

M46

(1982)
(Rev.1
June 2002)
(Rev.2
Dec 2018)
(Rev.3
Aug 2023)

Ambient conditions – Inclinations and Ship Accelerations and Motions

M46.1 General

The ambient conditions specified under M46.2 and M46.3 are to be applied to the layout, selection and arrangement of all shipboard machinery, equipment and appliances (addressed in this UR) to ensure proper operation.

Note:

1. The requirements of UR M46 Rev.2 are to be uniformly implemented by IACS Societies on ships contracted for construction on or after 1 January 2020.
2. The requirements of UR M46 Rev.3 are to be uniformly implemented by IACS Societies on ships contracted for construction on or after 1 January 2025.
23. The “contracted for construction” date means the date on which the contract to build the vessel is signed between the prospective owner and the shipbuilder. For further details regarding the date of “contract for construction”, refer to IACS Procedural Requirement (PR) No. 29.

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M46.2 Inclinations

Inclinations applied to respective components are as follows.

Installations, components	Angle of inclination [°] ²			
	Athwartships		Fore-and-aft	
	static	dynamic	static	dynamic
Main and auxiliary machinery	15	22.5	5 ⁴	7.5
Safety equipment, e.g. emergency power installations, emergency fire pump and their devices	22.5 ³	22.5 ³	10	10
Switch gear, electrical and electronic appliances ¹ and remote-control systems				

Notes:

1. No undesired switching operations or operational changes are to occur.
2. Athwartships and fore-and-aft inclinations may occur simultaneously.
3. In ships for the carriage of liquefied gases and of chemicals, the emergency power supply must also remain operable with the ship flooded to a final athwartships inclination up to maximum of 30°.
4. Where the length of the ship exceeds 100m, the fore-and-aft static angle of inclination may be taken as 500/L degrees where L = length of the ship, in metres, as defined in UR S2.

The Society may consider deviations from these angles of inclination, taking into consideration the type, size and service conditions of the ship.

M46.3 Shipboard accelerations

3.1 Main propulsion and steering machinery and auxiliary machinery that is essential to the propulsion and steering, and the safety of the ship shall be capable of operation under the effects of acceleration and motions.

3.2 The requirements in M46.4 to M46.6 apply where documented evidence of equipment suitability is specifically required by other relevant URs for such equipment or requested by the Classification Society.

M46.4 Documentation

4.1 For ships subject to the SOLAS Convention, ship builders are to identify and document the ship accelerations and motions periods to which machinery and equipment might be subjected to. The expected accelerations and ship motions periods are to be within machinery and equipment manufacturers requirements. The estimations are to consider vessel type, machinery or equipment location and expected service conditions.

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(cont)**M46.5 Evaluation of equipment suitability**

5.1 Machinery and equipment manufacturers are to submit evidence to the Classification Society that their machinery or equipment can operate under the required static and dynamic conditions stated in M46.2 and at least at the levels of shipboard accelerations as stated in M46.4 and/or specified in the relevant URs. Documentation of satisfactory performance shall take the form of:

- .1 Report of testing under representative conditions; or
- .2 Report of theoretical verification using recognised computational techniques accompanied by detailed and relevant validation data; or
- .3 Historical data which provides relevant demonstration of satisfactory experience in service.

M46.6 Installation and operation

6.1 Machinery and equipment manufacturers are to submit details of the requirements /recommendations for installation of the machinery and equipment onboard to ensure satisfactory operation in service under the required static and dynamic conditions as described in M46.2 and at least at the levels of shipboard accelerations as stated in M46.4 and/or specified in the relevant URs.

Note: Consideration should be given for positioning machinery in order to minimize the dynamic load on bearings due to ship motion.

6.2 Shipbuilders are to submit details demonstrating that the installation of the machinery and equipment onboard is in accordance with manufacturer's requirements /recommendations.

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