INSTRUMENTATION

§ 154.1300 Liquid level gauging system: General.
(a) If Table 4 lists a closed gauge for a cargo, the liquid level gauging system under §154.1305 must be closed gauges that do not have any opening through which cargo liquid or vapor could escape, such as an ultrasonic device, float type device, electronic or magnetic probe, or bubble tube indicator.
(b) If Table 4 lists a restricted gauge for a cargo, the liquid level gauging system under §154.1305 must be closed gauges that meet paragraph (a) of this section or restricted gauges that do not vent the cargo tank’s vapor space, such as a fixed tube, slip tube, or rotary tube.

§ 154.1305 Liquid level gauging system: Standards.
(a) Each cargo tank must have at least one liquid level gauging system that is operable:
(1) At pressures up to, and including, the MARVS of the tank; and
(2) At temperatures that are within the cargo handling temperature range for all cargoes carried.
(b) Unless the cargo tank has one liquid gauging system that can be repaired and maintained when the tank contains cargo, each cargo tank must have at least two liquid level gauging systems that meet paragraph (a) of this section.
(c) Each liquid level gauging system must measure liquid levels from 400 mm (16 in.) or less from the lowest point in the cargo tank, except collection wells, to 100 percent full.

§ 154.1310 Closed gauge shut-off valve.
Each closed gauge that is not mounted directly on the cargo tank must have a shut-off valve that is as close to the tank as practical.

§ 154.1315 Restricted gauge excess flow valve.
Each restricted gauge that penetrates a cargo tank must have an excess flow valve unless the gauge meets §154.536.

§ 154.1320 Sighting ports, tubular gauge glasses, and flat plate type gauge glasses.
(a) Cargo tanks may have sighting ports as a secondary means of liquid level gauging in addition to the gauges under §154.1305, if:
(1) The tank has a MARVS that is less than 69 kPa gauge (10 psig); and
(2) The port has a protective cover and an internal scale; and
(3) The port is above the liquid level.
(b) Tubular gauge glasses must not be liquid level gauges for cargo tanks.
(c) Plate type gauge glasses must not be liquid level gauges for cargo tanks, except deck tanks if the gauge connections have excess flow valves.

§ 154.1325 Liquid level alarm system: All cargo tanks.
Except as allowed under §154.1330, each cargo tank must have a high liquid level alarm system that:
(a) Is independent of the liquid level gauging system under §154.1305;
(b) Actuates quick-closing valves under §§154.530, 154.532, and 154,538 or a stop valve in the cargo tank loading line to prevent the tank from becoming 100 percent liquid full and without causing the pressure in the loading lines to exceed the design pressure; and
(c) Actuates an audible and visual alarm at the cargo control station at the liquid level at which the valves under paragraph (b) of this section are actuated or at some lower liquid level.

§ 154.1330 Liquid level alarm system: Independent tank type C.
Independent tanks type C need not have the high liquid level alarm system under §154.1325 if:
(a) The tank volume is less than 200 m³ (7,060 ft³); or
(b) The tank can withstand the maximum possible pressure during loading, that pressure is below the relief valve setting, and overflow of the tank cannot occur.

§ 154.1335 Pressure and vacuum protection.
(a) Each cargo tank must have the following:
(1) A pressure gauge that:
(i) Monitors the vapor space; and
(ii) Is readable at the tank; and
§ 154.1340 Temperature measuring devices.

(a) Each cargo tank must have devices that measure the temperature:
(1) At the bottom of the tank; and
(2) Near the top of the tank and below the maximum liquid level allowed under §154.1844.

(b) Each device required by paragraph (a) must have a readout at the cargo control station.

(c) Except for independent tanks type C, each cargo containment system for a design temperature colder than −55 °C (−67 °F) must have temperature measuring devices that meet the following:
(1) The number and location of the devices must be specially approved by the Commandant (CG–OES).
(2) The devices must be within the cargo tank’s insulation or on the adjacent hull structure.
(3) Each device must show the temperature continuously or at regular intervals of one hour or less.
(4) Each device must actuate an audible and visual alarm at the cargo control station and a remote group alarm in the wheelhouse before the temperature of the steel of the adjacent hull structure is cooled below the lowest temperature allowed for the steel under §154.172.

(d) For each cargo tank with a design temperature colder than −55 °C (−67 °F), the number and arrangement of the devices that show the temperature of the tank during cool down procedures must be specially approved by the Commandant (CG–OES).


§ 154.1345 Gas detection.

(a) Each vessel carrying a cargo that is designated with an “I” or “I and T” in Table 4 must have:
(1) A fixed flammable gas detection system that meets §154.1350; and
(2) Two portable gas detectors that can each measure 0 to 100% of the lower flammable limit of the cargo carried.

(b) Each vessel carrying a cargo that is designated with a “T” or “I and T” in Table 4 must have:
(1) Two portable gas detectors that show if the concentration of cargo is above or below the threshold limit value listed in 29 CFR 1910.1000 for that cargo; and
(2) Fixed gas sampling tubes in each hold space and interbarrier space with:
(i) The number of tubes specially approved by the Commandant (CG–OES);
(ii) Each tube valved and capped above the main deck unless it is connected to a fixed toxic gas detector;
(iii) If the vessel carries cargo that is heavier than the atmosphere of the space, each tube’s open end in the lower part of the space;
(iv) If the vessel carries cargo that is lighter than the atmosphere of the space.