

two draughts by formula 3.1. Draughts to be used are the maximum draught amidships referred to as UIWL and the minimum draught amidships referred to as LIWL, as defined in section 2.2. In the calculations, the ship's parameters which depend on the draught must be determined at the appropriate draught, but L and B must be determined only at the UIWL. The engine output shall be no less than the greater of these two outputs.

$$P_{min} = K_e \frac{(R_{CH}/1000)^{3/2}}{D_p} \text{ [kW]},$$
 (3.1)

where K_e shall be given a value according to Table 3-1.

Table 3-1: Values of K_e for conventional propulsion systemsNumber of propulersCP propeller or electric or hypellersFP propeller1 propeller2.032.262 propellers1.441.603 propellers1.181.31

These K_e values apply to conventional propulsion systems. Other methods may be used for determining the required power for advanced propulsion systems (see 3.2.5).

 R_{CH} is the ice resistance in Newton of the ship in a channel with brash ice and a consolidated surface layer.

$$R_{CH} = C_1 + C_2 + C_3 C_{\mu} (H_F + H_M)^2 (B + C_{\psi} H_F) + C_4 L_{PAR} H_F^2 + C_5 \left(\frac{LT}{B^2}\right)^3 \frac{A_{wf}}{L}, \tag{3.2}$$

where

 $C_{\mu} = 0.15 cos \, \varphi_2 + \sin \psi \sin \alpha$, C_{μ} has a value equal to or larger than 0.45

 $\textit{C}_{\psi} = 0.047 \psi - 2.115$ and $\textit{C}_{\psi} = 0$ if $\psi \leq 45^{\circ}$

 $H_F = 0.26 + (H_M B)^{0.5}$

 $H_M = 1.0$ m for ice classes IA and IA Super

= 0.8 m for ice class IB

= 0.6 m for ice class IC

 C_1 and C_2 take account of a consolidated upper layer of brash ice. C_1 =0 and C_2 =0 for ice classes IA, IB and IC.

For ice class IA Super:

$$C_{1} = f_{1} \frac{BL_{PAR}}{2\frac{T}{B} + 1} + (1 + 0.021\phi_{1})(f_{2}B + f_{3}L_{BOW} + f_{4}BL_{BOW}),$$

$$C_{2} = (1 + 0.063\phi_{1})(g_{1} + g_{2}B) + g_{3}\left(1 + 1.2\frac{T}{B}\right)\frac{B^{2}}{\sqrt{L}}.$$

For a ship with a bulbous bow, $\varphi_1 = 90^{\circ}$.