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Ships and Marine Technology — Marine cranes — Test specification and procedures

Navires et technologie maritime — Grues maritimes — Spécification de test et procédures

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Foreword

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The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2. www.iso.org/directives

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT), see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 8, *Ships and marine technology*, Subcommittee SC 4, *Outfitting and Deck Machinery*.

Ships and Marine Technology — Marine cranes — Test specification and procedures

1 Scope

This International Standard specifies the requirements for the test specification and procedures of marine cranes.

1.1 Marine cranes applicable to this International Standard include the following types of cranes:

Deck cranes mounted on ships for handling cargo or containers in harbour conditions; Floating cranes or grab cranes mounted on barges or pontoons for operating in harbour conditions; Engine room cranes and provision cranes etc. mounted on ships (including floating docks) for handling equipment and stores in harbour conditions.

1.2 This International Standard does not apply to:

Transport, assembly, dismantling and decommissioning of cranes,

Lifting accessories, i.e. any item between the crane and the load,

Lifting operations involving more than one crane,

Hand powered cranes,

Emergency rescue operations (except training),

Shore-side cargo handling cranes,

Portable cranes on board,

Lifting appliances for lifeboats, liferafts accommodation ladders and pilot ladders.

2 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 3828, *Shipbuilding and marine structures — Deck machinery — Vocabulary and symbols*

ISO 4306-1, *Cranes — Vocabulary — Part 1: General*

ISO 13202, *Cranes — Measurement of velocity and time parameters*

ISO 14518, *Cranes — Requirements for test loads*

ISO 19354, *Ships and Marine Technology–Marine cranes–General requirements*

3 Terms and definitions

For the purpose of this International Standard, the terms and definitions given in ISO 4306-1, ISO 3828 and ISO 19354 apply.

3.1
bench test
Test made on the test bench of the manufacturer.

4 Test specification and procedure requirements

4.1 General requirements

4.1.1 The test shall be carried out for the marine crane according to specified technical performances and main parameters shall be verified.

4.1.2 The test load of the marine crane shall comply with ISO 14518.

4.1.3 The measurement of the test speed and time parameters of the marine crane shall comply with ISO 13202.

4.1.4 The marine crane components shall be tested according to applicable regulations.

4.1.5 The marine crane shall be tested according to the test program made by the designer.

4.1.6 The test of the marine crane shall be recorded, and the test report with test conclusions and inspection results shall be made. The test report shall record types, serial numbers, main technical parameters, test durations, as well as test loads, locations, procedures and results for various conditions of the test crane, the tester and inspector shall sign their names on the test report, the user or verifier of the crane shall also sign their names on the test report for approval when involved in the test.

4.2 Functional test

4.2.1 General

4.2.1.1 The function test shall be carried out in the factory before the marine crane is sent out from the factory.

4.2.1.2 The functional test may be carried out in the plant. It is unnecessary to install jibs, wire ropes and hooks of the crane, and the function test shall be carried out for internal equipment in the machine room of the crane.

4.2.2 The following check items shall be completed before the functional test:

a) Compliance of accuracy range and validity period of the test instruments and gauges with the requirements

b) Tight and reliable connection of equipment and devices of the crane

c) Correctness of electrical wiring

d) Electric insulation (cold-state)

4.2.3 Functional test items:

a) Simulation test and check of limit safety function: upper and lower limits of hoisting, upper and lower limits of luffing, slewing limit (for the crane with a limited slew), travelling limit and slack rope limit

b) No-load operation of mechanisms: hoisting, luffing, slewing, travelling mechanisms act backward and forward more than 3 times, to observe whether they are in normal operation

c) Simulation test and check of the oil temperature switch, if installed

d) Simulation alarm test and check of the level switch of the oil tank, if installed

e) Functional test and check of the emergency brake for twice

f) Other necessary test items

4.2.4 Check items after test:

a) Electric insulation (hot-state)

b) Proper connection of the machinery and components

c) Other necessary check items

4.3 Bench test

4.3.1 General

4.3.1.1 The bench test of the marine crane can be carried out in the factory if conditions permit.

4.3.1.2 The bench test is carried out at the test bench of the marine crane.

4.3.2 Pre-test check

a) Check items in 4.2.2

b) Connections of the crane on the bench.

c) Compliance of the installations, such as the power source of the test bench with requirements.

d) Compliance of the test site conditions and safety installations with requirements.

4.3.3 Bench test items

4.3.3.1 Functional test identical with 4.2.3.

4.3.3.2 No-load operational test:

a) Make the hoisting operation, including lifting and lowering, and reach the upper limit of hoisting (note: only simulated action is made for the lower limit).

b) Make the luffing operation with upper and lower limits.

c) Make the travelling operation with the travelling limit, if possible.

d) Rotate from the left and right. The limit test is carried out for the crane with limit requirements.

e) Measure the maximum and minimum working amplitudes.

f) Make the hoisting motion, measure and record the lifting and lowering speeds.

g) Make the luffing motion, measure and record the derricking speed.

h) Make the slewing motion, measure and record leftward and rightward slewing speeds.

i) Make the travelling motion, measure and record the travelling speed, if possible.

4.3.3.3 Rated load test: the rated load is the safe working load (SWL).

a) Make the hoisting motion, measure and record the lifting and lowering speeds.

b) Make the luffing motion, measure and record the derricking speed, if possible.

c) Make the slewing motion, measure and record leftward and rightward slewing speeds.

d) Make the travelling motion, measure and record the travelling speed, if possible.

e) Carry out the brake test and power failure (i.e. emergency brake) test.

f) Carry out hoisting, inward luffing and rotation (travelling) tests simultaneously.

g) Carry out the overload protection test.

4.3.3.4 Overload test. The test load is given in Table 1.

Table 1 — Overload test

Safe working load (kN)	Test load (kN)
SWL ≤ 196	1.25 × SWL
196 < SWL ≤ 490	SWL+49
SWL > 490	1.1SWL

a) Hold the test load still for more than 5 min after placing it at the maximum amplitude (in the middle of the beam for the beam type). Check the condition of the structural elements.

4.3.3.5 For the crane with light load and high speed requirements, the light load and high speed test shall be carried out.

4.3.3.6 Emergency release test. For the test load no more than the SWL, the emergency release test shall be carried out.

4.3.3.7 The test items with other technical program requirements.

4.3.3.8 Work after test:

a) Check the conditions of the crane at various positions (the same as 4.2.4).

b) Check hooks, wire ropes, jibs and other components according to the specified procedures.

c) Check the hydraulic fluid in the charging pump station.

d) Check the cleanness of oil filter elements in the charging pump station.

a)-d) shall be required if necessary.

4.4 Inclination test

The inclination test may be carried out for the marine crane, based on the special consultation with the user.

The inclination test can be carried out by inclined test bench, or installed an inclined intermediate box in on the horizontal test bench. The inclination angle shall be based on the requirements of the agreement. The test method and items shall refer to 4.3.

4.5 Other tests

Other tests, such as an integration test on the twin-lift crane shall be carried out for the marine crane according to the test program based on technical requirements, if appropriate facilities are available.