom, tank with Grade E Liquid (if compatible with cargo) is satisfactory.

Internal tank inspection—

G—Indicates cargo is subject to general provisions of 151.04-5(b).

Specific numbers in this column are changes from the general provisions.

Abbreviations used:

Tank type: Ind=Independent.

Vent:

PV=Pressure vacuum valve.

SR=Safety relief.

Gauging device: Restr.=Restricted.

General usage:

NR=No requirement.

NA=Not applicable.

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

[USCG 2000-7079, 65 F.R. 67188, Nov. 8, 2000]