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steel that has equivalent chemical
properties, mechanical properties, and
heat treatment, and that is specially
approved by the Commandant (CG–522).

(3) The outer hull steel of vessels
must meet the standards in §154.172 if
the hull steel temperature is cal-
culated to be below −5 °C (23 °F) as-
suming:

(i) For any waters in the world, the
ambient cold conditions of still air at 5
°C (41 °F) and still sea water at 0 °C (32
°F);

(ii) For cargo containment systems
with secondary barriers, the tempera-
ture of the secondary barrier is the de-
sign temperature; and

(iii) For cargo containment systems
without secondary barriers, the tem-
perature of the cargo tank is the design
temperature.

[CGD 74–289, 44 FR 26009, May 3, 1979, as
amended by CGD 82–063b, 48 FR 4782, Feb. 3,
1983; CGD 77–069, 52 FR 31630, Aug. 21, 1987]

§ 154.172 Contiguous steel hull struc-
ture.

(a) Except as allowed in paragraphs
(b) and (c) of this section, plates, for-
gings, forged and rolled fittings, and
rolled and forged bars and shapes used
in the construction of the contiguous
steel hull structure must meet the
thickness and steel grade in Table 1 for
the temperatures under §§154.174(b) and
154.176(b).

(b) for a minimum temperature, de-
termined under §§154.174(b) and
154.176(b), below −25 °C (−13 °F ), the
contiguous steel hull structure must meet
§54.25–10 for that minimum tem-
perature.

(c) If a steel grade that is not listed
in Table 1 has the equivalent chemical
properties, mechanical properties, and
heat treatment of a steel grade that is
listed, the steel grade not listed may be
specially approved by the Commandant
(CG–522), for use in the contiguous hull
structure.

§ 154.174 Transverse contiguous hull
structure.

(a) The transverse contiguous hull
structure of a vessel having cargo con-
tainment systems without secondary
barriers must meet the standards of
the American Bureau of Shipping pub-
lished in “Rules for Building and Classing
Steel Vessels”, 1981.

(b) The transverse contiguous hull
structure of a vessel having cargo con-
tainment systems with secondary bar-
riers must be designed for a tempera-
ture that is:

(1) Colder than the calculated tem-
perature of this hull structure when:
(i) The temperature of the secondary
barrier is the design temperature, and
(ii) The ambient cold condition under
§154.176(b)(1)(ii) and (iii) are assumed;
or
(2) Maintained by the heating system
under §154.178.

[CGD 74–289, 44 FR 26009, May 3, 1979, as
amended by CGD 77–069, 52 FR 31630, Aug. 21,
1987]

§ 154.176 Longitudinal contiguous hull
structure.

(a) The longitudinal contiguous hull
structure of a vessel having cargo con-
tainment systems without secondary
barriers must meet the standards of
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(b) The longitudinal contiguous hull structure of a vessel having cargo containment systems with secondary barriers must be designed for a temperature that is:

(1) Colder than the calculated temperature of this hull structure when:
   (i) The temperature of the secondary barrier is the design temperature; and
   (ii) For any waters in the world except Alaskan waters, the ambient cold condition of:
      (A) Five knots air at \(-18^\circ C (0^\circ F)\); and
      (B) Still sea water at 0 \(^\circ C (32^\circ F)\); or
   (iii) For Alaskan waters the ambient cold condition of:
      (A) Five knots air at \(-29^\circ C (-20^\circ F)\); and
      (B) Still sea water at \(-2^\circ C (28^\circ F)\); or
(2) Maintained by the heating system under \$154.178, if, without heat, the contiguous hull structure is designed for a temperature that is colder than the calculated temperature of the hull structure assuming the:
   (i) Temperature of the secondary barrier is the design temperature; and
   (ii) Ambient cold conditions of still air at 5 \(^\circ C (41^\circ F)\) and still sea water at 0 \(^\circ C (32^\circ F)\).

\[\text{CGD 74–289, 44 FR 26009, May 3, 1979, as amended by CGD 77–069, 52 FR 31630, Aug. 21, 1987}\]

\$154.178 Contiguous hull structure: Heating system.

The heating system for transverse and longitudinal contiguous hull structure must:

(a) Be shown by a heat load calculation to have the heating capacity to meet \$154.174(b)(2) or \$154.176(b)(2); and
(b) Have standby heating to provide 100% of the required heat load and distribution determined under paragraph (a); and
(c) Meet Parts 52, 53, and 54 of this chapter.

\$154.180 Contiguous hull structure: Welding procedure.

Welding procedure tests for contiguous hull structure designed for a temperature colder than \(-18^\circ C (0^\circ F)\) must meet \$54.05–15 and subpart 57.03 of this chapter.

\$154.182 Contiguous hull structure: Production weld test.

If a portion of the contiguous hull structure is designed for a temperature colder than \(-34^\circ C (–30^\circ F)\) and is not part of the secondary barrier, each 100m (328 ft.) of full penetration butt welded joints in that portion of the contiguous hull structure must pass the following production weld tests in the position that the joint is welded:

(a) Bend tests under \$57.06–4 of this chapter.
(b) A Charpy V-notch toughness test under \$57.06–5 of this chapter on one set of 3 specimens alternating the notch location on successive tests between the center of the weld and the most critical location in the heat affected zone.
(c) If the contiguous hull structure does not pass the test under paragraph (b) of this section, the retest procedures under \$54.05–5(c) must be met.

\$154.188 Membrane tank: Inner hull steel.

For a vessel with membrane tanks, the inner hull plating thickness must meet the deep tank requirements of the American Bureau of Shipping published in “Rules for Building and Classing Steel Vessels”, 1981.

\[\text{CGD 74–289, 44 FR 26009, May 3, 1979, as amended by CGD 77–069, 52 FR 31630, Aug. 21, 1987}\]

\$154.195 Aluminum cargo tank: Steel enclosure.

(a) An aluminum cargo tank and its dome must be enclosed by the vessel’s hull structure or a separate steel cover.
(b) The steel cover for the aluminum cargo tank must meet the steel structural standards of the American Bureau of Shipping published in “Rules for Building and Classing Steel Vessels”, 1981.
(c) The steel cover for the aluminum tank dome must be:

\[\text{The most critical location in the heat affected zone of the weld is based on procedure qualification results, except austenitic stainless steel need have notches only in the center of the weld.}\]