



RUSSIAN MARITIME REGISTER OF SHIPPING

HEAD OFFICE

CIRCULAR LETTER

No. 315-30-1016c

dated 23.05.2017

Re:

amendments to the Rules for the Classification and Construction of Sea-Going Ships, 2017, ND No. 2-020101-095-E.

Item of supervision:

Computer Based Systems

Implementation 01.07.2017

Valid: till -

Validity period extended till -

Cancels / amends / supplements Circular Letter No. dated

Number of pages: 1 + 8

Appendices: text of amendments to Part XV "Automation" of the Rules for the Classification and Construction of Sea-Going Ships, 2017, ND No. 2-020101-095-E.

Director General  Konstantin G. Palnikov

Amends Part XV "Automation" of the Rules for the Classification and Construction of Sea-Going Ships, 2017, ND No. 2-020101-095-E

We hereby inform that in connection with coming into force on 01.07.2017 of new revision of IACS Unified Requirement (UR) E22 (Rev. 2 June 2016 Complete revision) "On Board Use and Application of Computer Based Systems", Part XV "Automation" of the Rules for the Classification and Construction of Sea-Going Ships, 2017, ND No. 2-020101-095-E, shall be amended as specified in the Appendix to the Circular Letter.

These amendments shall be applied to computer-based systems on ships contracted on or after 1 July 2017. Text of New revision of IACS UR E22 is available on the RS internal website in the section "External Normative Documents", as well as on the official IACS website www.iacs.org.uk. The above amendments will be introduced to the Rules for the Classification and Construction of Sea-Going Ships during their re-publication.

It is necessary to do the following:

1. Familiarize the surveyors of the RS Branch Offices with the content of the Circular Letter.
2. Bring the content of the Circular Letter to the notice of the interested organizations in the area of the RS Branch Offices' activity.
3. Apply the amendments specified in the Appendix to the Circular Letter during review of technical documentation on computer-based systems and during the relevant surveys.

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"Thesis" System

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RULES
FOR THE CLASSIFICATION AND CONSTRUCTION
OF SEA-GOING SHIPS, 2017, ND NO. 2-020101-095-E

PART XV. AUTOMATION
SECTION 7. COMPUTERS AND COMPUTER-BASED SYSTEMS

Chapter 7.2. Para 7.2.1 shall be supplemented with the following definitions:

"O w n e r is a Party developing a relevant specification and responsible for contracting for supply of computer-based system, sub-systems and software with the system integrator and (or) suppliers providing these products in accordance with the specification. The Owner is usually the Builder or Shipyard during construction. After ship delivery, the owner may delegate some responsibilities to the shipowner or operator.

S i m u l a t i o n t e s t s are computer-based system testing where the object under control as well as data link channels are partly or fully replaced with simulation tools, or where parts of the communication network and lines are replaced with simulation tools.

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Q u a l i t y P l a n is a document containing information on the requirements prescribed by the quality management system to be applied for the specific computer-based system and/or software, the minimum scope of which is specified in 7.5.2.2.

S u p p l i e r is a contracted or subcontracted provider (party) of computer-based system, sub-systems and / or software to the system integrator and / or owner, under the coordination of the System Integrator or Shipyard. The supplier also provides a description of the software functionality that meets the Owner's specification, applicable international and national standards, and the requirements specified in the RS rules.

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S y s t e m I n t e g r a t o r is a party integrating computer systems, sub-systems and software provided by suppliers into the system, into the system invoked by the requirements specified herein, as well as creating an integrated system. The system integrator may also be responsible for installation and integration of systems in the ship.

The role of system integrator are taken by the builder / shipyard. An alternative organisation may specifically contracted/assigned the system integrator's responsibilities, provided the corresponding contract is available.

If there are multiple parties performing system integration at any one time a single party may be a system integrator to coordinate the integration activities. If there are multiple stages of integration different System Integrators may be responsible for specific stages of integration but a single party is to be responsible for defining and coordinating all of the stages of integration."

All definitions in Para **7.2.1** shall be listed in the alphabetical order of the Russian language.

Chapter 7.5 shall be amended to read:

"7.5 REQUIREMENTS FOR SOFTWARE

7.5.1 General

7.5.1.1 The software development procedure shall comply with the applicable international or national standards spanning the software lifecycle and integration of the latter into an appropriate computer-based system.

7.5.2 Quality Management Systems Requirements.

7.5.2.1 System integrators and suppliers shall operate a quality system regarding software development and testing and associated hardware such as ISO 9001 taking into account ISO 90003, GOST R ISO/IEC 90003-2014, etc.

7.5.2.2 The quality management system specified in 7.5.2.1, shall include the following:

- .1** relevant procedures regarding responsibilities, system documentation, software configuration management and competent staff;
- .2** procedures regarding organization set in place for acquisition of related software and hardware from suppliers;
- .3** procedures regarding organization set in place for software code writing and verification. Having a specific procedure for programmable electronic systems verification of Category II and III (refer to 7.10.3) at the level of systems, sub-systems and programmable devices and modules. Having check points for Category II and III systems and providing possible verification by the Register, i.e submitting technical documentation to RS for review, performing the relevant tests, submitting the peer review results to RS and audits of the firm's technical control, etc., in compliance with 7.10.8;
- .4** having a specific procedure for software installation and amendments thereto on board the vessel including interactions with owners.

7.5.3 Software lifecycle.

7.5.3.1 Design.

- .1** risk assessment of system.

This step shall be undertaken to determine the risk to the system throughout the lifecycle by identifying and evaluating the hazards associated with each function of the system.

A risk assessment report shall be submitted to the Register. This document shall normally be submitted by the System Integrator or the Supplier, including data coming from other suppliers.

IEC/ISO31010 "Risk management - Risk assessment techniques" may be applied in order to determine method of risk assessment. The method of risk assessment shall be defined in the report submitted to Register.

If based on the risk assessment, a revised system category might be amended; such amendments with detailed clarification shall be submitted to Register for review.

Where the risks associated with a computer based system are well understood, it is permissible for the risk assessment to be omitted, however in such cases the supplier or the system integrator shall provide a justification for the omission. The justification shall give consideration to:

- risk identification technique;

- equivalence of the context of use of the current computer based system and the computer based system initially used to determine the risks;

- adequacy of existing control measures in the the system intended use under consideration.

.2 code production and testing. The following documentation shall be provided to the Register for Category II and III systems (refer to 7.10.3) by the supplier and system integrator:

- software modules functional description and associated hardware description for programmable devices;

- evidence of verification (detection and correction of software errors) for software modules, in accordance with the selected software development standard. Evidence requirements of the selected software standard might differ depending on how critical the correct operation of the software is to the function it performs (for example, IEC 61508 and GOST R 61508 has different requirements depending on SILs, similar approaches are taken by other standards).

In addition, for Category II and III systems evidence of functional tests for programmable devices at the software module, subsystem, and system level shall be supplied by the Supplier via the System Integrator. The functional testing shall be designed to test the provision of features provided by the operating system, function libraries, software shell, etc. and used by the inspected software.

7.5.3.2 Integration testing before installation on board.

Intra-system integration testing shall be done between system and sub-system software modules before being integrated on board. The objective is to check that software functions are properly executed, that the software and hardware it controls interact and function properly together and that software systems react properly in case of failures. Faults shall be simulated as realistically as possible to demonstrate appropriate system fault detection and system response. The results of integration testing shall also confirm findings of the appropriate failure mode and effects analysis (FMEA) if the latter shall be submitted by the Rules. Functional and failure testing can be demonstrated by simulation tests.

7.5.3.3 Approval of programmable devices.

Programmable devices integrated inside a computer based system shall be delivered with the Register documents listed in the Nomenclature of items of the Register technical supervision

(refer to Appendix 1, Part 1 "General Regulations for Technical Supervision" of the Rules for Technical Supervision during Construction of Ships and Manufacture of Materials and Products for Ships.).

List of technical documentation submitted to the Register in addition to the documentation specified in 1.4.1, as well as the list of relevant checks and tests is given in 7.10.8. Technical documentation shall address the compatibility of the programmable device with the relevant computer-based systems in the ship's application, list of necessary tests to be carried out on the ship during integration into the ship computer-based systems and it shall identify the programmable device scope of application as well as the ship computer based system components using if possible such a device.

7.5.3.4 Final integration and on board testing

.1 prior to final integration the simulation tests of a computer based system shall be undertaken to check safe interaction of the latter with other computerized systems and functions that could not be tested previously.

.2 after final integration of the computer-based system the relevant tests shall be carried out on board to check the computer-based system in actual operating conditions and integrated with all other systems in interaction:

performing functions it was designed for;

reacting safely in case of failures originated internally or by devices external to the system;

interacting safely with other systems implemented on board a ship.

The list of relevant checks and tests is given in 7.10.8.

7.5.3.5 Software modifications during operation.

7.5.3.5.1 Responsibilities.

.1 organizations in charge of software modifications during operation shall be clearly declared by Owner to the Class Society. A System integrator shall be designated by the Owner and shall fulfil requirements mentioned in 7.5.1, 7.5.2, 7.5.3.1 to 7.5.3.4;

.2 during the ship operation, it is the responsibility of the Owner to manage traceability of these modifications. The System integrator shall support traceability of these modifications by updating the Software Registry. This Software Registry shall contain as follows:

list and versions of the software installed in Category II and III systems;

date and results of the software security scans as described in paragraph 7.5.3.6.

7.5.3.5.2 Change management

The owner shall ensure that necessary procedures for software and hardware change management exist on board, and that any software modification/upgrade are performed in strict compliance with the procedures. All changes to computer based systems in the operational phase shall be recorded in accordance with 7.5.3.5.1.2.

7.5.3.6 Software security

Owner, system integrator and suppliers shall adopt security policies and include these in their quality management systems.

For Category I, II, and III systems, physical and logical security measures shall be in place to prevent unauthorized or unintentional modification of control software or limiting values of controlled parameters within the computer based systems, the appropriate structural means and organizational measures shall be provided. The above means and measures shall provide protection whether undertaken directly at the physical system or remotely.

Prior to software installation on board, the software code, executables and physical medium used for installation on the vessel shall be scanned for viruses and malicious software. Results of the scan shall be documented and kept with the Software Registry."

Chapter 7.10. PROGRAMMABLE ELECTRONIC SYSTEMS

Para 7.10.3.2 shall be amended to read:

"**7.10.3.2** Assignment of a programmable electronic system to the appropriate category shall be carried out depending on the greatest likely extent of direct damage to machinery and equipment, based on risk assessment for all operating conditions of the ship, specified in 3.1.5 of Part XI "Electrical Equipment".

The relevant examples of the assignment of a programmable electronic system to the appropriate categories are given in Table 7.10.3.2 . The list of the examples given is not exhaustive.";

Table 7.10.3.2 shall be amended to read:

"T a b l e 7 . 1 0 . 3 . 2

Examples of assignment to system categories

System categories	Examples
I	Maintenance support system Information system Diagnostic system
II	Liquid cargo transfer control system Automation system for bilge pumping system of machinery spaces Fuel oil treatment automation system Ballast remote automatic control system Stabilization and ride control systems Alarm and monitoring systems for propulsion systems

III	<p>Control system of propulsion system of a ship, meaning the means to generate and control mechanical thrust in order to move the ship Control system of devices used only during manoeuvring are not in the scope of this requirement such as bow tunnel thrusters</p> <p>Steering system control system</p> <p>Electric power system (including power management system)</p> <p>Fire detection system</p> <p>Fire-fighting system</p> <p>Flooding detection and fighting system</p> <p>Control bilge system</p> <p>Internal communication systems involved in evacuation phases</p> <p>Ship systems involved in operation of life saving appliances equipment</p> <p>Control system of dynamic positioning system (DPS) of equipment classes 2 and 3</p>
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Para 7.10.4.2 shall be amended to read:

"7.10.4.2 Loss of a data communication link shall be specifically addressed in risk assessment analysis.

If a single failure in any component of the data communication link hardware or software causes loss of data communication link, they shall be automatically treated in order to restore proper working of the data communication link.

For Category III systems a single failure in data communication link hardware shall not influence the proper working of the system in general.";

shall be supplemented with new **Para 7.10.5.5** reading as follows:

"7.10.5.5 During harbour and sea trials for wireless data communication equipment, tests shall be conducted to demonstrate that radio-frequency transmission does not cause failure of any equipment and does not its self-fail as a result of electromagnetic interference via wireless data communication links during expected operating conditions.";

Para 7.10.7.4.6 shall be amended to read:

".6 on-board test schedule (mooring and sea trials).";

Para 7.10.8 and **Table 7.10.8** shall be amended to read:

"7.10.8 Tests and evidence.

Tests and appropriate documents (reports, certificates) shall be issued in accordance with Table 7.10.8.

Table I 7.10.8

Examples of assignment to system categories

Requirement	SUPPLIER INVOLVED	SYSTEM INTEGRATOR INVOLVED	OWNER INVOLVED	CATEGORY I ¹	CATEGORY II	CATEGORY III
Quality Plan	X	X		Ⓐ ²	Ⓐ	Ⓐ
Risk assessment report		X		① ²	① ²	① ²
Software modules functional description and associated hardware description	X (if necessary)	X			①	①
Evidence of verification of software code	X (if necessary)	X			①	①
Evidence of functional tests for elements included in systems of Category II and III at the level of software module, sub-system and system	X	X			①	①
Test programs and procedures for functional tests and failure tests including a supporting FMEA or equivalent, at the RS request, depending on available relevant requirements in the RS rules		X			Ⓐ	Ⓐ
Factory acceptance test event including functional and failure tests	X	X			Ⓜ	Ⓜ
Test program for simulation tests for final integration of the system		X			Ⓐ	Ⓐ
Simulation tests for final integration of the system		X			Ⓜ	Ⓜ
Test program for on-board tests - mooring and sea - (includes wireless data communication testing)		X			Ⓐ	Ⓐ
On-board mooring and sea tests (includes wireless data communication testing)		X			Ⓜ	Ⓜ
<ul style="list-style-type: none"> – List and versions of software installed in system – Functional description of software – User manual including instructions during software maintenance – List of interfaces between system and other ship systems – List of standards for data communication 		X			①	①

Requirement	SUPPLIER INVOLVED	SYSTEM INTEGRATOR INVOLVED	OWNER INVOLVED	CATEGORY I ¹	CATEGORY II	CATEGORY III
link – Additional documentation at the RS request if relevant requirements are available in RS rules including “Failure modes and effects analysis” (FMEA) or a equivalent document						
Updated Software Registry		X	X		①	①
Procedures and documentation related to Security Policy		X	X		①	①
Test program for compliance with the shipboard service conditions	X	X		Ⓐ ³	Ⓐ	Ⓐ
Tests for compliance with the shipboard service conditions	X	X			Ⓜ	Ⓜ
Test reports according to the shipboard service conditions	X	X		Ⓐ ³	Ⓐ	Ⓐ
<p>Symbols:</p> <p>X – the Party shall design and submit relevant technical documentation to the Register for review and/or carry out the relevant tests and submit the item of technical supervision to the Register</p> <p>Ⓐ - Technical documentation shall be submitted (agreed) for review</p> <p>① - Technical documentation shall be submitted for reference (for information purposes)</p> <p>Ⓜ - the RS representative shall take part in these tests</p> <p>1. RS may request additional technical documentation if relevant requirements are available in RS Rules.</p> <p>2. Risk assessment is permissible to be omitted according to 7.5.3.1.1.</p> <p>3. if relevant requirements are available in the RS rules.</p>						

Appendix "DEFINITIONS AND NOTES RELATING TO TABLE 7.10.8" shall be deleted.