AUTHENTICATED
U.S. GOVERNMENT
INFORMATION
GPO

TABLE 4—SUMMARY OF MINIMUM REQUIREMENTS—Continued

Cargo name[1]	Ship type	Independent tank type C required	Control of cargo tank vapor space	Vapor detection[2]	Gauging[3]	Electrical hazard class and group[4]	Special requirements
Sulfur dioxide	IG	Yes	Dry	T	C		154.660 (b) (3), 154.1345 (c), (d), 154.1400 (c), 154.1405, 154.1410, 154.1705, 154.1715, 154.1720, 154.1870 (a), (b).
Vinyl chloride	IIG/IIPG			I & T	C	I–D	154.1405, 154.1410, 154.1702 (a) (b) (d) (f), 154.1710, 154.1740, 154.1745, 154.1750, 154.1818, 154.1830 (f), 154.1870.

[1]Refrigerant gases include non-toxic, non-flammable gases such as: dichlorodifluoromethane, dichloromonofluoromethane, dichlorotetrafluoroethane, monochlorodifluoromethane, monochlorotetrafluoroethane, and monochlorotrifluoromethane.
[2]As used in this column: ''I'' stands for flammable vapor detection; ''T'' stands for toxic vapor detection; ''O'' stands for oxygen detection; and see §§154.1345 thru 154.1360.
[3]As used in this column: ''C'' stands for closed gauging; ''R'' stands for restricted gauging; and see §154.1300.
[4]The designations used in this column are from the National Electrical Code.

[CGD 74–289, 44 FR 26009, May 3, 1979; 44 FR 59234, Oct. 15, 1979]

APPENDIX A—EQUIVALENT STRESS

I. Equivalent stress (σ_c) is calculated by the following formula or another formula specially approved by the Commandant (G–MSO) as equivalent to the following:

$$\sigma_c = \sqrt{\sigma_x^2 + \sigma_y^2 - \sigma_x \sigma_y + 3\tau_{xy}^2}$$

where:

σ_x=total normal stress in ''x'' direction.

σ_y=total normal stress in ''y'' direction.

τ_{xy}=total shear stress in ''xy'' plane.

II. When the static and dynamic stresses are calculated separately, the total stresses in paragraph I are calculated from the following formulae or another formulae specially approved by the Commandant (G–MSO) as equivalent to the following:

$$\sigma_x = \sigma_x(\text{static}) \pm \sqrt{\sum (\sigma_x(\text{dynamic}))^2}$$

$$\sigma_y = \sigma_y(\text{static}) \pm \sqrt{\sum (\sigma_y(\text{dynamic}))^2}$$

$$\tau_{xy} = \tau_{xy}(\text{static}) \pm \sqrt{\sum (\tau_{xy}(\text{dynamic}))^2}$$

III. Each dynamic and static stress is determined from its acceleration component and its hull strain component from hull deflection and torsion.

[CGD 74–289, 44 FR 26009, May 3, 1979, as amended by CGD 82–063b, 48 FR 4782, Feb. 3, 1983]

APPENDIX B—STRESS ANALYSES DEFINITIONS

The following are the standard definitions of stresses for the analysis of an independent tank type B:

Normal stress means the component of stress normal to the plane of reference.

Membrane stress means the component of normal stress that is uniformly distributed and equal to the average value of the stress across the thickness of the section under consideration.

Bending stress means the variable stress across the thickness of the section under consideration, after the subtraction of the membrane stress.

Shear stress means the component of the stress acting in the plane of reference.

Primary stress means the stress produced by the imposed loading that is necessary to balance the external forces and moments. (The