



RUSSIAN MARITIME REGISTER OF SHIPPING

CIRCULAR LETTER

No. 315-05-1339c

dated 25.02.2020

Re:

amendments to the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships, 2020, ND No. 2-020101-130-E

Item(s) of supervision:

equipment/products/machinery

Entry-into-force date:

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Appendices:

Appendix 1: information on amendments introduced by the Circular Letter

Appendix 2: text of amendments to Part IV "Technical Supervision During Manufacture of Products"

Director General

Konstantin G. Palnikov

Text of CL:

We hereby inform that to ensure compliance of the test procedures with the applicable IEC standards, the Rules for Technical Supervision During Construction of Ships and Manufacture of Materials and Products for Ships shall be amended as specified in the Appendices to the Circular Letter.

It is necessary to do the following:

- 1 Bring the content of the Circular Letter to the notice of the RS surveyors, interested organizations and persons in the area of the RS Branch Offices' activity.
 - 2 Apply the provisions of the Circular Letter during review/approval of the technical documentation on equipment/products/machinery, and while performing technical supervision during manufacture of equipment/products/machinery, if the above services are requested on or after 25.02.2020.
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List of the amended and/or introduced paras/chapters/sections:

Part IV: paras 10.5.5.1.1; 10.5.5.1.4 and 10.5.5.2.1, Tables 10.5.5.1.3 and 10.5.5.2.1

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**Information on amendments introduced by the Circular Letter
(for inclusion in the Revision History to the RS Publication)**

Nos.	Amended paras/chapters/sections	Information on amendments	Number and date of the Circular Letter	Entry-into-force date
1	Para 10.5.5.1	Para has been specified considering requirements of IEC standard 60529	315-05-1339c of 25.02.2020	25.02.2020
2	Table 10.5.5.1.3	Requirements have been specified considering standard IEC 60034-5	315-05-1339c of 25.02.2020	25.02.2020
3	Para 10.5.5.1.4	New para has been introduced considering requirements of IEC standard 60034-5	315-05-1339c of 25.02.2020	25.02.2020
4	Para 10.5.5.2.1	Para has been specified considering requirements of IEC standard 60529	315-05-1339c of 25.02.2020	25.02.2020
5	Table 10.5.5.2.1	Table has been amended considering requirements of IEC standard 60529	315-05-1339c of 25.02.2020	25.02.2020

**RULES FOR TECHNICAL SUPERVISION DURING CONSTRUCTION OF SHIPS AND
MANUFACTURE OF MATERIALS AND PRODUCTS FOR SHIPS, 2020,**

ND NO. 2-020101-130-E

PART IV. TECHNICAL SUPERVISION DURING MANUFACTURE OF PRODUCTS

10 ELECTRICAL EQUIPMENT

1 **Para 10.5.5.1.1** is replaced by the following text:

"10.5.5.1.1 These tests apply to products with voltage up to 1000 V.

Testing the degree of protection for voltage over 1000 V shall be in compliance with IEC standard 60529.

Testing the protection degree of rotation electrical machines shall be in compliance with IEC standard 60034-5."

2 **Table 10.5.5.1.3** is replaced by the following:

"Table 10.5.5.1.3

Degree of protection (first numeral after IP)	Test procedure and assessment criteria
1	A rigid sphere 50 mm in diameter is applied to any holes in the product enclosure with a force of 50 N ± 10 %.
2	The results are considered satisfactory if the sphere does not pass through and touch current-carrying parts inside the product.
3	A test probe (refer to Appendix 11) connected to a safety voltage (not below 40 V) source is applied in any possible position with a force of 10 N ± 10%, as well as a rigid sphere 12,5 mm in diameter is applied to any holes with the 30 N ± 10%.
4	The results are considered satisfactory if the pilot lamp of the probe does not illuminate, and the probe does not get through any of the holes and touch current-carrying or moving parts inside the product enclosure.
5	A rigid steel wire of 2,5 mm in diameter is applied to any hole in the enclosure with a force of 3 N ± 10 %.
6	The results are considered satisfactory if the wire does not get through any of the holes in the enclosure.
7	Similar to the protection degree 3, but the wire diameter is 1 mm and force applied 1N ± 10 %.
8	Enclosures are of necessity in one of two categories:
9	- Category 1: Enclosures where the normal working cycle of the equipment causes reductions in air pressure within the enclosure below that of the surrounding air, for example, due to thermal cycling effects.
10	- Category 2: Enclosures where no pressure difference relative to the surrounding air is present.
11	The enclosure shall be deemed category 1 unless the relevant product standard for the equipment specifies that the enclosure is category 2.
12	Test of Category 1 enclosures.
13	The enclosure is supported inside the test chamber and the pressure inside the enclosure is maintained below the surrounding atmospheric pressure by a vacuum pump. The suction connection shall be made to a hole specially provided for this test. If not otherwise specified in the relevant product standard, this hole shall be in the vicinity of the vulnerable parts.

Degree of protection (first numeral after IP)	Test procedure and assessment criteria
6	<p>If it is impracticable to make a special hole, the suction connection shall be made to the cable inlet hole. If there are other holes (for example, more cable inlet holes or drain-holes) these shall be treated as intended for normal use on site.</p> <p>The product is blown over with talc screened through a mesh with a clear opening of 75 µm and wire thickness of 50 µm on the basis of 2 kg of talc per 1 m³ of the chamber volume. The talc applied during the test shall not be use more than 20 tests.</p> <p>The object of the test is to draw into the enclosure, by means of depression, a volume of air 80 times the volume of the sample enclosure tested without exceeding the extraction rate of 60 volumes per hour. In no event shall the depression exceed 2 kPa (20 mbar) on the manometer. If an extraction rate of 40 to 60 volumes per hour is obtained the duration of the test is 2 h.</p> <p>If, with a maximum depression of 2 kPa (20 mbar), the extraction rate is less than 40 volumes per hour, the test is continued until 80 volumes have been drawn through, or a period of 8 h has elapsed.</p> <p>Tests of Category 2 enclosures.</p> <p>The enclosure under test is supported in its normal operating position inside the test chamber, but is not connected to a vacuum pump. Any drain-hole normally open shall be left open for the duration of the test. The test shall be continued for a period of 8 h.</p> <p>If it is impracticable to test the complete enclosure in the test chamber, one of the following procedures shall be applied:</p> <ul style="list-style-type: none"> – testing of individually enclosed sections of the enclosure; – testing of representative parts of the enclosure, comprising components such as doors, ventilation openings, joints, shaft seals, etc., in position during test; – testing of a smaller enclosure having the same full-scale design details. <p>In the last two cases, the volume of air to be drawn through the enclosure under test shall be the same as for the whole enclosure in full scale.</p> <p>The protection is satisfactory if, on inspection, talcum powder has not accumulated in a quantity or location such that, as with any other kind of dust, it could interfere with the correct operation of the equipment or impair safety.</p> <p>No dust shall deposit where it could lead to tracking along the creepage distances.</p> <p>The enclosure shall be deemed category 1, whether reductions in pressure below the atmospheric pressure are present or not.</p> <p>The test shall be carried out as for the enclosure of Category 1 (degree 5X).</p> <p>The protection is satisfactory if no deposit of dust is observable inside the enclosure at the end of the test (complete protection against penetration of dust).</p>

3 New para 10.5.5.1.4 is introduced reading as follows:

"10.5.5.1.4 If complete equipment is impractical to test, main parts of the equipment or smaller equipment but having full-scale structural parts subject to testing shall be tested."

4 Para 10.5.5.2.1 is replaced by the following text:

"10.5.5.2.1 The test procedure and the provisions on the assessment of testing the protective product enclosure against the ingress of water are given in Table 10.5.5.2.1. Testing the degree of protection shall be in compliance with IEC standard 60529."

Degree of protection (second numeral after IP)	Test procedure and assessment criteria
1	<p>Protection against vertically-falling water drops.</p> <p>The product in a normal working position is placed on a turntable.</p> <p>The turntable on which the enclosure is placed has a rotation speed of 1 r/min and the eccentricity (distance between turntable axis and specimen axis) is approximately 100 mm.</p> <p>The enclosure under test is placed in its normal operating position under the drip box, the base of which is larger than that of the enclosure. Except for enclosures designed for wall or ceiling mounting, the support for the enclosure under test should be smaller than the base of the enclosure. The enclosure is exposed to vertically-falling water drops from a tank with water through holes in its bottom arranged at nodes of an imaginary net with a mesh dimensioned 20 mm. The area of the bottom shall be larger than that of the product under test.</p> <p>An enclosure normally fixed to a wall or ceiling is fixed in its normal position of use to a wooden board having dimensions which are equal to those of that surface of the enclosure which is in contact with the wall or ceiling when the enclosure is mounted as in normal use.</p> <p>Water temperature shall not differ from the temperature of tested item by more than 5°C</p> <p>Delivery rate is to be 1 mm/min. The duration of test is 10 min.</p> <p>The test results are considered satisfactory if water drops penetrating the product do not break its normal functioning and water does not accumulate in single places and close to cable entries.</p>
2	<p>Protection against water drops.</p> <p>Tests are conducted in the same way as for degree of protection 1 herewith table on which the enclosure is placed does not turn as in the case of the test for the second characteristic numeral 1. Tilt angle for each position is 15° on either side of the vertical in two mutually perpendicular planes.</p> <p>The enclosure is tested for 2,5 min in each of four fixed positions of tilt.</p> <p>Delivery rate is to be 3 mm/min.</p> <p>The total duration of the test is 10 min.</p> <p>The assessment of test results is also as above.</p>
3	<p>Protection against rain drops.</p> <p>Tests with oscillating tube or spray nozzle in accordance with the standard for a specified product.</p> <p>Tests with oscillating tube.</p> <p>The product in a normal working position is sluiced with fine water jets from holes in a pipe bent in the shape of a semicircle. The support for enclosure shall not be perforated.</p> <p>The enclosure to be tested is placed at the centre point of the semicircle. The tube is caused to oscillate through an angle of 120°, 60° on either side of the vertical, the time for one complete oscillation (2 × 120°) being about 4 s and the test duration being 5 min. The enclosure is then turned through a horizontal angle of 90° and the test is continued for a further 5 min. An average rain intensity per one hole is 0,07 ± 5 % l/min.</p> <p>The number of holes is defined depending on the tube radius. The maximum acceptable radius of the oscillating tube is 1 600 mm.</p> <p>Tests with spray nozzle.</p> <p>The product in a normal working position is sprayed at an angle of ± 60° vertically to the spray nozzle on the maximum distance of 200 mm.</p> <p>For this test the counterbalanced shield is installed at 30°.</p> <p>Average delivery rate is 10 ±5 % l/min.</p> <p>The water pressure is adjusted to give the specified delivery rate in the range of 50 — 150 kPa.</p> <p>The pressure shall be kept constant during the test.</p> <p>The test duration is 1 min/m² of the calculated surface area of the enclosure (excluding any mounting surface), with a minimum duration of 5 min.</p> <p>The test results are assessed as for the protection degree 1.</p>

Degree of protection (second numeral after IP)	Test procedure and assessment criteria
4	<p>Similar to the protection degree 3 but with specifications.</p> <p>Tests with oscillating tube. The oscillating tube has spray holes over the whole 180° of the semicircle. The tube is caused to oscillate through an angle of almost 360°, 180° on either side of the vertical, the time for one complete oscillation (2 × 360°) being about 12 s. The duration of the test is 10 min. If not specified otherwise in the relevant product standard, the support for the enclosure under test is perforated so as to avoid acting as a baffle and the enclosure is sprayed from every direction by oscillating the tube to the limit of its travel in each direction.</p> <p>Tests with spray nozzle. The counterbalanced shield is removed from the spray nozzle and the enclosure is sprayed from all practicable directions. The test results are assessed as for the protection degree 1.</p>
5	<p>Protection against water jets. The test is made by spraying the enclosure from all practicable directions with a stream of water from a test nozzle. The conditions to be observed are as follows:</p> <ul style="list-style-type: none"> - internal diameter of the nozzle: 6,3 mm; - delivery rate: 12,5 l/min ± 5 %; - water pressure: to be adjusted to achieve the specified delivery rate; - core of the substantial stream: circle of approximately 40 mm diameter at 2,5 m distance from nozzle; - test duration per square metre of enclosure surface area likely to be sprayed: 1 min; - minimum test duration: 3 min; - distance from nozzle to enclosure surface: between 2,5 m and 3 m. <p>The test results are assessed as for the protection degree 1.</p>
6	<p>Protection against ship's deck conditions (protection against high pressure water jet). The test is made by spraying the enclosure from all practicable directions with a stream of water from a test nozzle. The conditions to be observed are as follows:</p> <ul style="list-style-type: none"> - internal diameter of the nozzle: 12,5 mm; - delivery rate: 100 l/min ± 5 %; - water pressure: to be adjusted to achieve the specified delivery rate; - core of the substantial stream: circle of approximately 120 mm diameter at 2,5 m distance from nozzle; - test duration per square metre of enclosure surface area likely to be sprayed: 1 min; - minimum test duration: 3 min; - distance from nozzle to enclosure surface: between 2,5 m and 3 m. <p>The test results are assessed as for the protection degree 1.</p>
7	<p>Protection against immersion in water. The test is made by completely immersing the enclosure in water in its service position as specified by the manufacturer so that the following conditions are satisfied:</p> <ol style="list-style-type: none"> a) the lowest point of enclosures with a height less than 850 mm is located 1 000 mm below the surface of the water; b) the highest point of enclosures with a height equal to or greater than 850 mm is located 150 mm below the surface of the water; c) the duration of the test is 30 min; d) the water temperature shall not differ from that of the equipment by more than 5 °C. <p>The water shall not penetrate the enclosure at specified pressure and time. For electrical machines the test shall be replaced by the following:</p> <ul style="list-style-type: none"> - the machine shall be tested with an inside air pressure of about 10 kPa (0,1 bar); - the duration of the test is 1 min. <p>The test is deemed satisfactory if no air leaks are found during the test. Air leakage may be detected either by submersion, the water just covering the machine, or by the application onto it of a solution of soap in water.</p>

Degree of protection (second numeral after IP)	Test procedure and assessment criteria
8	Unless there is a relevant product standard, the test conditions are subject to agreement between manufacturer and user, but they shall be more severe than those for degree of protection 7 and they shall take account of the condition that the enclosure will be continuously immersed in actual use.
<p>Notes: 1. Electrical machines having degrees of protection 1, 2, 3 and 7 are tested in a nonoperating condition, while those with degrees of protection 4, 5 and 6, in both an operating and a non-operating conditions. The duration of each test is at least 10 min.</p> <p>2. Following product enclosure tests against water penetration, electrical machines are immediately subjected to tests for insulation strength.</p> <p>If tests are carried out on non-rotating machines, prior to insulation strength testing, these latter shall be operational under idling conditions for 15 min. The test voltage therewith shall make up 50 % of the normal test voltage, but at least 125 % of the rated voltage.</p> <p>Electrical equipment designed for underwater operation regarding its structure and insulation is considered equivalent to the degree of protection 8.</p> <p>An enclosure designed with the second characteristic numeral 0 to 6 means simultaneous compliance with all requirements for smaller numerals.</p>	