

**RESOLUTION MEPC.335(76)**  
**(adopted on 17 June 2021)**

**2021 GUIDELINES ON THE SHAFT / ENGINE POWER LIMITATION SYSTEM TO  
COMPLY WITH THE EEXI REQUIREMENTS AND USE OF A POWER RESERVE**

THE MARINE ENVIRONMENT PROTECTION COMMITTEE,

RECALLING Article 38(a) of the Convention on the International Maritime Organization concerning the functions of the Marine Environment Protection Committee conferred upon it by international conventions for the prevention and control of marine pollution from ships,

NOTING that it adopted, by resolution MEPC.328(76), the 2021 revised MARPOL Annex VI, which is expected to enter into force on 1 November 2022 upon its deemed acceptance on 1 May 2022,

NOTING IN PARTICULAR that the 2021 revised MARPOL Annex VI contains amendments concerning mandatory goal-based technical and operational measures to reduce carbon intensity of international shipping,

NOTING FURTHER that ships may be equipped with a Shaft / Engine Power Limitation system in order to comply with regulation 25 (Required EEXI),

RECOGNIZING that the aforementioned amendments to MARPOL Annex VI require relevant guidelines for uniform and effective implementation of the regulations and to provide sufficient lead time for industry to prepare,

HAVING CONSIDERED, at its seventy-sixth session, draft *2021 Guidelines on the shaft / engine power limitation system to comply with the EEXI requirements and use of a power reserve*,

1 ADOPTS the *2021 Guidelines on the shaft / engine power limitation system to comply with the EEXI requirements and use of a power reserve*, as set out in the annex to the present resolution;

2 INVITES Administrations to take the annexed Guidelines into account when developing and enacting national laws which give force to and implement requirements set forth in regulations 23 and 25 of MARPOL Annex VI;

3 REQUESTS the Parties to MARPOL Annex VI and other Member Governments to bring the annexed Guidelines to the attention of masters, seafarers, shipowners, ship operators and any other interested parties;

4 AGREES to keep the Guidelines under review in light of experience gained with their implementation and in light of the review of EEXI regulations to be completed by the Organization by 1 January 2026 as identified in regulation 25.3 of MARPOL Annex VI;

5 NOTES that the Guidelines may be consolidated with possible future guidelines on the shaft / engine power limitation system under the EEDI framework as appropriate upon consideration by the Committee, taking into account circumstances and technical limitation of existing ships.

## ANNEX

### **2021 GUIDELINES ON THE SHAFT / ENGINE POWER LIMITATION SYSTEM TO COMPLY WITH THE EEXI REQUIREMENTS AND USE OF A POWER RESERVE**

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## 0 General

The purpose of these Guidelines is to provide technical and operational conditions that the SHaPoLi / EPL system should satisfy in complying with the EEXI requirements and in using a power reserve for existing ships. However, noting that guidelines on the SHaPoLi / EPL system under EEDI framework on new ships are currently considered at the Committee, these guidelines under EEXI and EEDI may be consolidated into one set of guidelines as appropriate upon consideration by the Committee, taking into account circumstances and technical limitation of existing ships.

## 1 Definitions

1.1 *Shaft power* means the mechanical power transmitted by the propeller shaft to the propeller hub. It is the product of the shaft torque and the shaft rotational speed. In case of multiple propeller shafts, the shaft power means the sum of the power transmitted to all propeller shafts.

1.2 *Engine power* means the mechanical power transmitted from the engine to the propeller shaft. In case of multiple engines, the engine power means the sum of the power transmitted from the engines to the propeller shafts.

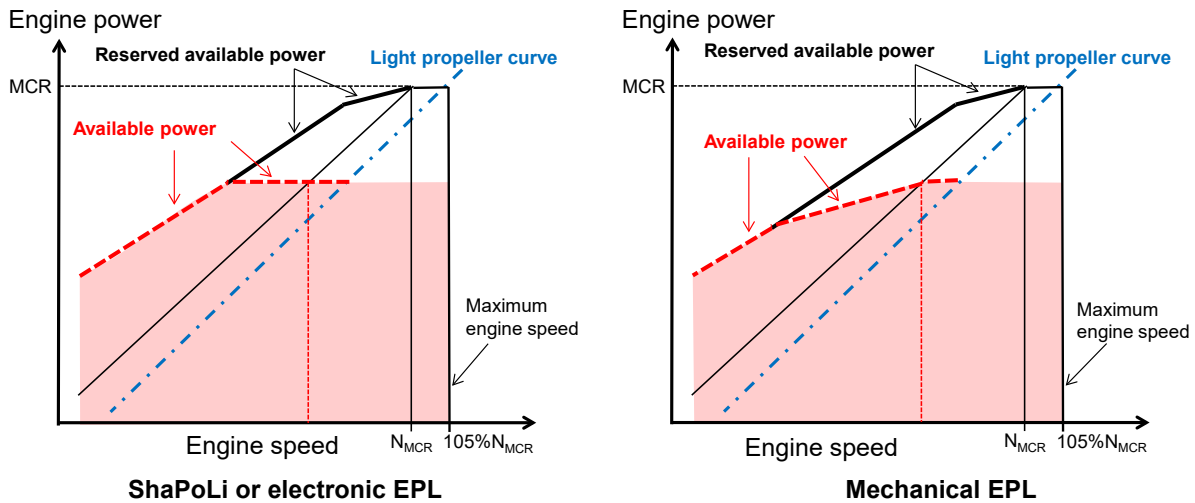
1.3 *Overridable Shaft Power Limitation (SHaPoLi) system* means a verified and approved system for the limitation of the maximum shaft power by technical means that can only be overridden by the ship's master or the officer in charge of navigational watch (OICNW) for the purpose of securing the safety of a ship or saving life at sea. (See figure 1 for an illustration of engine load diagram.)

1.4 *Overridable Engine Power Limitation (EPL) system* means a verified and approved system for the limitation of the maximum engine power by technical means that can only be overridden by the ship's master or OICNW for the purpose of securing the safety of a ship or saving life at sea. (See figure 1 for an illustration of engine load diagram.)

1.5 *Power reserve* means shaft / engine power above the limited power which cannot be used in normal operation unless in the case when SHaPoLi / EPL is unlimited for the purpose of securing the ship safety.

1.6 *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.

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



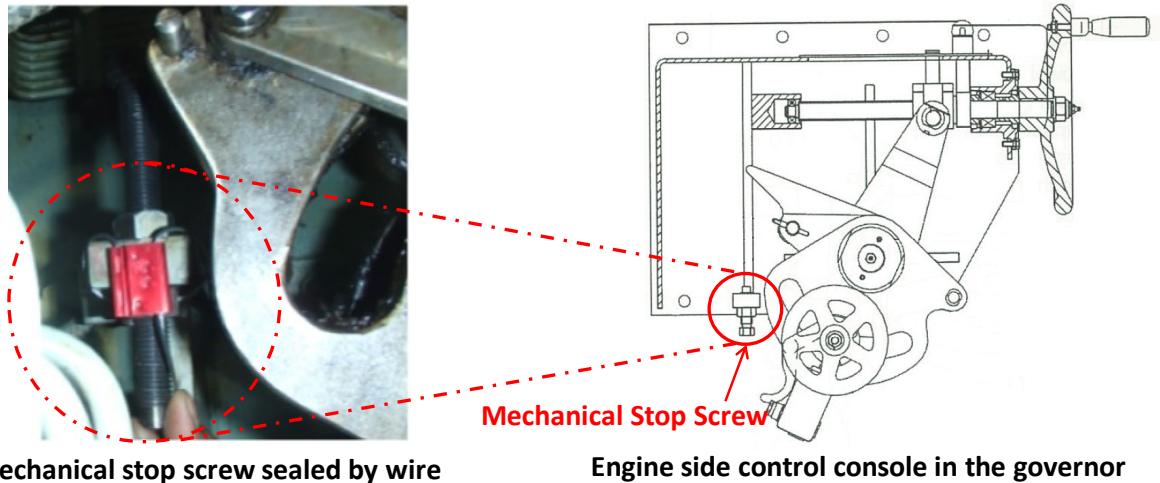
**Figure 1: Engine load diagram on Shaft/Engine Power Limitation**

## 2 Technical requirements for the SHaPoLi / EPL system

### 2.1 Required main systems

The SHaPoLi / EPL system should consist of the following main arrangements:

- .1 SHaPoLi:
  - .1 sensors for measuring the torque and rotational speed delivered to the propeller(s) of the ship. The system includes the amplifier and the analogue to the digital converter;
  - .2 a data recording and processing device for tracking and calculation of the data as given in paragraph 2.2.5.1 of these Guidelines; and
  - .3 a control unit for calculation and limitation of the power transmitted by the shaft to the propeller(s);
- .2 EPL:
  - .1 for the mechanically controlled engine, a sealing device which can physically lock the fuel index by using a mechanical stop screw sealed by wire or an equivalent device with governor limit setting so that the ship's crew cannot release the EPL without permission from the ship's master or OICNW, as shown in figure 2; or
  - .2 for the electronically controlled engine, fuel index limiter which can electronically lock the fuel index or direct limitation of the power in the engine's control system so that the ship's crew cannot release the EPL without permission from the ship's master or OICNW; and
- .3 where technically possible and feasible, the Sha/PoLi/EPL system should be controlled from the ships' bridge and not require attendance in the machinery space by ship's personnel.



Mechanical stop screw sealed by wire

Engine side control console in the governor

**Figure 2: Sealing of mechanical stop screw**

## 2.2 General system requirements

2.2.1 The SHaPoLi / EPL system should be non-permanent but should require the deliberate action of the ship's master or OICNW to enable the use of unlimited shaft / engine power (power reserve) of the ship. For systems that use a Password/PIN to control access to the power reserve override, attention should be paid to ensure that the necessary Password/PIN is always available when override is required.

2.2.2 For SHaPoLi / EPL system for the electronically controlled engine, the control unit should inform the ship's master or OICNW clearly and conspicuously when the ship's shaft / engine power exceeds the limited shaft / engine power as stated in the Onboard Management Manual (OMM) for SHaPoLi / EPL or in any case of system malfunction.

2.2.3 For EPL for the mechanically controlled engine, the sealing device should either:

- .1 visibly indicate removal of the sealing when the ship's engine power exceeds the limited engine power as stated in the OMM for EPL or in any case of system malfunction; or
- .2 be equipped with other systems such as an alert-monitoring system which can indicate when the ship's engine power exceeds the limited engine power as stated in the OMM for EPL or in any case of system malfunction and recording the use of unlimited mode, verified by the Administration or the RO.

2.2.4 The SHaPoLi / EPL system (or each subsystem) should be tamper-proof.

2.2.5 The SHaPoLi / EPL system for the electronically controlled engine should indicate the following data during operation:

- .1 for SHaPoLi, shaft rotational speed, shaft torque and shaft power (and total shaft power in case of multiple shaft arrangements) to be recorded constantly in unlimiting mode; or
- .2 for EPL, a fuel index sealing system or power limitation system which can indicate and record the use of unlimited mode.

2.2.6 The procedure for SHaPoLi / EPL depends on the propulsion system and should be described in the OMM for SHaPoLi / EPL in accordance with section 4 of these Guidelines.

### **3 Use of a power reserve by un-limiting the shaft / engine power limitation**

3.1 The use of a power reserve is only allowed for the purpose of securing the safety of a ship or saving life at sea, consistent with regulation 3.1 of MARPOL Annex VI (e.g. operating in adverse weather and ice-infested waters, participation in search and rescue operations, avoidance of pirates and engine maintenance). Use of a power reserve should not have adverse impact on the propeller, shaft and related systems. It is important that the ship master and OICNW are not restricted from exercising judgement to override the SHaPoLi / EPL when required for safety purposes. The authority for this should be clearly set out in the OMM and/or the Safety Management System manual, as appropriate.

3.2 Any use of a power reserve should be recorded in the record page of the OMM for SHaPoLi / EPL, signed by the master and should be kept on board. The record should include:

- .1 ship type;
- .2 IMO number;
- .3 ship size in DWT and/or GT, as applicable;
- .4 ship's limited shaft / engine power and ship's maximum unlimited shaft / engine power;
- .5 position of the ship and timestamp when the power reserve was used;
- .6 reason for using the power reserve;
- .7 Beaufort number and wave height or ice condition in case of using the power reserve under adverse weather condition;
- .8 supporting evidence (e.g. expected weather condition) in case of using the power reserve for avoidance action;
- .9 records from the SHaPoLi / EPL system for the electronically controlled engine during the power reserve was used; and
- .10 position of the ship and timestamp when the power limit was reactivated or replaced.

3.3 Where an EPL/ShaPoLi override is activated but the power reserve is not subsequently used, this event should be recorded in the bridge and engine-room logbooks. The engine-room logbook should record power used during the period when the override was activated. The EPL/ShaPoLi should be reset as soon as possible, and details of the reset should also be recorded in the bridge and engine-room logbooks.

3.4 In case of having used a power reserve, the ship should without delay notify its Administration or RO responsible for issuing the relevant certificate and the competent authority of the relevant port of destination with the information recorded in accordance with paragraph 3.2. On an annual basis, the Administration should report uses of a power reserve to IMO with the information recorded in accordance with paragraph 3.2.

3.5 Once the risks have been mitigated, the ship should be operated below the certified level of engine power under the SHaPoLi / EPL. The SHaPoLi / EPL system should be reactivated or replaced by the crew immediately after the risks have been prevented and the ship can be safely operated with the limited shaft / engine power. The reactivation or replacement of the SHaPoLi / EPL system should be confirmed (e.g. validation of mechanical sealing) with supporting evidence (e.g. engine power log, photo taken at the occasion of resetting the mechanical sealing) by the Administration or the RO at the earliest opportunity.

3.6 Any defect of the SHaPoLi / EPL system should be reported to the Administration or RO responsible for issuing the relevant certificate in accordance with regulation 5.6 of MARPOL Annex VI.

3.7 The port State control officers should inspect whether the SHaPoLi / EPL system has been properly installed and used in accordance with the IEE Certificate and the OMM as described in section 4 of these Guidelines. If overriding of the SHaPoLi / EPL without proper notification in accordance with paragraph 3.3 of these Guidelines has been detected, the reactivation or replacement of the SHaPoLi / EPL should be immediately conducted in the presence of the Administration or the RO at the port.

#### **4 Onboard Management Manual (OMM) for SHaPoLi / EPL**

4.1 The SHaPoLi / EPL system should be accompanied by the OMM for SHaPoLi / EPL that should be permanently on board the ship for inspection.

4.2 The OMM for SHaPoLi / EPL should be verified by the Administration or the RO after a survey verifying the ship's attained EEXI, as required by regulation 5.4 of MARPOL Annex VI.

4.3 The OMM for SHaPoLi / EPL should, as a minimum, include:

.1 SHaPoLi:

- .1 a technical description of the main system as specified in section 2 of these guidelines as well as relevant auxiliary systems;
- .2 identification of key components of the system by manufacturer, model/type, serial number and other details as necessary;
- .3 description of a verification procedure demonstrating that the system is in compliance with the technical description in accordance with items .1 and .2;
- .4 the maximum shaft power for which the unit is designed;
- .5 service, maintenance and calibration requirements of sensors according to sensor manufacturer and a description how to monitor the appropriateness of the calibration intervals, if applicable;
- .6 the SHaPoLi record book for the recording of service, maintenance and calibration of the system;
- .7 the description how the shaft power can be limited and unlimited and how this is displayed by the control unit as required by paragraph 2.2.5 of these Guidelines;

- .8 the description of how the controller limits the power delivered to the propeller shaft;
  - .9 the identification of responsibilities;
  - .10 procedures for notification of the use of power reserve and the detections of malfunctions of the system in accordance with paragraphs 3.4 and 3.5 of these Guidelines;
  - .11 time required for un-limiting the SHaPoLi; and
  - .12 procedures for survey of the SHaPoLi system by the Administration/RO.
- .2 EPL:
- .1 rated installed power (MCR) or motor output (MPP) and engine speed ( $N_{MCR}$ );
  - .2 limited installed power ( $MCR_{lim}$ ) or motor output ( $MPP_{lim}$ ) and engine speed ( $N_{MCR,lim}$ );
  - .3 technical description of the EPL system;
  - .4 method for sealing the EPL (mechanically controlled engine);
  - .5 method for locking and monitoring the EPL (electronically controlled engine);
  - .6 procedures and methods for releasing the EPL;
  - .7 time required for unlimiting the EPL;
  - .8 procedures for survey of the EPL system by the Administration/RO;
  - .9 procedure for the report on release of the EPL; and
  - .10 administrator of the EPL system.

## **5 Demonstration of compliance of the SHaPoLi / EPL system**

5.1 The demonstration of compliance of the SHaPoLi / EPL system should be verified by an appropriate survey in accordance with regulation 5.4 of MARPOL Annex VI for the verification of the ship's EEXI according to regulation 23. The survey should include the verification and validation of the system by addressing the following items:

- .1 the verification of compliance of the system with the OMM for SHaPoLi / EPL;
- .2 the verification of compliance of the system with the specifications set out in section 2 of these Guidelines; and
- .3 the verification of the OMM for SHaPoLi / EPL that the OMM for SHaPoLi / EPL is in compliance with the specifications set out in section 4 of these Guidelines.

5.2 In cases where the SHaPoLi / EPL system is applied and no changes are made to NO<sub>x</sub> critical settings and/or components\* outside what is allowed by the engine technical file as defined in the 2008 NO<sub>x</sub> Technical Code (NTC 2008), engine re-certification is not needed.

5.3 In cases where the SHaPoLi / EPL system is applied and the NO<sub>x</sub> critical settings and/or components are altered beyond what is allowed by the engine technical file as defined in NTC 2008, the engine needs to be re-certified. In such a case, for an EEDI-certified ship where the SHaPoLi / EPL system is applied at a power below that required by regulation 24.5 of MARPOL Annex VI (minimum power requirement), the certified engine power should be at the power satisfying that requirement.

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NO<sub>x</sub> critical parameters and components are listed in NO<sub>x</sub> Technical File under the section "Components, setting and operating values of the engine which may influence its NO<sub>x</sub> emission".