

**RULES  
FOR THE CLASSIFICATION OF  
SHIPS**

*Part 11 – REFRIGERATING PLANT  
July 2009*

*Amendments No. 1*  
**January 2026**

**CROATIAN REGISTER OF SHIPPING**

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By the decision of the General Committee of Croatian Register of Shipping,

Amendments No. 1 to the  
**RULES FOR THE CLASSIFICATION OF SHIPS**  
Part 11 – REFRIGERATING PLANT

have been adopted on 22nd December 2025 and shall enter into force on 1st January 2026

## GENERAL TERMS AND CONDITIONS

(March 2022)

### Article 1 GENERAL

**1.1** CROATIAN REGISTER OF SHIPPING (hereinafter: the *Register*) shall at all times remain an independent contractor and neither the *Register* nor any of its officers, surveyors, auditors, inspectors, agents, appointers, officers or managers shall act as an employee, servant or agent of any other party in the performance of the Services rendered by the *Register*.

**1.2** The *Register* acts as a service provider. The Services provided by the *Register* cannot be construed as a commitment by the *Register* to achieve any result or as a warranty.

**1.3** The provision of Services is subject to these General Terms and Conditions. No other terms and conditions shall apply, either expressly or by implication, unless expressly agreed in writing between the Parties.

**1.4** These General Terms and Conditions shall be incorporated into, or referred to in any Contract and shall prevail over and exclude any other terms and conditions that the Client may wish to impose.

Any amendments to and/or deviations from these General Terms and Conditions, as well as any additional terms and conditions of the Client, shall be binding or valid only if set forth in writing and duly signed by the authorised representatives of both Parties.

**1.5** The invalidity of one or more provisions of these General Terms and Conditions shall not affect the remaining provisions.

**1.6** The Client acknowledges that the latest version of these General terms and Conditions and the latest version of applicable Rules apply to the Services provided by the *Register*.

**1.7** Definitions in these General Terms and Conditions take precedence over other definitions that may appear in other documents issued by the *Register*.

**1.8** The Client should at all times be aware of the provisions of these General Terms and Conditions, as they may be further amended, with their latest up to date version available on the web site of the *Register*.

### Article 2 DEFINITIONS

**2.1** **Certificate** means either a class certificate or statutory certificate, statement, attestation, statement of compliance, and a report following the Services provided by the *Register*.

**2.2** **Certification** means the activity of certification in application of international and national standards and international industry practice provided by the *Register*.

Certification is an appraisal given by the *Register* to the Client and cannot be construed as an implied or express warranty of safety, fitness for purpose, seaworthiness of the vessel or its value for sale, insurance or chartering.

The purpose of Certification is to provide classification and statutory services and assistance to the maritime industry, Flag State Administrations, and regulatory authorities relating to maritime safety and pollution prevention.

**2.3** **Classification** includes all activities and Services provided by the *Register* in accordance with the Rules. Classification may or may not be accompanied by the issuance of a Certificate of class with reference to the Rules.

Certificate of class is valid only if issued by the *Register*.

However, Certificate of class should not be construed as a guarantee of the safety, fitness for purpose or seaworthiness of the vessel. It is merely an attestation that the vessel complies with the Rules developed and published by the *Register*.

In addition, the *Register* is not a guarantee of the safety of life or property at sea or the seaworthiness of a vessel because, although the classification of a vessel is based on the assumption that the vessel will be properly loaded, operated, and maintained by competent and qualified personnel, the *Register* has no control over how a vessel is operated and maintained between the periodic surveys it conducts.

**2.4** **Statutory certification** means certification made by the *Register* on behalf of the Flag State Administrations when and to the extent that the *Register* has been authorised to do so by the respective Flag State.

Statutory certification and services include the assessment of vessels registered by the Flag State and/or ship management companies to determine whether such ships/companies comply with the applicable requirements of international conventions, codes and national legislation, and the issuance of, or assistance in the issuance of, the appropriate certificates and documents.

Statutory certification includes, but is not limited to, certification, survey, and issuance of statutory certificates on behalf of the Flag State.

In cases where the *Register* acts on behalf of Flag State Administrations, the *Register* shall follow guidance issued by IMO (Resolutions, Circulars, etc.) or by IACS through Unified Interpretations (UI), unless otherwise directed by the Flag State.

**2.5** **Client** means the shipowner, company, shipyard and/or party requesting Services or taking ownership of a classed vessel. In cases where shipowners have authorized another party to operate the vessel on their behalf, that party shall be considered as the company.

In addition to the above the Client means the person and/or entity that has requested Services from the *Register* and that has entered into a Contract or an agreement for Services with the *Register*.

**2.6** **Parties** means the *Register* and Client together.

**2.7** **Party** means the *Register* or the Client.

**2.8** **Contract** means the contract in the form of a written agreement between the Client and the *Register* requesting Services, including these General Terms and Conditions and the Rules.

The provisions related to the Contract in these General Terms and Conditions shall apply even if there is no written agreement between the Client and the *Register*.

The Client may request the *Register* in writing to make a change to the contracted Services. However, the *Register* shall not be obligated to accept or execute any such change until a written agreement has been signed with the Client regarding the compensation and the possible impact of the change on the schedule as an addendum to the originally contracted Services.

**2.9** **Services** shall mean the services specified in 2.2, 2.3 and 2.4, but also other services related to certification, classification and statutory certification, such as, but not limited to: ISM Code certification, ISPS Code, MLC 2006 certification, fuel oil consumption reporting, IHM certification, approval of manufacturers and service providers, certification of materials and products, training activities, conformity assessment, and any other relevant activities such as third party inspections, testing, shore and shipboard trials.

The Services provided by the *Register* are performed on a random basis and in no case include a full inspection of all items.

The *Register* shall provide the Services in accordance with related Contract(s), the provisions of these General Terms and Conditions, Rules, the international and national standards, the international conventions, the EU Regulations, the Flag State requirements and the industry practices applicable to the particular Service and always assuming that the Client is aware of these standards and the industry practices.

When providing Services, the *Register* does not guarantee the accuracy of the information or advice provided.

In providing Services, the *Register* does not assess compliance with standards other than the Rules, international and national standards, international conventions, EU regulations, Flag State requirements and industry practice, to the extent agreed in writing or specified in the Contract.

**2.10** The *Register* means the Croatian Register of Shipping, an entity organized and existing under Croatian law, which, according to the Law on the Croatian Register of Shipping (Official Gazette No. 1996/81, 2013/76 and 2020/62) and the Charter of the *Register*, is an independent, not-for-profit, but public welfare oriented, public foundation that performs tasks:

- classification of sea-going ships,
- statutory certification of sea-going ships on behalf of the Flag State Administrations,
- classification of inland navigation vessels,
- statutory certification of inland navigation vessels,
- statutory certification of recreational crafts,
- certification of materials and products,
- conformity assessment of recreational crafts,
- conformity assessment of marine equipment,
- conformity assessment of pressure vessels,
- certification/registration of quality management systems.

**2.11** **Vessel** means a ship, vessel, unit or offshore structure of any kind, whether or not connected to the shore or sea/river bed, located at sea or in inland waters and intended for transportation or special operations on the water, as decided by the *Register*.

**2.12** **Rules** means the Rules for the classification, guidelines, instructions, or other documented evidence of the *Register* related to the Services provided.

The competent interpretation of the requirements specified in the Rules or other regulations published by the *Register* shall be the exclusive responsibility of the *Register's* Head Office, notwithstanding any possible different interpretations by other parties.

In cases where the Rules do not contain detailed requirements, the specific approval by the *Register* shall be based on the principles of the Rules and shall ensure a safety standard equivalent to that of the Rules.

### Article 3 RESPONSIBILITIES

**3.1** It is the Client's responsibility to ensure that all surveys required for vessel's class maintenance are conducted in a timely manner and in accordance with the Rules.

**3.2** The *Register* may suspend or withdraw the vessel's existing Certificate of class in the event of serious deficiencies and replace it with a new Certificate of class with a shortened period of validity during which the deficiencies are to be rectified.

In addition, the *Register* shall suspend or withdraw a vessel's Certificate of class if the deficiencies are of such a magnitude as to endanger the class of the vessel, its safety and integrity, the safety of the crew, passengers, or the marine environment, and shall require that the vessel is to be inspected at the first port of call where the necessary repairs are to be carried out.

**3.3** The Client should inform the *Register*:

- (i) in the event of a change in the intended use of a vessel, a conversion and alteration of the hull, machinery installations and other equipment affecting the Class of the vessel assigned by the *Register*. Conversions and alterations must be made under the supervision of the *Register* and must comply with the requirements of the Rules and/or additional requirements of the *Register*,
- (ii) in cases where the vessel has been damaged to such an extent that the Class of the vessel is likely to be affected and the safety and integrity of the vessel is likely to be compromised. In such cases, the vessel must be surveyed at the first port of call or as further directed by the *Register*. The survey shall be to the extent deemed necessary by the *Register*, by taking into account the extent of the damage.
- (iii) in cases where class-related deficiencies and/or defects are found as a result of a Flag State inspection or Port State Control. Should the Client fail to notify the *Register* of the detention of the vessel by Port State Authorities due to class related deficiencies, the *Register* reserves the right to suspend or withdraw the Certificate of class.

**3.4** The *Register* shall have full control over Certificates issued and may suspend or withdraw a Certificate at any time in its sole discretion if the Client fails to comply with the following requirements set forth in the *Rules for the Classification of Ships, Part 1 - General Requirements, Chapter 1 - General Information*, as applicable:

- (i) para. 5.3 - *Maintenance of the validity of Certificate of Class*,
- (ii) para. 5.4 - *Period of Validity*,
- (iii) para. 5.5 - *Extension of the Period of Validity*,
- (iv) para. 5.6 - *Suspension and Reinstatement of Class in the Case of Overdue Surveys*, and
- (v) para. 5.7 - *Withdrawal of Class*.

**3.5** The *Register* may suspend or withdraw a Certificate at any time in its sole discretion if the Client fails to comply with the following requirements set forth in the *Rules for the Classification of Inland Navigation Vessels, Part 1 - Classification and Surveys, Chapter I - Principles of Classification*, as applicable:

- (i) para. 2.8 - *Maintenance of the Validity of the Certificate of Class*,
  - (ii) para. 2.9 - *Extension of validity of the Certificate of Class*,
- and following requirements set forth in the *Rules for the Classification of Inland Navigation Vessels, Part 1 - Classification and Surveys, Chapter II - Classification*, as applicable:

- (iii) para. 2.1 - *Suspension of Class*,
- (iv) para. 2.2 - *Withdrawal of Class*.

**3.6** In addition to clauses 3.2, 3.4 and 3.5 of this Article, the *Register* reserves the right to terminate the Services and related Contract in the event of a breach of the provisions of these General Terms and Conditions.

**3.7** If the Client fails to provide the *Register* with the required access or information at the agreed times or fails to prepare for the Service in a timely manner, the *Register* may suspend the provision of the Service until it receives the Client's instructions for access and/or the required information.

The *Register* shall not be liable for the consequences of such suspension, and the Client shall be responsible for the *Register's* additional fees and other unnecessary costs and expenses incurred by the *Register*.

**3.8** The Client is obliged to perform timely payments of the invoices for provided Services. However, the *Register* may retain or withhold any Service or Certificate to the Client in the case of outstanding payments, whether mutually related or not, arising out of the entire business relationship with the Client.

#### Article 4

##### HEALTH, SAFETY AND ENVIRONMENT

**4.1** Both the *Register* and the Client shall apply reasonable standards to promote safety, health, and environmental protection and to provide a safe working environment for their personnel.

**4.2** The Client shall provide the *Register* with all access and information necessary for the safe and efficient performance of the requested Services as required by the Rules.

**4.3** During the survey, personnel of the *Register* should have secure access to all work that directly or indirectly affects the Service.

**4.4** The *Register* has the right to refuse to conduct an activity or visit an area or site if the *Register* in its sole discretion, believes that relevant risks are unacceptable or are not adequately addressed, contained, or otherwise mitigated.

Such a decision shall suspend the obligations of both Parties under the Contract without incurring any liability or penalty until the Parties agree on how to proceed.

#### Article 5

##### THIRD PARTIES AND SUBCONTRACTORS

**5.1** Each specific Contract, including any Certificates issued, relates specifically to the Client, and no rights, obligations, interests, claims, benefits or Certificates issued shall extend to any third party without the prior written consent of the *Register*.

**5.2** The Client shall not be entitled to grant any right to use the Certificates to any third party without the prior written consent of the *Register*.

**5.3** The Client shall not without *Register's* consent, cede, assign, transfer, subcontract or deal in any manner with all or any of its rights or obligations under any Service and related Contract.

**5.4** With regard to third party rights to access information and Certificates under confidentiality clause reference is to be made to Article 9.

#### Article 6

##### TAXES

**6.1** Each Party shall be responsible for and shall bear all taxes, duties or similar governmental charges levied or imposed on any activity of that Party.

**6.2** Prices, fees, rates, or remuneration are exclusive of any form of sales tax, value added tax, administrative fees and services tax and/or other similar taxes, including any surcharges. If any such indirect tax is or becomes applicable to the Services provided under the Contract, the Client shall be responsible for the payment of such indirect taxes.

#### Article 7

##### PAYMENT OF INVOICES

**7.1** The provision of Services by the *Register*, whether complete or not, shall include payment of fees thirty (30) days after issuance of the invoice for the portion of the Services performed.

**7.2** In the event that the Client fails to meet the requirements for payment in accordance with the instalments and terms of payment contained herein, the *Register* reserves the right to charge the Client with the interest rate in accordance with the applicable laws of the Republic of Croatia.

**7.3** If the Client disputes an invoice or part of an invoice, the Client shall notify *Register* thereof in writing without undue delay. If no notification is received by the due date, Client shall be deemed to have accepted the invoice in full. If only part of an invoice is disputed, the undisputed amount must be paid by the due date.

Consequently, no disputes arising between the *Register* and the Client shall interfere with prompt payment of invoices by the Client. Any rights of lien or retention in favour of the Client or otherwise, are hereby excluded.

**7.4** In the event of cancellation of all or part of the Services prior to their final completion, the Client shall pay all costs incurred by the *Register* on pro-rata basis for the portion of the Services provided to date. In such event, the *Register* will not claim the Client for loss of profit or reduced income. All reasonable costs directly attributable to the early termination and all amounts due to the *Register* at that time shall become immediately due and payable.

**7.5** In the event of termination of the Service and related Contract, the *Register* shall be entitled to retain any payments, deposits or prepayments of fees made by the Client prior to the date of termination up to the amount to which the *Register* is entitled.

#### Article 8

##### TERMINATION

**8.1** The Parties shall have the right to terminate the Services and the related Contract(s) by written notice to the other Party, and without prejudice to Article 7, in the following cases:

- (i) if the other Party commits a material breach of these General Terms and Conditions and/or the Contract and fails to rectify such breach in accordance with clause 8.4 of this Article,
- (ii) if the other Party becomes insolvent, is unable to pay its debts as they become due, or becomes subject to bankruptcy proceedings, administration, receivership, dissolution, liquidation, winding up or otherwise ceases to carry on its business; or
- (iii) for convenience, after giving the other Party thirty (30) days' prior written notice of termination.

**8.2** The Classification issued for the relevant vessel and the Certificates previously issued shall remain valid until the effective date of termination or, in the event of such termination, immediately, subject to compliance with Article 3 and Article 7.

**8.3** If, in the reasonable opinion of the *Register*, the Client breaches or is suspected of breaching Article 14 or Article 15, the *Register* shall have the right to terminate the Service and related Contract with immediate effect.

**8.4** Notwithstanding the provisions of clause 8.1 of this Article, the Party intending to terminate Services for non-compliance or breach of the provisions of these General Terms and Conditions shall notify the other Party of the non-compliance or violation of the provisions of these General Terms and Conditions and set a reasonable deadline of 15 (fifteen) days for the other Party to remedy the breaches of the provisions of these General Terms and Conditions.

If the Party fails to remedy the breaches of the provisions of these General Terms and Conditions within the aforementioned period, the other Party shall have the right to terminate Services without further notice.

**8.5** Termination of the Service and related Contract pursuant to the provisions of these General Terms and Conditions shall not give either Party the right to claim any additional compensation, indemnity or reimbursement from the other Party as a result of such termination, but such termination shall not affect any rights or remedies available to a Party at the time the termination becomes effective or any obligations or liabilities incurred by a Party.

#### Article 9 CONFIDENTIALITY

**9.1** The Parties agree to keep confidential all facts, data, information, etc. related to the other Party's business that they have learned in the course of providing Services. Such information and data shall not be disclosed by the Parties to any third party and shall not be used or misused to the detriment of the other Party.

**9.2** The *Register* will keep confidential any data, plans or other technical information received from the Client and will not disclose it to any third party outside the *Register*, unless authorised by the Client. This obligation shall continue to apply after termination of the Services. This obligation shall not apply to any data, plans or other technical information that was in the possession of the *Register* prior to being disclosed to the *Register* by or on behalf of the Client, or that becomes publicly available through no fault of the *Register*, or is otherwise provided to the *Register* by an independent source that is under no obligation of confidentiality to the *Register*.

**9.3** Certificates issued by the *Register* to the Client as a result of the Services provided shall not be covered by the confidentiality Article.

Notwithstanding the foregoing, the Client shall be entitled to disclose any data to its affiliates involved in the transactions related to the Services or the Client's core activities.

**9.4** Notwithstanding clause 9.1 and clause 9.2 of this Article, the *Register* shall have the right to disclose the Confidential Information to the following parties if required by regulations of:

- (i) authorised representatives of the Flag State Administration,
- (ii) authorised audit teams (i.e., accreditation body or EC auditors),
- (iii) the International Association of Classification Societies (IACS),
- (iv) a court of competent jurisdiction, government agency, or other relevant public authority, in accordance with applicable law, court order, or other public regulation.

**9.5** The Client acknowledges that the *Register* is required to provide access to information to the EU Commission or any person acting on its behalf in accordance with applicable EU requirements and that the Client shall give the EU Commission with unrestricted access to the vessels for the purpose of inspection.

**9.6** The obligations in this Article shall survive the conclusion of the Service or the termination of related Contract and shall continue for as long as the relevant information remains confidential.

#### Article 10 INTELLECTUAL PROPERTY

**10.1** Each Party shall be the sole owner of all rights to its Intellectual Property created before or after the effective date of these General Terms and Conditions, whether or not associated with any Contract between the Parties.

**10.2** The Intellectual Property developed by the *Register* for the provision of the Services, including but not limited to drawings, calculations and reports, shall remain the exclusive property of the *Register*.

#### Article 11 PROFESSIONAL ETHICS

**11.1** Each of the Parties warrants that, with respect to the matters contemplated herein, neither it nor its affiliates has made or will make, directly or indirectly, any offer, payment, gift or authorization of money to any government official or employee, political party, public official or candidate for the benefit or advantage thereof.

**11.2** In providing the Services, the *Register* shall strictly adhere to the requirements of its Code of Ethics relating to business activities.

#### Article 12 FORCE MAJEURE

**12.1** For the purposes of these General Terms and Conditions, the term "Force Majeure" includes any event that directly or indirectly prevents the Parties from fulfilling their obligations due to events beyond their control, such as: strikes, wars, riots, piracy, civil commotion, malicious damage, pandemic, compliance with laws or government orders, rules, regulations or directives, sanctions and embargoes, accidents, defects of plants or machinery, seizures, fires, floods, storms and the like.

**12.2** If either Party is prevented or delayed from performing its obligations by Force Majeure, such Party shall promptly notify the other Party in writing of the circumstances of the Force Majeure and its influence and, after such notification, shall not be liable for performance of any obligations prevented by the influence of the Force Majeure during its duration. Upon termination of the influence of the Force Majeure, the same Party should proceed with the planned activities in order to fulfil its obligations.

**12.3** If one of the Parties is prevented by Force Majeure in its activities and fulfilment of its obligations and this event lasts continuously for three (3) months, the other Party shall be entitled to terminate the Service and related Contract without liability.

**12.4** Neither of the Parties shall be liable for non-compliance with these General Terms and Conditions due to Force Majeure. If one of the Parties is prevented from fulfilling its obligations under these General Terms and Conditions due to Force Majeure, it shall immediately notify the other Party in writing within a reasonable period of time, stating the reasons for the Force Majeure and providing relevant evidence, if any.

#### Article 13 INDEMNIFICATIONS

**13.1** Each Party shall indemnify the other Party against all claims arising out of the performance of the Services in respect of bodily injury, illness or death of any of its employees or other representatives and in respect of loss of or damage to the Party's property.

This provision shall apply whether or not the damage is caused or contributed to by the negligence of the other Party. Both Parties are obliged to take out separate insurances for these liabilities.

**13.2** The Client shall indemnify the *Register* from and against all claims arising from the Client's violation of the provisions of these General Terms and Conditions and from the misuse of the Certificates issued by the *Register*.

**13.3** The Client shall indemnify the *Register* against any financial responsibility or amounts arising from non-payment, late payment or payment of withholding taxes to the non-relevant tax authority or any other relevant governmental body.

**13.4** Each Party shall notify the other Party without undue delay as soon as it becomes aware of any incident that could give rise to a claim against the other Party in respect of the Service provided and related Contract.

#### Article 14 ANTI-CORRUPTION

**14.1** Each Party agrees that in performing its obligations under any Service, it will ensure that its affiliates, employees and/or agents, subsidiaries, subcontractors, consultants, and any other persons providing Services will:

- (i) comply with all applicable anti-bribery and anti-corruption laws (collectively, Anti-Bribery Laws) and, in particular, do not, directly or indirectly, offer, promise, grant, authorise the payment of, or confer any financial or other benefit on any public or government official:
  - to a public or governmental official to obtain or retain business with the intent to influence such official in his or her capacity as an official, if such official is not permitted or required by written law to be influenced by the offer, promise or gift; or
  - to another person with the intent to induce or reward the improper performance of a function or activity or for any other illegal purpose,
- (ii) maintain adequate systems and procedures designed to prevent activities, practises, or conduct in connection with services that would constitute an offence under an anticorruption law; and
- (iii) take reasonable steps to prevent similar acts by customers, contractors, subcontractors, agents and other third parties, persons under its control or influence.

**14.2** Any failure by a Party to comply with or ensure compliance with its obligations under this Article shall, notwithstanding anything to the contrary in these General Terms and Conditions, be deemed a breach of these General Terms and Conditions which shall entitle the other Party to suspend and/or terminate the Services by notice in writing with immediate effect without further liability to the other Party except for any liability which may have arisen prior to the date of termination or suspension (as the case may be).

**14.3** If a Party elects to suspend the provision of Services under these General Terms and Conditions pursuant to this Article, it shall have the sole and absolute discretion to determine:

- (i) when it will resume performance (if at all); and
- (ii) extend the period for performance of its obligations under the Services in its sole discretion.

#### Article 15 SANCTIONS

**15.1** Each Party shall conduct all activities in compliance with all laws, statutes, rules, economic and trade sanctions (including, but not limited to, U.S. sanctions and EU sanctions) and regulations applicable to such Party, including, but not limited to: child labour, forced labour, collective bargaining, discrimination, abuse, working hours and minimum wages, anti-bribery, anti-corruption, copyright and trademark protection, personal data protection.

**15.2** Each Party hereby represents and warrants that it is not or will not be subject to any economic or trade sanctions ("Sanctions") imposed by the United States of America, the European Union, the United Kingdom, any EU Member State, or the United Nations with respect to any country and/or by any sanction giver with respect to any company/individual.

**15.3** Each Party represents and warrants that it will strictly comply with all Sanctions.

**15.4** Nothing in these General Terms and Conditions shall be construed as causing or obligating either Party to act or refrain from acting in a manner inconsistent with, punishable by, or prohibited by any Sanctions.

**15.5** Neither Party shall be obligated to perform any obligation arising under these Terms and Conditions (including, without limitation, the obligation to):

- (i) perform, deliver, accept, sell, purchase, pay or receive any funds to, from or through any person or entity; or
- (ii) engage in any other action whatsoever, if doing so violates or is inconsistent with sanctions and/or recommendations of international (intergovernmental) organisations to combat the financing of terrorism and other criminal activities and/or money laundering or exposes such Party to investigation or penalties.

**15.6** In the event that a Party breaches any Sanctions or the Party's Business and/or Transactions arising out of or in connection with these General Terms and Conditions breach any Sanctions or otherwise violate the recommendations of one or more international (intergovernmental) organisations for combating the financing of terrorism and other criminal activities and/or money laundering, the other Party shall be entitled to terminate these General Terms and Conditions by written notice with immediate effect without incurring any liability to the other Party, except for liabilities (if any) incurred prior to the date of termination.

#### Article 16 LIABILITY

**16.1** The *Register* is not, and cannot be considered as, an underwriter, consulting engineer, naval architect, shipbuilder, shipowner, or ship management company, nor can it assume the obligations and responsibilities associated with such functions, although the *Register's* experience may enable it to respond to inquiries about matters not covered by its Rules, policies, instructions, or other documented evidence.

**16.2** The practices and procedures of the *Register* shall be selected by the *Register* in its sole and absolute discretion based on its experience and knowledge and in accordance with generally accepted professional standards in the relevant field of classification societies.

**16.3** Nothing herein contained shall release any designer, naval architect or engineer, shipbuilder or manufacturer, shipyard, vendor, supplier, contractor or subcontractor, repairer or owner, from any information, report, certificate or similar document issued in connection with the provision of Services by the *Register*, operator, manager or other person or entity from any express or implied warranty or other contractual obligation or responsibility, or from any negligent act, error or omission of any kind whatsoever, nor shall they create any right, claim or benefit for any third party.

**16.4** The *Register* shall exercise due care in the selection or appointment of its surveyors and all other employees whose presence and work is necessary for the provision of the Services.

**16.5** If any person or entity using the Services of the *Register* suffers any loss, damage or expense that is or is shown to have been caused by a negligent act, omission or error of the *Register's* officers, surveyors, auditors, inspectors, agents, appointers, officers or managers, or those purporting to act in the name of and on behalf of the *Register*, or a negligent inaccuracy, advice, report or evidence given by or in the name of or/and on behalf of the *Register*, then the liability of the *Register* is limited in respect of any direct or indirect claim shall be limited to an amount not exceeding five times the fee charged or to be charged by the *Register* for the relevant Service.

**16.6** Any liability for consequential damages is expressly excluded.

For purposes of this clause, consequential damages include, without limitation:

- (i) indirect or consequential damages,

- (ii) loss and/or delay of production, loss of products, loss of use, loss of bargain, loss of revenue, loss of profit or anticipated profit, loss of business and business interruption, in each case directly or indirectly.

**16.7** The Parties are not entitled to assign the performance of obligations under these General Terms and Conditions or parts thereof to third parties without the prior written consent of the other Party.

**16.8** If during the term of the Contract, there is a transfer of function due to change of status (merger, acquisition, division, etc.), all obligations and rights under these General Terms and Conditions and associated Contract will be transferred to the legal successor of the Party concerned.

#### Article 17 GOVERNING LAW AND RESOLVING OF DISPUTES

**17.1** These General Terms and Conditions and any dispute or claim between the Parties arising from or in connection with it, or the Services provided hereunder, will be governed and interpreted in accordance with the English law.

**17.2** The Parties shall use their reasonable efforts to resolve any claim or dispute arising in relation to rendered Service by negotiations within a reasonable time.

**17.3** Should the Parties fail to resolve any claim or dispute by negotiations, the dispute shall be exclusively subject to the jurisdiction of the Permanent Arbitration Court with the Croatian Chamber of Economy in Zagreb, Republic of Croatia.

**17.4** The Parties agree to keep the any arbitration proceedings confidential.

**17.5** Notwithstanding the above, any claim not presented within three (3) months of the completion of the particular Services, or within three (3) months of from the date when the events which are relied on were first discovered by the Client, shall be deemed waived and absolutely time barred.

**17.6** Any objections against the line adopted by any of the *Register's* servants in fulfilling their duties or against the conclusions reached are to be raised to the *Register* by the Party as soon as possible.

If the Party is not satisfied with the final conclusions and interpretations by the *Register* the arbitration lays upon the Commission for appeal for Classification and Statutory certification of ships, which is to be formed according to the Regulation 39 of the Charter of the *Register*.

## **INTRODUCTORY NOTES**

These amendments shall be read together with the requirements in the Rules for the Classification of Ships, Part 11 – Refrigerating plant, edition July 2009.

Table 1 contains review of amendments, where items changed or added in relating to previous edition are given, with short description of each modification or addition. All major changes throughout the text are shaded.

This part of the Rules includes the requirements of the following international Organisations:

**International Maritime Organization (IMO)**

**Conventions:** International Convention for the Safety of Life at Sea, 1974 (SOLAS 1974) and all subsequent amendments up to and including the 2024 amendments (MSC.549(108)) Protocol of 1988 relating to the International Convention for the Safety of Life at Sea 1974, as amended (SOLAS PROT 1988)

**International Association of Classification Societies (IACS)**

**Unified Requirements (UR):** M57 (1993)

## TABLE 1 – REVIEW OF AMENDMENTS

This review comprises amendments in relation to the Rules for the Classification of Ships, Part 11 – Refrigerating plant, edition July 2009.

| <i>ITEM</i>  | <i>DESCRIPTION OF THE AMENDMENTS</i>   |
|--|--|
| <b>SECTION 1 - GENERAL</b>   |  |
| Head 1.2 DEFINITIONS AND EXPLANATIONS  | Items 1.2.3 and 1.2.4 have been added.<br>Added definitions for refrigerant and secondary refrigerant.   |
| Head 1.3 SCOPE OF SUPERVISION AND TECHNICAL DOCUMENTATION                                    | Item 1.3.4 has been amended.<br>Change in wording.   |
| <b>SECTION 2 GENERAL TECHNICAL REQUIREMENTS</b>  |  |
| Head 2.2 REFRIGERANTS AND DESIGN PRESSURE  | Items 2.2.1, 2.2.2 and table 2.2.2 have been amended.<br>New eco-friendly refrigerants added.  |
| Head 2.3 CAPACITY AND EQUIPMENT  | Items 2.3.1, 2.3.3 and 2.3.9 have been amended.<br>Operating conditions added.<br>Refrigeration plant arrangement specified.   |
| Head 2.5 ELECTRICAL EQUIPMENT  | Item 2.5.3 has been added.<br>Electrical supply for redundant equipment.   |
| <b>SECTION 3 – REFRIGERATING PLANT SPACES</b>  |  |
| Head 3.1 REFRIGERATING MACHINERY SPACES  | Items 3.1.1, 3.1.4 and 3.1.9 have been amended, new item 3.1.11 has been added.<br>Ventilation openings of refrigerating machinery spaces.   |
| Head 3.3 REFRIGERATED CARGO SPACES   | Items 3.3.1, 3.3.11 and 3.3.12 have been amended.<br>Temperature measurement for refrigerated cargo spaces.<br>Bilge wells in refrigerated cargo spaces.   |
| Head 3.4 FREEZING AND COOLING CHAMBERS   | New item 3.4.5 has been added.<br>Air pipes and water pipes in freezing chambers.  |
| <b>SECTION 5 – HEAT EXCHANGERS, PRESSURE VESSELS AND COOLING ARRANGEMENTS</b>                |  |
| Head 5.1 HEAT EXCHANGERS AND PRESSURE VESSELS  | Item 5.1.2 has been amended.<br>Pressure vessel classes aligned with Rules Part 10, item 1.3.1.2.  |
| Head 5.2 AIR COOLERS   | Item 5.2.2 has been amended, items 5.2.3 and 5.2.4 have been added.<br>Number of air coolers defined.<br>Number of air circulations in refrigerated cargo spaces defined.  |
| <b>SECTION 6 – FITTINGS AND PIPING</b>   |  |
| Head 6.2 PIPING  | Items 6.2.1, 6.2.2 and 6.2.5 have been amended, new items 6.2.10 and 6.2.11 have been added.<br>Compatibility of material and refrigerant requirements added.<br>Piping classes aligned with Rules Part 8, table 1.2.2.<br>Direct expansion system piping arrangement specified. |
| <b>SECTION 7 – INDICATING AND MEASURING INSTRUMENTS AND AUTOMATIC DEVICES</b>                |  |
| Head 7.1 INDICATING AND MEASURING INSTRUMENTS  | Item 7.1.2 has been changed and renumbered into amended item 7.1.3.<br>Temperature and pressure indication added.  |
| Head 7.2 AUTOMATIC DEVICES   | Items 7.2.1 and 7.2.8 have been amended, new items 7.2.9, 7.2.10, 7.2.11, 7.2.12, 7.2.13, 7.2.14 and 7.2.15 have been added.<br>Refrigerant leak detection requirements specified.<br>Fault condition alarm added.   |
| <b>SECTION 8 – INSULATION</b>  |  |
| Head 8.1 INSULATION OF THE REFRIGERATED SPACES   | Items 8.1.2 and 8.1.3 have been amended.<br>Properties of insulating materials more detailed.  |
| Head 8.2 INSULATION OF PIPING  | Items 8.2.1 and 8.2.2 have been changed and renumbered with rest of items.<br>Requirement additionally elaborated.   |
| <b>SECTION 12 – REFRIGERATING PLANTS DESIGNED FOR COOLING OF CARGO IN THERMAL CONTAINERS</b> | New section has been added.<br>Requirements for permanently installed refrigerating plants designed to supply cooling air to the thermal containers in holds included.   |

**PART 11**

## AMENDMENTS No. 1

# 1 GENERAL

■ **Head 1.2 DEFINITIONS AND EXPLANATIONS**, new items 1.2.3 and 1.2.4 have been added and should be read as follows:

Definitions and explanations relating to general terminology are given in the *Rules for the classification of ships, Part 1 - General requirements, Chapter 1 – General information*. The following definitions and explanations for purpose of the present part of the Rules have been adopted:

1.2.1 Refrigerating machinery space – a space containing mechanical and other types of equipment intended for refrigerating plants.

1.2.2 Refrigerated spaces – cargo holds and spaces provided with equipment capable of maintaining the reduced temperatures and intended for the carriage of refrigerated and frozen cargoes.

1.2.3 Refrigerant - a working medium of the refrigerating cycle.

1.2.4 Secondary refrigerant - a substance for heat removal from refrigerated spaces and heat transfer to a refrigerant, e.g. brine or glycol and water mixture.

■ **Head 1.3 SCOPE OF SUPERVISION AND TECHNICAL DOCUMENTATION**, item 1.3.4 has been amended and should be read as follows:

- 1.3.4 At the stage of ship's construction the following works are to be supervised by Register:
- .1 manufacture and testing of relevant items of the plant at the workshop,
  - .2 mounting of machinery, heat exchangers and pressure vessels,
  - .3 mounting of refrigerant systems,
  - .4 mounting of secondary refrigerant, cooled air and cooling water system,
  - .5 mounting of the main and emergency ventilation systems,
  - .6 mounting of insulation in the refrigerated spaces and freezing chambers, as well as on equipment and refrigerating piping,
  - .7 installation of control, indication, alarm and protection systems of the refrigerating plant,
  - .8 testing of refrigerating plant.

## 2 GENERAL TECHNICAL REQUIREMENTS

■ **Head 2.2 REFRIGERANTS AND DESIGN PRESSURE**, items 2.2.1, 2.2.2 and table 2.2.2 have been amended and should be read as follows:

2.2.1 The refrigerants are subdivided into **four** groups as follows:

- I – **non-toxic and** non-flammable refrigerants,
- II – toxic and flammable refrigerants having low flammable level at the volume concentration of the refrigerant vapours in air of 3,5 per cent and over,
- III – explosive or flammable refrigerants having low flammable level at the volume concentration of the refrigerant vapours in air of less than 3,5 per cent,
- IV – flammable fluorinated hydrocarbon refrigerants.**

The refrigerants included in group III may be permitted by Register only for the refrigerant systems of ships carrying the liquefied gases in bulk with the cargo used as a refrigerant.

2.2.2 In strength calculations of the items operating under refrigerant pressure the design pressure shall be taken not less than the **gauge** pressure of the saturated vapours of the refrigerant at temperature **+55 °C and +45 °C on the HP and LP side, respectively** in accordance with Table 2.2.2.

The refrigerating plant components working under the pressure are to be calculated for compliance with hydraulic test pressure (see 9.1.2). The stresses involved shall not exceed 0.9 times the yield point of material.

**Table 2.2.2**  
Refrigerant design pressure

| Refrigerant group | Symbol         | Chemical formula                                  | Design pressure, p - MPa  |                           |
|-------------------|----------------|---|---------------------------|---------------------------|
|                   |                |   | High-pressure side        | Low-pressure side         |
| I                 | R134a          | CF <sub>3</sub> CH <sub>2</sub> F                 | 1,34                      | 1,09                      |
|                   | R404a          | mixture R134a, R125, R143a                        | 2,5                       | 2,03                      |
|                   | R407c          | mixture R32, R125, R134a                          | 2,35                      | 1,9                       |
|                   | <b>R407h</b>   | <b>mixture R32, R125, R134a</b>                   | <b>2,5</b>                | <b>2,0</b>                |
|                   | R410a          | mixture R32, R125                                 | 3,3                       | <b>2,6</b>                |
|                   | <b>R448a</b>   | <b>mixture R32, R125, R1234yf, R1234ze, R134a</b> | <b>2,5</b>                | <b>2,0</b>                |
|                   | <b>R449a</b>   | <b>mixture R32, R125, R1234yf, R134a</b>          | <b>2,6</b>                | <b>2,0</b>                |
|                   | R507           | mixture R125, R143a                               | 2,55                      | 2,07                      |
| II                | <b>R744</b>    | <b>CO<sub>2</sub> (carbon dioxide)</b>            | <b>Note <sup>1)</sup></b> | <b>Note <sup>1)</sup></b> |
|                   | R717           | NH <sub>3</sub> (ammonia)                         | 2,4                       | 1,75                      |
| III               | R290           | C <sub>3</sub> H <sub>8</sub> (propane)           | 1,6                       |                           |
|                   | R1270          | C <sub>3</sub> H <sub>6</sub> (propylene)         | 2,0                       |                           |
| IV                | <b>R32</b>     | <b>CH<sub>2</sub>F<sub>2</sub></b>                | <b>3,6</b>                | <b>2,8</b>                |
|                   | <b>R1234yf</b> | <b>CH<sub>2</sub>=CF<sub>2</sub></b>              | <b>1,4</b>                | <b>1,1</b>                |
|                   | <b>R1234ze</b> | <b>CHF=CHCF<sub>3</sub></b>                       | <b>1,1</b>                | <b>0,8</b>                |

NOTE:

<sup>1)</sup> Design pressure specified by the refrigerating plant manufacturer is subject to approval in each individual case.

■ **Head 2.3 CAPACITY AND EQUIPMENT**, items 2.3.1, 2.3.3 and 2.3.9 have been amended and should read as follows:

2.3.1 The refrigerating plant shall be designed for one or more of the following operating conditions:

- carriage of frozen cargo at -20°C or colder
- freezing down from ambient to -20°C or colder a specified quantity of fish per 24 hours
- carriage of fruit in general at approximately +4°C to 0°C
- carriage of bananas at approximately +12°C
- other specified operating conditions.

Refrigerating plants are to provide effective maintenance of the temperatures in refrigerated spaces as may be required for the cargo carried, depending upon its type and conditions of area of navigation under the normal service conditions of the ship.

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**2.3.3** Capacity of the main equipment of the refrigerating plant is to be sufficient to maintain the required temperatures in refrigerated spaces when working 24 hours a day.

The main and standby equipment shall comprise at least two equal compressors with a drive motor as well as two equal condensers and, where intermediate secondary refrigerant or cascade and stage cycles are used, two equal evaporators, intercascade heat exchangers and intermediate pressure vessels, shall be provided.

The refrigeration plant arrangement shall be such that each refrigeration unit may be connected to any one refrigerated chamber. In the case of separate refrigeration plants fitted for individual chambers or groups of chambers, requirement of standby units will be subject to special consideration.

**2.3.9** The distribution of cooling grids is to provide uniform cooling of the space concerned.

The grids are to be arranged in not less than two independent sections, with means permitting shut-off of each section. For small spaces up to 300 m<sup>3</sup> one section may be installed. The use of cooling grids with direct expansion of group II refrigerant is not permitted.

■ **Head 2.5 ELECRTICAL EQUIPMENT**, new item 2.5.3 has been added and should be read as follows:

**2.5.3** When two or more refrigeration units, refrigeration compressors, cooling water pumps, brine pumps, air circulation fans etc., are required for redundancy purposes these shall have separate electrical supply.

### 3 REFRIGERATING PLANT SPACES

■ **Head 3.1 REFRIGERATING MACHINERY SPACES**, items 3.1.1, 3.1.4 and 3.1.9 have been amended, new item 3.1.11 has been added and should be read as follows:

**3.1.1** The refrigerating machinery spaces are to meet the requirements of the *Rules, Part 7-Machinery Installations*, 1.11.1, 1.11.2 and 1.11.9 as well as the requirements of this section.

Refrigerating equipment working with R744, group II, group III and group IV refrigerants is to be arranged in isolated gastight compartments.

In case of Group II refrigerant plants of fishing vessels under 55 m in length or other Group II refrigerant plants with a quantity of Group II refrigerant not greater than 25 kg said plants are allowed to be located in the machinery space.

Drainage of the refrigerating machinery space is to comply with requirements of the *Rules, Part 8-Piping*, 2.4.10.

Drainage of the group IV refrigerating machinery space is to be arranged as an independent bilge system.

**3.1.4** The escape ways from spaces of refrigerating machinery working with R744, group II, group III and group IV refrigerants are not to terminate in accommodation, public and service spaces in communication, therewith. One of the escape ways is to lead to the open deck.

Where the escape ways are located in corridors and casings, these are to be fitted with supply and exhaust ventilation. Forced air supply being obligatory. The starting arrangements of the ventilation are to be available both inside and outside the machinery space, placed in immediate proximity to the exit.

**3.1.9** In addition to the main ventilation system required in 3.1.8, each refrigerating machinery space is to be fitted with emergency independent ventilation system of a capacity sufficient for:

- .1 30 air changes per hour for spaces of refrigerating machinery working with group II, group III and group IV refrigerants;
- .2 20 air changes per hour for spaces of refrigerating machinery working with group I refrigerant.

For refrigerating machinery utilizing group II, III or IV refrigerants, the ventilation inlets and outlets to such rooms shall be located sufficiently high above deck to not require closing appliances according to the international load line convention. Ventilation outlets shall not be located such that vapour may accumulate on deck below the outlet. Group II refrigerant ventilation outlets shall face overboard and shall not be located on same side of the vessel as air intake to engine room or accommodation.

Capacity of the ventilation system is to be determined on the base of the total volume of the space. Other suitable arrangements which ensure an equivalent effectiveness may be considered.

Depending on density of the refrigerant, exhaust ventilation is to be provided from the uppermost or lowest parts of the space, on several places.

When calculating the emergency ventilation system, the capacity of the main ventilators may be included, provided these are operable with the emergency ones, should the switchboard of the refrigerating units be de-energised.

**3.1.11** Areas on open deck within a distance of 1 m from inlet ventilation openings, and within a distance of 3 m from outlet ventilation openings of refrigerating machinery spaces with group II, III and IV refrigerants (both main and emergency ventilation system) shall be classified as hazardous zone 2.

■ **Head 3.3 REFRIGERATED CARGO SPACES**, items 3.3.1, 3.3.11 and 3.3.12 have been amended and should be read as follows:

**3.3.1** The envelopes of individual refrigerated cargo spaces are to be sufficiently airtight.

All openings in the boundary walls of refrigerated cargo spaces are to be provided with airtight covers.

Where oil tanks are located adjacent to vertical boundaries of refrigerated cargo spaces, no manholes in these boundaries are permitted.

**3.3.11** In refrigerated cargo spaces with forced air circulation through air coolers, at least one thermometer is required in the circulated air entering each air cooler, and at least one in the circulated air leaving each air cooler. Additional thermometers may be required dependent upon the arrangement of the air circulation system. Number and location of temperature sensors in the refrigerated cargo spaces without forced circulation is to be such as to give a true measurement of the temperatures within the spaces.

The refrigerated spaces are to be fitted with telethermometric arrangements. In the absence of these arrangements the refrigerated spaces are to be fitted with not less than two thermometric tubes of not less than 50 mm in diameter. The portions of thermometric tubes that pass through non-cooled spaces are to be carefully insulated.

**3.3.12** Drainage of refrigerated spaces is to conform to the requirements stated in the *Rules for the classification of ships, Part 8 - Piping*, 2.7.

Bilge wells shall be separated from the insulated refrigerated cargo spaces by a gas tight construction.

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Bilge wells for refrigerated spaces may be accepted with a level alarm in lieu of a sounding pipe.

■ **Head 3.4 FREEZING AND COOLING CHAMBERS**, new item 3.4.5 has been added and should be read as follows:

**3.4.5** If air pipes for tanks or sea chests and water pipes are passing through freezing chambers or its insulation, they shall be arranged to prevent freezing.

## 5 HEAT EXCHANGERS AND PRESSURE VESSELS

■ **Head 5.1 HEAT EXCHANGERS AND PRESSURE VESSELS**, item 5.1.2 has been amended and should be read as follows:

**5.1.2** Pressure vessels and heat exchangers for refrigerants of group II. and III. are graded in accordance with the *Rules for the classification of ships, Part 10 - Boilers, heat exchangers and pressure vessels*, item 1.3.1.2, in equipment of class I. Pressure vessels and heat exchangers of group I and group IV refrigerants with design pressure above 1,6 MPa are graded in equipment of class I in accordance with the *Rules for the classification of ships, Part 10 - Boilers, heat exchangers and pressure vessels*, item 1.3.1.2.

Other pressure vessels and heat exchangers for refrigerants of group I and IV are graded in equipment of class II.

■ **Head 5.2 AIR COOLERS**, item 5.2.2 has been amended, with items 5.2.3 and 5.2.4 have been added and should be read as follows:

**5.2.2** For each refrigerated space at least two independent air coolers shall be provided, each comprising of one or more fans and one or more refrigerant circuits, and with isolating valves. For small spaces up to 300 m<sup>3</sup> one air cooler may be installed.

Where a single air cooler is used, its evaporator is to be arranged in not less than two sections, each of which is to be capable of being disconnected, if necessary.

**5.2.3** For refrigerated spaces fitted with air coolers with forced air circulation, the number of air circulations shall be at least:

- 90 per hour for bananas,
- 60 per hour for fruit in general,
- 30 per hour for frozen cargo.

**5.2.4** The cooling facilities of refrigerated cargo spaces shall be provided with effective defrosting system or means.

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**6 FITTINGS AND PIPING**

■ **Head 6.1 FITTINGS AND SAFETY VALVES**, item 6.1.1 has been amended and should read as follows:

**6.1.1** The refrigerating plants are to be provided with shut-off, regulating and safety devices, designed for pressure of not less than  $1,25 p$  where  $p$  is pressure as given in 2.2.2.

As a rule, steel fitting and valves are to be used. The use of other types of materials is subject to special consideration by *Register* taking into account chemical compatibility of the material and the refrigerant.

The integral shut-off valves and fittings made of spherical graphite cast iron which are intended for the inlet and outlet cavities of the refrigerant compressors, as well as the valves and fittings made of spherical graphite cast iron may be permitted when using group I refrigerants at working temperatures of not less than  $-40^{\circ}\text{C}$ .

Copper-alloy valves and fittings may be used in fluorinated hydrocarbon systems.

■ **Head 6.2 PIPING**, items 6.2.1, 6.2.2 and 6.2.5 have been amended, new items 6.2.10 and 6.2.11 have been added and should read as follows:

**6.2.1** The piping of refrigerant, secondary refrigerant and cooling water systems are to comply with respective requirements set out in the *Rules for the classification of ships, Part 8 - Piping*, 1.3 (except for 1.3.6 and for refrigerant piping 1.3.6 and 1.3.7), and is also to meet the requirements of this chapter.

Piping of group II and group III refrigerants belong to piping class I in accordance with the *Rules for the classification of ships, Part 8 - Piping*, Table 1.2.2.

Piping of R744 and group IV refrigerants with design pressure above 4,0 MPa belong to piping class I in accordance with the *Rules for the classification of ships, Part 8 - Piping*, Table 1.2.2.

Other refrigerant piping on both LP and HP side belong to piping class II in accordance with the *Rules for the classification of ships, Part 8 - Piping*, Table 1.2.2.

**6.2.2** The piping of refrigerant and secondary refrigerant is to be made of seamless or welded steel pipes or of copper pipes. The joining of steel pipes carrying the refrigerant is, as a rule, to be made by welding and, where copper pipes are concerned, by welding or brazing. Where pipes are joined with valves, machinery, heat exchangers and pressure vessels, detachable connections may be admitted.

For ammonia systems:

- piping is to be of black steel (non-galvanized),
- copper and zinc are not to be used,
- copper-nickel alloy piping may be used subject to special consideration by the *Register*.

Magnesium and zinc are not to be used for fluorinated hydrocarbon systems.

For brine systems, materials used within the system are to be compatible regarding galvanic potential.

**6.2.5** The pipes leading from safety valves (except for those in 4.1.5) are to be led overboard in a place below the waterline corresponding to the minimum draught of the ship. These pipes are to be fitted with refrigerant leak detectors and non return valve fitted directly to the ship's side.

It is permitted to discharge group I refrigerant to the open air at a position safe for persons.

It is permitted to discharge group II, III and IV refrigerants to the open air at a safe position as high as possible on the ship (top of funnel or mast), the outlet is to be directed upwards.

**6.2.10** A direct expansion system shall be fitted with shut off valves to divide the system into a suitable number of sections. The shut off valves shall be located outside the refrigerated chambers and shall be installed to ensure that the section may be completely separated for maintenance or repair without affecting the operation of the other sections.

Shut off valves shall be fitted upstream and downstream of all filters, strainers and automatic expansion valves to facilitate cleaning, replacements and repairs.

**6.2.11** Sounding pipes for oil tanks shall not end in refrigerated spaces or rooms for fans or air coolers.

## 7 INDICATING AND MEASURING INSTRUMENTS AND AUTOMATIC DEVICES

■ **Head 7.1 INDICATING AND MEASURING INSTRUMENTS**, item 7.1.2 has been changed and renumbered into amended item 7.1.3 and should be read as follows:

**7.1.2** The temperatures of the refrigerant on the suction and discharge sides of compressors, of the cooling water upstream and downstream of the condensers, of the brine feed and return as well as of the refrigerant from all coolers and freezers with direct expansion shall be indicated.

The pressure of the refrigerant in the suction lines, intermediate stages and delivery lines of the compressors, in the refrigerant circulation pumps delivery lines, in the return lines from all direct expansion air coolers and freezers and on the brine pumps pressure side shall be indicated.

**7.1.3** Indicating and measuring instruments are to be placed in readily accessible and visible positions. The scales are to be placed in readily accessible and visible positions. The scales are to bear clear marks indicating the minimum and maximum admissible values of the parameters controlled.

Indicating and measuring instruments are to be checked and calibrated by the competent bodies. Temperature sensors are to be type approved by the Register.

■ **Head 7.2 AUTOMATIC DEVICES**, items 7.2.1 and 7.2.8 have been amended, new items 7.2.9, 7.2.10, 7.2.11, 7.2.12, 7.2.13, 7.2.14 and 7.2.15 have been added, item 7.2.9 has been renumbered into item 7.2.16 and should be read as follows:

**7.2.1** The automatic control systems shall keep the cooling capacities within acceptable limits at all design operating conditions.

Automatic systems as well as the elements and components constituting these systems are to comply with requirements stated in the *Rules for the classification of ships, Part 13 - Automation*.

**7.2.8** Each refrigerating machinery space and all refrigerated chambers, in case of direct expansion, are to be provided with gas detecting sensors which actuate alarms at the refrigerating plant control station in case of the refrigerant leak.

For plants using group I refrigerants except R744, monitoring for oxygen deficiency is an acceptable alternative to refrigerant gas detection.

The sensors shall be located with due regard to the relative density of the refrigerant in gas form as well as to the ventilation flow.

**7.2.9** For provision and air condition refrigeration plants using group I refrigerants located in the engine room, leakage detection systems need not be fitted if the ventilation arrangement is considered sufficient to eliminate the risk of suffocation.

**7.2.10** When group II, III or IV refrigerant is used leakage detectors covering compartments with refrigerating machinery (including process vessels) shall give audible alarm within the compartment.

**7.2.11** When R717 (ammonia) is used, refrigerant leakage in the refrigerating machinery room shall be detected at three different consecutive levels with set points not higher than:

- a) 150 ppm, for initial detection of leakage,
- b) 300 ppm, access dangerous and automatic shutdown of refrigerant circulation pump,
- c) 5000 ppm, de-energizing of non-Ex protected electrical equipment and automatic start of mechanical emergency ventilation.

**7.2.12** For plants using R744 (CO<sub>2</sub>), a low pressure alarm with set point well above the triple point pressure (abt. 5.2 bar) shall be fitted in the low pressure liquid part of the system. For R744 leak detection alarm shall be given if the concentration exceeds 1500 ppm.

**7.2.13** For plants using group IV refrigerants, refrigerant leakage in the refrigerating machinery room shall be detected at 5000 ppm, triggering de-energizing of non-Ex protected electrical equipment and automatic start of mechanical emergency ventilation.

**7.2.14** Alarm is required for the following fault conditions:

- fresh air fans, failure,
- circulating fans, failure,
- cooling water pumps, failure,
- brine pumps, failure,
- refrigerated air temperature, high and low,
- brine temperature, high and low,
- low level in the brine tank,
- sea cooling water temperature outlet condensers, high.

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**7.2.15** The system for temperature, humidity and atmosphere control inside the refrigerated spaces shall ensure accuracy in maintaining these parameters within the ranges consistent with the cargo transportation conditions.

**7.2.16** The refrigerating plants of ships having an automation mark in the class notation according to the Rules, Part 1-General requirements, 2.2.2.3 are to comply with the relevant requirements of the *Rules for the classification of ships, Part 13 - Automation*, Sections 4 and 5.

## 8 INSULATION

■ **Head 8.1 INSULATION OF THE REFRIGERATED SPACES**, items 8.1.2 and 8.1.3 have been amended and should be read as follows:

**8.1.2** The insulating materials adopted for refrigerated cargo spaces are to have adequate resistance to adverse biological factors and are to be of the type that does not give off any odour or gases. They shall have good mechanical resistance to vibrations and deformations at the required temperatures. The insulating materials are to be approved by the *Register*.

Organic foams shall be of a flame-retarding quality, i.e. low ignitability and low flame-spread properties. Testing shall be carried out in accordance with a recognized standard.

**8.1.3** Insulating material placed on surfaces which may be exposed to direct sunshine or on heated tanks shall withstand temperatures of at least 100 °C without disintegration and structural changes. Surfaces of the fuel tank bulkheads and the double bottom tank top in way of fuel tanks should be covered with the chocks of oil resisting and inodorous material before putting the insulation.

■ **Head 8.2 INSULATION OF PIPING**, items 8.2.1 and 8.2.2 have been changed and renumbered with rest of items and should be read as follows:

**8.2.1** Cold refrigerant liquid and gas pipes and cold brine pipes shall be insulated where necessary to prevent the harmful or damaging effect on equipment, cargo spaces or cargo from condensation or frosting (with subsequent defrosting).

**8.2.2** Air and sounding pipes through the refrigerated spaces shall be effectively insulated.

Air, sounding and water pipes penetrating the tank top shall have substantial wall thickness in way of the insulation on the tank top.

**8.2.3** Where pipes are carried through bulkheads and decks, no direct contact with surfaces they pierce is permitted to prevent heat exchange.

**8.2.4** Provision is to be made for protecting the insulation of piping from dampness.

**8.2.5** Insulation of pipelines shall be of fire resisting materials in accordance with the *Rules for the classification of ships, Part 17 - Fire Protection*, 2.1.1.8. This requirement does not apply to insulation of pipelines within areas of refrigerated cargo spaces and refrigerated spaces.

**8.2.6** Materials which prevent condensation and the glues used with the insulation as well as the insulation of fittings may not comply with the *Rules for the classification of ships, Part 17 - Fire Protection*, 2.1.1.8, provided that their quantity is minimum and surface of their open parts have low flame spread characteristics.

## 12 REFRIGERATING PLANTS DESIGNED FOR COOLING OF CARGO IN THERMAL CONTAINERS

### 12.1 GENERAL PROVISIONS AND TECHNICAL REQUIREMENTS

**12.1.1** The refrigerating plants designed to supply cooled air to the thermal containers in holds and installed permanently onboard the ship are covered by the applicable requirements of the present Part of the Rules.

The refrigerating plant is to include the refrigerating machinery, air coolers, supply and return air ducting, and the flexible couplings between containers and the duct system.

**12.1.2** The refrigerating plants shall be capable of supplying cooled air to the thermal containers within the required temperature range for the cargo contained therein.

The number of air circulations in the containers, devices for measuring and controlling temperature, maintenance of required humidity, alarm functions shall be consistent with transportation conditions for the particular kind of cargo.

The refrigerating capacity margin of the plant shall not be less than 20 % of the specified capacity.

**12.1.3** The cooled air supplied to the thermal containers shall be sufficiently dry to avoid ice formation in flexible couplings.

**12.1.4** If for the carriage of particular kind of cargo, inside the thermal container, atmosphere control system is required, that system shall meet the applicable requirements of the present Part of the Rules, Section 11.

The atmosphere control system inside the thermal containers shall be capable of maintaining the required oxygen concentration in the thermal containers.

**12.1.5** Thermal container ventilation arrangements, insulation and alarm system shall meet the requirements of ISO 1496-2:2018 - Thermal containers, clause 7.

**12.1.6** In addition to technical documentation specified in 1.3, the following documentation is to be submitted for approval:

- Details of air coolers,
- Details of the design of ducting proposed, including joints, connections, insulation, vapour sealing and linings,
- Details of couplings between ducting and thermal containers, including operating arrangements,
- Details of cell ventilation arrangements and of hold insulation, if fitted.

### 12.2 AIR COOLERS

**12.2.1** Air ducts supplying more than ten standard 20 ft containers or five standard 40 ft containers are to have a single air cooler with multiple circuits or two independent coolers. The individual circuits or coolers are to be provided with stop valves so that each circuit or cooler may be readily isolated.

**12.2.2** The refrigeration capacity of the air cooler arrangement is to be such that the temperature conditions can be maintained with any one circuit or independent cooler out of action.

**12.2.3** For air ducts supplying ten standard 20 ft containers or five standard 40 ft containers or less, a single cooler with one circuit is acceptable.

### 12.3 AIR DUCT SYSTEMS

**12.3.1** The air ducts, together with all branches and couplings, supplying refrigerated air to insulated containers in holds, are to be made airtight. For design purposes, however, an air leakage rate of 0,5 per cent of total volume flow at the design pressure of 250 Pa for each duct is to be taken.

**12.3.2** Where air ducting is insulated on the internal surfaces, provision is to be made to prevent retention of odour which may contaminate subsequent cargo.

**12.3.3** Couplings are to be type approved by the *Register*. Prototypes are to be tested under all operating conditions to demonstrate that they extend, retract and separate satisfactorily from a container end wall at the minimum design temperature. When operated by means of air pressure they are to be supplied with air sufficiently dry to avoid ice formation. The air supply lines are to be strength pressure tested to 1,5 x design pressure.

### 12.4 TESTING

**12.4.1** In case of prefabricated air ducts, each production duct is to be tested for air leakage.

**12.4.2** Systems comprising prefabricated ducts complete with coolers and fans are to be tested for air distribution to the containers, at the manufacturer's works, by measuring the flow of air from the supply couplings while the fan is operated at full speed against the designed pressure. The air flow at each coupling is to meet the specified value within  $\pm 5\%$ .

**12.4.3** Air leakage tests on at least 10 per cent of air ducting installed onboard the ship, selected at random, are to be carried out to the satisfaction of the Surveyor before the insulation is applied.

**12.4.4** Verification of the refrigeration plant by the refrigeration and thermal balance test is to be carried out onboard the ship. If the refrigeration and thermal balance tests cannot be carried out due to the number of insulated containers available in the shipyard being inadequate, then, alternatively, the following separate tests may be accepted:

1. Compressor capacity test.
2. Air duct heat leakage test on at least 20 per cent of the insulated ducting selected at random. Results are not to exceed the specified value by more than 10 %.
3. Cell heat leakage test, for not insulated holds, on the first ship of the series only.