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ARCTIC SHIPPING POLLUTION PREVENTION REGULATIONS
[FEDERAL] [REPEALED]
C.R.C., c. 353 [Repealed Dec. 19/17 by SOR/2017-286]
[includes Federal Regulation SOR/96-474 amendments]

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SHORT TITLE

1. These Regulations may be cited as the *Arctic Shipping Pollution Prevention Regulations*. 
2. In these Regulations,

"Act" means the *Arctic Waters Pollution Prevention Act*;

"Arctic class ship" means a ship that complies with the applicable construction standards set out in Schedules VI and VII and is classified as an Arctic class 1, 1A, 2, 3, 4, 6, 7, 8 or 10 ship in the tables to Schedule VI;

"category", in relation to a ship, means an Arctic class ship or a Type A, B, C, D or E ship;

"complement" means the number of persons comprising the master and crew of a ship;

"deck watch" means that part of the complement that is required for the purpose of attending to the navigation or security of the ship;

"inspector" [Repealed, SOR/78-507, s. 1]

"oily mixture" means a mixture with any oil content;

"master" includes every person having command or charge of any ship, but does not include a pilot;

"oil" means oil of any kind or in any form and, without limiting the generality of the foregoing, includes petroleum, fuel oil, sludge, oil refuse, and oil mixed with wastes, but does not include dredged spoil;

"person in charge of the deck watch" every person who has immediate charge of the navigation or security of a ship, but does not include a pilot;

"pollution prevention officer" [Repealed, SOR/91-483, s. 1]

"Safety Convention" means the International Convention for the Safety of Life at Sea, 1960, signed at London on June 12, 1960, or the International Convention for the Safety of Life at Sea, 1974, signed at London on November 1, 1974;

"Safety Convention ship" means a ship that is of 500 tons or more and registered in a state that is a party to the Safety Convention;

"sewage" means human or animal waste generated on board ship and includes wastes from water closets, urinals or hospital facilities handling fecal material;

"ship" includes any description of vessel or boat used or designed for use in navigation without regard to method or lack of propulsion;

"tanker" means a ship in which the greater part of the cargo space is constructed or adapted for the carriage of liquid cargo and is carrying oil in that part of the cargo space;

"Type A ship" means a self-propelled ship that complies with the construction standards specified as Type A in Schedule V;

"Type B, C, D, or E ship" means a ship that complies with the construction standards specified as Type B, C, D or E in Schedule V;

"zone" means an area of the arctic waters prescribed as a shipping safety control zone under section 11 of the Act.

SOR/78-180, s. 1; SOR/78-507, s. 1; SOR/81-330, s. 1; SOR/83-271, s. 1; SOR/91-483, s. 1; SOR/95-412, ss. 1, 7(F).
APPLICATION

3. (1) Subject to subsection (2) and sections 8 and 19, these Regulations do not apply to a ship of 100 tons, gross tonnage, or less.
(2) Sections 28 to 30 apply to every ship.

SOR/78-507, s. 2; SOR/86-451, s. 1.
CONSTRUCTION OF SHIPS

4. (1) No non-Canadian ship that is not a Safety Convention ship shall navigate in any zone unless it complies, as if it were a Canadian ship, with the following Regulations:
   (a) Hull Construction Regulations;
   (b) Hull Inspection Regulations; and
   (c) Marine Machinery Regulations.
   (d) [Repealed, SOR/91-483, s. 2]

(2) No non-Canadian Safety Convention ship shall navigate in any zone unless it complies with the requirements of that Safety Convention most recent in time to which the state in which it is registered is a party.

(3) A non-Canadian Safety Convention ship has complied with that Safety Convention most recent in time to which the ship is registered is a party if the ship carries on board a valid certificate applicable to the ship and issued under the Safety Convention, namely:
   (a) a Passenger Ship Safety Certificate, or
   (b) a Cargo Ship Safety Construction Certificate and a Cargo Ship Safety Equipment Certificate,
   and where such ship has been exempted from any of the provisions of the Safety Convention,
   (c) an Exemption Certificate.

No non-Canadian ship...

5. (1) No non-Canadian ship, other than an Arctic class ship, that is registered in a state that is not a signatory to the International Convention on Load Lines, 1966, or the International Load Line Convention, 1930, shall navigate in any zone unless it complies, as if it were a Canadian ship, with the Load Line Regulations.

(2) No non-Canadian ship, other than an Arctic class ship, that is registered in a state that is a signatory to the International Convention on Load Lines, 1966 or the International Load Line Convention, 1930, shall navigate in any zone unless it complies with the requirements of the Convention to which its state is a signatory.

(3) No non-Canadian Arctic class ship shall navigate in any zone unless it complies with the requirements of Annex 1 of the International Convention on Load Lines, 1966.

(4) Every non-Canadian ship that has on board and in force a load line certificate showing that it complies with the International Convention on Load Lines, 1966, the International Load Line Convention, 1930, or Annex 1 of the International Convention on Load Lines, 1966, which certificate has been issued by
   (a) a surveyor working exclusively for
      (i) American Bureau of Shipping,
      (ii) Bureau Veritas,
      (iii) Det Norske Veritas,
(iv) Germanischer Lloyd,
(v) Lloyd's Register of Shipping,
(vi) Nippon Kaiji Kyokai,
(vii) Register of Shipping of the USSR,
(viii) Registro Italiano Navale,
(ix) Polski Rejestr Statkow, or
(x) Registrul Naval Roman,
(b) a surveyor of ships in the service of a state that is a signatory to the *International Convention on Load Lines, 1966*, or the *International Load Line Convention, 1930*, or
(c) an inspector,

shall be deemed to have complied with subsection (1), (2) or (3) as the case may be.

**No ship, carrying oil...**

6. (1) No ship, carrying oil in a quantity in excess of 453 m\(^3\), shall navigate in any zone unless

(a) it meets the standards of construction prescribed for any category of ship in Schedule V or Schedule VI; and

(b) in the case of an Artic class ship, it meets the standards of construction prescribed for that ship in Schedule VII.

(2) Subject to subsections (3) to (9), and except in accordance with an order of a pollution prevention officer pursuant to subparagraph 15(4)(c)(ii) of the Act, no ship of a category set out in Column I of an item of Schedule VIII and carrying oil in a quantity in excess of 453 m\(^3\) shall navigate in any zone set out in the heading of any column of that item:

(a) where the words "No Entry" are shown in that column of that item; and

(b) where a period of time is shown in that column of that item, except during that period of time.

(3) Subject to subsection (3.2), no ship that carries oil in a quantity in excess of 453 m\(^3\) may navigate in a zone at a time outside the period set out in Schedule VIII for that category of ship and zone unless

(a) the ice numeral for the ice regime in those parts of the zone to be navigated is greater than or equal to zero and is determined in accordance with sections 3, 5 and 6 of the *Arctic Ice Regime Shipping System (AIRSS) Standards* (TP 12259), published by Ship Safety, Transport Canada, in June 1996, as amended from time to time;

(b) the master of the ship has taken into account

(i) the manoeuvring characteristics of the ship and escorting ship, if any.

(ii) the operating characteristics and condition of the ship and of any equipment on board designed for the purpose of detecting ice hazards,

(iii) the probability of a change in the ice conditions during the intended transit through the zone, and the probable effect of the change, and

(iv) weather conditions;

(c) the master of the ship has sent a message to the Canadian Coast Guard that contains the following information:

(i) the call letters and category of the ship, and the name of any escorting ship,
(ii) a description of the proposed route through the zone,
(iii) the final destination of the ship,
(iv) the name of the master of the ship and the ice navigator, and
(v) a description of each ice regime on the proposed route and the ice numeral for
the regime; and
(d) the master of the ship receives an acknowledgment of the message sent pursuant to
paragraph (c) from the Canadian Coast Guard before entering the zone.

(3.1) The master of a ship of any category set out in column I of an item of Schedule VIII that
complies with subsection (3) and navigates in a zone at a time outside the period set out in
Schedule VIII for that category of ship and zone shall send to the Minister of Transport
within 30 days after the end of the transit an after-action report that contains
(a) a copy of the ice information used; and
(b) a summary description of the transit that includes
(i) the ship's name and category,
(ii) the duration of escort, if any, by an escorting ship,
(iii) weather conditions and visibility, and
(iv) the route followed, and the ice regimes encountered on the route and their ice
numerals.

(3.2) Subsection (3) does not apply in respect of a ship of a category referred to in subsection (4),
(5), (6), (7), (8) or (9) that is navigating in the zone and during the period referred to in the
same subsection of subsections (4) to (9).

(4) No Type B ship carrying oil in a quantity in excess of 453 m$^3$ shall navigate in zone 6
during the period commencing on August 1 and terminating on August 24 in any year
unless
(a) an ice breaker available for escort duties is located in or in the vicinity of zone 6; and
(b) where the ship carries oil as cargo, it is escorted by an icebreaker that has on board
the means to effect an immediate response to an oil spill.

(5) No Arctic class 4 ship carrying oil in a quantity in excess of 453 m$^3$ but not in excess of 2
000 m$^3$ shall navigate in zone 12 during the period commencing on May 1 and terminating
on May 31 in any year unless
(a) an Arctic class 4 or higher Arctic class icebreaker is available in the vicinity to assist
the ship; and
(b) the ship does not carry oil in direct contact with the shell plating within the forward
ice ramming part of the ship.

(6) From the day on which this subsection comes into force to December 31, 2001, no Arctic
class 3 ship carrying oil in excess of 453 m$^3$ shall navigate in zones 1 to 16 during any
period set out in columns II to XVII of item 5 of Schedule VIII unless
(a) in respect of the bow and mid-body, the ship complies with the construction
standards set out in Schedule VI for an Arctic class 4 ship;
(b) [Repealed, SOR/94-400, s. 1]
(c) the ship does not carry oil in direct contact with the shell plating;
(d) the ship is equipped with a means for effective communication with the Canadian
Coast Guard;
(e) the ship is fitted with navigational equipment capable of receiving and displaying the
imagery from
(i) satellite information, and
(ii) ice-mapping radar; and

(f) the person in charge of the deck watch has not less than 30 days experience
navigating in ice-covered arctic waters using the equipment referred to in paragraph
(e).

(7) From the day on which this subsection comes into force to December 31, 2001, no Arctic
class 3 ship carrying oil in a quantity in excess of 453 m$^3$ shall navigate in that part of zone
1 that consists of the southern approaches through the Byam Martin Channel or Erskine
Inlet to Cameron Island during the periods beginning on August 1 and ending on August 14
and beginning on September 16 and ending on September 30, unless
(a) the ship complies with the requirements of subsection (6);
(b) an ice navigator referred to in subsection 26(3) who has not less than 100 days
experience in navigating in ice-covered Arctic waters on board ships of Arctic class
3 or of a higher Arctic class
(i) is a member of each deck watch, in addition to the members of the deck watch
required by regulations made pursuant to the Canada Shipping Act, and
(ii) complies with the regulations made pursuant to the Canada Shipping Act that
relate to hours of rest;
(c) each deck watch, for members of the deck watch other than the ice navigator,
consists of a period of not more than six hours and is followed by a period of rest of
not less than eight consecutive hours where the ship is operated
(i) in ice of any concentration,
(ii) from one hour before dusk to one hour after dawn, or
(iii) while visibility is less than 3,000 m;
(d) [Repealed, SOR/96-474, s. 1]
(e) the ship is equipped with a main hull girder stress monitoring and warning system
capable of measuring and recording all significant stress events;
(f) the ship has on board the means to effect an immediate response to an oil spill; and
(g) the ship is assisted by an ice-breaker that has on board the means to effect an
immediate response to an oil spill.

(8) No ship that is an Arctic class 3, 2, 1A, or 1 ship or any Type A ship or any B, C, D or E
ship shall navigate in zone 6 after November 15 in any year or in zone 13 after December
15 in any year when carrying oil or ore as a cargo.

(9) From the day on which this subsection comes into force to December 31, 2001, no Arctic
class 3 ship carrying oil in a quantity in excess of 453 m$^3$ shall navigate in zone 6 during
the period beginning on July 1 and ending on July 19 or in zone 13 during the period
beginning on May 15 and ending on June 9, unless the ship complies with the requirements
of subsection (6).

(10) to (16) [Repealed, SOR/82-409, s. 1]

Repealed

7. [Repealed, SOR/86-451, s. 2]

Repealed
8. [Repealed, SOR/95-412, s. 3]

Repealed

9. [Repealed, SOR/78-430, s. 2]
BUNKERING STATION

10. No Arctic class ship shall navigate within any zone unless it is provided

(a) on each side of the deck with a bunkering station to which may be connected a bunkering hose with a flange that has the dimensions shown in Schedule IX;

(b) with one or more lengths of bunkering hose, capable of being connected to the bunkering stations, the total length and bore of which shall be at least 30 m and 100 mm respectively; and

(c) with such handling facilities as are necessary to permit the safe control of a bunkering hose link-up from one ship to another.
11. Where these Regulations require that a particular construction, machinery fitting, appliance, apparatus or material be fitted or carried in a ship or any particular provision to be made in a ship, a pollution prevention officer may allow any other construction, machinery fitting, appliance, apparatus or material to be fitted or carried, or any other provision to be made, if he is satisfied that such other construction, machinery, fitting, appliance, apparatus, material or provision is at least equivalent to that required by these Regulations.
ARCTIC POLLUTION PREVENTION CERTIFICATE

ARCTIC POLLUTION PREVENTION CERTIFICATE

12. The owner or master of any ship that proposes to navigate within any zone may apply to one of the persons referred to in section 13 for the issuance of an arctic pollution prevention certificate.

Subject to section 14...

13. (1) Subject to section 14,
   (a) an inspector, or
   (b) a surveyor working exclusively for
      (i) American Bureau of Shipping,
      (ii) Bureau Veritas,
      (iii) Det Norske Veritas,
      (iv) Germanischer Lloyd,
      (v) Lloyd's Register of Shipping,
      (vi) Nippon Kaiji Kyokai,
      (vii) Register of Shipping of the USSR,
      (viii) Registro Italiano Navale,
      (ix) Polski Rejestr Statkow, or
      (x) Registru Naval Roman,

      may issue an arctic pollution prevention certificate to the owner or master of a ship that is in non-Canadian waters.

   (2) Subject to section 14, an inspector may issue an arctic pollution prevention certificate to the owner or master of a ship that is within Canadian waters.

SOR/78-180, s. 4; SOR/81-330, s. 4.

No arctic pollution prevention certificate ...

14. No arctic pollution prevention certificate shall be issued to the owner or master of a ship unless the ship complies with the standards prescribed by these Regulations in respect of that ship.

Repealed

15. [Repealed, SOR/95-412, s. 4]

Subject to sections 17 and 18...

16. Subject to sections 17 and 18, an arctic pollution prevention certificate issued to the owner or master of a ship pursuant to sections 12 to 14 is, in the absence of any evidence to the
contrary, proof that such ship complies with such of the standards prescribed by these Regulations as are or would be applicable to it.

Subject to subsection (2)...

17. (1) Subject to subsection (2) and subsection 18(2), an arctic pollution prevention certificate is valid until the date of expiration shown on the certificate which date shall in no case be later than March 31st next following the date of issue.

(2) When an inspector conducts an inspection of a ship and is of the opinion

(a) that the ship does not comply with the essential conditions subject to which the arctic pollution prevention certificate was issued, or

(b) that the ship is in danger of depositing or causing the deposit of waste into the water of a zone in violation of subsection 4(1) of the Act,

he may declare or endorse the arctic pollution prevention certificate invalid.

Where any change...

18. (1) Where any change affecting the essential conditions, subject to which an arctic pollution prevention certificate was issued, occurs to a ship in respect of which the arctic pollution prevention certificate has been issued, the owner or master of the ship shall report the change to

(a) the pollution prevention officer who, to the best of his knowledge, is nearest to the ship; or

(b) a pollution prevention officer at the nearest location listed in Schedule II.

(2) Where the owner or master of a ship fails to comply with subsection (1), without reasonable cause, the arctic pollution prevention certificate issued to him in respect of that ship is invalid if the ship navigates within a zone.

Repealed

19. [Repealed, SOR/96-474, s. 2]

20. to 25. Repealed

20. Sections 20. to 25. [Repealed, SOR/78-507, s. 3]
26. (1) No tanker shall navigate within any zone without the aid of an ice navigator who is qualified in accordance with subsection (3).

(2) No ship other than a tanker shall navigate in any zone set out in the heading to each of Columns II to XVII of Schedule VIII
   (a) where the words "No Entry" are shown in that Column of item 14, and
   (b) where a period of time is shown in that Column of item 14, except during that period of time,
   without the aid of an ice navigator who is qualified in accordance with subsection (3).

(3) The ice navigator on a ship shall
   (a) be qualified to act as a master or person in charge of the deck watch in accordance with regulations made pursuant to the Canada Shipping Act; and
   (b) have served on a ship in the capacity of master or person in charge of the deck watch for a total period of at least 50 days, of which 30 days must have been served in Arctic waters while the ship was in ice conditions that required the ship to be assisted by an ice-breaker or to make manoeuvres to avoid concentrations of ice that might have endangered the ship.

(4) Despite subsections (1) and (2), a tanker or ship referred to in those subsections may navigate in a zone without the aid of an ice navigator during any part of the transit in open water.

(5) For the purposes of subsection (4), "open water" has the meaning assigned to that term in the Arctic Ice Regime Shipping System (AIRSS) Standards (TP 12259), published by Ship Safety, Transport Canada, in June 1996, as amended from time to time.
FUEL AND WATER

27. (1) No self-propelled ship shall navigate within any zone unless the ship
   (a) has on board sufficient fuel to enable it to
       (i) complete its intended voyage within the zones and to leave all zones, or
       (ii) reach a refueling place within any zone during its intended voyage; and
   (b) has on board sufficient fresh water or equipment capable of producing sufficient
       fresh water during its intended voyage to enable the ship to
       (i) complete its intended voyage within the zones and to leave all zones, or
       (ii) reach a place where fresh water is obtainable within any zone during its
            intended voyage.

(2) The refueling place referred to in subparagraph (1)(a)(ii) and the place with fresh water
     referred to in subparagraph (1)(b)(ii) must have available for the use of that ship sufficient
     fuel or fresh water, as the case may be, to enable the ship to continue to navigate on its
     intended voyage in compliance with subsection (1).

(3) No Arctic class ship shall navigate within any zone unless
   (a) it complies with subsection (1); and
   (b) it has on board, in addition to the requirements of subsection (1),
       (i) a reserve of fuel for domestic purposes sufficient for a period of 30 days, and
       (ii) a reserve of fresh water for domestic purposes sufficient for a period of 30
            days or equipment capable of producing such fresh water.

SOR/84-803, s. 2.
28. Any ship and any person on a ship may deposit in the arctic waters such sewage as may be generated on board that ship.
OIL DEPOSIT

29. Any ship and any person on a ship may deposit in the arctic waters oil or an oily mixture where that deposit is
   (a) for the purposes of saving life or preventing the immediate loss of a ship;
   (b) due to damage to or leakage from the ship as a result of stranding, collision or foundering if all reasonable precautions were taken
      (i) to avoid stranding, collision or foundering, and
      (ii) to prevent or minimize the deposit; or
   (c) through the exhaust of an engine or by leakage from an underwater machinery component where such deposit is minimal, unavoidable and essential to the operation of the engine or component.

SOR/95-412, s. 7(F).

Repealed

30. [Repealed, SOR/96-474, s. 4]
SCHEDULE I

Repealed. [SOR/95-412, s. 6]
LOCATION OF OFFICES AT WHICH POLLUTION PREVENTION OFFICERS MAY BE REACHED

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SCHEDULES III AND IV

Repealed.  [SOR/78-507, s. 5]
SCHEDULE V

[SOR/78-180, s. 7; SOR/81-330, s. 6; SOR/85-626, s. 2; SOR/90-628, s. 3.]

(Sections 2 and 6)

CONSTRUCTION STANDARDS FOR TYPES A, B, C, D AND E SHIPS

1. Subject to sections 2 to 4, every ship of a type set out in Column I of an item of the Table to this Schedule shall comply with the construction standards required of a ship by an organization set out in the heading to any of Columns II to XI of that item for the assignment of one of the classification symbols with notations shown in that column of that item.

2. The construction standards referred to in section 1 shall be those listed in the publication of the applicable organization as of December 31, 1976.

3. Where a ship does not comply with the construction standards referred to in section 1 respecting anchors and cables so that the applicable organization would assign a modified symbol, the anchors and cables need only meet the standards of that organization for the intended voyages to be made by that ship.

4. A non self-propelled ship need not meet the construction standards referred to in section 1 that are applicable to propulsion machinery.

GRAPHIC IS NOT DISPLAYED PLEASE SEE SOR/90-628, S. 3
SCHEDULE VI

[SOR/78-180, ss. 8 to 10; SOR/85-626, s. 3(E).]

(Sections 2 and 6)

HULL DESIGN FOR ARCTIC CLASS SHIPS

Interpretation

1. In this Schedule,

"aft perpendicular" means a perpendicular that coincides with the after side of the rudder post, or where no rudder post is fitted, with the centreline of the rudder stock; (perpendiculaire arrière)

"amidships" means the middle of length (L); (milieu du navire)

"bilge boundary line" means a line that in elevation is parallel to the line of the keel and coincident amidships with the boundary between the side of the hull and the upper turn of bilge; (ligne de démarcation du bouchain)

"breadth (B)" means the greatest moulded breadth in metres; (largeur (B))

"forward perpendicular" means a perpendicular erected at the intersection of the fore side of the stem and the deepest operating load waterline; (perpendiculaire avant)

"length (L)" means the distance in metres on the summer load waterline from the fore-side of the stem to

(a) the after side of the rudder post, or

(b) to the centre of the rudder stock, if there is no rudder post,

which distance shall not be less than 96 per cent and need not be greater than 97 per cent of the extreme length on the summer load waterline; (longueur (L))

"ice breaker" means a ship specially designed and constructed for the purpose of assisting the passage of other ships through ice. (brise-glace)

Definitions

2. (1) Subject to subsection (2), in every Arctic class ship, other than a Class 1 ship,

(a) the bow, forefoot, mid-body and stern are the parts of the ship, and
(b) the bow area, lower bow area, mid-body area, stern area, upper transition area and lower transition area are the areas of the shell shown in the figure to this section.

(2) In every Arctic class ship, other than a Class 1 ship,

(a) the forward extremity of the upper transition area is the forward extremity of the bow;

(b) the aft extremity of the upper transition area is the aft extremity of the stern;

(c) the forward extremity of the forefoot is the point at which the line of the keel is tangent to the stem contour;

(d) the bow area includes the bottom of the hull over the length of the forefoot;

(e) the lower bow area includes the bottom of the hull between the aft end of the forefoot and the aft end of the bow; and

(f) the lower boundary of that part of the lower transition area that is forward of amidships is the shortest line on the outside of the hull between

(i) the intersection of the bilge boundary line with the aft boundary of the lower bow area, and

(ii) the forward end of that part of the lower boundary of the lower transition area that is aft of amidships.

(3) In every Arctic class 1 ship the ice belt is that part of the shell that lies between

(a) a line that is 760 mm above and parallel to the deepest operating load waterline; and

(b) a line that is 610 mm below and parallel to the lightest operating waterline.

GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2254

Dimensions

3. (1) For an Arctic class ship set out in Column I of an item of Table I,

(a) the vertical height (D) of the forward extremity of the bow area above the deepest operating load waterline is set out in Column II of that item;

(b) the vertical height (AW) of the upper boundary of the mid-body area above the deepest operating load waterline is set out in Column III of that item;
(c) the vertical depth (BW) of the lower boundary of the mid-body area below the lightest operating waterline is set out in Column IV of that item;

(d) the vertical height (UT) of the upper boundary of the upper transition area above the upper boundaries of the bow area, mid-body area and the stern area is set out in Column V of that item;

(e) the vertical depth (BW + LT) of the lower boundary of

(i) the stern area, and

(ii) that part of the lower transition area that is aft of amidships, below the lightest operating waterline, is the value set out in Column VI of that item added to the value set out in Column IV of that item;

(f) the vertical height (C) of the aft extremity of the stern area above the deepest operating load waterline is set out in Column VII of that item;

(g) the length of the forefoot (E) is set out in Column VIII of that item;

(h) the horizontal distance (F) between the forward perpendicular and the aft end of the bow is set out in Column IX of that item; and

(i) the horizontal distance (S) between the aft perpendicular and the forward end of the stern is set out in Column X of that item.

(2) Notwithstanding paragraph (1)(h), the distance referred to in that paragraph need not be greater than the distance between the forward perpendicular and the point on the centreline that is 0.04L aft of the point at which, when proceeding aft from the stem, the breadth (B) is first reached.

4. (1) The bow of every Arctic class ship shall be shaped so that it can break ice effectively.

(2) The stern of every Arctic class ship shall be shaped so that it can displace broken ice effectively.

Shell Plating and Framing

5. (1) Subject to subsections (2) and (3), for each Arctic class ship set out in Column I of an item of Table II the shell plating and main framing in each area specified in the heading to each of Columns II to VII shall, without exceeding the yield stress of the materials from which they are made, be capable of withstanding the ice pressure shown in that Column of that item.

(2) Where waste is stowed in direct contact with the shell plating in the bow of a ship, other than an Arctic class 8 or 10 ship,

(a) the values shown in Columns II and III of an item of Table II, and

(b) with respect to the bow, the values shown in Column VI of an item of Table II
do not apply and the values shown in those Columns of the next following item apply in substitution therefor.

(3) Where the total length of the mid-body of a ship, other than an Arctic class 1 ship, is fitted with side tanks that comply with section 6 of this Schedule

(a) the values shown in Column IV of an item of Table II, and

(b) with respect to the mid-body, the values shown in Columns V and VI of an item of Table II

do not apply and the values shown in those Columns of the preceding item apply in substitution therefor.

(4) Subject to subsection (5), for each Arctic class ship in Column I of an item of Table III,

(a) the web frames supporting main longitudinal frames, and

(b) the stringers supporting main transverse frames

in each area specified in the heading to each of Columns II to IV shall, without exceeding the yield stress of the materials from which they are made, be capable of withstanding the ice loading shown in that Column of that item.

(5) Where the flare of the side shell plating is less than eight degrees outboard from the vertical for a distance of five per cent or more of the length of the mid-body of an Arctic class ship between the lower boundary of the lower transition area and the lower boundary of the upper transition area, the ice loadings shown in Column III of an item of Table III do not apply and the ice loadings shown in Column II of that item apply in substitution therefor.

6. The side tanks referred to in subsection 5(3) of this Schedule and fitted in an Arctic class ship set out in Column I of an item of Table IV shall

(a) have a width measured from the outer shell of not less than that shown in Column II of that item;

(b) extend vertically from the outer bottom of the ship up to the deck at which the main watertight bulkheads of the ship terminate;

(c) be so constructed that, if the shell plating or turn of bilge plating is deformed or penetrated by ice, any internal stiffening structure will buckle before it penetrates the inner side of the tank; and

(d) contain no waste.

7. (1) Subject to subsection (2), for an Arctic class ship set out in Column I of an item of Table II, the thickness of the shell plating in each area specified in the heading to each of Columns II to VII shall not be less than the spacing of the main frames multiplied by the factor obtained from the formula

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where

(a) "p" is the pressure shown in each of Columns II to VII of that item;

(b) "f" is the yield stress of the shell plating material; and

(c) "p" and "f" are expressed in the same units.

(2) The thickness of the stem plate shall be not less than 1.3 times the thickness of the adjacent shell plating in the bow area determined in accordance with subsection (1).

8. (1) For an Arctic class ship set out in Column I of an item of Table II, the section modulus of the main transverse frames with the adjacent shell plating in each area specified in the heading to each of Columns II, IV and VII shall not be less than the value given by the formula

\[ \frac{ps (b-400)}{8f} \text{ cm}^3 \]

where

(a) "p" is the pressure in megapascals shown in each of Columns II, IV and VII of that item;

(b) "s" is the main transverse frame spacing in millimetres;

(c) "b" is the span of the main transverse frame in millimetres; and

(d) "f" is the yield stress of the main transverse frame material in megapascals.

(2) For an Arctic class ship set out in Column I of an item of Table II, the section modulus of the main longitudinal frames with the adjacent shell plating shall not be less than the value given by the formula

\[ \frac{b^2 spk}{f} \text{ cm}^3 \]

where

(a) "b" is the span of the main longitudinal frame in millimetres in the bow area, mid-body area or stern area, whichever area is applicable;

(b) "s" is the main longitudinal frame spacing in millimetres in the bow area, mid-body area or stern area, whichever area is applicable;

(c) "p" is, subject to subsection (3), the pressure in megapascals shown in Column II, IV or VII, of the item, whichever column is applicable with respect to the area specified in the heading to the column;

(d) "k" is,

(i)
(ii) \[ \frac{1}{20300} \], in the case of framing in the bow area

or stern area; and

(e) "f" is the yield stress of the main longitudinal frame material in megapascals in the bow area, mid-body area or stern area, whichever area is applicable.

(3) Where longitudinal framing is used in the bow of a ship, the pressures shown in Columns II and III of an item of Table II shall be multiplied by the factor 1.2, except that in no case need the increased pressures so obtained exceed 10.34 MPa.

**Subdivision and Stability**

9. (1) Every Arctic class ship that is used solely as an icebreaker shall, when at its worst operating condition with respect to stability and freeboard, be able to withstand the flooding of any one compartment and remain afloat in a satisfactory condition of equilibrium.

(2) Every Arctic class ship, other than a ship that is used solely as an icebreaker, shall, when loaded to its worst operating condition with respect to stability and freeboard, be able to withstand the flooding of any two adjacent fore and aft compartments and remain afloat in a satisfactory condition of equilibrium.

(3) The necessary calculations to ensure compliance with subsections (1) and (2), shall be based on the following assumptions of damage:

(a) the side damage

(i) in a longitudinal direction, extends within one compartment on a ship described in subsection (1) and within two adjacent compartments on a ship described in subsection (2),

(ii) in a transverse direction, extends outboard of the outermost longitudinal watertight bulkhead or for a distance of one-fifth of the breadth (B) where no such bulkhead is fitted, and

(iii) in a vertical direction, extends from the baseline to the underside of the main watertight bulkhead deck; and

(b) the bottom damage

(i) in a longitudinal direction, extends within one compartment on a ship described in subsection (1) and within two adjacent compartments on a ship described in subsection (2),
(ii) in a transverse direction, extends over any distance equal to one-sixth of the breadth (B) or for a distance of five metres, whichever is the lesser, and

(iii) in a vertical direction, extends from the level of the keel to the underside of the inner bottom or for a distance of six metres where no inner bottom is fitted.

(4) Notwithstanding subsection (3), where lesser extents of damage could have greater effect than the extents of damage described therein, the necessary calculations to ensure compliance with subsections (1) and (2) shall also be based on those lesser extents of damage.

(5) For every Arctic class ship, intermediate stages of flooding resulting from the damage referred to in subsections (3) and (4) shall be considered when making the calculations to ensure compliance with subsections (1) and (2).

10. Every Arctic class ship shall be constructed or equipped so that, when the ship is riding up or sliding off the ice,

(a) the ship has positive stability; and

(b) the deck edge of any part of the ship does not submerge.

**Rudder and Steering Gear**

11. (1) The rudder, rudders posts, rudder stocks, pintles and steering gear of every Arctic class ship shall be strengthened as necessary to withstand the anticipated loading that a ship of that Arctic class may experience when navigating in those zones and at those times of year in which a ship of that Arctic class is permitted to operate.

(2) The main steering gear of every Arctic class ship shall be fitted with a shock absorbing device and shall be capable of moving the rudder from 35 degrees on one side to 30 degrees on the other in

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(3) Every Arctic class ship shall, in addition to the main steering gear, be fitted with

(a) an auxiliary steering gear capable of being readily connected to the tiller and, in the case of a ship of that category fitted with twin rudders operated by a single steering gear, an arrangement so that each rudder can be readily disconnected and secured; or

(b) an effective alternative means of steering the ship such as multiple propellers or side thrust arrangements.

(4) Every Arctic class ship shall be fitted with ice horns directly abaft each rudder in such a manner that

(a)
the upper edge of the rudder is protected within two degrees port and 
starboard of mid-position when going astern; and

(b) ice is prevented from wedging between the top of the rudder and the 
ship's hull.

**TABLE I**

Values expressed in metres
Values expressed as a percentage of the length (L) of the ship

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II D</th>
<th>Column III AW</th>
<th>Column IV BW</th>
<th>Column V UT</th>
<th>Column VI LT</th>
<th>Column VII C</th>
<th>Column VIII E</th>
<th>Column IX F</th>
<th>Column X S</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1A</td>
<td>1.22</td>
<td>0.76</td>
<td>1.07</td>
<td>0.30</td>
<td>0.61</td>
<td>0.76</td>
<td>2.5</td>
<td>20</td>
<td>15</td>
</tr>
<tr>
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<td>2</td>
<td>1.52</td>
<td>0.91</td>
<td>1.52</td>
<td>0.46</td>
<td>0.61</td>
<td>0.91</td>
<td>2.5</td>
<td>20</td>
<td>15</td>
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<tr>
<td>3</td>
<td>3</td>
<td>1.83</td>
<td>1.37</td>
<td>2.29</td>
<td>0.46</td>
<td>0.61</td>
<td>1.37</td>
<td>2.5</td>
<td>20</td>
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<td>4</td>
<td>2.44</td>
<td>1.83</td>
<td>3.66</td>
<td>0.61</td>
<td>0.91</td>
<td>1.83</td>
<td>2.5</td>
<td>20</td>
<td>15</td>
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<tr>
<td>5</td>
<td>6</td>
<td>3.66</td>
<td>2.74</td>
<td>4.57</td>
<td>0.91</td>
<td>1.37</td>
<td>2.74</td>
<td>2.5</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>6</td>
<td>7</td>
<td>4.88</td>
<td>3.66</td>
<td>6.10</td>
<td>1.22</td>
<td>1.83</td>
<td>3.66</td>
<td>2.5</td>
<td>30</td>
<td>25</td>
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<td>8</td>
<td>6.10</td>
<td>4.57</td>
<td>7.62</td>
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<td>2.29</td>
<td>4.57</td>
<td>2.5</td>
<td>30</td>
<td>25</td>
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<td>8</td>
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<td>2.74</td>
<td>5.49</td>
<td>2.5</td>
<td>30</td>
<td>25</td>
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</tbody>
</table>

**TABLE II**

Ice Pressures in megapascals

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Bow Area</th>
<th>Column III Lower Bow Area</th>
<th>Column IV Mid-body Area</th>
<th>Column V Lower Transition Area</th>
<th>Column VI Upper Transition Area</th>
<th>Column VII Stern Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>1.72**</td>
<td>**</td>
<td>0.69**</td>
<td>**</td>
<td>**</td>
<td>0.69*</td>
</tr>
<tr>
<td>2</td>
<td>1A</td>
<td>2.76</td>
<td>1.45</td>
<td>1.79</td>
<td>1.24</td>
<td>0.90</td>
<td>2.24</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>4.14</td>
<td>2.21</td>
<td>2.76</td>
<td>1.79</td>
<td>1.38</td>
<td>3.45</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>5.51</td>
<td>2.90</td>
<td>3.65</td>
<td>2.55</td>
<td>1.79</td>
<td>4.55</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>6.89</td>
<td>3.65</td>
<td>4.55</td>
<td>3.17</td>
<td>2.28</td>
<td>5.65</td>
</tr>
</tbody>
</table>
*In an Arctic Class 1 ship, only that part of

(a) the bow area and stern area lying between the horizontal projections of the upper and lower edges of the mid-body area need be considered; and

(b) the mid-body area forward of amidships need be considered.

**In an Arctic Class 1 ship, ice pressure need not be considered as a factor in the design of the hull in the lower bow area, lower transition area and upper transition area, and the strength standards usually applied to ocean-going ships shall apply in these areas.

**TABLE III**

Minimum ice loading expressed in tonnes per metre run, for stringers or web frames in the areas specified in the column headings below

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Bow Area</th>
<th>Column III Mid Area</th>
<th>Column IV Stern Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>72.1</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>2</td>
<td>1A</td>
<td>82.0</td>
<td>65.5</td>
<td>72.1</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>98.3</td>
<td>82.0</td>
<td>88.5</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>131.1</td>
<td>98.3</td>
<td>114.8</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>163.8</td>
<td>114.7</td>
<td>131.1</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>229.4</td>
<td>147.5</td>
<td>179.3</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>262.1</td>
<td>163.8</td>
<td>196.6</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>328.0</td>
<td>196.6</td>
<td>245.8</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>540.7</td>
<td>229.4</td>
<td>262.1</td>
</tr>
</tbody>
</table>

NOTE: The loading values shown in this Table are based upon a stringer or web frame spacing of 1.2 m. For any other spacing, these loading values shall be increased or decreased, respectively, in direct proportion to the amount that the actual spacing is greater than or less than 1.2 m.

*In an Arctic Class 1 ship, ice loads need not be considered as a factor in the design of the hull in the mid-body area and stern area, and the strength standards usually applied to ocean-going ships shall apply in...
TABLE IV

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Minimum Side Tank Widths in metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>not applicable</td>
</tr>
<tr>
<td>2</td>
<td>1A</td>
<td>0.91</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>0.91</td>
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<tr>
<td>4</td>
<td>3</td>
<td>1.07</td>
</tr>
<tr>
<td>5</td>
<td>4</td>
<td>1.22</td>
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<tr>
<td>6</td>
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<td>1.52</td>
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<tr>
<td>7</td>
<td>7</td>
<td>1.83</td>
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<tr>
<td>8</td>
<td>8</td>
<td>1.83</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>1.83</td>
</tr>
</tbody>
</table>

TABLE V

[Repealed, SOR/78-180, s. 10]
SCHEDULE VII

[SOR/78-180, ss. 11, 12; SOR/81-330, s. 7; SOR/91-483, s. 4.]

(Sections 2 and 6)

MACHINERY REQUIREMENTS FOR ARCTIC CLASS SHIPS

Power Requirements

1. (1) Subject to subsections (2), (3) and (7), the minimum continuous shaft power in kilowatts available from the propulsion machinery of every Arctic class ship shall not be less than the numerical value obtained from

(a) \( \frac{Pr}{x} \frac{Dr}{D} \) if \( \frac{Dr}{D} \geq 1 \),

(b) \( \frac{Pr}{x} \frac{Dr}{D} \) if \( \frac{Dr}{D} < 1 \),

where

(c) "Pr" = \((579.4 - 2.6 W^{1/3}) BA^2\),

(d) "B" = the maximum breadth of the ship at the operating waterline in metres,

(e) "W" = displacement of the ship in tonnes at the operating waterline,

(f) GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2263.

(g) "D" = the diameter of the propellers in metres except that where the propellers are of different diameters, GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2263.

(h) "Z" = the number of propellers, and

(i) "Pr" = for an Arctic Class ship set out in Column I of an item of the table to this section, the value shown in Column II of that item.

TABLE

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Value of A in metres</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>0.305</td>
</tr>
</tbody>
</table>

ARCTIC SHIPPING POLLUTION PREVENTION REGULATIONS [FEDERAL] [REPEALED]
(2) The minimum continuous shaft power available for the propulsion of every Arctic class ship shall not be less than that required to propel the ship in still water at a speed of 12 knots.

(3) A pollution prevention officer may accept a ship as an Arctic class ship where the shaft power is less than that required by subsection (1) for a ship of that Arctic class if the owner of the ship has demonstrated by physical model tests or by actual demonstration that the ship is suitable for navigation in those zones and at those times of year in which a ship of that Arctic class is permitted to operate.

(4) The shaft power that the propelling machinery of every Arctic class ship is able to develop when going astern shall not be less than 70 per cent of the power required for that ship in subsection (1) and the machinery shall be able to maintain that power for a period of not less than three hours.

(5) Every ship of Arctic class 10, 8 or 7 shall be

(a) powered by not less than two prime movers; and

(b) provided with not less than two propellers, each located at the stern.

(6) Every Arctic class ship that is propelled by steam driven machinery shall be provided with not less than two boilers that have an equal maximum evaporation rate.

(7) Every Arctic class ship that is propelled by diesel machinery other than

(a) diesel electric machinery, or

(b) diesel machinery that drives a controllable pitch propeller,

shall be provided with machinery capable of developing 1.1 times the shaft power derived from the formula in subsection (1).

Machinery Protection

2. (1) The propulsion machinery, gearing, shafting and propellers of every Arctic class 3, 4, 6, 7, 8 and 10 ship shall be designed so as to take into account the conditions that arise in the propulsion system when the propeller could be slowed or jammed by ice.
(2) Means shall be provided to prevent the prime movers of every Arctic class ship from overspeeding.

(3) Where an electric motor is used for the propulsion of any Arctic class ship, provision shall be made to automatically protect the motor from

(a) excess torque;

(b) overloading; and

(c) overheating.

**Determination of Ice Torque**

3. (1) The calculations made to determine the dimensions of a propeller and screw shaft of every Arctic class ship shall include an ice torque factor.

(2) The ice torque factor described in subsection (1) shall be derived from the following formula

\[ M = mD^2 \text{kN.m} \]

where

(a) "D" = the propeller diameter in metres; and

(b) "m" = for an Arctic class ship set out in Column I of an item of the table to this section, the value shown in Column II of that item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Value of &quot;m&quot;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>12.0</td>
</tr>
<tr>
<td>2</td>
<td>1A</td>
<td>15.7</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
<td>17.7</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
<td>21.1</td>
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<td>28.5</td>
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<td>7</td>
<td>7</td>
<td>30.1</td>
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<td>8</td>
<td>8</td>
<td>32.2</td>
</tr>
<tr>
<td>9</td>
<td>10</td>
<td>33.0</td>
</tr>
</tbody>
</table>

**Testing of Materials**

4. Materials used for propellers and shafting of every Arctic class ship shall be tested in accordance with
(a) the Marine Machinery Regulations; or

(b) in the case of a ship that is certificated by an exclusive surveyor of one of the classification societies described in paragraph 13(1)(b), the rules of that society.

Propellers

5. (1) Propellers of every Arctic class ship shall be made of a material that has

(a) an elongation of not less than 19 per cent; and

(a) if made of carbon or low alloy steel, a Charpy V-notch test value of not less than 20.34 J at -10°C.

(2) The width and thickness of propeller blade sections shall not be less than that determined by the following formulae:

(a) for solid propellers at 25 per cent of the radius measured from the centre of the boss

GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2266.

(b) for controllable pitch propellers at 35 per cent of the radius measured from the centre of the boss

GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2266.

(c) for all propellers at 60 per cent of the radius measured from the centre of the boss

GRAPHIC IS NOT DISPLAYED PLEASE SEE C.R.C., C. 353, P. 2266.

where

(d) "W" = expanded width of a cylindrical section of the propeller blade at the appropriate radius in centimetres;

(e) "T" = maximum thickness of the propeller blade at the appropriate radius in centimetres;

(f) "P" = in the case of a fixed pitch propeller, the propeller pitch in metres at the appropriate radius divided by the propeller diameter, or in the case of a controllable pitch propeller, 0.7 times the nominal pitch in metres divided by the propeller diameter;

(g) "H" = the maximum shaft power in kilowatts available for that propeller;

(h) "S" = the ultimate tensile stress of the material of the propeller blade in megapascals;

(i) "M" = the ice torque as determined in accordance with section 3 of this Schedule;
(j) "R" = propeller revolutions per minute at the maximum shaft power available for that propeller; and

(k) "N" = number of blades.

(3) The propeller blade thickness at 95 per cent of the radius measured from the centre of the boss shall not be less than that determined from the following formulae for a ship of the appropriate Arctic class:

(a) for an Arctic class 10, 8, 7, 6, 4, 3 or 2 ship
\[ t = \frac{(20 + 2D)}{S} \times 490 \text{ mm}, \]

(b) for an Arctic class 1A or 1 ship
\[ t = \frac{(15 + 2D)}{S} \times 490 \text{ mm}, \]

where

(c) "t" = thickness of blade in millimetres;

(d) "D" = diameter of propeller in metres; and

(e) "S" = ultimate tensile stress of the material of the propeller blade in megapascals.

(4) The strength of the mechanism in the boss of a controllable pitch propeller shall be 1 1/2 times the strength of one of the blades when a load is applied at 9/10 of the radius from the centre of the boss in the weakest direction of the blade.

**Shafting**

6. (1) Subject to subsection (2) and section 9 of this Schedule, the diameter of a screw shaft of every Arctic class ship shall not be less than that derived from the following formulae:

(a) if the diameter of the propeller boss is one-quarter of the diameter of the propeller or less,

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(b) if the diameter of the propeller boss is greater than one-quarter of the diameter of the propeller,

GRAPHIC IS NOT DISPLAYED PLEASE SEE SOR/81-330, S. 7, P. 1264.

where

(c) "Su" = the ultimate tensile stress of the material of the propeller blade in megapascals;

(d) "Sy" = the yield stress of the material of the screw shaft in megapascals; and

(e)
"WT^2" = in the case of the formula in paragraph (a) the value derived from the formulae in paragraph 5(2)(a) of this Schedule and in the case of the formula in paragraph (b) the value derived from the formulae in paragraph 5(2)(b) of this Schedule.

(2) Where the diameter of a screw shaft when calculated by the appropriate formulae in subsection (1) is less than that of a screw shaft required by the appropriate formulae in the *Marine Machinery Regulations*, the diameter of the screw shaft shall not be less than that required by those Regulations.

(3) When calculations are made to determine the diameter of the intermediate shaft in order to determine the diameter of the screw shaft for the purposes of subsection (2), the diameter of the intermediate shaft need not be increased as required in section 7 of this Schedule.

(4) Where carbon or low alloy steel is used for the construction of a screw shaft, the material shall

(a) be subjected to a Charpy V-notch test at -10°C; and

(b) have an average energy value of not less than 20.34 j.

7. (1) Subject to subsection (2) and section 9 of this Schedule, the diameter of the intermediate and thrust shafts for an Arctic class ship set out in Column I of an item of the table to this section, shall be determined by the appropriate formula in the *Marine Machinery Regulations*, and the diameter determined by that formula shall be increased by the amount shown in Column II of that item.

<table>
<thead>
<tr>
<th>Item</th>
<th>Column I Arctic Class</th>
<th>Column II Percentage of Increase in Diameter</th>
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<td>4</td>
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<td>4</td>
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<td>5</td>
<td>4</td>
<td>15</td>
</tr>
<tr>
<td>6</td>
<td>6 and 7</td>
<td>20</td>
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<tr>
<td>7</td>
<td>8 and 10</td>
<td>20</td>
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</table>

(2) Notwithstanding the requirements of subsection (1), the diameter of the intermediate and thrust shafts need not exceed 0.85 times the diameter of
the screw shaft determined by section 6 of this Schedule.

**Gearing**

8. (1) Subject to section 9 of this Schedule, where gearing is fitted between the engine and the propeller shafting of an Arctic class ship set out in Column I of an item of the table to this section, the gearing shall be designed and constructed to transmit, in addition to the maximum torque that the engine is able to develop, the percentage increase in torque that is set out in Column II of that item.

<table>
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<tr>
<th>Item</th>
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**Deep Submerged Propellers**

9. Notwithstanding the requirements of sections 5 to 8 of this Schedule, where, in the case of an Arctic class ship set out in Column I of an item of the table to this section, the propeller tips at their highest point are not less than the distance set out in Column II of that item below the lightest operating waterline of the ship, the construction of the propellers, shafts and gears need not be stronger than that required for an Arctic class 3 ship.

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Cooling Water Arrangements

10. (1) Every Arctic class ship shall be provided with at least one sea bay or tank from which cooling water for machinery that is essential for the propulsion of the ship may be drawn.

(2) The sea bays or tanks described in subsection (1) shall be

(a) located as close to the keel as practicable; and

(b) be supplied with water from more than one sea inlet box.

(3) The sea inlet boxes described in paragraph (2)(b) shall

(a) be fitted on each side of the ship;

(b) each have an area open to the sea of at least six times the total area of the pump suctions served by the sea bay; and

(c) be connected to the sea by pipes, valves and a strainer so that the strainer may be shut off from the sea and from the sea bay and the cross sectional area of such pipes, valves and strainer shall be not less than the total area of the pump suctions served by the sea bay.

11. (1) Every sea water pump in an Arctic class ship that provides sea water to machinery essential for the propulsion of the ship shall be able to draw sea water directly from the sea bay or tank described in subsection 10(1) of this Schedule.

(2) The design flow velocity of sea water through the suction pipe to any pump described in subsection (1) shall not be more than 2.03 m/s.

(3) Cross connections shall be provided from the overboard discharge pipes from the machinery referred to in subsection (1) and such cross connections shall be

(a) connected to the pipe between the valve on the sea inlet box and the strainer;

(b) of the same bore as the overboard discharge pipe; and

(c) provided with a suitable system of valves so that the water may be re-circulated.

Air Starting Systems

12. (1) Every Arctic class ship that is propelled with engines that are started by compressed air shall be provided with not less than two air receivers and the total capacity of the air receivers shall be sufficient to provide, without replenishment, air for

(a) 12 starts in the case of a ship with reversible engines; or

(b) six starts in the case of a ship with non-reversible engines.
(2) The compressed air required in subsection (1) shall be provided by more than one independently driven air compressor and the air compressors shall have sufficient capacity to charge the air receivers from empty to maximum pressure in not more than 30 minutes.

(3) The capacity of the smallest air compressor required by subsection (2) shall not be less than two-thirds of the capacity of the largest air compressor.
## SCHEDULE VIII

[SOR/78-180, s. 13; SOR/79-152, s. 1(E); SOR/81-330, s. 8; SOR/85-626, s. 4.]

(Sections 6 and 26)

### TABLE

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ARCTIC SHIPPING POLLUTION PREVENTION REGULATIONS [FEDERAL] [REPEALED]

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SCHEDULE IX

(Section 10)

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