§ 154.471 Design criteria.

(a) The cargo tank support system must be designed:

(1) For the loads in §154.406(a);

(2) To not exceed the allowable stress under this part at astatic angle of heel of 30°;

(3) To withstand a collision force equal to at least one-half the weight of the cargo tank and cargo from forward and one-quarter the weight of the cargo tank and cargo from aft; and

(4) For the largest resulting acceleration in Figure 1, including rotational and translation effects.

(b) The cargo tank support design loads in paragraph (a) of this section may be analyzed separately.

§ 154.476 Cargo transfer devices and means.

(a) If a cargo pump in a cargo tank is not accessible for repair when the cargo tank is in use, the cargo tank must have an additional means of cargo transfer, such as another pump or gas pressurization.

(b) If cargo is transferred by gas pressurization, the pressurizing line must have a safety relief valve that is set at less than 90 percent of the tank relief valve setting.
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§ 154.524 Piping joints: Welded and screwed couplings.

Pipe lengths without flanges must be joined by one of the following:

(a) A butt welded joint with complete penetration at the weld root except that for design temperatures colder than −10 °C (14 °F) the butt weld must be double welded or must be welded using:
   (1) A backing ring that for design pressures greater than 979 kPa gauge (142 psig) must be removed after the weld is completed;
   (2) A consumable insert; or

(b) A relief valve on a cargo pump that protects the cargo piping system must discharge into the pump suction.


§ 154.520 Piping calculations.

A piping system must be designed to meet the allowable stress values under §56.07–10 of this chapter and, if the design temperature is −110 °C (−166 °F) or lower, the stress analysis must be specially approved by the Commandant (CG–522) and must include:

(a) Pipe weight loads;
(b) Acceleration loads;
(c) Internal pressure loads;
(d) Thermal loads; and
(e) Loads from the hull.


§ 154.522 Materials for piping.

(a) The materials for piping systems must meet §154.625 for the minimum design temperature of the piping, except the material for open ended vent piping may be specially approved by the Commandant (CG–522) if:
   (1) The temperature of the cargo at the pressure relief valve setting is −55 °C (−67 °F) or warmer; and
   (2) Liquid can not discharge to the vent piping.

(b) Materials for piping outside the cargo tanks must have a melting point of at least 925 °C (1697 °F), except for short lengths of pipes with fire resisting insulation that are attached to the cargo tanks.

§ 154.524 Piping joints: Welded and screwed couplings.

Pipe lengths without flanges must be joined by one of the following:

(a) A butt welded joint with complete penetration at the weld root except that for design temperatures colder than −10 °C (14 °F) the butt weld must be double welded or must be welded using:
   (1) A backing ring that for design pressures greater than 979 kPa gauge (142 psig) must be removed after the weld is completed;
   (2) A consumable insert; or

(b) A relief valve on a cargo pump that protects the cargo piping system must discharge into the pump suction.