The following Rules come into force on 1 January 2016.

Alterations to the preceding Edition are marked by beams at the text margin.

DNV GL SE

(Germanischer Lloyd SE has on 29 January 2014 changed its name to DNV GL SE. Any references in this document to Germanischer Lloyd or GL shall therefore also be a reference to DNV GL SE.)

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“General Terms and Conditions” of the respective latest edition will be applicable.

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1 Definitions and General

“Affiliate” – shall mean any subsidiary, parent, ultimate holding company or a subsidiary of such parent or ultimate holding company. For the purpose of this definition, “subsidiary” and “holding company” shall have the meaning assigned to them under the Companies Act relevant to the applicable law set out in Clause 17 herein;

“Contract” – shall mean the contract entered into between the Customer and DNV GL including these General Terms and Conditions and the DNV GL Rules. The above listed documents shall be interpreted as one agreement and in case of any ambiguities or contradictions between the various documents, the documents shall take precedence in the order they are listed above;

“Claim” or “Claims” - shall mean any and all claims, losses (including pure economical losses), demands, taxes, liens, liabilities, judgments, awards, provisional injunctions, remedies, debts, damages, injuries, costs, legal and other expenses, or causes of action of whatsoever nature, and in whatever jurisdiction the foregoing may arise;

“Consequential Loss” - shall mean loss and/or deferral of production, lost productivity (disruptions), loss of product, loss of use, loss of time to any vessel or loss of hire, loss of business opportunities and contracts, loss of goodwill, loss of data, loss of revenue, profit or anticipated profit (if any), losses arising from liabilities or indemnities under other contracts, in each case whether direct or indirect and whether or not foreseeable at the commencement of the Work;

“Customer” – shall mean the person and/or company which has requested DNV GL’s service and has entered into a contract/agreement for services;

“Customer Group” – shall mean (i) the Customer and its Affiliates; (ii) the Customer’s other contractors (other than DNV GL), suppliers and subcontractors (of any tier) and their respective Affiliates; and (iii) the respective directors, officers, managers, agents, employees (including agency personnel) and repre-
sentatives of the persons and entities mentioned under (i) and (ii) above as well as any other person or entity acting on its/their behalf;

“Deliverable” – the deliverable(s) which is(are) to be provided to the Customer by DNV GL according to the Contract;

“DNV GL” – shall mean for the purposes of these General Terms and Conditions, the company with which the Customer has entered into the Contract being DNV GL AS or any of its branches and subsidiaries (as the case may be);

“DNV GL Group” – shall mean (i) DNV GL, all its direct and indirect owners and its Affiliates; (ii) DNV GL’s sub-contractors (of any tier) and their Affiliates; and (iii) the respective directors, officers, managers, agents, employees (including agency personnel) and representatives of the persons and entities mentioned under (i) and (ii) above as well as any other person or entity acting on its/their behalf;

“DNV GL Rules” – shall mean all provisions and/or requirements adopted by DNV GL as the basis for Classification at any point in time;

“Variation” – additional work to the Work originally agreed in the Contract;

“Work” – the services provided to Customer by DNV GL which are expressly set out in the Contract including any Variation and any Deliverable.

These General Terms and Conditions shall be incorporated in the Contract and shall override and exclude any terms and conditions sought to be imposed by the Customer. No amendment and/or variation to these General Terms and Conditions and no additional terms put forward by the Customer shall be considered binding or valid unless set out in writing and duly signed by the authorised representatives of both parties.

The respective latest version of the General Terms and Conditions as well as the applicable DNV GL Rules, as made available on www.dnvgl.com shall apply to all work rendered by DNV GL, including those rendered within the scope of DNV GL’s statutory functions as recognised organisation or similar, even if no written Contract was concluded.

2 The Work and execution of Work

2.1 The Work shall be carried out in accordance with the Contract, the provisions of these General Terms and Conditions, the DNV GL Rules, the international conventions and/or EU regulations applicable to the relevant Work and/or flag administration requirements. The same shall apply in the absence of a written agreement between the parties. The Work performed by DNV GL is performed under the basic assumption that other parties involved, including but not limited to the Customer’s other contractors and suppliers, fulfill their individual obligations and provide correct and complete information. DNV GL shall, upon completion of the relevant certification process and the Work, but subject to any relevant findings from its assessment or inspections, issue the Deliverable, provided always that DNV GL in its sole professional discretion finds that the applicable requirements are fulfilled.

2.2 When providing services DNV GL does not assess compliance with any standard other than the applicable DNV GL Rules, international conventions, EU Regulations and/or flag administration requirements and other standards, to the extent agreed in writing.

2.3 Any terms, conditions, duties or warranties otherwise incorporated or implied by law are hereby expressly excluded in full or to the fullest extent permitted by the applicable law. The remedies set forth in Clause 6 shall therefore be the sole remedies for any discrepancies, errors or omissions whatsoever regarding the Work.

2.4 DNV GL will provide suitably qualified personnel to carry out the Work. Unless otherwise agreed, DNV GL may at any time substitute personnel assigned to the Work, provided that any replacement personnel are suitably qualified.
2.5 A confirmation given or certificate issued by DNV GL shall not substitute the role of and/or release the Customer Group or any other parties involved from its contractual or legal obligations towards any third parties and/or the Customer (as the case may be). Maintenance of the validity of such confirmation or certificate, for example through the process of regular surveys in the case of ship classification, is the responsibility of the Customer.

2.6 DNV GL may, without prejudice to any other rights available to DNV GL, at any time recall, suspend, withhold, withdraw and/or reissue any Deliverable with immediate effect, suspend or withdraw any vessel from class and/or suspend further performance of any services if in DNV GL’s sole and unfettered opinion: (i) Customer fails to provide any necessary information or documentation for the purpose of maintaining the Deliverable and/or class; or (ii) Customer fails to comply in due time with conditions or instructions issued by DNV GL; or (iii) Customer fails to pay any fees or other sums due to DNV GL; or (iv) any relevant discrepancies, errors or omissions in the basis for the Deliverable is detected; or (v) Customer misrepresents DNV GL’s business name, trademark or Deliverable on which such name or trademark is used.

2.7 DNV GL may retain or withhold any service, certificate or other deliverable to the Customer in respect of all outstanding payments (whether related or not) arising out of the entire business relationship with the Customer, regardless of whether one or more vessels owned or managed by the Customer are affected.

3 General Obligations

3.1 Customer agrees that DNV GL’s performance of the Work requires DNV GL to be granted access to and the right to inspect all relevant sites, equipment, machinery and facilities and all relevant, correct and complete documents and information. For this purpose, Customer shall in a timely manner, without conditions, make all necessary arrangements and provide DNV GL with all reasonably necessary access to the above mentioned information and sites. Unless it is explicitly agreed as part of the Work to identify discrepancies, errors, inconsistencies or omissions in the information provided by the Customer Group, Customer shall be responsible for the correctness of the information it provides and DNV GL is entitled to rely on the accuracy and completeness of such information for the performance of the Work.

All Deliverables provided by DNV GL are based on the information, documentation and/or physical items made available by Customer to DNV GL up to the date of issuance of the Deliverable, and Customer acknowledges and agrees that any statement made by DNV GL in the Deliverable is a statement reflecting the situation at the time of issuance only.

3.2 Should the Customer fail to provide DNV GL with the required access or information at the agreed times, DNV GL may suspend the performance of the Work pending receipt of the Customer’s instructions for access and/or necessary information. DNV GL shall have no liability as a consequence of any such suspension and the Customer will be responsible for DNV GL’s fees and other wasted costs and expenses incurred by DNV GL.

3.3 Customer acknowledges and agrees that it has read and understood the requirements in the applicable DNV GL Rules, international conventions, EU Regulations and/or flag administration requirements and other standards applicable to the Contract and agrees to abide by them.

3.4 Any failure by Customer in fulfilling the obligations set out in this Section 3 is to be considered a material breach of this Contract.

4 Health, Safety and Environment (HSE)

4.1 Both DNV GL and the Customer shall employ reasonable standards for promoting safety, health and environmental protection and for ensuring safe working environments for their personnel.
4.2 Customer shall inform DNV GL without undue delay of: (i) any actual or potential HSE risk which Customer is aware of and which is reasonably relevant to the performance of the Work; and (ii) any of Customer’s implemented or planned measures against such risks that Customer requires DNV GL’s personnel to adhere to.

4.3 Whenever DNV GL’s performance of the Work involves visits to or work on Customer controlled facilities or sites, Customer is responsible for the adequacy, stability, safety and legal compliance of the working environment, including reasonable measures to mitigate or control relevant risks. DNV GL or its personnel is entitled to refuse to carry out any activity, or visit any area or site, if DNV GL or its personnel in their sole discretion consider that relevant risks are unacceptable or not adequately addressed, contained or otherwise mitigated. Any such decision shall suspend both parties’ obligations under the Contract without any liability or penalties until the parties have agreed on how to proceed.

5 Variations to the Work

Customer may in writing request DNV GL to perform a Variation. DNV GL shall not be obliged to execute any Variations until a written agreement with the Customer regarding the remuneration and the potential schedule impact of the Variation has been signed, which shall be an integral part of this Contract.

6 Re-performance

Any documented error or defect in the Work will be rectified by DNV GL within a reasonable period of time at DNV GL’s sole cost, provided said error or defect is not attributable to Customer or Customer Group and DNV GL is duly notified of said errors or defects within twelve (12) months after delivery or completion of the Work, whichever occurs first.

7 Taxes and Remuneration

7.1 Each party is solely responsible for paying any and all taxes, duties or similar government charges to the competent public authority wherever such charges are levied and/or imposed on the activities of the party.

Any and all prices, fees, rates or remuneration are agreed as stated exclusive of any form of sales taxes, value added tax, goods and services tax and/or any other similar taxes including any surcharges levied thereon which may be applicable.

7.2 Customer shall effect payment as agreed in the Contract to DNV GL for the Work, including any Variations, to DNV GL’s bank account stated on the invoice within thirty (30) days of the date of the invoice.

Work performed by DNV GL shall be invoiced in accordance with the tariffs of DNV GL or on the basis of the price quoted in the offer or in the Contract. In addition thereto, DNV GL will charge any extra expenses incurred in connection with the services rendered (e.g. travelling or other expenses and, where applicable, any value added/turnover tax).

Customer accepts invoices sent by electronic means.

Additional expenses which are incurred by DNV GL in connection with the performance of the Work, and for which DNV GL is not responsible, for instance, as a result of poor organisation on the part of the Customer or of repetition of tests and extra time spent, will be charged separately at the respective current cost rates.

7.3 In case of late payments, DNV GL is, in addition to the remedies set forth in Clause 2.6, entitled to charge a late payment interest according to the applicable law of this Contract, or 8% per annum pro rata, whichever is the higher.
7.4 All payments shall, subject to Clause 7.5, be made in cleared funds, without any deduction or set-off and free and clear of and without deduction for or on account of any taxes, levies, imports, duties, charges, fees and withholdings of any nature now or hereafter imposed by any governmental, fiscal or other authority save as required by law.

7.5 If and to the extent Customer has to withhold taxes or other government charges according to mandatory laws, Customer shall withhold and deduct such amounts from payments to DNV GL and pay the amount to the competent tax authority or any other relevant governmental body, as the case may be, within the time allowed and in the minimum amount required by law. Customer shall indemnify and hold DNV GL harmless from any and all financial responsibility or sums found to be due arising out of the non-payment, late-payment or payment to the non-competent tax authority or any relevant governmental body.

Customer shall inform DNV GL about such withholding, any change in the rate or the basis of the withholding and the availability of any formal procedure resulting in an authorisation to make a payment without a withholding prior to making the payment. Customer and DNV GL shall co-operate in completing any procedural formalities necessary for the Customer to obtain authorisation to make payment without a withholding.

Within ten days of making either the withholding or any payment required in connection with that withholding, the Customer shall deliver to DNV GL a withholding tax certificate, official receipt or evidence reasonably satisfactory to DNV GL that payment has been made to the competent tax authority or any other competent governmental body. Customer shall cooperate with DNV GL and shall use reasonable efforts, at no cost to DNV GL, in seeking any double tax treaty relief, other exemptions and refunds available following from such withholdings.

7.6 Section 7.1 to 7.5 shall apply accordingly in case an Affiliate provides the Work.

7.7 No disputes arising between DNV GL and the Customer shall interfere with prompt payment of invoices by the Customer. Any rights of lien or retention in favour of the Customer, statutory or otherwise, are hereby excluded. The Customer shall have no right to set-off any sums including sums in respect of counter-claims, unless such counter-claim is undisputed or has been finally adjudicated upon by the courts.

8 Confidentiality

8.1 Each party as recipient agrees to keep confidential any information it receives from the other party as disclosing party in the course of the Contract which, by denotation or reasonable circumstances, is considered confidential to the disclosing party. The recipient shall treat such received information with reasonable care and diligence, not disseminating or disclosing it to third parties without the disclosing party's prior written consent, provided however that each party may share such information with its officers, employees, affiliates, subsidiaries, subcontractors, suppliers or professional advisors who are subject to confidentiality obligations reflecting the principles herein.

8.2 The obligations set forth in Clause 8.1 shall not apply to any information which: (i) is or becomes known to the recipient from a third party without any confidentiality obligation to the disclosing party; (ii) is or becomes generally available in the public domain through no act or failure to act on the part of the recipient; (iii) has demonstrably been developed by the recipient independently from this Contract; (iv) is requested to be disclosed by any competent court, governmental agency, flag state administration, other relevant public authority in accordance with applicable law, court order or other public regulation; (v) is disclosed to the registered owner and/or ultimate owning company of a vessel without changing the general nature of confidentiality of such information if such information is vessel-related or (vi) is required to be disclosed by the applicable stipulations of the International Association of Classification Societies (IACS).
8.3 Customer acknowledges that DNV GL is bound by an obligation to give the EU Commission or anyone acting on its behalf, access to information in accordance with applicable EU requirements, and that Customer shall give the EU Commission unrestricted access to ships for the purpose of inspection.

8.4 DNV GL Group shall have the right to use for statistical, analytical and internal training purposes, any material, information or know-how generated in the course of the Work.

8.5 The obligations in this section shall survive the completion of the Work or termination of this Contract and shall continue for as long as the relevant information remains confidential.

9 Assignment and Subcontracting

9.1 This Contract, including any Deliverable issued as a result hereof, is specifically related to the Customer and no rights, obligations, interest, claim, benefit or Deliverable deriving here from shall extend to any other (third) party without the prior written consent of DNV GL. Customer is not entitled to grant to any third party any right of use in respect of any Deliverable without the prior written consent of DNV GL. The Contracts (Rights of Third Parties) Act 1999 shall not apply to this Contract.

9.2 DNV GL may at its discretion subcontract parts of or the whole of the Work to any other company within the DNV GL Group. The DNV GL Group shall have the benefit of, and shall be entitled to enforce against the Customer the rights, exclusions, limitations of liability and indemnities set out in the Contract.

9.3 DNV GL is only responsible for the Work it has performed directly or through its subcontractors.

10 Intellectual Property Rights

10.1 For the purpose of this Contract, each party shall remain the sole owner of any of its intellectual property and rights thereto existing prior to the date of this Contract and, except as explicitly set out in this Contract, nothing herein shall imply any transfer or grant of rights to any such intellectual property or rights thereto.

10.2 Customer shall hold a restricted, global and royalty free license to use the Deliverables or the results of the Work for their agreed or ordinary purpose, including the right to use any valid certificates or similar documents in accordance with the applicable requirements.

10.3 Subject to the confidentiality obligations set out in Clause 8 above, all intellectual property rights in the information and data created in connection with this Contract shall vest in DNV GL. In particular, DNV GL shall hold the copyright to all certificates and similar documents issued under this Contract. Nothing herein shall be deemed to limit DNV GL Group rights according to Clause 8.4.

10.4 The Customer warrants that it holds all necessary rights to material and information submitted for the purpose of the Work. The Customer shall indemnify and hold harmless DNV GL from any Claim DNV GL might suffer or receive as a consequence of any infringement of third party rights.

10.5 DNV GL is continuously improving its services to the industry to safeguard life, property and the environment. The customer acknowledges that DNV GL shall hold a right to use and process any information, data or databases generated or collected throughout the Work in an anonymized form, for its own competence building, research or business purposes.
11 Force Majeure

11.1 Neither party shall be in breach of this Contract, nor liable for any failure or delay in performance hereunder if the cause of such failure or delay is attributable to events beyond the reasonable control of the affected party, including but not limited to armed conflict, terrorist attack, civil war, riots, toxic hazards, epidemics, natural disasters, extreme weather, fire, explosion, failure of utility service, labour disputes, breakdown of infrastructure, transport delays, or any public restrictions following any of the incidents above, or any other force majeure occurrence.

11.2 In the event of a force majeure occurrence, the affected party shall notify the other party without undue delay of the particulars of the situation and the estimated duration. Either party shall be entitled to terminate the Contract with immediate effect should the force majeure occurrence endure for more than thirty (30) days.

12 Indemnifications

12.1 Each party shall indemnify and hold harmless the other party from and against all Claims arising while carrying out the Work in respect of: (i) bodily injury, sickness, disease, or death of any of its employees or other representatives; and (ii) loss of or damage to the party’s property. This provision shall apply whether or not the Claim is caused or contributed to by the negligence of the other party. Both parties shall maintain insurances for such liabilities, cf. Clause 14, to make this knock-for-knock provision effective.

12.2 The Work including any advice and information provided by DNV GL to the Customer as a part of the Work, shall be for the Customer only. The Customer shall ensure that any other member of the Customer Group and/or any third party is aware that the Work is intended for the Customer only and it is understood and agreed that nothing expressed herein is intended or shall be construed to give any person, firm or corporation, other than the signatories hereto any right, remedy or claim hereunder or under any provisions herein contained. The Customer shall indemnify and hold harmless the DNV GL Group from and against Claims brought by the Customer Group (other than the Customer) in connection with the Work or any advice and information, in whatever form it may be given, which has been provided by DNV GL to the Customer.

12.3 The Customer shall be responsible for and shall save, indemnify, defend and hold harmless the DNV GL Group from and against all Claims in respect of pollution or contamination emanating from the assets, equipment, facilities or property of Customer Group whether owned, hired, leased or otherwise provided by the Customer Group and arising from, relating to or in connection with the performance or non-performance of the Work, irrespective of cause and whether or not resulting from or contributed to by any negligence, breach of duty (statutory or otherwise), breach of contract, breach of warranty and/or strict liability of any member of the DNV GL Group.

12.4 Customer shall indemnify and hold harmless DNV GL from and against any Claims in respect of: (i) Customer's breach of Section 3 (General Obligations); (ii) any abuse of the Deliverable issued under this Contract.

12.5 The Customer’s obligations to indemnify DNV GL Group set out above in Clause 12.2, 12.3 and 12.4, shall apply in respect of any Claims regardless whether such Claims against DNV GL Group are based on breach of contract, direct action, breach of duty (statutory or otherwise), tort (including negligence), "information liability", strict liability or otherwise, except if and to the extent such Claims are caused by DNV GL’s (i) act or omission with the intent to cause damage or injury; (ii) act or omission in gross disregard of a known or obvious risk which made it highly probable that harm would follow.

12.6 Each party shall notify the other party without undue delay upon becoming aware of any incident likely to give rise to a Claim against the other party in relation to this Contract.
12.7 The Customer agrees that any Claim with respect to the Work shall be brought solely against DNV GL, and the Customer shall indemnify and hold harmless DNV GL Group from any Claim brought against DNV GL Group by any other party as a consequence of the Customer’s breach of this Clause 12.7.

13 Limitation of Liability

13.1 Except for the re-performance of the Work as provided in Clause 6 and DNV GL’s indemnification obligations set out in Clause 12.1 above, DNV GL shall not be liable for any Claim incurred by Customer and/or Customer Group arising from, relating to or in connection with the performance or non-performance of the Work by DNV GL, whether or not resulting from or contributed to by any negligence (in whatever form on whatever organisation level), breach of duty (statutory or otherwise), breach of contract, breach of warranty and/or strict liability of any member of the DNV GL Group, except to the extent set out below.

DNV GL’s liability for all Claims arising out of or in connection with this Contract shall be limited to an aggregate total of 10 (ten) times the net fees (excluding any expenses and disbursements) payable to DNV GL for the Work, never exceeding a maximum aggregate sum of USD 4 (four) million.

In case the Customer pays the fees periodically, e.g. under a Periodical Service Agreement or similar fee arrangement, DNV GL’s liability for all Claims arising out of or in connection with this Contract shall be limited to an aggregate total of 10 (ten) times the annual net fee (excluding any expenses or disbursements), never exceeding a maximum aggregate sum of USD 4 (four) million.

13.2 Any limitations and exclusions of DNV GL’s liability shall extend to:

(i) the other members of the DNV GL Group; and

(ii) the relevant maritime administration of a vessel’s country of registry (the “Flag Administration”) for any services provided hereunder on behalf of such Flag Administration, and the Customer accepts that the other members of the DNV GL Group and the Flag Administration shall be entitled to invoke such limitations and exclusions of liability directly towards any Claim from the Customer Group.

13.3 Notwithstanding any provision to the contrary elsewhere in these General Terms and Conditions and irrespective of cause and whether or not resulting from or contributed to by any negligence (whatsoever degree and whatsoever organisation level), breach of duty (statutory or otherwise), breach of contract, breach of warranty and/or strict liability, the Customer shall be responsible for and shall save, indemnify, defend and hold harmless the DNV GL Group from the Customer Group’s own Consequential Loss and DNV GL shall be responsible for and shall save, indemnify, defend and hold harmless the Customer Group from the DNV GL Group’s own Consequential Loss.

13.4 Neither party excludes or limits any liability which cannot be excluded or limited by the applicable mandatory law.

13.5 Any Claim against DNV GL Group by the Customer shall be deemed to be irrevocably waived and time barred upon the expiry of twelve (12) months from the date of completion of the relevant Work.

A later issuance of class certificate or confirmation of vessel being in class shall not result in the commencement of a new 12 (twelve) months’ time bar period, except for services provided in addition to the initial Work.

14 Insurance

14.1 Both parties shall maintain adequate insurance coverage for general and professional liabilities and their relevant personnel under the Contract, for such amounts and on such terms as are standard
in their respective industries and with underwriters who are in good standing. Such insurances shall contain a waiver of subrogation.

15  Fair Business Practice, Anti-bribery and Compliance

15.1 The parties shall conduct their respective business activities in a fair, ethical, and lawful manner in accordance with all applicable laws and generally accepted codes of conduct (including but not limited to the DNV GL code of conduct), avoiding any unacceptable activities, including but not limited to acceptance of or acquiescence in extortion, bribery, use of child labour, breach of human rights, or the imposition of unreasonable work conditions.

15.2 Customer shall indemnify and hold harmless DNV GL from any breach of Clause 15.1.

15.3 Both parties may terminate this Contract with immediate effect, without any liability or penalties, if a member of DNV GL Group or Customer Group are or become subject to sanctions or penalties imposed by a national government, the United Nations, the European Union or similar organisations related to the Work which is provided hereunder, or if the Work could be considered to be illegal or in conflict with applicable law for the respective party, its subcontractors and/or its subcontractor’s parent companies.

16  Term and Termination

16.1 This Contract shall remain in full force and effect until all Deliverables are delivered, or the Work is otherwise completed and paid for in full unless terminated earlier by mutual agreement or in accordance with Clause 15.3 or Clause 16.2 below.

16.2 Each party may terminate this Contract by written notice to the other party under the following circumstances:

(i) if the other party commits a material breach of this Contract and fails to rectify such breach within 10 (ten) working days after receipt of the other party’s written notice;

(ii) if the other party becomes insolvent, is unable to pay its debts as they fall due, or is subject to bankruptcy proceedings, administration, receivership, dissolution, liquidation, winding-up or otherwise discontinues its business; or

(iii) for convenience after serving the other party a written notice 30 (thirty) days prior to termination.

16.3 In the event the Contract is terminated by the Customer in accordance with 16.2 (iii) prior to completion of the Work, irrespective of cause, DNV GL shall be entitled to: (i) the agreed remuneration for the Work rendered up to the date of termination; (ii) all costs incurred by DNV GL up to and including the termination date; and (iii) 10% of the remuneration agreed in respect of Work which has not been provided. In the event of termination, DNV GL shall be entitled to retain any payment, deposit or advance of any fees made by the Customer prior to the date of termination up to the amount to which DNV GL is entitled.

16.4 In the event of termination of the Contract, the rights and obligations of DNV GL and the Customer included in Clauses 1, 3, 6, 7, 8, 10, 11, 12, 13, 17 and 18 shall remain in full force and effect.
17 Law and Jurisdiction

17.1 This Contract shall be governed by and construed exclusively in accordance with the laws of Norway, without regard to principles of conflicts of law.

17.2 The parties shall use their reasonable efforts to resolve any claim or dispute arising in relation to this Contract by negotiations within a reasonable time. Should the parties fail to resolve any claim or dispute by negotiations, the dispute shall be exclusively subject to the jurisdiction of the courts of Oslo, Norway.

18 Severability

Should any provision of these General Terms and Conditions be held to be invalid or unenforceable, such shall not affect the validity or enforceability of any other part or provision of these General Terms and Conditions. Such provision shall be amended to the extent necessary to make the provision valid and enforceable, while keeping as strictly and closely as possible to the original wording and purpose of the provision.
Section 2 Classification

A General

A.1 Rules and Guidelines

A.1.1 Underlying GL Rules and Guidelines

A.1.1.1 The Classification of ships, of other floating units and of any pertinent equipment is based on:

- the respective latest edition of the Rules for Classification and Surveys of Germanischer Lloyd (GL)
- the Construction Rules and Guidelines relating to the respective ship type or installation, as applicable on the date of conclusion of the contract between shipyard (builder) and prospective ship owner (buyer), see also D.1.

A.1.1.2 The Construction Rules cover Rules for materials and welding and any other special Rules published by GL that may be applicable from case to case.

A.1.1.3 In case of multi-lingual editions, the English text shall be authoritative in the event of doubts as to the interpretation of the GL Construction Rules and Guidelines.

A.1.2 The following shall apply unless otherwise specified:

A.1.2.1 The date of "contract for construction" of a vessel is the date on which the contract to build the vessel is signed between the prospective ship owner and the shipyard. This date is normally to be declared to GL by the ordering client (a client being the person/entity concluding the respective contract with GL) applying for the assignment of Class to a newbuilding, see also D.1.

A.1.2.2 The date of "contract for construction" of a series of sister vessels, including specified optional vessels for which the option is ultimately exercised, is the date on which the contract to build the series is signed between the prospective ship owner and the shipyard.

Sister vessels are vessels built to the same approved plans for Classification purposes. The optional vessels will be considered part of the same series of sister vessels if the option is exercised not later than one year after the contract to build the series was signed.

A.1.2.3 If a contract for construction is later amended to include additional vessels or additional options, the date of "contract for construction" for such vessels is the date on which the amendment to the contract is signed between the prospective ship owner and the shipyard. The amendment to the contract is to be considered as a "new contract" to which A.1.2.1 and A.1.2.2 apply.

A.1.2.4 In any case Section 1, C. is to be observed.

––––––––––––––
1 For Classification and Construction of mobile and fixed offshore installations the Rules for Offshore Technology (IV-6) are applicable. For diving systems, submersibles and underwater equipment the Rules for Underwater Technology (I-5) are applicable.
2 Sister vessels may have minor design alterations provided such alterations do not affect matters related to Classification (see also IACS Proc. Req. No. 29, Rev. 0 July 2009).
A.1.3 Statutory regulations

A.1.3.1 National regulations as, for instance, adopted by the respective flag state will as a matter of principle not be affected by the Rules for Classification and Construction. However, various requirements stipulated by international conventions are taken into account in the GL Rules, see also Section 3, A.4.

A.1.3.2 Disclaimer

Statutory requirements are continuously being processed and updated by the IMO and the entry into force date may not coincide with the annual release of GL Rules. GL makes an effort to keep GL Rules up to date with mandatory requirements; however, GL cannot accept any liability for damages incurred in this context.

A.1.4 Port state control

In case of a ship's detention by port state control the operators (being the ship owner, charterer, manager or other person responsible for the operation of the ship, as the case may be) are obliged to call in a GL surveyor without delay. This requirement has to be met in any case, where the deficiencies are related to statutory certificates issued by Germanischer Lloyd on behalf of a flag state. In case of deficiencies related to the Cargo Ship Safety Construction Certificate, however, it is also essential to call in the GL surveyor, regardless of the issuing flag state or organization.

A.2 Scope

A.2.1 Classification covers the ship's hull and machinery, including electrical installations. For sailing ships, the rigging is also included.

A.2.2 On request, certain installations - e.g. refrigerating installations - may be classed separately, see A.2.5.

A.2.3 GL reserves the right to extend the scope of Classification to all equipment and machinery used in the operation of the ship, which by their character and/or arrangement may impair the safety of human life, of the ship and her cargo or of the environment.

A.2.4 Structural systems and equipment determining the ship type are subject to examination within the scope of Classification, if the ship type is specified in the form of a Notation affixed to the Character of Classification (see C.3.3).

A.2.5 Refrigerating installations

A.2.5.1 For the purpose of the present rules the following are considered to be refrigerating installations:

- cargo refrigerating installations for the refrigeration of insulated cargo holds
- container refrigerating installations for the refrigeration of insulated containers,

provided that the refrigerating installations are permanently installed and form an integral part of the ship.

The refrigerating installation includes the technical installations required for power supply.

A.2.5.2 Reefer units which can be connected to a container and transported in combination therewith, and containers with or without a reefer unit, are subject to the GL Guidelines for the Construction, Repair and Testing of Freight Containers (VI-1-1).

A.3 Class Certificate, Characters of Classification

A.3.1 Assignment of Class, issuance of the Class Certificate, and assignment of the corresponding Character of Classification and Notations thereto are conditional upon proof being furnished of compliance with the GL Construction Rules in force on the date of conclusion of the contract for construction, see A.1.1.

A.3.2 GL reserves the right to add special remarks in the Class Certificates, as well as information regarding operation of the ship which is of relevance for the vessel's Class.
Section 2 Classification

A.4 Register

A.4.1 General

The Classification data of each ship classified will be included in the GL data file. An extract of these ship data will be entered in the Register published by GL. During the period of Class GL will update these details on the basis of relevant reports submitted by the Surveyors.

A.4.2 Refrigerating installations

The refrigerating installations classed by GL are recorded in the Register, with indication of the Character of Classification, and are entered in the list of ships holding refrigerating installation certificates.

A.5 Request to Head Office

In case a client does not agree on a technical decision made by or on behalf of GL, he may, as the case may be, send a written complaint either to the responsible Customer Service Team or to the Chief Surveyor.

B Validity of Class

B.1 Period of Class

The hull, the machinery and any special equipment classed have the same period of Class (duration of one Class period). The class continues to be valid, provided that the hull and the machinery are subjected to all surveys stipulated and that any repairs required are carried out to the satisfaction of GL, see Sections 3 and 4.

B.2 Prerequisites for validity of Class

B.2.1 The Class assigned by GL is valid only subject to the conditions stated in the Class Certificate (e.g. range of service, freeboard, main engine output). Class assignment is conditional upon the ship, including her machinery, being loaded and operated such as to comply with the design concept, and with the applicable rules. This also applies to the distribution of cargo and ballast, if necessary to the securing of cargo, as well as to the operation of the ship in heavy weather.

B.2.2 If the hull and/or machinery are not subjected to the prescribed surveys on their due dates, vessel's Class will be suspended for both hull and machinery.

If special shipboard equipment classed is not subjected to the prescribed surveys on their due dates, only the Class of the special equipment will be suspended.

A ship's class may also be suspended if a client fails to comply with any other class or safety relevant conditions or instructions. A ship's class is suspended with effect of the respective date mentioned by GL or otherwise at the moment the technical status leading to the suspension of class occurs.

B.2.3 GL Head Office or one of the Society’s representations are to be immediately informed about any average or deficiencies and damages to hull and machinery or other equipment classed, where these may be of relevance to the vessel's Class. A survey will have to be arranged for a date not later than that of vessel's arrival at the next port. If the survey reveals that vessel's Class has been affected, the vessel's Class will be maintained only on condition that the repairs or modifications demanded by GL will be carried out within the period specified by the Surveyor. Until full settlement of these conditions, Class will be restricted, see also B.4.1

B.2.4 Any damage or excessive wastage beyond allowable limits to side shell frames, their end attachments and/or adjacent shell plating, the deck structure and deck plating, the bottom structure and bottom plating, the watertight or oiltight bulkheads and the hatch covers or hatch coamings that affect a vessel's Class, is to be permanently repaired immediately after the survey.
Section 2  Classification

For locations where adequate repair facilities are not available, consideration may be given to allow a vessel to proceed directly to a repair yard. This may require discharging of the cargo and/or temporary repairs for the intended voyage.

Damages or excessive wastage at the areas noted above and not immediately affecting the vessel's structural or watertight/weathertight integrity may be temporarily repaired for a period to be defined.

B.2.5 In exceptional cases, following inspection of hull and machinery, performance of the repairs required for maintenance of the original Class may be dispensed with, if owners agree to the Class and/or the range of service being restricted, or possibly a higher freeboard being assigned.

B.2.6 Apart from the Class Certificates any other documentation of significance for Classification is to be kept on board and made available to the Surveyor on request, such as:

- reports on surveys previously performed
- approved drawings and other documentation handed out to owners together with the class certificates and containing particulars or instructions of significance in respect of the Classification requirements (e.g. use of higher strength hull structural steel)

B.3 Repairs, conversions

B.3.1 Where parts are damaged or worn to such an extent that they no longer comply with the requirements of GL, they are to be repaired or replaced.

B.3.2 Maintenance work, repairs and conversions of classed ships and special equipment have to be carried out under the supervision of GL to ensure maintenance or reassignment of Class.

B.3.3 The areas affected by the repair and conversion are to be treated in the same way as new-buildings, irrespective of whether the hull, the machinery including the electrical installation, the inert gas system, automated systems or other classed equipment are concerned, see also D.3.1.2.

B.3.4 If following major conversions a new Character of Classification and/or new Notations are assigned so that new Certificates have to be issued, commencement of a new period of Class may be agreed about.

B.3.5 Assistance for planning of conversion projects is given in GL’s Guidance for Conversion available via website.

B.4 Class expiry

B.4.1 Where hull and machinery are found to no longer comply with the requirements on which Class assignment had been based, or where owners refuse to have repairs or modifications required by GL carried out within a period to be determined from case to case, vessel's Class will cease to be valid. The same applies to the Class of special equipment.

B.4.2 If owners are not interested in maintenance of, or re-admission to Class of the vessel or any of its classed equipment, GL will have to be informed accordingly. The Class Certificates will have to be returned to GL.

B.4.3 If for some reason the Class has expired or has been withdrawn or suspended by GL, this will be indicated in the Register.

B.4.4 Where following withdrawal of vessel's Class the repairs required by GL have been carried out and the ship has been subjected to a survey for re-admission to Class, the original Class may be reassigned with a new period of Class. Such surveys are to be carried out in accordance with the requirements for a Class Renewal Survey.
B.5 Laid-up ships

B.5.1 The period of Class of hull and machinery will not be interrupted throughout the laying-up period. This means that periodical surveys will have to be carried out as before; surveys due, for which dry-docking is required, may be postponed until recommissioning. Apart from this, the requirements of the preceding paragraphs are to be applied.

B.5.2 Upon expiry of the Class, a survey substituting the Class Renewal Survey will have to be performed. An entry on the Class Renewal will be made in the Class Certificate, with the Notation **LAID-UP SHIP**, and indicated in the Register.

B.5.3 At the time of recommissioning a thorough survey of the entire machinery will have to be performed in addition to the outstanding periodical surveys. Depending on the duration of the laying-up period, a sea trial and/or recommissioning trials of specific installations and/or components will have to be carried out.

C Characters of Classification and Notations

C.1 General

C.1.1 Within the scope of Classification, the characteristic features of hull, machinery and equipment are reflected in the Character of Classification, see C.2 and Notations affixed to the Character of Classification, see C.3.

C.1.2 The following applies from the date of transfer of ships to the common DNV GL production system:

Class notations may be given one or more qualifiers which are supplementary symbols used to identify variants of the class notation or a design parameter. Qualifiers typically denote differences in levels of complexity and/or special requirements or limitations, and may be assigned additional requirements.

C.1.3 The presentation of class notations in certificates and documents issued by the Society, in the Register of Vessels and in electronic customer portals and user interfaces may differ from the presentation in the Rules. Reference is made to DNV GL rules for classification DNVGL-RU-0050 Sec 3[1.5].

C.1.4 Class designation

The following example shows a Class designation for hull and machinery:

<table>
<thead>
<tr>
<th>Characters of Classification</th>
<th>Notations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hull</td>
<td>MC</td>
</tr>
<tr>
<td>100A5</td>
<td>E1 CONTAINER SHIP</td>
</tr>
<tr>
<td>E1 AUT</td>
<td></td>
</tr>
</tbody>
</table>

C.2 Characters of Classification, definitions

The Characters of Classification have the following meaning:

<table>
<thead>
<tr>
<th>Application</th>
<th>Character of Classification</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hull</td>
<td>100A5</td>
<td>The ship's hull fully complies with the requirements of the Construction Rules of GL or other rules considered to be equivalent.</td>
</tr>
</tbody>
</table>
## Machinery

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>MC</strong></td>
<td>The machinery including electrical installations complies with the requirements of the Construction Rules of GL or other rules considered to be equivalent.</td>
</tr>
<tr>
<td><strong>A-MC</strong></td>
<td>The machinery including electrical installations of non-self-propelled vessels and floating units complies with the requirements of the Construction Rules of GL or other rules considered to be equivalent.</td>
</tr>
<tr>
<td><strong>MC, A-MC</strong></td>
<td>The machinery including electrical installations does not fully comply with the requirements of the Construction Rules of GL, but functional safety and general fitness for purpose are ensured for the envisaged service.</td>
</tr>
</tbody>
</table>

## Survey, Supervision of Construction

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
</table>
| □         | Hull, machinery and/or special equipment (e.g. refrigerating installation) have been constructed:  
- under the supervision and in accordance with the Rules of GL at the shipyard and/or at subcontractors supplying construction components / hull sections  
- with certification by GL of components and materials requiring inspection, subject to the GL Construction Rules |
| (□)       | Hull, machinery and/or special equipment (e.g. refrigerating installation) have been constructed:  
- under the supervision of GL at the shipyard and/or at subcontractors supplying construction components / hull sections  
- without certification by GL of components and materials requiring inspection, subject to the GL Construction Rules  

**Note**  
For hull, this Character of Classification can only be assigned, if proof of damage stability is not required and/or dispensed with. |
| ▪         | Hull, machinery installation or special equipment have been constructed under the supervision of and in accordance with the rules of another recognized Classification Society and have later on been classed with GL. Deviations from the GL Rules may be accepted. |

## Subdivision, Damage Stability

<table>
<thead>
<tr>
<th>Character</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>□</td>
<td>For the hull, proof of subdivision and damage stability has been furnished.</td>
</tr>
<tr>
<td>□, □</td>
<td>Hulls which have been constructed under supervision, and for which proof of subdivision and damage stability has been furnished.</td>
</tr>
</tbody>
</table>

## Diving Systems

<table>
<thead>
<tr>
<th>Classification</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>TAZ</strong></td>
<td>The diving system complies with the requirements of the GL Rules for Diving Systems and Diving Simulators (I-5-1).</td>
</tr>
</tbody>
</table>
Note
In the event of admission to Class (change of Class) from a Society which is not recognized, prior examination of drawings of the hull structure, the machinery and electrical installations is conditional.

Table 2.2 Notations for restricted service area

<table>
<thead>
<tr>
<th>Notation</th>
<th>Service area restriction</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSA (200)</td>
<td>This area of service is restricted, in general, to trade along the coast, provided that the distance to the nearest port of refuge as well as the offshore distance do not exceed 200 nautical miles. This applies also to trade in the North Sea and within enclosed seas, such as the Mediterranean, the Black Sea and waters with similar seaway conditions. Trade to Iceland, Spitsbergen and the Azores is exempted.</td>
</tr>
<tr>
<td>RSA (50)</td>
<td>This area of service is restricted, in general, to trade along the coast, provided that the distance to the nearest port of refuge as well as the offshore distance do not exceed 50 nautical miles. This applies also to trade within enclosed seas, such as the Baltic Sea and gulfs with similar seaway conditions. Where a permissible distance of less than 50 nautical miles has been fixed for a ship, the relevant distance will be indicated in the Class Certificate, e. g. RSA (20).</td>
</tr>
<tr>
<td>RSA (SW)</td>
<td>This area of service is restricted to trade in shoals, bays, haffs and firths or similar waters, where heavy seas do not occur. GL Rules for Hull Structures (I-1-1), Section 30</td>
</tr>
<tr>
<td></td>
<td>The Notations may possibly be assigned on the basis of the seaway conditions prevailing in the respective service area (e. g. official seaway statistics).</td>
</tr>
<tr>
<td></td>
<td>Obsurrence of the range of service boundaries is a prerequisite for validity of the Class.</td>
</tr>
<tr>
<td></td>
<td>GL may, on request, agree to the range of service being extended for a limited period and/or with certain reservations. This will have to be documented.</td>
</tr>
<tr>
<td></td>
<td>Ships, which due to their overall design are only suitable for trade in defined waterways (e.g. RSA (SW)) may in no case be assigned an extended navigation notation to the Character of Classification, even if the strength of the hull is sufficient for a wider range of service (e.g. RSA (50)). In that event, this may be expressed in the Certificate by adding the following note: &quot;The strength of the hull structural elements complies with the service range ...&quot;.</td>
</tr>
</tbody>
</table>

C.3 Notations affixed to the Character of Classification

C.3.1 Restricted service area for seagoing ships

Ships complying with the Construction Rule requirements for a restricted service area only will have the Notations specified in Table 2.2 affixed to their Character of Classification.

C.3.2 Ice strengthening

Ships, which comply with the requirements of the Construction Rules relating to strengthening for navigation in ice, will have one of the "Ice Class" Notations specified below affixed to the Character of Classification. Except for Class Notation E, which on request may be assigned to the hull or the machinery installation only, hull and machinery shall always be assigned the same ice class. If the hull is constructed such as to comply with a higher ice class, this will be indicated in the Technical File.

E, E1, E2, E3, E4

Hull and machinery have been designed such as to comply with the requirements for navigation in ice, with index 4 representing the highest notation. Notations E1 to E4 correspond to ice classes IC to IA Super of the Finnish-Swedish Ice Class Rules 2010 (23.11.2010 TRAFI / 31298 / 03.04.01.00 / 2010).

PC7, PC6, PC5, PC4, PC3, PC2, PC1
Section 2  Classification

Hull and machinery have been designed such as to comply with the requirements for navigation in ice, with index 1 representing the highest notation. Reference is made to the GL Guidelines for the Construction of Polar Class Ships (I-1-22).

Note

For navigation in the arctic waters of Canada reference is made to the requirements of the Canadian "Arctic Shipping Pollution Prevention Regulations". GL is authorised to issue the relevant "Arctic Pollution Prevention Certificate".

Note

For tankers and gas carriers reference is made to the OCIMF regulations for ship inspections (OCIMF SIRE 2011, Ch. 13)

C.3.3  Notations for hull and equipment

Ships of a special type, design or construction, or designed to carry defined cargoes, will have a relevant descriptive Notation affixed to their Characters of Classification, as given in the following Tables.

C.3.3.1  Dry cargo ships

Class Notations for dry cargo ships, see Table 2.3 and 2.4.

Table 2.3  Ship type Notations for dry cargo ships

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONTAINER SHIP ¹</td>
<td>A container ship is characterised by fixed stowage appliances in the form of cell guides at the bulkheads as well as fixed container foundations on the inner bottom. In addition fixed appliances for stowage and lashing are provided on the upper deck and/or hatch covers. The transport of break bulk on the inner bottom may be accepted in special cases; the transport of bulk cargo is excluded.</td>
<td>GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1) for ships with ( L &lt; 150 \text{ m} ) and for ships with ( L \geq 150 \text{ m} ) and restricted service area (see C.3.1) GL Structural Rules for Container Ships (I-1-5) for ships with ( L \geq 150 \text{ m} ) and unrestricted service area GL Rules for Stowage and Lashing of Containers (I-1-20) GL Guidelines for Global Strength Analysis of Container Ships (V-1-1) DNV CN 30.12, Fatigue and ultimate strength assessment of container ships including whipping and springing. GL Guidelines for the Carriage of Refrigerated Containers on Board Ships (I-1-19)</td>
</tr>
<tr>
<td>MULTI-PURPOSE DRY CARGO SHIP ²</td>
<td>Ships constructed for the carriage of general and bulk cargo</td>
<td>GL Rules for Seagoing Ships (I-1) GL Guidelines for Global Strength Analysis of Multipurpose Vessels (V-1-4)</td>
</tr>
<tr>
<td>GENERAL CARGO SHIP</td>
<td>Ships constructed for the carriage of general cargo</td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td>RO-RO SHIP</td>
<td>Ships for the carriage of vehicles, which are loaded via integral or external ramps and strengthened in accordance with the GL Rules</td>
<td></td>
</tr>
</tbody>
</table>
### Section 2 Classification

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAR CARRIER</td>
<td>Ships intended for the carriage of cars</td>
<td>GL Rules for Seagoing Ships (I-1) including all requirements related to the notation RO-RO SHIP</td>
</tr>
<tr>
<td>BULK CARRIER</td>
<td>Bulk carriers with $L &lt; 90 \text{ m}$ and bulk carriers not subject to the IACS Common Structural Rules for Bulk Carriers and Oil Tankers. Entries will be made into the Certificate as to whether specified cargo holds may be empty in case of alternating loading. Additional indications of the types of cargo for which the ship is strengthened may be entered into the Certificate. For bulk carriers with $L \geq 90 \text{ m}$ according to the Common Structural Rules for Bulk Carriers and Oil Tankers the further Notation CSR will be assigned (see Table 2.4).</td>
<td>GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1), Section 23</td>
</tr>
<tr>
<td>ORE CARRIER</td>
<td>Ships specially designed for the carriage of bulk cargo and ore respectively and strengthened in accordance with the GL Construction Rules. See also Table 2.10. Entries will be made into the Certificate as to whether specified cargo holds may be empty in case of alternating loading. Additional indications of the types of cargo for which the ship is strengthened may be entered into the Certificate.</td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td>CEMENT CARRIER</td>
<td>Ships exclusively designed for the carriage of cement and fitted with corresponding cargo loading/discharging equipment</td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
</tbody>
</table>

1. The validity of the Notation depends on the exclusive use of container stowage and lashing elements approved by GL and/or tested in accordance with GL's Rules, as well as on the approval of the container stowage and lashing plan with parts lists.

2. The provisions of IMO resolution MSC.277(85) apply to ships, which occasionally carry dry cargoes in bulk, the keels of which are laid or which are at similar stage of construction on or after 1st July 2010.

The resolution is non-mandatory in general. If a flag state considers the regulation as mandatory, all provisions are to be applied regardless of the length of the ship.

The following application has to be used if flag state considers the regulation as non-mandatory:

- **Multi Purpose Dry Cargo Ships with ship length less than 150 m**
  
  Generally, all provisions given for MPVs with $L < 150 \text{ m}$ shall be applied. A ship owner may refuse applying resolution MSC.277(85).

- **Multi Purpose Dry Cargo Ships with ship length of 150 m and upwards**
  
  It is recommended to apply all provisions given for MPVs with $L \geq 150 \text{ m}$.

Further guidance can be given on request.
Table 2.4 Type related Notations for dry cargo ships

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>LC</td>
<td>Mandatory for ships having Class Notations CONTAINER SHIP or EQUIPPED FOR CARRIAGE OF CONTAINERS. Use of a container lashing computer onboard approved by GL is required. Ships, the contract for which was made between the shipyard and the ordering party before entry into force of these Rules, will be assigned the Notation LC upon request. Consequently, the use of design accelerations according to current Rules for Stowage and Lashing of Containers (I-1-20) will be permitted for these ships.</td>
<td>GL Rules for Stowage and Lashing of Containers (I-1-20)</td>
</tr>
<tr>
<td>RSCS</td>
<td>Notation for Route Specific Container Stowage for ships intended to carry containers on a specified sea route. Assignment of Class Notation LC and GL approval for route specific container securing arrangement plan are required.</td>
<td></td>
</tr>
<tr>
<td>HATCHCOVERLESS</td>
<td>For Hatchcoverless Container Ships and Multi-purpose Vessels equipped with the appropriate facilities</td>
<td>See Table 2.3</td>
</tr>
<tr>
<td>EQUIPPED FOR CARRIAGE OF CONTAINERS</td>
<td>For ships carrying containers occasionally or as part cargo only, and equipped with the appropriate facilities</td>
<td></td>
</tr>
<tr>
<td>EQUIPPED FOR CARRIAGE OF RO-RO-CARGO</td>
<td>For ships which are also equipped for the transport of trailers and motor vehicles without fuel in the tanks and which are for this purpose fitted with ramps and if applicable shell doors and strengthened according to the Rules</td>
<td></td>
</tr>
<tr>
<td>BC</td>
<td>Notation for Multi Purpose Dry Cargo Ships which occasionally carry dry cargo in bulk. These ships have to fulfil the requirements of IMO Resolution MSC.277(85) if agreed between owner and GL.</td>
<td></td>
</tr>
<tr>
<td>BC-XII</td>
<td>Notation for Bulk Carriers in accordance with the definition in SOLAS, Ch. XII, but not in accordance with the definition in SOLAS, Ch. IX.</td>
<td></td>
</tr>
<tr>
<td>BC-C</td>
<td>For Bulk Carriers designed to carry dry bulk cargoes of cargo density less than 1.0 t/m³</td>
<td>For Ships without the notation CSR: GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1), Section 23</td>
</tr>
<tr>
<td>BC-B</td>
<td>For Bulk Carriers designed to carry dry bulk cargoes of cargo density of 1.0 t/m³ and above with all cargo holds loaded in addition to BC-C conditions.</td>
<td>For Ships with the notation CSR: GL Rules for Seagoing Ships (I-1) IACS Common Structural Rules for Bulk Carriers and Oil Tankers Relevant rules of GL Rules for Hull Struc-</td>
</tr>
<tr>
<td>BC-A</td>
<td>For Bulk Carriers designed to carry dry bulk cargoes of cargo density of 1.0 t/m³ and above with specified holds empty at maximum draught in addition to BC-B conditions.</td>
<td></td>
</tr>
<tr>
<td>{no MP}</td>
<td>For Bulk Carrier Notations BC-A, BC-B and BC-C, when the vessel has not been designed for loading and unloading in multiple ports in accordance with the conditions specified in the GL Rules for Hull Structures (I-1-1), Section 23.</td>
<td></td>
</tr>
</tbody>
</table>
### Section 2 Classification

| {maximum cargo density ... t/m³} | For Bulk Carrier Notations BC-A and BC-B if the maximum cargo density is less than 3.0 tonnes/m³. Features (I-1-1) which are not covered by the IACS Common Structural Rules for Bulk Carriers and Oil Tankers. |
| {holds a, b, ... may be empty} | For Bulk Carrier Notations BC-A |
| CSR | For Bulk Carriers contracted for new construction on or after 1 April 2006 having a length of 90 m or above and complying with IACS Common Structural Rules for Bulk Carriers and Oil Tankers. |
| GRAB [X] | For ships with the notation CSR and with holds designed for loading/discharging by grabs. In the notation X is replaced by the unladen grab weight. For ships with the notation CSR and the notations BC-A or BC-B the notation GRAB [X] with an unladen grab weight X equal to or greater than 20 tons is mandatory. For ships with the notation CSR and other related notations than BC-A or BC-B the Notation GRAB [X] is voluntary. For ships without the notation CSR and with holds designed for loading/discharging by grabs see Table 2.10. |

1. The validity of the Notation depends on the exclusive use of container stowage and lashing elements approved by GL and/or tested in accordance with GL's Rules, as well as on the approval of the container stowage and lashing plan with parts lists.
2. Notation for bulk carriers contracted for new construction on or after 1 July 2003, having a length of 150 m or above.

### C.3.3.2 Tankers for liquid cargo, special cargoes and for alternative carriage of oil and dry cargo

Ships constructed for the carriage of liquid cargo and complying with the respective GL Construction Rules may have Notations according to Table 2.5 and 2.6.

### Table 2.5 Type Notations for ships carrying liquid and special cargoes as well as combined carriage of liquid and dry cargo

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>OIL TANKER</td>
<td>Oil Tankers are ships engaged in the trade of carrying oil and Product Tankers are ships engaged in the trade of carrying oil other than crude oil.</td>
</tr>
<tr>
<td>PRODUCT TANKER</td>
<td>For the definition of oil and crude oil see GL Rules for Hull Structures (I-1-1), Section 24, A.3. For oil tanker with ( L \geq 150 \text{ m} ) according to the Common Structural Rules for Bulk Carriers and Oil Tankers the further Notation CSR will be assigned (see Table 2.6). GL Rules for Seagoing Ships (I-1) Rules for Hull Structures (I-1-1), Section 24</td>
</tr>
<tr>
<td>OIL / PRODUCT TANKER</td>
<td>For oil tanker with ( L \geq 150 \text{ m} ) according to the Common Structural Rules for Bulk Carriers and Oil Tankers the further Notation CSR will be assigned (see Table 2.6). GL Rules for Seagoing Ships (I-1) Rules for Hull Structures (I-1-1), Section 24</td>
</tr>
<tr>
<td>CHEMICAL TANKER TYPE 1, 2 or 3</td>
<td>GL Rules for Seagoing Ships (I-1) Rules for Chemical Tankers (I-1-7), see also Section 4, C.</td>
</tr>
</tbody>
</table>
### Section 2  Classification

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>LIQUEFIED GAS CARRIER</strong></td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td></td>
<td>DNV GL rules SHIP Pt.5 Ch.7</td>
</tr>
<tr>
<td><strong>ASPHALT TANKER</strong></td>
<td>Tankers intended to carry liquids other than oil tankers and product tankers.</td>
</tr>
<tr>
<td><strong>SPECIAL TANKER</strong></td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td><strong>EDIBLE OIL TANKER</strong></td>
<td>GL Rules for Hull Structures (I-1-1), Section 24</td>
</tr>
<tr>
<td><strong>WINE TANKER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>FRUIT JUICE CARRIER</strong></td>
<td></td>
</tr>
<tr>
<td><strong>BC / OIL TANKER</strong></td>
<td>Ships intended to alternatively carry dry cargo or liquids in bulk having a flashpoint (closed cup test) not exceeding 60 °C.</td>
</tr>
<tr>
<td><strong>ORE CARRIER / OIL TANKER</strong></td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td><strong>ORE CARRIER / PRODUCT TANKER</strong></td>
<td>GL Rules for Hull Structures (I-1-1), Section 24</td>
</tr>
<tr>
<td></td>
<td>IACS Common Structural Rules for Bulk Carriers and Oil Tankers</td>
</tr>
</tbody>
</table>

#### Table 2.6  Type related Notations for ships carrying liquid and special cargoes

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CTCOAT</strong></td>
<td>For Oil Tankers, the cargo tanks of which comply with the GL Rules for Corrosion Protection of Crude Oil Cargo Tanks (VI-10-3)</td>
</tr>
<tr>
<td><strong>CSR</strong></td>
<td>For Oil Tankers and Product Tankers having a length L of 150 m and above, contracted for construction on or after 1 April 2006 and being in compliance with the following Rules:</td>
</tr>
<tr>
<td></td>
<td>GL Rules for Seagoing Ships (I-1)</td>
</tr>
<tr>
<td></td>
<td>IACS Common Structural Rules for Bulk Carriers and Oil Tankers</td>
</tr>
<tr>
<td></td>
<td>Relevant rules of GL Rules for Hull Structures (I-1-1) which are not covered by the IACS Common Structural Rules for Bulk Carriers and Oil Tankers</td>
</tr>
<tr>
<td><strong>SPM, SPM 1, SPM 2, SPM 3</strong></td>
<td>For tankers in shuttle service and of one of 4 different single point mooring designs meeting the requirements of GL Rules for Hull Structures (I-1-1), Section 24.</td>
</tr>
<tr>
<td><strong>STL</strong></td>
<td>For tankers in shuttle service and designed with a submerged turret loading arrangement meeting the requirements of GL Rules for Hull Structures (I-1-1), Section 24.</td>
</tr>
<tr>
<td><strong>VEC</strong></td>
<td>This Notation may be assigned to tankers equipped with vapour return installations for the return of volatile organic compounds to shore during loading operations complying either with:</td>
</tr>
<tr>
<td></td>
<td>• USCG Regulations for foreign flag vessels Title 46 CFR, Part 39 Vapour Control Systems, or</td>
</tr>
<tr>
<td></td>
<td>• IMO MSC/ Circ. 585, Standards for vapour emission control systems.</td>
</tr>
<tr>
<td><strong>NLS</strong></td>
<td>Notation for Oil Tankers and Gas Carriers complying with MARPOL Annex II requirements for NLS Certificate (Noxious Liquid Substances)</td>
</tr>
<tr>
<td><strong>NOT SUITABLE FOR CARGO WITH FLASHPOINT ≤ 60 °C</strong></td>
<td>For tankers which are intended to carry liquids having a flashpoint (closed cup test) above 60 °C only.</td>
</tr>
<tr>
<td><strong>SUITABLE FOR CARRIAGE OF VARIOUS OIL PRODUCTS</strong></td>
<td>For tankers with special structural measures (separation of piping, tank coating etc.) permit simultaneous carriage of various oils and oil products.</td>
</tr>
</tbody>
</table>
C.3.3.3 Passenger ships

Class Notations for passenger ships, see Table 2.7.

Table 2.7 Notations assigned for passenger ships

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>PASSENGER SHIP</td>
<td>Ships which carry more than twelve passengers and engaged on international voyages. GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1), Section 26 Chapters II-1 and II-2 of the SOLAS Convention Exemptions from these requirements may be granted only within the framework of options given therein and are subject of approval by the competent Administration.</td>
</tr>
<tr>
<td>PASSENGER SHIP EU</td>
<td>Ships which carry more than twelve passengers and engaged on domestic voyages in member states of the EU. GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1), Section 26 EU Directive for passenger ships</td>
</tr>
<tr>
<td>PASSENGER SHIP N</td>
<td>Ships which carry more than twelve passengers and engaged on national trade. GL Rules for Seagoing Ships (I-1) GL Rules for Hull Structures (I-1-1), Section 26 National regulations</td>
</tr>
</tbody>
</table>

Passenger ships may be assigned the additional notations:
- OPEN RO-RO CARGO SPACE
- CLOSED RO-RO CARGO SPACE

C.3.3.4 Offshore Service Vessels

The Notation OFFSHORE SERVICE VESSEL is to be assigned to ships designed for support service to offshore installations and built to the requirements of the GL Rules for Hull Structures (I-6-1). At the request of the owner, ships having functional equipment as required below may be assigned an additional notation according to Table 2.8.

Table 2.8 Additional Notations for Offshore Service Vessels

<table>
<thead>
<tr>
<th>Additional Notation</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>HNLS</td>
<td>Carrying hazardous and noxious liquid substances</td>
</tr>
<tr>
<td>AH</td>
<td>Anchor handling</td>
</tr>
<tr>
<td>TOW</td>
<td>Towing</td>
</tr>
<tr>
<td>TVS-ST, TVS-U, TVS-C, TVS-R1</td>
<td>Towing vessel  approvability scheme †</td>
</tr>
<tr>
<td>WSV</td>
<td>Well stimulation</td>
</tr>
<tr>
<td>FF(x)</td>
<td>Fire fighting</td>
</tr>
<tr>
<td>STANDBY</td>
<td>Standby and rescue</td>
</tr>
<tr>
<td>OR</td>
<td>Oil recovery and transportation</td>
</tr>
</tbody>
</table>
Section 2  Classification

<table>
<thead>
<tr>
<th>Additional Notation</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR</td>
<td>Chemical recovery and transportation</td>
</tr>
<tr>
<td>SPS</td>
<td>Special purpose</td>
</tr>
<tr>
<td>WTIS</td>
<td>Wind turbine installation and maintenance support</td>
</tr>
</tbody>
</table>

1 Requirements for each of the categories according to the Guidelines for the Approval of Towing Vessels of GL Noble Denton

C.3.3.4.1 Crew Boats and Offshore Wind Farm Service Craft

The notation CREW BOAT 1 may be assigned to crew boats with offshore support personnel of up to 12 persons according to the GL Rules for Crew Boats and Offshore Wind Farm Service Craft (I-6-3).

The notation CREW BOAT 2 may be assigned to crew boats with offshore support personnel of more than 12 persons according to the GL Rules for Crew Boats and Offshore Wind Farm Service Craft (I-6-3).

The notation OWFSC may be assigned to cargo ships of not more than 500 GT regardless the length, with not more than 60 persons onboard including offshore support personnel and crew according to the GL Rules for Crew Boats and Offshore Wind Farm Service Craft (I-6-3).

C.3.3.5 High Speed Craft

The maximum permitted operating conditions expressed in terms of speed restriction curve from structural point of view and significant wave heights are specified in the Class Certificate.

HSC-PASSENGER A

Notation for craft (up to 450 passengers) meeting the requirements of category A in the GL Rules for High Speed Craft (I-3-1).

HSC-PASSENGER B

Notation for craft (over 450 passengers) meeting the requirements of category B in the GL Rules for High Speed Craft (I-3-1).

HSC-CARGO

Notation for cargo craft meeting the requirements of the cargo craft category in the GL Rules for High Speed Craft (I-3-1).

HSDE

Notation for craft which have been constructed by using elements of the GL Rules for High Speed Craft (I-3-1) and which are not subject to the IMO HSC Code. Details regarding rule application are specified in the Class Certificate.

C.3.3.6 Yachts ≥ 24 m

Notations for yachts complying with the GL Rules for Yachts ≥ 24 m (I-3-2):

SAILING YACHT

MOTOR YACHT

SPECIAL YACHT

MOTOR SAILING SHIP

Notation for sail-assisted ships with engine as main propulsion system.

C.3.3.6.1 Craft from 24 m up to 48 m in length used for commercial purposes or by authorities

LYDE

Notation for craft which have been constructed by using elements of the GL Rules for Yachts ≥ 24 m (I-3-2). Details regarding rule application are specified in the Class Certificate.
### C.3.3.6.2 Passenger yachts

The Notation **PASSENGER YACHT** may be assigned to ships complying with "The Red Ensign Group – A CODE OF PRACTICE FOR YACHTS CARRYING 13 TO 36 PASSENGERS (THE PASSENGER YACHT CODE)" as amended, which applies to pleasure yachts of any size, in private use or engaged in trade, which carry more than 12 but not more than 36 passengers and which do not carry cargo, the code later called PYC in this Rules. With regard to classification requirements the respective GL Rules for seagoing ships or yachts apply.

Following additional notations for passenger yachts may be assigned:

**PY0**
Notation for ships engaged in trade operating in an unlimited area not including the polar regions, fulfilling the respective requirements defined in the PYC.

**PY1**
Notation for ships operating in prescribed international voyage which is a voyage during which the yacht is not more than 200 nautical miles from a port or place in which the passengers and crew could be placed in safety and within a geographical area which limits the length of the voyage to a maximum of 1000 nautical miles from the initial point of departure, as specified in any Certificate issued in accordance with the PYC with respect to the ship, fulfilling the respective requirements defined in the PYC.

**PY2**
Notation for ships operating in area which is within 60 n.m. of a safe haven and not more than 20 n.m. from land in weather conditions not exceeding wind force 6 and sea state 5 on Beaufort scale, fulfilling the respective requirements defined in the PYC.

**PY3**
Notation for pleasure vessels not engaged in trade operating in an unlimited area not including the polar regions, fulfilling the respective requirements defined in the PYC. Pleasure vessel shall have the meaning assigned to the term as defined in the national legislation of the REG Member State implementing the provisions of the Code.

**BWM (D1) or BWM (D2)**
The requirements of one of these additional notations are to be fulfilled mandatorily. See definitions in Table 2.11.

Furthermore, a combination with one or more of the following class notations is possible. HC (hcpass / hc crew), RPxx%, DP 0 … DP 3, PC1 … PC7, E1 … E4, NAV, NAV-INS, FC, GF, EP-D, EP-O.

### C.3.3.7 Special vessels

Other types of ships and/or craft which have been specially designed dimensioned and/or equipped for their intended purpose will have a relevant descriptive Notation affixed to their Character of Classification, see Table 2.9. Combination with other purposes is possible and will be noted accordingly in the Class Certificate.

For ship types not listed in Table 2.9 which are covered by existing Class Notations and related approval criteria, but for which a special designation shall be stated in the Class Certificate due to client-specific reasons, the special designation may be added in quotation marks behind the Class Notations.

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAILING SHIP</td>
<td>For ships according to the GL Rules for Seagoing Ships (I-1) with sailing set as main propulsion system in accordance with the GL Rules for Rigging Technology (I-4)</td>
</tr>
<tr>
<td>SPECIAL PURPOSE SHIP</td>
<td>A special purpose ship is a ship as defined in the Code of Safety for Special Purpose Ships (2008 SPS Code), as amended. GL Rules for Hull Structures (I-1-1), Sections 1 – 21, 26 and 27 The Structural Fire Protection, Dangerous Goods and Stability are to be in accordance with 2008 SPS Code, as amended.</td>
</tr>
<tr>
<td>Class</td>
<td>Description</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td><strong>ICEBREAKER</strong></td>
<td>For ships having an operational profile that includes escort or ice management functions and having powering and dimensions that allow it to undertake aggressive operations in ice-covered waters.</td>
</tr>
<tr>
<td><strong>ACTIVE ESCORT TUG</strong></td>
<td>Vessel specially intended for active escort towing. This includes steering, braking and otherwise controlling a vessel in restricted waters during speeds of up to 10 knots by means of a permanent towline connection with the stern of the escorted vessel. GL Rules for Hull Structures (I-1-1), Section 25</td>
</tr>
<tr>
<td><strong>TUG</strong>¹</td>
<td>Ships primarily designed for towing and/or pushing operations or assisting other vessels or floating objects in manoeuvring. Where towing services are to be combined with other duties such as offshore supply or ice breaking, corresponding additional class notations may be assigned if the relevant requirements are met. GL Rules for Hull Structures (I-1-1), Section 25</td>
</tr>
<tr>
<td><strong>FISHING VESSEL</strong></td>
<td>For ships according to the GL Rules for Fishing Vessels (I-1-8), possibly with supplementary Notations for specification of type.</td>
</tr>
<tr>
<td><strong>SUPPLY VESSEL</strong></td>
<td>Supply vessels are ships intended for supply/replenishment of islands and ships of similar use and work ships are e.g. buoy tender, etc. GL Rules for Hull Structures (I-1-1), Section 29</td>
</tr>
<tr>
<td><strong>WORK SHIP</strong></td>
<td>GL Rules for Hull Structures (I-1-1), Section 29.</td>
</tr>
<tr>
<td><strong>CHEMICAL RECOVERY VESSEL</strong></td>
<td>For ships according to the GL Rules for Chemical Recovery Vessels (I-1-12).</td>
</tr>
<tr>
<td><strong>OIL RECOVERY VESSEL</strong></td>
<td>For ships according to the GL Rules for Oil Recovery Vessels (I-1-9).</td>
</tr>
<tr>
<td><strong>RESEARCH VESSEL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>RESCUE VESSEL</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PILOT BOAT</strong></td>
<td></td>
</tr>
<tr>
<td><strong>PATROL</strong></td>
<td>For patrol boats, patrol vessels or ships according to the Preliminary Rules for Patrol Boats (I-3-6).</td>
</tr>
<tr>
<td><strong>BARGE</strong></td>
<td>For ships according to the GL Rules for Hull Structures (I-1-1), Section 31. Barges built for the carriage of special cargo (e.g. liquid or ore cargo) will have the respective Notations affixed to the Characters of Classification.</td>
</tr>
<tr>
<td><strong>HOPPER BARGE</strong></td>
<td>For ships according to the GL Rules for Hull Structures (I-1-1), Section 32.</td>
</tr>
<tr>
<td><strong>PONTOON</strong></td>
<td>For ships according to the GL Rules for Hull Structures (I-1-1), Section 31.</td>
</tr>
<tr>
<td><strong>DREDGER</strong></td>
<td>For ships according to the GL Rules for Hull Structures (I-1-1), Section 32.</td>
</tr>
<tr>
<td><strong>SUCTION DREDGER</strong></td>
<td>For ships according to the GL Rules for Hull Structures (I-1-1), Section 32.</td>
</tr>
<tr>
<td><strong>FLOATING CRANE</strong></td>
<td></td>
</tr>
</tbody>
</table>
### C.3.3.8 Carriage of dangerous goods

**DG**

Notation for ships equipped for the carriage of dangerous goods in accordance with the GL Rules for Machinery Installations (I-1-2), Section 12, P./Q. and SOLAS II-2, Reg. 19 or in accordance with the GL Rules for High Speed Craft (I-3-1), Section 7, D. and the HSC Code 7.17.

**DBC**

Notation for ships equipped for the carriage of solid bulk cargoes in accordance with the GL Rules for Machinery Installations (I-1-2), Section 12, Q. and the IMSBC Code.

### C.3.3.9 Material

If ships are constructed of mild steel, this will not be specially indicated. If other materials are employed for the entire hull, this will be indicated in the Register and in the Class Certificate, e. g.:

**HIGHER STRENGTH HULL STRUCTURAL STEEL**

**ALUMINIUM**

**FRP** (Fibre Reinforced Plastics)

Other materials used for structure parts of the hull will be indicated into the Register.

### C.3.3.10 Novel designs

**EXP**

Ships, machinery installations or essential parts have been constructed in accordance with a design, for which sufficient experience is not available. GL will decide at what intervals the required periodical surveys will have to be carried out. Where experience over a prolonged period of time has proved the efficiency of the design, the Notation **EXP** may be cancelled.

### C.3.3.11 Special hull structural analysis and survey procedures

The notations in Table 2.10 may be assigned for special hull structural analysis or strengthenings. Notations assigned for special surveys or procedures are specified in Table 2.11.

---

**Table: Classification of special vessels**

<table>
<thead>
<tr>
<th><strong>SEMI-SUBMERSIBLE</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>SHIP LIFT</strong></td>
<td>With indication of the lifting capacity [t]</td>
</tr>
<tr>
<td><strong>SUBMERSIBLE</strong></td>
<td>For manned, non-military submersibles according to the GL Rules for Manned Submersibles (I-5-2)</td>
</tr>
<tr>
<td><strong>ROV</strong></td>
<td>For remotely operated, unmanned vehicles according to the GL Rules for Unmanned Submersibles (ROV, AUV) and Underwater Working Machines (I-5-3), Sections 1–3</td>
</tr>
<tr>
<td><strong>AUV</strong></td>
<td>For autonomous, unmanned vehicles according to the GL Rules for Unmanned Submersibles (ROV, AUV) and Underwater Working Machines (I-5-3), Section 1–4</td>
</tr>
</tbody>
</table>

---

1. Tugs may be assigned the additional notation: **EQUIPPED FOR SALVAGE SERVICES**
### Table 2.10  Notations assigned for special hull structural analysis or strengthenings

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>RSD</td>
<td>Cargo hold analysis carried out by the designer and examined by GL.</td>
</tr>
<tr>
<td>RSD (F25)</td>
<td>Fatigue assessment based on $6.25 \cdot 10^7$ load cycles of North Atlantic Spectrum carried out by GL. ¹</td>
</tr>
<tr>
<td>RSD (F30)</td>
<td>Fatigue assessment based on $7.5 \cdot 10^7$ load cycles of North Atlantic Spectrum carried out by GL. ¹</td>
</tr>
<tr>
<td>RSD (ACM)</td>
<td>Additional corrosion margin according to detailed listings in the technical file. Analysis carried out by GL.</td>
</tr>
<tr>
<td>RSD (gFE)</td>
<td>Global finite element analysis carried out in accordance with the GL Guidelines for Global Strength Analysis of Container Ships (V-1-1)</td>
</tr>
<tr>
<td>RSD (WIV)</td>
<td>Explicit consideration of Wave-induced Vibrations (Whipping and Springing) carried out in accordance with DNV CN 30.12, Fatigue and ultimate strength assessment of container ships including whipping and springing.</td>
</tr>
</tbody>
</table>

**STRENGTHENED FOR HEAVY CARGO**

For ships provided with strengthening recommended by GL in accordance with the GL Construction Rules and not complying with the requirements of the Notations **BULK CARRIER** or **ORE CARRIER**, see Table 2.3.

- **G** For ships with strengthening within the working range of grabs in accordance with the GL Rules for Hull Structures (I-1-1), Section 23, J.
- **COLL** The hull side structures are specially strengthened to resist collision impacts as stipulated in the GL Construction Rules. The index added to the Notation (e. g. COLL2) reflects the degree of strengthening provided.

¹ Fatigue assessment will be carried out for all hatch opening corners on all deck levels, longitudinal frames and butt welds of deck plating and side shell plating (where applicable).

### Table 2.11  Notations assigned for special surveys or procedures

<table>
<thead>
<tr>
<th>Notation</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>IW</td>
<td>The ship's hull is specially equipped for in-water surveys acc. to the GL Rules for Hull Structures (I-1-1), Section 34. See also Section 3, C.1.7.</td>
</tr>
<tr>
<td>ESP (Enhanced Survey Programme)</td>
<td>The ship's hull and piping in way of cargo area will be surveyed according to an enhanced survey programme. Notation for all Oil Tankers, Product Tankers and Chemical Tankers of 500 GRT/GT and above. Bulk carriers of 500 GRT/GT are affected therefrom only if these ships are constructed generally with single deck, double bottom, hopper side tanks, topside tanks and with single or double side skin construction in cargo length area and intended primarily to carry dry cargoes in bulk.</td>
</tr>
<tr>
<td>ERS (Emergency Response Service)</td>
<td>For ships, the geometry and structural data of which are made available in a database to provide the assistance necessary for limiting damages in case of average with the aid of special computer programs.</td>
</tr>
<tr>
<td>HLP (Hull Lifecycle Programme)</td>
<td>For ships, where the hull structural data necessary for the performance of thickness measurements with the GL Pegasus programme are available in a database in order to determine the allowable corrosion tolerances of all structural elements of the ship's hull. The results of the surveys will be entered into the database for further analysis and evaluation based on the results of the calculation.</td>
</tr>
</tbody>
</table>
### Section 2  Classification

#### BWM (D1)
Assigned for ships complying with the IMO D-1 exchange standard and with requirements in GL Guidelines on Ballast Water Management (VI-11-10), Section 3.

#### BWM (D2)
Assigned for ships complying with the IMO D-2 performance standard and with requirements in GL Guidelines on Ballast Water Management (VI-11-10), Section 4.

#### BWM (Tr)
Assigned for ships complying with the IMO D-2 performance standard and with requirements in GL Guidelines on Ballast Water Management (VI-11-10), Section 4 as well as having obtained a GL BWMS Approval.

### Table 2.12  Harmony Class Notations

<table>
<thead>
<tr>
<th>Notation</th>
<th>Harmony categories</th>
<th>Application / Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC (hc&lt;sub&gt;pass&lt;/sub&gt;/hc&lt;sub&gt;crew&lt;/sub&gt;)&lt;sup&gt;1&lt;/sup&gt;</td>
<td>( hc = E ) ***** excellent comfort</td>
<td>For cruise ships either with ( v \leq 25 \text{ kn} ) or ( v &gt; 25 \text{ kn} ) complying with the respective GL Rules on Rating Noise and Vibration for Comfort</td>
</tr>
<tr>
<td></td>
<td>( hc = 1 ) **** very high comfort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( hc = 2 ) *** high comfort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( hc = 3 ) ** moderate comfort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( hc = 4 ) * acceptable comfort</td>
<td></td>
</tr>
<tr>
<td>HC (hc)</td>
<td>( hc = 1 ) *** high comfort</td>
<td>For cargo ships complying with the respective GL Rules on Rating Noise and Vibration for Comfort</td>
</tr>
<tr>
<td></td>
<td>( hc = 2 ) ** moderate comfort</td>
<td></td>
</tr>
<tr>
<td></td>
<td>( hc = 3 ) * acceptable comfort</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Two separate categories, \( hc<sub>pass</sub> \) and \( hc<sub>crew</sub> \), reflect the level attained for passenger and crew spaces, respectively. For instance, HC (2/3) corresponds to a high comfort for passengers and a moderate comfort for crew.

### Table 2.13  Notations for hull response monitoring systems

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>HRM</td>
<td>Assigned to ships provided with a hull response monitoring system that can display, in real time, and record the motion information from one or more accelerometer or pressure transducer</td>
<td>GL Structural Rules for Container Ships (I-1-5), Annex C</td>
</tr>
<tr>
<td>HRS</td>
<td>Assigned to ships provided with a hull response monitoring system that can display, in real time, and record the hull stress information from at least two strain gauges</td>
<td></td>
</tr>
<tr>
<td>HRSRA</td>
<td>Assigned to ships provided with a shipboard routing assistance (SRA) system for the continuous monitoring of the ship with the aim to recognize situations potentially dangerous to the ship and its cargo</td>
<td></td>
</tr>
<tr>
<td>HRW</td>
<td>Assigned to ships provided with a shipboard wave sensor for the continuous shipboard measurement of the seaway surrounding the ship</td>
<td></td>
</tr>
<tr>
<td>+D</td>
<td>At the request of the owners or shipyard, a hull response monitoring system receiving any of the above notations and has the provisions for recording data for later analysis and evaluation will be distinguished in the record by the additional symbol +D, e.g. HRS+D</td>
<td></td>
</tr>
</tbody>
</table>
Section 2  Classification

C.3.3.12  Bridge arrangement and equipment on seagoing ships
The bridge is designed in compliance with the GL Rules for Bridge Arrangement and Equipment on Sea-going Ships (I-1-11).

NAV
Technical requirements for an ergonomic bridge design which fulfils the principles and aims of SOLAS V/15, MSC/Circ. 982 and IACS REC. 95.

NAV-INS
In addition to NAV, special focus is laid on increased availability and consistency of the bridge equipment.

C.3.3.13  Special equipment and systems
Special systems (e.g. propulsion systems) or equipment covered by Classification may be referred to by a Notation affixed to the Character of Classification, such as:

EQUIPPED WITH BOW RUDDER

C.3.4  Notations for machinery and systems
C.3.4.1  Ice strengthening
E, E1, E2, E3, E4
as Notation affixed to the Character of Classification for the machinery installation see C.3.2.

C.3.4.2  Condition monitoring of propeller shaft at stern tube
CM-PS
Where the propeller shaft runs within the stern tube in oil, the possibility exists, to prolong the intervals between shaft withdrawals, if the requirement according to the GL Rules for Machinery Installations (I-1-2), Section 4, D.5.6 are fulfilled.

C.3.4.3  Automation
Machinery installations which comply with the Rules of GL for automated and/or remote-controlled systems, will have the Notations specified in Table 2.14 affixed to the Character of Classification (not applicable if Class Notations for high-speed craft have been assigned). Other Notations for a detailed description are possible.

C.3.4.4  Redundant Propulsion and Steering Systems
Ships with propulsion and steering systems which meet the redundancy requirements of GL for these systems obtain one of the Notations specified in Table 2.15 affixed to the Character of Classification.

Table 2.14  Notations for machinery with automated and/or remote-controlled systems

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>AUT</td>
<td>The machinery installation is fitted with equipment for unattended machinery spaces, so that it does not require to be operated and/or maintained for periods of at least 24 hours.</td>
<td>GL Rules for Automation (I-1-4)</td>
</tr>
<tr>
<td>AUT-nh</td>
<td>The period during which attendance to and maintenance of equipment is not required, is less than 24 hours, with nh indicating that the machinery space may remain unattended for n hours.</td>
<td></td>
</tr>
<tr>
<td>AUT-Z</td>
<td>The machinery installation is operated with the engine control room permanently attended (centralized control) and is equipped with a system for remote control of the main propulsion plant from the bridge or arrangements for manoeuvring from the engine control room.</td>
<td></td>
</tr>
<tr>
<td>RC</td>
<td>Fishing vessels: The installation is provided with a system for remote control of the main propulsion plant from the bridge.</td>
<td>GL Rules for Fishing Vessels (I-1-8)</td>
</tr>
</tbody>
</table>
### Table 2.15 Notations for redundant propulsion and steering systems

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>RP1x%</td>
<td>The ship has at least two propulsion machines, which are independent or can be disconnected from each other. This also applies to the auxiliary systems which are needed to operate the propulsion machines. No redundancy of propeller, shaft line, gearbox and steering system is required.</td>
<td>GL Rules for Redundant Propulsion and Steering Systems (I-1-14)</td>
</tr>
<tr>
<td>RP2x%</td>
<td>The ship has at least two propulsion systems and two steering systems, each of which is independent or can be disconnected from each other. This also applies to each of the auxiliary systems which is needed to operate the propulsion and/or steering systems.</td>
<td>GL Rules for Redundant Propulsion and Steering Systems (I-1-14)</td>
</tr>
<tr>
<td>RP3x%</td>
<td>The ship has at least two propulsion systems and two steering systems, each of which is independent or can be disconnected from each other and is installed in separate compartments. This also applies to each of the auxiliary systems which is needed to operate the propulsion and/or steering systems.</td>
<td></td>
</tr>
</tbody>
</table>

The additional index x% denotes what percentage of the main propulsion power of the ship is provided by the redundant ship's propulsion system.

### C.3.4.5 Dynamic Positioning Systems

Notation for ships complying with the GL Rules for Dynamic Positioning Systems (I-1-15). The Class Notation required for a particular operation should be agreed between the owner of the ship and the client/charterer based on the intended operating conditions and an analysis of the consequence of a loss of position, see Table 2.16.

### C.3.4.6 Reliquefaction plants (liquefied gas carriers)

RI

Class Notation for the machinery installation of ships carrying liquefied gases and equipped with systems for cooling (reliquefaction) of their cargo in accordance with the GL Construction Rules.

### C.3.4.7 Refrigerated cargoes

Notations for ships equipped with systems and installations for the carriage of refrigerated cargoes are specified in Table 2.17.

### C.3.4.8 Inert gas systems

INERT

The ship is equipped with an inert gas system in accordance with the GL Construction Rules, or with a system recognized as being equivalent in design.

### Table 2.16 Notations for dynamic positioning systems

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>DP 0</td>
<td>Loss of position may occur (only functionality)</td>
<td>GL Rules for Dynamic Positioning Systems (I-1-15)</td>
</tr>
<tr>
<td>DP 1</td>
<td>Loss of position may occur, meets IMO Equipment Class 1 (non-redundant)</td>
<td>GL Rules for Dynamic Positioning Systems (I-1-15)</td>
</tr>
<tr>
<td>DP 2</td>
<td>No loss of position in the event of a single fault in an active component, meets IMO Equipment Class 2 (redundant)</td>
<td>GL Rules for Dynamic Positioning Systems (I-1-15), Section 4</td>
</tr>
<tr>
<td>DP 2 (ICE)</td>
<td>No loss of position in the event of a single fault in an active or stat-</td>
<td></td>
</tr>
<tr>
<td>DP 3</td>
<td>No loss of position in the event of a single fault in an active or stat-</td>
<td></td>
</tr>
</tbody>
</table>
DP 3 (ICE)
ic component, meets IMO Equipment Class 3 (redundant installation in separate compartments)
Additional requirements for dynamic positioning systems in managed ice conditions are complied with, see GL Rules for Dynamic Positioning Systems (I-1-15), Section 4

Note For DP 2 and DP 3 a redundancy concept document (FMEA of basic design) with worst case failure design intent is to be submitted in due time.

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRS 1</td>
<td>Both in respect of hull and machinery, the cargo refrigerating system fully complies with the requirements of the Construction Rules of GL or other rules considered to be equivalent.</td>
<td>GL Rules for Refrigerating Installations (I-1-10)</td>
</tr>
<tr>
<td>RIC 1</td>
<td>Both in respect of hull and machinery, the cargo refrigerating installation fully complies with the requirements of the GL Construction Rules for Fishing Vessels or other rules considered to be equivalent.</td>
<td>GL Rules for Fishing Vessels (I-1-8)</td>
</tr>
<tr>
<td>CA</td>
<td>Refrigerated cargo installations with cargo areas intended for the carriage of refrigerated cargo in controlled atmosphere. It is taken for granted that the gas generating systems are permanently installed.</td>
<td>GL Rules for Refrigerating Installations (I-1-10)</td>
</tr>
<tr>
<td>CA mob</td>
<td>Refrigerated cargo installations with cargo areas intended for the carriage of refrigerated cargo in controlled atmosphere, using mobile gas generating systems, which are taken on board, when required.</td>
<td></td>
</tr>
<tr>
<td>RCP x/y</td>
<td>(Refrigerated Container Stowage Positions) Class Notation for ships for which the suitability of the carriage of refrigerated containers is proved. The Class Notation RCP is supplemented by two figures. The first figure x stands for the total number of certified refrigerated container stowage positions on deck and in container holds and is related to FEU (forty foot equivalent units). The second figure y indicates the percentage of containers carrying fruit/chilled cargoes for which the ship is certified. Details concerning container size, stowage positions and special conditions will be indicated in the Register, if required.</td>
<td>GL Guidelines for the Carriage of Refrigerated Containers on Board Ships (I-1-19)</td>
</tr>
</tbody>
</table>

1 The Notations CRS or RIC may be assigned if the cargo refrigerating system or installation does not in all respects comply with the requirements of the GL Rules, but functional safety and general fitness for purpose are ensured for the envisaged service.

C.3.4.9 Fire fighting
Ships fitted with equipment complying with the GL Guidelines for Equipment on Fire Fighting Ships (VI-3-4) will, depending on the size and purpose of the equipment provided, have one of the Notations specified in Table 2.18 affixed to the Character of Classification for the machinery installation.

<table>
<thead>
<tr>
<th>Notation</th>
<th>Characterization</th>
<th>Underlying Rules</th>
</tr>
</thead>
<tbody>
<tr>
<td>FF1</td>
<td>Equipment for fighting fires in the initial stage and performing rescue operations in the immediate vicinity of the installation on fire.</td>
<td>GL Guidelines for Equipment on Fire Fighting Ships (VI-3-4)</td>
</tr>
</tbody>
</table>
FF2  Equipment for sustained fighting of large fires and for cooling parts of the installation on fire.

FF3  Corresponding to FF2, but with greater fire-extinguishing capacity and more comprehensive fire-extinguishing equipment.

FF1/2 or FF1/3  Equipment corresponding to FF2 or FF3 and additionally suited for rescue operations as per FF1.

C.3.4.10 Fuel cell systems

FC-xxx  Notation for watercraft with fuel cell systems the nominal power of which is equal or exceeds 10% of the total nominal power of the machinery installation (excluding the emergency supply power) complying with the GL Guidelines for the Use of Fuel Cell Systems on Board of Ships and Boats (VI-3-11). "xxx" means the percentage of the fuel cell system related to the nominal power of the machinery installation.

with FC  Notation for fuel cell systems the nominal power of which is below 10% of the nominal power of the machinery installation.

C.3.4.11 Gas as fuel for ships

GF  Notation for ships fitted with engine installations suitable for operation with natural gas as fuel and complying with the GL Guidelines for the Use of Gas as Fuel for Ships (VI-3-1).

C.3.4.12 Environmental standards

EP-D  Notation for ships environmental design properties, particularly regarding emissions into the sea and the air and fulfilling the requirements of the GL Guidelines for the Environmental Service System (VI-12-1), Section 2. These requirements go beyond relevant mandatory regulations and take into account expected future regulatory requirements.

EP-O  Notation for ships environmental operational performance, particularly regarding emissions into the sea and the air and fulfilling the requirements of the GL Guidelines for the Environmental Service System (VI-12-1), Section 3. These requirements go beyond relevant mandatory regulations and take into account expected future regulatory requirements.

C.3.4.13 Offshore Service Vessels

For ships with the ship type notation OFFSHORE SERVICE VESSEL (see C.3.3.4), the requirements of the GL Rules for Machinery and Systems (I-6-2), Sections 1 to 4, apply. Where hull notations for additional services of Offshore Service Vessels are assigned (see Table 2.8), the corresponding requirements for these additional notations laid down in the GL Rules for Machinery and Systems (I-6-2), Sections 5 to 21, apply, as far as they are assigned.

For Offshore Service Vessels with additional functional capabilities further notations according to Table 2.19 may be assigned:

Table 2.19 Additional Notations for machinery and systems of Offshore Service Vessels

<table>
<thead>
<tr>
<th>Additional Notation</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRANE</td>
<td>Equipped with classified lifting appliances</td>
</tr>
<tr>
<td>POSMOOR</td>
<td>Positional mooring</td>
</tr>
<tr>
<td>DSV 1</td>
<td>Diving support with a fixed installed diver pressure chamber</td>
</tr>
<tr>
<td>DSV 2</td>
<td>Diving support with diving bell</td>
</tr>
<tr>
<td>UES 1</td>
<td>Support for underwater equipment with a weight of up to 5 to</td>
</tr>
</tbody>
</table>
Section 2  Classification

### Additional Notation Service

<table>
<thead>
<tr>
<th>Notation</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>UES 2</td>
<td>Support for underwater equipment with a weight of up to 20 to</td>
</tr>
<tr>
<td>UES 3</td>
<td>Support for underwater equipment with a weight of up to 80 to</td>
</tr>
<tr>
<td>UES 4</td>
<td>Support for underwater equipment with a weight of more than 80 to</td>
</tr>
<tr>
<td>HELIW</td>
<td>Equipped for helicopter winching operations</td>
</tr>
<tr>
<td>HELIL</td>
<td>Equipped with helicopter landing deck</td>
</tr>
<tr>
<td>HELILF</td>
<td>Equipped with helicopter landing deck and refuelling capabilities</td>
</tr>
<tr>
<td>ICEOPS</td>
<td>Equipped with machinery and systems suitable for operations at very low temperatures</td>
</tr>
</tbody>
</table>

C.3.4.14 Submersibles

The machinery, including all electrical installations, corresponds to the GL Rules for Manned Submersibles (I-5-2).

C.3.4.15 Novel designs

EXP see C.3.3.10

### D Classification of Newbuildings

**D.1 Order for Classification**

**D.1.1** The written order for Classification is to be submitted to GL by the shipyard. The order has to be given by the client, who on the basis of the building contract has the duty to observe the Rules of GL.

**D.1.2** Where orders for the production of components are placed with subcontractors, GL should be advised about it, also indicating the scope of production. The client will be responsible for observance of the GL Rules by the subcontractors.

**D.1.3** Where the order considers particulars already having been approved by GL (for previous new buildings) to be used for the Classification, this will have to be specifically stated in the order. Amendments to the Construction Rules having been introduced meanwhile shall be taken into account, see A.1.1.

**D.2 Examination of construction particulars**

**D.2.1** A list of particulars for examination - such as construction plans, proofs by computation, details on materials, etc. - is generated by GL. The particulars to be submitted in English or German language have to contain all details required for examination and are to be submitted in due time prior to commencement of construction. GL reserves the right to request additional information and particulars to be submitted.

To facilitate a smooth and efficient approval process they shall be submitted electronically via GLOBE 3. In specific cases and following prior agreement with GL they can also be submitted in paper form in triplicate.

**D.2.2** The particulars and drawings to be submitted, of components subject to approval, will be examined by GL. Where applicable, they will be provided with a mark of approval and returned in one copy. If not otherwise agreed, a drawing approval comprises of the approval of submitted drawings and/or documents plus one review in which alterations or comments will be incorporated.

---

3  Detailed information about the secured GL system GLOBE can be found on GL’s website www.gl-group.com/globe.
D.2.3 Any deviations from approved drawings require to be approved by GL prior to being realized.

D.3 Supervision of construction and trials

D.3.1 General

D.3.1.1 GL will assess the production facilities and procedures of the shipyard and other manufacturers as to whether they meet the requirements of the Construction Rules. In general, approvals based on such assessments are conditional for acceptance of products subject to testing.

D.3.1.2 Materials, components, appliances and installations subject to inspection are to comply with the relevant rule requirements and be presented for inspection and/or construction supervision by GL Surveyors, unless otherwise provided as a result of special approvals granted by GL.

New installation of materials which contain asbestos, e.g. materials used for hull structure, machinery, electrical installations and equipment, is not permitted for all new and existing ships.

D.3.1.3 For each inspection, an appointment is to be arranged in time with the local GL representation.

D.3.1.4 In order to enable the Surveyor to fulfill his duties, he is to be given free access to the ship and the workshop, where parts requiring approval are manufactured, assembled or tested. For performance of the tests required, the shipyard or manufacturers are to give the Surveyor assistance by providing the staff and equipment necessary for such tests.

D.3.2 Supervision of construction

During the phase of construction of a vessel or installation, GL will satisfy themselves by surveys and inspections that:

- parts for hull and machinery and/or special equipment requiring approval have been constructed in compliance with the approved drawings and particulars
- all tests and trials stipulated by the Construction Rules are performed satisfactorily
- workmanship is in compliance with current engineering standards and/or GL rule requirements
- welded parts are produced by qualified welders having undergone tests
- test certificates have been presented for components requiring approval (the shipyard will have to ensure that any parts and materials requiring approval will only be delivered and installed, if the appropriate test certificates have been issued, see D.4.1.
- where no individual certificates are required, type-tested appliances and equipment are employed in accordance with rule requirements

D.3.3 Tests at the manufacturers’

As far as practicable, machinery and equipment will be subjected to operational trials on the manufacturers’ test bed to the scope specified in the Construction Rules. This applies also to engines produced in large series. Where the machinery, equipment or electrical installations are novel in design or have not yet sufficiently proved their efficiency under actual service conditions on board ship, GL may require performance of a trial under particularly severe conditions.

For refrigerating installations, see D.3.5.

D.3.4 Shipboard trials

Upon completion of the ship and/or the system/equipment to be classed, all hull, machinery and electrical installations will be subjected to operational trials in the presence of the GL Surveyor, prior to and during the sea trial. This will comprise e.g.:

- tightness, operational and load tests of tanks, hatch covers, shell ports, ramps, etc.
- operational and/or load tests of the machinery and installations (propulsion plant, electrical installations, steering gear, anchor equipment, etc.) of importance for safe operation

During a final survey, checks will be made to ensure that any deficiencies found, for instance during the sea trial, have been eliminated.

For yachts/small watercraft, see F.
Section 2    Classification

D.3.5    Refrigerating installations

D.3.5.1    Refrigerating machines are to be subjected to operational tests at the manufacturers'.

D.3.5.2    Fitting of the refrigerating installation will be supervised by the Surveyor, who will examine the
workmanship and perform the prescribed tightness and operational tests.

D.3.5.3    Upon completion the entire installation will be subjected to operational trials in accordance
with the requirements of the Construction Rules.

D.3.5.4    For refrigerating installations deviating in design from installations in common use, GL re-
serves the right to require additional tests to be performed, schedule special survey dates and make spe-
cial entries in the refrigerating installation certificate and in the Register.

D.3.6    Gas trials on liquefied gas carriers

D.3.6.1    Before delivery of a liquefied gas carrier and in addition to the initial surveys and sea trials, a
gas trial has to be carried out.

D.3.6.2    The purpose of the gas trial is, to demonstrate the compliance of the overall performance of
the cargo containment system with the design parameters during initial cool-down, loading and discharg-
ing of the cargo. All components of the gas plant shall be function tested under the lowest or close to the
lowest design temperature conditions. 4

D.4    Reports, certificates

D.4.1    Testing of materials, components, machinery, etc. at subcontractor's works will be certified by
the Surveyor and/or the local GL representation.

D.4.2    Upon completion of the ship or installation the Surveyors will prepare construction reports, on
the basis of which GL will issue the Class Certificate, see A.3.

D.5    Workmanship

D.5.1    General

D.5.1.1    Requirements to be complied with by the manufacturer

D.5.1.1.1    The manufacturing plant shall be provided with suitable equipment and facilities to enable
proper handling of the materials, manufacturing processes, structural components, etc. GL reserve the
right to inspect the plant accordingly or to restrict the scope of manufacture to the potential available at
the plant.

D.5.1.2    The manufacturing plant shall have at its disposal sufficiently qualified personnel. GL is to be
advised of the names and areas of responsibility of all supervisory and control personnel. GL reserve the
right to require proof of qualification.

D.5.1.2.1    Quality control

D.5.1.2.1.1    As far as required and expedient, the manufacturer's personnel has to examine all structural
components both during manufacture and on completion, to ensure that they are complete, that the di-
mensions are correct and that workmanship is satisfactory and meets the standard of good shipbuilding
practice.

D.5.1.2.2    Upon inspection and corrections by the manufacturing plant, the structural components are to
be shown to the GL Surveyor for inspection, in suitable sections, normally in unpainted condition and en-
abling proper access for inspection.

4 The International Code for the Construction and Equipment of Ships Carrying Liquid Gases in Bulk (IGC Code), 4.10.14 and
4.10.16. IACS UI GC 13 (Jan 2008)
D.5.1.2.3 The Surveyor may reject components that have not been adequately checked by the plant and may demand their re-submission upon successful completion of such checks and corrections by the plant.

D.5.2 Structural details

D.5.2.1 Details in manufacturing documents

D.5.2.1.1 All significant details concerning quality and functional ability of the component concerned shall be entered in the manufacturing documents (workshop drawings, etc.). This includes not only scantlings but - where relevant - such items as surface conditions (e.g. finishing of flame cut edges and weld seams), and special methods of manufacture involved as well as inspection and acceptance requirements and where relevant permissible tolerances. So far as for this aim a standard shall be used (works or national standard etc.) it shall be harmonized with GL. This standard shall be based on the IACS Recommendation 47 Shipbuilding and Repair Quality Standard for New Construction. For weld joints details, see GL Rules for Design, Fabrication and Inspection of Welded Joints (II-3-2).

D.5.2.1.2 If, due to missing or insufficient details in the manufacturing documents, the quality or functional ability of the component cannot be guaranteed or is doubtful, GL may require appropriate improvements. This includes the provision of supplementary or additional parts (for example reinforcements) even if these were not required at the time of plan approval or if - as a result of insufficient detailing - such requirement was not obvious.

D.5.2.2 Cut-outs, plate edges

D.5.2.2.1 The free edges (cut surfaces) of cut-outs, hatch corners, etc. are to be properly prepared and are to be free from notches. As a general rule, cutting drag lines, etc. shall not be welded out, but are to be smoothly ground. All edges should be broken or in cases of highly stressed parts, should be rounded off.

D.5.2.2.2 Free edges on flame or machine cut plates or flanges are not to be sharp cornered and are to be finished off as laid down in D.5.2.2.1. This also applies to cutting drag lines, etc., in particular to the upper edge of sheer strake and analogously to weld joints, changes in sectional areas or similar discontinuities.

D.5.2.3 Cold forming

D.5.2.3.1 For cold forming (bending, flanging, beading) of plates the minimum average bending radius should not fall short of $3 \times t \ (t = \text{plate thickness})$ and shall be at least $2 \times t$. Regarding the welding of cold formed areas, see GL Rules for Welding in the Various Fields of Application (II-3-3).

D.5.2.3.2 In order to prevent cracking, flame cutting flash or sheering burrs shall be removed before cold forming. After cold forming all structural components and, in particular, the ends of bends (plate edges) are to be examined for cracks. Except in cases where edge cracks are negligible, all cracked components are to be rejected. Repair welding is not permissible.

D.5.2.4 Assembly, alignment

D.5.2.4.1 The use of excessive force is to be avoided during the assembly of individual structural components or during the erection of sections. As far as possible major distortions of individual structural components should be corrected before further assembly.

D.5.2.4.2 Girders, beams, stiffeners, frames, etc. that are interrupted by bulkheads, decks, etc. shall be accurately aligned. In the case of critical components, control drillings are to be made where necessary, which are then to be welded up again on completion.

D.5.2.4.3 After completion of welding, straightening and aligning shall be carried out in such a manner that the material properties will not be influenced significantly. In case of doubt, GL may require a procedure test or a working test to be carried out.
Section 2 Classification

E Admission to Class

E.1 Order, particulars

E.1.1 Order

E.1.1.1 Orders for the Classification of ships or special equipment not constructed under the supervision of GL are to be addressed to GL in writing, in triplicate. The order for Classification is to be accompanied at least by the particulars specified in E.1.2 and E.1.3, respectively.

For yachts/small watercraft, see F.

E.1.1.2 GL is to be informed about the previous Class status and period, as well as about any Conditions of Class (recommendations) imposed by the previous Classification Society.

E.1.2 Particulars for hull and machinery

The following particulars and/or drawings are to be submitted:

- particulars of the type and main dimensions of the ship, building year, building yard, freeboard, stability documentation and details of the anchor equipment
- particulars of the type, output and main data, building year and manufacturer of the main engine(s) and of the auxiliary machinery essential for operational safety, the electrical installations, the inert gas system, the automatic/remote-control system, the safety arrangements, the steering gear and the windlasses
- general arrangement, capacity plan, hydrostatic and cross curves, loading manual, where required, midship section, longitudinal and transverse sections, transverse bulkheads, decks, shell expansion, engine and boiler foundations, stem and stern frame, rudder and rudder stock, hatch covers
- machinery arrangement, intermediate, thrust- and screw shafts, propeller, main engines, propulsion gears and clutch systems, starting-air receivers, main and/or auxiliary boilers and oil fuel burning systems, turbines, superheaters and economisers (or manufacturer make, model and rating information)
- steam and feed-water systems, cooling water and lubricating oil systems, bilge and ballast systems, fuel oil and starting-air systems, air and sounding pipes systems, electrical arrangements and wiring diagram
- steering gear arrangements and piping system and steering gear manufacturer, make and model information
- torsional vibration calculations of the main shafting system including its branches for vessels less than two years old
- for vessels with ice class notation: drawings for flexible couplings and/or torque limiting shafting devices in the propulsion line shafting (or manufacturer make, model and rating information)
- for tankers: tank bulkheads, loading and unloading facilities, cargo tank venting system and safety devices, pumping arrangements at the forward and after ends of the vessel, drainage of cofferdams and pump rooms
- for unattended machinery spaces, Notation AUT: instrument and alarm list, fire alarm system, list of automatic safety functions (e.g. slowdowns, shutdowns, etc.), function testing plan
- for ships with built-in tanks, the walls of which do not form part of the shell plating: drawings of these tanks, their safety arrangement, as well as their loading and unloading systems
- for ship type related equipment and installations the documentation is to be determined from case to case

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GL reserves the right to request additional information depending of ship's type and/or according to Flag State requirements.
E.1.3 **Particulars for special equipment (refrigeration installations, diving systems)**

The application for Classification for special equipment (refrigeration installations, diving systems) is to be accompanied by particulars in the extent as indicated in the Construction Rules. Results of the trials under working conditions are to be submitted; if an operational trial has not as yet been performed, it will have to be carried out.

E.2 **Performance of Admission to Class**

E.2.1 The drawings and other particulars of relevance to Classification are checked for compliance with the applicable GL Construction Rules and/or equivalent other rules.

E.2.2 For Admission to Class the extent of the Classification survey for the hull and machinery installation respectively the special equipment will be especially determined by GL depending on the vessel's age and type. If the result of the survey is satisfactory, the class of GL will be effective as of the date of conclusion of the admission to class survey.

E.2.3 If the ship and/or her special equipment hold the valid Class of another recognized Classification Society (i.e. an IACS member) and if sufficient proof has been furnished regarding the Class status, GL may dispense with the examination of drawings and computations. In such cases, the period of Class will remain as assigned by the previous Classification Society.

E.2.4 A ship will not be admitted to Class if the relevant drawings and computations are not submitted.

E.2.5 If the ship complies with the requirements of GL, a Class Certificate will be issued in accordance with the Surveyor's report on the condition of the ship. Once a ship and/or her equipment have been classed with GL, the Rules in force as well as procedures applicable to ships and/or special equipment constructed under supervision by GL will apply.

E.2.6 If a sufficient proof of the loosing Classification Society regarding the ship's previous Class status is not as yet available the survey status information provided by the Owner may be used. An "Interim Class Certificate" may be issued after completion of the surveys requested for Admission to Class with a statement that Conditions of Class (recommendations) which are overdue, if received after issuance of the Interim Class Certificate are to be dealt with at the next port of call.

F **Classification of Yachts and Small Watercraft from 6 to 24 m in Length**

F.1 **General requirements**

F.1.1 Watercraft built and equipped in accordance with the GL Rules for *Yachts and Boats up to 24 m (I-3-3)* will be assigned GL Class upon request.

F.1.2 The general requirements as per A. to E are to be applied, as far as applicable to this type of craft, and unless stated otherwise in the following.

F.1.3 Classification covers the hull, the machinery, including the electrical installation, the hull equipment, the closures, and if needed the rigging, as defined in the Rules. Components and equipment not dealt with in the Rules are not subject to examination within the scope of Classification. Responsibility for compliance with any existing flag state regulations rests with the owner.

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6 See IACS PR 1 A on Transfer of Class for further details.
Section 2 Classification

F.1.4 GL reserves the right to also classify craft made of materials, for which no special GL Rules exist, provided that proof of suitability of these materials has been furnished.

F.1.5 Sporting craft and comparable craft, partly or predominantly serving commercial purposes, may additionally be subject to rules having to be observed beyond the GL Construction Rules.

F.1.6 Watercraft built under GL construction supervision of a current series may be classed, if the application for Classification is made prior to commencement of construction, provided the relevant surveys and trials do not give cause for objections, see the GL Rules for Yachts and Boats up to 24 m (I-3-3), Annex A.

F.2 Characters of Classification and Notations

F.2.1 Characters of Classification

F.2.1.1 Hull
The Character of Classification for the hull is

**100A5**
if the hull was constructed under supervision by GL, with additional Notations as per F.2.2.
Apart from this, C.2. is to be applied.

F.2.1.2 Machinery
For water craft with a total propulsion machinery output of more than 300 kW the Character of Classification for the machinery is

**MC Y**
if the machinery was manufactured under supervision by GL.
For water craft with a propulsion machinery output of up to 300 kW, any comments on surveys of the machinery installation will be entered into the hull Certificate.

F.2.2 Notations affixed to the Character of Classification

F.2.2.1 Ranges of service
The scantlings of the hull structural elements conform to the unrestricted range of service I.
Water craft meeting the requirements of the Construction Rules for a restricted range of service only will be assigned the following Notations affixed to the Character of Classification characterizing the range of service (II, III, IV, V).
The Notations may possibly be assigned on the basis of the seaway conditions prevailing in the respective service area (e. g. official seaway statistics).

I
Unrestricted voyages far away from coastlines, during which a vessel entirely left to its own devices has to be in a position to cope with emergency situations for prolonged periods, without relying on outside assistance.

II
Voyages along the coastline, but restricted to a sea area located at a distance not exceeding 200 nautical miles, measured from the main land and/or from off-shore islands situated at a distance not exceeding 400 nautical miles from the main land ⁷ and/or from another island.

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⁷ Coastline measured at mean high water
III
Voyages along the coastline confined to a sea area located at a distance of 20 nautical miles, measured from the main land and/or from offshore islands situated at a distance not exceeding 40 nautical miles from the main land and/or from another island.

IV
Day trips between close ports along the coastline within a relatively protected area. However, voyages are restricted to a sea area located at a distance not exceeding 3 nautical miles, measuring from the main land and/or from offshore islands situated at a distance not exceeding 6 nautical miles from the main land and/or from another island.

V
Trips on inland waterways and lakes. Also included are day trips off the coastline, confined to shallows and/or sea areas located at a distance not exceeding 0.75 nautical miles, measured from the shore and/or the main land.

F.2.2.2 Designation of types and use

F.2.2.2.1 In addition to the Character of Classification, water craft will be characterized by Notations affixed, describing their type and envisaged use, as shown in the following.

F.2.2.2.2 Sporting craft
SAILING YACHT
MOTOR SAILER
MOTOR YACHT
SPECIAL SAILING YACHT
SPECIAL MOTOR YACHT
RACING YACHT

Note
The term "special" applies to yachts of unusual shape/dimensions and with special technical equipment, if any. GL reserves the right of determining whether the Society's Rules are applicable and how they are to be interpreted.

F.2.2.2.3 Yachts for commercial purposes
TRAINING SAILING / MOTOR YACHT
CHARTER SAILING / MOTOR YACHT

These Notations are applicable, where the main structural elements comply with the Construction Rules for the type of craft listed under F.2.2.2.4.

F.2.2.2.4 Craft used for commercial purposes or by authorities
Craft complying with the GL Rules for Yachts and Boats up to 24 m (I-3-3) may be assigned the following Notations affixed to the Character of Classification:

FISHING VESSEL
see also Table 2.9
PATROL BOAT
WORK BOAT
YDE

Notation for craft which have been constructed by using elements of the GL Rules for Yachts and Boats up to 24 m (I-3-3). Details regarding rule application are specified in the Class Certificate.
Section 2 Classification

F.3 Approval and survey of new buildings

F.3.1 Regarding the order for Classification and the particulars to be submitted, the provisions in D. apply analogously. The documents to be submitted for approval shall include drawings and calculations of the rigging.

F.3.2 Qualification of the workshop

F.3.2.1 Regarding the processing of metallic materials and the manufacture of machinery installations and components, the GL Rules for Materials and Welding apply, see also D.3.1.1.

F.3.2.2 Regarding facilities, quality control, production procedures and skills of the personnel, workshops producing sporting craft of fibre-reinforced reaction resins and other non-metallic special materials have to be suited for the work carried out by them. This suitability will be certified by a relevant workshop approval. In general the GL Rules for Non-Metallic Materials apply.

F.3.3 Construction supervision, see D.3.2.

F.3.4 Trials

The craft having been completed, all equipment of the hull, the machinery and electrical installation and the sailing equipment will be tested in operation during a sea trial, in the GL Surveyor's presence.

F.3.5 Marking

Water craft constructed in accordance with the GL Construction Rules will be marked with a label which will continue to be valid as long as the structural conditions remain unchanged. The label is valid only in connection with the pertinent Class Certificate.

Validity of Class see B.

F.4 Admission to Class

F.4.1 The general provisions in E. are, as far as applicable, to be applied analogously, with the following additions to be observed.

F.4.2 Vessels constructed under supervision by a recognized Classification Society are to be presented for survey in dry-dock. The machinery and electrical installations are to be subjected to an operational trial. GL will fix the scope of surveys, depending on the vessel's age, maintenance condition, intended use and on the informative value of the documents received.

F.4.3 Vessels not constructed under the supervision of a recognized Classification Society are excluded from Classification, if their hulls consist of fibre-reinforced plastic materials or ferro-cement.

For other vessels previously not classified, within the scope of Classification a complete examination of drawings is required to the extent stipulated for new buildings. Beyond this, surveys are to be conducted onshore for assessment of compliance with the drawings and documentation, as well as trials/function tests to be determined from case to case.
This Section is not applicable for ships transferred to the common DNV GL production system from the date of transfer. For such ships, see DNV GL rules for Classification of Ships, Pt.7.

A General Information

A.1 Surveys for maintenance of class

A.1.1 For maintenance of the class, the regular periodical and non-periodical surveys of hull, machinery, including electrical installation, and any special equipment classed as defined below have to be performed, see also Section 2, B.2. and Section 4.

Other surveys performed by GL are listed in A.4.

A survey comprises of one survey. Re-surveys, if necessary, will be regarded as separate surveys with individually agreed scope.

A.1.2 Surveys required for maintenance of the class, e.g. in the case of repairs of, or modifications to any parts subject to Classification, are to be agreed with the local GL representation in due time, so that the measures envisaged may be assessed and supervised, as required.

A.1.3 The Surveyors are to be given access at any time to the ship and/or to the workshops, so that they may perform their duties, see also Section 2, D.3.1.4.

In this connection all areas to be surveyed have to be cleared, cleaned and to be made free from gas, as deemed necessary by the Surveyor.

The Class Certificates and other particulars relating to classification are to be made available to the Surveyor on request.

A.1.4 Surveys conducted during a voyage may be agreed and credited to periodical surveys due (e.g. inspection of large holds by boat). The prerequisites, procedures and specific (e.g. weather) conditions to be met will be fixed from case to case. The decision as to feasibility of the survey may only be taken in agreement with the Surveyor.

A.1.5 GL will inform the owner or operator about the status of class, indicating the last recognized surveys and the next due dates. However, even if not provided with such information, the operator is obliged to have the surveys stipulated by the present Rules performed.

A.1.6 GL may agree to test and analysis procedures as a supplement to or equivalent substitute for conventional survey and inspection such as by uncovering/opening up of components, see also B.1.3.7.

A.1.7 GL reserves the right for given reasons, e.g. in the light of special experience gained during operation, to extend the scope of survey and/or inspection or to carry that out with two Surveyors, if needed. Furthermore if deemed necessary, a Surveyor may at his own discretion inspect parts of the ship which do not fall within the scope of the respective survey.
A.1.8 GL reserves the right to demand surveys to be held between the due dates of regular surveys, if this is necessary, see B.2.

A.1.9 If a ship has to be surveyed in a port beyond the reach of a GL Surveyor (also in the events of force majeure or of armed conflicts); GL Head Office will have to be notified. Upon checking of the facts, the further procedure will then be decided on.

In extraordinary cases and with GL Head Office agreement, it is possible to call for an external expert, whose report is, however, subject to examination by GL, who will decide on whether or not the ship will have to be re-surveyed.

A.2 Selection of Surveyors

On principle, the acting Surveyors will be chosen by GL. However, the operator of a ship and/or an installation classed is free to have any findings of surveys or decisions which he deems to be doubtful checked by other GL Surveyors upon his request, see also Section 2, A.5.

A.3 Documentation, confirmation of class

A.3.1 The records of each survey, as well as any requirements upon which maintenance of the class has been made conditional, will be entered into the respective Survey Statement. By his signature in the Certificate and other documents the Surveyor only certifies what he himself has seen and checked during the particular survey. The technical status of a ship and its installations as reflected in the Survey Statement refers only to the actual state at the time of the respective survey.

A.3.2 The reports prepared by the Surveyor will be send to GL Head Office. If there are no objections, the results will be documented in the GL Register and the confirmation of Class effected by the Surveyor in the Certificate will acquire final validity.

A.3.3 In the Register the dates of the surveys will be indicated, such as Class renewals, annual survey, intermediate class renewal, bottom and propeller shaft survey. Records on periodical repeat tests on steam boilers and thermal oil heaters will in the case of seagoing ships be also entered in special Test Certificates, which are to be kept on board.

A.3.4 A confirmation of class effected by the Surveyor relates to the kind of survey referred to in the report and is valid under the reservation that examination will not give cause for any objections, see A.3.2.

A.3.5 On request, the class may be confirmed in writing by a separate Certificate (Class Maintenance Certificate). However, such Certificates are valid only if issued by GL Head Office or if, in exceptional cases, Head Office has expressly authorized the field service representatives to do so and they are only based on the records available in Head Office.

A.3.6 Where defects are repaired provisionally only, or where the Surveyor does not consider immediate repairs or replacements necessary, the vessel's class may be confirmed for a limited period by making an entry in the Survey Statement to the Certificate of Classification. Cancellation of such limitations will also have to be indicated in the Survey Statement, see also Section 2, B.2.4.

A.4 Surveys in accordance with flag state regulations

A.4.1 Where surveys are required on account of international conventions and of corresponding laws/official ordinances of a flag state, GL will undertake them on request, or by official order, acting on behalf of the authorities concerned, based on the respective provisions; this includes surveys according to:

- the International Convention on Load Lines (ILC 66)
- the International Convention for the Safety of Life at Sea (SOLAS 74)
- the International Convention for the Prevention of Pollution from Ships (MARPOL 73/78)
- the IMO Codes, e.g. on Chemical and Gas Tankers
- the related Conventions of the International Labour Organization (ILO)
Where possible, such surveys will be carried out simultaneously with the class surveys.

**A.4.2** GL will also undertake on request other surveys and checks stipulated by additional regulations and requirements of the flag state. Such surveys are subject to agreements made in each individual case and/or to the regulations of the country concerned.

**A.4.3** All activities as outlined in A.4.1 and A.4.2 and, where applicable, issuance of relevant Certificates are likewise subject to the general conditions of Section 1.

**A.4.4** If for some reason a vessel's class has expired or has been withdrawn by GL, all statutory Certificates issued by GL will automatically become void. If subsequently the class is renewed or reassigned, validity of these certificates will be revived within the scope of its original period of validity, provided that all surveys meanwhile having fallen due have been carried out.

**A.5** **External service suppliers**

The personnel or firms engaged in services affecting classification and statutory work are subject to approval by GL.

**A.6** **Calibration of measuring equipment**

The inspection, measuring and test equipment used in workshops, shipyards and on board ships, which may form the basis for Surveyor's decisions affecting Classification or statutory work, shall be appropriate for the services to be performed. The firms shall individually identify and calibrate each unit of such equipment to a recognized national or international standard.  

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**B** **Surveys for Maintenance of Class - Definitions, Due Dates**

**B.1** **Periodical surveys**

**B.1.1** **Annual surveys (seagoing ships)**

**B.1.1.1** For seagoing ships, annual surveys are to be conducted for the hull and the machinery, including the electrical plant, and, where applicable, for special equipment classed, at intervals of 12 months, as from the date of commencement of the class period indicated in the certificate, see C.1.1.

**B.1.1.2** **Survey period (time window)**

The survey has to be carried out within a time interval of 3 months before to 3 months after the day at which the current class period will complete one year of validity. This time window also applies to the periodical annual Class Surveys for ships with the Notation HSC–Passenger A or B as defined in Section 2, C.3.1.3.10.

For ships with accommodations for more than 12 passengers, the annual survey has to be carried out not later than the due date entered.

**B.1.2** **Intermediate surveys**

Extended annual surveys are referred to as intermediate surveys, see C.1.2 and D.2.2, respectively.

The intermediate survey falls due nominally, 2.5 years after commissioning and each class renewal and may in the case of seagoing ships be carried out on the occasion of the second or third annual survey.

Refrigerating installations see D.

Special ship types see Section 4.

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1 For requirements, see UR Z19 of IACS
Section 3 Surveys - General Requirements

B.1.3 Class Renewal Surveys

B.1.3.1 Class Renewal Surveys are to be carried out for the ship's hull, machinery, including the electrical plant, and, for any special equipment classed, at the intervals indicated by the Character of Classification for the hull, see C.1.3 and Section 4, Special Ship Types.

For avoiding loss of Class, in exceptional cases extension of the Class period by 3 months at the most may be granted by GL upon request.

B.1.3.2 A Class Renewal may be carried out in several parts. The Class Renewal Survey may be commenced at the 4th annual survey and shall have been completed by the end of the class period. The total survey period shall not exceed 15 months.

B.1.3.3 The periodical surveys and inspections of propulsion systems and machinery as per B.1.4 and B.1.5 form an integral part of the surveys required for Class Renewal, unless otherwise specified in the following.

B.1.3.4 Class Renewals for the hull are numbered in the sequence I, II, III, etc. Class Renewal IV and subsequent ones correspond to Class Renewal III. Regarding their scope see C.1.3.2. A survey planning meeting is to be held prior to the upcoming survey, see also C.2.1.2.

B.1.3.5 The new period of Class will commence:

- with the following day, after which the previous class expires, provided that the Class Renewal Survey has been completed within 3 months preceding that date. This applies also to a granted extension of the Class period by 3 months at the most,
- with the date on which the surveys for Class Renewal have been completed, if this is the case more than 3 months before expiry of the previous Class.
- In cases where the vessel has been laid up or has been out of service for a considerable period because of a major repair or modification and the owner elects to only carry out the overdue surveys, the next period of class will start from the expiry date of the Class Renewal Survey. If the owner elects to carry out the next due Class Renewal Survey, the period of class will start from the survey completion date.

B.1.3.6 Continuous Class Renewal Surveys

B.1.3.6.1 On owner's request, the surveys required for Class Renewal may be split, according to a schedule to be agreed, such as to extend over the entire period of Class so that about 20 % of all surveys required for Class Renewal will be completed every year.

This means that all areas subject to survey as defined by GL Head Office are to be surveyed at least once per Class period, unless closer intervals are prescribed elsewhere. The period between two subsequent surveys of each area shall not exceed 5 years.

For ships more than 10 years of age, the ballast tanks are to be internally examined twice in each five-year class period, i.e. once within the scope of the intermediate survey and once within the scope of the continuous Class Renewal Survey (hull).

The survey in dry-dock for Continuous Class Renewal (hull) may be held at any time within the five-year Class period provided all the requirements of B.1.6 are also complied with.

Exception for hulls of oil tankers/product carriers, chemical tankers and bulk carriers with Class Notation ESP, see Section 4, A.4.1.5, C.4.1.6 and E.4.1.3. For General Dry Cargo Ships, see C.3.7.5.

B.1.3.6.2 Continuous Class Renewal may be requested separately for the hull, the machinery and the special equipment.

B.1.3.6.3 Regarding the duration of the period of Class and due dates of surveys, the requirements B.1.3.1 and B.1.3.5 continue to be applicable.

B.1.3.6.4 At the end of a period of Class, for the purpose of Class Renewal, a final survey at least in the scope of an annual survey, will be performed, during which the Surveyor will satisfy himself as to whether all areas required to be surveyed have been surveyed throughout, and with satisfactory results. If there are special reasons, the Surveyor may inspect individual parts again.

B.1.3.6.5 Ships surveyed subject to the Continuous Class Renewal system, are not exempted from other periodical surveys (such as annual and intermediate surveys) prescribed.
B.1.3.7 Surveys based on Planned Maintenance Systems

B.1.3.7.1 On owners’ request, an optimized Continuous Class Renewal system may be agreed upon as outlined below for ships the machinery of which is maintained with the aid of an approved, computer-assisted maintenance system.

B.1.3.7.2 Owners will introduce a preventive maintenance system (Planned Maintenance System) comprising at least the survey scopes/systems as covered by the normal Continuous Class Renewal system.

B.1.3.7.3 This maintenance system will have to be approved by GL, to this effect, owners will submit the following documentation, in English or German language:

- detailed description of the system, indicating the information flows
- list of components/systems to be covered by the optimized Continuous Class Renewal system (inventory content)
- indication of intervals for each of the maintenance measures in general
- list of maintenance intervals (TBO) and of the expected lifetime (LT) of the main and auxiliary machinery components essential for operation, taking into account manufacturers’ recommendations and specific operational requirements
- list of instructions (maintenance procedures) underlying the maintenance concept.
- maintenance documentation (reports containing important operational information, component condition, offset sheets, measures carried out)
- documentation on the maintenance strategy applied prior to filing of the request

B.1.3.7.4 Within the scope of a shipboard survey the GL Surveyor will have to confirm that:

- the current maintenance system complies with the approved documentation
- the current maintenance system takes into account, without reservation, the specific service conditions
- the maintenance documentation permits conclusions to be drawn as to be construction condition and operability of the machinery
- the personnel in charge of operation of the machinery are properly qualified and hold the necessary qualification certificates

B.1.3.8 Surveys based on Condition Monitoring Systems

Machinery or technical installations, which are subject to a Condition Monitoring System, may be surveyed in line with the requirements and prerequisites described in the GL Guidelines for Machinery Condition Monitoring (I-1-17). Prerequisite for this special Survey Arrangement CM is the existence of a computerized Planned Maintenance System (PMS). The elements of the PMS considering the machinery components or part of them covered by Condition Monitoring shall be approved by GL according to B.1.3.7.

The Condition Monitoring System is not limited to the equipment used to determine the machinery’s condition, but also in addition consists of the applied procedures and schedules for data collection and analysis.

If the Condition Monitoring information are giving evidence to the Surveyor that the machinery, or part of it, is in an acceptable running condition, he may grant a waiver from dismantling of the machinery, or part of it, for direct inspection. Any item of the installation or machinery not covered by the Survey Arrangement CM shall be surveyed and credited in the conventional way.

B.1.3.9 Class extension

See B.1.3.1.

B.1.4 Periodical surveys of propeller shafts and tube shafts, propellers, vane wheels and other systems

For maintenance of the Class, periodical surveys and tests of propeller shafts and tube shafts, propellers, vane wheels and other systems of seagoing ships are to be carried out. The scope of surveys and tests unless specifically restricted is defined in C.1.4.
B.1.4.1 Propeller shafts and tube shafts

The following surveys are applicable:

- normal survey
- modified survey
- partial survey

B.1.4.1.1 Normal survey

Propeller shafts and tube shafts are to be sufficiently drawn to permit entire examination at the following intervals unless alternative means are provided to assure the condition of the shaft.

B.1.4.1.1.1 Where the propeller shafts and tube shafts are fitted with continuous liners or approved oil sealing glands, or are made of corrosion resistant materials, the interval of survey is to be:

- 3 years for single shafting arrangement
- 4 years for multi-shafting arrangement

The interval of drawing may be raised to:

- 5 years for single shafting arrangement
- 5 years for multi-shafting arrangement

at the most, in any of the following three cases:

- where
  - the design details are approved
  - the propeller is fitted to a keyed shaft taper
  - the shaft is protected from seawater
  - a non-destructive examination is made at each survey by an approved crack-detection method of the after end of the cylindrical part of the shaft (from the after end of the liner, if any), and of about one third of the length of the taper from the large end, or

- where
  - the design details are approved
  - the propeller is fitted to a solid flange coupling at the aft end of the shaft
  - the shaft and its fittings are not exposed to corrosion.
  - Non-destructive examination of the fillet radius of the aft propeller shaft flange may be required if the visual examination of the area is not satisfactory.

- where
  - the design details are approved
  - the propeller is fitted keyless to the shaft taper
  - the shaft is protected from seawater
  - a non-destructive examination is made at each survey by an approved crack detection method of the forward part of the aft shaft taper

In all other cases the nominal interval of survey is to be 2.5 years with an admissible time window of ± 6 months.

B.1.4.1.1.2 Propeller shafts and tube shafts are to be sufficiently drawn to permit entire examination. For further details see C.1.4.1.1.1.

For oil lubricated arrangement, the shaft need not be drawn at the occasion of the normal survey, provided that all exposed areas of the after shaft area as described in B.1.4.1.1.1 are examined by an approved crack-detection method

- where
  - the clearances and wear down of the bearings
  - the records of lubricating oil analysis, oil consumption and bearing temperature
  - the visible shaft areas
are examined and found satisfactory. The crack detection test of the aft flange fillet area may be dis-
pensed with for the solid flange couplings fitted at the end of the shaft, see also B.1.4.1.1.1.

Lubricating oil and bearing temperature controls are to be performed as specified in B.1.4.1.2.2. For fur-
ther details see C.1.4.1.1.2. Where any doubt exists regarding the findings of the above, the shaft is to be
sufficiently drawn to permit an entire examination.

B.1.4.1.2 Modified survey

B.1.4.1.2.1 For single and multi-shafting arrangements a modified survey may be accepted instead of
the normal survey at alternate 5 yearly survey intervals, at the most, subject to:

- the design details are approved
- the shaft is fitted with oil lubricated bearings and oil sealing glands
- the shaft and its fittings are not exposed to corrosion
- new oil seals may be fitted without removal of the propeller (except in the case of keyed propeller)

and provided that the clearances of the aft bearing are found in order and the lube oil and the oil sealing
arrangements have proved effective in any of the following three cases:

- where the propeller is keyed on the shaft taper and suitable crack-prevention measures are taken, or
- where the propeller is fitted to a solid flange coupling at the end of the shaft, or
- where the propeller is fitted keyless to the shaft taper

The maximum interval between two successive normal surveys is not to exceed 10 years.

B.1.4.1.2.2 The shaft is to be sufficiently drawn to permit examination of the aft bearing contact area of
the shaft. For further details see C.1.4.1.2.1.

Drawing of the shaft to expose the aft bearing contact area of the shaft may not be required where a lu-
bricating oil analysis is carried out regularly at intervals not exceeding 6 months, and the oil consumption
and bearing temperature are recorded and considered to be within permissible limits. The documentation
on lubricating oil analysis is to be available on board and be checked. Each analysis should include the
minimum parameters:

- water content
- chloride content
- content of bearing metal particles
- oil aging (resistance to oxidation)

Oil samples should be taken under service conditions. For further details see C.1.4.1.2.2.

The Class Notation CM-PS assumes the fulfillment of these requirements.

Where any doubt exists regarding the findings of the above, the shaft is to be sufficiently drawn to permit
an examination according to C.1.4.1.2.1.

B.1.4.1.3 Partial survey

B.1.4.1.3.1 Upon request by the Owner for shafts where the modified survey is applicable and

- a prolonged service fatigue life of seals is expected due to the appropriate combination of materials
  and controlled pressures in way of seals

consideration may be given to a prolongation of the 5-yearly interval between normal surveys, provided a
partial survey is performed.

In no case the interval between normal surveys shall exceed 1.5 times the due interval.

B.1.4.1.3.2 The partial survey consists of checking the oil sealing glands and the clearance of the bear-

ings.

For keyed propellers, the propeller is to be dismantled to expose the forward part of the taper and a non-
destructive examination by an approved crack detection method is to be performed. For further details
see C.1.4.1.3.
B.1.4.2 Propellers
During normal or modified surveys of the propeller shafts and tube shafts, the propellers as well as the remote and local control gear of controllable pitch propellers are to be surveyed at the Surveyor’s discretion, depending on the findings.

B.1.4.3 Vane wheels
Vane wheels are to be examined in dismounted condition in intervals of nominally 2.5 years with an admissible time window of ± 6 months.

B.1.4.4 Other systems
Other systems for main propulsion purposes, such as rudder and steering propellers, pod propulsion systems, pump jet units, etc., are subject to the same survey intervals as propeller shafts and tube shafts.

B.1.5 Periodical surveys and tests of individual machinery items
B.1.5.1 The periodical surveys of individual machinery items or installations listed below are to be carried out in addition to those prescribed in B.1.3 and C.1.3.3, for maintenance of class.

B.1.5.2 Steam boiler plants
B.1.5.2.1 Steam boilers are to be subjected to the following examinations and tests at regular intervals\(^2\). The term 'steam boilers' includes exhaust gas boilers and warm water and hot water generators (except where they are heated by steam or liquids).

B.1.5.2.2 External inspection
Boilers are to be subjected at annual intervals to an external inspection in accordance with the GL inspection programme.

For the external inspection a time window of ± 3 months is admissible.

B.1.5.2.3 Internal inspection
Steam boilers are to be subjected to internal inspections at least twice in every Class period. On no account the maximum interval between two internal inspections shall exceed 3 years. For ships with one main boiler only, internal inspections are to be performed every 2.5 years until 10 years after commissioning and every year thereafter. Boiler installations with one main boiler only and one auxiliary boiler powerful enough to operate the propulsion plant in an emergency (take-home boiler), count as multi-boiler plants.

B.1.5.2.4 An extension of the internal inspection of the boiler up to 3 months can be granted under exceptional circumstances. The extension may be granted by GL after the following is satisfactorily carried out:

- external inspection of the boiler
- functional test of the boiler safety valves
- functional test of the boiler protective devices
- review of the following records since the last internal inspection:
  - operational documentation
  - maintenance documentation
  - repairs carried out
  - records of water analysis

\(^2\) For steam boiler plants on board seagoing vessels, where GL is authorised to carry out the statutory inspections, more extensive regulations of the country, where the ship is registered, have to be observed.
### B.1.5.3 Thermal oil plants

#### B.1.5.3.1 External inspection

Thermal oil plants are to be subjected to an external inspection once a year. Proof of continued usability of the thermal oil shall be furnished yearly by a competent testing agency, see C.1.5.3.

For the external inspection a time window of ± 3 months is admissible.

#### B.1.5.3.2 Internal inspection

An internal inspection, including a tightness test of the whole plant, is to be performed at intervals of 5 years, counting from commencement of initial operation, and possibly in connection with a Class Renewal Survey.

### B.1.5.4 Steam pipes

#### B.1.5.4.1 Steam pipes

Steam pipes are to be examined regularly every 5 years, possibly in connection with a class renewal survey. Starting from class renewal II the steam pipes are to be examined as to their internal and, where advisable, as to their external condition as well, employing non-destructive testing methods, where necessary, see C.1.5.4.

#### B.1.5.4.2 Steam pipes with service temperatures exceeding 500 °C

Steam pipes with service temperatures exceeding 500 °C are to be examined for expansion at 5 year intervals, starting from class renewal II, at the latest.

### B.1.5.5 Pressure vessels

#### B.1.5.5.1 Pressure vessels

Pressure vessels which are subject to survey by GL according to the Construction Rules, are to be examined internally and externally every 5 years, possibly in connection with a Class Renewal Survey.

#### B.1.5.5.2 Pressure vessels with product of pressure by cubic capacity $p \times l \leq 200$

Pressure vessels having a product of pressure [bar] by cubic capacity [l] of $p \times l \leq 200$ are to be surveyed on the occasion of checking of the pertinent piping system.

#### B.1.5.5.3 Periodical tests of CO$_2$ cylinders

Periodical tests of CO$_2$ cylinders and other gas cylinders for fire-extinguishing purposes are to be carried out at intervals not exceeding 10 years, as follows:

At least 10% of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. If one or more gas cylinders fail, a total of 50% of the gas cylinders provided are to be subjected to an internal inspection and hydrostatic test. If further gas cylinders fail at the extended test, all gas cylinders are to be subjected to foregoing tests. In any case, all gas cylinders having failed shall be replaced by new ones.

Halon containers of existing fixed Halon fire-extinguishing systems are exempted from this requirement.

Irrespective thereof, on the occasion of recharging CO$_2$ cylinders, Halon containers and other gas cylinders are to be tested, if the last test dates back 10 years or more.

#### B.1.5.5.4 Low pressure CO$_2$ bulk storage containers

Low pressure CO$_2$ bulk storage containers are subject to internal survey if the content has been released and the container is more than 5 years old but not more frequently than once within five years.

#### B.1.5.5.5 In the case of vessels for powder extinguishing agents

In the case of vessels for powder extinguishing agents, periodical pressure tests may be dispensed with, provided that their internal inspection does not reveal any deficiencies.

#### B.1.5.5.6 Receivers in hydraulic or pneumatic control systems

Receivers in hydraulic or pneumatic control systems are to be examined during maintenance and repairs at the system; air receivers with a product of pressure by cubic capacity $p \times l \geq 1000$ (p in bar) are to be subjected to an internal inspection at least once during each class period and/or at intervals not exceeding 5 years.

#### B.1.5.5.7 The intervals between surveys

The intervals between surveys as referred to may be reduced, depending on the findings.

### B.1.5.6 Automation equipment

For confirmation of the class notation, machinery having been assigned the notations AUT, AUT-nh, AUT-Z or RC is to be inspected in accordance with GL Survey programmes during Annual, Intermediate or Class Renewal Surveys, respectively.
Section 3 Surveys - General Requirements

B.1.5.7 **Inert gas systems**

Inert gas installations of the cargo tank area of tankers are to be checked annually as to their operability. Tankers with the class notation INERT are to be surveyed in accordance with GL Survey programme, at intervals of nominally 2.5 years, preferably on the occasion of each class renewal and intermediate survey, see Section 4, A. to D.

B.1.6 **Bottom surveys**

B.1.6.1 Bottom surveys serve the purpose of periodical checking of the underwater hull, of the openings and closures in the shell related to the machinery, and of externally arranged components of the steering and propulsion system, see C.1.4 and C.1.6.

B.1.6.2 For seagoing ships carrying the Character of Class 100A5 there is to be a minimum of two examinations of the outside of the ship's bottom and related items during each five-year Class Renewal Survey period. One such examination is to be carried out in conjunction with the Class Renewal Survey. In all cases the interval between any two such examinations is not to exceed 36 months.

In exceptional circumstances 3, an extension of examination of the ship's bottom of 3 months beyond the due date can be granted.

B.1.6.3 Seagoing ships having a character of classification other than 100A5 are to be subjected to bottom surveys at intervals corresponding to half the respective period of class.

B.1.6.4 Seagoing ships with accommodations for more than 12 passengers are to be presented for bottom survey at intervals of 1 year.

B.1.6.5 It is expected that also for each bottom survey performed in addition to the bottom surveys stipulated by the classification requirements a Surveyor will be called to attend.

B.1.6.6 The surveys may be carried out on the occasion of a scheduled intermediate survey, see B.1.2 and for ships referred to in B.1.6.4, on the occasion of the annual survey.

B.1.6.7 If a bottom survey is intended to be credited to a class renewal, all tests of hull and machinery prescribed for the respective class renewal and usually requiring dry-docking will have to be carried out.

A bottom survey for class renewal may be carried out up to 15 months before completion of the class renewal.

B.1.6.8 Bottom surveys at an "Extended dry-dock interval" can be credited as IW survey during Intermediate and Class Renewal surveys in terms of the 7.5 years interval, see B.1.8.

B.1.7 **In-water surveys (seagoing ships)**

B.1.7.1 For ships assigned the Class Notation IW, an in-water survey performed with the assistance of an approved diving firm may be recognized as a substitute for every second periodical dry-docking survey, see C.1.7.

Exemption from the above mentioned point is the "Extended dry-dock interval", see B.1.8.

B.1.7.2 The In-water Survey is to provide the information normally obtained from a docking survey. Special consideration shall be given to ascertaining stern bush clearances of oil stern bearings based on a review of the operating history, on board testing and stern oil sample reports. These considerations are to be included in the proposals for In-water Survey which are to be submitted in advance of the survey so that satisfactory arrangements can be agreed with GL.

B.1.7.3 **Passenger ships**

In general, bottom survey shall be carried out in dry-dock. For vessels having the Class Notation IW the inspections of the outside of the ship's bottom are to be carried out in dry-dock at least twice in any 5 year

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3 "Exceptional circumstances", e.g. means unavailability of dry-docking facilities, unavailability of repair facilities, unavailability of essential materials, equipment or spare parts, or delays incurred by action taken to avoid severe weather conditions.
period. The interval between bottom inspections shall not exceed 36 months. The remaining yearly in-
spections of the ship’s bottom may be carried out in-water by an approved diving company provided that
the vessel has not sustained any grounding or contact damage since the previous bottom inspection. For
vessels less than 15 years of age and having the Class Notation IW, the first dry-docking may be substi-
tuted by an in-water survey as well.

The final approval to substitute a dry-docking by an in-water survey is subject to the consent of GL Head
Office and is valid for one substitution only. More extensive Flag State requirements regarding the substi-
tution of the bottom survey in dry-dock shall be observed, see B.1.6.4 and C.1.1.1.3.

B.1.7.4 Special consideration should be given to vessels of 15 years of age or over prior to permission
being granted to carry out an in-water survey in lieu of a dry-docking survey.

For ships subject to ESP Surveys, see Section 4, A.3.1.2, C.3.1.2 and E.3.1.2.

B.1.8 Extended dry-dock interval

B.1.8.1 The "Extended dry-dock interval" applies to container ships. It also applies to general cargo
and multi-purpose dry cargo ships excluding single-skin construction in cargo area.

B.1.8.2 The "Extended dry-dock interval" for 7.5 years is limited from the delivery of the vessel to the
age of 15 years.

B.1.8.3 At the 7.5 years interval it is possible to perform the first two forthcoming bottom surveys as
underwater survey in the scope of an in-water survey. The third bottom survey at 7.5 years has to be
performed in dry-dock. The interval is independent whether the bottom survey will be performed at an
Intermediate or Class renewal survey.

B.1.8.4 The owner has the possibility to join the "Extended dry-dock interval" from delivery of the ves-
sel or between the years to an age of 10 years. The interval of bottom survey will be adapted according to
the date of entry. The necessary bottom surveys with in-water survey and dry-docking will be performed
in accordance with interval created by date of entry.

B.1.8.5 Necessary requirements for implementation of the "Extended dry-dock interval":

- Planned Maintenance System Hull according to the GL Guidelines for Extended Dry-Dock Interval
(VI-11-5), Section 2
- Planned Maintenance System Machinery according to “Instructions for Planned Maintenance Sys-
tem”, see B.1.3.7.
- Class Notation CM-PS or equivalent, shaft bearing and sealing system of approved design and
regular monitoring procedures implemented
- Class Notation IW or equivalent, hull, rudder and shafting systems to be inspectable during in-water
survey

The extended Dry Docking Scheme is in any case subject to approval by the relevant Flag State.

B.2 Non-periodical surveys

B.2.1 Damage and repair surveys

Damage and repair surveys fall due whenever the ship’s hull, machinery or electrical installations and/or
some special equipment classed have suffered a damage, which might affect the validity of the class, or if
damage may be assumed in consequence of an average or some other event, see C.4. and Section 2, B.2.

B.2.2 Voyage Repairs and Maintenance

Where repairs to hull, machinery or equipment, which affect or may affect Classification, are to be carried
out by a riding crew during a voyage, they are to be planned well in advance. A complete repair proce-
dure including the extent of proposed repair and the need for Surveyor’s attendance during the voyage is
to be submitted to and agreed upon by GL reasonably in advance. Failure to notify GL, in advance of the
repairs, may result in suspension of the vessel's class.
The above is not intended to include maintenance and overhaul to hull, machinery and equipment in accordance with the recommended manufacturer's procedures and established marine practice and which does not require the GL's approval, however, any repair as a result of such maintenance and overhauls which affects or may affect classification is to be noted in the ship's log and submitted to the attending Surveyor for use in determining further survey requirements.

B.2.3 Conversion surveys
In the case of conversions of a ship's hull or machinery, surveys are to be conducted in accordance with the relevant approved particulars, as in the case of new buildings, see Section 2, B.3.

B.2.4 Extraordinary Surveys
GL reserves the right to require Extraordinary Surveys to be held independently of any regular surveys. Such surveys may become necessary for examining a vessel's technical condition and are understood to form a part of GL's Quality Assurance System.

B.3 Special equipment
Periodical surveys and tests of special equipment covered by the class, such as diving installations, firefighting installations, incinerators or sea-water desalination systems, are to be carried out in accordance with the respective programmes fixed or to be fixed by GL for such special equipment characteristic of a particular type of ship.

For refrigerating installations see D.
For diving installations see E.

B.4 Additional Safety Measures
B.4.1 For all concerned ships the strength of the small hatches and their securing devices fitted on the exposed fore deck, are to comply with additional requirements for these structures.

The strength requirements to resist sea forces of items, such as air and ventilator pipes and their closing appliances, and the securing of windlasses located within the forward quarter length, are to comply with additional requirements for fore deck fittings and equipment.

B.4.2 For additional requirements applicable to water level detectors fitted on single hold cargo ships, see C.3.8.

C Performance and Scope of Surveys
C.1 Periodical Surveys
C.1.1 Annual surveys
C.1.1.1 General
C.1.1.1.1 Unless a dry-docking survey is due, annual surveys as per B.1.1 may be carried out with the ship afloat.
C.1.1.1.2 The following applies to seagoing ships in general. Section 4 for special ship types is to be observed.
C.1.1.1.3 For ships with accommodations for more than 12 passengers, the annual surveys shall always include a bottom survey. If requested by the owner, the final permission for substitution with an In-Water

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4 Additional requirements see UR S 26 of IACS
5 Additional requirements see UR S 27 of IACS
survey is subject to Flag State Administration and GL Head Office approval and this shall be valid for one substitution only, see B.1.6.4.

C.1.1.2 Hull, equipment

C.1.1.2.1 The main structural elements of the hull are to be subjected to a general visual inspection, as far as accessible, on the occasion of the annual survey. Cargo holds and engine rooms are to be surveyed at random, depending on the ship type and the age and condition of the ship. In the case of suspected damages affecting the Class, the Surveyor is entitled to carry out further investigations. Suspect areas, see C.3.5.2.

C.1.1.2.2 The hatches, hatch covers and coamings, bulkhead doors, ramps, bow visors, bow, side and stern doors, etc., of all ships have to be surveyed at each opportunity arising, but at least once a year, regarding the tightness and operability of all closures. Additionally to the overall-survey the following structural members of visors and doors are to be thoroughly inspected:

- all hinges and the pertinent hydraulic cylinders in way of their securing points
- all securing elements of the locking devices and stoppers

Bow, inner, side shell and stern doors of Ro-Ro- and Ro-Pax-ships are to be surveyed in accordance to the applicable regulation as well as Operating and Maintenance Manual (OMM, if required). Manufacturer's instructions are to be considered. For this purpose Ro-Ro-ships are ships which utilize a loading ramp to enable wheeled vehicles to be rolled-on and rolled off the ship and Ro-Pax-ships are passenger ships with Ro-Ro-spaces. This survey comprises, inter alia, structural examinations, measurements of clearances, examination of sealing and drainage arrangements, function tests of doors, function tests of indicator, water leakage detection and television surveillance systems and tightness tests. NDT and thickness measurements to be performed as considered necessary by Surveyor.

Shell doors on ships other than Ro-Ro-ships or Ro-Pax-ships and with a clear opening of less than 12 m² are to be checked as per the surveyor's instructions for their operability and unobjectionable technical condition. Car decks are to be surveyed in respect of operational safety, technical condition and accident prevention.

C.1.1.2.3 The steering gear and the anchor equipment are to be checked for visible damages. For operability, see C.1.1.3.

C.1.1.2.4 If parts of the cargo hold area are discharged with grabs, these areas are to be surveyed, respectively the survey is to be extended to the discretion of the surveyor.

C.1.1.2.5 On ships equipped for carriage of containers, the annual survey shall include random checks of

- condition and origin/identity of (loose) lashing/securing elements, against documentation on board (approved container stowage plan)
- condition of container supports welded into the ship's structure or the hatch covers

C.1.1.2.6 For ballast tanks, in the case of substantial corrosion damages, annual surveys may be required, see C.1.2.2.

C.1.1.2.7 Passenger vessels: in addition to the annual surveys prescribed for all seagoing ships and the surveys to be conducted during dry-docking, all closures on the weather deck, the watertight bulkheads, including all closures, all bow visors, bow, side and stern doors, fire doors and similar closures, the escapes and any cross-flooding arrangements are to be checked every year as to their general condition and operability.

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6 For detailed requirements, see UR Z 24 of IACS

7 "Substantial Corrosion" is an extent of corrosion such that assessment of corrosion pattern indicates wastage in excess of 75 % of allowable margins, but within acceptable limits.
C.1.1.3 Machinery

The machinery, including the electrical installations, will be subjected to the following surveys and operational checks:

- general inspection of the machinery and boiler rooms, with special regard to the propulsion system, the auxiliary engines, fire and explosion sources, and checking of emergency exits as to their free passage
- external inspection of boilers, pressure vessels with their appliances and safety devices
- inspection and checking of the remote control, quick-closing/stopping devices of pumps, valves, ventilators, etc.
- random checking of the remote control and automation equipment
- inspection and checking of the main and auxiliary steering gear, including their appliances and control systems
- checking of all communication systems between bridge and machinery, boiler and steering gear rooms
- inspection of the bilge system, including remote control actuators and bilge filling level monitor
- checking of the main and emergency power supply systems, including the switch-gear and other electrical installations
- survey of explosion-proof installations
- checking of further permanently installed installations to the Surveyor's discretion, e.g. provision cooling plant, air conditioning, incinerating plant, etc.

For Class Notation CM-PS the stern tube lubrication oil system has to be surveyed and the correct performance of oil sampling, evaluation of the temperature of the stern tube bearings and the evaluation of the oil consumption as well as the results of the required measurements according CM-PS record file (F 233 AE) have to be checked and confirmed in the relevant forms of the record file.

C.1.1.4 Fire protection systems and fire-fighting systems and appliances

The following systems and appliances are subject to inspection/testing:

- fire mains and fire pumps
- fire detection and fire alarm systems
- fixed fire-extinguishing systems
- fire dampers
- emergency shutdown for ventilation fans, boiler forced draft fans, fuel transfer pumps, fuel oil purifiers and thermal oil pumps
- quick-closing fuel valves
- fire doors, including their controls
- general emergency alarm systems
- special arrangements for ships intended for the carriage of dangerous goods with Notations as specified in Section 2, C.3.3.8
- special arrangements for fire fighting ships with Notations as specified in Section 2, C.3.4.9.

For replacement of hose assemblies for fixed gas fire-extinguishing system, see C.1.3.3.10.1.

For periodical tests of pressure vessels, see C.1.5.5 and B.1.5.5.

C.1.1.4.1 Maintenance plan

Maintenance, testing and inspections of fire protection systems and fire-fighting systems and appliances shall be carried out based on a ship’s maintenance plan. For minimum scope of maintenance, testing and inspections refer to IMO resolution A.951(23), IMO MSC.1/Circ.1318 and IMO MSC.1/Circ.1432. More extensive requirements of manufacturers and of the flag state are to be observed.
C.1.1.4.2 Maintenance by approved service suppliers

Fixed fire-extinguishing systems are subject to maintenance by approved service suppliers at intervals not exceeding 2 years. Water-spraying systems supplied from the fire main and consisting solely of an isolating valve and open nozzles are exempted from this requirement (e.g. for paint store).

C.1.1.5 Navigation bridge workstations

On the occasion of the annual survey of the safety equipment or the prescribed regular surveys onboard ships assigned the Class Notation NAV or NAV-INS, an operational test of the relevant bridge navigational equipment is to be performed.

C.1.2 Intermediate surveys

C.1.2.1 General

C.1.2.1.1 Intermediate surveys are to be performed to the extent of annual surveys. Additionally, the following requirements are to be observed.

C.1.2.1.2 The requirements listed below apply to seagoing ships in general. Section 4 for special ship types is to be observed.

C.1.2.2 Ballast tanks

C.1.2.2.1 In ships aged 5 to 10 years, selected ballast tanks are to be examined for corrosion damages and/or damages to their coatings. Depending on the survey result, and in particular in the case of poor hard protective coating condition, if soft coating or semi-hard coating has been applied, or if when built the tanks were not provided with a hard protective coating, the survey is to be extended to additional tanks of the same type.

C.1.2.2.2 If the hard protective coating in ballast tanks except the double bottom tanks is found to be in poor condition, but is not renewed, if soft coating or semi-hard coating has been applied, or if when built, the tanks were not provided with a hard protective coating, or if corrosion respectively other defects are found, maintenance of class is to be subject to the tanks in question being examined at annual intervals, and thickness measurements carried out as considered necessary.

Also in case of double bottom tanks, annual surveys may have to be carried out.

C.1.2.2.3 In ships aged 10 years and over, during the intermediate survey, all ballast tanks are to be examined for damages to the hull structural elements and to the hard protective coating, if applicable the procedure as outlined in C.1.2.2.2 shall be followed.

C.1.2.2.4 If such inspections reveal no visible structural defects, the examination may be limited to a verification that the corrosion protection system remains efficient.

C.1.2.2.5 If the hard protective coating is to be renewed totally or partly, only approved coating is applicable in case of a repair. The whole working procedure including the surface preparation has to be documented.

C.1.2.3 Cargo holds

Depending on the ship's age and on the cargo carried, selected cargo holds are to be closely examined in accordance with the Surveyor's instructions in order to ensure that the condition of all important structural elements may be ascertained.

In case of ships over 10 years of age, other than ships engaged in the carriage of dry cargoes only or ships subject to Section 4 additionally, an internal examination of selected cargo spaces is to be carried out.

8 Poor condition: General breakdown of coating over 20 % or more of areas, or hard scale at 10 % or more of areas under consideration.

9 "soft coating" means: Solvent-free coating on base of wool grease, grease, mineral oils and/or wax that remains soft so that it wears off when touched.
C.1.2.4 Bow visors and bow side and stern doors

Structural members inspected thoroughly as per C.1.1.2.2 are to be additionally crack tested.

Essentially, the crack tests will cover:
- main joining welds and their interfacial areas both on the vessel's hull and on the visor and/or doors
- highly stressed areas in way of the centres of rotation of the hinges, at the Surveyor's discretion
- highly stressed areas of the locking devices and their stoppers, at the Surveyor's discretion
- repair welding

For crack detection the dye penetration method or the magnetic particle inspection method shall be employed, and a test protocol is to be prepared.

C.1.2.5 Elastic mounting of deck houses

Elastic mountings of deckhouses have to be thoroughly checked for the general condition and operability of:
- the spring elements (possibly pre-stressing of screwed connections)
- the insulation
- the securing devices to prevent shifting and lifting
- the pipe and cable connections to the hull

If damages are suspected, mountings not easily accessible are to be dismounted and examined in detail.

C.1.2.6 Machinery and electrical installations

C.1.2.6.1 The following measurements are to be performed and/or proved to have been performed by up-to-date protocols:
- crank web deflection, main engine(s)
- crank web deflection, auxiliary diesel(s) (where relevant)
- axial thrust bearing clearance of shafting system(s)
- axial thrust bearing clearance of main and auxiliary turbine rotors
- insulation resistance of generators and essential electrical motors, including cabling and switch gear

C.1.2.6.2 Additionally, the following system components are to be subjected to operation tests:
- emergency generating set, including emergency switchboard
- emergency bilge valve
- drainage facilities of starting-air and control-air receivers
- general operational test of the machinery and electrical installations for furnishing proof of unrestricted operability, as indicated by the Surveyor

C.1.2.6.3 Automation equipment

The automation equipment is to be checked according to B.1.5.6.

C.1.3 Class Renewal Surveys

C.1.3.1 General

C.1.3.1.1 In addition to the surveys and checks to be carried out as outlined in C.1.1 and C.1.2, on the occasion of class renewals, the following regulations are to be observed.

C.1.3.1.2 The requirements listed below apply to seagoing ships in general. Section 4 for special ship types is to be observed.

C.1.3.1.3 The Class Renewal Survey is as a rule to be held when the ship is in dry-dock or on a slipway, unless a dry-docking survey has been carried out within the admissible period (see B.1.6.7 and B.1.6.8). The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating and the rudder can be examined.
Section 3  Surveys - General Requirements

C.1.3.2  Hull, equipment

C.1.3.2.1  Class Renewal I
(Age of ship up to 5 years)

C.1.3.2.1.1  Hull, general

At the Surveyor's discretion, the survey will cover the hull structural elements, particularly those areas, which from experience are known to be exposed to fatigue and corrosion, such as: cargo holds, tanks, hatch structure, bow visors, bow, side and stern doors, engine foundations, ends of superstructures. All spaces, such as holds and their tween decks (where fitted), pump rooms, pipe tunnels, duct keels, machinery spaces, dry spaces, cofferdams and voids are to be internally examined; including the plating and framing, bilges and drain wells, piping systems, venting, sounding, pumping and drainage arrangements contained within.

Bow, inner, side shell and stern doors of Ro-Ro- and Ro-Pax-ships are to be surveyed in accordance to the applicable regulation 6 as well as Operating and Maintenance Manual (OMM, if required). Manufacturer's instructions are to be considered. For this purpose Ro-Ro-ships are ships which utilize a loading ramp to enable wheeled vehicles to be rolled-on and rolled off the ship and Ro-Pax-ships are passenger ships with Ro-Ro-spaces. Additionally to the scope as listed in C.1.1.2.2 NDT and thickness measurements are to be performed. The maximum thickness diminution of hinging arms, securing, supporting and locking devices is limited to 15 %.

C.1.3.2.1.2  Preparations

The cargo holds, the bilges and the tanks are to be cleared, cleaned and - if necessary - freed from gas at the Surveyor's discretion so that all structural parts, such as frames, floor plates, stringers, shell plating, decks, deck beams, bulkheads, inner bottom, etc. may be examined. Tanks for fuel oil, lubricating oil and fresh water, see C.1.3.2.1.3.

Where soft 9 or semi-hard coating has been applied, safe access is to be provided for the surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

Where ships have no double bottom, it is left to the Surveyor's discretion to have portions of the bottom ceiling of each watertight compartment removed on either side of the ship, especially near the centre-line girder and in way of the bilge pipes and sounding pipes, so that the bottom structure below may be examined.

Where ships have a double bottom, the ceiling is to be removed at several points, at the Surveyor's discretion.

If deemed necessary by the Surveyor, defective cement and asphalt covering is to be removed. The steel work is to be examined before painting or before the cement or other coverings are renewed.

Casings, ceilings or linings, and loose insulation, where fitted, are to be removed, as required by the Surveyor for examination of plating and framing. Compositions on plating are to be examined and sounded, but need not to be disturbed if found adhering satisfactorily to the plating.

In refrigerated cargo spaces the condition of the coating behind the insulation is to be examined at representative locations. This may be limited to verify that the protective coating remains effective and that there are no visible structural defects. Where poor 8 coating condition found, the examination is to be extended as required by Surveyor. The coating condition is to be reported. If indents, scratches etc. are detected during surveys of shell plating from the outside, insulations in way are to be removed as required by the Surveyor for further examination of plating and adjacent frames.

C.1.3.2.1.3  Tanks

All ballast tanks are to be inspected; if applicable, the procedure as outlined in C.1.2.2.2 shall be followed.

If the inspection reveals no visible structural defects, the examination may be limited to a verification that the protective coatings remain efficient.

Fuel oil, lubricating oil and fresh water tanks need not be emptied, if their tightness can be verified by an external examination while they are completely filled and there is no reason for doubt as to their unobjectionable condition. However, fore peak and after peak are in any case subject to internal examinations at each Class Renewal Surveys, see also Table 3.1
C.1.3.2.1.4 Tightness tests

Each compartment of the double bottom and all tanks, the boundary bulkheads of which form part of the main structure of the ship, are to be subjected to a pressure test. Fuel, lubricating oil and fresh water tanks may be tested by filling with the respective liquid.

The test pressure applied is to correspond to a head of water up to the top of the hatch for cargo tanks or up to the top of the overflow/air pipe of a tank, whichever is higher.

The tightness of pipe tunnels outside the inner bottom, and of void spaces, can be tested by air pressure. Testing of other tanks, by air pressure, is to be agreed with the Surveyor from case to case. The over-pressure shall not exceed 0.2 bar.

C.1.3.2.1.5 Thickness measurements

If the Surveyor has reason to suspect premature inadmissible corrosion, he may require the rust to be removed from parts of the structure and thickness measurements to be performed, see C.2.

| Table 3.1 Minimum requirements for internal examination at Hull Class Renewal Surveys of structural fuel oil, lube oil and fresh water tanks |
|---|---|---|---|---|
| **Tank** | **I. age ≤ 5** | **II. 5 < age ≤ 10** | **III. 10 < age ≤ 15** | **IV. and subsequent, age > 15** |
| Fuel oil bunker tanks | None | None | One | One |
| Engine room | None | One | Two | One |
| Cargo area | None | All | All | All |
| Lube oil | None | None | None | One |
| Fresh water | None | One | All | All |

1. If a selection of tanks is accepted to be examined, then different tanks are to be examined at each Class Renewal Survey, on a rotational basis.
2. Fore peak tanks and after peak tanks are subject to internal examination at each Class Renewal Survey.
3. One deep tank for fuel oil in the cargo length area is to be included, if fitted.

C.1.3.2.1.6 Rudder, equipment, deck openings, etc.

The Class Renewal Survey also covers other parts essential for the operation and safety of the ship, such as rudder and steering gear, watertight doors, sluice valves, air pipes and sounding pipes including their heads, gas-freeing and safety arrangements of cargo tanks, life-boat davits, skylights, companionways, hatches, scuppers and water drain pipes with their valves, fire protecting arrangements, masts, anchors, anchor chains and hawser.

Visors and doors, if any, are to be checked, see C.1.2.4.

Elastic mountings of deck houses, if any, are to be checked, see C.1.2.5.

For trials of the steering gear and possible dismounting of the rudder, see C.1.1.3 and C.1.6.3.

C.1.3.2.1.7 Engine room

The engine room structure is to be examined. Particular attention is to be given to tank tops, shell plating in way of tank tops, brackets connecting side shell frames and tank tops, and engine room bulkheads in way of tank top and bilge wells. Where wastage is evident or suspected, thickness measurements are to be carried out.

C.1.3.2.1.8 Container ships

For ships equipped for the carriage of containers, the following scope of survey is required for class renewal:

- checking for cracks and deformations of the container supporting elements (weld-in elements) in the inner bottom and in hatch covers, of supporting stanchions arranged on deck, if any, and of the entire hatch covers
- hatch covers: Checking of condition and operability of supports and stoppers
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- survey of guide rails and supporting frames if fitted (connection to hull, deformations)
- random checking of the (loose) stowage and lashing elements, comparison with the certificates kept in the ship's files

C.1.3.2.1.9 Loading instruments and loading manual

Where necessary for the vessel, at each class renewal, the satisfactory operation of the approved loading computer systems is to be tested in the presence of a GL Surveyor using the approved test conditions. At least 3 test conditions are to be checked, and the results may not deviate from the approved figures by more than 5 %.

The weights of the cargo, ballast, fuel etc. are to be read in step by step.

Where necessary for the vessel, the Surveyor has to check that the approved Loading Manual is on board.

C.1.3.2.2 Class Renewal II

(Age of ship 5 to 10 years)

C.1.3.2.2.1 The requirements of Class Renewal II are identical to those of Class Renewal I; however, the requirements listed below are to be observed additionally.

C.1.3.2.2.2 The structural parts behind ceilings and insulation are to be examined as required by the Surveyor.

C.1.3.2.2.3 All tanks are to be examined internally. Lubricating oil and fresh water tanks are to be subjected at least to random examinations as required by the Surveyor, see also Table 3.1.

In the case of ballast tanks the procedure as outlined in C.1.2.2.2 shall be followed, if applicable.

C.1.3.2.2.4 The chain cables are to be ranged so that they can be examined for wear and damages throughout their length. The mean diameter of the anchor chain cables is to be determined on at least 3 links per length.

C.1.3.2.2.5 For thickness measurements see C.2.

C.1.3.2.2.6 Where hull structural members of container ships build according to the Rules valid before 1 July 2014 are made of steel with yield strength of 460 N/mm², additional ultrasonic testing of the butt welds is to be carried out according to the provisions of the GL Supplementary Rules for Application of Steel with Yield Strength of 460 N/mm², Edition 2009.

C.1.3.2.2.7 Hull structural members of the upper flange of container ships build according to the Rules valid from 1 July 2014 shall be subject to additional close-up visual inspection on the butt weld of target joints according to Edition 2014 of the GL Supplementary Rules for Application of Steel with Yield Strength of 460 N/mm² as well as Extremely Thick Steel Plates of Different Yield Strength (I-1-5a), Section 1, C.2 provided that:

- Measure 2 (high toughness weld in combination with enhanced NDT during newbuilding) according to Edition 2014 of the GL Supplementary Rules for Application of Steel with Yield Strength of 460 N/mm² as well as Extremely Thick Steel Plates of Different Yield Strength (I-1-5a), Section 2 is applied and
- plate thickness of one longitudinal member is exceeding
  - 50 mm in case of steel with yield strength of 460 N/mm², or
  - 85 mm in case of steel with yield strength of 390 N/mm².

C.1.3.2.3 Class Renewal III and subsequent ones

(Age of ship over 10 years)

C.1.3.2.3.1 For Class Renewals III and subsequent ones the requirements of Class Renewal II are to be complied with; however, the requirements listed below are to be observed additionally.

C.1.3.2.3.2 Ceilings and insulation of holds are to be removed, where necessary, to enable the condition of the bottom structure and the inner surfaces of the shell plating or of the tank tops to be assessed. For Class Renewals IV and subsequent ones the bottom ceilings of cargo holds are to be completely removed and the tank top is to be carefully cleaned, such as to enable proper assessment of their condition.
C.1.3.2.3.3 The wall lining underneath windows in the outer shell is to be lifted as required by the Surveyor so that the structure behind may be examined.

C.1.3.2.3.4 All tanks are to be examined internally. The fuel, lubricating oil and fresh water tanks are to be examined internally and tested to the maximum working overpressure, at the Surveyor's discretion, see C.1.3.2.1.3 and Table 3.1. In the case of ballast tanks the procedure as outlined in C.1.2.2.2 shall be followed, if applicable.

C.1.3.2.3.5 Cargo tanks of dry cargo vessels are to be tested by filling with water to the level of the upper edge of the tank hatch, or if this is not possible, by air pressure (max. 0.2 bar overpressure).

C.1.3.2.3.6 The rudder body is to be examined. The connections to the rudder stock and, if fitted, to the pintle and pertinent securing devices are to be inspected. For clearances, see C.1.6.3.

As far as accessible, the rudder stock is to be surveyed. If deemed necessary in view of the findings of the external inspection, the stock is to be dismantled. In way of the bearings, as far as accessible, stock and pintle are to be examined for corrosion.

C.1.3.2.3.7 The weight of the anchors is to be checked.

C.1.3.3 Machinery including electrical installation

C.1.3.3.1 General

Except for individual machinery items as indicated in C.1.5, the scopes of all Class Renewal Surveys for the machinery installation, including the electrical installation, are identical. If the continuous class renewal system is applied, B.1.3.6 is to be observed.

C.1.3.3.2 Surveys requiring dry-docking

While the ship is in dry-dock, the sea inlet and discharge valves are to be examined as to their condition and to be opened up and overhauled once within a period of class.

Bow thrusters and positioning equipment are to be subjected to a general survey, and to trials, upon floating of the ship.

If vessels are equipped with scoops, these are also to be covered by the survey.

For propellers, propeller and stern tube shaft, vane wheels, see C.1.4.

C.1.3.3.3 Propulsion system

C.1.3.3.3.1 Inspections of the propulsion system are to mainly cover:

- intermediate shafts and bearings, including thrust bearings
- gearing
- mechanical and flexible couplings
- turning gear, and
- the main propulsion engines, see C.1.3.3.4, C.1.3.3.5 and auxiliary engines, see C.1.3.3.6

For electrically driven propellers, see C.1.3.3.8.

C.1.3.3.3.2 Spring elements made of rubber – with or without plies of fabric – of rubber ring clutches with or without plies of fabric and under shear load, and other rubber or fibre reinforced, couplings, are to be renewed, if required on account of negative inspection results.

C.1.3.3.4 Main propulsion engines

The components listed below are to be inspected and, where deemed necessary by the Surveyor, checked in dismantled condition:

- cylinders, cylinder covers, pistons, piston rods and bolts, cross heads, crankshaft and all bearings
- camshaft, with drive and bearings
- tie rods, frame, and foundation and fastening elements
- injection system, attached pumps and compressors, superchargers, suction and exhaust lines, charging air coolers, filters, monitoring, control, protective and safety devices, starting, reversing and manoeuvring equipment
Note

In the case of medium-speed diesel engines, dismantling and replacement of main and crank bearings may be postponed until the service life limits have been reached. The acceptable intervals between overhauls are to be agreed with GL Head Office.

C.1.3.3.5 Main propulsion turbines

On the occasion of each class renewal the vibration behaviour of the main propulsion turbines is to be proved, possibly by regular checks during operation. Depending on the result obtained and as required by the Surveyor, the turbine casings will have to be opened up.

The safety devices of the turbines are to be tested.

C.1.3.3.6 Auxiliary engines

For all essential auxiliary engines, the survey scope is identical to that applying to main engines. A reduction in the scope of survey may be agreed to upon examination of the maintenance protocols.

C.1.3.3.7 Auxiliary machinery, equipment and piping

The following machinery components are, if deemed necessary by the Surveyor, to be inspected and tested in the dismantled condition:

- all pumps of the essential systems
- air compressors, including safety devices
- separators, filters and valves
- coolers, pre-heaters, see C.1.5.5
- main and auxiliary steering gear
- anchor and other windlasses, including their drives
- piping, pipe connections, compensators and hoses
- emergency drain valves and bilge piping systems
- tank filling level indicators
- installations preventing the ingress of water into open spaces
- freshwater distillation plant
- oil purifier and sewage systems and
- additional systems and components, where deemed necessary by the Surveyor

C.1.3.3.8 Electrical installations

C.1.3.3.8.1 If the ship is propelled by electric machinery, the propulsion motors, the propulsion generators, exciters, particularly the windings of these machines and their ventilating systems are to be examined and tested. Checking of the electric switch gear for operability is to also cover the protective, safety and interlocking devices. The electric cables and their connections are to be inspected. The insulation resistance of all electric machinery and equipment is to be tested.

C.1.3.3.8.2 Dynamic positioning systems according to Section 2, C.3.1.9 including control systems, are to be subjected to operational tests.

C.1.3.3.8.3 The electrical equipment, including the generators, the motors of the essential auxiliary machinery, the switch gear, including its protective and interlocking devices, as well as the cable network, is to be inspected externally. The insulation resistance is to be measured.

C.1.3.3.8.4 Electrical installations, including machinery and equipment, located in spaces in which there is a risk of inflammable gas or vapour air mixtures accumulating, are to be checked as to the explosion protection provided.

C.1.3.3.9 Pipes in tanks

Where pipes lead through tanks, they are to be examined and, if required by the Surveyor, subjected to hydraulic tests, if for such tanks an internal examination is required by C.1.3.2. Depending on the results obtained, thickness measurements are to be performed.
C.1.3.3.10 Fire protection systems and fire-fighting systems and appliances

C.1.3.3.10.1 General requirements

The fire protection systems and fire-fighting systems and appliances as per C.1.1.4 are subject to inspection/testing.

All hose assemblies of fixed gas fire-extinguishing systems shall be replaced at intervals not exceeding 10 years from the date of manufacture. The hose assemblies are to be delivered onboard with a GL test certificate (for details refer to the GL Rules for Machinery Installations (I-1-2), Section 11, U).

For periodical tests of pressure vessels, see C.1.5.5 and B.1.5.5.

Means of escape are to be inspected.

C.1.3.3.10.2 Fire-fighting ships

Special arrangements for fire fighting ships with Notations as specified in Section 2, C.3.4.9 are subject to inspection/testing.

Positioning equipment, see C.1.3.3.2, C.1.3.3.8.

C.1.3.3.11 Automation equipment see C.1.5.6.

C.1.3.3.12 Dangerous goods

Special arrangements for ships intended for the carriage of dangerous goods with Notations as specified in Section 2, C.3.3.8 are subject to inspection/testing.

C.1.3.3.13 Trials

Upon completion of the surveys for class renewal, the Surveyor shall be satisfied that the entire machinery installation, including the electrical machinery and equipment and the steering gear, is operable without any restrictions. In case of doubt, this may have to be proved by trials and/or operational tests.

C.1.4 Periodical surveys of propeller shafts and tube shafts, propellers, vane wheels and other systems

The periodical surveys and tests of propeller shafts and tube shafts, propellers, vane wheels and other systems defined in B.1.4 are to be performed as follows.

C.1.4.1 Propeller shafts and tube shafts

C.1.4.1.1 Normal survey

The prerequisites are defined in B.1.4.1.1. It is distinguished between:

- survey with drawing of the shaft
- survey without drawing of the shaft

C.1.4.1.1.1 Survey with drawing of the shaft

The scope of normal survey consists in the following:

- dismantling of propeller and key, where fitted, visual inspection of all parts of the shaft especially the cone, the keyway, the bearing contact areas of the shaft, the bearings, and the thread of the propeller nut, or the fillet of the flange, examination of the propeller fit
- non-destructive examination by an approved crack-detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of the keyway, or the fillet of the flange in case of a solid flange coupling. The crack detection test of the aft flange fillet area may be dispensed with for the solid flange couplings fitted at the end of the shaft, see also B.1.4.1.1.1.
- examination of the bearing clearances and/or wear down before dismantling and after reassembling of the shaft with recording of the values measured
- overhaul of the shaft sealing glands according to manufacturer's instructions (sealing rings, liners, etc.)

C.1.4.1.1.2 Survey without drawing of the shaft

Where the prerequisites as defined in B.1.4.1.1.2 apply, for oil lubricating arrangement the scope of normal survey without drawing of the shaft consists in the following:
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- examination of all accessible parts of the shaft including the propeller connection to the shaft
- non-destructive examination by an approved crack-detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of the keyway for keyed propellers, or of the forward part of the aft shaft taper for keyless propellers, or of the after fillet flange area of the shaft for solid flange coupling propellers. The crack detection test of the aft flange fillet area may be dispensed with for the solid flange couplings fitted at the end of the shaft, see also C.1.4.1.1.1.
- The area to be examined is to be sufficiently exposed, if necessary by shifting of the propeller shaft or backing-off of the propeller
- examination of the bearing clearances, respectively wear down of the aft bearing
- overhaul of the shaft sealing glands acc. to manufacturer's instructions (sealing rings, liners, etc.)
- examination of the records of all regularly carried out lubricating oil analyses
- examination of the records of the oil consumption and the bearing temperatures

Where doubts exist regarding the findings, the shaft is to be drawn to permit an entire examination.

C.1.4.1.2  Modified survey

The prerequisites are defined in B.1.4.1.2. It is distinguished between:
- survey with exposing the aft bearing contact area of the shaft
- survey without exposing the aft bearing contact area of the shaft

C.1.4.1.2.1  Survey with exposing the aft bearing contact area of the shaft

The scope of the modified survey consists in the following:
- drawing the shaft to expose the aft bearing contact area of the shaft
- examination of the forward bearing as far as possible and of all accessible parts of the shaft including the propeller connection to the shaft
- examination and overhaul of the oil sealing glands according to manufacturer's instructions (sealing rings, liners, etc.)
- examination of the bearing clearances and/or wear down of the shaft with recording of the values measured
- examination of the lubricating oil analysis and consumption to be within permissible limits
- for keyed propellers, performing a non-destructive examination by an approved crack-detection method of about one third of the length of the taper from the large end, for which dismantling of the propeller is required, examination of the propeller fit

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.

C.1.4.1.2.2  Survey without exposing the aft bearing contact area of the shaft

Where the prerequisites as defined in B.1.4.1.2.2 apply, the scope of the modified survey without exposing the aft bearing contact area of the shaft consists in the following:
- examination and overhaul of the oil sealing glands according to manufacturer's instructions (sealing rings, liners, etc.)
- examination of the bearing clearances and/or wear down of the shaft with recording of the values measured
- for keyed propellers, performing a non-destructive examination by an approved crack-detection method of about one third of the length of the taper from the large end, for which dismantling of the propeller is required, examination of the propeller fit

In addition to this the survey shall include the following:
- examination of the records of all regularly carried out lubricating oil analyses
- examination of the records of the oil consumption and the bearing temperatures

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.
C.1.4.1.3 Partial survey
The prerequisites are defined in B.1.4.1.3. The partial survey consists in the following:

- checking of the oil sealing for leakages
- examination of the bearing clearances and/or wear down of the shaft with recording of the values measured
- examination of the records of the lubricating oil analysis
- examination of the records of the oil consumption and the bearing temperatures

Where the propeller is fitted to a keyed shaft taper, in addition:

- dismantling of the propeller and examination of propeller fit
- non-destructive examination by an approved crack-detection method of the aft end of the cylindrical part of the shaft and of about one third of the length of the taper from the large end and of the area of keyway

are to be performed.

Where doubts exist regarding the findings, the shaft is to be further dismantled, respectively drawn.

C.1.4.2 Propellers
Propellers are to be examined visually on the occasion of each propeller shaft or tube shaft survey.

Damages, such as cracks, deformation, cavitation effects, etc. are to be reported and repaired at the Surveyor's discretion.

Controllable pitch propellers are to be checked for oil leakages. The function of the controllable pitch propellers has to be tested. The maintenance according to manufacturer's instructions has to be checked.

C.1.4.3 Vane wheels
The scope of surveys is to be agreed with GL Head Office.

C.1.4.4 Other systems
As far as practicable, the gearing and control elements of rudder and steering propellers are to be examined through inspection openings. For other systems such as pod propulsion systems, pump jet units, etc. the scope of survey is to be agreed with GL Head Office. The maintenance according to manufacturer's instructions is to be checked. A function test is to be carried out.

C.1.5 Periodical surveys and tests of individual machinery items

C.1.5.1 The periodical surveys and tests of individual machinery items defined in B.1.5 are to be performed as outlined below.

C.1.5.2 Steam boiler plants

C.1.5.2.1 External inspection

External inspection including functional test of the safety and protective devices as well as the test of the safety valves is to be carried out annually.

The operability and general condition of the entire boiler, including its valves and fittings, pumps, piping, insulation, foundation, control and regulating systems, as well as its protective and safety equipment, are to be examined. Also, the boiler records, operational documentation and qualifications of the boiler operator are to be checked.

For exhaust gas boilers, the safety valves are to be functional tested by the Chief Engineer at sea within the boiler external survey window. This test is to be recorded in the log book for review by the attending Surveyor prior to crediting the Annual Survey of Machinery.

C.1.5.2.2 Internal inspection

Where deemed necessary by the Surveyor, the boiler is to be cleaned on the water, flue gas and exhaust gas sides, and, if required, its outside surfaces are to be exposed as well, so that all walls subject to pressure may be examined.
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At each survey the boilers, superheaters and economizers are to be examined on water and steam side as well as flue gas or exhaust gas side. Boiler mountings and safety valves are to be examined at each survey. They are to be opened up as considered necessary by the Surveyor.

The set pressure and the function of the safety valves are to be verified during each internal boiler inspection. For exhaust gas boilers, if steam pressure cannot be raised at port, the safety valves are to be adjusted at the test bench. The correct set pressure is to be verified by the Chief Engineer at sea and the results to be recorded in the log book for review by GL.

Review of the following records since the last boiler survey is to be carried out as part of the survey:

- operational documentation
- maintenance documentation
- repairs carried out
- records of water analysis

Where the design of the boiler does not permit an adequate internal inspection, a hydraulic pressure test may be required additionally. It is left to the Surveyor's discretion to have the internal inspection supplemented by hydraulic pressure test, if required on account of the condition of the boiler.

In case of doubts concerning the existing thickness of the boiler walls, the wall thickness is to be ascertained by means of a recognized gauging method. On the basis of the existing wall thickness the maximum allowable working pressure at which the boiler may be operated in future is to be decided on.

The hydraulic pressure test is to be carried out to a test pressure of 1.5 times the maximum allowable working pressure. If this is less than 2 bar, then the test pressure shall be at least 1 bar more than the maximum allowable working pressure. In no case the test pressure may exceed the test pressure applied during the constructional check and hydrostatic pressure test of the boiler after completion.

All accessible welded joints are to be subjected to a visual examination for cracking. It is left to the discretion of the Surveyor if non-destructive testing is required for this purpose additionally.

C.1.5.2.3 Extraordinary inspection

Beyond the above mentioned periodical inspections extraordinary inspections including non-destructive tests and hydraulic pressure tests may be required at the Surveyor's discretion, e.g. in case of damages, repairs and maintenance work.

C.1.5.3 Thermal oil plants

C.1.5.3.1 External inspection

Thermal oil plants are to be subjected to functional tests, while in operation. In detail, the following items are to be examined:

- the entire thermal oil plant for leakages
- the condition of the insulation
- the functioning of the indication, control and safety equipment
- the remote controls for the shut-off and discharge valves
- the leakage monitors for the heaters
- the emergency switch-off devices (oil firing, pumps)
- the safety switch-off devices for the oil burner
- lighting, emergency lighting and labelling

Reference is to be made to the test reports on the annual checks to be performed by an appropriate testing institution for continued use of the thermal oil. This is to be confirmed in the report.

C.1.5.3.2 Internal inspection

During the internal inspection the heating surfaces and, where appropriate, the combustion chamber, are to be examined for contamination, corrosion, deformations and leakages. As a rule, tightness tests are to be carried out to the admissible working pressure. Following repairs and renewals of plant components exposed to pressure, a pressure test is to be carried out to 1.5 times the admissible working pressure.
C.1.5.4 Steam pipes/heating coils

C.1.5.4.1 Steam pipes with steam temperatures of up to 350 °C and with outside diameters of more than 75 mm, are to be examined at random. Examinations of the internal condition of the pipelines, especially of pipe bends, or additional more detailed examinations may be required. Instead of the internal inspection, a hydraulic test may be affected to a pressure equal to 1.5 times the design pressure, but not exceeding that of the prescribed test pressure for the pertinent boiler plant.

C.1.5.4.2 In the case of steam pipes with steam temperatures exceeding 350 °C (at least two) selected individual parts of pipes are to be dismounted from each piping system (main steam pipe and auxiliary steam pipes of each service group) having an outside diameter exceeding 32 mm. Approximately 10 % of the welding seams at bends, flanges or tee-branches are to be subjected to an inspection for cracks by recognized non-destructive test methods.

Before being used again, removed screws of flanged joints are to be inspected for their general condition and cracks and renewed, if necessary.

C.1.5.4.3 Steam pipes designed to resist steam temperatures exceeding 500 °C and welded piping systems are to be examined as follows:

Flanged pipes in accordance with C.1.5.4.2; however, the inspection for cracks has to cover at least 20 % of the welded seams.

If internal examination of welded piping systems through the inspection holes appears to be inadequate or if their reliable assessment is not possible even by ultrasonic testing or an equivalent examination method, it may be necessary to cut out certain parts of pipes. At least 20 % of the welding seams are to be inspected for cracks.

Removed screws of flanged joints, see above C.1.5.4.2.

C.1.5.4.4 Heating coils in oil tanks and vessels are to be subjected to a pressure test to 1.5 times the allowable working pressure.

The same applies to heating coils in cargo tanks.

C.1.5.5 Pressure vessels

C.1.5.5.1 Subject to B.1.5.5, pressure vessels are to be inspected internally and externally.

C.1.5.5.2 Supplementary tests

Where pressure vessels cannot be satisfactorily examined internally and where their unobjectionable condition cannot be clearly recognized during the internal inspection, recognized non-destructive test methods are to be applied and/or hydraulic pressure tests are to be carried out.

The hydraulic pressure test is to be performed at a test pressure of 1.5 times the maximum allowable working pressure. If the maximum allowable working pressure is less than 2 bar, then the test pressure should be at least 1 bar more than the maximum allowable working pressure. Pressure vessels manufactured in accordance with DIN Standard 4810 are, subject to that Standard, to be tested to 1.3 times the admissible working pressure. The test pressure shall in no case exceed the initial test pressure.

C.1.5.5.3 CO₂ low-pressure fire-extinguishing systems and halon tanks

The surfaces are to be checked for corrosion at the Surveyor's discretion.

Insulated vessels are to be exposed at some selected points, such as to offer a general impression of the vessel's external condition.

Following a hydraulic pressure test, the vessels and/or bottles are to be carefully dried, see also B.1.5.5.4.

C.1.5.6 Automation equipment

The monitoring equipment and the automated functions of the machinery installation are to be subjected to operational trials according to B.1.5.6. The bridge remote control equipment of the propulsion system will be examined as required.
C.1.6 Dry-docking surveys  
(Seagoing ships)

C.1.6.1 General

For the survey the ship is to be placed on sufficiently high and secure blocks, so that all necessary examinations can be carried out. It may be necessary to clean the bottom and outer shell and/or remove rust from some areas.

C.1.6.2 Hull (bottom survey)

C.1.6.2.1 The survey covers an examination of the bottom and side plates of the shell plating, including any attachments, of the rudder, the scuppers and water drain pipes, including their closures.

C.1.6.2.2 For intermediate surveys of tankers, to be carried out in the form of dry-docking surveys, see Section 4, A. to D.

C.1.6.3 Steering gear

The rudder, rudder couplings and bearings, as well as stocks and pintles, are to be surveyed in mounted condition, the rudder clearance is to be measured and documented. The steering gear is to be subjected to an operational trial. If considered necessary in view of the inspection results, the rudder or parts of the steering gear will have to be dismantled.

Bow thrusters are to be inspected externally, see B.1.4.4.

C.1.6.4 Machinery and propulsion systems

C.1.6.4.1 For propellers, propeller shaft(s), stem tube, see C.1.4.2.

C.1.6.4.2 Sea and discharge valves - including those of special equipment, if any - are to be checked as to their condition during each dry-docking survey and to be opened up and overhauled once within a period of class.

C.1.7 In-water surveys

C.1.7.1 Approvals

C.1.7.1.1 The diving firm assisting in in-water surveys shall be approved by GL for this purpose.

C.1.7.1.2 Validity of an approval granted will depend on the continued qualification for satisfactorily carrying out the work required. The approval will have to be renewed after a period not exceeding 5 years.

C.1.7.2 Performance of survey

C.1.7.2.1 Unless accessible from outside with the aid of the vessel's trim and/or heel, underwater parts are to be surveyed and/or relevant maintenance work is to be carried out with assistance by a diver whose performance is controlled by a Surveyor, using an underwater camera with monitor, communication and recording systems.

C.1.7.2.2 Surveys of the underwater body are to be carried out in sufficiently clear and calm waters.

The ship should be in light ship condition.

The shell sides below the water-line and the bottom shall be free from fouling.

C.1.7.2.3 The underwater pictures on the surface monitor screen shall offer reliable technical information such as to enable the Surveyor to judge the parts and/or the areas surveyed.

C.1.7.2.4 Documentation suited for video reproduction including voice is to be made available to GL.

C.1.7.3 Additional examinations

C.1.7.3.1 Where, for instance, grounding is assumed to have taken place, the Surveyor may demand individual parts of the underwater body to be additionally inspected from inside.

C.1.7.3.2 If during the in-water survey damages are found which can be assessed reliably only in dry-dock or require immediate repair, the vessel is to be dry-docked. If the coating of the underwater body is
in a condition which may cause corrosion damages affecting vessel's class to occur before the next dry-docking, the vessel is to be dry-docked.

C.2 Thickness measurements and corrosion tolerances

C.2.1 General

C.2.1.1 The thickness of structural elements is checked by measurements, in order to assess whether or not the values stipulated in the Construction Rules are observed, taking into account the admissible tolerances. Unless severe corrosion has occurred owing to particular service conditions, thickness measurements will not be required until Class Renewal II, see C.1.2.2 and C.1.3.2.1.5.

C.2.1.2 Thickness measurements are to be carried out in accordance with recognized methods, by authorized personnel or companies, see C.2.2. Rust and contamination are to be removed from the components to be examined. The Surveyor is entitled to require check measurements or more detailed measurements to be performed in his presence. The thickness measurements on board are to be witnessed by the Surveyor. This requires the Surveyor to be on board while the gauging is taken, to the extent necessary to control the process.

The scope of thickness measurements as well as the reporting shall be fixed in a survey planning meeting between the surveyor(s), representatives of the owner and the approved thickness measurement operator/firm well in advance of measurements and prior to commencing the survey.

Thickness measurements of structures in areas where close-up surveys are required shall be carried out simultaneously with the close-up surveys.

C.2.2 Authorization

C.2.2.1 The personnel or the company entrusted with thickness measurements (as well as the procedure for documentation) shall be approved by GL for this purpose.

C.2.2.2 Validity of an approval granted will depend on the continued qualification. The approval will have to be renewed after a period not exceeding 3 years.

C.2.3 Scope of measurements

C.2.3.1 Main hull structural elements

In Class Renewal II and all subsequent ones the plate thickness of the main hull (essential longitudinal and transverse) structural elements are to be checked by measurements. The number of measurements depends on the vessel's maintenance condition and is left to the Surveyor's discretion. The minimum requirements for thickness measurements on the occasion of Class Renewal Surveys are stated in Table 3.2, depending on the ship's age. Respective thickness measurements to determine the general level of corrosion are to be carried out.

C.2.3.2 The extent of thickness measurements may be reduced, in comparison with Table 3.2, providing that during the close-up examination the Surveyor is satisfied that there is no structural diminution and the protective coating, where applied, continues to be good. This special consideration only applies for the number of the measurement spots within the structures mentioned in Table 3.2.

The Surveyor may extend the scope of the thickness measurement as deemed necessary. This applies especially to areas with substantial corrosion.

Transverse sections should be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements.

C.2.3.3 Ballast tanks

In the case of major corrosion damages, the structural elements of ballast tanks are to be checked by thickness measurements, see C.1.2.2.
### Table 3.2  Class Renewal Surveys (Hull)

**Minimum Requirements for Thickness Measurements**

<table>
<thead>
<tr>
<th>Class renewal survey [No.] and ship's age [years]</th>
<th>I. age ≤ 5</th>
<th>II. 5 &lt; age ≤ 10</th>
<th>III. 10 &lt; age ≤ 15</th>
<th>IV. and subsequent, age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suspect Areas throughout the vessel</td>
<td>One transverse section in way of a cargo space within the amidships 0.5 L</td>
<td>Two transverse sections in way of cargo spaces within the amidships 0.5 L, in way of two different cargo spaces</td>
<td>Three transverse sections in way of cargo spaces within the amidships 0.5 L</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All cargo hold hatch covers and coamings (plating and stiffeners)</td>
<td>All exposed main deck plating within 0.5 L amidships</td>
<td>All exposed main deck plating full length</td>
<td></td>
</tr>
<tr>
<td></td>
<td>All wind- and water strakes within 0.5 L amidships</td>
<td>All wind- and water strakes full length</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Internals in forepeak and after peak tanks</td>
<td>Internals in forepeak and after peak tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Lowest strake and strakes in way of tween decks of selected transverse bulkheads in cargo spaces together with internals in way</td>
<td>Lowest strake and strakes in way of tween decks of all transverse bulkheads in cargo spaces together with internals in way</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Representative exposed super-structure deck plating (poop, bridge, and forcastle deck)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>All keel plates full length. Also, additional bottom plates in way of cofferdams, machinery space and aft ends of tanks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Plating of sea chests. Shell plating in way of overboard discharges as considered necessary by the Surveyor.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
C.2.3.4 Where special reasons exist, the Surveyor may demand thickness measurements to be carried out already on the occasion of Class Renewal I, also outside the area of 0.5 L amidships, see C.1.3.2.1.5. The same applies in the case of conversion or repair of a ship.

C.2.3.5 In order to be used as a basis for class renewal, thickness measurements should, as far as practicable, be carried out already on the occasion of the fourth annual survey.

C.2.3.6 Equipment
In Class Renewal II and all subsequent Class Renewals the cross sectional areas of the anchor chain cables are to be determined. The mean diameters of the anchor chain cables are to be determined by representative measurements, approx. 3 links per length of 27.5 m, made at the ends of the links where the wear is greatest.

C.2.3.7 For additional details on thickness measurements for special ship types, see Section 4.

C.2.4 Corrosion and wear tolerances

C.2.4.1 Where thickness measurements according to C.2.3 result in corrosion and wear values exceeding those stated in the following, the respective hull structural elements will have to be renewed.

GL reserves the right where applicable to modify the indicated values according to C.2.4.3 and C.2.4.7.3 referring to the maximum permissible large-surface corrosion allowances.

Where reduced material thickness was admitted for the new building (effective system of corrosion prevention), the permissible corrosion allowances are to be based on the unreduced rule thickness.

C.2.4.2 Longitudinal strength
Maximum permissible reduction of midship section modulus: 10 %.

C.2.4.3 Local strength
\[ t_k = \begin{cases} 1.5 \text{ mm} & \text{for } t \leq 11.5 \text{ mm} \\ 0.09 \cdot t + 0.45 \text{ mm, max. 3.0 mm} & \text{for } t > 11.5 \text{ mm} \end{cases} \]

\[ t \] : plate and/or web thickness in [mm], as stipulated in the GL Construction Rules.

Maximum permissible locally limited reduction of thickness: 0.2 t

In ballast tanks in way of 1.5 m below the weather deck, if the weather deck is the tank deck: \( t_k = 2.5 \text{ mm} \)

In cargo oil tanks in way of 1.5 m below the weather deck, if the weather deck is the tank deck, and for horizontal structural elements in cargo oil and fuel tanks: \( t_k = 2.0 \text{ mm} \).

In dry cells, such as fore-to-aft passageways of container ships and comparable spaces:
\[ t_k = \begin{cases} 1.0 \text{ mm} & \text{for } t \leq 11.5 \text{ mm} \\ 0.09 \cdot t, \text{ max. 2.5 mm} & \text{for } t > 11.5 \text{ mm} \end{cases} \]

For hatch covers of dry cargo holds: \( t_k = 1.0 \text{ mm} \)

Maximum permissible surface reduction of the side shell in way of the ice belt: 2.0 mm.

C.2.4.4 Hatch covers
For single skin hatch covers and for the plating of double skin hatch covers, steel renewal is required where the gauged thickness is less than \( t_{\text{net}} + 0.5 \text{ mm} \). Where the gauged thickness is within the range \( t_{\text{net}} + 0.5 \text{ mm} \) and \( t_{\text{net}} + 1.0 \text{ mm} \), coating (applied in accordance with the coating manufacturer’s requirements) or annual gauging may be adopted as an alternative to steel renewal. Coating is to be maintained in GOOD condition, as defined in UR Z10.2.1.2.
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For the internal structure of double skin hatch covers, thickness gauging is required when hatch cover top or bottom plating renewal is to be carried out or when this is deemed necessary, at the discretion of the surveyor, on the basis of the plating corrosion or deformation condition. In these cases, steel renewal for the internal structures is required where the gauged thickness is less than \( t_{\text{net}} \).

For corrosion addition \( t_k = 1.0 \text{ mm} \) the thickness for steel renewal is \( t_{\text{net}} \) and the thickness for coating or annual gauging is when gauged thickness is between \( t_{\text{net}} \) and \( t_{\text{net}} + 0.5 \text{ mm} \).

C.2.4.5 Vessels with Class Notation CSR

For hull structural parts on vessels built in compliance with IACS Common Structural Rules for Bulk Carriers and Oil Tankers (Class Notation CSR) applicable corrosion allowances are noted in structural drawings or described in the CSR Rules.

C.2.4.6 Anchor equipment

Maximum permissible reduction of the mean diameter of chain links: 12 %.

Maximum permissible reduction in weight of anchors: 10 %.

C.2.4.7 High speed craft

C.2.4.7.1 For high speed (seagoing) craft as defined in GL Rules for High Speed Craft (I-3-1) the following corrosion and wear tolerances apply, see also Section 2, C.3.3.5.

C.2.4.7.2 Longitudinal strength

Maximum permissible reduction of midship section modulus: 10 %.

C.2.4.7.3 Local strength

Where applicable, the maximum permissible large-surface reduction \( t_k \) of plate thickness and web thickness of profiles is:

\[
\begin{align*}
  t_k &= 0.5 \text{ mm} \quad \text{for } t \leq 10.5 \text{ mm} \\
  t_k &= 0.03 t + 0.2 \text{ mm}, \text{ max. } 1.0 \text{ mm} \quad \text{for } t > 10.5 \text{ mm}
\end{align*}
\]

For tank bottoms: \( t_k = 1.0 \text{ mm} \)

Maximum permissible locally limited reduction of thickness: 0.1 t.

If the measures for corrosion prevention described in the GL Rules for High Speed Craft (I-3-1), Section 3, C.3.1.8 are fully applied and maintained according to a document available on board and specifying all maintaining procedures, the corrosion reduction \( t_k \) can be assumed as 0.0 mm for steel and the aluminium alloys.

C.2.4.7.4 For anchor chain cables the maximum permissible reduction of the mean diameter of chain links is 10 %.

C.3 Additional requirements for General Dry Cargo ships

C.3.1 The following additional requirements refer to the hull structure and piping systems of all self-propelled general dry cargo ships carrying solid cargoes other than:

- bulk carriers with Class Notation ESP
- dedicated container carriers
- ro-ro cargo ships
- refrigerated cargo ship
- dedicated wood chip carriers

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10 Requirements see UR Z 10.2 or UR Z 10.5 of IACS
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- dedicated cement carriers
- livestock carriers
- deck cargo ships
- general dry cargo ships of double side-skin construction, with double side-skin extending for the entire length of the cargo area, and for the entire height of the cargo hold to the upper deck

C.3.2 The additional survey requirements apply to surveys of hull structure and piping systems in way of cargo holds, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area and all ballast tanks. The requirements are additional to the classification requirements applicable to the remainder of the ship.

C.3.3 The requirements contain the minimum extent of examination, thickness measurements and tank testing. The survey is to be extended when substantial corrosion and/or structural defects are found and will include additional close-up survey where deemed necessary by the Surveyor. The extent of the survey may be reduced provided there is no structural diminution and the protective coating is found in good condition.

C.3.4 Unless otherwise regulated in the following requirements of C.3 the applicable provisions of this Section shall be observed.

C.3.5 Annual surveys

C.3.5.1 The survey is to ensure that the hull, hatch covers, coamings and piping are maintained in satisfactory condition, as stipulated in C.1.1

C.3.5.2 In addition, suspect areas identified at previous Class Renewal or Intermediate Surveys shall be overall and close-up surveyed. Thickness measurements shall be taken of the areas of substantial corrosion and the number of thickness measurements shall be increased to determine the extent of substantial corrosion. For ballast tanks see also C.1.1.2.6.

C.3.5.3 For General Dry Cargo Ships over 10 years of age, an overall survey of a representative forward and aft cargo hold and their associated tween deck spaces shall be carried out. Where this level of survey reveals substantial corrosion or the need for remedial measures, the survey shall be extended as deemed necessary by the Surveyor.

C.3.5.4 For General Dry Cargo ships over 15 years of age, an overall survey of all cargo holds and tween deck spaces and a close up examination of minimum 25% of frames to establish the condition of the lower one-third of the shell frames, adjacent shell plating and lower frame connections in a forward lower and one other selected lower cargo hold shall be carried out. Where this level of survey reveals substantial corrosion or the need for remedial measures, the survey shall be extended, as deemed necessary by the Surveyor. Where the protective coating in cargo holds is found to be in good condition, the extent of the close-up surveys may be specially considered. All piping and penetrations in cargo holds, included overboard piping, shall be examined.

C.3.6 Intermediate Surveys

C.3.6.1 In addition to the surveys and checks listed in C.3.5 and as stipulated in C.1.2, the following requirements are to be observed. For bottom surveys see also B.1.6

C.3.6.2 An overall survey of one representative forward and one representative aft cargo hold and their associated tween deck spaces for ships aged 5 to 10 years shall be carried out. For ships aged 10 to 15 years, an overall survey of all cargo holds and tween deck spaces shall be performed. For ballast tanks see also C.1.2.2

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11 For the additional survey requirements see UR Z 7.1 of IACS
12 Good condition: Condition with only minor spot rusting, see UR Z 7.2 (1.2.10)
13 Suspect Areas: Locations showing substantial corrosion and/or considered by the Surveyor to be prone to rapid wastage.
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### C.3.6.3
In case of ships exceeding 15 years of age the intermediate survey shall be to the same extent as the previous Class Renewal Survey according to C.1.3 and C.3.7. However, testing of ballast tanks and cargo holds used for ballast water as well as the maximum permissible reduction of the mean diameter of chain links and weight of anchors is not required unless deemed necessary by the Surveyor.

### C.3.7  Class Renewal Surveys

#### C.3.7.1
In addition to the surveys and checks listed in C.3.6 above and as stipulated in C.1.3, the following requirements are to be observed. For dry-docking see also C.1.3.1.3

#### C.3.7.2
An overall survey of all tanks and spaces, excluding fuel oil, lube oil and fresh water tanks, shall be carried out at each Class Renewal Survey, see also Table 3.1. Each Class Renewal Survey shall include a close-up examination of sufficient extent to establish the condition of the shell frames and their end attachments in all cargo holds and ballast tanks as indicated in Table 3.3. For ballast tanks see also C.1.2.2

#### C.3.7.3
The minimum requirements for additional thickness measurements at the Class Renewal Survey as per Table 3.2 are given in Table 3.4. Thickness measurements to determine both general and local level of corrosion in the shell frames and their end attachments in all cargo holds and ballast tanks, as well as on the transverse bulkhead plating shall be carried out. The thickness measurement may be dispensed with provided the Surveyor is satisfied by the close-up examination, that there is no structural diminution, and the protective coating where applied remains efficient and in good condition 12. The Surveyor may extend the thickness measurements as deemed necessary.

#### Table 3.3  Class Renewal Surveys of General Dry Cargo Ships (Hull)
Minimum Additional Requirements for Close-up Surveys

<table>
<thead>
<tr>
<th>Class Renewal survey [No.] and ship's age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.  age ≤ 5</td>
</tr>
<tr>
<td>Selected shell transverse frames in one forward and one aft cargo hold and associated tween deck spaces</td>
</tr>
<tr>
<td>One selected cargo hold transverse bulkhead including bulkhead plating, stiffeners and girders</td>
</tr>
<tr>
<td>Forward and aft transverse bulkhead in one side ballast tank including stiffening system</td>
</tr>
<tr>
<td>All cargo hold hatch covers and coamings (plating and stiffeners)</td>
</tr>
</tbody>
</table>
### Section 3 Surveys - General Requirements

<table>
<thead>
<tr>
<th>One transverse web frame or watertight transverse bulkhead with associated plating and framing in two representative water ballast tanks of each type</th>
<th>All transverse web frames with associated plating and framing in each water ballast tank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected areas of all deck plating and under deck structure inside line of hatch openings between all cargo hold hatches</td>
<td>All deck plating and under deck structure inside line of hatch openings between cargo hold hatches</td>
</tr>
<tr>
<td>Selected areas of inner bottom plating</td>
<td>All areas of inner bottom plating</td>
</tr>
</tbody>
</table>

**Note**

*Close-up survey of cargo hold transverse bulkheads to be carried out at the following levels:*

- *immediately above the inner bottom and immediately above the tween decks, as applicable*
- *mid-height of the bulkheads for holds without tween decks*
- *immediately below the main deck plating and tween deck plating*

When thickness measurements indicate substantial corrosion, the number of thickness measurements shall be increased to determine the extent of substantial corrosion. Transverse sections shall be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

**C.3.7.4** All boundaries of ballast tanks and deep water tanks used for ballast within the cargo area length shall be pressure tested. For fuel oil tanks, only the representative tanks shall be tested. The Surveyor may extend the tank testing as deemed necessary. Tanks are to be tested with a head of liquid to the top of the air pipes for ballast tanks, deep tanks or fuel oil tanks. For tightness and pressure tests see also **C.1.3.2.1.4**.

**C.3.7.5** For Class Renewal Surveys of General Dry Cargo Ships (hull), the Continuous Class Renewal procedure described in **B.1.3.6** is excluded.

**C.3.8** Additional requirements for single hold cargo ships after determining compliance with **SOLAS II-1/23-3 and 25**

For ships complying with the requirements of **SOLAS II-1/23-3** and **25** for hold water level detectors, the Class Annual, Intermediate and Renewal Surveys are to include an examination and a test of the water ingress detection system and their alarms. The requirements also apply to those cargo ships, which although belonging to the ship types listed in **C.3.1** that are excluded from the application of these requirements, are fitted with a single hold.
Table 3.4  Class Renewal Surveys of General Dry Cargo Ships (Hull)
Minimum Additional Requirements for Thickness Measurements

<table>
<thead>
<tr>
<th>Class Renewal survey [No.] and ship’s age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.  age ≤ 5</td>
</tr>
<tr>
<td>Measurement for general assessment and recording of corrosion pattern of those structural members subject to close up survey according to Table 3.3</td>
</tr>
<tr>
<td>All exposed main deck plating within the cargo length area</td>
</tr>
<tr>
<td>All wind and water strakes within the cargo length area</td>
</tr>
<tr>
<td>Selected wind and water strakes outside the cargo length area</td>
</tr>
<tr>
<td>Each bottom plate including lower turn of the bilge</td>
</tr>
</tbody>
</table>

C.4  Damage and repair surveys

C.4.1  Where damage has occurred to the ship's hull, machinery, including the electrical plant, the automatic/remote-control systems, etc., the damaged parts are to be made accessible for inspection in such a way that the kind and extent of the damage can be thoroughly examined and ascertained, see also Section 2, B.2.3.

In the case of grounding, dry-docking or, alternatively, an in-water survey is required.

If deemed necessary, the Surveyor may at his own discretion inspect other parts of the ship as well.

C.4.2  The repair measures are to be agreed with the Surveyor such as to render possible confirmation of the class without reservation upon completion of the repairs. In general, a confirmation of class with Conditions of Class, e.g. in the case of a preliminary repair (“emergency repair”), requires to be approved by GL Head Office.

C.4.3  Surveys conducted in the course of repairs are to be based on the latest technical knowledge and instructions by GL. In exceptional cases advice is to be obtained from GL Head Office, in particular where doubts exist as to the cause of damage.

C.4.4  For older ships, in the case of repairs and/or replacement of parts subject to classification, as a matter of principle, the Construction Rules in force during their period of construction continue to be applicable.

This does not apply in the case of modifications required to the structure in the light of new knowledge gained from damage analyses, with a view to avoiding recurrence of similar damages.

C.4.5  Regarding the materials employed and certificates required, the requirements for new buildings are applicable, see Section 2, B.3.

C.4.6  Regarding damages or excessive wastage beyond allowable limits that affect the vessel's class, see Section 2, B.2.4.
D Refrigerating Installations

D.1 General, definitions

D.1.1 Kinds of surveys

D.1.1.1 In order to maintain their class, refrigerating installations with GL class have to be subjected to the following surveys:

- annual survey see D.2.1
- intermediate survey, nominally, at mid-time between Class Renewal Surveys see D.2.2
- Class Renewal Survey every five years, see D.2.3
- continuous Class Renewal Survey where, on ship owner's request and with GL's consent, the surveys required shall be spread over the period of class, see D.2.4
- damage survey where the refrigerating installation is defective or where the ship's hull or parts of the machinery have been damaged such that the operability of the refrigerating installation might be affected, see D.3.1
- conversion surveys, see D.3.3.

D.1.1.2 GL reserves the right to carry out extraordinary surveys or to demand trials between the due dates of regular surveys, if considered necessary. Such surveys may be credited to the regular surveys referred to above.

D.1.1.3 For ascertaining the operability of the installation concerned for a defined purpose, in addition to the surveys for maintenance of the class, on request, the following - likewise extraordinary - surveys and tests will be conducted:

- surveys in the port of loading, see D.3.4.1
- safety surveys, see D.3.4.2
- specially agreed surveys (e.g., for confirmation of class in the case of sale of the ship), see D.3.4.3
- refrigerating tests, see D.3.2.

D.1.2 Survey instructions

D.1.2.1 GL's local representative is to be informed in due time about prescribed surveys or intended repairs or alterations, so that all work may be suitably supervised.

D.1.2.2 The results of each survey - with the exception of loading port surveys - as well as any special Conditions of Class, on which maintenance of class has been made conditional, will be entered in the refrigerating installation certificate. The character of classification, month and year of the commencement of the class period, as well as month and year of the last annual survey (and/or last intermediate survey, or last Class Renewal Survey), will be stated in the Register.

D.1.2.3 Any deficiencies and/or damages ascertained (also during surveys as per D.1.1.3) may entail restrictions of class and/or are to be followed up within the scope of classification.

D.1.2.4 The reports prepared by the Surveyors will be checked. The results of surveys carried out will be indicated in the Register, upon acceptance.

D.1.2.5 Where defects are repaired provisionally only, or where the Surveyor does not consider immediate repairs or replacements to be necessary, the class of the refrigerating installation may be confirmed for a limited period or for one voyage by making a corresponding entry in the certificate of classification. Upon withdrawal of such restrictions, a relevant note is to also be entered in the certificate of classification.

D.1.2.6 If a refrigerating installation has to be surveyed in a port where, or near which, there is no Surveyor to GL, the procedure outlined in A.1.9 will be applicable.
Section 3  Surveys - General Requirements

D.2  Regular surveys, procedures

D.2.1  Annual surveys

D.2.1.1  The refrigerating machinery is to be checked in operation. During this check, the delivery and discharge temperatures at the air coolers and at the brine coolers respectively, the temperatures of the refrigerated cargo spaces, or refrigerated cargo containers, of the ambient air, the cooling water inlet and outlet, the refrigerant in the condenser and evaporator will be determined.

D.2.1.2  The entire plant for the power supply, including the part of the electrical plant necessary for operation of the refrigerating installation, is to be inspected externally. The Surveyor is to obtain the information required on the condition of the installation from the operating data records for the refrigerating and machinery installation and is then to decide whether individual machines will have to be opened up for inspection, see also D.2.3.4.

D.2.1.3  Insulation resistance measurements are to be carried out at the electrical plant. Any measurement protocols prepared on board may be considered.

D.2.1.4  All pressure vessels, including valves, fittings and safety devices, are to be inspected externally.

If ammonia is used as refrigerant, the covers of one or more heat exchangers are to be taken off for inspection of the tube plates. Depending on the inspection result, the Surveyor may require further parts of the installation to be opened up for inspection.

D.2.1.5  The refrigerant and brine pipes and their insulation are to be examined externally, and the pipes are to be tested for tightness during operation.

D.2.1.6  In the refrigerated cargo spaces, the air coolers, the brine grids and direct expansion evaporators respectively, as well as circulating fans, are to be inspected during operation.

D.2.1.7  The defrosting devices are to be externally inspected. Where necessary, proof is to be furnished of their proper functioning.

D.2.1.8  Bilge coverings are to be opened up. Bilges are to be checked as to their perfect condition. The drains of the upper spaces with their closing devices, the bilge pipes and their suction strums, as well as the sounding pipes, are to be inspected. Hatches, doors, pipelines, thermometer tubes with their connections and fastenings, as well as watertight doors and air ducts, are to be checked. Cemented parts where brine might seep into the bilges are to be inspected with particular care.

D.2.1.9  The insulation of all refrigerated cargo spaces, apparatus and piping are to be checked as to whether they are free from damages and dry, especially at positions where moisture may collect, e. g. in the bottom insulation underneath the hatches, underneath stringers and below decks.

After repairs of the hold insulation, the Surveyor has to satisfy himself that no cooling air enters the insulation.

D.2.1.10  The proper operation of dehydrators, thermometers and remote indicating thermometers is to be checked.

The proper operation of air duct couplings for connecting refrigerated containers to the ship's own refrigerated installation has to be checked. Also, it is to be ascertained whether the air ducts are free from defects.

The results of checks conducted on board may be considered.

D.2.2  Intermediate surveys

D.2.2.1  As against the procedure outlined in D.2.1, starting with the 2nd class period, the second or third annual survey within a class period will as an intermediate survey to be extended in scope as follows.

D.2.2.2  Parts of compressors subject to wear, such as cylinders, pistons, piston rods, glands, bearings as well as parts of auxiliaries, such as shafts, impellers and diffusers of centrifugal pumps, etc., are to be inspected at random, unless the Surveyor considers a thorough examination to be necessary. The driving
motors of compressors are to be inspected. Also, parts necessary for operation of the driving motors are included, see also D.2.3.4.

D.2.2.3 At the Surveyor's discretion, the end covers of some heat exchangers are to be removed for inspection of the tube plates and tubes.

D.2.3 Class Renewal Surveys

D.2.3.1 The class period of the refrigerating installation should coincide with that of the hull and the machinery. Apart from the surveys as detailed in D.2.1 and D.2.2, the following tests and inspections are to be carried out:

- examination of all parts of compressors and driving motors subject to wear, at the Surveyor's discretion, see D.2.3.4
- inspection of the primary installation for power supply of the refrigerating installation, as well as of the electrical installation
- inspection of the sea inlet and discharge valves for cooling water supply to the installation (possibly, within the scope of classification of the ship)
- internal inspection of the pressure vessels, as far as possible. The end covers of all heat exchangers are to be removed, see D.2.2.3
- tightness tests on condensers, evaporators, refrigerant and brine pipes. Pipe coils (air coolers) in the primary/secondary refrigerating system are to be inspected, removed at the Surveyor's discretion and/or subjected to a hydraulic pressure test.

D.2.3.2 In the case of new installations the above-mentioned tightness tests, as well as the removal of parts of the piping insulation and dismounting of pipe coils, may be dispensed with at the time of the first Class Renewal Survey, at the Surveyor's discretion.

D.2.3.3 Hydraulic pressure tests on pressure vessels are to be carried out for the first time 10 years after initial operation, and subsequently, on the occasion of each class renewal. In the case of pressure vessels operated with refrigerants in closed circuit, the periodical hydraulic pressure tests may be dispensed with. For surveys after repairs, see D.3.1.

D.2.3.4 Where screw compressors or semi-hermetic piston compressors are fitted, for which manufacturers have prescribed fixed intervals for maintenance or replacements, GL may on request agree to differing intervals between surveys, provided that the compressors are equipped with reliable working-hour meters and that a sufficient number of units ready for installation or of complete rotor runner sets is available on board.

A supplementary sheet or the Appendix to the Refrigerating Installation Certificate contains more detailed information as to whether such surveys will be accepted.

D.2.4 Continuous Class Renewal Surveys

D.2.4.1 If application of the continuous class renewal system has been agreed upon, it is to be ensured that the intervals between successive inspections of the same parts of the refrigerating installation do not exceed the periods normally allowed for maintenance of the class. In particular, the surveys according to D.2.1 are to be conducted annually.

D.2.4.2 Prior to expiry of the period of classification, a final survey of the installation is to be conducted, even if all parts have already been surveyed during this period. If deemed necessary by the Surveyor, individual parts may be re-inspected.

D.3 Extraordinary surveys and inspections

D.3.1 Damage surveys

D.3.1.1 In case of damage the refrigerating installation is to be made accessible for inspection in such a way as to enable the damage to be thoroughly examined for assessment of its kind and extent.

D.3.1.2 Following repair, the installation is to be subjected to a trial in the presence of the Surveyor, who will enter a relevant note in the Class Certificate.
D.3.2 Refrigeration tests for ships in service
If there are any doubts in respect of the capacity of the installation or the quality of the insulation, GL reserves the right to require an additional test in the form of a refrigeration test. Also, a refrigeration test may be carried out on request.

D.3.3 Conversion surveys
In the case of conversion of the refrigerating installation or of equipment essential for operation of the refrigerating installation, like for new buildings, surveys are to be performed in accordance with approved particulars.

D.3.4 Other extraordinary surveys

D.3.4.1 Loading port survey

D.3.4.1.1 Where the owner or any other interested party requests for a loading port survey to be carried out prior to taking over refrigerated cargo, this will be performed as stated below. The certificate on such survey documents the present condition of the installation. No relevant entry will be made in the Register.

D.3.4.1.2 Where no Surveyor to Germanischer Lloyd is available at the loading port, the loading port survey may be conducted at one of the preceding ports of call.

If no Surveyor to Germanischer Lloyd is available there either, the survey report submitted by an expert or, failing that, a survey report signed by two of the ship’s engineers may be accepted.

D.3.4.1.3 The loading port survey is to be carried out as follows:
- The refrigerated spaces, scuppers and bilges in the refrigerated cargo spaces are to be clean and dry, the cargo space ceilings and battens have to be in order, and the insulation and other fixtures are to be free from defects.
- The bilge pipes, sounding and drain pipes of the refrigerated cargo spaces are to be in good condition and effective.
- The Surveyor has to check whether the entire refrigerating installation operates without objections, and to record the temperatures in the cargo spaces or refrigerated cargo containers.
- The refrigerated cargo spaces and air ducts are to be free of odour, so that no unfavourable effects upon the cargo to be loaded are to be expected.
- The proper operation of air duct couplings for connecting refrigerated containers to the ship’s own refrigerating installation is to be checked, as is the intactness of the air ducts. If refrigerated cargo containers are coupled to the air ducts during the onboard survey, the tight sealing effect of the couplings is also to be checked.

D.3.4.2 Technical safety surveys

D.3.4.2.1 On request, GL will perform technical safety surveys in accordance with approved particulars and, if appropriate, pressure tests on essential components (e.g. apparatus and vessels under refrigerant pressure) of refrigerating installations for provisions, air conditioning etc.

D.3.4.2.2 On request, GL will also carry out the required periodical surveys of the pressure vessels and apparatus exposed to refrigerant pressure, mentioned above.

D.3.4.3 Specially agreed surveys

D.3.4.3.1 Where surveys are required on account of (national) official ordinances, international conventions or other provisions, GL will perform these on request by or on behalf of operators, in accordance with the relevant regulations.

D.3.4.3.2 Also, upon special agreement, GL will carry out condition surveys on the occasion of change of ownership.

D.3.5 All activities as outlined in D.3.1 to 3.4 are likewise subject to the general conditions of Section 1.
Section 3  Surveys - General Requirements

E  Diving Systems
For diving systems, diving simulators and diver pressure chambers see the GL Rules for Diving Systems and Diving Simulators (I-5-1).

F  Towing Gear
See GL Rules for Hull Structures (I-1-1), Section 25, D.
**A Oil Tankers**

**A.1 General Requirements**

**A.1.1 Application**

**A.1.1.1** The following instructions refer to oil tankers and product carriers as defined by the GL Rules for Hull Structures (I-1-1), Section 24, i.e., also to ships intended for the alternative carriage of dry cargo or oil, and to double hull oil tankers.

**A.1.1.2** The following requirements apply to surveys of hull structure and piping systems in way of cargo tanks, pump rooms, cofferdams, pipe tunnels, void spaces within the cargo area, and for all ballast tanks on ships with the class notation ESP additionally to the arrangements in Section 3. IACS UR Z10.1 or Z10.4 are also applicable to these ships.

Unless otherwise stated in the following, the arrangements in Section 3 apply.

**A.1.2 Extent of surveys**

**A.1.2.1** The surveys are to cover all installations, outfit and equipment related to the carriage and handling of oil cargo. They also cover the surveys required by the SOLAS 74 regulations for oil tankers. The protective equipment and the safety equipment required by the SOLAS 74 regulations for protection of the personnel as well as other equipment and outfit, which are no class requirement items, are not covered by the present Rules for Classification and Surveys. These items will, however, be included in the surveys, if compliance with the requirements of an Administration has to be certified.

**A.1.2.2 Hull**

The following requirements under A.2 to 4. define the minimum extent of examinations. The surveys are to be extended where substantial corrosion and/or structural defects are found, and will include an additional close-up survey (close visual inspection range, preferably within reach of hand) where deemed necessary by the Surveyor.

**A.1.2.3 Repairs**

Necessary repairs, see Section 2, B.2.4.
A.1.3 Documents to be carried on board

A.1.3.1 The owner is to supply and maintain on board documentation as specified under A.1.3.2 and A.1.3.3 which is to be readily available for the Surveyor. The documentation is to be kept on board for the life time of the ship.

A.1.3.2 Survey Report File

A Survey Report File is to be part of the documentation on board:
- reports on structural surveys
- Executive Hull Summary
- thickness measurements reports

The Survey Report File is to be available also in the Owners management office.

A.1.3.3 Supporting documents

- main structural plan of cargo and ballast tanks
- previous damage and repair history
- cargo and ballast history
- extent of use of inert gas plant and tank cleaning procedures
- inspections by ship's personnel with reference to
  - structural deterioration in general
  - leakage in bulkheads and piping
  - condition of protective coating or corrosion prevention
- Survey Programme as required under A.1.6 till the completion of the next Class Renewal Survey
- Description and history corrosion prevention systems, if any
- Information regarding conversion or modification of cargo and ballast tanks
- any other information that will help to identify Suspect Areas requiring inspection

A.1.4 Access to Structures

A.1.4.1 Regarding accessibility to spaces, absence of gases, removal of residual cargo and rust, and in respect of lighting, the ship is to be prepared such as to enable it to be duly examined without any risk.

Where soft or semi-hard coating has been applied, safe access is to be provided for the surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

A.1.4.2 For close-up surveys in cargo and ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:
- permanent or temporary staging
- passages through structures
- hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms
- boats or rafts
- other equivalent means

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2 Applicable in conjunction with Class Notation ESP, see Section 2, C.3.1.6
3 "Soft coating" means: Solvent-free coating on base of wool grease, grease, mineral oils and/or wax that remains soft so that it wears off when touched.
A.1.5 Survey at Sea

Upon prior agreement with the owner, GL may carry out surveys at sea or at anchorage, provided the Surveyor is given the necessary assistance, including safety equipment, by the personnel on board. See also Section 3, A.1.4.

A.1.6 Survey programme

For each Class renewal as well as for intermediate surveys for oil tankers over 10 years of age, a survey programme / planning document has to be worked out in advance. This planning document is prepared by GL Head Office and adjusted to the actual situation found on board by the owner in cooperation with the surveyor during the intermediate survey. The completed planning document is then reviewed by GL Head Office.

A.2 Annual Surveys

A.2.1 General

In addition to the surveys as stipulated in Section 3, C.1.1 the following installations, structural elements, items of equipment and outfit, including facilities for handling and carriage of the oil cargo as stated below in A.2.2 to A.2.8, are to be surveyed in order to ensure that they are maintained in satisfactory condition.

Prior to inspection, the Surveyor shall examine the documentation required to be kept on board for this type of vessel, as a basis for the survey, see A.1.3.

A.2.1.2 The annual survey is to ensure that the cargo handling installations and pertinent safety equipment are in good working order. The surveys are preferably to be carried out during loading or discharging operations.

For the aforementioned surveys normally access to cargo holds or other spaces within the cargo area necessitating gas-freeing is not required, unless checking of the equipment for correct functioning is not possible otherwise.

A.2.2 Installations on the weather deck

A.2.2.1 On the weather deck the following equipment, if fitted, will have to be surveyed and/or checked:

- cargo tank hatches, including seals and covers
- cargo tank pressure/vacuum relief valves and flame arresters
- air pipe heads/flame arresters of all bunker tanks and the like
- cargo, crude oil washing, bunkering, ballast and cargo tank vent line systems, including remotely controlled valves and safety equipment
- cargo tank gauging systems
- for electrical equipment, see A.2.4
- for fire-extinguishing equipment, see A.2.5.
- emergency towing appliances for oil tankers exceeding to 20.000 tdw
- safe access to tanker bow

A.2.2.2 The cargo handling installations (including spool pieces of the loading and unloading system, spray shields and drip trays, cargo hoses, etc.) arranged on the weather deck, possibly in the fore or aft area, are to be visually examined.

A.2.3 Pump rooms and pipe tunnels

Equipment in pump rooms and other enclosed spaces serving cargo handling operations, including pipe tunnels if fitted, is to be checked, in particular as to leakages and potential sources of danger (explosion protection), e. g.:

- condition of bulkheads and bulkhead penetrations (cracks, leakages)
- all piping systems including pressure gauges
Section 4 Surveys - Special Ship Types

- cargo, stripping, bilge and ballast pumps for leakages, as far as practicable
- electrical and mechanical remote control and emergency stopping equipment, see also A.2.4
- ventilation systems
- fire extinguishing systems, see also A.2.5

A.2.4 Electrical installations

In gas-dangerous spaces and zones the electrical equipment, including cables and their supports is to be visually examined, particularly regarding explosion protection.

A.2.5 Fire-extinguishing systems

The survey of the fire-extinguishing systems covers
- external inspection of all systems for the cargo tank area, including the pump room
- checking of the foam fire extinguishing and/or water spraying system on deck, see Section 3, C.1.1.4.

A.2.6 Inert gas systems

A survey of the inert gas system covers:
- external checking of important system components for wear and corrosion
- external checking of piping, fittings and safety equipment, including operational test of the blowers
- checking of the soot blowers as to interlocking
- checking of the alarm, recording and safety equipment

A.2.7 Ballast tanks

Ballast tanks shall be surveyed, within annual surveys, as a consequence of findings on the occasion of an intermediate or Class Renewal Survey, see A.3.3 and Section 3, C.1.2.2.

Ballast tanks are to be examined at annual intervals where:
- a hard protected coating has not been applied from the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion\(^4\) is found within the tank, or
- the hard protective coating is found in less than good condition\(^5\) and the hard protective coating is not repaired to the satisfaction of Surveyor

Regarding the renewal of protective coating see Section 3, C.1.2.2.5.

If considered necessary by the Surveyor, thickness measurements are to be carried out, which are to be extended if substantial corrosion is found.

A.2.8 Miscellaneous

On the occasion of the annual survey also the following items are to be checked:
- special arrangements related to damage control, e.g. sliding bulkhead doors in accordance with the approved damage control plan
- cargo sample stowage spaces
- gas detection instruments
- cargo information, safety instructions, etc., see A.1.3.

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\(^4\) Substantial corrosion is an extent of corrosion such that assessment of corrosion pattern indicate a wastage in excess of 75 \% of allowable margins, but within acceptable limits. For vessels built under the IACS Common Structural Rules for Bulk Carriers and Oil Tankers, substantial corrosion is an extent of corrosion such that the assessment of the corrosion pattern indicates a gauged (or measured) thickness between \(t_{net} + 0.5 \text{ mm}\) and \(t_{net} - 0.5 \text{ mm}\).

\(^5\) Good condition: Condition with only minor spot rusting
A.3 Intermediate Surveys

A.3.1 General

A.3.1.1 In addition to the surveys and checks listed in item 2 above, on the occasion of the second or the third annual survey the checks mentioned below will be carried out. If deemed necessary by the Surveyor, functional test, pressure tests or thickness measurements are to be carried out in addition to the survey.

A.3.1.2 For oil tankers of 15 years of age and over the intermediate survey is to be carried out in dry-dock. For oil tankers of less than 15 years of age, GL may agree to an in-water survey according to Section 3, C.1.7.

A.3.1.3 In case of ships exceeding 10 years of age the intermediate survey is to be enhanced to the scope of previous Class Renewal Survey according to A.1.6 and A.4. Pressure testing of ballast and cargo tanks and the requirements for longitudinal strength evaluation of hull girder according to A.4.2.3.4 are not required unless deemed necessary by the attending Surveyor.

A.3.1.4 Concurrent crediting for surveys and thickness measurements to both Intermediate and Class Renewal Survey is not acceptable.

A.3.2 Installations in the cargo area

A.3.2.1 Irrespective of the vessel's age the condition of the cargo, tank cleaning, bunkering, ballast, steam and venting systems, as well as of the vent masts and headers is to be checked. In cases of any doubt on whose condition pressure tests and/or wall thickness measurements may be demanded. Cargo tank high velocity vent and pressure/vacuum valves are to be function tested, and if deemed necessary by the Surveyor, to be opened up and re-adjusted.

A.3.2.2 Beyond this, the following is to be checked:
- drainage of cargo tank vent lines
- bonding devices of all piping systems and cargo tanks built-in independent from the hull
- cargo hoses (repeat test, if needed)

A.3.3 Ballast tanks

A.3.3.1 Vessels over 5 and up to 10 years of age

All ballast tanks are to be examined at non-double hull oil tankers. When considered necessary by the Surveyor, thickness measurement and testing are to be carried out to ensure that the structural integrity remains effective.

A ballast tank is to be examined at subsequent annual intervals where:
- a hard protective coating has not been applied from the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

Regarding the renewal of protective coating, see also Section 3, C.1.2.2.5.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in A.2.7.

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6 Suspect Areas: Locations showing substantial corrosion and/or considered by the Surveyor to be prone to rapid wastage.
Section 4 Surveys - Special Ship Types

A.3.3.2 Vessels more than 10 years of age

For the intermediate survey of ships exceeding 10 years of age, see A.3.1.3.

A.3.3.3 For double hull oil tankers, see Table 4.1.

Table 4.1 Intermediate Surveys (Hull) of Double Hull Oil Tankers. Minimum Requirements for Overall and Close-up Survey and Thickness Measurement

<table>
<thead>
<tr>
<th>Ship's age [years]</th>
<th>Overall survey of representative water ballast tanks, selected by the attending surveyor (the selection is to include fore and aft peak tanks and three other tanks)</th>
<th>Thickness measurements of those areas found to be suspect at the previous Class Renewal Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 &lt; age ≤ 10</td>
<td>As for the previous Class Renewal Survey, see also A.3.1.3</td>
<td>As for the previous Class Renewal Survey, see also A.3.1.3</td>
</tr>
<tr>
<td>10 &lt; age ≤ 15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>age &gt; 15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A.3.3.4 Thickness measurements

Thickness measurements are to be carried out in areas found to be suspect during the previous Class Renewal Survey. In case of ships exceeding 10 years of age please refer also to A.3.1.3.

Where substantial corrosion is found, the extent of the thickness measurements is to be increased.

Authorization for thickness measurements see Section 3, C.2.2.

A.3.4.1 For double hull oil tankers, see Table 4.1.

A.3.5 Electrical installations

A.3.5.1 Irrespective of the vessel's age, electrical equipment and cables in gas-dangerous spaces, such as pump rooms and spaces adjacent to cargo tanks, are to be inspected. Insulation measurements are to be carried out (only in gas-free or inerted condition). Any measurement protocols kept on board may be considered.

A.3.5.2 Beyond this, in gas-dangerous areas the following checks are to be made:
- protective earthing of system components (spot checks)
- integrity of certified safe-type equipment
- damages to outer sheet of cables
- function testing of pressurized equipment and of associated alarms

A.3.6 Inert gas systems

The survey is to be carried out according to GL survey-programmes, see Section 3, B.1.5.7.

A.4 Class Renewal Surveys

A.4.1 General requirements

A.4.1.1 In addition to the Class Renewal Surveys of the ship's hull, the machinery plant and electrical installation, according Section 3, C.1.3, the structural elements, equipment and outfit including the cargo system and pertinent safety devices listed in A.3.2 for intermediate survey, are to be subjected to thorough examination and testing for proper functioning at the Surveyor's discretion.
It is to be verified that the relevant instructions, documentation and information material, such as cargo handling plans, cargo tank loading limit information etc. are kept on board, see A.1.3.

A.4.1.2 The Class Renewal Survey of cargo handling installations and related control, alarm and safety devices cannot normally be carried out during loading or discharging operations and is preferably to be carried out with the ship in gas-free condition.

A.4.1.3 Spaces and areas serving cargo handling operations (e.g. cargo control rooms and pump rooms), are to be examined with respect to their general condition and possible sources of danger. All accessible gas tight bulkhead penetrations including gastight shaft seals are to be visually examined.

A.4.1.4 Regarding planning/survey programme, see A.1.6.

A.4.1.5 For Class Renewal Surveys of oil tankers (hull), the "Continuous Class Renewal" procedure described in Section 3, B.1.3.6 is excluded.

A.4.1.6 The Class Renewal Survey is to be held when the ship is in dry-dock or on a slipway, unless a dry-docking survey has been carried out within the admissible period, see Section 3, B.1.6.7. The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating and the rudder can be examined.

A.4.1.7 Concurrent crediting for surveys and thickness measurements to both Intermediate and Class Renewal Survey is not acceptable.

A.4 Hull in the cargo area

A.4.2 General requirements

A.4.2.1 All cargo tanks, ballast tanks including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined. This examination is to be supplemented by thickness measurements and tank testing as deemed necessary to ensure that the structural integrity continues to be given.

The examination is to be sufficiently thorough for revealing substantial corrosion, significant deformations, fractures, damages or other structural deteriorations affecting vessel's class. Special attention is to be drawn to the structure and the coating in ballast tanks for necessity of annual inspections, see A.2.7.

Regarding anticipated thickness measurements, see also Section 3, C.2.3.5.

A.4.2.2 Cargo piping on deck, including crude oil washing piping, and cargo and ballast piping within the above spaces are to be examined and tested to working conditions to ensure their continued satisfactory condition.

Special attention is to be given to ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces.

A.4.2.3 The survey extent of combined ballast/cargo holds is to be determined based on the records of ballast history, the corrosion prevention system provided, and the extent of corrosion found, see A.1.3.

A.4.2.2 Surveys

A.4.2.2.1 Overall Survey

An overall survey of all cargo and ballast tanks and spaces is to be carried out, see also A.3.3.1.

For fuel oil, lubricating oil and fresh water tanks, the necessity for the overall survey is to be determined based on the ship's age, see Section 3, Table 3.1.

A.4.2.2.2 Close-up Surveys

Close-up Surveys are to be carried out at least acc. to the requirements shown in Table 4.2 or, for double hull oil tankers, Table 4.3, depending on the age of the vessel.

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey and the condition of the corrosion prevention system, and also in the following cases:
Section 4 Surveys - Special Ship Types

- in particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information
- tanks which have structures approved with reduced scantlings due to an approved corrosion control system

For areas in tanks where the protective coating is found to be in a good condition, the extent of close-up surveys according to Tables 4.2 and 4.3 may be specially considered by the Surveyor.
### Class Renewal Surveys (Hull) of Oil Tankers, Ore/Oil Ships etc.

**Minimum Requirements for Close-up Surveys**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ≤ 5</td>
</tr>
<tr>
<td>One complete transverse web frame ring including adjacent structural members in a ballast wing tank (if existing) or a cargo wing tank used primarily for water ballast.</td>
</tr>
<tr>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td>All complete transverse web frame rings including adjacent structural members in a ballast wing tank (if existing) or a cargo wing tank used primarily for water ballast.</td>
</tr>
<tr>
<td>III. 10 &lt; age ≤ 15</td>
</tr>
<tr>
<td>All complete transverse web frame rings including adjacent structural members</td>
</tr>
<tr>
<td>• in all ballast tanks</td>
</tr>
<tr>
<td>• in a cargo wing tank</td>
</tr>
<tr>
<td>IV. and subsequent, age &gt; 15</td>
</tr>
<tr>
<td>As for class renewal survey no. III</td>
</tr>
<tr>
<td>Additional transverse frames as deemed necessary by the Surveyor.</td>
</tr>
<tr>
<td>One deck transverse including adjacent deck structural members in a cargo tank</td>
</tr>
<tr>
<td>One deck transverse including adjacent deck structural members</td>
</tr>
<tr>
<td>• in each remaining ballast tank (if existing)</td>
</tr>
<tr>
<td>• in two cargo centre tanks</td>
</tr>
<tr>
<td>• in a cargo wing tank</td>
</tr>
<tr>
<td>A minimum of 30 % of all complete transverse web frame rings including adjacent structural members in each remaining cargo wing tank (see Note I)</td>
</tr>
<tr>
<td>Additional complete transverse web frame rings as considered necessary by the surveyor</td>
</tr>
<tr>
<td>Both complete transverse bulkheads –including girder system and adjacent members in a ballast wing tank, if any, or a cargo wing tank used primarily for water ballast</td>
</tr>
<tr>
<td>Lower part of one transverse bulkhead including girder system and adjacent structural members</td>
</tr>
<tr>
<td>• in a ballast tank</td>
</tr>
<tr>
<td>• in a cargo centre tank</td>
</tr>
<tr>
<td>• in a cargo wing tank</td>
</tr>
<tr>
<td>All complete transverse bulkheads including girder system and adjacent members</td>
</tr>
<tr>
<td>• in all ballast tanks</td>
</tr>
<tr>
<td>• in all cargo tanks</td>
</tr>
<tr>
<td>As for class renewal survey no. III</td>
</tr>
</tbody>
</table>

**Note I:** The 30 % value is to be rounded up to the next whole integer.
### Table 4.3 Class Renewal Surveys (Hull) of Double Hull Oil Tankers

**Minimum Requirements for Close-Up Surveys**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship's age [years]</th>
<th>I.  age ( \leq ) 5</th>
<th>II.  ( 5 &lt; \text{age} \leq 10 )</th>
<th>III.  ( 10 &lt; \text{age} \leq 15 )</th>
<th>IV. and subsequent, age ( &gt;15 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>One web frame (see Note III) including adjacent structural members in a ballast tank (see Note I)</td>
<td>All web frames (see Note III) including adjacent structural members in a ballast tank (see Note I)</td>
<td>All web frames (see Note III) including adjacent structural members in all ballast tanks</td>
<td>As for class renewal survey no. III. Additional transverse areas as deemed necessary by the surveyor.</td>
<td></td>
</tr>
<tr>
<td>One web frame (see Note II) including adjacent structural members in a ballast tank</td>
<td>All web frames (see Note III) including adjacent structural members in a ballast tank (see Note I)</td>
<td>All web frames (see Note III) including adjacent structural members in all ballast tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One deck transverse including adjacent deck structural members (or external structure on deck in way of the tank, where applicable) in a cargo tank</td>
<td>One deck transverse including adjacent deck structural members (or external structure on deck in way of the tank, where applicable) in two cargo tanks</td>
<td>One web frame (see Note IV) including adjacent structural members in a cargo tank</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One complete transverse bulkhead (see Note VI) including girder system and adjacent structural members in a ballast tank (see Note I)</td>
<td>One complete transverse bulkhead (see Note VI) including girder system and adjacent structural members in each ballast tank (see Note I)</td>
<td>One complete transverse bulkhead (see Note VI) including girder system and adjacent structural members in all ballast tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower part of one transverse bulkhead (see Note VIII) including girder system and adjacent structural members</td>
<td>Lower part of one transverse bulkhead (see Note VIII) including girder system and adjacent structural members</td>
<td>Lower part of one transverse bulkhead (see Note VIII) including girder system and adjacent structural members</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• in a cargo centre tank</td>
<td>• in two cargo centre tanks</td>
<td>• in a cargo wing tank (see Note II)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• in a cargo wing tank (see Note II)</td>
<td>• in a cargo wing tank</td>
<td>As for class renewal survey no. III.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Lower part: considered to be the part below light ballast water line

**Note I:** Ballast tank means ballast double bottom tank plus double side tank plus double deck tank (as applicable), even if these tanks are separated

**Note II:** Where no cargo centre tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in additional wing tanks are to be surveyed accordingly

**Note III:** Web frame in ballast tanks means vertical web in side tanks, hopper web in hopper tanks, floor in double bottom tanks and deck transverse in double deck tanks (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members

**Note IV:** Web frame in cargo tanks means deck transverse, longitudinal bulkhead vertical girder and cross ties (where fitted), including adjacent structural members

**Note V:** Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom

**Note VI:** Complete transverse bulkhead in ballast tanks including girder system and adjacent structural members such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, and connecting brackets

**Note VII:** Complete transverse bulkhead in cargo tanks including girder system, adjacent structural members such as longitudinal bulkheads, and internal structure of lower and upper stool (where fitted)

**Note VIII:** Lower part of transverse bulkhead in cargo tanks including girder system, adjacent structural members such as longitudinal bulkheads, and internal structure of lower stool (where fitted)
A.4.2.2.3 Tank corrosion prevention

Where provided, the condition and/or function of protective coating or corrosion prevention of cargo and ballast tanks is/are to be examined. Detail procedure (possible change to annual surveys) as under A.3.3.1, regardless of the ship’s age.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate survey commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in A.2.7.

A.4.2.3 Thickness measurements

A.4.2.3.1 The minimum requirements for thickness measurements on the occasion of Class Renewal Surveys are stated in Table 4.4. Extended measurements may be required by the Surveyor, e.g. for areas with substantial corrosion and/or as specified in the survey programme, see A.1.6. Thickness measurements shall be witnessed by the Surveyor to the necessary extent.

A.4.2.3.2 For areas in tanks where the protective coating is found to be in a good condition, the extent of thickness measurements according to Table 4.4 may be specially considered by the Surveyor. That means sufficient measurements are to be taken to confirm the actual average condition of the structure under the coating.

A.4.2.3.3 Transverse sections are to be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements. At least one of these transverse sections is to include a ballast tank within 0.5 L amidships.

A.4.2.3.4 Regarding thickness measurements see also Section 3, C.2. For oil tankers, exceeding 10 years of age and 130 m in length L, the longitudinal strength is to be evaluated using the actual thickness measurements. The maximal allowable diminution of midship section modulus should be calculated using specific criteria.

A.4.2.4 Tank testing

A.4.2.4.1 The minimum requirements for tank testing are given in Table 4.5. The Surveyor may require tank testing to be extended as deemed necessary. IACS UR Z10.1 or Z10.4 are to be followed as applicable.

A.4.2.4.2 Regarding pressure heads and testing with air pressure, see Section 3, C.1.3.2.1.4.

Table 4.4 Class Renewal Surveys (Hull) of Single and Double Hull Oil Tankers, Ore/Oil Ships etc. Minimum Requirements for Thickness Measurements

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.  age ≤ 5</td>
</tr>
<tr>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td>III. 10 &lt; age ≤ 15</td>
</tr>
<tr>
<td>IV. and subsequent, age &gt; 15</td>
</tr>
</tbody>
</table>

| One section of deck plating for the full beam of the ship (see Note I) within the cargo area |
| Within the cargo area:                                                                         |
|   • each deck plate                                                                            |
|   • one transverse section (see Note I) within 0.5 L amidships                                  |
| Within the cargo area:                                                                         |
|   • each deck plate                                                                            |
|   • two transverse sections (see Note I) within 0.5 L amidships                                 |
| Within the cargo area:                                                                         |
|   • each deck plate                                                                            |
|   • three transverse sections (see Note I) within 0.5 L amidships                               |
|   • each bottom plate                                                                          |

Measurements of structural members subject to close-up survey according to Table 4.2 or 4.3, for general assessment and recording of corrosion pattern

<table>
<thead>
<tr>
<th>Suspect areas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Selected wind and water strakes outside the cargo area</td>
</tr>
<tr>
<td>All wind and water strakes full length</td>
</tr>
<tr>
<td>All wind and water strakes within the cargo area</td>
</tr>
</tbody>
</table>

Note: A transverse section includes the chosen frame and all adjacent longitudinal structural members, i.e. plating, longitudinal stiffeners and girders, in all concerned tanks and spaces

Note I: On single hull tankers preferably in way of a ballast tank (if existing) or a cargo tank used primarily for water ballast
### Table 4.5 Class Renewal Surveys (Hull) of Oil Tankers, Ore/Oil Ships, Double Hull Oil Tankers etc., Minimum Requirements for Tank Testing

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
<th>I. age ≤ 5</th>
<th>II. 5 &lt; age ≤ 10</th>
<th>III. 10 &lt; age ≤ 15</th>
<th>IV. and subsequent, age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams</td>
<td>All ballast tank boundaries</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All cargo tank bulkheads</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### A.4.3 Cargo area equipment

**A.4.3.1** Cargo and ballast piping systems, including valves and fittings, are to be internally inspected for corrosion as deemed necessary by the Surveyor. Subsequently, a pressure test is to be carried out.

**A.4.3.2** Cargo, stripping and ballast pumps are to be examined and checked. Pressure relief valves of pumps are to be function tested.

**A.4.3.3** Cargo tank high velocity vent and pressure/vacuum valves are to be overhauled, adjusted by makers/recognized firm and tested under supervision of a Surveyor.

**A.4.3.4** Tank venting systems are to be examined; flame arresters are to be opened as far as necessary, and cleaned.

**A.4.3.5** Cargo tank heating systems are to be examined and pressure-tested to 1.5 times the operating pressure, see Section 3, C.1.5.4.4.

**A.4.3.6** The bilge systems of pump rooms and cofferdams are to be inspected and tested.

**A.4.3.7** All ventilation systems in the cargo area including portable fans are to be examined and function-tested.

**A.4.3.8** The following equipment is to be function-tested:

- level indicators of cargo tanks
- liquid level alarms
- overflow controls
- pressure and temperature alarms
- remote-control systems of cargo pumps
- sampling arrangements of cargo tanks, if fitted
- for inert gas systems see A.3.6.

### A.4.4 Electrical installations

In addition to the inspection and tests as per A.3.5 the protection devices of electric motors are to be tested.
B Oil Recovery Vessels

B.1 General Requirements

B.1.1 Application

B.1.1.1 The following instructions refer to oil recovery vessels as defined by the GL Rules for Oil Recovery Vessels (I-1-9).

B.1.1.2 Unless otherwise stated in the following, the arrangements as per Section 3 and A. apply.

B.1.2 Extent of surveys

B.1.2.1 The surveys are to cover installations, outfit and equipment for:

- operation in oil covered waters
- recovering oil floating on the water
- the carriage and handling of oil cargo

They also cover the surveys required by the SOLAS regulations for oil tankers.

The protective equipment and the safety equipment required by the SOLAS regulations for protection of the personnel as well as other equipment and outfit, which are no class requirement items, are not covered by the present Rules for Classification and Surveys. These items will, however, be included in the surveys, if compliance with the requirements of an Administration has to be certified.

B.1.2.2 Hull

The following requirements under B.2 to B.4 define the minimum extent of examinations. The surveys are to be extended where substantial corrosion and/or structural defects are found, and will include an additional close-up survey (close visual inspection range, preferably within reach of hand) where deemed necessary by the Surveyor.

B.1.3 Documents to be carried on board

In addition to the documents specified in A.1.3 the following information is to be readily available for the Surveyor's use in connection with the survey:

- operation- and equipment manual
- maintenance records for the gas detection and alarm system

and any information that will help to identify suspect areas requiring inspection.

B.1.4 Access to Structures

B.1.4.1 Regarding accessibility to spaces, absence of gases, removal of residual cargo and rust, and in respect of lighting, the ship is to be prepared such as to enable it to be duly examined without any risk.

B.1.4.2 For close-up surveys in cargo and ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent or temporary staging
- passages through structures
- hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms
- boats or rafts
- other equivalent means

B.1.5 Survey at Sea

Upon prior agreement with the owner, GL may carry out surveys at sea or at anchorage, provided the Surveyor is given the necessary assistance, including safety equipment, by the personnel on board, see also Section 3, A.1.4.
Section 4 Surveys - Special Ship Types

B.2 Annual Surveys

B.2.1 General

B.2.1.1 In addition to the surveys as stipulated in Section 3, C.1.1 the following installations, structural elements, items of equipment and outfit, including facilities for handling and carriage of the oil cargo, are to be surveyed in order to ensure that they are maintained in satisfactory condition.

Prior to inspection, the Surveyor shall examine the documentation required to be kept on board for this type of vessel, as a basis for the survey, see B.1.3.

B.2.1.2 The annual survey is to ensure that the equipment for operation in oil-covered waters and for oil recovery as well as the cargo handling installations and pertinent safety equipment are in good working order.

For the aforementioned surveys normally access to cargo holds or other spaces within the cargo area necessitating gas-freeing is not required, unless checking of the equipment for correct functioning is not possible otherwise.

B.2.2 Installations on the weather deck

On the weather deck the oil recovery equipment will have to be surveyed and/or checked in addition to the items specified in A.2.2.

B.2.3 Pump rooms

Equipment in pump rooms and other enclosed spaces used during oil recovery and cargo handling operations is to be checked, in particular as to leakages and potential sources of danger (explosion protection), e.g.:

- equipment according A.2.3
- equipment for the recovery of oil (separation plants) and the associated pumping and piping arrangements

B.2.4 Electrical installations

In gas-dangerous spaces and zones the electrical equipment, including cables and their supports is to be visually examined, particularly regarding explosion protection.

B.2.5 Fire-extinguishing systems

The scope of survey of the fire-extinguishing systems is as specified in A.2.5.

B.2.6 Equipment for operation in oil-covered waters

The following equipment for operation in oil-covered waters is to be visually examined and to be checked:

- air locks
- arrangements for effecting the closures necessary for explosion protection
- ventilation system for pressurizing accommodation, workshops and machinery spaces (test operation)
- vapour detection and alarm systems and portable gas detection equipment

B.2.7 Ballast tanks

In the case of ballast tanks the procedure as outlined in A.2.7 shall be followed, if applicable.

B.2.8 Miscellaneous

See A.2.8.
B.3 Intermediate Surveys

B.3.1 General

In addition to the surveys and checks listed in item B.2 above, on the occasion of the second or the third annual survey the checks mentioned below will be carried out. If deemed necessary by the Surveyor, apart from the survey a functional test will be performed.

B.3.2 Installations in the cargo area

B.3.2.1 Irrespective of the vessel's age the condition of the cargo, oil recovery, tank cleaning, bunkering, ballast, steam and venting systems, as well as of the ventilation and ventilator heads is to be checked. In cases of doubt pressure tests and/or wall thickness measurements may be demanded. Cargo tank high velocity vent valves and pressure/vacuum valves are to be function tested, and if deemed necessary by the Surveyor, to be opened up and re-adjusted.

B.3.2.2 In the case of oil recovery vessels, beyond this, the following are to be checked:
- drainage of cargo tank vent lines
- bonding devices of all piping systems and independent cargo tanks
- cargo hoses (repeat test, if needed)
- sea inlet discharge valves
- for appliances with pressurized enclosures, see B.3.5.

B.3.3 Ballast and cargo tanks

For the scope of the surveys refer to A.3.3.

B.3.4 Thickness measurements

Thickness measurements are to be carried out in sections found to be suspect on occasion of the previous Class Renewal Survey. In case of substantial corrosion the extent of the thickness measurements is to be increased.

B.3.5 Electrical installations

For the scope of the surveys refer to A.3.5.

B.4 Class Renewal Surveys

B.4.1 General requirements

B.4.1.1 In addition to the Class Renewal Surveys of the ship's hull, the machinery plant and electrical installation, the cargo system, the oil recovery system, and the pertinent safety devices listed in B.3.2 for intermediate survey are to be subjected to thorough examination and testing for proper functioning at the Surveyor's discretion. It is to be verified that the relevant instructions, documentation and information material, such as cargo handling plans, cargo tank loading limit information etc. are kept on board, see B.1.3.

B.4.1.2 The Class Renewal Survey of cargo handling installations and related control, alarm and safety devices cannot normally be carried out during loading or discharging operations and is preferably to be carried out with the ship in gas-free condition.

B.4.1.3 Spaces and areas used in connection with cargo handling (e.g. cargo control rooms and pump rooms), are to be examined with respect to their general condition and possible sources of danger. All accessible gas tight bulkhead penetrations including gastight shaft seals are to be visually examined.

B.4.1.4 Dry-docking, see Section 3, C.1.3.1.3 and A.4.1.6.

B.4.1.5 The equipment for operation of the vessel in oil-covered waters has to be subjected to thorough surveys and operational tests.
### B.4.2 Hull

#### B.4.2.1 General requirements

**B.4.2.1.1** All cargo tanks, ballast tanks including double bottom tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined. This examination is to be supplemented by thickness measurements and tank testing as deemed necessary to ensure that the structural integrity continues to be given.

The examination is to be sufficiently thorough for revealing substantial corrosion, significant deformations, fractures, damages or other structural deteriorations.

Regarding anticipated thickness measurements, see also Section 3, C.2.3.5.

**B.4.2.1.2** All piping systems within the above spaces are to be examined and tested under working conditions to ensure their continued satisfactory condition.

Special attention is to be given to ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces.

**B.4.2.1.3** The survey extent of combined ballast/cargo holds is to be evaluated based on the records of ballast history, see B.1.3.

#### B.4.2.2 Surveys

**B.4.2.2.1** An overall survey of all tanks and spaces is to be carried out.

**B.4.2.2.2** The scope of close-up surveys is to be established based on the requirements shown in Table 4.2 or, for double hull vessels, Table 4.3, depending on the age of the vessel and the operational profile of the vessel during the last period of class.

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey and the condition of the corrosion protection system, and also in the following cases:

- in particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships according to available information
- tanks which have structures approved with reduced scantlings due to an approved corrosion control system

**B.4.2.2.3** Tank corrosion prevention

Where provided, the condition and/or function of protective coating or corrosion prevention of ballast tanks is to be examined. Detail procedure (possible change to annual intervals) as under Section 3, C.1.2.2 and A.3.3.1 (2nd paragraph).

#### B.4.2.3 Thickness measurements

**B.4.2.3.1** The scope of thickness measurements is to be established based on the requirements shown in Table 4.4 depending on following items:

- age of the vessel
- operation of the vessel during the last period of class
- results of the close-up surveys acc. to B.4.2.2.2.

**B.4.2.3.2** Transverse sections are to be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements.

In cases where three sections are to be measured, at least one is to include a ballast tank within 0.5 L.

**B.4.2.3.3** Regarding thickness measurements, see also Section 3, C.2.

#### B.4.2.4 Tank testing

**B.4.2.4.1** The scope of tank testing shall be established based on the requirements shown in Table 4.5 depending on following items:

- age of the vessel
Section 4 Surveys - Special Ship Types

- operation of the vessel during the last period of class
- results of the close-up surveys according to B.4.2.2.2
- results of the thickness measurements according to B.4.2.3.

B.4.2.4.2 Regarding pressure heads and testing with air pressure, see Section 3, C.1.3.2.1.4.

B.4.3 Cargo area equipment

B.4.3.1 Cargo, oil recovery and ballast piping systems, including valves and fittings, are to be internally inspected for corrosion as deemed necessary by the Surveyor. Subsequently, a pressure test is to be carried out.

B.4.3.2 Cargo, stripping, oil recovery, and ballast pumps are to be examined and checked. Pressure relief valves of pumps are to be function tested.

B.4.3.3 Cargo tank high velocity vent and pressure/vacuum valves are to be overhauled, adjusted by makers/recognized firms and tested under supervision of a Surveyor.

B.4.3.4 Tank venting systems are to be examined; flame arresters are to be opened as far as necessary, and cleaned.

B.4.3.5 Cargo tank heating systems are to be examined and pressure-tested to 1.5 times the operating pressure, see Section 3, C.1.5.4.4.

B.4.3.6 The bilge systems of pump rooms are to be inspected and tested.

B.4.3.7 All ventilation systems in the cargo area including portable fans are to be examined and function-tested.

B.4.3.8 The following equipment is to be function-tested:
- level indicators of cargo tanks
- liquid level alarms
- overflow controls
- pressure and temperature alarms
- remote-control systems of cargo pumps
- sampling arrangements of cargo tanks, if fitted

B.4.4 Equipment for operation in oil-covered waters

The equipment for operation in oil-covered waters and the pertinent safety equipment have to be subject to thorough surveys and operational tests.

B.4.5 Electrical installations

In addition to the inspection and tests as per B.3.5 the protection devices of electric motors are to be tested.

C Chemical Tankers

C.1 General requirements

C.1.1 Range of application

C.1.1.1 The following arrangements relate to chemical tankers as defined in the GL Rules for Chemical Tankers (I-1-7).

C.1.1.2 Unless otherwise stipulated in the following, the requirements of Section 3 apply. For ships with the class notation ESP IACS UR Z10.3 is also applicable.
C.1.1.3 In the case of chemical tankers also qualified as oil or product carriers additionally A. is to be observed.

C.1.2 Scope of surveys

C.1.2.1 The surveys are to cover all installations, outfit and equipment related to the carriage and handling of chemicals. They also cover the surveys required by the IMO Codes for Chemical Tankers. 7

The protective equipment and the safety equipment required by the Codes for protection of the personnel as well as other equipment and outfit which are no class requirement items are not covered by the present Rules for Classification and Surveys. These items will, however, be included in the surveys, if compliance with the requirements of an Administration has to be certified, see the GL Rules for Chemical Tankers (I-1-7), Section 1.

Reference should be made to the procedures stated in the IBC Code regarding the authorization of recognized institutions, surveys and issuance, validity and extension of certificates. The “Certificate of Fitness” required for chemical tankers is issued either by the Administration of the vessel's flag state on the basis of GL certificates or, if GL is authorized by the respective flag state, by GL itself.

C.1.2.2 Hull

The following defines the minimum extent of examinations. The surveys shall be extended where substantial corrosion and/or structural defects are found, and will include an additional close-up survey (close visual inspection range, preferably within reach of hand) where deemed necessary by the Surveyor.

C.1.2.3 Repairs

Necessary repairs, see Section 2, B.2.4.

C.1.3 Documents to be carried on board

C.1.3.1 The owner is to supply and maintain on board documentation as specified under C.1.3.2 and C.1.3.3 which should be readily available for the Surveyor. The documentation is to be kept on board for the life time of the ship.

C.1.3.2 Survey Report File

A Survey Report File is to be part of the documentation on board:

- reports on structural surveys
- Executive Hull Summary 2
- thickness measurements reports 2

The Survey Report File shall be available also in the Owners management office.

C.1.3.3 Supporting Documents

- main structural plan of cargo and ballast tanks
- list of substances permitted to be carried (Annex I to "Certificate of Fitness")
- previous repair history
- cargo and ballast history 2
- extent of use of inert gas plant and tank 2 cleaning procedures
- inspections by ship's personnel with reference to 2
  - structural deterioration in general

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7 “Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk” (BCH Code) for ships the keels of which were laid on or after 12.4.1972, and with some limitations, also for ships built before that date;

"International Code for the Construction and Equipment of Ships Carrying Dangerous Chemicals in Bulk" (IBC Code) for ships, the keels of which were laid on or after 1.7.1986.

The IBC Code is also part of the MARPOL Convention (Annex II), and of the SOLAS Convention 1974 (Chapter VII).
Section 4 Surveys - Special Ship Types

- leakage in bulkheads and piping
- condition of protective coating or corrosion prevention

• survey Programme as required under C.1.6 until the completion of the next Class Renewal Survey
• any other information that will help the Surveyor to identify Suspect Areas requiring inspection

C.1.4 Access to structures

C.1.4.1 The ship's spaces are to be made accessible, adequately lighted, freed from gas and cleaned, so that they may be properly examined without risk.

Where soft or semi-hard coating has been applied, safe access is to be provided for the surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

C.1.4.2 For close-up surveys in cargo and ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:

- permanent or temporary staging
- passages through structures
- hydraulic arm vehicles such as conventional cherry pickers, lifts and moveable platforms
- boats or rafts
- other equivalent means

C.1.5 Survey at sea

Upon prior agreement with the owner, GL may carry out surveys at sea or at anchorage, provided the Surveyor is given the necessary assistance, including safety equipment, by the personnel on board, see also Section 3, A.1.4.

C.1.6 Survey programme

For each Class renewal as well as for intermediate surveys to chemical tankers over 10 years of age, a survey programme / planning document have to be worked out in advance. This planning document is prepared by GL Head Office and adjusted to the actual situation found on board by the owner in cooperation with the surveyor during the intermediate survey. The completed planning document is then reviewed by GL Head Office.

C.2 Annual surveys

C.2.1 General

C.2.1.1 In addition to the surveys as stipulated in Section 3, C.1.1, the following installations, items of equipment and outfit as listed in C.2.2 to 2.10 below are to be checked as to their perfect maintenance condition.

C.2.1.2 The annual survey is to ensure that the cargo handling installations and pertinent safety equipment are in good working order.

C.2.1.3 The surveys are preferably to be carried out during loading or discharging operations.

C.2.1.4 Access to cargo tanks or other spaces within the cargo area, necessitating gas-freeing will normally not be required unless necessary for checking items of equipment and installations for correct functioning.

C.2.2 Installations on the weather deck

C.2.2.1 On the weather deck the following equipment, if fitted, is to be surveyed and/or examined:

- cargo tank hatches, including seals, covers, coamings and flame screens
- tank gauging devices, level alarms and overflow controls with automatic closing valves
Section 4 Surveys - Special Ship Types

- cargo, washing, bunkering, ballast and cargo tank vent line systems, including vent masts and headers, remotely controlled valves and safety equipment
- pressure/vacuum relief valves and flame arresters of the cargo tank venting arrangements as well as devices for measuring the cargo tank vapour pressure
- flame arresters on vents to all bunker, oily ballast and oily slop tanks
- sampling devices of cargo cooling or heating installations as well as temperature measuring devices and temperature alarm systems
- pump discharge pressure gauges and the distinctive marking of pumps, valves and cargo piping.
- wheelhouse doors and wheelhouse windows, deckhouse and superstructure windows facing the cargo area (closing condition).
- electrical installations, see C.2.4
- for fire-extinguishing systems, see C.2.5.
- emergency towing appliances for chemical tankers exceeding 20,000 tdw
- safe access to tanker bow

C.2.2.2 The cargo handling installations (including spool pieces of the loading and unloading system, spray shields and drip trays, cargo hoses, etc.) arranged on the weather deck, possibly in the fore or aft area, are to be visually examined.

C.2.3 Pump rooms and pipe tunnels
Equipment in pump rooms and other enclosed spaces serving cargo handling operations, including pipe tunnels if fitted, is to be checked, in particular as to leakages and potential sources of danger (explosion protection), e.g.:
- condition of bulkheads and bulkhead penetrations (cracks, leakages)
- all piping systems including pressure gauges
- cargo, stripping, bilge and ballast pumps for leakages, as far as practicable
- electrical and mechanical remote control and emergency stopping equipment, see also C.2.4
- ventilation systems
- rescue arrangements
- for fire-extinguishing systems, see C.2.5.

C.2.4 Electrical installations
In gas-dangerous spaces and zones, the electrical equipment, including cables and their supports, is to be visually examined, particularly regarding explosion protection.

C.2.5 Fire extinguishing systems
The survey of the fire-extinguishing systems covers:
- external inspection of all systems for the cargo tank area
- checking of the foam fire-extinguishing and/or water-spraying system on deck, see also Section 3, C.1.1.4.

C.2.6 Inert gas systems
The arrangements for the inert of cargo tanks and spaces surrounding cargo tanks and for padding of cargo tanks by filling with inert gas or dry air are to be examined as to their operability.

C.2.7 Ballast tanks
Ballast tanks shall be surveyed, within annual surveys, as a consequence of findings on the occasion of an intermediate or Class Renewal Survey, see A.3.3.1 and Section 3, C.1.2.2.

Regarding the renewal of protective coating, see Section 3, C.1.2.2.5.

If considered necessary by the Surveyor, thickness measurements are to be carried out, which are to be extended if substantial corrosion is found.
Section 4 Surveys - Special Ship Types

C.2.8 Miscellaneous

On the occasion of the annual survey also the following items, if fitted, are to be checked:

- special arrangements related to damage control (e.g. sliding bulkhead doors) in accordance with
  the approved damage control plan (also for tankers of less than 100 m in length).
- cargo sample stowage space
- gas detection instruments
- cargo information, safety instructions, etc., see C.1.3

C.2.9 OSV for carrying hazardous and noxious liquid substances

Onboard Offshore Service Vessels (OSV) assigned the additional notation HNLS for carrying hazardous
and noxious liquid substances, the equipment employed for cargo handling and monitoring (piping,
pumps, valves, safety equipment) is to be surveyed. As far as accessible, spaces employed for storage
are to be subjected to a general condition survey.

C.3 Intermediate surveys

C.3.1 General

C.3.1.1 In addition to the surveys and checks listed in C.2 above, on the occasion of the second or
third annual survey the checks listed below are to be performed. If deemed necessary by the Surveyor,
functional test, pressure tests or thickness measurements are to be carried out in addition to the survey.

C.3.1.2 For chemical tankers of 15 years of age and over the intermediate survey is to be carried out
in dry-dock. For chemical tankers of less than 15 years of age, GL may agree to an in-water survey ac-
cording to Section 3, C.1.7.

C.3.1.3 In case of ships exceeding 10 years of age the intermediate survey is to be enhanced to the
scope of the preceding Class Renewal Survey according to C.1.6 and C.4. Pressure testing of ballast and
cargo tanks is not required unless deemed necessary by the attending Surveyor.

C.3.1.4 Concurrent crediting for surveys and thickness measurements to both Intermediate and Class
Renewal Survey is not acceptable.

C.3.2 Installations in the cargo area

Irrespective of the vessel's age, all important piping systems in the cargo area are to be examined, e.g.:

- cargo, tank-cleaning, bunkering, ballast and steam piping (if considered necessary by the Surveyor,
  pressure testing or thickness measurements may be required
- provisions for drainage of cargo tank vent lines
- cargo tank high velocity vent and pressure/vacuum valves are to be function tested, and if deemed
  necessary by the Surveyor, to be opened up and re-adjusted
- bonding devices of all piping systems and cargo tanks built-in independent from the hull
- cargo hoses (repeat test, if needed)
- cargo cooling systems
- tank heating systems

C.3.3 Ballast tanks

C.3.3.1 Vessels over 5 and up to 10 years of age

For tanks used for water ballast, an overall survey of representative tanks selected by the Surveyor is to
be carried out. If such inspections reveal no visible structural defects, the examination may be limited to a
verification that the hard protective coating remains in good condition.

A ballast tank is to be examined at subsequent annual intervals where:

- a hard protective coating has not been applied from the time of construction, or
- a soft or semi-hard coating has been applied, or
- substantial corrosion is found within the tank, or
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- the hard protective coating is found to be in less than good condition and the hard protective coating is not repaired to the satisfaction of the Surveyor.

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

Regarding the renewal of protective coating see also Section 3, C.1.2.2.5.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in C.2.7.

C.3.3.2 Vessels over 10 and up to 15 years of age
For the intermediate survey of ships exceeding 10 years of age, see C.3.1.3.

C.3.3.3 Vessels more than 15 years of age
For the intermediate survey of ships exceeding 15 years of age, see C.3.1.3.

The overall and close-up surveys and thickness measurements, as applicable, of the lower portions of the cargo and water ballast tanks (below light ballast water line) are to be carried out in accordance to the applicable requirements for intermediate surveys, if not already performed.

C.3.4 Thickness measurements
Thickness measurements shall be carried out in areas found to be suspect during the previous Class Renewal Survey. In case of ships exceeding 10 years of age please refer also to C.3.1.3.

Where substantial corrosion is found, the extent of the thickness measurements should be increased.

Authorization for thickness measurements, see Section 3, C.2.2.

C.3.5 Electrical installations
Irrespective of the vessel's age, the electrical equipment in gas-dangerous spaces and zones is to be examined with respect to the following:
- protective earthing (spot checks)
- integrity of certified safe-type equipment
- damages to outer sheet of cables
- function testing of pressurized equipment, and of associated alarms
- Isolation resistance of circuits (only in gas-free or inert condition). If proper test reports are available on board, the readings made by the crew may be accepted.

C.3.6 Inert gas systems
For ships with the class notation INERT, a survey according to GL survey programmes is to be carried out.

C.3.7 OSV for carrying hazardous and noxious liquid substances
Onboard Offshore Service Vessels (OSV) assigned the additional notation HNLS for carrying hazardous and noxious liquid substances, all tanks employed for the storage of such substances, including piping and fittings, have to be thoroughly examined for corrosion and possible damages to their protective coatings, where provided. The thickness measurements in these areas are to be conducted analogously to those of chemical tankers.

C.4 Class Renewal Surveys

C.4.1 General requirements

C.4.1.1 In addition to the Class Renewal Surveys of the ship's hull, the machinery plant and electrical installation according to Section 3, C.1.3 to 1.6, the structural elements, equipment and outfit including the cargo system and pertinent safety devices listed in C.3.2. for intermediate survey are to be subjected to thorough examination and testing for proper functioning, at the Surveyor's discretion.
It is to be ensured that the relevant instructions and information material, such as cargo handling plans, cargo tank loading limit information, etc. are kept on board, see C.1.3.

C.4.1.2 The Class Renewal Survey of cargo handling installations and pertinent control, alarm and safety devices cannot normally be carried out during loading or discharging operations and is preferably to be carried out with the ship in gas-free condition.

C.4.1.3 Spaces and areas serving cargo handling operations (e.g. cargo control rooms and pump rooms) are to be examined with respect to their general condition and possible sources of danger. All accessible gas-tight bulkhead penetrations, including gas-tight shaft seals, are to be visually examined.

C.4.1.4 Surveys for general condition, close-up surveys, tank pressure tests and thickness measurements of the hull are to be carried out in accordance with C.4.2. Regarding the preparation of a survey programme, see C.1.6.

C.4.1.5 The Class Renewal Survey is to be held when the ship is in dry-dock or on a slipway, unless a dry-docking survey has been carried out within the admissible period, see Section 3, B.1.6.7. The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating and the rudder can be examined.

C.4.1.6 For Class Renewal Surveys of chemical tankers (hull), the "Continuous Class Renewal" procedure described in Section 3, B.1.3.6 is excluded.

C.4.1.7 Concurrent crediting for surveys and thickness measurements to both Intermediate and Class Renewal Survey is not acceptable.

C.4.2 Hull

C.4.2.1 General requirements

C.4.2.1.1 All cargo tanks, ballast tanks including double bottom tanks, pumprooms, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined.

The examination is to be sufficiently thorough for revealing substantial corrosion, significant deformations, fractures, damages or other structural deteriorations. Special attention is to be drawn to the structure and the coating in ballast tanks for necessity of annual inspections, see A.2.7.

The examination is to be supplemented by thickness measurements and tank testing as deemed necessary to ensure that the structural integrity continues to be given. Regarding anticipated thickness measurements, see also Section 3, C.2.3.5.

C.4.2.1.2 All piping systems on deck and within the above spaces are to be examined and tested under working conditions to ensure their continued satisfactory condition.

Special attention is to be given to ballast piping in cargo tanks and cargo piping in ballast tanks and void spaces. Surveyors are to be advised on all occasions when these piping including fittings are open during repair periods for internally examination.

C.4.2.1.3 The survey extent of combined ballast/cargo holds is to be evaluated based on the records of ballast history, the corrosion prevention system provided, and the extent of corrosion found, see C.1.3.

C.4.2.2 Surveys

C.4.2.2.1 Overall surveys

An overall survey of all cargo and ballast tanks and spaces is to be carried out, see also C.3.3.1.

The survey of stainless steel tanks is to be carried out as an overall survey and can be supplemented by a close-up survey as deemed necessary by the Surveyor. For fuel oil, lubricating oil and fresh water tanks the necessity for an overall survey is to be determined based on the ship’s age, see also Table 3.1.

C.4.2.2.2 Close-up surveys

Depending on the design and age of the ship, in general, close-up surveys shall be carried out at least according to the requirements shown in Table 4.6 and Table 4.7.

The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under surveys and the condition of the corrosion prevention system, and also in the following cases:
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- in particular, tanks having structural arrangements or details which have suffered defects in similar tanks or on similar ships acc. to available information
- tanks which have structures approved with reduced scantlings due to an approved corrosion control system
- stainless steel tanks, see C.4.2.2.1
- pipes see C.4.2.3.5.

For areas in tanks where the protective coating and/or lining are found to be in a good condition, or where the tanks are made of stainless steel, the extent of close-up surveys according to Table 4.6 may be specially considered by the Surveyor.

Table 4.6 Class Renewal Surveys (Hull) of Single Skin Chemical Tankers
Minimum Requirements for Close-up Surveys

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship's age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ( \leq 5 )</td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>One complete transverse web frame ring including adjacent structural members in a ballast wing tank</td>
</tr>
<tr>
<td>One deck transverse including adjacent deck structural members in a cargo tank or on deck</td>
</tr>
<tr>
<td>Lower part of one transverse bulkhead including girder system and adjacent structural members: ( \text{in a ballast tank} ) ( \text{in a cargo centre tank} ) ( \text{in a cargo wing tank} ) (see Note I)</td>
</tr>
</tbody>
</table>

**Note:** Lower part: considered to be the part below light ballast water line

**Note I:** Where no cargo centre tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in additional wing tanks are to be surveyed accordingly.
## Table 4.7 Class Renewal Surveys (Hull) of Double Skin Chemical Tankers
### Minimum Requirements for Close-up Surveys

| Class Renewal Survey [No.] and ship's age [years] |
|---|---|---|---|
| I.  age \( \leq 5 \) | II.  \( 5 < \text{age} \leq 10 \) | III.  \( 10 < \text{age} \leq 15 \) | IV.  and subsequent, \( \text{age} > 15 \) |
| One web frame (see Note III) including adjacent structural members in a ballast double hull tank (see Note I) | All web frames (see Note III) including adjacent structural members in a ballast wing tank or a ballast double hull tank (see Note I) | All web frames (see Note III) including adjacent structural members in all ballast tanks | As for class renewal survey no. III |
| | The knuckle area (see Note V) and the upper part (approx. 3 metres) including adjacent structural members of one web frame in each remaining ballast tank | All web frames (see Note IV) including adjacent structural members in a cargo wing tank | Additional transverse areas as deemed necessary by the Surveyor |
| One deck transverse including adjacent deck structural members (or external structure on deck in way of tank, where applicable) in a cargo tank or on deck | One deck transverse including adjacent deck structural members (or external structure on deck in way of tank, where applicable) in two cargo tanks | One web frame (see Note IV) including adjacent structural members in each remaining cargo tank | |
| One complete transverse bulkhead (see Note VI) including girder system and adjacent structural members in a ballast tank (see Note I) | One complete transverse bulkhead (see Note VI) including girder system and adjacent structural members in each ballast tank (see Note I) | All complete transverse bulkheads (see Note VI) including girder system and adjacent structural members in all ballast tanks | As for class renewal survey no. III |
| Lower part of one transverse bulkhead (see Note VIII) including girder system and adjacent structural members | Lower part of one transverse bulkhead (see Note VIII) including girder system and adjacent structural members | All complete transverse bulkheads (see Note VII) including girder system and adjacent structural members in all cargo tanks | |
| • in a cargo centre tank | • in two cargo centre tanks | • in two cargo centre tanks | |
| • in a cargo wing tank (see Note II) | • in a cargo wing tank (see Note II) | • in a cargo wing tank (see Note II) | |

**Note:** Lower part: considered to be the part below light ballast water line

**Note I:** Ballast double hull tank means ballast double bottom tank plus double side tank plus double deck tank (as applicable), even if these tanks are separated

**Note II:** Where no cargo centre tanks are fitted (as in the case of centre longitudinal bulkhead), transverse bulkheads in additional wing tanks are to be surveyed accordingly

**Note III:** Web frame in ballast tanks means vertical web in side tanks, hopper web in hopper tanks, floor in double bottom tanks and deck transverse in double deck tanks (where fitted), including adjacent structural members. In fore and aft peak tanks web frame means a complete transverse web frame ring including adjacent structural members

**Note IV:** Web frame in cargo tanks means deck transverse, longitudinal bulkhead vertical girder and cross ties (where fitted), including adjacent structural members

**Note V:** Knuckle area is the area of the web frame around the connections of the slope hopper plating to the inner hull bulkhead and the inner bottom plating, up to 2 metres from the corners both on the bulkhead and the double bottom

**Note VI:** Complete transverse bulkhead in ballast tanks including girder system and adjacent structural members such as longitudinal bulkheads, girders in double bottom tanks, inner bottom plating, hopper side, and connecting brackets

**Note VII:** Complete transverse bulkhead in cargo tanks including girder system, adjacent structural members such as longitudinal bulkheads, and internal structure of lower and upper stool (where fitted)

**Note VIII:** Lower part of transverse bulkhead in cargo tanks including girder system, adjacent structural members such as longitudinal bulkheads, and internal structure of lower stool (where fitted)
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C.4.2.2.3 Tank corrosion prevention

Protective coating and/or corrosion prevention equipment, if fitted, are to be examined for their general condition and functioning. Detailed procedure (possible change to annual surveys), see C.3.3.1.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in A.2.7.

C.4.2.3 Thickness measurements

C.4.2.3.1 The minimum requirements for thickness measurements on the occasion of Class Renewal Surveys are stated in Table 4.8, depending on the ship's age.

Extended measurements may be required, e.g. for areas with substantial corrosion, and/or according to the statements in the survey programme, see C.1.6. The thickness measurements should be witnessed by the Surveyor to the necessary extent.

C.4.2.3.2 For areas in spaces where protective coating and/or lining are found to be in good condition, or where the cargo tanks are made of stainless steel (except for clad steel plating), the extent of thickness measurements according to Table 4.8 may be specially considered by the Surveyor. That means sufficient measurements are to be taken to confirm the actual average condition of the structure under the coating.

C.4.2.3.3 The selected transverse sections should include all continuous longitudinal structural elements. The sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

C.4.2.3.4 At least one of these transverse sections is to include a ballast tank within 0.5 L.

C.4.2.3.5 For chemical tankers exceeding 10 years of age, selected cargo pipes outside cargo tanks and ballast pipes passing through tanks are to be subjected to random thickness measurements, and selected pipe lengths opened for inspection if deemed necessary.

C.4.2.3.6 Regarding thickness measurements see also Section 3, C.2. For chemical tankers, which are also qualified as oil or product tankers, see also A.4.2.3.4.

Table 4.8 Class Renewal Surveys (Hull) of Chemical Tankers Minimum Requirements for Thickness Measurements

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
<th>I. age ≤ 5</th>
<th>II. 5 &lt; age ≤ 10</th>
<th>III. 10 &lt; age ≤ 15</th>
<th>IV. and subsequent, age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>One section of deck plating for the full beam of the ship in way of a ballast tank (see Note I) within the cargo area</td>
<td>Within the cargo area: • each deck plate • one transverse section (see Note I) within 0.5 L amidships</td>
<td>Within the cargo area: • each deck plate • two transverse sections (see Note I) within 0.5 L amidships</td>
<td>Within the cargo area: • each deck plate • three transverse sections (see Note I) within 0.5 L amidships • each bottom plate</td>
<td></td>
</tr>
<tr>
<td>Measurements of structural members subject to close-up survey according to Table 4.6, or 4.7 for general assessment and recording of corrosion pattern</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Suspect areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Selected wind and water strakes, outside the cargo area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All wind and water strakes within the cargo area</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A transverse section includes the chosen frame and all adjacent longitudinal structural members, i.e. plating, longitudinal stiffeners and girders, in all concerned tanks and spaces

Note I: On single hull tankers preferably in way of a ballast tank (if existing) or a cargo tank used primarily for water ballast
**C.4.2.4 Pressure tests**

**C.4.2.4.1** In general, pressure tests are to be carried out in line with Table 4.9. Depending on the design and use of the tanks, the Surveyor may accept deviations (e.g. correctly documented recent pressure tests of cargo tanks carried out by the crew) or require additional tests to be carried out. IACS UR Z10.1 or Z10.4 is to be followed as applicable.

**C.4.2.4.2** For the pressure heads, see Section 3, C.1.3.2.1.4.

**C.4.2.4.3** For chemical tankers exceeding 10 years of age, selected cargo pipes outside cargo tanks and ballast pipes passing through cargo tanks are to be pressure tested to the maximum working pressure.

**C.4.2.4.4** The testing of tanks and spaces not designed for carriage of liquid may be omitted provided as satisfactory internal examination together with an examination of the tank top is carried out.

**Table 4.9 Class Renewal Surveys (Hull) of Chemical Tankers Minimum Requirements for Tank Testing**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship's age [years]</th>
<th>I. age ≤ 5</th>
<th>II. 5 &lt; age ≤ 10</th>
<th>III. 10 &lt; age ≤ 15</th>
<th>IV. and subsequent, age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cargo tank boundaries facing ballast tanks, void spaces, pipe tunnels, pump rooms or cofferdams</td>
<td>All ballast tank boundaries</td>
<td></td>
<td></td>
<td>All cargo tank bulkheads</td>
</tr>
</tbody>
</table>

**C.4.3 Cargo area equipment**

**C.4.3.1** Cargo and ballast piping systems, including valves and fittings, are to be internally inspected for corrosion, as deemed necessary by the Surveyor. Subsequently, a pressure test is to be carried out.

**C.4.3.2** Cargo, stripping and ballast pumps are to be examined and checked. Pressure-relief valves of pumps are to be function-tested.

**C.4.3.3** Cargo tank high velocity vent and pressure/vacuum valves are to be overhauled, adjusted by makers/recognized firm and tested under supervision of a Surveyor.

**C.4.3.4** Tank venting systems are to be examined; flame arresters are to be opened as far as necessary, and cleaned.

**C.4.3.5** Cargo tank heating systems are to be examined and pressure-tested to 1.5 times the operating pressure, see Section 3, C.1.5.4.4.

**C.4.3.6** All ventilation systems in the cargo area, including portable fans, are to be examined and function-tested.

**C.4.3.7** The following equipment is to be function-tested:
- level indicators of cargo tanks
- liquid level alarms
- overflow controls
- pressure and temperature alarms
- remote-control systems of cargo pumps
- bilge systems of pump rooms and cofferdams
- sampling arrangements of cargo tanks, if fitted
- inert gas systems, if the survey is due, see C.3.6

**C.4.4 Electrical installations**

In addition to the inspections and tests according to C.3.5, the protection devices of electric motors are to be tested.
D Liquefied Gas Carriers

D.1 General requirements

D.1.1 The following arrangements relate to liquefied gas carriers as defined in the DNV GL rules SHIP Pt.5 Ch.7.

D.1.2 Unless otherwise stipulated in the following, the requirements in Section 3 apply.

D.1.3 The surveys are to cover all installations, outfit and equipment related to the carriage and handling of liquefied gases. They also cover the surveys required by the IMO Codes for Liquefied Gas Carriers. The fire protection equipment and the safety equipment required by the Codes for protection of the personnel as well as other equipment and outfit which are no class requirement items are not covered by the present Rules for Classification and Surveys. These items will, however, be included in the surveys, if compliance with the requirements of an Administration has to be certified, see also the DNV GL rules SHIP Pt.5 Ch.7 Sec.1.

Reference should be made to the procedures stated in the IGC Code regarding the authorization of recognized institutions, surveys and issuance, validity and extension of Certificates. The “Certificate of Fitness” required for liquefied gas carriers is issued either by the Administration of the vessel's flag state on the basis of GL Certificates or, if GL is authorized by the respective flag state, by GL itself.

D.1.4 The ship's spaces and tanks are to be made accessible, adequately lighted, freed from gas and cleaned, so that they may be properly examined without risk.

Where soft or semi-hard coating has been applied, safe access is to be provided for the Surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

D.1.5 For ships of special design, the survey intervals and procedures will be specially considered.

D.2 Annual surveys

D.2.1 General

D.2.1.1 In addition to the surveys as per Section 3, C.1.1, the components, equipment and outfit as listed below in D.2.2 to D.2.9 are to be examined as to whether they are in unobjectionable maintenance condition.

D.2.1.2 The annual survey is to ensure that the cargo handling installations and pertinent safety equipment are in good working order. The annual survey is preferably to be carried out during a loading or discharging operation. Access to cargo tanks or inert cargo holds, necessitating gas-freeing/venting will normally not be required unless deemed necessary by the Surveyor in specific cases.

D.2.1.3 The second annual survey during each period of class, or the third at the latest will be carried out in the form of an intermediate survey in accordance with a programme covering a wider scope, see D.3.

D.2.1.4 Spaces and areas used in connection with cargo handling (e.g. cargo control rooms, air-locks, compressor rooms), are to be examined with respect to their general condition and maintenance. All accessible gas-tight bulkhead penetrations, including gas-tight shaft seals, are to be visually examined.

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8 “Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk” (IGC Code) for ships ordered after 31.10.1976, but before 1.7.1986;

“Code for Existing Ships Carrying Liquefied Gases in Bulk” for ships ordered before 31.10.1976;

“International Code for the Construction and Equipment of Ships Carrying Liquefied Gases in Bulk” (IGC Code) for ships the keel of which is laid on or after 1.7.1986.

The IGC-Code is part of the SOLAS Convention 1974 (Chapter VII).
D.2.2 Cargo handling systems

D.2.2.1 The cargo and process piping, expansion joints, cargo hoses and machinery, such as heat exchangers, vaporizers pumps, and compressors are to be visually examined.

D.2.2.2 The availability of the required spool pieces for piping separation is to be verified.

D.2.2.3 The log books are to be examined with regard to correct functioning of the cargo containment and cargo handling systems. The running hours per day of the reliquifaction plant or the boil-off rate and the inert gas consumption are to be considered.

D.2.2.4 It is to be ensured that the relevant instructions and information material, such as cargo handling plans, cargo tank loading limit information, cooling-down procedures, etc. are on board.

D.2.3 Cargo containment venting systems

D.2.3.1 Venting systems for the cargo tanks, inter barrier spaces (in case of Type A tanks, cargo holds) are to be visually examined. It is to be verified that the cargo tank relief valves are sealed and that the certificate containing details on opening/closing pressures of the relief valves is on board.

D.2.3.2 Protection screens and flame arresters, if fitted, are to be examined for corrosion and cleanliness.

D.2.4 Instrumentation and safety systems

D.2.4.1 The monitoring and control equipment for pressure, temperature and liquid levels is to be verified as to its good working order, by one or several of the following methods:

- visual external examination
- comparison of read-outs of different indicators
- comparison of read-outs with the data of the cargo actually handled
- examination of repair and maintenance records with reference to the cargo plant repair and maintenance manual
- verification of calibration status of the measuring instruments

D.2.4.2 Emergency shut-down valves at shore connections and tanks are to be tested without flow in the pipe lines. It is to be verified that operation of the emergency shut-down system will cause the cargo pumps and compressors to stop.

D.2.4.3 The fixed and portable gas detection equipment, including indicators and alarms, is to be tested for correct functioning.

D.2.5 Electrical installations

In gas-dangerous spaces and zones the electrical equipment, including the cables and their supports, is to be visually examined, particularly regarding explosion protection.

D.2.6 Ventilation systems

Ventilation systems for all spaces in the cargo area, including cargo pump rooms, cargo compressor rooms, electric motor rooms, cargo control rooms and other spaces used for cargo handling operations are to be examined as to their satisfactory operating condition.

D.2.7 Inert gas and dry air systems

Inert gas/dry air systems, including the means for prevention of back-flow of cargo vapour to gas-safe spaces are to be checked as to their satisfactory operating condition.

D.2.8 Fire-fighting systems

All systems in the cargo tank area, including the compressor room, are to be checked visually, see also Section 3, C.1.1.4.
D.2.9 Miscellaneous

The following items of equipment are to be inspected for their condition and correct functioning:

- means for ensuring gas-tightness of the wheelhouse windows and doors, windows in end bulkheads of superstructures and deckhouses facing the cargo area or stern loading/unloading arrangements, and closing devices of all air intakes and openings into accommodations, service and control stations
- sealing arrangements for tanks or tank domes penetrating decks or tank covers
- drip trays or insulation for deck protection against cargo leakage
- arrangements for heating of hull structural elements, if any. Access to heated cofferdams, etc. is normally not required
- electric bonding of cargo piping systems
- arrangements for the use of boil-off gas as fuel, including alarm and safety systems
- emergency towing appliances for liquefied gas carriers exceeding 20,000 tdw
- safe access to tanker bow

D.3 Intermediate surveys

D.3.1 General

D.3.1.1 In addition to the surveys and checks as stipulated in D.2. and in Section 3, C.1.2 irrespective of the vessel's age, unless expressly stated otherwise, the checks mentioned below are to be carried out on the occasion of the second or third annual survey.

The intermediate survey supplements the preceding annual survey by testing of the cargo handling installations, with pertinent automatic controls, alarm and safety systems, for their correct functioning.

D.3.1.2 For some of the surveys and checks to be carried out within the scope of the intermediate survey, the ship is required to be in gas-free condition. They may be carried out on the occasion of dry-docking.

D.3.2 Ballast tanks

D.3.2.1 For ships between 5 and 10 years of age, an overall survey of representative ballast tanks is to be carried out. If there is no hard protective coating, soft or semi-hard coating or poor coating condition 9, the examination is to be extended to other ballast tanks of the same type.

D.3.2.2 For ships over 10 years of age, an overall survey of all ballast tanks is to be carried out.

D.3.2.3 If such examinations reveal no visible structural defects, the examination may be limited to a verification that the corrosion prevention system remains efficient.

D.3.2.4 For ballast tanks, excluding double bottom tanks, if there is no hard protective coating, soft or semi-hard coating or poor coating condition 9 and it is not renewed, the tanks in question are to be examined at annual intervals. When such conditions are found in double bottom ballast tanks, the tanks in question may be internally examined at annual intervals.

D.3.2.5 Minimum requirements for close-up surveys at intermediate survey are given in Table 4.12.

D.3.3 Cargo systems, tanks

D.3.3.1 Bonding of tanks and pipes is to be controlled.

D.3.3.2 It is to be checked whether the ship's cargo hoses are of approved type and in satisfactory condition. At intervals not exceeding 2.5 years, the cargo hoses are to be subjected to pressure and conductivity tests.

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9 Poor: General breakdown of coating over 20 % or more of areas, or hard scale at 10 % or more of areas under consideration.
D.3.3.3 Weather deck

The piping systems essential for operation of the ship, e.g. cargo transfer, bunker and ballast lines, are to be examined, see C.3.2.

D.3.4 Cargo containment venting systems

D.3.4.1 The drainage arrangements of the venting systems are to be examined.

D.3.4.2 If the cargo tanks are equipped with relief valves with non-metallic membranes in the main or pilot valves, such membranes are to be replaced by new ones and the valves are to be adjusted, function-tested, and sealed.

These measures need not be taken simultaneously with the intermediate survey, provided that the non-metallic membranes are renewed at intervals not exceeding 3 years.

D.3.5 Instrumentation and safety systems

D.3.5.1 The alarm, control and safety systems of the cargo installation are to be visually examined and tested by varying pressure, temperature and liquid level, as far as practicable, and comparisons are to be drawn, using test instruments. Simulated testing may be accepted for sensors which are not accessible or for sensors located within cargo tanks or inert cargo holds. This test is to include testing of alarm and safety functions.

D.3.5.2 The gas detection equipment, including indicators and alarms, is to be tested for correct functioning. The piping of the gas detection system is to be visually inspected for corrosion and damages. The tightness and integrity of the suction lines between suction points and analysing units is to be verified as far as possible.

Gas detectors are to be calibrated or verified with sample gases.

D.3.5.3 On ships having arrangements for the use of boil-off gases as fuel, the safety, control, alarm and shut-down systems are to be checked. The extent of the checks will be determined from case to case.

D.3.5.4 The emergency shutdown system is to be tested without flow in the pipelines, to verify that the system will cause the cargo pumps and compressors to stop.

D.3.6 Electrical installations

Electrical equipment in gas-dangerous spaces and zones is to be examined in respect of the following:

- protective earthing (spot checks)
- integrity of certified safe-type equipment
- damage to outer sheath of cables
- function-testing of pressurized equipment and associated alarms
- testing of systems for de-energizing non-certified safe electrical equipment located in spaces protected by air-locks, such as electric motor rooms, cargo control rooms, etc.
- checking of insulation resistance of circuits. Relevant measurements are only to be made when the ship is in gas-free or inert condition. If proper test reports are available on board, readings made by the crew may be accepted.
- when the ship is in gas-free condition, it is to be verified that the cargo tanks are electrically bonded to the hull

D.3.7 Inert gas system

The inert gas installation is to be tested in accordance with GL survey programmes.
Section 4 Surveys - Special Ship Types

D.4 Class Renewal Surveys

D.4.1 General requirements

In addition to the surveys and inspections referred to in D.3. and in Section 3, C.1.3, the examinations and tests as mentioned in D.4.2 to D.4.9 below are to be performed.

D.4.2 Hull in the cargo area

D.4.2.1 Extent of overall and close-up survey

D.4.2.1.1 An overall survey of all tanks and spaces, excluding fuel oil, lube oil and fresh water tanks, is to be carried out at each renewal survey.

Note
For fuel oil, lube oil and fresh water tanks, reference is to be made to Section 3, Table 3.1.

D.4.2.1.2 The minimum requirements for close-up surveys at renewal survey are given in Table 4.10.

D.4.2.1.3 The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and where tanks have structural arrangements or details which have suffered defects in similar spaces or on similar ships according to available information.

D.4.2.1.4 For areas in tanks where hard protective coatings are found to be in a good condition (see Section 3, C.3.3), the extent of close-up surveys according to Table 4.10 may be specially considered.

Note
For examination of automatic air pipe heads reference is made to Section 3, C.1.3.2.1.6.

D.4.2.2 Extent of thickness measurement

D.4.2.2.1 The minimum requirements for thickness measurements at renewal survey are given in Table 4.11.

D.4.2.2.2 The Surveyor may extend the thickness measurements as deemed necessary. When thickness measurements indicate substantial corrosion (see Section 3, C.1.1.2.6), the extent of thickness measurements is to be increased to determine the extent of areas of substantial corrosion.

D.4.2.2.3 For areas in tanks where hard protective coatings are found to be in a good condition, the extent of thickness measurement according to Table 4.11 may be specially considered.

D.4.2.2.4 Transverse sections are to be chosen where the largest reductions are suspected to occur or are revealed from deck plating measurements.

D.4.3 Cargo containment system

D.4.3.1 Surveys

D.4.3.1.1 All cargo tanks are to be inspected internally. Where applicable, inspections performed between the class renewals may be recognized.

D.4.3.1.2 As far as practicable, the outer surface of non-insulated cargo tanks or the outer surface of cargo tank insulations, including vapour or protective cover if any, is to be examined, as are areas in way of supports, keys and anti-flotation chocks. Partial removal of insulation may be required in order to verify the condition of the tank or the insulation itself, if found necessary by the Surveyor. Where, e. g. in the case of membrane-type cargo tanks, the insulation arrangement is such, that it cannot be examined, the surrounding structures of wing tanks, double bottom tanks and cofferdams are to be examined for cold spots when the cargo tanks are in cold condition. This examination may be dispensed with if the log book, together with the monitoring instruments, gives sufficient evidence of the integrity of the insulation system.
D.4.3.2 Non-destructive tests

D.4.3.2.1 Thickness measurements of the cargo tanks may be required, if deemed necessary by the Surveyor.

D.4.3.2.2 Non-destructive testing of the main structural members, tank shell and highly stressed parts, including welded connections is to supplement cargo tank inspection as far as deemed necessary by the Surveyor. However, for type C tanks this does not mean that non-destructive testing can be dispensed with totally. The following items are inter alia considered as highly stressed parts:

- cargo tank supports and longitudinal and transverse securing devices
- y-connections between tank shell and longitudinal bulkhead of bilobe tanks
- web frames or stiffening rings
- swash bulkheads and their fixations
- dome and sump connections to tank shell
- foundations for pumps, towers, ladders, etc.
- pipe connections

Table 4.10 Class Renewal Surveys (Hull) of Liquefied Gas Carriers

<table>
<thead>
<tr>
<th>Minimum Requirements for Close-up Surveys</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ≤ 5</td>
</tr>
<tr>
<td>One web frame in a representative ballast tank of the topside, hopper side and double hull side type</td>
</tr>
<tr>
<td>One transverse bulkhead in a ballast tank</td>
</tr>
<tr>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td>All web frames in a ballast tank, which is to be a double hull side tank or a topside tank. If such tanks are not fitted, another ballast tank is to be selected</td>
</tr>
<tr>
<td>One web frame in each remaining ballast tank</td>
</tr>
<tr>
<td>One transverse bulkhead in each ballast tank</td>
</tr>
<tr>
<td>III. and subsequent, age &gt; 10</td>
</tr>
<tr>
<td>All web frames in all ballast tanks</td>
</tr>
<tr>
<td>All transverse bulkheads in all ballast tanks</td>
</tr>
</tbody>
</table>

1. Complete transverse web frame including adjacent structural members.
2. Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.
3. Transverse bulkhead lower part including girder system and adjacent structural members.

Notes

1. Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.
2. For areas in tanks where coatings are found to be in good condition, the extent of close-up surveys may be specially considered by GL.
3. For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by GL.
4. The Surveyor may extend the close-up survey as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:
   - in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information;
   - in tanks having structures approved with reduced scantlings.
### Table 4.11 Class Renewal Surveys (Hull) of Liquefied Gas Carriers

**Minimum Requirements for Thickness Measurements**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
<th>I.  age ( \leq 5 )</th>
<th>II.  ( 5 &lt; \text{age} \leq 10 )</th>
<th>III.  ( 10 &lt; \text{age} \leq 15 )</th>
<th>IV.  and subsequent, ( \text{age} &gt; 15 )</th>
</tr>
</thead>
</table>
| One section of deck plating for the full beam of the ship within 0.5 L amidships in way of a ballast tank, if any | Within the cargo area: 
- each deck plate 
- one transverse section within 0.5 L amidships in way of a ballast tank, if any | Within the cargo area: 
- each deck plate 
- two transverse sections \(^1\) 
- all wind and water strakes | Within the cargo area: 
- each deck plate 
- three transverse sections \(^1\) 
- each bottom plate 
- duct keel plating and internals |

Selected wind and water strakes outside the cargo area

Measurements, for general assessment and recording of corrosion pattern, of those structural members subject to close-up survey according to Table 4.10

**Suspect areas**

1. At least one section is to include a ballast tank within 0.5 L amidships, if any.

**Notes**

1. *For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of thickness measurements may be increased to include the tank top plating at the discretion of the Surveyor.*
2. *For areas in spaces where coatings are found to be in good condition, the extent of thickness measurements may be specially considered by GL.*
3. *The Surveyor may extend the thickness measurements as deemed necessary. Where substantial corrosion is found, the extent of thickness measurements is to be increased to the satisfaction of the Surveyor.*

### Table 4.12 Intermediate Surveys (Hull) of Liquefied Gas Carriers

**Minimum Requirements for Close-up Surveys**

<table>
<thead>
<tr>
<th>Close-up survey of:</th>
<th>10 &lt; age ( \leq 15 )</th>
<th>age &gt; 15</th>
</tr>
</thead>
</table>
| all web frames and both transverse bulkheads in a representative ballast tank \(^1, 2\) | Close-up survey of: 
- all web frames and both transverse bulkheads in two representative ballast tanks \(^1, 2\) |
| the upper part of one web frame in another representative ballast tank | |
| one transverse bulkhead in another representative ballast tank \(^2\) | |

1. Complete transverse web frame including adjacent structural members.
2. Transverse bulkhead complete, including girder system and adjacent members, and adjacent longitudinal bulkhead structure.

**Notes**

1. *Ballast tanks include topside, double hull side, double bottom, hopper side, or any combined arrangement of the aforementioned, and peak tanks where fitted.*
2. *For areas in tanks where protective coating is found to be in good condition, the extent of close-up survey may be specially considered by GL.*
3. *For ships having independent tanks of type C, with a midship section similar to that of a general cargo ship, the extent of close-up surveys may be specially considered by GL.*
4. *The extent of close-up surveys may be extended by the Surveyor as deemed necessary, taking into account the maintenance of the tanks under survey, the condition of the corrosion prevention system and also in the following cases:*
   - *in particular, in tanks having structural arrangements or details which have suffered defects in similar tanks, or on similar ships according to available information;*
   - *in tanks having structures approved with reduced scantlings.*
D.4.3.2.3 For independent Type B tanks, the extent of non-destructive testing is defined in a programme specially prepared for the particular cargo tank design.

D.4.3.3 Tightness tests

D.4.3.3.1 The tightness of all cargo tanks is to be verified by an appropriate procedure. Provided that the effectiveness of the ship’s gas detection equipment has been confirmed, it will be acceptable to utilize this equipment for the tightness test of independent tanks below deck during the first process of filling of the cargo tanks subsequent to the Class Renewal Survey. Where applicable, inspections performed between the class renewals may be recognized.

D.4.3.3.2 Where the findings of checks according to D.4.3.1 to 4.3.3.1 or an examination of the log book raise doubts as to the structural integrity of a cargo tank, a hydrostatic or hydro pneumatic test is to be carried out. For integral tanks and for independent Type A and B tanks, the test pressure at the top of tank is to correspond to the MARVS (maximum allowable relief valve setting) of the tank. For independent Type C tanks, the test pressure at the top of tank is not to be less than 1.25 times the MARVS.

D.4.3.4 Extended tests

At intervals of 10 years and on the occasion of Class Renewal Surveys Nos. II, IV, VI, etc., all independent Type C tanks are to be either

- hydrostatically or hydro pneumatically tested to a pressure at upper edge of tank of 1.25 times MARVS and thereafter, non-destructively, in accordance with D.4.3.2.2 / D.4.3.2.3

or

- subjected to a thorough, systematically planned non-destructive testing procedure. These tests are to be carried out in accordance with a programme specially prepared for the particular tank design.

If a special programme does not exist, the following applies with regard to non-destructive testing:

Testing shall be concentrated on the detection of surface cracks in welded connections in highly stressed areas, as listed in D.4.3.2.2.

At least 10% of the length of the welded connections in each of the above mentioned areas are to be tested. This testing is to be carried out internally and externally, as far as practicable.

Insulation is to be removed as necessary for the required non-destructive testing.

D.4.3.5 Tank supporting structures and insulation, secondary barrier

D.4.3.5.1 As far as practicable, all hold spaces and hull insulation (if provided), secondary barriers and tank supporting structures are to be visually examined. The secondary barrier of all tanks is to be checked for its effectiveness by means of a pressure / vacuum test, a visual examination or some other acceptable method.

D.4.3.5.2 For membrane and semi-membrane tank systems inspection and testing as per D.4.3.5.1 are to be carried out in accordance with programmes specially prepared in accordance with an approved method for the actual tank system. For further details regarding testing of membrane containment systems and their barriers, see IACS UR Z16.

D.4.3.6 Pressure and vacuum relief valves

D.4.3.6.1 The pressure relief valves for the cargo tanks are to be opened for examination, adjusted, function-tested and sealed. The requirements of D.3.3.2 regarding replacement of non-metallic membranes apply. The following tolerances apply regarding the set pressures of the cargo tank pressure relief valves:

<table>
<thead>
<tr>
<th>Set pressure</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 bar to 1.5 bar</td>
<td>± 10 %</td>
</tr>
<tr>
<td>1.5 bar to 3.0 bar</td>
<td>± 6 %</td>
</tr>
<tr>
<td>≥ 3.0 bar</td>
<td>± 3 %</td>
</tr>
</tbody>
</table>
D.4.3.6.2 Pressure/vacuum relief valves, rupture discs and other pressure relief devices for inter-barrier spaces and hold spaces are to be examined, opened and tested if necessary, depending on their design.

D.4.3.7 Electric bonding
It is to be verified that the cargo tanks are electrically bonded to the hull.

D.4.4 Piping systems

D.4.4.1 The cargo, liquid nitrogen and process piping systems, including their valves and actuators, compensators etc., are to be opened for examination as deemed necessary by the Surveyor. Insulation is to be removed as deemed necessary to ascertain the external condition of the pipes. At the Surveyor’s discretion welded seams at branches and bends are to be subjected to non-destructive random crack tests. If the visual examination raises doubts as to the integrity of the pipelines, the pipeline is to be pressure-tested to 1.25 times the MARVS. After reassembly the complete piping system is to be tested for leaks.

D.4.4.2 The pressure relief valves in the piping systems are to be function-tested. A random selection of valves is to be opened for examination and adjusted.

D.4.4.3 Cargo pumps, booster pumps and gas compressors, as well as hoses and spool pieces used for segregation of piping systems, inert gas and bilging are to be inspected and tested.

D.4.5 Reliquification installation

D.4.5.1 The parts of the compressors subject to wear, such as cylinders, pistons, connecting rods, glands, bearings, auxiliary machinery components, such as the shafts, rotors and diffusers of centrifugal pumps, etc., are to be examined.

D.4.5.2 The drives of the compressors, including those components which are required for operation of the drives, are to be inspected.

D.4.5.3 All covers of the heat exchangers are to be dismounted for inspection of the pipe plates and pipes. After renewal of pipes or pipe plates, if necessary, pressure and tightness tests are to be conducted. If only a few pipes have been exchanged, a tightness test may be sufficient.

D.4.5.4 The safety equipment (pressure relief valves, rupture discs) is to be checked.

D.4.6 Process pressure vessels
At Class Renewal Surveys Nos. II, IV, VI, etc. all process pressure vessels are to be tested pneumatically at a pressure equal to 1.1 times the working pressure, unless the result of the survey requires a hydraulic pressure test to 1.5 times the working pressure.

D.4.7 Equipment for the use as fuel of gases evaporated from the LNG cargo

D.4.7.1 The gas conditioning plant is to be inspected externally.

D.4.7.2 The pipe or duct enclosing the gas fuel line is to be inspected for leaks. The ventilation system of that pipe or duct as well as the inert equipment of a double-wall piping system are to be checked for their operability.

Heat exchangers are to be visually examined internally.

D.4.7.3 Safety devices
See D.3.4.

D.4.8 Electrical installation
In addition to the visual examinations and tests as per D.3.5, the protection devices of electric motors are to be tested.
D.4.9 Miscellaneous

D.4.9.1 Drainage systems for removal of water or cargo from inter-barrier spaces and hold spaces are to be examined and tested where necessary.

D.4.9.2 All gas-tight bulkheads are to be inspected. The effectiveness of gas-tight shaft seals is to be verified.

D.4.9.3 Any installations for heating of hull structures are to be examined for correct functioning.

E Bulk Carriers

E.1 General Requirements

E.1.1 Application

E.1.1.1 The following requirements refer to the steel structure and related piping systems of all self-propelled single and double skin bulk carriers, in way of cargo holds, cofferdams, pipe tunnels, void spaces and fuel oil tanks within the cargo area, and to all ballast tanks. For ships with the class notation ESP IACS UR Z10.2 or Z10.5 are also applicable.

E.1.1.2 Unless otherwise stated in the following, the arrangements as per Section 3 apply.

E.1.1.3 For bulk carriers also designed for the carriage of crude oil A. should be observed as well.

E.1.2 Extent of surveys

The following defines the minimum extent of examinations. The surveys are to be extended where substantial corrosion and/or structural defects are found, and will include an additional close-up survey (close visual inspection range, preferably within reach of hand) where deemed necessary by the Surveyor.

E.1.2.1 Repairs

Necessary repairs, see Section 2, B.2.4.

E.1.3 Documents to be carried on board

E.1.3.1 The owner is to supply and maintain on board documentation as specified under E.1.3.2 and E.1.3.3 which is to be readily available for the Surveyor. The documentation is to be kept on board for the life time of the ship.

E.1.3.2 Survey Report File

A Survey Report is to be part of the documentation on board consisting of:

- reports on structural surveys
- Executive Hull Summary
- thickness measurements reports

The Survey Report File is to be available also in the Owners management office.

E.1.3.3 Supporting documents

- main structural plan of cargo holds and ballast tanks
- previous damage and repair history
- cargo and ballast history
- inspections by ship's personnel with reference to
  - structural deterioration in general
  - leakage in bulkheads and piping
  - condition of protective coating or corrosion prevention
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- Survey Programme as required under E.1.6 \(^2\) until such time as the next Class Renewal Survey has been completed
- description and history corrosion prevention systems, if any
- information regarding conversion or modification of cargo and ballast tanks
- any other information that will help to identify Suspect Areas requiring inspection

E.1.4 Access to structures

E.1.4.1 Regarding accessibility to spaces, absence of gases, removal of residual cargo and rust, and in respect of lighting, the ship is to be prepared such as to enable it to be duly examined without any risk.

Where soft \(^3\) or semi-hard coating has been applied, safe access is to be provided for the surveyor to verify the effectiveness of coating and to assess the internal structure. When safe access cannot be provided, it may be necessary to remove this soft or semi-hard coating, at least partially.

E.1.4.2 For close-up surveys in cargo holds and ballast tanks, one or more of the following means for access, acceptable to the Surveyor, is to be provided:
- permanent staging and passages through structures
- temporary staging, e.g. ladders and passages through structures
- hydraulic arm vehicles such as conventional cherry pickers, lifts and movable platforms
- boats or rafts
- other equivalent means

E.1.5 Survey at sea

Upon prior agreement with the owner, GL may carry out surveys at sea or at anchorage, provided the Surveyor is given the necessary assistance by the personnel on board, see also Section 3, A.1.4.

E.1.6 Survey programme \(^2\)

For each Class Renewal as well as for intermediate survey for bulk carriers over 10 years of age, a survey programme/planning document has to be worked out in advance. This planning document is prepared by GL Head Office and adjusted to the actual situation found on board by the owner in cooperation with the surveyor during the intermediate survey. The completed planning document is then reviewed by GL Head Office.

E.1.7 Additional Safety Measures

E.1.7.1 Strength evaluation of the foremost cargo hold

The strength of the transverse watertight corrugated bulkhead between cargo holds No. 1 and 2 \(^10\) and the allowable hold loading \(^11\), i.e. the strength of the internal structure of the double bottom in hold No. 1 have to be evaluated for flooded condition of the foremost cargo hold.

This applies to existing bulk carriers of 150 m in length and above, intended to carry solid bulk cargoes having a density of 1.78 t/m\(^3\), or above, with single deck, topside tanks, hopper tanks and single side shell or double skin construction of less than 760 mm breadth.

In connection with this strength calculation additional thickness measurements have to be taken of the aforementioned structures. Renewal and strengthening required are to be approved by GL. Thickness measurements and strength calculations are to be performed at all subsequent Intermediate Surveys (for ships over 10 years) and Class Renewal Surveys.

E.1.7.2 Damage stability requirements

Bulk carriers of 150 m in length and above of single side skin construction have to comply with the damage stability requirements as specified in SOLAS Reg. XII/4.

\(^2\) For requirements see UR S19 of IACS
\(^3\) For requirements see UR S22 and S23 of IACS
For possible exemptions please refer to SOLAS Reg. XII/9.

E.1.7.3 Cargo hold hatch cover securing arrangements

Bulk carriers which were not built in accordance with the particular requirements \(12\) for evaluation of the scantlings of hatch covers and hatch coamings of cargo holds have to comply with the additional requirements \(13\) for cargo hatch cover securing arrangements.

E.1.7.4 Side shell frames and brackets

Single side bulk carriers which were not built in accordance with the particular requirements \(14\) for side structures, as well as Oil/Bulk/Ore (OBO) carriers, have to be assessed for compliance with the respective renewal criteria for side shell frames and brackets \(15\).

In connection with this, additional thickness measurements and strength calculations have to be performed for the aforementioned structures. Renewal and strengthening required are to be approved by GL. Thickness measurements and strength calculations have to be performed at all subsequent intermediate and Class Renewal Surveys.

E.1.7.5 Water ingress detection and dewatering system

All bulk carriers have to comply with the requirements \(16\) concerning water level detectors in hold, ballast and dry spaces, as well as with the availability requirements \(17\) of pumping systems for dewatering and pumping ballast tanks forward of the collision bulkhead and bilges of dry spaces forward of the foremost cargo hold.

Function tests are to be carried out at a random basis at all subsequent annual surveys and in full scope at Class Renewal Surveys.

E.1.7.6 Strength and securing of small hatches on exposed Fore Deck

All bulk carriers have to comply with the requirements \(18\) concerning the strength and securing devices for small hatches fitted on the exposed fore deck.

Those hatches are designed for access to spaces below deck and are capable to be closed weather-tight or watertight, as applicable. There opening is normally 2.5 square meters or less.

E.1.7.7 Strength of Fore Deck fittings and Equipment

All bulk carriers have to comply with the requirements \(19\) concerning the strength of air pipes, ventilator pipes and their closing devices and windlasses.

E.1.7.8 Restriction from sailing with any hold empty

Bulk carriers of 150 m in length L and upwards of single-side skin construction carrying dry cargoes having a density of 1.780 kg/m\(^3\) and above, have to comply with the requirements \(20\) concerning the loading of cargo holds in full load condition (at least 90 % of ship's deadweight). Requirements are applicable after the vessel reaches 10 years of age and only if the vessel meets not the requirements for withstanding flooding of any one cargo hold.

\(12\) For requirements see UR S21 of IACS
\(13\) For requirements see UR S30 of IACS
\(14\) For requirements see UR S12 of IACS
\(15\) For requirements see UR S31 of IACS
\(16\) For requirements see SOLAS XII/12 and UI SC 180 of IACS
\(17\) For requirements see SOLAS XII/13 and UI SC 179 of IACS
\(18\) For requirements see UR S26 of IACS
\(19\) For requirements see UR S27 of IACS
\(20\) For requirements see SOLAS XII/14
E.2 Annual surveys

E.2.1 General
The survey is to ensure that the hull, weather decks, hatch covers, coamings and piping are maintained in satisfactory condition, see also Section 3, C.1.1.2. Prior to inspection, the Surveyor shall examine the documentation required to be kept on board for this type of vessel, as a basis for the survey, see E.1.3.

E.2.2 Hull and weather decks
Examination of hull, its closing appliances and watertight penetrations should be carried out as far as practicable.
Flame screens on vents to all bunker tanks as well as bunker and vent piping system including ventilators are to be examined.

E.2.3 Hatch covers, coamings

E.2.3.1 A thorough survey of cargo hatch covers and coamings is only possible by examination in the open as well as closed positions and should include verification of proper opening and closing operation. As a result, at least the hatch cover sets within the forward 25% of the ships length and at least one additional set, such that all the sets on the ship are assessed at least once in every five-year period, should be surveyed open, closed and in operation to the full extent in each direction at each annual survey, including:
   - stowage and securing in open condition;
   - proper fit and efficiency of sealing in closed condition; and
   - operational testing of hydraulic and power components, wires, chains and link drives.
The closing of covers should include the fastening of all peripheral, and cross joint cleats or other securing devices. Particular attention should be paid to the condition of hatch covers in the forward 25% of the ships length, where the sea loads are normally greatest.

E.2.3.2 If there are indications of difficulty in operation and securing hatch covers, additional sets above those required in E.2.3.1, at the discretion of the surveyor, should be tested in operation.

E.2.3.3 Where the cargo hatch securing system does not function properly, repairs should be carried out under the supervision of the surveyor. Where hatch covers or coamings undergo substantial repairs, the strength of securing devices should be upgraded to comply with Annex A, Part A, Annex 13 or Annex A, Part B, Annex 11 of the 2011 ESP Code as amended.

E.2.3.4 For each cargo hatch cover set, at each annual survey, the following items should be surveyed:
   - cover panels, including side plates, and stiffener attachments that may be accessible in the open position by close-up survey (for corrosion, cracks, deformation);
   - sealing arrangements of perimeter and cross joints (gaskets for condition and permanent deformation, flexible seals on combination carriers, gasket lips, compression bars, drainage channels and non-return valves);
   - clamping devices, retaining bars, cleating (for wastage, adjustment, and condition of rubber components);
   - closed cover locating devices (for distortion and attachment);
   - chain or rope pulleys;
   - guides;
   - guide rails and track wheels;
   - stoppers;
   - wires, chains, tensioners and gypsies;
   - hydraulic system, electrical safety devices and interlocks; and
   - end and interpanel hinges, pins and stools where fitted.
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E.2.3.5 At each hatchway, at each annual survey, the coamings, with plating, stiffeners and brackets should be checked for corrosion, cracks and deformation, especially of the coaming tops.

E.2.3.6 Where considered necessary, the effectiveness of sealing arrangements may be proved by hose or chalk testing supplemented by dimensional measurements of seal compressing components.

E.2.3.7 Where portable covers, wooden or steel pontoons are fitted, the satisfactory condition of the following should be confirmed:

- wooden covers and portable beams, carriers or sockets for the portable beam, and their securing devices;
- steel pontoons, including close-up survey of hatch cover plating;
- tarpaulins;
- cleats, battens, and wedges;
- hatch securing bars and their securing devices;
- loading pads/bars and the side plate edge;
- guides plates and chocks;
- compression bars; drainage channels and drain pipes (if any).

E.2.3.8 The Surveyor shall check whether since the last survey any unapproved changes or repairs have been made to the hatch covers, hatch coamings and the securing and sealing devices.

E.2.4 Cargo holds

E.2.4.1 For single skin bulk carriers over 10 years up to 15 years of age the following is required:

- overall survey of all cargo holds
- close-up examination of sufficient extent (minimum 25 % of frames) to establish the condition of the lower one-third of the shell frames, adjacent shell plating and frame connections, in the forward cargo hold. Where this survey reveals the need for remedial measures, the survey is to be extended to include a close-up survey of all the shell frames and adjacent shell plating of that cargo hold as well as close-up survey of sufficient extent of all remaining cargo holds.
- thickness measurements, where considered necessary by the Surveyor. If the measurements indicate substantial corrosion, the extent of measurements is to be increased.
- Where protective coating in cargo holds found in good condition, the extent of close-up surveys and thickness measurements may be specially considered.

E.2.4.2 For single skin bulk carriers over 15 years of age, a close-up survey of one more selected cargo hold is to be carried out, in addition to the surveys indicated in E.2.4.1 and with the same extent. All piping and penetrations in cargo holds including overboard piping are to be examined. Consequent measures in case of damages, and thickness measurements: See E.2.4.1.

E.2.4.3 Additional annual survey requirements acc. to SOLAS Reg. XII/9.1

Single skin bulk carriers of 150 m in length and above which were exempted from the damage stability requirements specified in SOLAS Reg. XII/4.3 are subject to extended annual surveys in the foremost cargo hold according to SOLAS Reg. XII/9.1.

On those ships the scope of inspections in the foremost cargo hold has to be enhanced to the scope prescribed in the requirements 21.

21 For requirements see Annex IV of UR Z10.2 of IACS
E.2.4.4 For double skin bulk carriers 10 to 15 years of age the following is required:

- overall survey of two selected cargo holds
- thickness measurements before the survey is credited as complete, when considered necessary by the Surveyor, or when suspect areas respectively areas of substantial corrosion have been identified at previous surveys. If the results of these measurements indicate substantial corrosion, the extent of the survey and the measurements are to be increased to sufficient extent to the remaining cargo holds
- All piping and penetration in cargo holds, including overboard piping, are to be examined.

E.2.4.5 For double skin bulk carriers over 15 years of age, in addition to the requirements as indicated in E.2.4.4, an overall survey of all cargo holds is to be carried out.

E.2.5 Ballast tanks

Ballast tanks shall be surveyed, within annual surveys, as a consequence of findings on the occasion of an intermediate or Class Renewal Survey, see Section 3, C.1.2.2.

When considered necessary by the Surveyor, thickness measurements are to be carried out. If these measurements indicate substantial corrosion, the extent of thickness measurements is to be increased.

E.3 Intermediate Surveys

E.3.1 General

E.3.1.1 In addition to the surveys and checks listed in E.2. above, on the occasion of the second or third annual survey the checks listed below are to be performed. If deemed necessary by the Surveyor, functional test, pressure tests or thickness measurements are to be carried out in addition to the survey.

For double skin bulk carriers the survey extent is dependent on the age of the vessel shown in Table 4.13.

E.3.1.2 For ships of 15 years of age and over the intermediate survey is to be carried out in dry-dock. For ships of less than 15 years of age, GL may agree to an in-water survey according to Section 3, C.1.7.

E.3.1.3 In case of ships exceeding 10 years of age the intermediate survey is to be enhanced to the scope of the preceding Class Renewal Survey according to E.1.6 and E.4. Pressure testing of ballast and cargo tanks is not required unless deemed necessary by the Surveyor.

E.3.1.4 Concurrent crediting for surveys and thickness measurements to both Intermediate and Class Renewal Survey is not acceptable.

E.3.2 Cargo holds

E.3.2.1 Vessels over 5 and up to 10 years of age

E.3.2.1.1 The survey is to include:

- an overall survey of all cargo holds of sufficient extent to establish the general condition of the structure
- close-up survey of a least 25 % of shell frames including their end attachments and adjacent shell plating over the entire height in the forward cargo hold and one other selected cargo hold
- close-up survey of the transverse bulkheads in the cargo holds mentioned above
- close-up survey of suspect areas identified by the previous Class Renewal Survey
- regarding protective coating see E.2.3.4.

E.3.2.1.2 Where considered necessary by the Surveyor as a result of the overall and close-up survey as described in E.3.2.1.1, the survey is to be extended to include a close-up survey of all of the shell frames and adjacent shell plating of that cargo hold, as well as a close-up survey of sufficient extent of all remaining cargo holds.
Section 4  Surveys - Special Ship Types

E.3.2.2  Vessels more than 10 years of age

For the intermediate survey of ships exceeding 10 years of age, see E.3.1.3.

E.3.2.3  For double skin bulk carriers, see also Table 4.13.

E.3  Ballast tanks

E.3.3.1  Vessels over 5 and up to 10 years of age

For tanks used for water ballast, an overall survey of representative spaces selected by the Surveyor is to be carried out. The selection has to include fore and aft peak tanks and a number of other tanks, taking into account the total number and type of ballast tanks. If such overall survey reveals no visible structural defects, the examination may be limited to verification that the corrosion prevention system remains efficient.

Where poor coating condition \(^{22}\), corrosion or other defects are found in water ballast tanks or where a hard protective coating was not applied from the time of construction, the examination is to be extended to other ballast tanks of the same type.

In ballast tanks other than double bottom tanks, where a hard protective coating is found in poor condition, and it is not renewed, or where soft or semi-hard coating has been applied, or where substantial corrosion is found or where a hard protective coating was not applied from the time of construction, the tanks in question are to be examined and thickness measurements carried out as considered necessary at annual intervals.

When such breakdown of hard protective coating is found in ballast double bottom tanks, or where a soft or semi-hard coating has been applied, or where substantial corrosion is found or where a hard protective coating has not been applied, the tanks in question may be examined at annual intervals. When considered necessary by the Surveyor, or where extensive corrosion exists, thickness measurements are to be carried out.

In addition to the requirements above, suspect areas identified at previous surveys are to be examined.

Regarding the renewal of protective coating, see also Section 3, C.1.2.2.5.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate survey commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in A.2.7.

E.3.3.2  Vessels more than 10 years of age

For the intermediate survey of ships exceeding 10 years of age, see E.3.1.3.

E.3.3.3  For double skin bulk carriers, see Table 4.13.

E.3.4  Extent of thickness measurements

E.3.4.1  Thickness measurements are to be carried out to an extent sufficient to determine both general and local corrosion levels in areas subject to close-up survey.

As a minimum requirement thickness measurements are to be carried out in suspect areas identified by the previous Class Renewal Survey. Where substantial corrosion is found, the extent of thickness measurements should be increased.

In case of ships exceeding 10 years of age, see also E.3.1.3.

E.3.4.2  The thickness measurements may be specially considered provided the Surveyor is satisfied by the close-up survey that there is no structural diminution and that the protective coating remains effective where fitted.

E.3.4.3  For double skin bulk carriers, see Table 4.13.

\(^{22}\) Poor: General breakdown of coating over 20 % or more of areas, or hard scale at 10 % or more of areas under consideration.
### E.4 Class Renewal Surveys

#### E.4.1 General requirements, scope

**E.4.1.1** In order to ensure that the hull and related piping are in satisfactory condition and fit for the new period of class, the following surveys are to be carried out, in addition to the annual and intermediate surveys outlined in E.2. and E.3., and the surveys prescribed in Section 3, C.1.3 – 1.5 for all types of ships.

**E.4.1.2** Regarding planning/survey programme, see E.1.6. Regarding anticipated thickness measurements, see also Section 3, C.2.3.5.

**E.4.1.3** For Class Renewal Surveys of bulk carriers (hull), the "Continuous Class Renewal" procedure, as described in Section 3, B.1.3.6 is excluded.

**E.4.1.4** The Class Renewal Survey is to be held when the ship is in dry-dock or on a slipway, unless a dry-docking survey has been carried out within the admissible period, see Section 3, B.1.6.7. The ship is to be placed on blocks of sufficient height so that the keel, the bottom plating and the rudder can be examined.

**E.4.1.5** Concurrent crediting for surveys and thickness measurements to both Intermediate and Class Renewal Survey is not acceptable.

#### E.4.2 Hull, general

**E.4.2.1** All cargo holds, ballast tanks including double bottom and double side tanks, pipe tunnels, cofferdams and void spaces bounding cargo holds, decks and outer hull are to be examined. This examination is to be supplemented by thickness measurements and tank testing to the necessary extent, in order to ensure that the structural integrity continues to be given.

A sufficiently thorough examination should be carried out for revealing substantial corrosion, significant deformations, fractures, damages or other structural deterioration affecting vessel’s class. Special attention is to be drawn to the structure and the coating in ballast tanks for necessity of annual inspections, see A.2.7.

Regarding protective coating see E.2.3.4.

---

**Table 4.13 Intermediate Surveys (Hull) of Double Skin Bulk Carriers**

**Minimum Requirements of Overall and Close-up Survey and Thickness Measurements**

<table>
<thead>
<tr>
<th>Ship’s age [years]</th>
<th>5 &lt; age ≤ 10</th>
<th>10 &lt; age ≤ 15</th>
<th>age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall survey of representative ballast tanks selected by the attending surveyor (the selection is to include fore and aft peak tanks) and a number of other tanks, taking into account the total number and type of ballast tanks</td>
<td>The requirements of the previous Class Renewal Survey</td>
<td>The requirements of the previous Class Renewal Survey</td>
<td></td>
</tr>
<tr>
<td>Overall and close-up survey of suspect areas identified at previous surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overall survey of all cargo holds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thickness measurements to an extent sufficient to determine both general and local corrosion levels and areas subject to close-up survey at suspect areas identified at previous surveys</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---
All piping systems within the above spaces are to be examined and tested under working conditions to ensure their continued satisfactory condition.

The survey extent of combined ballast/cargo holds is to be evaluated based on the records of ballast history, the kind and extent of the fitted corrosion prevention system and the extent of the revealed corrosion.

The survey extent of ballast tanks converted into void spaces will be specially considered in relation to the requirements for ballast tanks.

Regarding the extent of close-up surveys and thickness measurements, see E.4.3, 4.4 and 4.5 below.

Hatch covers, coamings

The survey of hatch covers and coamings shall include the following:

- a thorough inspection of the items listed in E.2.3
- checking of the satisfactory operation of mechanically operated hatch covers, e.g.:
  - stowage and securing in open condition
  - condition of sealing, proper fit in closed condition
  - operational testing of hydraulic and power components (wires, chains, link drives, etc.)
- checking of the effectiveness of sealing arrangements of all hatch covers by hose testing or equivalent
- thickness measurements of the hatch cover and coamings plating and stiffeners as given in Table 4.17.
- close-up survey of all hatch covers and hatch coamings (plating and stiffeners)

Cargo holds, ballast tanks

An overall survey of all cargo holds, ballast tanks and spaces is to be carried out. For fuel oil, lubricating oil and fresh water tanks the necessity for an overall survey is to be determined based on the ship's age, see also Section 3, Table 3.1.

A close-up examination of sufficient extent should be included in the Class Renewal Survey, in order to establish the condition of the shell frames and their lower and upper end attachments in all cargo holds and of the stiffening structures in ballast tanks as indicated in Table 4.14 or 4.15 or 4.16. The Surveyor may extend the close-up survey as deemed necessary taking into account the maintenance of spaces under survey, the condition of corrosion prevention system and structural arrangements which have suffered defects in similar spaces or ships.

Tank corrosion prevention

The condition of protective coating or corrosion prevention of ballast tanks is to be examined, where provided. The statements under E.3.3.1 apply to Class Renewal Surveys of bulk carriers, regardless of age.

Semi-hard coatings in ballast tanks, if already applied, will not be accepted from the next special or intermediate survey commenced on or after 1 July 2010, whichever comes first, with respect to waiving the annual internal examination of ballast tanks as required in A.2.7.

For areas in tanks where the protective coating is found to be in a good condition, the extent of close-up surveys according to Table 4.14 or 4.15 or 4.16 may be specially considered by the Surveyor.

Thickness measurements

The minimum requirements for thickness measurements on the occasion of Class Renewal Surveys are stated in Table 4.17, depending on the ship's age.

Representative thickness measurements to determine both general and local levels of corrosion in the shell frames and their end attachments in all cargo holds, of the stiffening structure in ballast tanks and on the transverse bulkhead plating are to be carried out.
E.4.5.2 The extent of thickness measurements may be reduced, in comparison with those stated in Table 4.17, provided during the close-up examination the Surveyor satisfies himself that there is no structural diminution, and the protective coating where applied continues to be effective and in good condition.

That means sufficient measurements are to be taken to confirm the actual average condition of the structure under the coating.

E.4.5.3 The Surveyor may extend the thickness measurements as deemed necessary. These apply especially to areas with substantial corrosion and to areas defined as suspect in the inspection programme, see E.1.6. The thickness measurements should be witnessed by the Surveyor to the necessary extent. Extended thickness measurements are to be carried out before the survey is credited as completed.

E.4.5.4 Transverse sections are to be chosen where largest corrosion rates are suspected to occur or are revealed by deck plating measurements.

E.4.5.5 Regarding thickness measurements, see also Section 3, C.2. For bulk carriers designed also for the carriage of crude oil, see also A.4.2.3.4.

Table 4.14 Class Renewal Surveys (Hull) of Single Skin Bulk Carriers
Minimum Requirements for Close-up Surveys

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship's age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ≤ 5</td>
</tr>
<tr>
<td>25 % of shell frames in the forward cargo hold at representative positions</td>
</tr>
<tr>
<td>Selected shell frames in remaining cargo holds</td>
</tr>
<tr>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td>All shell frames in the forward cargo hold and 25 % of shell frames in each of the remaining cargo holds (see Note II)</td>
</tr>
<tr>
<td>For bulk carriers 100,000 tdw and over, all shell frames in the forward cargo hold and 50 % of shell frames in each of the remaining cargo holds (see Note II)</td>
</tr>
<tr>
<td>III. 10 &lt; age ≤ 15</td>
</tr>
<tr>
<td>All shell frames in the forward and one other selected cargo hold and 50 % of frames in each of the remaining cargo holds (see Note II)</td>
</tr>
<tr>
<td>IV. and subsequent, age &gt; 15</td>
</tr>
<tr>
<td>All shell frames in all cargo holds (see Note II)</td>
</tr>
<tr>
<td>One transverse web with associated plating and longitudinals in two representative water ballast tanks of each type</td>
</tr>
<tr>
<td>One transverse web with associated plating and longitudinals in each water ballast tank</td>
</tr>
<tr>
<td>All transverse webs with associated plating and longitudinals in all water ballast tanks</td>
</tr>
<tr>
<td>Forward and aft transverse bulkhead including stiffening system in one side ballast tank</td>
</tr>
<tr>
<td>All transverse bulkheads including stiffening system in all ballast tanks</td>
</tr>
<tr>
<td>Two cargo hold transverse bulkheads (see Note I) including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted)</td>
</tr>
<tr>
<td>All cargo hold transverse bulkheads including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted)</td>
</tr>
<tr>
<td>All cargo hold hatch covers and coamings (plating and stiffeners)</td>
</tr>
<tr>
<td>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches.</td>
</tr>
</tbody>
</table>

Note I: For bulk carriers as per Section 4, E.1.7 one of these bulkheads has to be the aft transverse bulkhead of the foremost cargo hold.

Note II: Shell frames including upper and lower end attachments and adjacent shell plating.
### Table 4.15  Class Renewal Surveys (Hull) of Double Skin Bulk Carriers, excluding Ore Carriers

**Minimum Requirements for Close-up Surveys**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
<th>I. age ≤ 5</th>
<th>II. 5 &lt; age ≤ 10</th>
<th>III. 10 &lt; age ≤ 15</th>
<th>IV. and subsequent, age &gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td>One transverse web frame (see Note I) with associated plating and longitudinals in two representative ballast tanks of each type (This is to include the foremost topside and double side ballast tanks on either side.)</td>
<td>One transverse web frame (see Note I) with associated plating and longitudinals as applicable in each ballast tank</td>
<td>All transverse web frames (see Note I) with associated plating and longitudinals (as applicable) in all ballast tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>25% of ordinary transverse frames in the foremost double side tanks</td>
<td>25% of ordinary transverse frames in each double side tank</td>
<td>All ordinary transverse frames in all double side tanks</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forward and aft transverse bulkhead (see Note I) including stiffening system in each ballast tank appendant to one selected transverse section</td>
<td>All transverse bulkheads (see Note I) including stiffening system in all ballast tanks</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two cargo hold transverse bulkheads including plating, stiffeners girders, and internal structure of upper and lower stools (where fitted)</td>
<td>One transverse bulkhead including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted) in each cargo hold</td>
<td>All cargo hold transverse bulkheads, including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>All cargo hold hatch covers and coamings (platings and stiffeners)</td>
<td>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Note:** Close-up survey of transverse bulkheads to be carried out at four levels:
- immediately above the inner bottom or immediately above the line of gussets (if fitted) and shedders for ships without lower stools
- immediately above and below the lower stool shelf plate for ships fitted with lower stools or immediately above the line of the shedder plates
- about mid-height of the bulkhead
- immediately below the upper deck plating, immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools or immediately below the topside tanks

**Note I:** Transverse web frame or watertight transverse bulkhead in topside, hopper side and double side and double bottom ballast tanks. In fore and aft peak tanks transverse web frame means a complete transverse web frame ring including adjacent structural members.
### Table 4.16 Class Renewal Surveys (Hull) of Double Skin Bulk Carriers, only Ore Carriers

<table>
<thead>
<tr>
<th>Minimum Requirements for Close-up Surveys</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ≤ 5</td>
</tr>
<tr>
<td>One complete web frame ring (see Note I) including adjacent structural members in a ballast wing tank</td>
</tr>
<tr>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td>All complete web frame rings (see Note I) including adjacent structural members in a ballast wing tank</td>
</tr>
<tr>
<td>One deck transverse (see Note I) including adjacent deck structural members in each remaining ballast tank</td>
</tr>
<tr>
<td>III. 10 &lt; age ≤ 15</td>
</tr>
<tr>
<td>All complete web frame rings (see Note I) including adjacent structural members in each ballast tank</td>
</tr>
<tr>
<td>One complete web frame ring (see Note I) including adjacent structural members in each wing void space</td>
</tr>
<tr>
<td>IV. and subsequent, age &gt; 15</td>
</tr>
<tr>
<td>One complete web frame ring (see Note I) including adjacent structural members in each ballast tank</td>
</tr>
</tbody>
</table>

| Lower part of one transverse bulkhead (see Note I) including girder system and adjacent structural members in a ballast tank |
| Complete forward and aft transverse bulkhead (see Note I) including girder system and adjacent structural members in a ballast wing tank |
| Lower part of one transverse bulkhead (see Note I) including girder system and adjacent structural members in each remaining ballast tank |
| All complete transverse bulkheads (see Note I) including girder system and adjacent structural members in each ballast tank |

| Two cargo hold transverse bulkheads, including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted) |
| One transverse bulkhead including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted) in each cargo hold |
| All cargo hold transverse bulkheads, including plating, stiffeners, girders, and internal structure of upper and lower stools (where fitted) |

| All cargo hold hatch covers and coamings (platings and stiffeners)  
|---------------------------------------------------------------|
| All cargo hold hatch covers and coamings (platings and stiffeners)  

| All cargo hold hatch covers and coamings (platings and stiffeners)  
<table>
<thead>
<tr>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>All deck plating and under deck structure inside line of hatch openings between all cargo hold hatches</td>
</tr>
</tbody>
</table>

**Note:** Close-up survey of transverse bulkheads to be carried out at four levels:
- immediately above the inner bottom or immediately above the line of gussets (if fitted) and shedders for ships without lower stools
- immediately above and below the lower stool shelf plate for ships fitted with lower stools or immediately above the line of the shedder plates
- about mid-height of the bulkhead
- immediately below the upper deck plating, immediately adjacent to the upper wing tank, and immediately below the upper stool shelf plate for those ships fitted with upper stools or immediately below the topside tanks

**Note I:** Transverse web frame or watertight transverse bulkhead in ballast wing tanks and void spaces. In fore and aft peak tanks transverse web frame means a complete transverse web frame ring including adjacent structural members.
### Table 4.17 Class Renewal Surveys (Hull) of Single Skin and Double Skin Bulk Carriers

**Minimum Requirements for Thickness Measurements**

<table>
<thead>
<tr>
<th>Class Renewal Survey [No.] and ship’s age [years]</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I. age ≤ 5</td>
<td>II. 5 &lt; age ≤ 10</td>
</tr>
<tr>
<td><strong>Suspect areas</strong></td>
<td></td>
</tr>
<tr>
<td>Within the cargo length area:</td>
<td>Within the cargo length area:</td>
</tr>
<tr>
<td>• two transverse sections of deck plating outside line of cargo hatch openings</td>
<td>• each deck plate outside line of cargo hatch openings</td>
</tr>
<tr>
<td>• one transverse section within the amidships 0.5 L</td>
<td>• two transverse sections, one in amidship area, outside line of cargo hatch openings</td>
</tr>
<tr>
<td>Wind and water strakes in way of the transverse sections of deck plating indicated above</td>
<td>All wind and water strakes within the cargo length area</td>
</tr>
<tr>
<td>Selected wind and water strakes outside the cargo length area</td>
<td></td>
</tr>
<tr>
<td>Measurement of structural members subject to close-up survey according to Table 4.14, 4.15 or 4.16 for general assessment and recording of corrosion pattern</td>
<td></td>
</tr>
<tr>
<td>Additional measurements of the aft bulkhead of cargo hold no. 1, for ships as per E.1.7.1 and E.1.7.2.</td>
<td></td>
</tr>
<tr>
<td>Additional measurements of side shell frames and brackets for ships as per E.1.7.4</td>
<td></td>
</tr>
</tbody>
</table>

**Note:** A transverse section includes the chosen frame and all adjacent longitudinal structural members, i.e. plating, longitudinal stiffeners and girders, in all concerned tanks and spaces.

### E.4.6 Tank testing

**E.4.6.1** All boundaries of ballast tanks and deep tanks within the cargo hold area, and of cargo holds used for ballast, are to be pressure-tested by filling with water.

**E.4.6.2** Representative fuel oil, lubricating oil and fresh water tanks as selected by the Surveyor are to be tested. The tightness of fuel oil, lubricating oil and fresh water tanks may be confirmed by filling with oil, water or air pressure test. The air pressure shall not exceed 0.2 bar gauge pressure.

**E.4.6.3** The pressure should correspond to a water level to the top of hatches for ballast/cargo holds or to the top of air pipes for ballast tanks or fuel oil, lubricating oil or fresh water tanks, see A.4.2.2.1, whichever pressure is higher, see also Section 3, C.1.3.2.1.4.
Section 4 Surveys - Special Ship Types

F Floating Docks

F.1 General

F.1.1 For floating docks subject to classification by GL, unless otherwise agreed, Class Renewal Surveys are to be conducted at intervals of 5 years.

F.1.2 Floating docks which are not classified may on request be subjected to a condition survey, e.g. prior to sale or conversion.

F.1.3 If classification is intended, the procedure to be followed regarding documents to be submitted and the scope of surveys for classification is analogous to that outlined in Section 2, E. Structural plans of the essential structural elements of the dock structure and particulars on their machinery and equipment are to be submitted for approval.

F.2 Class Renewal Surveys

F.2.1 Floating dock structure

F.2.1.1 For Class renewal, the dock structure should be immersed as little as possible; the structural elements above the waterline will be inspected both, internally and externally, and the watertight compartments internally, at the Surveyor's discretion. Particular attention is to be paid to the piping arranged inside the compartments, including their valves; these, as well as the inlet and outlet valves, are to be checked for tightness and operability.

F.2.1.2 The partition bulkheads of the watertight compartments are to be checked for tightness and tested by compressed air (max. 0.2 bar). The compartments to be tested will be selected by the Surveyor, depending on the age and general condition of the dock; however, at least every second compartment is to be tested.

F.2.1.3 If only every other compartment is pressure-tested, on the occasion of a trial docking also the tightness of the safety deck is to be tested.

F.2.1.4 Thickness measurements at parts of the dock structure are to be carried out on the occasion of every second class renewal, and/or the Surveyor may require them to be carried out, if he suspects an inadmissible degree of corrosion.

F.2.1.5 Dry-docking or bottom surveys with the floating dock in inclined position will be restricted to special cases (averages, leakages, etc.) upon agreement between owners/operators and GL.

F.2.2 Machinery equipment

The machinery equipment for operation of the dock, including the electrical equipment, is to be surveyed and checked analogously to the procedure outlined in Section 3, C.1.3.3 and C.1.5, as far as applicable.

F.2.3 Equipment

The equipment required for operation of the dock, e.g. bilge and keel blocks and - if fitted - their drives, warping capstans, cranes, bridge connections, shore connections and the dock mooring equipment are to be covered by the condition survey. Changes introduced since the last class renewal are to be documented.

G Yachts and Small Watercraft

G.1 General remarks. Kinds of surveys.

G.1.1 Regarding the surveys necessary for maintenance of class, on principle, the requirements of Section 3, and in particular, of 3, A. apply.

The following kinds of surveys are prescribed for watercraft as defined in Section 2, F.
Section 4  Surveys - Special Ship Types

G.1.2  Intermediate surveys
For sporting craft with total engine outputs exceeding 300 kW, and for watercraft employed for commercial purposes and/or by authorities: Intermediate surveys of the hull, the machinery installation including the electrical installation, the rigging and the closures, according to G.2.1.

The intermediate survey is due 2.5 years after assignment or renewal of class, with a time window of ± 6 months being allowed.

G.1.3  Class Renewal Surveys
For all types of watercraft: Class Renewal Surveys according to G.2, 2.5 years after assignment of class or last class renewal. The time window is as for seagoing ships, see B.1.3 (i.e. the survey may be started 15 months before, and shall be finished at the date of expiry of the class period).

G.1.4  Damage surveys
Damage surveys are required if the hull, machinery, electrical installation or rigging have suffered a damage, if a damage is suspected in consequence of some other event, or if deteriorations affecting the vessel's class have been ascertained.

G.1.5  Bottom surveys
For bottom surveys (dry-docking or placing onshore), see also Section 3, B.1.6.7.

G.1.6  Other surveys
G.1.6.1  Upon special agreement, GL may undertake condition surveys and supervise repairs of watercraft constructed under the Society's supervision.

The surveys and findings will be certified informally.

G.1.6.2  Expertises are prepared only by order of a court and provided that GL's principle of impartiality is not affected.

G.1.6.3  Where surveys are required by official directives or similar provisions of an Administration, GL will perform these on request and/or on behalf of the authorities, in accordance with their instructions.

G.2  Performance and scope of surveys
G.2.1  Intermediate surveys
The survey is to be conducted on shore. To this effect, the vessel is to be stacked at a height enabling its keel and bottom to be thoroughly examined.

The surveys/inspections will have to cover:
- the hull structural areas, including the foundations
- watertight closures, such as hatches, skylights, air and sounding pipes, scuppers, discharge lines, doors, etc., including their seals and locking devices.
- rudder and steering gear, including measurement of bearing clearances
- main and auxiliary machinery with pertinent components
- electrical installation, including pertinent machinery, switchboards and cabling
- propeller, including fastening/securing devices
- external inspection of the entire propeller shaft system(s) in place, including measurement of bearing clearances
- sea valves and all inlet and outlet shell openings

G.2.2  Class Renewal Surveys
The Class Renewal Survey is to be carried out on shore. To this effect, the vessel is to be stacked at a height enabling its keel and bottom to be thoroughly examined.

In addition to the surveys required in G.2.1 above, the surveys/inspections will have to include:
Section 4 Surveys - Special Ship Types

- internal inspection of fresh water, ballast and fuel tanks
- pressure tests of tanks carrying water
- hose testing of all watertight closures
- inspection of anchors, chain cables, hawses
- inspection of bilge and ballast lines, including pertinent pumps, with operational trials
- dismounting of sea valves depending of the findings obtained during external inspection, in accordance with the Surveyor's instructions
- drawing of propeller shaft in accordance with the Surveyor's instructions, if necessary depending of the findings obtained by external inspection
- dismounting of individual components of the machinery in accordance with the Surveyor's instructions, where required on account of his findings
- partial or complete disassembly of main engines (with a total output, exceeding 300 kW), in accordance with the Surveyor's instructions, taking into account provable service times between overhauls and maintenance work performed
- operational trials of the entire machinery and electrical installation, with the ship afloat

G.3 Thickness measurements and corrosion / Wear tolerances

G.3.1 In the case of aged steel ships thickness measurements are to be conducted at the hull structural elements in accordance with the Surveyor's instructions. The scope of measurements depends on the vessel's age and maintenance condition.

G.3.2 Parts damaged or worn to such an extent as to no longer comply with the requirements of GL are to be repaired or replaced.

G.3.3 Components with thickness of less than 90 % of those stipulated are to be renewed.

G.3.4 Anchors are to be replaced, if their weights have been reduced by more than 10 % compared with the rule weight.

Chain-link cables are to be renewed, if the prescribed cross-section of the chain links has been reduced by more than 12 %, see also Section 3, C.2.4.4

H Submersibles

H.1 Manned, non-military submersibles

Regarding the required surveys for admission to Class respectively for maintenance of the Class, see the GL Rules for Manned Submersibles (I-5-2), Section 2 resp. Section 1.

H.2 Unmanned submersibles

Regarding the required surveys for admission to Class respectively for maintenance of the Class, see the GL Rules for Unmanned Submersibles (ROV, AUV) and Underwater Working Machines (I-5-3), Section 2 resp. Section 1.

H.3 Underwater working machines

Regarding the required survey for Certification, see the GL Rules for Unmanned Submersibles (ROV, AUV) and Underwater Working Machines (I-5-3), Section 5.