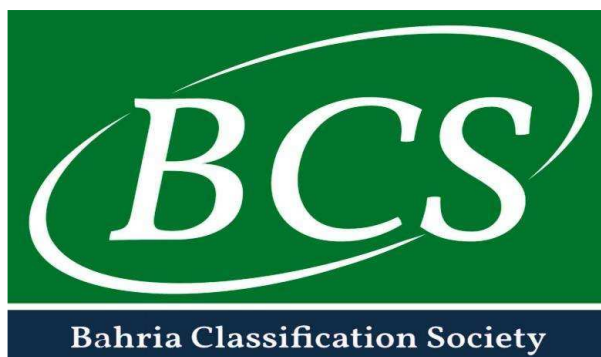


BAHRIA CLASSIFICATION SOCIETY



BCS-G 001

Guidelines for Survey and Certification of Attained Energy Efficiency Existing Ship Index

October 2022

These guidelines list requirements and procedures and are intended to be used as supporting material to BCS Rules.

Unless otherwise specified, these Rules apply according to the implementation dates as defined in each interpretation. See Rule Change Summary on BCS website for revision details

“General Terms and Conditions” of the respective latest edition will be applicable (see Rules for Classification and Survey).

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1. GENERAL

These guidelines are prepared in accordance with Resolution MEPC.351(78) and enter into force on November 1, 2022.

The purpose of these Guidelines is to assist verifiers of the Energy Efficiency Existing Ship Index (EEXI) of ships in conducting the survey and certification of the EEXI, in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI, and assist shipowners, shipbuilders, manufacturers and other interested parties in understanding the procedures for the survey and certification of the EEXI.

2. DEFINITIONS

2.1 Verifier means an Administration, or organization duly authorized by it, which conducts the survey and certification of the EEXI in accordance with regulations 5, 6, 7, 8 and 9 of MARPOL Annex VI and these Guidelines.

2.2 Ship of the same type means a ship the hull form (expressed in the lines such as sheer plan and body plan), excluding additional hull features such as fins, and principal particulars of which are identical to that of the base ship.

2.3 Tank test means model towing tests, model self-propulsion tests and model propeller open water tests. Numerical calculations may be accepted as equivalent to model propeller open water tests or used to complement the tank tests conducted (e.g. to evaluate the effect of additional hull features such as fins, etc. on ships' performance), or as a replacement for model tests provided that the methodology and numerical model used have been validated/calibrated against parent hull sea trials and/or model tests, with the approval of the verifier.

2.4 MARPOL means the International Convention for the Prevention of Pollution from Ships, 1973, as modified by the Protocols of 1978 and 1997 relating thereto, as amended.

2.5 For the purpose of these Guidelines, the definitions in MARPOL Annex VI, as amended, apply.

3. APPLICATION

These Guidelines should be applied to ships for which an application for a survey for verification of the ship's EEXI specified in regulation 5 of MARPOL Annex VI has been submitted to a verifier.

4. PROCEDURE FOR SURVEY AND CERTIFICATION

4.1 General

4.1.1 The attained EEXI should be calculated in accordance with regulation 23 of MARPOL Annex VI and **BCS-G 002** Guidelines on the method of calculation of the attained Energy Efficiency Existing Ship Index (EEXI).

4.1.2 **BCS-G 003** Guidance on treatment of innovative energy efficiency technologies for calculation and verification of the attained EEDI and EEXI should be applied for calculation of the attained EEXI, if applicable.

4.1.3 The information used in the verification process may contain confidential information of submitters, including shipyards, which requires Intellectual Property Rights (IPR) protection. In the case where the submitter wants a non-disclosure agreement with the verifier, the additional information should be provided to the verifier upon mutually agreed terms and conditions.

4.2 Verification of Attained EEXI

4.2.1 For verification of the attained EEXI, an application for a survey and an EEXI Technical File containing the necessary information for the verification and other relevant background documents should be submitted to a verifier, unless the attained EEDI of the ship satisfies the required EEXI.

4.2.2 The EEXI Technical File should be written at least in English. The EEXI Technical File should include, but not be limited to:

- .1 deadweight (DWT) or gross tonnage (GT) for ro-ro passenger ship and cruise passenger ship having non-conventional propulsion;
- .2 the rated installed power (MCR) of the main and auxiliary engines;
- .3 the limited installed power (MCR_{lim}) in cases where the overridable Shaft/Engine Power Limitation system is installed;
- .4 the ship speed (V_{ref});
- .5 the approximate ship speed ($V_{ref,app}$) for pre-EEDI ships in cases where the speed-power curve is not available, as specified in paragraph 2.2.3.5 of the EEXI Calculation Guidelines;
- .6 an approved speed-power curve under the EEDI condition as specified in paragraph 2.2 of the EEDI Calculation Guidelines, which is described in the EEDI Technical File, in cases where regulation 22 of MARPOL Annex VI (Attained EEDI) is applied;
- .7 an estimated speed-power curve under the EEDI condition, or under a different load draught to be calibrated to the EEDI condition, obtained from tank test and/or numerical calculations, if available;
- .8 estimation process and methodology of the power curves, as necessary, including documentation on consistency with the defined quality standards (e.g. ITTC 7.5-03-01-02 and ITTC 7.5-03-01-04 in their latest revisions) and the verification of the numerical set-up with parent hull or the reference set of comparable ships in case of using numerical calculations;

- .9 a sea trial report including sea trial results, which may have been calibrated by the tank test, under the sea condition as specified in paragraph 2.2.2 of the EEDI Calculation Guidelines, if available;
- .10 an in-service performance measurement report, where applicable, as specified in paragraphs 2.2.3.5 and 2.2.3.7.2 of the EEXI Calculation Guidelines;
- .11 calculation process of $V_{ref,app}$ for pre-EEDI ships in cases where the speed-power curve is not available, as specified in paragraph 2.2.3.6 of the EEXI Calculation Guidelines;
- .12 type of fuel;
- .13 the specific fuel consumption (SFC) of the main and auxiliary engines, as specified in paragraph 2.2.4 of the EEXI Calculation Guidelines;
- .14 the electric power table for certain ship types, as necessary, as defined in the EEDI Calculation Guidelines;
- .15 the documented record of annual average figure of the auxiliary engine load at sea obtained prior to the date of application for a survey for verification of the ship's EEXI, as specified in paragraph 2.2.2.3 of the EEXI Calculation Guidelines, if applicable;
- .16 calculation process of $P_{AE,app}$, as specified in paragraph 2.2.2.3 of the EEXI Calculation Guidelines, if applicable;
- .17 principal particulars, ship type and the relevant information to classify the ship as such a ship type, classification notations and an overview of the propulsion system and electricity supply system on board;
- .18 description of energy-saving equipment, if available;
- .19 calculated value of the attained EEXI, including the calculation summary, which should contain, at a minimum, each value of the calculation parameters and the calculation process used to determine the attained EEXI; and
- .20 for LNG carriers:
 - .1 type and outline of propulsion systems (such as direct drive diesel, diesel electric, steam turbine);
 - .2 LNG cargo tank capacity in m^3 and BOR as defined in paragraph 2.2.5.6.3 of the EEDI Calculation Guidelines;
 - .3 shaft power of the propeller shaft after transmission gear at 100% of the rated output of motor (MPP_{Motor}) and $\eta(i)$ for diesel electric;

.4 shaft power of the propeller shaft after transmission gear at the de-rated output of motor ($MPP_{Motor,lim}$) in cases where the overridable Shaft / Engine Power Limitation is installed;

.5 maximum continuous rated power ($MCR_{SteamTurbine}$) for steam turbine;

.6 limited maximum continuous rated power ($MCR_{SteamTurbine,lim}$) for steam turbine in cases where the overridable Shaft / Engine Power Limitation is installed; and

.7 $SFC_{SteamTurbine}$ for steam turbine, as specified in paragraph 2.2.7.2 of the EEDI Calculation Guidelines. If the calculation is not available from the manufacturer, $SFC_{SteamTurbine}$ may be calculated by the submitter.

A sample of an EEXI Technical File is provided in the appendix.

4.2.3 The SFC should be corrected to the value corresponding to the ISO standard reference conditions using the standard lower calorific value of the fuel oil, referring to ISO 15550:2002 and ISO 3046-1:2002. For the confirmation of the SFC, a copy of the approved NOx Technical File and documented summary of the correction calculations should be submitted to the verifier.

4.2.4 For ships equipped with dual-fuel engine(s) using LNG and fuel oil, the CF-factor for gas (LNG) and the specific fuel consumption (SFC) of gas fuel should be used by applying the criteria specified in paragraph 4.2.3 of the 2014 Guidelines on survey and certification of the Energy Efficiency Design Index (EEDI), as amended,³ as a basis for the guidance of the Administration.

4.2.5 Notwithstanding paragraphs 4.2.3 and 4.2.4, in cases where overridable Shaft/Engine Power Limitation is installed, or in cases where engines do not have a test report included in the NOx Technical File, SFC should be calculated in accordance with paragraph 2.2.4 of the EEDI Calculation Guidelines. For this purpose, actual performance records of the engine may be used if satisfactory and acceptable to the verifier.

4.2.6 The verifier may request further information from the submitter, as specified in paragraph 4.2.7 of the EEDI Survey and Certification Guidelines, in addition to that contained in the EEXI Technical File, as necessary, to examine the calculation process of the attained EEXI.

4.2.7 In cases where the sea trial report as specified in paragraph 4.2.2.9 is submitted, the verifier should request further information from the submitter to confirm that:

.1 the sea trial was conducted in accordance with the conditions specified in paragraphs 4.3.3, 4.3.4 and 4.3.7 of the EEDI Survey and Certification Guidelines, as applicable;

.2 sea conditions were measured in accordance with ISO 15016:2002 or the equivalent if satisfactory and acceptable to the verifier;

.3 ship speed was measured in accordance with ISO 15016:2002 or the equivalent if satisfactory and acceptable to the verifier; and

.4 the measured ship speed was calibrated, if necessary, by taking into account the effects of wind, tide, waves, shallow water and displacement in accordance with ISO 15016:2002 or the equivalent which may be acceptable provided that the concept of the method is transparent for the verifier and publicly available/accessible.

4.2.8 In cases where the in-service performance measurement report as specified in paragraph 4.2.2.10 is submitted, the verifier should confirm that the in-service performance measurement was conducted and verified in accordance with the methods and procedures as specified in the Guidance on methods, procedures and verification of in-service performance measurements (**BCS-G 004**).

4.3 Verification of Attained EEXI in case of major conversion

4.3.1 In cases of a major conversion of a ship taking place at or after the completion date of the survey for EEXI verification specified in regulation 5.4.7 of MARPOL Annex VI, the shipowner should submit to a verifier an application for a general or partial survey with the EEXI Technical File duly revised, based on the conversion made and other relevant background documents.

4.3.2 The background documents should include as a minimum, but are not limited to:

- .1 details of the conversion;
- .2 EEXI parameters changed after the conversion and the technical justifications for each respective parameter;
- .3 reasons for other changes made in the EEXI Technical File, if any; and
- .4 calculated value of the attained EEXI with the calculation summary, which should contain, as a minimum, each value of the calculation parameters and the calculation process used to determine the attained EEXI after the conversion.

4.3.3 The verifier should review the revised EEXI Technical File and other documents submitted and verify the calculation process of the attained EEXI to ensure that it is technically sound and reasonable and follows regulation 23 of MARPOL Annex VI and the EEXI Calculation Guidelines.

4.3.4 For verification of the attained EEXI after the major conversion, speed trials of the ship may be conducted, as necessary.