

Subject

Appraisal services for energy efficiency improvement of ships

# **ClassNK**

## **Technical Information**

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To whom it may concern

Amendments to MARPOL Annex VI making the "Energy Efficiency Design Index" (EEDI)<sup>\*1)</sup> and the "Ship Efficiency Management Plan" (SEEMP)<sup>\*2)</sup> mandatory were adopted at the 62nd session of the Marine Environment Protection Committee (MEPC 62) held in July 2011, and will become effective from 1 January 2013.

ClassNK has already started to offer appraisal services related to improving the energy efficiency of ships prior to the effective date of the amendments. This ClassNK Technical Information provides information relating to the appraisal services along with a summary of the outcomes of MEPC 62.

### 1. Summary of MEPC 62 outcomes

(1) Amendments to MARPOL Annex VI were adopted that make the EEDI and SEEMP mandatory. A brief outline of the amendments is given below.

(a) The Attained EEDI of each new ship for which the building contract order is placed on or after 1 January 2013 (in the absence of a building contract, the keel of which is laid or which is at a similar stage of construction on or after 1 July 2013) or the delivery of which is on or after 1 July 2015, is to comply with the EEDI limit value specified based on the EEDI reference line<sup>†</sup> for each type of ship in cases where the deadweight exceeds a certain value. However, the Administration may waive this requirement up to four years. The EEDI limit values will become more stringent in a step by step manner from 1 January 2015 by introducing a specified reduction rate from the EEDI reference line.

<sup>†</sup> The EEDI reference line is the average line of the EEDI determined for existing ships of the same type expressed by an exponential function of the deadweight calculated by the IMO by using data on ships built during the ten year period from 1999 to 2008.

(b) All ships (both new and existing ships) with a gross tonnage of 400 tons or above will be required to retain a SEEMP onboard on or after 1 January 2013.

(2) A work plan was agreed on regarding the development of EEDI frameworks for ships, types and sizes, and propulsion systems not covered by the current EEDI requirements, as well as for the development of remaining EEDI and SEEMP guidelines.

(To be continued)

### NOTES:

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- (3) It was agreed that the second Intersessional Meeting of the Working Group on Energy Efficiency Measures for Ships will be held in January 2012. At the Intersessional Meeting, the following Guidelines will be discussed with a view to further improvement and finalization at MEPC 63.
- Guidelines on the method of calculation of the EEDI for new ships
  - Guidelines for the development of a SEEMP
  - Guidelines on the survey and certification of the EEDI
  - Guidelines for determining minimum propulsive power and speed to enable safe manoeuvring in adverse weather conditions

## 2. Appraisal services on energy efficiency improvement of ships

ClassNK provides the following appraisal services on EEDI, SEEMP or "Energy Efficiency Operational Indicator" (EEOI)<sup>\*3)</sup>.

### (1) EEDI appraisal service

EEDI verification is conducted in accordance with MEPC.1/Circ.682 "INTERIM GUIDELINES FOR VOLUNTARY VERIFICATION OF THE ENERGY EFFICIENCY DESIGN INDEX" through two steps: preliminary verification at the design stage and, final verification during sea trials. After satisfactory completion of the verifications, ClassNK will issue a Statement of Fact for the relevant EEDI requirements.

#### (a) Preliminary verification at the design stage

At the design stage, the calculation process for the Attained EEDI which is calculated using a power curve (relationship between ship speed and main engine output) estimated under the "fully loaded condition"<sup>\*4)</sup> and principal particulars of the ship are verified.

In cases where a speed trial is not conducted under the fully loaded condition during the sea trial, the power curve under the fully loaded condition needs to be estimated from the tank test results using the model ship. In this case, not only the power curve under the fully loaded condition but also a power curve under the sea trial condition needs to be developed for the final EEDI verification, because the ship speed under the fully loaded condition has to be finally estimated by using the speed trial results obtained under the sea trial condition.

#### (b) Final verification during sea trials

During sea trials, the Attained EEDI is to be finally determined by correcting the calculated value of the Attained EEDI at the design stage using the speed trial results. During the final verification, the relevant data measured during the speed trials is to be confirmed and correction process of the Attained EEDI is to be verified.

(To be continued)

In order to conduct the above verifications, the "EEDI Technical File" for the ship, which provides basic information on the calculation conditions of the EEDI, and "Additional Information", which provides supplementary information, need to be submitted to ClassNK. (The items to be included in the EEDI Technical File and Additional Information are shown below) Since the additional information may contain the submitter's confidential information, ClassNK will return such information to the submitter immediately after completion of the appraisal service. In addition, ClassNK will conclude a secrecy agreement with the submitter, as necessary.

(i) Items to be included in the EEDI Technical File

- Basic data such as deadweight/Gross tonnage, maximum continuous ratings of the main and auxiliary engines, estimated ship speed, specific fuel consumptions of the main and auxiliary engines
- Estimated power curves under the fully loaded condition and sea trial condition
- Principal particulars of the propulsion system and electricity supply system on board
- Estimation process and methodology of the power curve
- Description of the energy saving equipment
- Calculated value of the attained EEDI

(ii) Items to be included in the Additional Information

- Description of tank test facility
- Lines of the model ship and actual ship
- Lightweight of the ship and displacement table
- Detailed report on the method and results of the tank test
- Detailed calculation process of the ship's speed, which includes the way to estimate the power curve.
- Reason for exempting tank test (in cases where the tank test is exempted)

(2) SEEMP appraisal service

It is to be confirmed that the Ship Energy Efficiency Management Plan (SEEMP) is developed in accordance with MEPC.1/Circ.683 "GUIDANCE FOR THE DEVELOPMENT OF A SHIP ENERGY EFFICIENCY MANAGEMENT PLAN (SEEMP)". ClassNK will issue a Statement confirming the result.

(3) EEOI appraisal service

ClassNK released its EEOI calculation and analysis system "PrimeShip-GREEN/EEOI" in April 2011 for free to use. EEOI calculations performed using this system are in compliance with MEPC.1/Circ.684 "INTERIM GUIDELINES FOR VOLUNTARY USE OF THE SHIP ENERGY EFFICIENCY OPERATIONAL INDICATOR (EEOI)". ClassNK offers an appraisal service for confirming the EEOI calculation results using this system and issues a Statement for the calculation results, accordingly.

(To be continued)

You can download an "Application for use of PrimeShip-GREEN/EEOI" from the following URL.  
<http://www.classnk.or.jp/hp/en/activities/primeship/>

Note \*1): Energy Efficiency Design Index (EEDI)

EEDI provides the number of grams of CO<sub>2</sub> emissions per tonne nautical mile estimated by the ship's specifications for the new ship and stands for the ship's potential for energy efficiency.

Note \*2): Ship Energy Efficiency Management Plan (SEEMP)

SEEMP is a management plan designed to improve the ship's energy efficiency by operational means (speed optimization, optimum routing, hull maintenance, etc.)

Note \*3): Energy Efficiency Operational Indicator (EEOI)

The EEOI provides the number of grams of CO<sub>2</sub> emissions per tonne nautical mile calculated using the ship's actual operational data (specific fuel consumption, cargo mass carried, and distance sailed) and stands for the ship's energy efficiency actually achieved during operation.

Note \*4): Maximum summer load draught is applied. However, for container ships, it was agreed at MEPC 62 that a draught corresponding to 70% of the ship's deadweight is to be applied instead of the maximum summer load draught.

For any questions about the above, please contact:

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