Manoeuvring Performance of Controllable Pitch Propellers

Object of Amendment

Rules for the Survey and Construction of Steel Ships Parts B and D
Rules for High Speed Craft
Rules for the Survey and Construction of Inland Waterway Ships

Reason for Amendment

IACS Unified Requirements (UR) M25 specifies requirements related to astern power of the main prolusion, including ones for controllable pitch propellers. During a recent review of the UR, the IACS Machinery Panel identified the need for requirements related to the verification of the manoeuvring performance of controllable pitch propellers, and discussed the development of a new UR related to such verification.

As a result, requirements for testing the manouevring performance of controllable pitch propellers were developed and adopted as UR M83 in October 2023.

Accordingly, relevant requirements are amended based on UR M83.

Outline of the Amendment

Specifies that testing requirements related to the manoeuvring performance of control systems of controllable pitch propellers intended for main propulsion are based on UR M83.

Effective Date and Application

(1) Rules for the Survey and Construction of Steel Ships Part B, Rules for High Speed Craft, Rules for the Survey and Construction of Inland Waterway Ships
This amendment applies to ships that fall under the following:
   (a) those for which the date of contract for construction is on or after 1 January 2025; and
   (b) those for which astern testing is carried out in accordance with UR Z18 on or after 1 January 2025.

(2) Rules for the Survey and Construction of Steel Ships Part D
This amendment applies to ships for which the date of contract for construction is on or after 1 January 2025.

ID: DD24-16

An asterisk (*) after the title of a requirement indicates that there is also relevant information in the corresponding Guidance.

Amended-Original Requirements Comparison Table (Manoeuvring Performance of Controllable Pitch Propellers)

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part B CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 Sea Trials and Stability Experiments** **2.3.1 Sea Trials*** **1** In the Classification Survey of all ships, sea trials specified in following **(1)** to **(13)** are to be carried out in full load condition, in the calmest possible sea and weather condition and in deep unrestricted water. However, where sea trials cannot be carried out in full load condition, sea trials may be carried out in an appropriate loaded condition. The noise measurements specified in **(11)** are to be carried out at either the full load condition or the ballast condition. ((1) to (6) are omitted.) (7) Performance test of automatic and remote control systems for main propulsion machinery, controllable pitch propellers, boilers and electric generating sets The tests are to be carried out in accordance with the following **(a)** to **(e)**. However, where these tests have been carried out when the ship was anchored or at dockside, some of these tests may be dispensed with at the sea trial. (a) The control systems for main propulsion machinery and controllable pitch propellers are to	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part B CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 Sea Trials and Stability Experiments** **2.3.1 Sea Trials*** **1** In the Classification Survey of all ships, sea trials specified in following **(1)** to **(13)** are to be carried out in full load condition, in the calmest possible sea and weather condition and in deep unrestricted water. However, where sea trials cannot be carried out in full load condition, sea trials may be carried out in an appropriate loaded condition. The noise measurements specified in **(11)** are to be carried out at either the full load condition or the ballast condition. ((1) to (6) are omitted.) (7) Performance test of automatic and remote control systems for main propulsion machinery, controllable pitch propellers, boilers and electric generating sets The tests are to be carried out in accordance with the following **(a)** to **(e)**. However, where these tests have been carried out when the ship was anchored or at dockside, some of these tests may be dispensed with at the sea trial. (a) The control systems for main propulsion machinery and controllable pitch propellers are to	

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Amended	Original	Remarks
be subjected to the following **i)** to **iv)**. i) The main propulsion machinery or the controllable pitch propellers are to be subjected to starting tests, ahead-astern tests and running tests in the whole range of output, by means of the remote control devices in the main control station or the main control station on the bridge. ii) In addition to output increase and decrease tests, the operation tests of the main propulsion machinery or the controllable pitch propellers using the bridge control devices are to be carried out. Where operation tests were carried out for the entire output range by the bridge control devices, consideration may be given to reduction of the test items with the exception of the starting test. iii) Where there are two or more control stations for main propulsion machinery or controllable pitch propellers, the test on transfer of control is to be carried out while the ship is running ahead and when it is running astern. Where the remote devices for main propulsion machinery or controllable pitch propellers is in accordance with **18.3.2-2(3)(b), Part D**, the above-mentioned test may be carried out while the main propulsion machinery is stopped. iv) After completion of the test on transfer of	be subjected to the following **i)** to **iv)**. i) The main propulsion machinery or the controllable pitch propellers are to be subjected to starting tests, ahead-astern tests and running tests in the whole range of output, by means of the remote control devices in the main control station or the main control station on the bridge. ii) In addition to output increase and decrease tests, the operation tests of the main propulsion machinery or the controllable pitch propellers using the bridge control devices are to be carried out. Where operation tests were carried out for the entire output range by the bridge control devices, consideration may be given to reduction of the test items with the exception of the starting test. iii) Where there are two or more control stations for main propulsion machinery or controllable pitch propellers, the test on transfer of control is to be carried out while the ship is running ahead and when it is running astern. Where the remote devices for main propulsion machinery or controllable pitch propellers is in accordance with **18.3.2-2(3)(b), Part D**, the above-mentioned test may be carried out while the main propulsion machinery is stopped. iv) After completion of the test on transfer of	

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control specified in **iii)**, a demonstration that the main propulsion machinery or the controllable pitch propellers can be smoothly operated from the respective control stations is to be conducted. (b) Notwithstanding **(a)** above, the control systems for controllable pitch propellers intended for main propulsion are to be in accordance with **Annex 2.3.1-3** "Testing Procedures for Control Systems for Controllable Pitch Propellers Intended for Main Propulsion" (c) (Omitted) (d) (Omitted) (e) (Omitted) (f) The "electric generating sets specified in **3.2.1-3, Part H**" mentioned in **(e)** above, refer to the application of **6.2.11-1** and **-3, Part H** for the ships specified in **6.1.1, Part H**.	control specified in **iii)**, a demonstration that the main propulsion machinery or the controllable pitch propellers can be smoothly operated from the respective control stations is to be conducted. (Newly added) (b) (Omitted) (c) (Omitted) (d) (Omitted) (e) The "electric generating sets specified in **3.2.1-3, Part H**" mentioned in **(d)** above, refer to the application of **6.2.11-1** and **-3, Part H** for the ships specified in **6.1.1, Part H**.	Clarifies that the control systems for controllable pitch propellers intended for main propulsion are to be in accordance with Annex 2.3.1-3.
Annex 2.1.4 TESTING PROCEDURES FOR CONTROL SYSTEMS FOR CONTROLLABLE PITCH PROPELLERS INTENDED FOR MAIN PROPULSION **An1.1 General** **An1.1.1 Purpose** The purpose of the tests required by this annex is to ascertain that the pitch control system of controllable pitch	**(Newly added)**	UR M83 UR M83 Para.1

Amended	Original	Remarks
propellers for main propulsion is working correctly. **An1.1.2 Application** This annex applies to all new ships and to all replacements, modifications, repairs, or re-adjustments that may affect the pitch control or response characteristics for main propulsion. **An1.2Tests** **An1.2.1 Pitch Response Test** **1** A full range of tests is to be carried out to get the pitch response and verify that it coincides with the combinator curve of the propeller. The combinator curve is the relationship between the propeller pitch setting and the propeller speed. **2** The tests are to be carried out for at least three positions of the control lever in ahead and astern directions (e.g. dead slow ahead / astern, half ahead / astern and full ahead / astern). **3** The tests are to be carried out in normal and emergency operating conditions. In this context, “emergency operation conditions” means operations from those locations from where it is planned to operate the system in an emergency.		UR M83 Para.2 UR M83 Para.3.1 Emergency operating conditions are not intended for operations from the bridge but are intended for operations from the engine side during an emergency. However, emergency operations are to be carried out from the bridge when the local

Amended	Original	Remarks
4 Tests that are not affected by the control position may be carried out from one control position only.		emergency operating control stations are additionally arranged on the bridge. This intends that there is to be no differences in the power or functions of the propulsion system due to differences in operating location.
An1.2.2 Test of Fail-to-safe Characteristics **1** A test of the fail-to-safe characteristics of the propeller pitch control system is to be carried out to demonstrate that failures in the pitch command and control or feedback signals are alarmed and do not cause any change of thrust. **2** Such failures are to be clearly identified and included in the test procedure.		UR M83 Para.3.2
An1.2.3 Test Procedure The test procedure is to be prepared and proposed by the pitch control system manufacturer or integrator and approved by the Society.		UR M83 Para.3.3
An1.3 Records **1** The list of the parameters to be recorded during the pitch response test within this annex is to be established by the pitch control system manufacturer or integrator and approved		UR M83 Para.4

Amended	Original	Remarks
by the Society. **2** The parameters in **1** above are to include at least the following: (1) Position of the control handle; (2) Actual pitch indication (local indications and remote indications); (3) Rotational speed of the propeller; (4) Response time between the pitch change order (modification of the lever position) and the instant when the pitch and propeller speed have reached their final position; (5) Propelling thrust variation during the transfer of the control from one location to another. **An1.4Test Results** **1** It is to be verified that propelling thrust is not significantly altered under the following **(1)** and **(2)**: (1) Transferring control from one location to another; (2) Failures in the pitch command and control or feedback signals. **2** The pitch response times measured during the test are not to exceed the maximum value to be defined by the pitch control system manufacturer or integrator. EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 1 January 2025.		UR M83 Para.5

Amended	Original	Remarks
2. Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction* is before the effective date and astern testing is carried out in accordance with UR Z18 before the effective date. * "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29. IACS PR No.29 (Rev.0, July 2009) **1.** The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding. **2.** The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder. For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided: (1) such alterations do not affect matters related to classification, or (2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are submitted to the Society for approval. The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed. **3.** If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply. **4.** If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder. Note: This Procedural Requirement applies from 1 July 2009.		

Amended-Original Requirements Comparison Table (Manoeuvring Performance of Controllable Pitch Propellers)

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS **Part D MACHINERY INSTALLATIONS** **Chapter 18 AUTOMATIC AND REMOTE CONTROL** **18.3 Automatic and Remote Control of Main Propulsion Machinery or Controllable Pitch Propellers** **18.3.2 Remote Control Devices for Main Propulsion Machinery or Controllable Pitch Propellers*** **1** General (Omitted) **2** Transfer of Control Remote control devices for main propulsion machinery or controllable pitch propellers are to comply with the following requirements with respect to transfer of control: (1) Each control station for main propulsion machinery or controllable pitch propellers is to be provided with means to indicate which of them is in control. (2) Remote control of main propulsion machinery or controllable pitch propellers is to be only possible from one location at a time. (3) Transfer of control is to be only possible with orders from the serving station and acknowledgement by the	**RULES FOR THE SURVEY AND CONSTRUCTION OF STEEL SHIPS** **Part D MACHINERY INSTALLATIONS** **Chapter 18 AUTOMATIC AND REMOTE CONTROL** **18.3 Automatic and Remote Control of Main Propulsion Machinery or Controllable Pitch Propellers** **18.3.2 Remote Control Devices for Main Propulsion Machinery or Controllable Pitch Propellers*** **1** General (Omitted) **2** Transfer of control Remote control devices for main propulsion machinery or controllable pitch propellers are to comply with the following requirements with respect to transfer of control: (1) Each control station for main propulsion machinery or controllable pitch propellers is to be provided with means to indicate which of them is in control. (2) Remote control of main propulsion machinery or controllable pitch propellers is to be only possible from one location at a time. (3) Transfer of control is to be only possible with orders from the serving station and acknowledgement by the	

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Amended	Original	Remarks
receiving station except for the following cases: (a) Transfer of control between a local control station for main propulsion machinery or controllable pitch propellers and the main control station or sub-control station; and (b) Transfer of control during a stoppage condition of the main propulsion machinery. (4) In cases where the main propulsion machinery or controllable pitch propellers is controlled from the navigation bridge or the main control station on bridge, the transfer of control is to be possible from a local control station for main propulsion machinery or controllable pitch propellers to the main control station or the sub-control station even if no order of the transfer of control from the navigation bridge or the main control station on bridge has been given. (5) Means are to be provided to prevent the propelling thrust from being significantly altered when control is transferred from one location to another. (-3 and -4 are omitted.)	receiving station except for the following cases: (a) Transfer of control between a local control station for main propulsion machinery or controllable pitch propellers and the main control station or sub-control station; and (b) Transfer of control during a stoppage condition of the main propulsion machinery. (4) In cases where the main propulsion machinery or controllable pitch propellers is controlled from the navigation bridge or the main control station on bridge, the transfer of control is to be possible from a local control station for main propulsion machinery or controllable pitch propellers to the main control station or the sub-control station even if no order of the transfer of control from the navigation bridge or the main control station on bridge has been given. (5) Means are to be provided to prevent the propelling thrust from being significantly altered when control is transferred from one location to another, except for when the transfer of control is as described in **(3)(a)** and **(4)**. (-3 and -4 are omitted.)	Harmonisation with the SOLAS II-1/31.2.5 and 49.3
EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 1 January 2025. **2.** Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction is before the effective date.		

Amended-Original Requirements Comparison Table (Manoeuvring Performance of Controllable Pitch Propellers)

Amended	Original	Remarks
RULES FOR HIGH SPEED CRAFT **Part 2 CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 Sea Trials and Stability Experiments** **2.3.1 Sea Trials*** **1** In the Classification Survey of all craft, sea trials specified in following **(1)** to **(11)** are to be carried out in a full load condition, at the calmest possible sea and weather conditions and in deep unrestricted water. However, where sea trials cannot be carried out in a full load condition, sea trials may be carried out in an appropriate loaded condition. ((1) to (6) are omitted.) (7) Performance test of automatic and remote control systems for main propulsion machinery or the controllable pitch propellers, boilers and electric generating sets. However, the control systems for controllable pitch propellers intended for main propulsion are to be in accordance with **Annex 2.3.1-3** "Testing Procedures for Control Systems for Controllable Pitch Propellers Intended for Main Propulsion"**, Part D of the Rules for the Survey and Construction of Steel Ships.** ((8) to (11) are omitted.)	**RULES FOR HIGH SPEED CRAFT** **Part 2 CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 Sea Trials and Stability Experiments** **2.3.1 Sea Trials*** **1** In the Classification Survey of all craft, sea trials specified in following **(1)** to **(11)** are to be carried out in a full load condition, at the calmest possible sea and weather conditions and in deep unrestricted water. However, where sea trials cannot be carried out in a full load condition, sea trials may be carried out in an appropriate loaded condition. ((1) to (6) are omitted.) (7) Performance test of automatic and remote control systems for main propulsion machinery or the controllable pitch propellers, boilers and electric generating sets. ((8) to (11) are omitted.)	

Amended-Original Requirements Comparison Table (Manoeuvring Performance of Controllable Pitch Propellers)

Amended	Original	Remarks
RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS **Part 2 CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 River Trials and Stability Experiments** **2.3.1 River Trials*** **1** In the Classification Survey of all ships, river trials specified in following **(1)** to **(9)** are to be carried out in full load condition, in the calmest possible water and weather condition and in deep unrestricted water. However, where river trials cannot be carried out in full load condition, river trials may be carried out in an appropriate loaded condition. ((1) to (4) are omitted.) (5) Performance test of automatic and remote control systems for main propulsion machinery, controllable pitch propellers, boilers and electric generating sets. However, the control systems for controllable pitch propellers intended for main propulsion are to be in accordance with **Annex 2.3.1-3** "Testing Procedures for Control Systems for Controllable Pitch Propellers Intended for Main Propulsion"**, Part D of the Rules**	**RULES FOR THE SURVEY AND CONSTRUCTION OF INLAND WATERWAY SHIPS** **Part 2 CLASS SURVEYS** **Chapter 2 CLASSIFICATION SURVEYS** **2.3 River Trials and Stability Experiments** **2.3.1 River Trials*** **1** In the Classification Survey of all ships, river trials specified in following **(1)** to **(9)** are to be carried out in full load condition, in the calmest possible water and weather condition and in deep unrestricted water. However, where river trials cannot be carried out in full load condition, river trials may be carried out in an appropriate loaded condition. ((1) to (4) are omitted.) (5) Performance test of automatic and remote control systems for main propulsion machinery, controllable pitch propellers, boilers and electric generating sets	

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for the Survey and Construction of Steel Ships. ((6) to (9) are omitted.) (-2 to -5 are omitted.) EFFECTIVE DATE AND APPLICATION **1.** The effective date of the amendments is 1 January 2025. **2.** Notwithstanding the amendments to the Rules, the current requirements apply to ships for which the date of contract for construction* is before the effective date and astern testing is carried out in accordance with UR Z18 before the effective date. * "contract for construction" is defined in the latest version of IACS Procedural Requirement (PR) No.29. IACS PR No.29 (Rev.0, July 2009) **1.** The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. This date and the construction numbers (i.e. hull numbers) of all the vessels included in the contract are to be declared to the classification society by the party applying for the assignment of class to a newbuilding. **2.** The date of "contract for construction" of a series of vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective owner and the shipbuilder. For the purpose of this Procedural Requirement, vessels built under a single contract for construction are considered a "series of vessels" if they are built to the same approved plans for classification purposes. However, vessels within a series may have design alterations from the original design provided: (1) such alterations do not affect matters related to classification, or (2) If the alterations are subject to classification requirements, these alterations are to comply with the classification requirements in effect on the date on which the alterations are contracted between the prospective owner and the shipbuilder or, in the absence of the alteration contract, comply with the classification requirements in effect on the date on which the alterations are	((6) to (9) are omitted.) (-2 to -5 are omitted.)	

Amended-Original Requirements Comparison Table (Manoeuvring Performance of Controllable Pitch Propellers)

Amended	Original	Remarks
submitted to the Society for approval. The optional vessels will be considered part of the same series of vessels if the option is exercised not later than 1 year after the contract to build the series was signed. **3.** If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract, is signed between the prospective owner and the shipbuilder. The amendment to the contract is to be considered as a "new contract" to which **1.** and **2.** above apply. **4.** If a contract for construction is amended to change the ship type, the date of "contract for construction" of this modified vessel, or vessels, is the date on which revised contract or new contract is signed between the Owner, or Owners, and the shipbuilder. Note: This Procedural Requirement applies from 1 July 2009.		