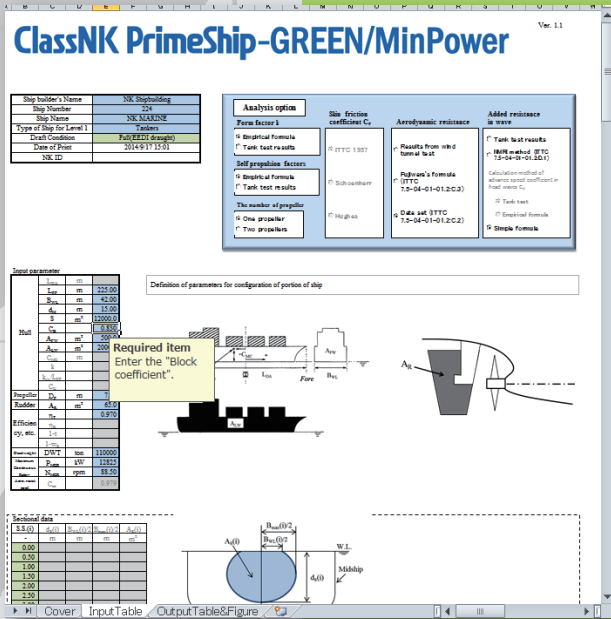


# GREEN / MinPower

Software for Assessment of Minimum Propulsion Power



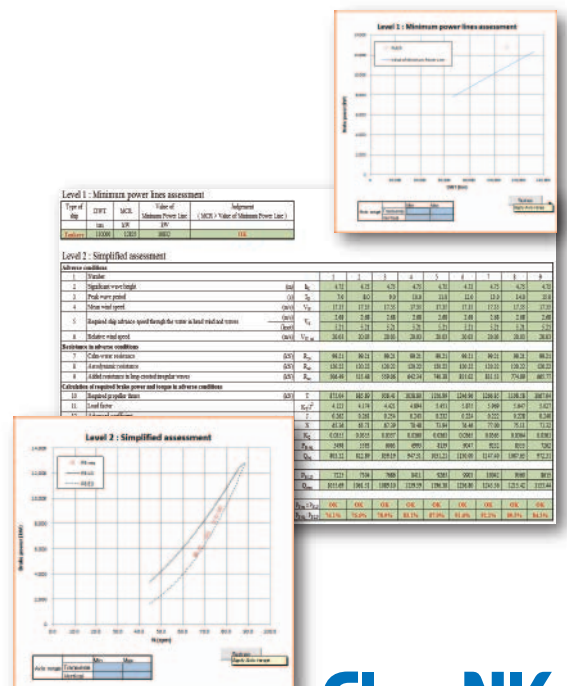
## Key Features

- ◆ Easy to assess the minimum propulsion power to maintain the manoeuvrability in adverse conditions according to the “minimum propulsion power interim guidelines”
- ◆ Both assessment Level 1 and Level 2 in the guidelines are available
- ◆ Stand-alone software base on Microsoft Excel
- ◆ User-friendly interface
- ◆ Auto-generation of output results and figures for class approval
- ◆ Free to use

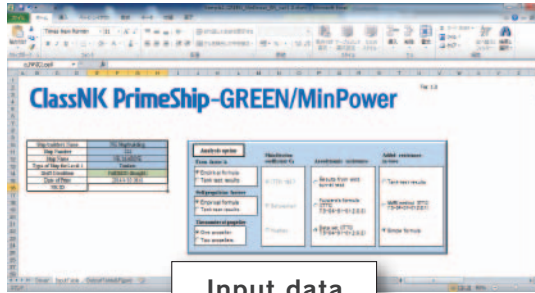
This software is intended to conduct assessments of required minimum propulsion power in adverse conditions for bulk carriers, tankers and combination carriers with the size of equal or more than 20,000DWT by means of methods defined in Res. MEPC.232(65) of IMO “2013 INTERIM GUIDELINES FOR DETERMINING MINIMUM PROPULSION POWER TO MAINTAIN THE MANOEVRABILITY OF SHIP IN ADVERSE CONDITIONS”.

## Main Functions

- ◆ Both assessment Level 1 and Level 2 in the guidelines are available. (The ship should be considered to have sufficient power if it fulfills one of these assessment levels.)
- ◆ Level 1: According to Res. MEPC.232(65) the ship under Level 1 must have installed power not less than the power defined by the minimum power line for the specific type of ship in the resolution.
- ◆ Level 2: This assessment procedure is based on the assumption that, if the ship has sufficient installed power to move with a certain advance speed in head waves and wind, the ship will also be able to keep course in waves and wind from any other direction. It is necessary to input self-propulsion factors, aerodynamic resistance, added resistance, etc. for the assessment.
- ◆ The added resistance in waves used for the assessment can be easily estimated using a simplified formula with the principal particulars.
- ◆ The added resistance in waves can be estimated based on ship's lines using NMRI method.



## Structure of the system



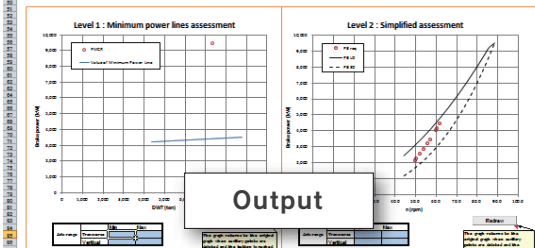
**Input data**



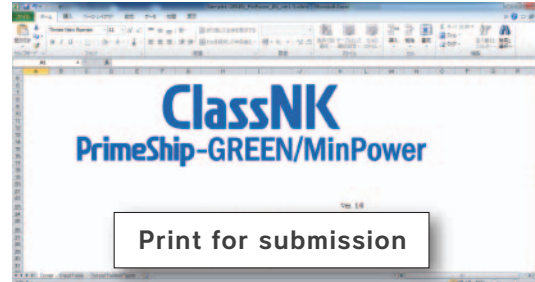
Level 1 - Minimum power lines assessment					
Type of ship	DWT	MCR	Value of resistance	Value of resistance	Value of resistance
Ship	Ship	Ship	Ship	Ship	Ship
100	100	100	100	100	100

Level 2 - Simplified assessment										
Adverse conditions	1	2	3	4	5	6	7	8	9	10
1 Significant wave height	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
2 Pitch wave period	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
3 Roll wave period	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
4 Added resistance caused through the water in head wind and waves	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
5 Required wind speed	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50
6 Required wind speed	0.05	0.10	0.15	0.20	0.25	0.30	0.35	0.40	0.45	0.50



**Output**



**Print for submission**

### Input

- ◇ Ship's principal particulars
- ◇ Self-propulsion factors
- ◇ Frontal and side windage area of hull and superstructure, Actual rudder area
- ◇ Propeller open water characteristics
- ◇ Torque-speed limitation curve of the engine provided by the engine manufacturer
- ◇ Ship's Lines
- ◇ Added resistance in long-crested irregular waves, etc.

### Analysis options

- There are selectable options below.
- ◇ For the form factor k and the self-propulsion factors
    - ① Empirical formula
    - ② Tank test results
  - ◇ For the aerodynamic resistance coefficient
    - ① Results from wind tunnel test
    - ② Fujiwara's formula (ITTC 7.5-04-01-01.2:C.3)
    - ③ ITTC data sets (ITTC 7.5-04-01-01.2:C.2)
  - ◇ For the added resistance in long-crested irregular waves
    - ① Tank test results
    - ② NMRI method (ITTC 7.5-04-01-01.2:D.1)
    - ③ Simplified formula

### Output

- ◇ Results of the assessments Level1 and Level2 for submission

### Free to use

This software is provided free of charge.

### PrimeShip-GREEN/MinPower system requirements

Hardware requirements	Software requirements
Print function of Microsoft Windows	OS: Windows 7 (64bit) Office: Microsoft Excel 2010, 2013 (32bit)